APPENDIX C

ECONOMIC STUDIES

# NORFOLK HARBOR AND CHANNELS, VIRGINIA

# LONG-TERM DISPOSAL (INNER HARBOR)

US Army Corps
Of Engineers

Norfolk District
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Draft Information Report

## APPENDIX C

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## OVERVIEW

This appendix presents the comparisons of alternatives examined for long term disposal for Norfolk Harbor and Channels. The objective was to capture all relevant costs associated with all methods of disposal used by organizations which dredge channels, berths or anchorages in Hampton Roads. Costs were standardized with respect to price level (October 1988) and interest rate (Federal Discount rate of 8 7/8%) so that valid comparisons could be made between different plans. Plans were only compared if they could accomodate the same total and annual depositions. Because this is an information paper to be used by decision makers from Federal, State and local governments, the economic evaluation of alternatives encompasses several different perspectives. The best alternative from the National Economic Development (Federal) point of view would be the one which minimizes all system costs, regardless of who pays, subject to environmental and social constraints. The best alternative from the perspective of the organization implementing the plan, or the sponsor, can only be determined after the consideration of additional factors, such as means of financing and cost recovery. An exercise illustrating the effect of using 30 year bonds with a higher rate of interest than the Federal rate (.08875) is shown in Attachment 3.

The economic consequences of the plans are not uniform for the entire maritime community. From 1978 to 1987 approximately 45 million cubic yards of material was disposed of in Craney Island. Over 35 million of this total was generated by hydraulic dredging, with the material pumped directly into the site. It is primarily Federal, State and local government agencies dredging by this method that would experience the greatest adverse impact from the loss of a convenient disposal site in the harbor. For all jobs currently being performed by bucket dredge, with material barged to the existing Craney Island facility, the cost differences between future options would be small. However, all options are more expensive than current practises using Craney Island. This appendix is concerned primarily

with average costs, which are expressed on a per cubic yard basis, and therefore account for the entire array of jobs historically performed throughout Hampton Roads. In comparing alternatives where unit costs differences are very small, decision makers should look carefully at all aspects of projects before ranking them solely on the basis of cost.

## COMPARING PLANS BASED ON APPROPRIATE DREDGING SCENARIOS

One of the criteria for achieving comparability is that all plans have equivalent lives and provide the same output, which in this case is storage for the same quantity of material, measured in the same way. There are six dredging scenarios which identify the amount of material which must be accommodated each year. All of these scenarios include 4 million cubic yards of dredged material per year which is generated by ongoing operations and maintenance of Federal channels and projects, dredging performed by government agencies other than the Corps, and by private and corporate interests. The differences in quantities of material generated among the 6 scenarios come from new work. Several dredging scenarios were considered unlikely to be realized, including two with inbound channels for the 50 and 55 foot Norfolk Harbor projects. Those examined in detail in this appendix are described below:

Dredging Scenarios

| | |
|---|---|
| DS-1 | No new work, maintenance of the existing 50 foot channel and other work |
| DS-2 | 55' Norfolk Harbor (Outbound) and Channels new work |
| DS-4 | 40' and 45' Southern Branch Channels new work |
| DS-5 | New work of both DS-2 and DS-4 |

In order to meet the criteria for equivalent project lives, adjustments had to made to some of the shorter lived plans. Plans are essentially of two types, confined disposal sites which are constructed for the purpose of retaining material, and ocean disposal which is primarily a non-structural plan. There were 9 confined sites examined. Six were extensions of the existing Craney Island Disposal Site and 3 were island sites. Because these sites ranged in

size from 660 acres to 2500 acres, they do not have equal capacity or equal lives. Site B with 2500 acres, the largest of the sites as well as the longest lived, was used as the standard of comparison for each dredging scenario. After a smaller site was filled, it was assumed that an ocean disposal plan would be implemented to extend the life to the number of years required to provide the same capacity afforded by Site B.

If a new confined site were to be constructed and placed in use before the existing Craney Island Disposal Area (CIDA) were filled, it would enable additional years of service to be gained from CIDA. More time could be allowed for material to dry and consolidate by rotating placement of material among additional site compartments or cells. This option was not evaluated in detail since it would not change the ranking of alternatives with respect to cost. The closer CIDA is to being full, the less opportunity there will be to obtain any savings from operating the two sites together.

DESCRIPTION OF THE SITES AND THEIR USEFUL LIVES UNDER EACH DREDGING SCENARIO

The following table describes the individual sites and shows their effective life under each dredging scenario. Note that plans with * and italicized years of life have had 3 years deducted from the estimate made by WES of their useful life. This adjustment was made to retain some capacity for ocean unsuitable material.

| PLAN | (acres) | DS | Years of Life | Dredged Material Capacity | Cubic Capacity |
|---|---|---|---|---|---|
| A (1) * | 1700 | 1 | *36* | 144 | 112 |
| | | 2 | *26* | 123 | |
| | | 4 | *31* | 137 | |
| | | 5 | *22* | 114 | |
| B (2) | 2500 | 1 | 56 | 224 | 149 |
| | | 2 | 49 | 220 | |
| | | 4 | 51 | 219 | |
| | | 5 | 43 | 209 | |
| C (3) | 740 | 1 | 12 | 48 | 43 |
| | | 2 | 4 | 31 | |
| | | 4 | 8 | 42 | |
| | | 5 | -- | | |
| D (4) | 660 | 1 | 10 | 40 | 39 |
| | | 2 | 3 | 27 | |
| | | 4 | 5 | 30 | |
| | | 5 | -- | | |

(Con't)

| PLAN | (acres) | DS | Years of Life | Dredged Material Capacity | Cubic Capacity |
|---|---|---|---|---|---|
| E (5) * | 1500 | 1 | *26* | 104 | 85 |
| | | 2 | *20* | 98 | |
| | | 4 | *22* | 100 | |
| | | 5 | *14* | 79 | |
| F (6) | 1000 | 1 | 15 | 60 | 56 |
| | | 2 | 8 | 48 | |
| | | 4 | 10 | 50 | |
| | | 5 | -- | | |
| OCEAN DISPOSAL | | 1 | 56 | | |
| | | 2 | 49 | | not limited |
| | | 4 | 51 | | |
| | | 5 | 43 | | |
| BUCKROE BEACH | 2500 | 1 | | | |
| | | 2 | | | |
| | | 4 | Use same values | | |
| | | 5 | as site B | | |
| OCEAN VIEW | 2000 | 1 | | | |
| | | 2 | Use same values | | |
| | | 4 | as site B | | |
| | | 5 | | | |
| CHEASAPEAKE BAY | 2000 | 1 | | | |
| | | 2 | Use same values | | |
| | | 4 | as site B | | |
| | | 5 | | | |

The table of useful lives demonstrates the relationship between the amount of material which a site holds, measured as material in place in a channel, before it is dredged, and the physical or cubic space which is available in the site. This relationship is important to the determination of unit costs. As the material is dredged it expands in volume, because the space between the solid particles becomes filled with water. Different types of dredging affect the degree to which the material gains volume. Hydraulic dredging introduces more water into the material as compared with mechanical dredging. After being placed in a confined site, material settles and excess water is discharged. The result over time is a shrinkage of material, so that it requires less space in the site. Many factors affect the change in volume and these are described in a technical study conducted by the Waterways Experimental Station which evaluated the storage capacity of various expansion alternatives. A copy of this study is contained in appendix A. One major factor affecting consolidation, however, is the quantity of material deposited each year and the rate at which it is deposited. This is the reason why a site does not hold the same number of cubic yards of material under all dredging scenarios and why unit costs differ for the same site under different scenarios. The other factor is the efficiency of any management efforts to aid desiccation and consolidation. The WES study has assumed the optimum effect will be achieved through management efforts, but different useful lives and thus, unit costs, would result if this is not the case.

## DATA USED IN CONSTRUCTING MODELS FOR COSTS

The following inputs were used to derive costs per cubic yard for each alternative considered under each of four dredging scenarios.

1. Estimate of first costs of constructing confined site - Appendix B-Engineering, Design and Cost Estimates. Interest during construction was calculated and added to this construction cost.

2. Mitigation costs - Compensation for environmental values. Appendix E - Environmental Information Report

3. Real estate - Economic losses whether compensable or not. Appendix D - Real Estate Studies.

4. Operation and maintenance of a confined site, monitoring or other management efforts associated with an ocean site. Appendix B and Norfolk District experience with use of Dam Neck site.

5. Years of site life and yards of material deposited - Developed for each site under each dredging scenario. Contained in Appendix B- Engineering, Design and Cost Estimates , as Attachment 1 (Storage Capacity Evaluation for Craney Island Expansion Alternatives Technical Report EL-89-6, April 1989 by Waterways Experiment Station). Adjustments were made to some of these as already noted.

6. Unit costs for dredging - Developed for an array of job sizes, for hydraulic and bucket dredging plant, and contained in consultant's study which is an attachment to Appendix A, Engineering, Design and Cost Estimates.

The first 4 elements above are related to plans which include the construction of a confined disposal site. The fifth element, years of life and quantities of material, is the link which enables comparison of structural with non-structural plans (ocean disposal). The last element, unit cost, is the means by which the comparisons are made. Several different types of unit costs were employed to construct average costs to approximate total system dredging costs on a per cubic yard basis.

What is meant by a total system dredging cost? Dredging involves the physical process of removing material, transporting it away from an area and disposing of it. All of these steps have costs. There are also costs associated with the site in which the material is deposited. For any comparison of the costs of different disposal sites to be meaningful, all

elements of the process must be examined. One of the difficulties with comparisons of this sort is that not all parts of a system are purchased by the same individuals. A confined site involves large initial outlays which become sunk costs, although the owner may recover costs through tolls or user charges. A site lasts a certain number of years, depending on its initial cubic capacity and how quickly material is placed in it. The types of dredging plant to be used must be compatible with the type of disposal site and its location. A bucket dredge has different rate of output or production than a cutter head dredge, and different costs per unit of output.

Historically, material from the Hampton Roads area has either been dredged with a hydraulic cutter head pipeline dredge and the material pumped directly into Craney Island, or it has been removed by bucket dredge and deposited in a barge or scow, transported to the Craney Island Rehandling Basin and bottom-dumped. The reason for the use of different methods is that while hydraulic dredging is usually less costly, it may not be possible where the pumping distance is too great, where there are obstructions such as piers, or where the total size of the job is too small to justify plant mobilization costs.

To determine an average unit cost for dredging by type of plant in the Hampton Roads harbor, the size of job and the method of dredging was taken into account by using the actual quantities of all jobs performed over a recent 10 year period (1978 to 1987). Unit costs for various sizes of jobs with different types of plant were developed by a consultant using recent bid data. (see appendix B). These unit costs were escalated to 1988 price levels and applied to the historical (10 year) quantities (Attachment 1 of this appendix). The total costs were divided by the total yards to obtain average unit costs of dredging under two types of plans, confined site and ocean disposal.

The average costs in combination with future estimates of the cubic yards of material requiring disposal were used to calculate the yearly costs of maintenance dredging under each dredging scenario and each site . New

work dredging costs were also developed and added to the maintenance dredging costs to obtain a total for each year of a plan's life. The discounted stream of dredging costs added to the present worth of all costs associated with site construction and maintenance yielded the accumulated present worth of all relevant system costs. When these were annualized, and divided by the average annual amount of dredged material for that scenario, the result was an estimate of the per cubic yard cost of that plan . For the ocean plan, there were no construction costs, although there are some site related costs associated with confinement of material unsuitable for ocean disposal.

The costs per cubic yard for all plans are summarized in the following two sets of tables. The first table is organized by plan and shows clearly the effect of the dredging scenario on confined site life and unit cost. For example, dredging scenario 1, with no new work, has lower unit costs for any given site than any of the other scenarios, and also allows the sites to hold more material. The second table is organized by dredging scenario and allows the unit costs of each plan to be compared on a common basis.

Summary of all Options Under All Dredging Scenarios

| | | | | |
|---|---|---|---|---|
| | Expansion A - Site 1 | Expansion A - Site 1 | Expansion A - Site 1 | Expansion A - Site 1 |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $53,504,000 | $53,504,000 | $53,504,000 | $53,504,000 |
| NUMBER OF ACRES | 1,700 | 1,700 | 1,700 | 1,700 |
| # Years Site Receives Material | 36 | 26 | 31 | 22 |
| Amount of Material Site Holds | 144,000,000 | 123,347,000 | 136,746,000 | 113,963,000 |
| Average annual cost per yard | 4.96 | 5.42 | 5.31 | 5.74 |
| | Expansion B - Site 2 | Expansion B - Site 2 | Expansion B - Site 2 | Expansion B - Site 2 |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $55,538,000 | $55,538,000 | $55,538,000 | $55,538,000 |
| NUMBER OF ACRES | 2,500 | 2,500 | 2,500 | 2,500 |
| # Years Site Receives Material | 56 | 49 | 51 | 43 |
| Amount of Material Site Holds | 224,000,000 | 219,947,000 | 219,006,000 | 208,849,000 |
| Average annual cost per yard | 5.08 | 5.37 | 5.36 | 5.53 |

Summary of all Options Under All Dredging Scenarios

| | | | | |
|---|---|---|---|---|
| | Expansion E - Site 5 | Expansion E - Site 5 | Expansion E - Site 5 | Expansion E - Site 5 |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $24,688,000 | $24,688,000 | $24,688,000 | $24,688,000 |
| NUMBER OF ACRES | 1,500 | 1,500 | 1,500 | 1,500 |
| # Years Site Receives Material | 26 | 20 | 22 | 14 |
| Amount of Material Site Holds | 104,000,000 | 98,147,000 | 99,729,000 | 79,459,000 |
| Average annual cost per yard | 4.41 | 4.97 | 4.87 | 5.60 |
| | Expansion C - Site 3 | Expansion C - Site 3 | Expansion C - Site 3 | Expansion C - Site 3 |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $45,158,000 | $45,158,000 | $45,158,000 | |
| NUMBER OF ACRES | 740 | 740 | 740 | NOT EVALUATED |
| | | | | LIFE TOO SHORT |
| # Years Site Receives Material | 12 | 4 | 8 | |
| Amount of Material Site Holds | 48,000,000 | 30,947,000 | 42,147,000 | |
| Average annual cost per yard | 5.55 | 6.93 | 6.47 | |

Summary of all Options Under All Dredging Scenarios

| | | | | |
|---|---|---|---|---|
| | Expansion D - Site 4 | Expansion D - Site 4 | Expansion D - Site 4 | Expansion D - Site 4 |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $22,396,000 | $22,396,000 | $22,396,000 | |
| | | | | |
| NUMBER OF ACRES | 660 | 660 | 660 | NOT EVALUATED |
| | | | | LIFE TOO SHORT |
| # Years Site Receives Material | 10 | 3 | 5 | |
| | | | | |
| Amount of Material Site Holds | 40,000,000 | 26,747,000 | 29,808,000 | |
| | | | | |
| Average annual cost per yard | 5.18 | 6.64 | 6.29 | |
| | | | | |
| | | | | |
| | Expansion F - Site 6 | Expansion F - Site 6 | Expansion F - Site 6 | Expansion F - Site 6 |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $25,780,000 | $25,780,000 | $25,780,000 | |
| | | | | |
| NUMBER OF ACRES | 1000 | 1000 | 1000 | NOT EVALUATED |
| | | | | LIFE TOO SHORT |
| # Years Site Receives Material | 15 | 8 | 10 | |
| | | | | |
| Amount of Material Site Holds | 60,000,000 | 47,747,000 | 50,373,000 | |
| | | | | |
| Average annual cost per yard | 4.85 | 5.89 | 5.65 | |
| | | | | |

Summary of all Options Under All Dredging Scenarios

| | | | | |
|---|---|---|---|---|
| | Ocean Disposal | Ocean Disposal | Ocean Disposal | Ocean Disposal |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | 0 | 0 | 0 | 0 |
| NUMBER OF ACRES | **OCEAN** | **OCEAN** | **OCEAN** | **OCEAN** |
| # Years Site Receives Material | **56** | **49** | **51** | **43** |
| Amount of Material Site Holds | n.a. | n.a. | n.a. | n.a. |
| Average annual cost per yard | 6.53 | 7.20 | 7.04 | 7.58 |
| | Buckroe Beach | Buckroe Beach | Buckroe Beach | Buckroe Beach |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $82,883,000 | $82,883,000 | $82,883,000 | $82,883,000 |
| NUMBER OF ACRES | **2,500** | **2,500** | **2,500** | **2,500** |
| # Years Site Receives Material | **56** | **49** | **51** | **43** |
| Amount of Material Site Holds | 224,000,000 | 219,947,000 | 219,006,000 | 208,849,000 |
| Average annual cost per yard | 8.55 | 8.96 | 8.86 | 8.98 |

Summary of all Options Under All Dredging Scenarios

| | | | | |
|---|---|---|---|---|
| | Ocean View | Ocean View | Ocean View | Ocean View |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $89,636,000 | $89,636,000 | $89,636,000 | $89,636,000 |
| NUMBER OF ACRES | **2,000** | **2,000** | **2,000** | **2,000** |
| # Years Site Receives Material | **56** | **49** | **51** | **43** |
| Amount of Material Site Holds | 224,000,000 | 219,947,000 | 219,006,000 | 208,849,000 |
| Average annual cost per yard | 9.43 | 9.40 | 9.29 | 9.41 |
| | | | | |
| | Chesapeake Bay | Chesapeake Bay | Chesapeake Bay | Chesapeake Bay |
| | Dredging Scenario 1 | Dredging Scenario 2 | Dredging Scenario 4 | Dredging Scenario 5 |
| Construction Costs (w/o IDC) | $128,025,200 | $128,025,200 | $128,025,200 | $128,025,200 |
| NUMBER OF ACRES | **2,000** | **2,000** | **2,000** | **2,000** |
| # Years Site Receives Material | **56** | **49** | **51** | **43** |
| Amount of Material Site Holds | 224,000,000 | 219,947,000 | 219,006,000 | 208,849,000 |
| Average annual cost per yard | 11.26 | 11.53 | 11.42 | 11.45 |

## FINANCIAL COSTS VERSUS ECONOMIC COSTS

### Economic (NED) Costs

The process of comparing system costs is consistent with the kind of evaluations performed for Federal Project costs and benefits. Each years' costs are in constant dollars. They are discounted to a common base year and annualized over the project life using a Federal discount rate for water resources projects of 8 7/8 %. In average annual terms the difference between ocean disposal and site B (under dredging scenario 1) is about 6 million dollars; between ocean disposal and site E it is over 8 million dollars (see attachment 2 for detailed calculations.) Because these differences are so large, project ranking was not sensitive to changes in the cost of project inputs. A number of changes in the cost of confined site inputs was examined, including the cost of fuel for dredging (attachment 3). Even considerable shortening of site lives did not make ocean disposal the least costly option.

This methodology enables a determination of which of several alternatives is the least costly if one organization is going to implement a project and pay for all the costs. However, when comparing the construction of a confined site and a non-structural alternative such as ocean disposal, neither the Commonwealth, nor the Federal government, purchases an entire system of disposal for millions of cubic yards of dredged material. Yet, the existence of one or the other of those systems will affect the total outlay which each must make for this necessary service.

What costs are relevant for the Commonwealth of Virginia to look at in order to make their decision as to the best alternative? Under each plan they must know what costs they will pay for dredging their own projects, for their share of Federal project costs, and for implementing a new disposal scheme. They would also be concerned about the costs of all port users

whose businesses would face higher costs using ocean disposal versus a confined site adjacent to Craney Island. Because they would pay all costs associated with the construction of a site using financing mechanisms different from those available to the Federal Government, there are separate calculations required to determine the financial costs of a project.

If the source of borrowed capital to build a site is revenue bonds (backed by the Commonwealth's transportation fund), these have a maximum term of 30 years because of investor requirements. The alternatives which have been examined in this study have lives from 4 to 56 years. Selection of a plan which lasts longer than 30 years, would still require the repayment of debt within that time.

If revenue is to be generated by tolls on material deposited, the unit charge for a site with an estimated life of 56 years will be slightly higher with a 30 year payback than it would be for a 56 year term. Deposits of yardage less than those projected in a cost recovery analysis can cause projected toll revenue to fall short, so accurate projections of use are very important. On the other hand, if tolls accomplish cost recovery in 30 years, useful life beyond that will generate revenue in excess of original investment cost.

Revenue backed bonds of this level of risk require 'coverage' of annual debt service by revenues of 1.2 after all operations and maintenance charges are deducted from gross revenues. Estimates were made of tolls which would have to be charged to meet these conditions. The 1.2 coverage ratio was applied to fixed costs of interest and amortization (debt service). An interest rate of 11% was used, as the Federal discount rate is not applicable here. For dredging scenario 1, Site B required a toll of $3.09 and site E, $1.74. Under dredging scenario 4, the equivalent rates were $2.45 and $1.41. To this charge must be added the cost of dredging the material. If the $2.99 average cost per yard for hydraulic dredging computed for this study is added to these tolls, the cost differential between confined site options and ocean disposal decreases. Before it would be possible to obtain financing in the bond market, it would be necessary to

demonstrate that there is very little chance that yardage would be diverted from hydraulic dredging operations to those using ocean disposal.

DIFFERENCES IN IMPACTS TO PLAN USERS

The impacts on port interests who need a place to dispose of material will not be uniform under all plans. An analysis of organizations which deposited material into Craney Island from 1978 to 1987 revealed users were of three types: 1) Federal, 2) State and/or local, and 3) private companies.

The Federal organizations were the United States Navy and the Army Corps of Engineers. The table below shows the percentage of material attributable to several sub-groups of users of CIDA.

Ten Year Record (1978 to 1987)

| | Material Deposited into Craney Island | |
|---|---|---|
| Organization | Yards (m.c.) | Percent |
| Army Corps | 19.3 | 42.2 |
| U.S. Navy | 9.6 | 20.9 |
| Commercial (private) | 3.9 | 8.6 |
| Virginia Port Authority | 5.0 | 11.0 |
| Other Virginia agencies | 2.0 | 4.4 |
| Local government agencies | .3 | .7 |
| Ship repair yards | 5.6 | 12.2 |
| TOTAL | 45.7 | 100.0 |

The tables which follow provide additional detail on private companies, of which 47 used CIDA in this 10 year period.

Table 1 shows that 26 of the 47 deposited only once during the period, while 9 companies deposited material from 2 to 4 times. In the group of companies which used CIDA only once in 10 years, four had total deposits between 0 and 999 cubic yards. For more frequent users (over 9 times), two had total deposits between 250,000 and 499,999.

In comparison, Table 2 shows the same information but includes Federal, State and/or local organizations, as well as private companies.

The probable future estimated cost of disposal of dredged material by private companies was based on four operative plans as shown on Figure 1. Note that for small jobs the unit cost has been artificially constrained to $21 per yard. These sizes of jobs are difficult to estimate and may have options to confined and ocean disposal, including on site disposal.

Figure 1 indicates the following:

a) Disposal into the rehandling basin and subsequently Norfolk Disposal Site is much more costly than the other alternatives.

b) Dredged material ranging from 1750 to about 15,000 cubic yards which is deposited into a rehandling basin and later removed to Site B is less expensive than taking the material direct to Norfolk Disposal Site. Dredged material ranging from 15,000 to 50,000 cubic yards would benefit slightly from this scheme.

c) Larger dredging operations have the option of using hydraulic dredging if they are within range of Craney Island and the berth or channel can accommodate that type of plant. Within the 10 year period 14 operations were carried out by 10 different companies using hydraulic dredging. The

operations ranged in size from about 50,000 cubic yards to almost 1,000,000 cubic yards of material. Jobs as small as 50,000 cubic yards are probably being performed in conjuntion with other work because they could not justify the entire cost of mobilizing equipment.

Table 3 shows estimates of ten years of costs for dredging jobs by three hypothetical companies in order to illustrate how different disposal options would affect private companies' total dredging costs. This exercise demonstrates that the companies which can economically use hydraulic dreging would experience the greatest cost increase if they have to switch to ocean disposal from a confined inner harbor site. The assumption made in constructing these tables was that material could be dredged from the rehandling basin and deposited in site B for $1.45 per yard, and that interest and amortization charges for the site itself would be $1.40. While this is appropriate for a Federal cost recovery scheme, other conditions might apply for a project financed by the Commonwealth of Virginia.

1

Table COMPANIES THAT DEPOSITED DREDGED MATERIAL INTO CRANEY ISLAND FROM 1978 TO 1987

| Total amount deposited by each company in 10 year period | Number of companies that deposited material into Craney Island in 10 year period | | | | Total number of private companies |
|---|---|---|---|---|---|
| | 1 time | 2 to 4 times | 5 to 9 times | over 9 times | |
| 0-999 | 4 | 0 | 0 | 0 | 4 |
| 1,000-4,999 | 3 | 1 | 0 | 0 | 4 |
| 5,000-9,999 | 2 | 1 | 0 | 0 | 3 |
| 10,000-19,999 | 6 | 1 | 0 | 0 | 7 |
| 20,000-29,999 | 6 | 1 | 0 | 0 | 7 |
| 30,000-39,999 | 1 | 2 | 0 | 0 | 3 |
| 40,000-49,999 | 1 | 0 | 0 | 0 | 1 |
| 50,000-74,999 | 0 | 2 | 2 | 0 | 4 |
| 75,000-99,999 | 1 | 0 | 0 | 0 | 1 |
| 100,000-249,999 | 2 | 1 | 2 | 0 | 5 |
| 250,000-499,999 | 0 | 0 | 2 | 2 | 4 |
| 500,000-999,999 | 0 | 0 | 0 | 2 | 2 |
| >1,000,000 | 0 | 0 | 1 | 1 | 2 |
| Totals | 26 | 9 | 7 | 5 | 47 |

2

Table FEDERAL, STATE,LOCAL ORGANIZATIONS AND PRIVATE COMPANIES DEPOSITING DREDGED MATERIAL INTO CRANEY ISLAND FROM 1978 TO 1987

| Total amount dumped in 10 year period, cubic yards | Number of different organizations or companies that deposited material into Craney Island in 10 yr. period | | | Total |
|---|---|---|---|---|
| | Federal | State of local | private | |
| 0-999 | 0 | 1 | 4 | 5 |
| 1,000-4,999 | 0 | 0 | 4 | 4 |
| 5,000-9,999 | 0 | 0 | 3 | 3 |
| 10,000-19,999 | 1 | 0 | 7 | 8 |
| 20,000-29,999 | 0 | 1 | 7 | 8 |
| 30,000-39,999 | 0 | 0 | 3 | 3 |
| 40,000-49,999 | 0 | 1 | 1 | 2 |
| 50,000-74,999 | 0 | 2 | 4 | 6 |
| 75,000-99,999 | 1 | 2 | 1 | 4 |
| 100,000-249,999 | 1 | 1 | 5 | 7 |
| 250,000-499,999 | 1 | 0 | 4 | 5 |
| 500,000-999,999 | 0 | 1 | 2 | 3 |
| >1,000,000 | 3 | 2 | 2 | 7 |
| Totals | 7(a) | 11 | 47 | 65 |

(a) Includes various Naval facilities.

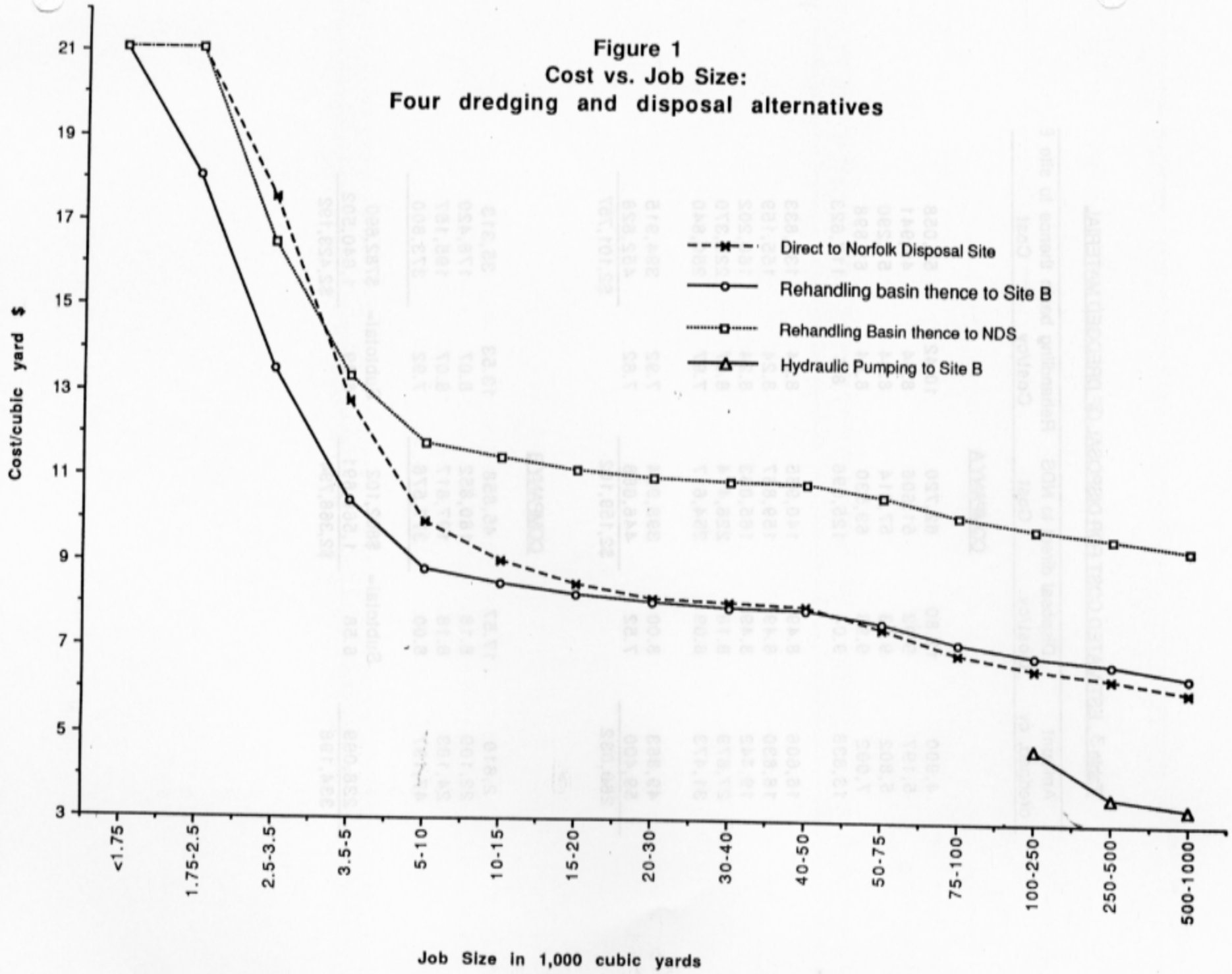
Figure 1
Cost vs. Job Size:
Four dredging and disposal alternatives
Direct to Norfolk Disposal Site
Rehandling basin thence to Site B
Rehandling Basin thence to NDS
Hydraulic Pumping to Site B
Cost/cubic yard $
21
19
17
15
13
11
9
7
5
3
<1.75
1.75-2.5
2.5-3.5
3.5-5
5-10
10-15
15-20
20-30
30-40
40-50
50-75
75-100
100-250
250-500
500-1000
Job Size in 1,000 cubic yards

Table 3. ESTIMATED COST FOR DISPOSAL OF DREDGED MATERIAL

| Amount dredged, cy | Disposal direct to NDS Cost/cy | Disposal direct to NDS Cost | Rehandling basin thence to site E Cost/cy | Rehandling basin thence to site E Cost |
|---|---|---|---|---|
| | | COMPANY A | | |
| 4,900 | 12.80 | 62,720 | 10.42 | 51,058 |
| 5,197 | 9.93 | 51,606 | 8.84 | 45,941 |
| 5,802 | 9.93 | 57,614 | 8.84 | 51,290 |
| 7,002 | 9.93 | 69,530 | 8.84 | 61,898 |
| 13,838 | 9.04 | 125,096 | 8.5 | 117,623 |
| 16,606 | 8.49 | 140,985 | 8.24 | 136,833 |
| 18,830 | 8.49 | 159,867 | 8.24 | 155,159 |
| 19,442 | 8.49 | 165,063 | 8.24 | 160,202 |
| 27,679 | 8.18 | 226,414 | 8.07 | 223,370 |
| 31,473 | 8.09 | 254,617 | 7.97 | 250,840 |
| 49,863 | 8.00 | 398,904 | 7.92 | 394,915 |
| 59,400 | 7.52 | 446,688 | 7.62 | 452,628 |
| 260,032 | | $2,159,102 | | $2,101,757 |
| | | COMPANY B | | |
| 2,610 | 17.57 | 45,858 | 13.53 | 35,313 |
| 22,109 | 8.18 | 180,852 | 8.07 | 178,420 |
| 24,183 | 8.18 | 197,817 | 8.07 | 195,157 |
| 47,197 | 8.00 | 377,576 | 7.92 | 373,800 |
| | Subtotal= | $802,102 | Subtotal= | $782,690 |
| 238,099 | 6.58 | 1,566,691 | 6.89 | 1,640,502 |
| 334,198 | | $2,368,794 | | $2,423,192 |

TABLE 3. CONTINUED

| Amount dredged, cy | Disposal direct to NDS Cost/cy | Disposal direct to NDS Cost | Rehandling basin thence to site B Cost/cy | Rehandling basin thence to site B Cost |
|---|---|---|---|---|
| | | COMPANY C | | |
| 150 | - | - | - | - |
| 374 | - | - | - | - |
| 783 | - | - | - | - |
| 1,336 | - | - | - | - |
| 3,066 | 17.57 | 53,870 | 13.53 | 41,483 |
| 4,058 | 12.80 | 51,942 | 10.42 | 42,284 |
| 5,492 | 9.93 | 54,536 | 8.84 | 48,549 |
| 5,730 | 9.93 | 56,899 | 8.84 | 50,653 |
| 6,313 | 9.93 | 62,688 | 8.84 | 55,807 |
| 6,838 | 9.93 | 67,901 | 8.84 | 60,448 |
| 16,330 | 8.49 | 138,642 | 8.24 | 134,559 |
| 19,319 | 8.49 | 164,018 | 8.24 | 159,189 |
| | Subtotal= | $650,496 | Subtotal= | $592,972 |
| 96,024 | 6.91 | 663,526 | 4.73(a) | 454,194 |
| 121,457 | 6.58 | 799,187 | 4.73(a) | 574,492 |
| 147,225 | 6.58 | 968,741 | 4.73(a) | 696,374 |
| 230,345 | 6.58 | 1,515,670 | 4.73(a) | 1,089,532 |
| 664,840 | | $4,597,619 | | $3,407,564 |

(a) Indiates hydraulic dredge was used.

# ATTACHMENT 1

AVERAGE COST OF DREDGING AND DISPOSAL - Material Unsuitable for Ocean to Remaining CI

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | ESTIMATED COST OF DREDGING MATERIAL NOT SUITABLE FOR OCEAN DISPOSAL AND | | | | | |
| 2 | DEPOSITING IT INTO CRANEY ISLAND BY BARGE REHANDLER. | | | | | |
| 3 | Unit charge per yard includes cost of barge rehandling, but no toll to cover cost of site | | | | | |
| 4 | (inter., amort. and O & M). Charge for use of site calculated on separate table. | | | | | |
| 5 | | | | | | |
| 6 | | | | AVERAGE UNIT COST = | | $6.25 |
| 7 | | | | | | |
| 8 | | MATERIAL UNSUITABLE FOR OCEAN DISPOSAL | | | | |
| 9 | | To Be Deposited Into Remaining Space at CI | | | | |
| 10 | | | | | | |
| 11 | | | Ocean Unsuitable | | Ocean Unsuitable | |
| 12 | YEAR | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 13 | | | | | | |
| 14 | 1978 | | | $ | | $ |
| 15 | | 224,923 | | | | |
| 16 | Average | | | 8.81 | 6,649 | 58,578 |
| 17 | Unit Cost | | | 9.42 | 4,227 | 39,818 |
| 18 | 1978 | | | 10.00 | 1,480 | 14,800 |
| 19 | | $6.16 | | 8.84 | 6,045 | 53,438 |
| 20 | | | | 9.93 | 1,687 | 16,752 |
| 21 | | | | 9.96 | 1,598 | 15,916 |
| 22 | | | | 9.93 | 1,650 | 16,385 |
| 23 | | | | 7.41 | 29,924 | 221,737 |
| 24 | | | | 10.35 | 110 | 1,139 |
| 25 | | | | 7.72 | 17,410 | 134,405 |
| 26 | | | 151,893 | 5.21 | | 791,363 |
| 27 | | | 2,250 | 9.90 | | 22,275 |
| 28 | | | | | | |
| 29 | | Totals | 154,143 | - | 70,780 | $1,386,604 |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | YEAR | | | | | |
| 33 | | | Ocean Unsuitable | | Ocean Unsuitable | |
| 34 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 35 | 1979 | | | | | |
| 36 | | 296,579 | | | | |
| 37 | Average | | | | | |
| 38 | Unit Cost | | | 5.09 | 223,026 | 1,135,202 |
| 39 | 1979 | | | 8.03 | 11,726 | 94,160 |
| 40 | | $5.79 | | 9.40 | 4,424 | 41,586 |
| 41 | | | | 10.09 | 730 | 7,366 |
| 42 | | | | 7.70 | 15,906 | 122,476 |
| 43 | | | | 7.40 | 30,163 | 223,206 |
| 44 | | | | 8.62 | 9,447 | 81,433 |
| 45 | | | | 10.01 | 1,157 | 11,582 |
| 46 | | | 0 | | | |
| 47 | | | | | | |
| 48 | | Totals | | | 296,579 | $1,717,011 |

AVERAGE COST OF DREDGING AND DISPOSAL - Material Unsuitable for Ocean to Remaining CI

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 49 | | | | | | |
| 50 | | | Ocean Unsuitable | | Ocean Unsuitable | |
| 51 | YEAR | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 52 | | | | | | |
| 53 | 1980 | | | | | |
| 54 | | 162,538 | | | | |
| 55 | Average | | | 10.03 | 1,246 | 12,497 |
| 56 | Unit Cost | | | 9.75 | 2,429 | 23,683 |
| 57 | 1980 | | | 9.72 | 2,640 | 25,661 |
| 58 | | $7.63 | | 10.04 | 905 | 9,086 |
| 59 | | | | 10.33 | 120 | 1,240 |
| 60 | | | | 7.70 | 17,566 | 135,258 |
| 61 | | | | 7.42 | 23,162 | 171,862 |
| 62 | | | | 10.25 | 334 | 3,424 |
| 63 | | | | 7.38 | 38,167 | 281,672 |
| 64 | | | | 9.59 | 3,248 | 31,148 |
| 65 | | | | 7.39 | 31,137 | 230,102 |
| 66 | | | | 10.03 | 1,029 | 10,321 |
| 67 | | | | 7.41 | 27,345 | 202,626 |
| 68 | | | | 7.73 | 13,210 | 102,113 |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | Totals | | | 162,538 | $1,240,694 |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | | Ocean Unsuitable | | Ocean Unsuitable | |
| 75 | YEAR | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 76 | | | | | | |
| 77 | 1981 | | | | | |
| 78 | | 515,498 | | 7.92 | 12,681 | 100,434 |
| 79 | Average | | | 10.24 | 390 | 3,994 |
| 80 | Unit Cost | | | 8.77 | 7,130 | 62,530 |
| 81 | 1981 | | | 7.39 | 30,627 | 226,334 |
| 82 | | $5.58 | | 9.27 | 5,262 | 48,779 |
| 83 | | | | 5.08 | 239,271 | 1,215,497 |
| 84 | | | | 9.51 | 3,797 | 36,109 |
| 85 | | | | 8.48 | 10,260 | 87,005 |
| 86 | | | | 5.15 | 195,792 | 1,008,329 |
| 87 | | | | 8.48 | 10,288 | 87,242 |
| 88 | | | | | | |
| 89 | | | | | | |
| 90 | | Totals | | | 515,498 | $2,876,251 |

AVERAGE COST OF DREDGING AND DISPOSAL - Material Unsuitable for Ocean to Remaining CI

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 91 | | | | | | |
| 92 | YEAR | | Ocean Unsuitable | | Ocean Unsuitable | |
| 93 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 94 | 1982 | | | | | |
| 95 | | 577,457 | | 10.30 | 146 | 1,504 |
| 96 | Average | | | 8.82 | 6,322 | 55,760 |
| 97 | Unit Cost | | | 9.93 | 1,666 | 16,543 |
| 98 | 1982 | | | 9.77 | 2,392 | 23,370 |
| 99 | | $5.89 | | 7.73 | 13,644 | 105,468 |
| 100 | | | | 7.39 | 31,010 | 229,164 |
| 101 | | | | 7.72 | 15,247 | 117,707 |
| 102 | | | | 9.61 | 3,112 | 29,906 |
| 103 | | | | 7.50 | 19,075 | 143,063 |
| 104 | | | | 5.14 | 196,961 | 1,012,380 |
| 105 | | | | 7.42 | 27,057 | 200,763 |
| 106 | | | | 9.81 | 2,180 | 21,386 |
| 107 | | | | 5.03 | 204,000 | 1,026,120 |
| 108 | | | | 7.39 | 31,852 | 235,386 |
| 109 | | | | 7.70 | 17,568 | 135,274 |
| 110 | | | | 9.27 | 5,225 | 48,436 |
| 111 | | | | | | |
| 112 | | | | | | |
| 113 | | Totals | | | 577,457 | $3,402,229 |
| 114 | | | | | | |
| 115 | | | | | | |
| 116 | | | | | | |
| 117 | YEAR | | Ocean Unsuitable | | Ocean Unsuitable | |
| 118 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 119 | 1983 | | | | | |
| 120 | | 490,243 | | | | |
| 121 | Average | | | 9.40 | 4,912 | 46,173 |
| 122 | Unit Cost | | | 8.60 | 9,400 | 80,840 |
| 123 | | $5.73 | | 7.37 | 32,976 | 243,033 |
| 124 | | | | 7.71 | 16,163 | 124,617 |
| 125 | | | | 9.28 | 5,190 | 48,163 |
| 126 | | | | 10.06 | 866 | 8,712 |
| 127 | | | | 8.48 | 10,218 | 86,649 |
| 128 | | | | 10.01 | 1,170 | 11,712 |
| 129 | | | | 10.18 | 594 | 6,047 |
| 130 | | | | 6.80 | 59,169 | 402,349 |
| 131 | | | | 5.00 | 349,201 | 1,746,005 |
| 132 | | | | 10.25 | 384 | 3,936 |
| 133 | | | | | | |
| 134 | | | | | | |
| 135 | | Totals | | | 490,243 | $2,808,235 |

AVERAGE COST OF DREDGING AND DISPOSAL - Material Unsuitable for Ocean to Remaining CI

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 136 | YEAR | | | | | |
| 137 | | | Ocean Unsuitable | | Ocean Unsuitable | |
| 138 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 139 | 1984 | | | | | |
| 140 | | 223,256 | | 7.41 | 27,959 | 207,176 |
| 141 | Average | | | 7.38 | 38,496 | 284,100 |
| 142 | Unit Cost | | | 5.26 | 128,482 | 675,815 |
| 143 | 1984 | | | 7.73 | 13,899 | 107,439 |
| 144 | | $6.31 | | 9.92 | 1,719 | 17,052 |
| 145 | | | | 10.01 | 1,188 | 11,892 |
| 146 | | | | 9.80 | 2,234 | 21,893 |
| 147 | | | | 8.70 | 6,745 | 58,682 |
| 148 | | | | 10.06 | 861 | 8,662 |
| 149 | | | | 9.93 | 1,673 | 16,613 |
| 150 | | | | | | |
| 151 | | | | | | |
| 152 | | Totals | | | 223,256 | $1,409,325 |
| 153 | | | | | | |
| 154 | | | | | | |
| 155 | | | | | | |
| 156 | YEAR | | Ocean Unsuitable | | Ocean Unsuitable | |
| 157 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 158 | 1985 | | | | | |
| 159 | | 65,642 | | 10.03 | 1,027 | 10,301 |
| 160 | Average | | | 10.06 | 812 | 8,169 |
| 161 | Unit Cost | | | 7.41 | 23,938 | 177,381 |
| 162 | 1985 | | | 8.71 | 8,631 | 75,176 |
| 163 | | $7.80 | | 7.71 | 16,335 | 125,943 |
| 164 | | | | 7.70 | 14,899 | 114,722 |
| 165 | | | | | | |
| 166 | | Totals | | | 65,642 | $511,691 |
| 167 | | | | | | |

**AVERAGE COST OF DREDGING AND DISPOSAL - Material Unsuitable for Ocean to Remaining CI**

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 168 | | | | | | |
| 169 | YEAR | | Ocean Unsuitable | | Ocean Unsuitable | |
| 170 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 171 | | | | | | |
| 172 | 1986 | | | | | |
| 173 | | 555,173 | | 7.48 | 19,973 | 149,398 |
| 174 | Average | | | 5.42 | 308,140 | 1,670,119 |
| 175 | Unit Cost | | | 7.41 | 27,922 | 206,902 |
| 176 | 1986 | | | 10.20 | 550 | 5,610 |
| 177 | | $7.29 | | 8.72 | 8,513 | 74,233 |
| 178 | | | | 8.82 | 6,201 | 54,693 |
| 179 | | | | 7.75 | 15,000 | 116,250 |
| 180 | | | | 7.37 | 40,489 | 298,404 |
| 181 | | | | 7.36 | 45,000 | 331,200 |
| 182 | | | | 7.43 | 25,678 | 190,788 |
| 183 | | | | 7.49 | 19,462 | 145,770 |
| 184 | | | | 8.03 | 11,810 | 94,834 |
| 185 | | | | 7.43 | 26,435 | 196,412 |
| 186 | | | 96,028 | 5.35 | | 513,750 |
| 187 | | | | | | |
| 188 | | Totals | | | 555,173 | $4,048,363 |
| 189 | | | | | | |
| 190 | | | | | | |
| 191 | | | | | | |
| 192 | YEAR | | Ocean Unsuitable | | Ocean Unsuitable | |
| 193 | | TOTAL | (form. direct/CI) | COST/C.Y. | (former rehand.) | COST |
| 194 | 1987 | | | | | |
| 195 | | 237,111 | | 7.38 | 38,820 | 286,492 |
| 196 | Average | | | 9.35 | 5,062 | 47,330 |
| 197 | Unit Cost | | | 7.41 | 27,276 | 202,115 |
| 198 | 1987 | | | 7.43 | 26,900 | 199,867 |
| 199 | | $6.48 | | 9.22 | 5,673 | 52,305 |
| 200 | | | | 7.44 | 20,857 | 155,176 |
| 201 | | | | 5.28 | 112,523 | 594,121 |
| 202 | | | | | | |
| 203 | | Totals | | | 237,111 | $1,537,406 |
| 204 | | | | | | |
| 205 | | | | | | |
| 206 | | | | | | |
| 207 | | GRAND | TOTAL | | 3,348,420 | $20,937,810 |
| 208 | | | | | CU. YDS. MAT. | |
| 209 | | | | | | |
| 210 | | | | Average Unit Cost All Years | | |
| 211 | | | | | | |
| 212 | | | | | $6.25 | |
| 213 | | | | | | |
| 214 | | | | | | |
| 215 | | | | | | |

AVERAGE COST OF DREDGING AND DISPOSAL- CLEAN MATERIAL TO NORFOLK DISPOSAL AREA

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | NORFOLK INNER HARBOR AREA- Historical yardages multiplied by unit costs (1989 price level) | | | | | | |
| 2 | estimated by Rich & Associates. All material goes directly to the ocean site. | | | | | | |
| 3 | | | | | | | AVER. UNIT COST |
| 4 | | | | | Total from all years | | = $6.33 |
| 5 | | | | | | | |
| 6 | MATERIAL FORMERLY: | | Pumped | | Deposited into | | |
| 7 | YEAR | | Direct into CI | COST/C.Y. | Rehand Basin | COST/C.Y. | COST |
| 8 | | TOTAL | CLEAN(a) | | CLEAN(a) | | |
| 9 | | | | | | $ | $ |
| 10 | 1978 | 5,954,202 | | | | | |
| 11 | | | 211,246 | $6.52 | 4,199 | 25.06 | 1,482,551 |
| 12 | Average | | 151,893 | 6.63 | 101,088 | 6.70 | 1,684,340 |
| 13 | Unit Cost | | 954,180 | 5.86 | 11,512 | 19.80 | 5,819,432 |
| 14 | 1978 | $6.22 | 129,160 | 6.67 | 91,926 | 6.87 | 1,493,029 |
| 15 | | | 108,389 | 6.70 | 119,800 | 6.68 | 1,526,470 |
| 16 | | | 345,990 | 6.41 | 16,320 | 19.54 | 2,536,689 |
| 17 | | | 146,990 | 6.63 | 200,894 | 6.54 | 2,288,390 |
| 18 | | | 8,458 | 24.21 | 10,752 | 19.94 | 419,163 |
| 19 | | | 59,400 | 7.70 | | | 457,380 |
| 20 | | | 457,370 | 6.36 | | | 2,908,873 |
| 21 | | | 2,147,368 | 5.66 | | | 12,154,103 |
| 22 | | | 601,176 | 6.22 | | | 3,739,315 |
| 23 | | | 76,091 | 7.09 | | | 539,485 |
| 24 | | | | | | | |
| 25 | | Totals | 5,397,711 | | 556,491 | | $37,049,221 |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | 1979 | 2,110,534 | | | | | |
| 29 | | | 475,435 | $6.35 | 100 | 25.76 | 3,021,588 |
| 30 | Average | | 337,630 | $6.42 | 5,554 | 24.71 | 2,304,824 |
| 31 | Unit Cost | | 400,971 | $6.39 | 11,789 | 19.78 | 2,795,391 |
| 32 | 1979 | $7.23 | 111,255 | $6.70 | 5,097 | 24.98 | 872,732 |
| 33 | | | 9,068 | $20.50 | 315,956 | 6.42 | 2,214,332 |
| 34 | | | | | 13,921 | 19.64 | 273,408 |
| 35 | | | | | 85,477 | 6.95 | 594,065 |
| 36 | | | | | 6,184 | 24.66 | 152,497 |
| 37 | | | | | 16,454 | 19.54 | 321,511 |
| 38 | | | | | 10,560 | 19.97 | 210,883 |
| 39 | | | | | 18,830 | 19.40 | 365,302 |
| 40 | | | | | 50,443 | 7.90 | 398,500 |
| 41 | | | | | 53,234 | 7.84 | 417,355 |
| 42 | | | | | 175,738 | 6.58 | 1,156,356 |
| 43 | | | | | 6,838 | 24.61 | 168,283 |
| 44 | | | | | | | |
| 45 | | Totals | 1,334,359 | COST | 776,175 | | $15,267,027 |
| 46 | | | | | | | |
| 47 | | | | | | | |

## AVERAGE COST OF DREDGING AND DISPOSAL- CLEAN MATERIAL TO NORFOLK DISPOSAL AREA

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 48 | This table was compiled from four completed in late 1988-early 1989. | | | | | HUBER | 5/5/89 |
| 49 | | | | | | | |
| 50 | | | | | | | |
| 51 | | | | | | | |
| 52 | | | | | | | |
| 53 | | | | | | | |
| 54 | | | | | | | |
| 55 | | | | | | | |
| 56 | | | Former Direct | | Former Rehandl. | | |
| 57 | 1980 | 7,094,546 | | | | | |
| 58 | | | 296,375 | $6.44 | 25,143 | 8.08 | 2,111,810 |
| 59 | Average | | 1,477,626 | $5.75 | 1,170 | 25.54 | 8,526,231 |
| 60 | Unit Cost | | 2,016,563 | $5.68 | 8,100 | 24.23 | 11,650,341 |
| 61 | 1980 | $6.28 | 204,007 | $6.53 | 4,826 | 25.03 | 1,452,960 |
| 62 | | | 1,087,166 | $5.79 | 604 | 25.64 | 6,310,178 |
| 63 | | | 407,375 | $6.38 | 13,632 | 19.65 | 2,866,921 |
| 64 | | | 159,350 | $6.61 | 27,679 | 8.16 | 1,279,164 |
| 65 | | | 230,354 | $6.48 | 239,511 | 6.47 | 3,042,330 |
| 66 | | | 251,738 | $6.45 | 53,657 | 7.84 | 2,044,381 |
| 67 | | | 25,092 | $8.19 | 77,320 | 7.09 | 753,702 |
| 68 | | | 14,823 | $19.59 | 6,452 | 24.63 | 449,295 |
| 69 | | | | | 17,603 | 19.46 | 342,554 |
| 70 | | | | | 16,606 | 19.54 | 324,481 |
| 71 | | | | | 143,280 | 6.64 | 951,379 |
| 72 | | | | | 6,668 | 24.62 | 164,166 |
| 73 | | | | | 31,287 | 8.12 | 254,050 |
| 74 | | | | | 34,128 | 8.11 | 276,778 |
| 75 | | | | | 140,620 | 6.65 | 935,123 |
| 76 | | | | | 31,355 | 8.12 | 254,603 |
| 77 | | | | | 4,893 | 25.02 | 122,423 |
| 78 | | | | | 5,802 | 24.67 | 143,135 |
| 79 | | | | | 33,741 | 8.11 | 273,640 |
| 80 | | | | | | | |
| 81 | | Totals | 6,170,469 | | 924,077 | | $44,529,648 |
| 82 | | | | | | | |

AVERAGE COST OF DREDGING AND DISPOSAL- CLEAN MATERIAL TO NORFOLK DISPOSAL AREA

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 83 | | | | | | | |
| 84 | | | | | | | |
| 85 | | | | | | | |
| 86 | | | | | | | |
| 87 | | | | | | | |
| 88 | | | Former Direct | | Former Rehandl. | | |
| 89 | YEAR | | | | | | |
| 90 | 1981 | 4,279,094 | | | | | |
| 91 | | | 247,155 | $6.47 | 17,356 | 19.46 | 1,936,841 |
| 92 | Average | | 651,882 | $6.18 | 3,617 | 25.06 | 4,119,273 |
| 93 | Unit Cost | | 35,997 | $8.08 | 989 | 25.57 | 316,144 |
| 94 | 1981 | $6.35 | 2,228,076 | $5.65 | 1,511 | 25.52 | 12,627,190 |
| 95 | | | 96,024 | $6.80 | 49,863 | 7.96 | 1,049,873 |
| 96 | | | | | 14,406 | 19.61 | 282,502 |
| 97 | | | | | 8,149 | 24.23 | 197,450 |
| 98 | | | | | 50,576 | 7.94 | 401,573 |
| 99 | | | | | 28,767 | 8.13 | 233,876 |
| 100 | | | | | 33,178 | 8.11 | 269,074 |
| 101 | | | | | 3,066 | 25.16 | 77,141 |
| 102 | | | | | 5,868 | 24.69 | 144,881 |
| 103 | | | | | 5,730 | 24.69 | 141,474 |
| 104 | | | | | 33,055 | 8.11 | 268,076 |
| 105 | | | | | 4,058 | 25.04 | 101,612 |
| 106 | | | | | 238,099 | 6.48 | 1,542,882 |
| 107 | | | | | 340,057 | 6.41 | 2,179,765 |
| 108 | | | | | 177,339 | 6.58 | 1,166,891 |
| 109 | | | | | 4,126 | 25.03 | 103,274 |
| 110 | | | | | 150 | 25.70 | 3,855 |
| 111 | | | | | | | |
| 112 | | | | | | | |
| 113 | | Totals | 3,259,134 | | 1,019,960 | | $27,163,645 |
| 114 | | | | | | | |

AVERAGE COST OF DREDGING AND DISPOSAL- CLEAN MATERIAL TO NORFOLK DISPOSAL AREA

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 115 | | | Former Direct | | Former Rehandl. | | |
| 116 | 1982 | **2,414,986** | | | | | |
| 117 | | | 648,722 | $6.08 | 5,492 | 24.73 | 4,080,047 |
| 118 | Average | | 330,000 | $6.42 | 673 | 25.63 | 2,135,849 |
| 119 | Unit Cost | 6.70 | 891,629 | $5.93 | 19,442 | 19.34 | 5,663,368 |
| 120 | 1982 | | | | 352,724 | 6.41 | 2,260,961 |
| 121 | | | | | 783 | 25.60 | 20,045 |
| 122 | | | | | 2,187 | 25.42 | 55,594 |
| 123 | | | | | 4,900 | 25.03 | 122,647 |
| 124 | | | | | 16,393 | 19.54 | 320,319 |
| 125 | | | | | 374 | 25.69 | 9,608 |
| 126 | | | | | 11,009 | 19.88 | 218,859 |
| 127 | | | | | 28,194 | 8.13 | 229,217 |
| 128 | | | | | 2,597 | 25.35 | 65,834 |
| 129 | | | | | 13,908 | 19.64 | 273,153 |
| 130 | | | | | 51,876 | 7.87 | 408,264 |
| 131 | | | | | 31,473 | 8.12 | 255,561 |
| 132 | | | | | 2,610 | 25.34 | 66,137 |
| 133 | | | | | | | |
| 134 | | | | | | | |
| 135 | | Totals | 1,870,351 | | 544,635 | | $16,185,463 |
| 136 | | | | | | | |
| 137 | | | Former Direct | | Former Rehandl. | | |
| 138 | | | | | | | |
| 139 | 1983 | **5,113,868** | | | | | |
| 140 | | | 989,925 | $5.82 | 5,197 | 24.96 | 5,891,081 |
| 141 | Average | | 2,183,692 | $5.66 | 7,002 | 24.36 | 12,530,265 |
| 142 | Unit Cost | | 366,479 | $6.40 | 8,919 | 24.19 | 2,561,216 |
| 143 | 1983 | $6.20 | 114,005 | $6.69 | 18,476 | 19.42 | 1,121,497 |
| 144 | | | 392,148 | $6.39 | 385,275 | 6.40 | 4,971,586 |
| 145 | | | 363,098 | $6.40 | 870 | 25.60 | 2,346,099 |
| 146 | | | | | 3,892 | 25.08 | 97,611 |
| 147 | | | | | 47,197 | 8.00 | 377,576 |
| 148 | | | | | 199,317 | 6.54 | 1,303,533 |
| 149 | | | | | 16,945 | 19.51 | 330,597 |
| 150 | | | | | 6,313 | 24.64 | 155,552 |
| 151 | | | | | 5118 | 24.97 | |
| 152 | | | | | | | |
| 153 | | | | | | | |
| 154 | | Totals | 4,409,347 | | 704,521 | | $31,686,614 |

AVERAGE COST OF DREDGING AND DISPOSAL- CLEAN MATERIAL TO NORFOLK DISPOSAL AREA

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 155 | | | | | | | |
| 156 | | | | | | | |
| 157 | | | | | | | |
| 158 | | | Former Direct | | Former Rehandl. | | |
| 159 | 1984 | **6,811,127** | | | | | |
| 160 | | | 1,752,340 | $5.71 | 13,838 | 19.64 | 10,277,640 |
| 161 | Average | | 469,639 | $6.35 | 2,786 | 25.37 | 3,052,888 |
| 162 | Unit Cost | | 2,451,377 | $5.62 | 3,600 | 25.06 | 13,866,955 |
| 163 | 1984 | $6.04 | 876,171 | $5.94 | 46,808 | 8.01 | 5,579,388 |
| 164 | | | 775,448 | $6.04 | 3,060 | 25.16 | 4,760,696 |
| 165 | | | 121,457 | $6.68 | 35,480 | 8.05 | 1,096,947 |
| 166 | | | | | 18,520 | 19.38 | 358,918 |
| 167 | | | | | 200,487 | 6.54 | 1,311,185 |
| 168 | | | | | 19,319 | 19.34 | 373,629 |
| 169 | | | | | 1,336 | 25.53 | 34,108 |
| 170 | | | | | 12,514 | 19.73 | 246,901 |
| 171 | | | | | 6,440 | 24.63 | 158,617 |
| 172 | | | | | 507 | 25.66 | 13,010 |
| 173 | | | | | | | |
| 174 | | Totals | 6,446,432 | | 364,695 | | $41,130,881 |
| 175 | | | | | | | |
| 176 | | | | | | | |
| 177 | | | | | | | |
| 178 | | | | | | | |
| 179 | 1985 | **2,261,777** | | | | | |
| 180 | | | 600,095 | $6.22 | 45,025 | 8.01 | 4,093,241 |
| 181 | Average | | 183,546 | 6.56 | 116 | 25.75 | 1,207,049 |
| 182 | Unit Cost | | 610,386 | 6.21 | 666 | 25.65 | 3,807,580 |
| 183 | 1985 | $6.62 | 77,150 | 7.08 | 22,109 | 8.20 | 727,516 |
| 184 | | | 45,400 | 7.96 | 91,099 | 6.89 | 989,056 |
| 185 | | | 251,987 | 6.44 | 59,249 | 7.70 | 2,079,014 |
| 186 | | | | | 80,029 | 7.02 | 561,804 |
| 187 | | | | | 178,357 | 6.58 | 1,173,589 |
| 188 | | | | | 2,826 | 25.45 | 71,922 |
| 189 | | | | | 13,737 | 19.64 | 269,795 |
| 190 | | | | | | | |
| 191 | | | | | | | |
| 192 | | Totals | 1,768,564 | | 493,213 | | $14,980,564 |

AVERAGE COST OF DREDGING AND DISPOSAL- CLEAN MATERIAL TO NORFOLK DISPOSAL AREA

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 193 | | | | | | | |
| 194 | | | | | | | |
| 195 | YEAR | | | | | | |
| 196 | | | Former Direct | | Former Rehandl. | | |
| 197 | 1986 | **4,533,930** | | | | | |
| 198 | | | 997,142 | $5.81 | 5,808 | 24.67 | 5,936,678 |
| 199 | Average | | 150,431 | $7.53 | 941 | 25.57 | 1,156,807 |
| 200 | Unit Cost | | 1,618,841 | $5.72 | 168,387 | 6.59 | 10,369,441 |
| 201 | 1986 | $6.35 | 185,365 | $6.57 | 24,766 | 8.10 | 1,418,453 |
| 202 | | | 96,027 | $6.80 | 14,447 | 19.61 | 936,289 |
| 203 | | | 529,325 | $6.30 | 23,902 | 8.18 | 3,530,266 |
| 204 | | | | | 3,423 | 25.11 | 85,952 |
| 205 | | | | | 348 | 25.69 | 8,940 |
| 206 | | | | | 27,239 | 8.16 | 222,270 |
| 207 | | | | | 21,691 | 8.19 | 177,649 |
| 208 | | | | | 323,972 | 6.41 | 2,076,661 |
| 209 | | | | | 9,973 | 20.04 | 199,859 |
| 210 | | | | | 18,633 | 19.44 | 362,226 |
| 211 | | | | | 146,750 | 6.63 | 972,953 |
| 212 | | | | | 19,294 | 19.34 | 373,146 |
| 213 | | | | | 147,225 | 6.62 | 974,630 |
| 214 | | | | | | | |
| 215 | | | | | | | |
| 216 | | Totals | 3,577,131 | | 956,799 | | $28,802,218 |
| 217 | | | | | | | |
| 218 | | | | | | | |
| 219 | | | Former Direct | | Former Rehandl. | | |
| 220 | | | | | | | |
| 221 | 1987 | **1,273,298** | | | | | |
| 222 | | | 978,250 | $5.83 | 36,138 | 8.04 | 5,993,747 |
| 223 | Average | | 153,474 | $6.61 | 24,183 | 8.17 | 1,212,038 |
| 224 | Unit Cost | | | | 16,330 | 19.54 | 319,088 |
| 225 | 1987 | $6.29 | | | 64,923 | 7.45 | 483,676 |
| 226 | | | | | | | |
| 227 | | | | | | | |
| 228 | | | 1,131,724 | | 141,574 | | $8,008,550 |
| 229 | | | | | | | |
| 230 | | | | | | | |
| 231 | | | | | | | |
| 232 | | | | | | | |
| 233 | | | | | | | |
| 234 | | **GRAND TOTALS** | 41,847,362 | | $264,803,832 | | **$6.33** |

# ATTACHMENT 2

*Summary of all Plan Costs*

*Under Dredging Scenarios 1, 2, 4 & 5*

CALCULATING INTEREST DURING CONSTRUCTION TO OBTAIN TOTAL SITE CONSTRUCTION COST

| | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 |
|---|---|---|---|---|---|
| NUMBER OF ACRES | **1,700** | **2,500** | **1,500** | **740** | **660** |
| Construction Costs (Before interest added) | $53,504,000 | $55,538,000 | $24,688,000 | $45,158,000 | $22,396,000 |
| **CONSTRUCTION COST FIRST YEAR** | **18,304,000** | **18,999,842** | **11,603,360** | **15,448,789** | **10,526,120** |
| 0.34 | | | 0.47 | | |
| **CONSTRUCTION COST 2nd YEAR** | **18,304,000** | **18,999,842** | **11,603,360** | **15,448,789** | **10,526,120** |
| 0.34 | | | **0.47** | | |
| **CONSTRUCTION COST 3rd YEAR** | **16,896,000** | **17,538,316** | **1,481,280** | **14,260,421** | **1,343,760** |
| 0.32 | | | | | |
| Interest during construction at this rate: | 0.08875 | 0.08875 | 0.08875 | 0.08875 | 0.08875 |
| **If construction period is 3 years:** | | | | | |
| Calculate interest on year one for 2.5 yrs | 4,335,479 | 4,500,296 | 2,748,368 | 3,659,195 | 2,493,213 |
| Calculate interest on year two for 1.5 yrs | 2,490,011 | 2,584,670 | 1,578,479 | 2,101,598 | 1,431,936 |
| Calculate interest on year three for .5 yrs | 749,760 | 778,263 | 65,732 | 632,806 | 59,629 |
| Total interest during construction | 7,575,249 | 7,863,229 | 4,392,579 | 6,393,599 | 3,984,778 |
| Add Total Construction Expenditure | 53,504,000 | 55,538,000 | 24,688,000 | 45,158,000 | 22,396,000 |
| **Equals Total Construction Cost** | $61,079,249 | $63,401,229 | $29,080,579 | $51,551,599 | $26,380,778 |
| (Enter in tables which follow) | | | | | |
| | | | | | **6/21/90** |

2-1-1

CALCULATING INTEREST DURING CONSTRUCTION TO OBTAIN TOTAL SITE CONSTRUCTION COST

| | EXP F - Site 6 | Ocean Disposal | Buckroe Beach | Ocean View | Chesapeake Bay |
|---|---|---|---|---|---|
| NUMBER OF ACRES | 1000 | OCEAN | 2,500 | 2,000 | 2,000 |
| Construction Costs (Before interest added) | $25,780,000 | with Confined Unsuitable | $93,627,000 | $112,708,000 | $184,447,000 |
| **CONSTRUCTION COST FIRST YEAR** | 12,116,600 | | 32,030,289 | 38,558,000 | 63,100,289 |
| **CONSTRUCTION COST 2nd YEAR** | 12,116,600 | | 32,030,289 | 38,558,000 | 63,100,289 |
| **CONSTRUCTION COST 3rd YEAR** | 1,546,800 | | 29,566,421 | 35,592,000 | 58,246,421 |
| Interest during construction at this rate: | 0.08875 | 0.08875 | 0.08875 | 0.08875 | 0.08875 |
| **If construction period is 3 years:** | | | | | |
| Calculate interest on year one for 2.5 yrs | 2,869,934 | | 7,586,683 | 9,132,834 | 14,945,912 |
| Calculate interest on year two for 1.5 yrs | 1,648,299 | | 4,357,286 | 5,245,292 | 8,583,937 |
| Calculate interest on year three for .5 yrs | 68,639 | | 1,312,010 | 1,579,395 | 2,584,685 |
| Total interest during construction | 4,586,872 | | 13,255,979 | 15,957,521 | 26,114,534 |
| Add Total Construction Expenditure | 25,780,000 | | 93,627,000 | 112,708,000 | 184,447,000 |
| **Equals Total Construction Cost** | $30,366,872 | | $106,882,979 | $128,665,521 | $210,561,534 |
| (Enter in tables which follow) | | | | | |
| | | | | | 6/21/90 |

2-1-2

Cost of All Expansion Plans and Ocean Disposal - Dredging Scenario 1 - 50' / Maintenance

| Dredging Scenario S1 | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 |
|---|---|---|---|---|---|
| **50' Out. & Maintenance** | | | | | |
| TOTAL CONSTRUCTION COST | $61,079,249 | $63,401,229 | $29,080,579 | $51,551,599 | $26,380,778 |
| | | | | | |
| Mititigation Costs (proportionate to | 9,919,000 | 14,586,000 | 8,752,000 | 4,317,000 | 3,851,000 |
| acreage & includes 10% contingency) | | | | | |
| Real Estate Economic Loss | 579,000 | 2,637,000 | 2,637,000 | 0 | 579,000 |
| | | | | | |
| Enter Salvage Value (See RE appendix) | 6,000,000 | 8,000,000 | 5,000,000 | 3,000,000 | 2,000,000 |
| Dredging Scenario # | **S1** | **S1** | **S1** | **S1** | **S1** |
| Year the site fills | 2028 | 2048 | 2018 | 2004 | 2002 |
| Year salvage value realized (start of yr) | 2031 | 2051 | 2021 | 2007 | 2005 |
| Discounted value of land salvage | 281,020 | 374,693 | 234,183 | 912,277 | 720,928 |
| | | | | | |
| Total Investment Costs (Project Related) | 71,577,249 | 80,624,229 | 40,469,579 | 55,868,599 | 30,810,778 |
| Subtract Salvage from Investment Costs | 281,020 | 374,693 | 234,183 | 912,277 | 720,928 |
| Total Costs Remaining to Amortize | 71,296,229 | 80,249,536 | 40,235,396 | 54,956,322 | 30,089,850 |
| Number of Years Site Receives Material | **36** | **56** | **26** | **12** | **10** |
| Amortization Rate Based on Yrs in Service | 0.00436 | 0.00077 | 0.01093 | 0.05002 | 0.06621 |
| Amount of Amortization | 310,923 | 61,428 | 439,609 | 2,749,053 | 1,992,364 |
| Interest (See calculation of IDC) | 6,327,540 | 7,122,146 | 3,570,891 | 4,877,374 | 2,670,474 |
| | | | | | |
| ADD Average Annual O & M | 1,000,000 | 1,200,000 | 700,000 | 500,000 | 500,000 |
| Total Avg. annual cost of site over its life | 7,638,464 | 8,383,574 | 4,710,500 | 8,126,426 | 5,162,838 |
| ***xxxxxxxxxxx*** | ***xxxxx*** | ***xxxxx*** | ***xxxxx*** | ***xxxxx*** | ***xxxxx*** |
| **Total yards deposited in site (LINK)** | 144,000,000 | 224,000,000 | 104,000,000 | 48,000,000 | 40,000,000 |
| Yards Remaining for Ocean Disposal | 80,000,000 | 0 | 120,000,000 | 176,000,000 | 184,000,000 |
| Approximate Yards per year | 4,000,000 | 4,000,000 | 4,000,000 | 4,000,000 | 4,000,000 |
| | | | | | |
| Total PV of Constructing Site | 71,296,229 | 80,249,536 | 40,235,396 | 54,956,322 | 30,089,850 |
| Total PV of O & M for Site Life | 10,693,032 | 13,395,245 | 6,946,030 | 3,422,787 | 3,012,917 |
| **APW of all Dredging Costs (LINK)** | 139,485,508 | 133,505,939 | 149,711,835 | 189,682,716 | 198,284,539 |
| | | | | | |
| Total PW of all Costs | 221,474,770 | 227,150,720 | 196,893,260 | 248,061,824 | 231,387,306 |
| (Amortize these costs over longest life) | 0.08952 | 0.08952 | 0.08952 | 0.08952 | 0.08952 |
| Average annual amount of all Costs | 19,825,415 | 20,333,500 | 17,624,990 | 22,205,367 | 20,712,740 |
| | | | | | |
| Average annual cost per yard (average) | **4.96** | **5.08** | **4.41** | **5.55** | **5.18** |
| AAPW Costs/Approximate yards per year | WES yrs less 3 | Full life exp. | WES yrs less 3 | Full life exp. | Full life exp. |

2-1-3

Cost of All Expansion Plans and Ocean Disposal - Dredging Scenario 1 - 50' / Maintenance

| **Dredging Scenario S1** | EXP F - Site 6 | Ocean Disposal | Buckroe Beach | Ocean View | Chesapeake Bay |
|---|---|---|---|---|---|
| **50' Out. & Maintenance** | | | | | |
| TOTAL CONSTRUCTION COST | $30,366,872 | | $106,882,979 | $128,665,521 | $210,561,534 |
| | | | | | |
| Mititigation Costs (proportionate to | 5,834,000 | 0 | 14,586,000 | 11,669,000 | 11,669,000 |
| acreage & includes 10% contingency) | | | | | |
| Real Estate Economic Loss | 657,000 | | 0 | 0 | 0 |
| | | | | | |
| Enter Salvage Value (See RE appendix) | 3,000,000 | | 0 | 0 | 0 |
| Dredging Scenario # | **S1** | **S1** | **S1** | **S1** | **S1** |
| Year the site fills | 2007 | 2048 | 2048 | 2048 | 2048 |
| Year salvage value realized (start of yr) | 2010 | N.A. | N.A. | N.A. | N.A. |
| Discounted value of land salvage | 706,875 | 0 | 0 | 0 | 0 |
| | | | | | |
| Total Investment Costs (Project Related) | 36,857,872 | 317,466,034 | 121,468,979 | 140,334,521 | 222,230,534 |
| Subtract Salvage from Investment Costs | 706,875 | 0 | 0 | 0 | 0 |
| Total Costs Remaining to Amortize | 36,150,997 | 317,466,034 | 121,468,979 | 140,334,521 | 222,230,534 |
| Number of Years Site Receives Material | **15** | **56** | **56** | **56** | **56** |
| Amortization Rate Based on Yrs in Service | 0.03439 | | 0.00077 | 0.00077 | 0.00077 |
| Amount of Amortization | 1,243,409 | | 92,979 | 107,420 | 170,108 |
| Interest (See calculation of IDC) | 3,208,401 | | 10,780,372 | 12,454,689 | 19,722,960 |
| | | | | | |
| ADD Average Annual O & M | 500,000 | 0 | 1,381,000 | 1,235,000 | 1,235,000 |
| Total Avg. annual cost of site over its life | 4,951,810 | 28,418,117 | 12,161,372 | 13,689,689 | 20,957,960 |
| ***xxxxxxxxxxx*** | ***xxxxx*** | ***xxxxx*** | ***xxxxx*** | ***xxxxx*** | ***xxxxx*** |
| **Total yards deposited in site (LINK)** | 60,000,000 | n.a. | 224,000,000 | 224,000,000 | 224,000,000 |
| Yards Remaining for Ocean Disposal | 184,000,000 | 224,000,000 | 0 | | 0 |
| Approximate Yards per year | 4,000,000 | 4,000,000 | 4,000,000 | 4,000,000 | 4,000,000 |
| | | 0 | | | |
| Total PV of Constructing Site | 36,150,997 | 0 | 121,468,979 | 140,334,521 | 222,230,534 |
| Total PV of O & M for Site Life | 3,920,606 | 0 | 15,415,694 | 13,785,939 | 13,785,939 |
| **APW of all Dredging Costs (LINK)** | 176,750,543 | 291,607,440 | 245,320,761 | 267,467,062 | 267,216,421 |
| | | 0 | | | |
| Total PW of all Costs | 216,822,146 | 291,607,440 | 382,205,434 | 421,587,522 | 503,232,895 |
| (Amortize these costs over longest life) | 0.08952 | 0.08952 | 0.08952 | 0.08952 | 0.08952 |
| Average annual amount of all Costs | 19,408,933 | 26,103,373 | 34,213,294 | 37,738,600 | 45,047,122 |
| | | | | | |
| Average annual cost per yard (average) | **4.85** | **6.53** | **8.55** | **9.43** | **11.26** |
| AAPW Costs/Approximate yards per year | Full life exp. | Full life exp. | Full life exp. | Full life exp. | Full life exp. |

2-1-4

Cost of All Expansion Plans- Dredging Scenario 2 - 55 Outbound and Maintenance

| Dredging Scenario S2 | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 |
|---|---|---|---|---|---|
| **55' Out. & Maintenance** | | | | | |
| TOTAL CONSTRUCTION COST | 61,079,249 | 63,401,229 | 29,080,579 | 51,551,599 | 26,380,778 |
| | | | | | |
| Mititigation Costs (proportionate to | 9,919,000 | 14,586,000 | 8,752,000 | 4,317,000 | 3,851,000 |
| acreage & includes 10% contingency) | | | | | |
| Real Estate Economic Loss | 579,000 | 2,637,000 | 2,637,000 | 0 | 579,000 |
| | | | | | |
| Enter Salvage Value (See RE appendix) | 6,000,000 | 8,000,000 | 5,000,000 | 3,000,000 | 2,000,000 |
| Dredging Scenario # | **S2** | **S2** | **S2** | **S2** | **S2** |
| Year the site fulls | 2018 | 2041 | 2012 | 1996 | 1995 |
| Year salvage value realized (start of yr) | 2021 | 2044 | 2015 | 1999 | 1998 |
| Discounted value of land salvage | 554,833 | 104,653 | 770,106 | 1,801,160 | 1,307,342 |
| | | | | | |
| Total Investment Costs (Project Related) | 71,577,249 | 80,624,229 | 40,469,579 | 55,868,599 | 30,810,778 |
| Subtract Salvage from Investment Costs | 554,833 | 104,653 | 770,106 | 1,801,160 | 1,307,342 |
| Total Costs Remaining to Amortize | 71,022,416 | 80,519,576 | 39,699,473 | 54,067,439 | 29,503,436 |
| Number of Years Site Receives Material | **26** | **49** | **20** | **4** | **3** |
| Amortization Rate Based on Yrs in Service | 0.01093 | 0.00140 | 0.01982 | 0.21907 | 0.30542 |
| Amount of Amortization | 775,985 | 112,558 | 786,938 | 11,844,672 | 9,011,086 |
| Interest (See calculation of IDC) | 6,303,239 | 7,146,112 | 3,523,328 | 4,798,485 | 2,618,430 |
| | | | | | |
| ADD Average Annual O & M | 1,000,000 | 1,200,000 | 700,000 | 500,000 | 500,000 |
| Total Avg. annual cost of site over its life | 8,079,224 | 8,458,670 | 5,010,267 | 17,143,158 | 12,129,516 |
| ***XXXXXXXXXXX*** | ***XXXXX*** | ***XXXXX*** | ***XXXXX*** | ***XXXXX*** | ***XXXXX*** |
| **Total yards deposited in site (LINK)** | 123,347,000 | 219,947,000 | 98,147,000 | 30,947,000 | 26,747,000 |
| Yards Remaining for Ocean Disposal | 96,600,000 | 0 | 121,800,000 | 189,000,000 | 193,200,000 |
| Approximate Yards per year | 4,488,714 | 4,488,714 | 4,488,714 | 4,488,714 | 4,488,714 |
| | | | | | |
| Total PV of Constructing Site | 71,022,416 | 80,519,576 | 39,699,473 | 54,067,439 | 29,503,436 |
| Total PV of O & M for Site Life | 9,922,899 | 13,292,850 | 6,319,510 | 1,268,472 | 881,049 |
| **APW of all Dredging Costs (LINK)** | 189,085,655 | 173,382,024 | 201,260,169 | 289,552,279 | 300,092,038 |
| | | | | | |
| Total PW of all Costs | 270,030,970 | 267,194,450 | 247,279,153 | 344,888,191 | 330,476,523 |
| (Amortize these costs over longest life) | 0.09015 | 0.09015 | 0.09015 | 0.09015 | 0.09015 |
| Average annual amount of all Costs | 24,342,724 | 24,087,018 | 22,291,696 | 31,090,945 | 29,791,764 |
| | | | | | |
| Average annual cost per yard (average) | **5.42** | **5.37** | **4.97** | **6.93** | **6.64** |
| AAPW Costs/Approximate yards per year | WES yrs less 3 | Full life exp. | WES yrs less 3 | Full life exp. | Full life exp. |

2-1-5

Cost of All Expansion Plans- Dredging Scenario 2 - 55 Outbound and Maintenance

| Dredging Scenario S2 | EXP F - Site 6 | Ocean Disposal | Buckroe Beach | Ocean View | Chesapeake Bay |
|---|---|---|---|---|---|
| 55' Out. & Maintenance | | | | | |
| TOTAL CONSTRUCTION COST | 30,366,872 | | 94,617,812 | 102,326,921 | 146,151,374 |
| | | | | | |
| Mititigation Costs (proportionate to | 5,834,000 | 0 | 14,586,000 | 11,668,800 | 11,668,800 |
| acreage & includes 10% contingency) | | | | | |
| Real Estate Economic Loss | 657,000 | | 0 | 0 | 0 |
| | | | | | |
| Enter Salvage Value (See RE appendix) | 3,000,000 | | 0 | 0 | 0 |
| Dredging Scenario # | S2 | S2 | S2 | S2 | S2 |
| Year the site fulls | 2000 | 2,041 | 2041 | 2041 | 2041 |
| Year salvage value realized (start of yr) | 2003 | N.A. | N.A. | N.A. | N.A. |
| Discounted value of land salvage | 1,281,857 | 0 | 0 | 0 | 0 |
| | | | | | |
| Total Investment Costs (Project Related) | 36,857,872 | 390,122,974 | 109,203,812 | 113,995,721 | 157,820,174 |
| Subtract Salvage from Investment Costs | 1,281,857 | 0 | 0 | 0 | 0 |
| Total Costs Remaining to Amortize | 35,576,015 | 390,122,974 | 109,203,812 | 113,995,721 | 157,820,174 |
| Number of Years Site Receives Material | 8 | 49 | 49 | 49 | 49 |
| Amortization Rate Based on Yrs in Service | 0.09109 | 0.00140 | 0.00140 | 0.00140 | 0.00140 |
| Amount of Amortization | 3,240,472 | 545,352 | 152,656 | 159,354 | 220,616 |
| Interest (See calculation of IDC) | 3,157,371 | 34,623,414 | 9,691,838 | 10,117,120 | 14,006,540 |
| | | | | | |
| ADD Average Annual O & M | 500,000 | 0 | 1,381,000 | 1,235,000 | 1,235,000 |
| Total Avg. annual cost of site over its life | 6,897,843 | 35,168,766 | 11,225,494 | 11,511,475 | 15,462,157 |
| xxxxxxxxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx |
| **Total yards deposited in site (LINK)** | 47,747,000 | n.a. | 219,947,000 | 219,947,000 | 219,947,000 |
| Yards Remaining for Ocean Disposal | 172,200,000 | 0 | 0 | | 0 |
| Approximate Yards per year | 4,488,714 | 4,488,714 | 4,488,714 | 4,488,714 | 4,488,714 |
| | | | | | |
| Total PV of Constructing Site | 35,576,015 | 0 | 121,468,979 | 140,334,321 | 222,230,334 |
| Total PV of O & M for Site Life | 2,527,066 | | 15,297,855 | 13,680,559 | 13,680,559 |
| **APW of all Dredging Costs (LINK)** | 255,312,518 | 0 | 309,323,805 | 313,961,102 | 338,032,746 |
| | | 0 | | | |
| Total PW of all Costs | 293,415,599 | 358,321,905 | 446,090,639 | 467,975,982 | 573,943,638 |
| (Amortize these costs over longest life) | 0.09015 | 0.09015 | 0.09015 | 0.09015 | 0.09015 |
| Average annual amount of all Costs | 26,450,799 | 32,301,966 | 40,214,133 | 42,187,051 | 51,739,812 |
| | | | | | |
| Average annual cost per yard (average) | 5.89 | 7.20 | 8.96 | 9.40 | 11.53 |
| AAPW Costs/Approximate yards per year | Full life exp. | Full life exp. | Full life exp. | Full life exp. | Full life exp. |

2-1-6

Cost of All CI Expansion Plans and Other Alternatives- Dredging Scenario 4 - S Br 50' Maint

| **Dredging Scenario S4** | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 |
|---|---|---|---|---|---|
| **Southern Branch and 50' Norf. Harb.** | | | | | |
| TOTAL CONSTRUCTION COST | 61,079,249 | 63,401,229 | 29,080,579 | 51,551,599 | 26,380,778 |
| | | | | | |
| Mititigation Costs (proportionate to | 9,919,000 | 14,586,000 | 8,752,000 | 4,317,000 | 3,851,000 |
| acreage & includes 10% contingency) | | | | | |
| Real Estate Economic Loss | 579,000 | 2,637,000 | 2,637,000 | 0 | 579,000 |
| | | | | | |
| Enter Salvage Value (See RE appendix) | 6,000,000 | 8,000,000 | 5,000,000 | 3,000,000 | 2,000,000 |
| Dredging Scenario # | **S4** | **S4** | **S4** | **S4** | **S4** |
| Year the site fulls | 2023 | 2043 | 2014 | 2000 | 1997 |
| Year salvage value realized (start of yr) | 2026 | 2046 | 2017 | 2003 | 2000 |
| Discounted value of land salvage | 429,910 | 573,214 | 358,259 | 1,281,857 | 1,102,892 |
| | | | | | |
| Total Investment Costs (Project Related) | 71,577,249 | 80,624,229 | 40,469,579 | 55,868,599 | 30,810,778 |
| Subtract Salvage from Investment Costs | 429,910 | 573,214 | 358,259 | 1,281,857 | 1,102,892 |
| Total Costs Remaining to Amortize | 71,147,339 | 80,051,015 | 40,111,320 | 54,586,742 | 29,707,886 |
| Number of Years Site Receives Material | **31** | **51** | **22** | **8** | **5** |
| Amortization Rate Based on Yrs in Service | 0.00685 | 0.00118 | 0.01616 | 0.09109 | 0.16751 |
| Amount of Amortization | 487,352 | 94,171 | 648,121 | 4,972,080 | 4,976,343 |
| Interest (See rate on line 12) | 6,314,326 | 7,104,528 | 3,559,880 | 4,844,573 | 2,636,575 |
| | | | | | |
| ADD Average Annual O & M | 1,000,000 | 1,200,000 | 700,000 | 500,000 | 500,000 |
| Total Avg. annual cost of site over its life | 7,801,678 | 8,398,699 | 4,908,001 | 10,316,653 | 8,112,918 |
| ***xxxxxxxxxxx*** | | | | ***xxxxx*** | ***xxxxx*** |
| **Total yards deposited in site (LINK)** | 136,746,000 | 219,006,000 | 99,729,000 | 42,147,000 | 29,808,000 |
| Yards Remaining for Ocean Disposal | 82,260,000 | 0 | 119,277,000 | 176,859,000 | 189,198,000 |
| Approximate Yards per year | 4,294,235 | 4,294,235 | 4,294,235 | 4,294,235 | 4,294,235 |
| | | | | | |
| Total PV of Constructing Site | 71,147,339 | 80,051,015 | 40,111,320 | 54,586,742 | 29,707,886 |
| Total PV of O & M for Site Life | 10,388,610 | 13,328,550 | 6,564,695 | 2,527,066 | 1,624,314 |
| **APW of all Dredging Costs (LINK)** | 172,158,442 | 162,433,513 | 185,834,989 | 251,823,066 | 268,796,445 |
| | | | | | |
| Total PW of all Costs | 253,694,391 | 255,813,078 | 232,511,004 | 308,936,874 | 300,128,645 |
| (Amortize these costs over longest life) | 0.08993 | 0.08993 | 0.08993 | 0.08993 | 0.08993 |
| Average annual amount of all Costs | 22,813,820 | 23,004,346 | 20,908,875 | 27,781,577 | 26,989,485 |
| | | | | | |
| Average annual cost per yard (average) | **5.31** | **5.36** | **4.87** | **6.47** | **6.29** |
| AAPW Costs/Approximate yards per year | WES yrs less 3 | Full life exp. | WES yrs less 3 | Full life exp. | Full life exp. |

Cost of All CI Expansion Plans and Other Alternatives- Dredging Scenario 4 - S Br 50' Maint

| Dredging Scenario S4 | EXP F - Site 6 | Ocean Disposal | Buckroe Beach | Ocean View | Chesapeake Bay |
|---|---|---|---|---|---|
| **Southern Branch and 50' Norf. Harb.** | | with Confined | | | |
| TOTAL CONSTRUCTION COST | 30,366,872 | | 94,617,812 | 102,326,921 | 146,151,374 |
| | | | | | |
| Mititigation Costs (proportionate to | 5,834,000 | 0 | 14,586,000 | 11,668,800 | 11,668,800 |
| acreage & includes 10% contingency) | | | | | |
| Real Estate Economic Loss | 657,000 | | 0 | 0 | 0 |
| | | | | | |
| Enter Salvage Value (See RE appendix) | 3,000,000 | | 0 | 0 | 0 |
| Dredging Scenario # | **S4** | **S4** | **S4** | **S4** | **S4** |
| Year the site fulls | 2002 | 2,043 | 2043 | 2043 | 2043 |
| Year salvage value realized (start of yr) | 2005 | N.A. | N.A. | N.A. | N.A. |
| Discounted value of land salvage | 1,081,392 | 0 | 0 | 0 | 0 |
| | | | | | |
| Total Investment Costs (Project Related) | 36,857,872 | 0 | 109,203,812 | 113,995,721 | 157,820,174 |
| Subtract Salvage from Investment Costs | 1,081,392 | 0 | 0 | 0 | 0 |
| Total Costs Remaining to Amortize | 35,776,479 | 0 | 109,203,812 | 113,995,721 | 157,820,174 |
| Number of Years Site Receives Material | **10** | **51** | **51** | **51** | **51** |
| Amortization Rate Based on Yrs in Service | 0.06621 | 0.00118 | 0.00118 | 0.00118 | 0.00118 |
| Amount of Amortization | 2,368,897 | 0 | 128,466 | 134,103 | 185,658 |
| Interest (See rate on line 12) | 3,175,163 | 0 | 9,691,838 | 10,117,120 | 14,006,540 |
| | | | | | |
| ADD Average Annual O & M | 500,000 | 0 | 1,381,000 | 1,235,000 | 1,235,000 |
| Total Avg. annual cost of site over its life | 6,044,060 | 0 | 11,201,304 | 11,486,223 | 15,427,198 |
| ***XXXXXXXXXXX*** | ***XXXXX*** | ***XXXXX*** | ***XXXXX*** | ***XXXXX*** | ***XXXXX*** |
| **Total yards deposited in site (LINK)** | 50,373,000 | n.a. | 219,006,000 | 219,006,000 | 219,006,000 |
| Yards Remaining for Ocean Disposal | 168,633,000 | 219,947,000 | 0 | | 0 |
| Approximate Yards per year | 4,294,235 | 4,312,686 | 4,488,714 | 4,488,714 | 4,488,714 |
| | | | | | |
| Total PV of Constructing Site | 35,776,479 | 0 | 121,468,979 | 140,334,321 | 222,230,334 |
| Total PV of O & M for Site Life | 3,012,917 | | 15,338,939 | 13,717,299 | 13,717,299 |
| **APW of all Dredging Costs (LINK)** | 231,207,616 | 336,265,599 | 286,058,427 | 289,785,786 | 309,484,248 |
| | | 0 | | | |
| Total PW of all Costs | 269,997,012 | 336,265,599 | 422,866,344 | 443,837,406 | 545,431,881 |
| (Amortize these costs over longest life) | 0.08993 | 0.08993 | 0.08993 | 0.08993 | 0.08993 |
| Average annual amount of all Costs | 24,279,856 | 30,239,151 | 38,026,843 | 39,912,695 | 49,048,719 |
| | | | | | |
| Average annual cost per yard (average) | **5.65** | **7.04** | **8.86** | **9.29** | **11.42** |
| AAPW Costs/Approximate yards per year | Full life exp. | Full life exp. | Full life exp. | Full life exp. | Full life exp. |

Cost of All Expansion Plans- Dredging Scenario 5 - 55' and 45' /40' So. Br.

| Dredging Scenario S5 | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | Ocean Disposal |
|---|---|---|---|---|
| **55' Out. & 45' and 40' Southern Br.** | | | | |
| TOTAL CONSTRUCTION COST | $61,079,249 | $63,401,229 | $29,080,579 | |
| | | | | |
| Mititigation Costs (proportionate to | 9,919,000 | 14,586,000 | 8,752,000 | 0 |
| acreage & includes 10% contingency) | | | | |
| Real Estate Economic Loss | 579,000 | 2,637,000 | 2,637,000 | |
| | | | | |
| Enter Salvage Value (See RE appendix) | 6,000,000 | 8,000,000 | 5,000,000 | |
| Dredging Scenario # | **S5** | **S5** | **S5** | **S5** |
| Year the site fulls | 2014 | 2035 | 2006 | 2,035 |
| Year salvage value realized (start of yr) | 2017 | 2038 | 2009 | N.A. |
| Discounted value of land salvage | 779,606 | 174,310 | 1,282,683 | 0 |
| | | | | |
| Total Investment Costs (Project Related) | 71,577,249 | 80,624,229 | 40,469,579 | 0 |
| Subtract Salvage from Investment Costs | 779,606 | 174,310 | 1,282,683 | 0 |
| Total Costs Remaining to Amortize | 70,797,643 | 80,449,919 | 39,186,896 | 0 |
| Number of Years Site Receives Material | **22** | **43** | **14** | **43** |
| Amortization Rate Based on Yrs in Service | 0.01616 | 0.00235 | 0.03878 | |
| Amount of Amortization | 1,143,952 | 189,298 | 1,519,719 | |
| Interest (See calculation of IDC) | 6,283,291 | 7,139,930 | 3,477,837 | |
| | | | | |
| ADD Average Annual O & M | 1,000,000 | 1,200,000 | 700,000 | 0 |
| Total Avg. annual cost of site over its life | 8,427,243 | 8,529,229 | 5,697,556 | 0 |
| ***xxxxxxxxxxx*** | | | | 0 |
| **Total yards deposited in site (LINK)** | 113,963,000 | 208,849,000 | 79,459,000 | |
| Yards Remaining for Ocean Disposal | 94,886,000 | 0 | 129,390,000 | 208,849,000 |
| Approximate Yards per year | 4,856,953 | 4,856,953 | 4,856,953 | 4,856,953 |
| | | | | 0 |
| Total PV of Constructing Site | 70,797,643 | 80,449,919 | 39,186,896 | 0 |
| Total PV of O & M for Site Life | 9,378,135 | 13,140,911 | 5,275,984 | |
| **APW of all Dredging Costs (LINK)** | 225,931,437 | 201,308,912 | 254,290,408 | 404,058,722 |
| | | | | 0 |
| Total PW of all Costs | 306,107,215 | 294,899,743 | 298,753,288 | 404,058,722 |
| (Amortize these costs over longest life) | 0.09110 | 0.09110 | 0.09110 | 0.09110 |
| Average annual amount of all Costs | 27,887,285 | 26,866,250 | 27,217,320 | 36,810,961 |
| | | | | |
| Average annual cost per yard (average) | **5.74** | **5.53** | **5.60** | **7.58** |
| AAPW Costs/Approximate yards per year | WES yrs. less 3 | Full Life | WES yrs. less 3 | |

2-1-9

Cost of All Expansion Plans- Dredging Scenario 5 - 55' and 45' /40' So. Br.

| Dredging Scenario S5 | Buckroe Beach | Ocean View | Chesapeake Bay | EXP C, D and F |
|---|---|---|---|---|
| **55' Out. & 45' and 40' Southern Br.** | | | | Do not last long enough |
| Equals Total Construction Cost | $94,617,812 | $102,326,921 | $146,151,374 | under Dredging |
| | | | | Scenario 5 |
| Mititigation Costs (proportionate to | 14,586,000 | 11,668,800 | 11,668,800 | to be considered |
| acreage & includes 10% contingency) | | | | long term sites |
| Real Estate Economic Loss | 0 | 0 | 0 | |
| | | | | |
| Enter Salvage Value (See RE appendix) | 0 | 0 | 0 | |
| Dredging Scenario # | **S5** | **S5** | **S5** | |
| Year the site fulls | 2035 | 2035 | 2035 | |
| Year salvage value realized (start of yr) | | | | |
| Discounted value of land salvage | 0 | 0 | 0 | |
| | | | | |
| Total Investment Costs (Project Related) | 109,203,812 | 113,995,721 | 157,820,174 | |
| Subtract Salvage from Investment Costs | 0 | 0 | 0 | |
| Total Costs Remaining to Amortize | 109,203,812 | 113,995,721 | 157,820,174 | |
| Number of Years Site Receives Material | **43** | **43** | **43** | |
| Amortization Rate Based on Yrs in Service | 0.00235 | 0.00235 | 0.00235 | |
| Amount of Amortization | 256,956 | 268,232 | 371,350 | |
| Interest (See calculation of IDC) | 9,691,838 | 10,117,120 | 14,006,540 | |
| | | | | |
| ADD Average Annual O & M | 1,381,000 | 1,235,000 | 1,235,000 | |
| Total Avg. annual cost of site over its life | 11,329,795 | 11,620,352 | 15,612,891 | |
| ***xxxxxxxxxxx*** | | | | |
| **Total yards deposited in site (LINK)** | 208,849,000 | 208,849,000 | 208,849,000 | |
| Yards Remaining for Ocean Disposal | | | | |
| Approximate Yards per year | 4,856,953 | 4,856,953 | 4,856,953 | |
| | | | | |
| Total PV of Constructing Site | 121,468,979 | 140,334,321 | 222,230,334 | |
| Total PV of O & M for Site Life | 15,122,999 | 13,524,188 | 13,524,188 | |
| **APW of all Dredging Costs (LINK)** | 342,405,981 | 347,611,233 | 374,499,131 | |
| | | | | |
| Total PW of all Costs | 478,997,958 | 501,469,743 | 610,253,653 | |
| (Amortize these costs over longest life) | 0.09110 | 0.09110 | 0.09110 | |
| Average annual amount of all Costs | 43,638,150 | 45,685,397 | 55,595,937 | |
| | | | | |
| Average annual cost per yard (average) | **8.98** | **9.41** | **11.45** | |
| | | | | |

2-1-10

*Calculation of Yearly Dredging*

*Costs of all Plans Under*

*Dredging Scenario 1*

Summary - DS 1 options

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | Dredging Scenario S1 - 50' Out. & Maintenance | | | | 6/21/90 | | |
| 2 | | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 | EXP F - Site 6 |
| 3 | Construction Costs (w/o IDC) | $53,504,000 | $55,538,000 | $24,688,000 | $45,158,000 | $22,396,000 | $25,780,000 |
| 4 | | | | | | | |
| 5 | NUMBER OF ACRES | 1,700 | 2,500 | 1,500 | 740 | 660 | 1000 |
| 6 | | | | | | | |
| 7 | # Years Site Receives Mater | 36 | 56 | 26 | 12 | 10 | 15 |
| 8 | | | | | | | |
| 9 | Amount of Material Site Hold | 144,000,000 | 224,000,000 | 104,000,000 | 48,000,000 | 40,000,000 | 60,000,000 |
| 10 | | | | | | | |
| 11 | Average annual cost per yard | 4.96 | 5.08 | 4.41 | 5.55 | 5.18 | 4.85 |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | Ocean Disposal | | | | | |
| 16 | | with Confined | | | | | |
| 17 | | Unsuitable | Buckroe Beach | Ocean View | Chesapeake Bay | | |
| 18 | Construction Costs (w/o IDC) | 0 | $92,627,000 | $112,708,000 | $184,447,000 | | |
| 19 | | | | | | | |
| 20 | NUMBER OF ACRES | OCEAN | 2,500 | 2,000 | 2,000 | | |
| 21 | | | | | | | |
| 22 | # Years Site Receives Mater | 56 | 56 | 56 | 56 | | |
| 23 | | | | | | | |
| 24 | Amount of Material Site Hold | n.a. | 224,000,000 | 224,000,000 | 224,000,000 | | |
| 25 | | | | | | | |
| 26 | Average annual cost per yard | 6.53 | 8.55 | 9.43 | 11.26 | | |

2-2-1

Ocean Disposal Costs - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | |
| 2 | | 55' Outbound only | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 3 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 4 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 5 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 6 | | Ocean Suitabl | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 7 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | 1993 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 23,973,915 | 0.9185 | 1 |
| 11 | 1994 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 22,019,669 | 0.8436 | 2 |
| 12 | 1995 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 20,224,725 | 0.7748 | 3 |
| 13 | 1996 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 18,576,096 | 0.7117 | 4 |
| 14 | 1997 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 17,061,857 | 0.6537 | 5 |
| 15 | 1998 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 15,671,051 | 0.6004 | 6 |
| 16 | 1999 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 14,393,617 | 0.5514 | 7 |
| 17 | 2000 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 13,220,314 | 0.5065 | 8 |
| 18 | 2001 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 12,142,654 | 0.4652 | 9 |
| 19 | 2002 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 11,152,839 | 0.4273 | 10 |
| 20 | 2003 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 10,243,710 | 0.3925 | 11 |
| 21 | 2004 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 9,408,689 | 0.3605 | 12 |
| 22 | 2005 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 8,641,735 | 0.3311 | 13 |
| 23 | 2006 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 7,937,300 | 0.3041 | 14 |
| 24 | 2007 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 7,290,287 | 0.2793 | 15 |
| 25 | 2008 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 6,696,015 | 0.2565 | 16 |
| 26 | 2009 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 6,150,186 | 0.2356 | 17 |
| 27 | 2010 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 5,648,851 | 0.2164 | 18 |
| 28 | 2011 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 5,188,382 | 0.1988 | 19 |
| 29 | 2012 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 4,765,448 | 0.1826 | 20 |
| 30 | 2013 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 4,376,990 | 0.1677 | 21 |
| 31 | 2014 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 4,020,198 | 0.1540 | 22 |
| 32 | 2015 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 3,692,489 | 0.1415 | 23 |
| 33 | 2016 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 3,391,494 | 0.1299 | 24 |
| 34 | 2017 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 3,115,035 | 0.1193 | 25 |
| 35 | 2018 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 2,861,111 | 0.1096 | 26 |
| 36 | 2019 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 2,627,886 | 0.1007 | 27 |

2-2-2

Ocean Disposal Costs - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | | Cubic Yards of Material | | **Maintenance** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 38 | | **MAINTENANCE WORK** | | **Unit Prices** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | Discount | Yr. |
| 39 | | | | **Dredging Only** | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Factor | # |
| 40 | | Ocean Suitabl | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | | |
| 41 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 42 | 2020 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 2,413,673 | 0.0925 | 28 |
| 43 | 2021 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 2,216,921 | 0.0849 | 29 |
| 44 | 2022 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 2,036,208 | 0.0780 | 30 |
| 45 | 2023 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,870,225 | 0.0717 | 31 |
| 46 | 2024 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,717,773 | 0.0658 | 32 |
| 47 | 2025 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,577,748 | 0.0604 | 33 |
| 48 | 2026 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,449,137 | 0.0555 | 34 |
| 49 | 2027 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,331,010 | 0.0510 | 35 |
| 50 | 2028 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,222,512 | 0.0468 | 36 |
| 51 | 2029 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,122,858 | 0.0430 | 37 |
| 52 | 2030 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 1,031,328 | 0.0395 | 38 |
| 53 | 2031 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 947,259 | 0.0363 | 39 |
| 54 | 2032 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 870,042 | 0.0333 | 40 |
| 55 | 2033 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 799,120 | 0.0306 | 41 |
| 56 | 2034 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 733,980 | 0.0281 | 42 |
| 57 | 2035 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 674,149 | 0.0258 | 43 |
| 58 | 2036 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 619,195 | 0.0237 | 44 |
| 59 | 2037 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 568,721 | 0.0218 | 45 |
| 60 | 2038 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 522,362 | 0.0200 | 46 |
| 61 | 2039 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 479,781 | 0.0184 | 47 |
| 62 | 2040 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 440,672 | 0.0169 | 48 |
| 63 | 2041 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 404,750 | 0.0155 | 49 |
| 64 | 2042 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 371,757 | 0.0142 | 50 |
| 65 | 2043 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 341,453 | 0.0131 | 51 |
| 66 | 2044 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 313,619 | 0.0120 | 52 |
| 67 | 2045 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 288,054 | 0.0110 | 53 |
| 68 | 2046 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 264,573 | 0.0101 | 54 |
| 69 | 2047 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 243,006 | 0.0093 | 55 |
| 70 | 2048 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 243,006 | 0.0086 | 56 |
| 71 | | | | | | | | | | | | | |
| 72 | | 204,120,000 | 19,880,000 | | | | | | | | | | |
| 73 | | | | | | New Work | | | | | | | |
| 74 | | 224,000,000 | **TOTAL** | | | Total of discounted amounts equals Present Worth | | | | | $291,607,440 | | |

2-2-3

Plan A-DS1- 50' Outbound New Work and NH Maint. - PW Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-1 | PLAN A - EXP. (#1) | | 55' Out - | | EXPANSION OF CI - Material goes to ocean when site full | | | | | |
| 2 | | | DREDGING COSTS ONLY | | | Portion of material unsuitable continues going to the site - | | | | | |
| 3 | | 6/19/90 | | | | Deduct 3 years of life to account for this | | | | | |
| 4 | | | | | Aver. Cost | | | | | | |
| 5 | | Maintenance | Maintenance | NO | Maintenance | | Total Cost | | Annual | | |
| 6 | | Quantities | per Ocean | new | Dredging | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr. |
| 7 | Year | To Site A | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,985,075 | 0.9185 | 1 |
| 10 | 1994 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,089,621 | 0.8436 | 2 |
| 11 | 1995 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 9,267,160 | 0.7748 | 3 |
| 12 | 1996 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 8,511,743 | 0.7117 | 4 |
| 13 | 1997 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,817,904 | 0.6537 | 5 |
| 14 | 1998 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,180,624 | 0.6004 | 6 |
| 15 | 1999 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,595,292 | 0.5514 | 7 |
| 16 | 2000 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,057,673 | 0.5065 | 8 |
| 17 | 2001 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,563,879 | 0.4652 | 9 |
| 18 | 2002 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,110,337 | 0.4273 | 10 |
| 19 | 2003 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,693,765 | 0.3925 | 11 |
| 20 | 2004 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,311,150 | 0.3605 | 12 |
| 21 | 2005 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,959,725 | 0.3311 | 13 |
| 22 | 2006 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,636,946 | 0.3041 | 14 |
| 23 | 2007 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,340,478 | 0.2793 | 15 |
| 24 | 2008 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,068,178 | 0.2565 | 16 |
| 25 | 2009 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,818,074 | 0.2356 | 17 |
| 26 | 2010 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,588,357 | 0.2164 | 18 |
| 27 | 2011 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,377,366 | 0.1988 | 19 |
| 28 | 2012 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,183,574 | 0.1826 | 20 |
| 29 | 2013 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,005,578 | 0.1677 | 21 |
| 30 | 2014 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,842,093 | 0.1540 | 22 |
| 31 | 2015 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,691,934 | 0.1415 | 23 |
| 32 | 2016 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,554,015 | 0.1299 | 24 |
| 33 | 2017 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,427,338 | 0.1193 | 25 |
| 34 | 2018 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,310,988 | 0.1096 | 26 |
| 35 | 2019 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,204,122 | 0.1007 | 27 |

2-2-4

Plan A-DS1- 50' Outbound New Work and NH Maint. - PW Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | | | Aver. Cost | | Total Cost | | Annual | | |
| 37 | | Maintenance | Maintenance | NO | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr. |
| 38 | Year | Quantities | per Ocean | new | Dredging | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 39 | | To Site A | Disposal Plan | work | $ per Yd | | | | | | |
| 40 | 2020 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,105,968 | 0.0925 | 28 |
| 41 | 2021 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,015,814 | 0.0849 | 29 |
| 42 | 2022 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 933,010 | 0.0780 | 30 |
| 43 | 2023 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 856,955 | 0.0717 | 31 |
| 44 | 2024 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 787,100 | 0.0658 | 32 |
| 45 | 2025 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 722,939 | 0.0604 | 33 |
| 46 | 2026 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 664,008 | 0.0555 | 34 |
| 47 | 2027 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 609,881 | 0.0510 | 35 |
| 48 | 2028 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 560,166 | 0.0468 | 36 |
| 49 | 2029 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,122,858 | 0.0430 | 37 |
| 50 | 2030 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,031,328 | 0.0395 | 38 |
| 51 | 2031 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 947,259 | 0.0363 | 39 |
| 52 | 2032 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 870,042 | 0.0333 | 40 |
| 53 | 2033 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 799,120 | 0.0306 | 41 |
| 54 | 2034 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 733,980 | 0.0281 | 42 |
| 55 | 2035 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 674,149 | 0.0258 | 43 |
| 56 | 2036 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 619,195 | 0.0237 | 44 |
| 57 | 2037 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 568,721 | 0.0218 | 45 |
| 58 | 2038 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 522,362 | 0.0200 | 46 |
| 59 | 2039 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 479,781 | 0.0184 | 47 |
| 60 | 2040 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 440,672 | 0.0169 | 48 |
| 61 | 2041 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 404,750 | 0.0155 | 49 |
| 62 | 2042 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 371,757 | 0.0142 | 50 |
| 63 | 2043 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 341,453 | 0.0131 | 51 |
| 64 | 2044 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 313,619 | 0.0120 | 52 |
| 65 | 2045 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 288,054 | 0.0110 | 53 |
| 66 | 2046 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 264,573 | 0.0101 | 54 |
| 67 | 2047 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 243,006 | 0.0093 | 55 |
| 68 | 2048 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 223,198 | 0.0086 | 56 |
| 69 | | | | | | | | | | | |
| 70 | | 144,000,000 | 80,000,000 | | | | | | | | |
| 71 | | | | | | | | | | | |
| 72 | TOTAL | 224,000,000 | | | | | | Total | $139,485,508 | | |

2-2-5

Plan B - DS2-50' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 1 | PLAN B - EXP. (#2) | | 50' Out - DREDGING COSTS ONLY | | | 6/19/90 | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | Annual | | |
| 4 | | Maintenance | N O | Maintenance | N o Ocean | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | new | $ per Yd | Disposal | Maintenance | Amount | Factor | Yr. |
| 6 | | | work | | | | | | |
| 7 | 1993 | 4,000,000 | | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 8 | 1994 | 4,000,000 | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 9 | 1995 | 4,000,000 | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 10 | 1996 | 4,000,000 | | 2.99 | | 11,960,000 | 8,511,743 | 0.71168 | 4 |
| 11 | 1997 | 4,000,000 | | 2.99 | | 11,960,000 | 7,817,904 | 0.65367 | 5 |
| 12 | 1998 | 4,000,000 | | 2.99 | | 11,960,000 | 7,180,624 | 0.60039 | 6 |
| 13 | 1999 | 4,000,000 | | 2.99 | | 11,960,000 | 6,595,292 | 0.55145 | 7 |
| 14 | 2000 | 4,000,000 | | 2.99 | | 11,960,000 | 6,057,673 | 0.50649 | 8 |
| 15 | 2001 | 4,000,000 | | 2.99 | | 11,960,000 | 5,563,879 | 0.46521 | 9 |
| 16 | 2002 | 4,000,000 | | 2.99 | | 11,960,000 | 5,110,337 | 0.42729 | 10 |
| 17 | 2003 | 4,000,000 | | 2.99 | | 11,960,000 | 4,693,765 | 0.39246 | 11 |
| 18 | 2004 | 4,000,000 | | 2.99 | | 11,960,000 | 4,311,150 | 0.36046 | 12 |
| 19 | 2005 | 4,000,000 | | 2.99 | | 11,960,000 | 3,959,725 | 0.33108 | 13 |
| 20 | 2006 | 4,000,000 | | 2.99 | | 11,960,000 | 3,636,946 | 0.30409 | 14 |
| 21 | 2007 | 4,000,000 | | 2.99 | | 11,960,000 | 3,340,478 | 0.27930 | 15 |
| 22 | 2008 | 4,000,000 | | 2.99 | | 11,960,000 | 3,068,178 | 0.25654 | 16 |
| 23 | 2009 | 4,000,000 | | 2.99 | | 11,960,000 | 2,818,074 | 0.23562 | 17 |
| 24 | 2010 | 4,000,000 | | 2.99 | | 11,960,000 | 2,588,357 | 0.21642 | 18 |
| 25 | 2011 | 4,000,000 | | 2.99 | | 11,960,000 | 2,377,366 | 0.19878 | 19 |
| 26 | 2012 | 4,000,000 | | 2.99 | | 11,960,000 | 2,183,574 | 0.18257 | 20 |
| 27 | 2013 | 4,000,000 | | 2.99 | | 11,960,000 | 2,005,578 | 0.16769 | 21 |
| 28 | 2014 | 4,000,000 | | 2.99 | | 11,960,000 | 1,842,093 | 0.15402 | 22 |
| 29 | 2015 | 4,000,000 | | 2.99 | | 11,960,000 | 1,691,934 | 0.14147 | 23 |
| 30 | 2016 | 4,000,000 | | 2.99 | | 11,960,000 | 1,554,015 | 0.12993 | 24 |
| 31 | 2017 | 4,000,000 | | 2.99 | | 11,960,000 | 1,427,338 | 0.11934 | 25 |
| 32 | 2018 | 4,000,000 | | 2.99 | | 11,960,000 | 1,310,988 | 0.10961 | 26 |
| 33 | 2019 | 4,000,000 | | 2.99 | | 11,960,000 | 1,204,122 | 0.10068 | 27 |
| 34 | 2020 | 4,000,000 | | 2.99 | | 11,960,000 | 1,105,968 | 0.09247 | 28 |
| 35 | 2021 | 4,000,000 | | 2.99 | | 11,960,000 | 1,015,814 | 0.08493 | 29 |

2-2-6

Plan B - DS2-50' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | N O | Maintenance | N o Ocean | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | new | $ per Yd | Disposal | Maintenance | Amount | Factor | Yr. |
| 38 | | | work | | | | | | |
| 39 | 2022 | 4,000,000 | | 2.99 | | 11,960,000 | 933,010 | 0.07801 | 30 |
| 40 | 2023 | 4,000,000 | | 2.99 | | 11,960,000 | 856,955 | 0.07165 | 31 |
| 41 | 2024 | 4,000,000 | | 2.99 | | 11,960,000 | 787,100 | 0.06581 | 32 |
| 42 | 2025 | 4,000,000 | | 2.99 | | 11,960,000 | 722,939 | 0.06045 | 33 |
| 43 | 2026 | 4,000,000 | | 2.99 | | 11,960,000 | 664,008 | 0.05552 | 34 |
| 44 | 2027 | 4,000,000 | | 2.99 | | 11,960,000 | 609,881 | 0.05099 | 35 |
| 45 | 2028 | 4,000,000 | | 2.99 | | 11,960,000 | 560,166 | 0.04684 | 36 |
| 46 | 2029 | 4,000,000 | | 2.99 | | 11,960,000 | 514,504 | 0.04302 | 37 |
| 47 | 2030 | 4,000,000 | | 2.99 | | 11,960,000 | 472,564 | 0.03951 | 38 |
| 48 | 2031 | 4,000,000 | | 2.99 | | 11,960,000 | 434,043 | 0.03629 | 39 |
| 49 | 2032 | 4,000,000 | | 2.99 | | 11,960,000 | 398,662 | 0.03333 | 40 |
| 50 | 2033 | 4,000,000 | | 2.99 | | 11,960,000 | 366,165 | 0.03062 | 41 |
| 51 | 2034 | 4,000,000 | | 2.99 | | 11,960,000 | 336,316 | 0.02812 | 42 |
| 52 | 2035 | 4,000,000 | | 2.99 | | 11,960,000 | 308,901 | 0.02583 | 43 |
| 53 | 2036 | 4,000,000 | | 2.99 | | 11,960,000 | 283,721 | 0.02372 | 44 |
| 54 | 2037 | 4,000,000 | | 2.99 | | 11,960,000 | 260,594 | 0.02179 | 45 |
| 55 | 2038 | 4,000,000 | | 2.99 | | 11,960,000 | 239,351 | 0.02001 | 46 |
| 56 | 2039 | 4,000,000 | | 2.99 | | 11,960,000 | 219,840 | 0.01838 | 47 |
| 57 | 2040 | 4,000,000 | | 2.99 | | 11,960,000 | 201,920 | 0.01688 | 48 |
| 58 | 2041 | 4,000,000 | | 2.99 | | 11,960,000 | 185,460 | 0.01551 | 49 |
| 59 | 2042 | 4,000,000 | | 2.99 | | 11,960,000 | 170,342 | 0.01424 | 50 |
| 60 | 2043 | 4,000,000 | | 2.99 | | 11,960,000 | 156,457 | 0.01308 | 51 |
| 61 | 2044 | 4,000,000 | | 2.99 | | 11,960,000 | 143,703 | 0.01202 | 52 |
| 62 | 2045 | 4,000,000 | | 2.99 | | 11,960,000 | 131,989 | 0.01104 | 53 |
| 63 | 2046 | 4,000,000 | | 2.99 | | 11,960,000 | 121,230 | 0.01014 | 54 |
| 64 | 2047 | 4,000,000 | | 2.99 | | 11,960,000 | 111,348 | 0.00931 | 55 |
| 65 | 2048 | 4,000,000 | | 2.99 | | 11,960,000 | 102,271 | 0.00855 | 56 |
| 66 | | | | | | | | | |
| 67 | | | | | | Total | $133,505,939 | | |
| 68 | TOTAL | 224,000,000 | | | | | | | |

2-2-7

Plan C-DS1 - 50' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 1 | PLAN C - EXP. (#3) | 50' Out - DREDGING COSTS | | | EXPANSION OF CI - Material goes to ocean when site full | | | | | |
| 2 | | | | | | Portion of material unsuitable continues going to the site | | | | | |
| 3 | | 6/20/90 | | | | Deduct 3 years of life to allow space for this | | | | | |
| 4 | | | | | Aver. Cost | | | | | | |
| 5 | | Maintenance | Maintenance | NO | Maintenance | | Total Cost | | Annual | | |
| 6 | | Quantities | per Ocean | new | Dredging | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr |
| 7 | Year | To Site C | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 8,511,743 | 0.71168 | 4 |
| 13 | 1997 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,817,904 | 0.65367 | 5 |
| 14 | 1998 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,180,624 | 0.60039 | 6 |
| 15 | 1999 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,595,292 | 0.55145 | 7 |
| 16 | 2000 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,057,673 | 0.50649 | 8 |
| 17 | 2001 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,563,879 | 0.46521 | 9 |
| 18 | 2002 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,110,337 | 0.42729 | 10 |
| 19 | 2003 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,693,765 | 0.39246 | 11 |
| 20 | 2004 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,311,150 | 0.36046 | 12 |
| 21 | 2005 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 8,641,735 | 0.33108 | 13 |
| 22 | 2006 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 7,937,300 | 0.30409 | 14 |
| 23 | 2007 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 7,290,287 | 0.27930 | 15 |
| 24 | 2008 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 6,696,015 | 0.25654 | 16 |
| 25 | 2009 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 6,150,186 | 0.23562 | 17 |
| 26 | 2010 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 5,648,851 | 0.21642 | 18 |
| 27 | 2011 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 5,188,382 | 0.19878 | 19 |
| 28 | 2012 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 4,765,448 | 0.18257 | 20 |
| 29 | 2013 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 4,376,990 | 0.16769 | 21 |
| 30 | 2014 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 4,020,198 | 0.15402 | 22 |
| 31 | 2015 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 3,692,489 | 0.14147 | 23 |
| 32 | 2016 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 3,391,494 | 0.12993 | 24 |
| 33 | 2017 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 3,115,035 | 0.11934 | 25 |
| 34 | 2018 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 2,861,111 | 0.10961 | 26 |
| 35 | 2019 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 2,627,886 | 0.10068 | 27 |

2-2-8

Plan C-DS1 - 50' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | Maintenance | NO | Aver. Cost | | Total Cost | | Annual | | |
| 37 | | Quantities | per Ocean | new | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr |
| 38 | Year | To Site C | Disposal Plan | work | Dredging | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 39 | | | | | $ per Yd | | | | | | |
| 40 | 2020 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 2,413,673 | 0.09247 | 28 |
| 41 | 2021 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 2,216,921 | 0.08493 | 29 |
| 42 | 2022 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 2,036,208 | 0.07801 | 30 |
| 43 | 2023 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,870,225 | 0.07165 | 31 |
| 44 | 2024 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,717,773 | 0.06581 | 32 |
| 45 | 2025 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,577,748 | 0.06045 | 33 |
| 46 | 2026 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,449,137 | 0.05552 | 34 |
| 47 | 2027 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,331,010 | 0.05099 | 35 |
| 48 | 2028 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,222,512 | 0.04684 | 36 |
| 49 | 2029 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,122,858 | 0.04302 | 37 |
| 50 | 2030 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 1,031,328 | 0.03951 | 38 |
| 51 | 2031 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 947,259 | 0.03629 | 39 |
| 52 | 2032 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 870,042 | 0.03333 | 40 |
| 53 | 2033 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 799,120 | 0.03062 | 41 |
| 54 | 2034 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 733,980 | 0.02812 | 42 |
| 55 | 2035 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 674,149 | 0.02583 | 43 |
| 56 | 2036 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 619,195 | 0.02372 | 44 |
| 57 | 2037 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 568,721 | 0.02179 | 45 |
| 58 | 2038 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 522,362 | 0.02001 | 46 |
| 59 | 2039 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 479,781 | 0.01838 | 47 |
| 60 | 2040 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 440,672 | 0.01688 | 48 |
| 61 | 2041 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 404,750 | 0.01551 | 49 |
| 62 | 2042 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 371,757 | 0.01424 | 50 |
| 63 | 2043 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 341,453 | 0.01308 | 51 |
| 64 | 2044 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 313,619 | 0.01202 | 52 |
| 65 | 2045 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 288,054 | 0.01104 | 53 |
| 66 | 2046 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 264,573 | 0.01014 | 54 |
| 67 | 2047 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 243,006 | 0.00931 | 55 |
| 68 | 2048 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 223,198 | 0.00855 | 56 |
| 69 | | | | | | | | | | | |
| 70 | TOTAL | 48,000,000 | 176,000,000 | | | **6/20/90** | | Total | $189,682,716 | | |
| 71 | | | | | | | | | | | |
| 72 | | 224,000,000 | | | | | | | | | |

Plan D-DS1 - 50' Outbnd New Work and NH Maint. - P W Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS -1 | PLAN D - EXP. (#4) | 50' Out - DREDGING COSTS | | | EXPANSION OF CI - Material goes to ocean when site full | | | | | |
| 2 | | | | | | Portion of material unsuitable continues going to the site | | | | | |
| 3 | | 6/20/90 | | | | Deduct 3 years of life to allow space for this | | | | | |
| 4 | | | | | Aver. Cost | | | | | | |
| 5 | | Maintenance | Maintenance | NO | Maintenance | | Total Cost | | Annual | | |
| 6 | | Quantities | per Ocean | new | Dredging | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr |
| 7 | Year | To Site D | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 8,511,743 | 0.71168 | 4 |
| 13 | 1997 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,817,904 | 0.65367 | 5 |
| 14 | 1998 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,180,624 | 0.60039 | 6 |
| 15 | 1999 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,595,292 | 0.55145 | 7 |
| 16 | 2000 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,057,673 | 0.50649 | 8 |
| 17 | 2001 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,563,879 | 0.46521 | 9 |
| 18 | 2002 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,110,337 | 0.42729 | 10 |
| 19 | 2003 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 10,243,710 | 0.39246 | 11 |
| 20 | 2004 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 9,408,689 | 0.36046 | 12 |
| 21 | 2005 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 8,641,735 | 0.33108 | 13 |
| 22 | 2006 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 7,937,300 | 0.30409 | 14 |
| 23 | 2007 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 7,290,287 | 0.27930 | 15 |
| 24 | 2008 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 6,696,015 | 0.25654 | 16 |
| 25 | 2009 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 6,150,186 | 0.23562 | 17 |
| 26 | 2010 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 5,648,851 | 0.21642 | 18 |
| 27 | 2011 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 5,188,382 | 0.19878 | 19 |
| 28 | 2012 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 4,765,448 | 0.18257 | 20 |
| 29 | 2013 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 4,376,990 | 0.16769 | 21 |
| 30 | 2014 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 4,020,198 | 0.15402 | 22 |
| 31 | 2015 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 3,692,489 | 0.14147 | 23 |
| 32 | 2016 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 3,391,494 | 0.12993 | 24 |
| 33 | 2017 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 3,115,035 | 0.11934 | 25 |
| 34 | 2018 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,861,111 | 0.10961 | 26 |
| 35 | 2019 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,627,886 | 0.10068 | 27 |

2-2-10

Plan D-DS1 - 50' Outbnd New Work and NH Maint. - P W Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | Maintenance | NO | Aver. Cost | | Total Cost | | Annual | Discount | Yr |
| 37 | | Quantities | per Ocean | new | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Factor | # |
| 38 | Year | To Site D | Disposal Plan | work | Dredging | Ocean Disp. | at Site | Site & Ocean | Amount | | |
| 39 | | | | | $ per Yd | | | | | | |
| 40 | 2020 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,413,673 | 0.09247 | 28 |
| 41 | 2021 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,216,921 | 0.08493 | 29 |
| 42 | 2022 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,036,208 | 0.07801 | 30 |
| 43 | 2023 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,870,225 | 0.07165 | 31 |
| 44 | 2024 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,717,773 | 0.06581 | 32 |
| 45 | 2025 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,577,748 | 0.06045 | 33 |
| 46 | 2026 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,449,137 | 0.05552 | 34 |
| 47 | 2027 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,331,010 | 0.05099 | 35 |
| 48 | 2028 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,222,512 | 0.04684 | 36 |
| 49 | 2029 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,122,858 | 0.04302 | 37 |
| 50 | 2030 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,031,328 | 0.03951 | 38 |
| 51 | 2031 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 947,259 | 0.03629 | 39 |
| 52 | 2032 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 870,042 | 0.03333 | 40 |
| 53 | 2033 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 799,120 | 0.03062 | 41 |
| 54 | 2034 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 733,980 | 0.02812 | 42 |
| 55 | 2035 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 674,149 | 0.02583 | 43 |
| 56 | 2036 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 619,195 | 0.02372 | 44 |
| 57 | 2037 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 568,721 | 0.02179 | 45 |
| 58 | 2038 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 522,362 | 0.02001 | 46 |
| 59 | 2039 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 479,781 | 0.01838 | 47 |
| 60 | 2040 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 440,672 | 0.01688 | 48 |
| 61 | 2041 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 404,750 | 0.01551 | 49 |
| 62 | 2042 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 371,757 | 0.01424 | 50 |
| 63 | 2043 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 341,453 | 0.01308 | 51 |
| 64 | 2044 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 313,619 | 0.01202 | 52 |
| 65 | 2045 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 288,054 | 0.01104 | 53 |
| 66 | 2046 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 264,573 | 0.01014 | 54 |
| 67 | 2047 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 243,006 | 0.00931 | 55 |
| 68 | 2048 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 223,198 | 0.00855 | 56 |
| 69 | | | | | | | | | | | |
| 70 | TOTAL | 40,000,000 | 184,000,000 | | | | | Total | $198,284,539 | | |
| 71 | | | | | | | | | | | |
| 72 | | 224,000,000 | | | | | | | 6/20/90 | | |

2-2-11

Plan E-DS- 50' New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-1 | PLAN E - EXP. (#1) | | 50' Out - | | EXPANSION OF CI - Material goes to ocean when site full | | | | | |
| 2 | | | DREDGING COSTS ONLY | | | Portion of material unsuitable continues going to the site - | | | | | |
| 3 | | 6/20/90 | | | | Deduct 3 years of life to account for this | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | Maintenance | Maintenance | NO | | | Total Cost | | Annual | | |
| 6 | | Quantities | per Ocean | new | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr. |
| 7 | Year | To Site E | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 8,511,743 | 0.71168 | 4 |
| 13 | 1997 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,817,904 | 0.65367 | 5 |
| 14 | 1998 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,180,624 | 0.60039 | 6 |
| 15 | 1999 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,595,292 | 0.55145 | 7 |
| 16 | 2000 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,057,673 | 0.50649 | 8 |
| 17 | 2001 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,563,879 | 0.46521 | 9 |
| 18 | 2002 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,110,337 | 0.42729 | 10 |
| 19 | 2003 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,693,765 | 0.39246 | 11 |
| 20 | 2004 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,311,150 | 0.36046 | 12 |
| 21 | 2005 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,959,725 | 0.33108 | 13 |
| 22 | 2006 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,636,946 | 0.30409 | 14 |
| 23 | 2007 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,340,478 | 0.27930 | 15 |
| 24 | 2008 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,068,178 | 0.25654 | 16 |
| 25 | 2009 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,818,074 | 0.23562 | 17 |
| 26 | 2010 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,588,357 | 0.21642 | 18 |
| 27 | 2011 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,377,366 | 0.19878 | 19 |
| 28 | 2012 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,183,574 | 0.18257 | 20 |
| 29 | 2013 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 2,005,578 | 0.16769 | 21 |
| 30 | 2014 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,842,093 | 0.15402 | 22 |
| 31 | 2015 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,691,934 | 0.14147 | 23 |
| 32 | 2016 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,554,015 | 0.12993 | 24 |
| 33 | 2017 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,427,338 | 0.11934 | 25 |
| 34 | 2018 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 1,310,988 | 0.10961 | 26 |
| 35 | 2019 | | 4,000,000 | | | 26,101,600 | 0 | 26,101,600 | 2,627,886 | 0.10068 | 27 |

2-2-12

Plan E-DS- 50' New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | Maintenance | NO | | | Total Cost | | Annual | Discount | Yr. |
| 37 | | Quantities | per Ocean | new | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Factor | # |
| 38 | Year | To Site E | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | | |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,413,673 | 0.09247 | 28 |
| 41 | 2021 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,216,921 | 0.08493 | 29 |
| 42 | 2022 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,036,208 | 0.07801 | 30 |
| 43 | 2023 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,870,225 | 0.07165 | 31 |
| 44 | 2024 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,717,773 | 0.06581 | 32 |
| 45 | 2025 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,577,748 | 0.06045 | 33 |
| 46 | 2026 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,449,137 | 0.05552 | 34 |
| 47 | 2027 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,331,010 | 0.05099 | 35 |
| 48 | 2028 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,222,512 | 0.04684 | 36 |
| 49 | 2029 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,122,858 | 0.04302 | 37 |
| 50 | 2030 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,031,328 | 0.03951 | 38 |
| 51 | 2031 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 947,259 | 0.03629 | 39 |
| 52 | 2032 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 870,042 | 0.03333 | 40 |
| 53 | 2033 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 799,120 | 0.03062 | 41 |
| 54 | 2034 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 733,980 | 0.02812 | 42 |
| 55 | 2035 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 674,149 | 0.02583 | 43 |
| 56 | 2036 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 619,195 | 0.02372 | 44 |
| 57 | 2037 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 568,721 | 0.02179 | 45 |
| 58 | 2038 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 522,362 | 0.02001 | 46 |
| 59 | 2039 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 479,781 | 0.01838 | 47 |
| 60 | 2040 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 440,672 | 0.01688 | 48 |
| 61 | 2041 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 404,750 | 0.01551 | 49 |
| 62 | 2042 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 371,757 | 0.01424 | 50 |
| 63 | 2043 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 341,453 | 0.01308 | 51 |
| 64 | 2044 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 313,619 | 0.01202 | 52 |
| 65 | 2045 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 288,054 | 0.01104 | 53 |
| 66 | 2046 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 264,573 | 0.01014 | 54 |
| 67 | 2047 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 243,006 | 0.00931 | 55 |
| 68 | 2048 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 223,198 | 0.00855 | 56 |
| 69 | | | | | | | | | | | |
| 70 | | 104,000,000 | 120,000,000 | | | | | | | | |
| 71 | | | | | | | | Total | $149,711,835 | | |

2-2-13

Plan F-DS1 - 50' New Work and NH Maint. - PW of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS -1 | PLAN F - EXP. (#6) 50' Out - DREDGING COSTS | | | | EXPANSION OF CI - Material goes to ocean when site full | | | | | |
| 2 | | | | | | Portion of material unsuitable continues going to the site | | | | | |
| 3 | | 6/20/90 | | | | Deduct 3 years of life to allow space for this | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | Maintenance | Maintenance | N O | | | Total Cost | | Annual | | |
| 6 | | Quantities | per Ocean | new | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Discount | Yr |
| 7 | Year | To Site F | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 8,511,743 | 0.71168 | 4 |
| 13 | 1997 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,817,904 | 0.65367 | 5 |
| 14 | 1998 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 7,180,624 | 0.60039 | 6 |
| 15 | 1999 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,595,292 | 0.55145 | 7 |
| 16 | 2000 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 6,057,673 | 0.50649 | 8 |
| 17 | 2001 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,563,879 | 0.46521 | 9 |
| 18 | 2002 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 5,110,337 | 0.42729 | 10 |
| 19 | 2003 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,693,765 | 0.39246 | 11 |
| 20 | 2004 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 4,311,150 | 0.36046 | 12 |
| 21 | 2005 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,959,725 | 0.33108 | 13 |
| 22 | 2006 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,636,946 | 0.30409 | 14 |
| 23 | 2007 | 4,000,000 | | | 2.99 | | 11,960,000 | 11,960,000 | 3,340,478 | 0.27930 | 15 |
| 24 | 2008 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 6,696,015 | 0.25654 | 16 |
| 25 | 2009 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 6,150,186 | 0.23562 | 17 |
| 26 | 2010 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 5,648,851 | 0.21642 | 18 |
| 27 | 2011 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 5,188,382 | 0.19878 | 19 |
| 28 | 2012 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 4,765,448 | 0.18257 | 20 |
| 29 | 2013 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 4,376,990 | 0.16769 | 21 |
| 30 | 2014 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 4,020,198 | 0.15402 | 22 |
| 31 | 2015 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 3,692,489 | 0.14147 | 23 |
| 32 | 2016 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 3,391,494 | 0.12993 | 24 |
| 33 | 2017 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 3,115,035 | 0.11934 | 25 |
| 34 | 2018 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,861,111 | 0.10961 | 26 |
| 35 | 2019 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,627,886 | 0.10068 | 27 |

2-2-14

Plan F-DS1 - 50' New Work and NH Maint. - PW of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | Maintenance | N O | | | Total Cost | | Annual | Discount | Yr |
| 37 | | Quantities | per Ocean | new | Maintenance | Total Cost | Deposited | Total Costs | Discounted | Factor | # |
| 38 | Year | To Site F | Disposal Plan | work | $ per Yd | Ocean Disp. | at Site | Site & Ocean | Amount | | |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,413,673 | 0.09247 | 28 |
| 41 | 2021 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,216,921 | 0.08493 | 29 |
| 42 | 2022 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 2,036,208 | 0.07801 | 30 |
| 43 | 2023 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,870,225 | 0.07165 | 31 |
| 44 | 2024 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,717,773 | 0.06581 | 32 |
| 45 | 2025 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,577,748 | 0.06045 | 33 |
| 46 | 2026 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,449,137 | 0.05552 | 34 |
| 47 | 2027 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,331,010 | 0.05099 | 35 |
| 48 | 2028 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,222,512 | 0.04684 | 36 |
| 49 | 2029 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,122,858 | 0.04302 | 37 |
| 50 | 2030 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 1,031,328 | 0.03951 | 38 |
| 51 | 2031 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 947,259 | 0.03629 | 39 |
| 52 | 2032 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 870,042 | 0.03333 | 40 |
| 53 | 2033 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 799,120 | 0.03062 | 41 |
| 54 | 2034 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 733,980 | 0.02812 | 42 |
| 55 | 2035 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 674,149 | 0.02583 | 43 |
| 56 | 2036 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 619,195 | 0.02372 | 44 |
| 57 | 2037 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 568,721 | 0.02179 | 45 |
| 58 | 2038 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 522,362 | 0.02001 | 46 |
| 59 | 2039 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 479,781 | 0.01838 | 47 |
| 60 | 2040 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 440,672 | 0.01688 | 48 |
| 61 | 2041 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 404,750 | 0.01551 | 49 |
| 62 | 2042 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 371,757 | 0.01424 | 50 |
| 63 | 2043 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 341,453 | 0.01308 | 51 |
| 64 | 2044 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 313,619 | 0.01202 | 52 |
| 65 | 2045 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 288,054 | 0.01104 | 53 |
| 66 | 2046 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 264,573 | 0.01014 | 54 |
| 67 | 2047 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 243,006 | 0.00931 | 55 |
| 68 | 2048 | | 4,000,000 | | | 26,101,600 | | 26,101,600 | 223,198 | 0.00855 | 56 |
| 69 | | | | | | | | | | | |
| 70 | TOTAL | 60,000,000 | 164,000,000 | | | | | Total | $176,750,543 | | |
| 71 | | | | | | | | | | | |
| 72 | | 224,000,000 | | | | | | | | | |

2-2-15

Plan Buckroe Beach - DS1-50' Outbound New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 1 | PLAN Buckroe Beach - 50' Out - DREDGING COSTS | | | | 6/19/90 | | | |
| 2 | | | | | | | | | |
| 3 | | Maintenance | No | | | | Annual | | |
| 4 | | Quantities | New | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | To Buckroe B. | Work | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | |
| 7 | 1993 | 4,000,000 | | 5.49 | | 21,960,000 | 20,169,920 | 0.91848 | 1 |
| 8 | 1994 | 4,000,000 | | 5.49 | | 21,960,000 | 18,525,759 | 0.84361 | 2 |
| 9 | 1995 | 4,000,000 | | 5.49 | | 21,960,000 | 17,015,622 | 0.77485 | 3 |
| 10 | 1996 | 4,000,000 | | 5.49 | | 21,960,000 | 15,628,585 | 0.71168 | 4 |
| 11 | 1997 | 4,000,000 | | 5.49 | | 21,960,000 | 14,354,613 | 0.65367 | 5 |
| 12 | 1998 | 4,000,000 | | 5.49 | | 21,960,000 | 13,184,490 | 0.60039 | 6 |
| 13 | 1999 | 4,000,000 | | 5.49 | | 21,960,000 | 12,109,750 | 0.55145 | 7 |
| 14 | 2000 | 4,000,000 | | 5.49 | | 21,960,000 | 11,122,617 | 0.50649 | 8 |
| 15 | 2001 | 4,000,000 | | 5.49 | | 21,960,000 | 10,215,952 | 0.46521 | 9 |
| 16 | 2002 | 4,000,000 | | 5.49 | | 21,960,000 | 9,383,193 | 0.42729 | 10 |
| 17 | 2003 | 4,000,000 | | 5.49 | | 21,960,000 | 8,618,317 | 0.39246 | 11 |
| 18 | 2004 | 4,000,000 | | 5.49 | | 21,960,000 | 7,915,791 | 0.36046 | 12 |
| 19 | 2005 | 4,000,000 | | 5.49 | | 21,960,000 | 7,270,531 | 0.33108 | 13 |
| 20 | 2006 | 4,000,000 | | 5.49 | | 21,960,000 | 6,677,870 | 0.30409 | 14 |
| 21 | 2007 | 4,000,000 | | 5.49 | | 21,960,000 | 6,133,520 | 0.27930 | 15 |
| 22 | 2008 | 4,000,000 | | 5.49 | | 21,960,000 | 5,633,543 | 0.25654 | 16 |
| 23 | 2009 | 4,000,000 | | 5.49 | | 21,960,000 | 5,174,322 | 0.23562 | 17 |
| 24 | 2010 | 4,000,000 | | 5.49 | | 21,960,000 | 4,752,535 | 0.21642 | 18 |
| 25 | 2011 | 4,000,000 | | 5.49 | | 21,960,000 | 4,365,130 | 0.19878 | 19 |
| 26 | 2012 | 4,000,000 | | 5.49 | | 21,960,000 | 4,009,304 | 0.18257 | 20 |
| 27 | 2013 | 4,000,000 | | 5.49 | | 21,960,000 | 3,682,483 | 0.16769 | 21 |
| 28 | 2014 | 4,000,000 | | 5.49 | | 21,960,000 | 3,382,304 | 0.15402 | 22 |
| 29 | 2015 | 4,000,000 | | 5.49 | | 21,960,000 | 3,106,594 | 0.14147 | 23 |
| 30 | 2016 | 4,000,000 | | 5.49 | | 21,960,000 | 2,853,358 | 0.12993 | 24 |
| 31 | 2017 | 4,000,000 | | 5.49 | | 21,960,000 | 2,620,765 | 0.11934 | 25 |
| 32 | 2018 | 4,000,000 | | 5.49 | | 21,960,000 | 2,407,132 | 0.10961 | 26 |
| 33 | 2019 | 4,000,000 | | 5.49 | | 21,960,000 | 2,210,914 | 0.10068 | 27 |
| 34 | 2020 | 4,000,000 | | 5.49 | | 21,960,000 | 2,030,690 | 0.09247 | 28 |
| 35 | 2021 | 4,000,000 | | 5.49 | | 21,960,000 | 1,865,157 | 0.08493 | 29 |

2-2-16

Plan Buckroe Beach - DS1-50' Outbound New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | No | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | New | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | Work | | | | | | |
| 39 | 2022 | 4,000,000 | | 5.49 | | 21,960,000 | 1,713,118 | 0.07801 | 30 |
| 40 | 2023 | 4,000,000 | | 5.49 | | 21,960,000 | 1,573,472 | 0.07165 | 31 |
| 41 | 2024 | 4,000,000 | | 5.49 | | 21,960,000 | 1,445,210 | 0.06581 | 32 |
| 42 | 2025 | 4,000,000 | | 5.49 | | 21,960,000 | 1,327,403 | 0.06045 | 33 |
| 43 | 2026 | 4,000,000 | | 5.49 | | 21,960,000 | 1,219,199 | 0.05552 | 34 |
| 44 | 2027 | 4,000,000 | | 5.49 | | 21,960,000 | 1,119,815 | 0.05099 | 35 |
| 45 | 2028 | 4,000,000 | | 5.49 | | 21,960,000 | 1,028,533 | 0.04684 | 36 |
| 46 | 2029 | 4,000,000 | | 5.49 | | 21,960,000 | 944,692 | 0.04302 | 37 |
| 47 | 2030 | 4,000,000 | | 5.49 | | 21,960,000 | 867,685 | 0.03951 | 38 |
| 48 | 2031 | 4,000,000 | | 5.49 | | 21,960,000 | 796,955 | 0.03629 | 39 |
| 49 | 2032 | 4,000,000 | | 5.49 | | 21,960,000 | 731,991 | 0.03333 | 40 |
| 50 | 2033 | 4,000,000 | | 5.49 | | 21,960,000 | 672,322 | 0.03062 | 41 |
| 51 | 2034 | 4,000,000 | | 5.49 | | 21,960,000 | 617,518 | 0.02812 | 42 |
| 52 | 2035 | 4,000,000 | | 5.49 | | 21,960,000 | 567,180 | 0.02583 | 43 |
| 53 | 2036 | 4,000,000 | | 5.49 | | 21,960,000 | 520,946 | 0.02372 | 44 |
| 54 | 2037 | 4,000,000 | | 5.49 | | 21,960,000 | 478,481 | 0.02179 | 45 |
| 55 | 2038 | 4,000,000 | | 5.49 | | 21,960,000 | 439,477 | 0.02001 | 46 |
| 56 | 2039 | 4,000,000 | | 5.49 | | 21,960,000 | 403,653 | 0.01838 | 47 |
| 57 | 2040 | 4,000,000 | | 5.49 | | 21,960,000 | 370,749 | 0.01688 | 48 |
| 58 | 2041 | 4,000,000 | | 5.49 | | 21,960,000 | 340,527 | 0.01551 | 49 |
| 59 | 2042 | 4,000,000 | | 5.49 | | 21,960,000 | 312,769 | 0.01424 | 50 |
| 60 | 2043 | 4,000,000 | | 5.49 | | 21,960,000 | 287,274 | 0.01308 | 51 |
| 61 | 2044 | 4,000,000 | | 5.49 | | 21,960,000 | 263,856 | 0.01202 | 52 |
| 62 | 2045 | 4,000,000 | | 5.49 | | 21,960,000 | 242,348 | 0.01104 | 53 |
| 63 | 2046 | 4,000,000 | | 5.49 | | 21,960,000 | 222,593 | 0.01014 | 54 |
| 64 | 2047 | 4,000,000 | | 5.49 | | 21,960,000 | 204,448 | 0.00931 | 55 |
| 65 | 2048 | 4,000,000 | | 5.49 | | 21,960,000 | 187,782 | 0.00855 | 56 |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | TOTAL | 224,000,000 | | | | Total | $245,320,761 | | |

2-2-17

Plan Ocean View - DS1-50' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 1 | PLAN Ocean View - 50' Out - DREDGING COSTS ONLY | | | | | 6/19/90 | | |
| 2 | | | | | | | | | |
| 3 | | Maintenance | | | | | | | |
| 4 | | Quantities | No New | Maintenance | Total Cost | Total Cost | Annual Discounted | Discount | # |
| 5 | Year | To Ocean View | Work | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | |
| 7 | 1993 | 4,000,000 | | 5.57 | | 22,280,000 | 20,463,835 | 0.91848 | 1 |
| 8 | 1994 | 4,000,000 | | 5.57 | | 22,280,000 | 20,463,835 | 0.84361 | 2 |
| 9 | 1995 | 4,000,000 | | 5.57 | | 22,280,000 | 18,795,715 | 0.77485 | 3 |
| 10 | 1996 | 4,000,000 | | 5.57 | | 22,280,000 | 17,263,573 | 0.71168 | 4 |
| 11 | 1997 | 4,000,000 | | 5.57 | | 22,280,000 | 15,856,324 | 0.65367 | 5 |
| 12 | 1998 | 4,000,000 | | 5.57 | | 22,280,000 | 14,563,788 | 0.60039 | 6 |
| 13 | 1999 | 4,000,000 | | 5.57 | | 22,280,000 | 13,376,613 | 0.55145 | 7 |
| 14 | 2000 | 4,000,000 | | 5.57 | | 22,280,000 | 12,286,212 | 0.50649 | 8 |
| 15 | 2001 | 4,000,000 | | 5.57 | | 22,280,000 | 11,284,695 | 0.46521 | 9 |
| 16 | 2002 | 4,000,000 | | 5.57 | | 22,280,000 | 10,364,818 | 0.42729 | 10 |
| 17 | 2003 | 4,000,000 | | 5.57 | | 22,280,000 | 9,519,925 | 0.39246 | 11 |
| 18 | 2004 | 4,000,000 | | 5.57 | | 22,280,000 | 8,743,903 | 0.36046 | 12 |
| 19 | 2005 | 4,000,000 | | 5.57 | | 22,280,000 | 8,031,140 | 0.33108 | 13 |
| 20 | 2006 | 4,000,000 | | 5.57 | | 22,280,000 | 7,376,477 | 0.30409 | 14 |
| 21 | 2007 | 4,000,000 | | 5.57 | | 22,280,000 | 6,775,180 | 0.27930 | 15 |
| 22 | 2008 | 4,000,000 | | 5.57 | | 22,280,000 | 6,222,898 | 0.25654 | 16 |
| 23 | 2009 | 4,000,000 | | 5.57 | | 22,280,000 | 5,715,635 | 0.23562 | 17 |
| 24 | 2010 | 4,000,000 | | 5.57 | | 22,280,000 | 5,249,722 | 0.21642 | 18 |
| 25 | 2011 | 4,000,000 | | 5.57 | | 22,280,000 | 4,821,789 | 0.19878 | 19 |
| 26 | 2012 | 4,000,000 | | 5.57 | | 22,280,000 | 4,428,738 | 0.18257 | 20 |
| 27 | 2013 | 4,000,000 | | 5.57 | | 22,280,000 | 4,067,727 | 0.16769 | 21 |
| 28 | 2014 | 4,000,000 | | 5.57 | | 22,280,000 | 3,736,144 | 0.15402 | 22 |
| 29 | 2015 | 4,000,000 | | 5.57 | | 22,280,000 | 3,431,591 | 0.14147 | 23 |
| 30 | 2016 | 4,000,000 | | 5.57 | | 22,280,000 | 3,151,863 | 0.12993 | 24 |
| 31 | 2017 | 4,000,000 | | 5.57 | | 22,280,000 | 2,894,937 | 0.11934 | 25 |
| 32 | 2018 | 4,000,000 | | 5.57 | | 22,280,000 | 2,658,955 | 0.10961 | 26 |
| 33 | 2019 | 4,000,000 | | 5.57 | | 22,280,000 | 2,442,209 | 0.10068 | 27 |
| 34 | 2020 | 4,000,000 | | 5.57 | | 22,280,000 | 2,243,131 | 0.09247 | 28 |
| 35 | 2021 | 4,000,000 | | 5.57 | | 22,280,000 | 2,060,281 | 0.08493 | 29 |

2-2-18

Plan Ocean View - DS1-50' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | No New | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Work | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | |
| 39 | 2022 | 4,000,000 | | 5.57 | | 22,280,000 | 1,738,082 | 0.07801 | 30 |
| 40 | 2023 | 4,000,000 | | 5.57 | | 22,280,000 | 1,596,401 | 0.07165 | 31 |
| 41 | 2024 | 4,000,000 | | 5.57 | | 22,280,000 | 1,466,270 | 0.06581 | 32 |
| 42 | 2025 | 4,000,000 | | 5.57 | | 22,280,000 | 1,346,746 | 0.06045 | 33 |
| 43 | 2026 | 4,000,000 | | 5.57 | | 22,280,000 | 1,236,965 | 0.05552 | 34 |
| 44 | 2027 | 4,000,000 | | 5.57 | | 22,280,000 | 1,136,133 | 0.05099 | 35 |
| 45 | 2028 | 4,000,000 | | 5.57 | | 22,280,000 | 1,043,521 | 0.04684 | 36 |
| 46 | 2029 | 4,000,000 | | 5.57 | | 22,280,000 | 958,458 | 0.04302 | 37 |
| 47 | 2030 | 4,000,000 | | 5.57 | | 22,280,000 | 880,329 | 0.03951 | 38 |
| 48 | 2031 | 4,000,000 | | 5.57 | | 22,280,000 | 808,568 | 0.03629 | 39 |
| 49 | 2032 | 4,000,000 | | 5.57 | | 22,280,000 | 742,657 | 0.03333 | 40 |
| 50 | 2033 | 4,000,000 | | 5.57 | | 22,280,000 | 682,119 | 0.03062 | 41 |
| 51 | 2034 | 4,000,000 | | 5.57 | | 22,280,000 | 626,516 | 0.02812 | 42 |
| 52 | 2035 | 4,000,000 | | 5.57 | | 22,280,000 | 575,445 | 0.02583 | 43 |
| 53 | 2036 | 4,000,000 | | 5.57 | | 22,280,000 | 528,537 | 0.02372 | 44 |
| 54 | 2037 | 4,000,000 | | 5.57 | | 22,280,000 | 485,453 | 0.02179 | 45 |
| 55 | 2038 | 4,000,000 | | 5.57 | | 22,280,000 | 445,882 | 0.02001 | 46 |
| 56 | 2039 | 4,000,000 | | 5.57 | | 22,280,000 | 409,535 | 0.01838 | 47 |
| 57 | 2040 | 4,000,000 | | 5.57 | | 22,280,000 | 376,152 | 0.01688 | 48 |
| 58 | 2041 | 4,000,000 | | 5.57 | | 22,280,000 | 345,490 | 0.01551 | 49 |
| 59 | 2042 | 4,000,000 | | 5.57 | | 22,280,000 | 317,327 | 0.01424 | 50 |
| 60 | 2043 | 4,000,000 | | 5.57 | | 22,280,000 | 291,460 | 0.01308 | 51 |
| 61 | 2044 | 4,000,000 | | 5.57 | | 22,280,000 | 267,701 | 0.01202 | 52 |
| 62 | 2045 | 4,000,000 | | 5.57 | | 22,280,000 | 245,879 | 0.01104 | 53 |
| 63 | 2046 | 4,000,000 | | 5.57 | | 22,280,000 | 225,836 | 0.01014 | 54 |
| 64 | 2047 | 4,000,000 | | 5.57 | | 22,280,000 | 207,427 | 0.00931 | 55 |
| 65 | 2048 | 4,000,000 | | 5.57 | | 22,280,000 | 190,519 | 0.00855 | 56 |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | TOTAL | 224,000,000 | | | | Total | $267,467,062 | | |

2-2-19

Plan Chesapeake Bay - DS1-50' Outbound New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 1 | PLAN Chesapeake Bay - 50' Out - DREDGING COSTS | | | | 6/19/90 | | | |
| 2 | | | | | | | | | |
| 3 | | Maintenance | No | | | | Annual | | |
| 4 | | Quantities | New | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | To Chesapeake B | Work | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | |
| 7 | 1993 | 4,000,000 | | 5.98 | | 23,920,000 | 21,970,149 | 0.91848 | 1 |
| 8 | 1994 | 4,000,000 | | 5.98 | | 23,920,000 | 20,179,242 | 0.84361 | 2 |
| 9 | 1995 | 4,000,000 | | 5.98 | | 23,920,000 | 18,534,321 | 0.77485 | 3 |
| 10 | 1996 | 4,000,000 | | 5.98 | | 23,920,000 | 17,023,486 | 0.71168 | 4 |
| 11 | 1997 | 4,000,000 | | 5.98 | | 23,920,000 | 15,635,808 | 0.65367 | 5 |
| 12 | 1998 | 4,000,000 | | 5.98 | | 23,920,000 | 14,361,248 | 0.60039 | 6 |
| 13 | 1999 | 4,000,000 | | 5.98 | | 23,920,000 | 13,190,583 | 0.55145 | 7 |
| 14 | 2000 | 4,000,000 | | 5.98 | | 23,920,000 | 12,115,346 | 0.50649 | 8 |
| 15 | 2001 | 4,000,000 | | 5.98 | | 23,920,000 | 11,127,758 | 0.46521 | 9 |
| 16 | 2002 | 4,000,000 | | 5.98 | | 23,920,000 | 10,220,673 | 0.42729 | 10 |
| 17 | 2003 | 4,000,000 | | 5.98 | | 23,920,000 | 9,387,530 | 0.39246 | 11 |
| 18 | 2004 | 4,000,000 | | 5.98 | | 23,920,000 | 8,622,301 | 0.36046 | 12 |
| 19 | 2005 | 4,000,000 | | 5.98 | | 23,920,000 | 7,919,449 | 0.33108 | 13 |
| 20 | 2006 | 4,000,000 | | 5.98 | | 23,920,000 | 7,273,892 | 0.30409 | 14 |
| 21 | 2007 | 4,000,000 | | 5.98 | | 23,920,000 | 6,680,957 | 0.27930 | 15 |
| 22 | 2008 | 4,000,000 | | 5.98 | | 23,920,000 | 6,136,355 | 0.25654 | 16 |
| 23 | 2009 | 4,000,000 | | 5.98 | | 23,920,000 | 5,636,147 | 0.23562 | 17 |
| 24 | 2010 | 4,000,000 | | 5.98 | | 23,920,000 | 5,176,714 | 0.21642 | 18 |
| 25 | 2011 | 4,000,000 | | 5.98 | | 23,920,000 | 4,754,731 | 0.19878 | 19 |
| 26 | 2012 | 4,000,000 | | 5.98 | | 23,920,000 | 4,367,147 | 0.18257 | 20 |
| 27 | 2013 | 4,000,000 | | 5.98 | | 23,920,000 | 4,011,157 | 0.16769 | 21 |
| 28 | 2014 | 4,000,000 | | 5.98 | | 23,920,000 | 3,684,185 | 0.15402 | 22 |
| 29 | 2015 | 4,000,000 | | 5.98 | | 23,920,000 | 3,383,867 | 0.14147 | 23 |
| 30 | 2016 | 4,000,000 | | 5.98 | | 23,920,000 | 3,108,030 | 0.12993 | 24 |
| 31 | 2017 | 4,000,000 | | 5.98 | | 23,920,000 | 2,854,677 | 0.11934 | 25 |
| 32 | 2018 | 4,000,000 | | 5.98 | | 23,920,000 | 2,621,977 | 0.10961 | 26 |
| 33 | 2019 | 4,000,000 | | 5.98 | | 23,920,000 | 2,408,245 | 0.10068 | 27 |
| 34 | 2020 | 4,000,000 | | 5.98 | | 23,920,000 | 2,211,936 | 0.09247 | 28 |
| 35 | 2021 | 4,000,000 | | 5.98 | | 23,920,000 | 2,031,629 | 0.08493 | 29 |

2-2-20

Plan Chesapeake Bay - DS1-50' Outbound New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 36 | | Maintenance | No | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | New | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | Work | | | | | | |
| 39 | 2022 | 4,000,000 | | 5.98 | | 23,920,000 | 1,866,019 | 0.07801 | 30 |
| 40 | 2023 | 4,000,000 | | 5.98 | | 23,920,000 | 1,713,910 | 0.07165 | 31 |
| 41 | 2024 | 4,000,000 | | 5.98 | | 23,920,000 | 1,574,200 | 0.06581 | 32 |
| 42 | 2025 | 4,000,000 | | 5.98 | | 23,920,000 | 1,445,878 | 0.06045 | 33 |
| 43 | 2026 | 4,000,000 | | 5.98 | | 23,920,000 | 1,328,016 | 0.05552 | 34 |
| 44 | 2027 | 4,000,000 | | 5.98 | | 23,920,000 | 1,219,763 | 0.05099 | 35 |
| 45 | 2028 | 4,000,000 | | 5.98 | | 23,920,000 | 1,120,333 | 0.04684 | 36 |
| 46 | 2029 | 4,000,000 | | 5.98 | | 23,920,000 | 1,029,008 | 0.04302 | 37 |
| 47 | 2030 | 4,000,000 | | 5.98 | | 23,920,000 | 945,128 | 0.03951 | 38 |
| 48 | 2031 | 4,000,000 | | 5.98 | | 23,920,000 | 868,086 | 0.03629 | 39 |
| 49 | 2032 | 4,000,000 | | 5.98 | | 23,920,000 | 797,323 | 0.03333 | 40 |
| 50 | 2033 | 4,000,000 | | 5.98 | | 23,920,000 | 732,329 | 0.03062 | 41 |
| 51 | 2034 | 4,000,000 | | 5.98 | | 23,920,000 | 672,633 | 0.02812 | 42 |
| 52 | 2035 | 4,000,000 | | 5.98 | | 23,920,000 | 617,803 | 0.02583 | 43 |
| 53 | 2036 | 4,000,000 | | 5.98 | | 23,920,000 | 567,442 | 0.02372 | 44 |
| 54 | 2037 | 4,000,000 | | 5.98 | | 23,920,000 | 521,187 | 0.02179 | 45 |
| 55 | 2038 | 4,000,000 | | 5.98 | | 23,920,000 | 478,702 | 0.02001 | 46 |
| 56 | 2039 | 4,000,000 | | 5.98 | | 23,920,000 | 439,681 | 0.01838 | 47 |
| 57 | 2040 | 4,000,000 | | 5.98 | | 23,920,000 | 403,840 | 0.01688 | 48 |
| 58 | 2041 | 4,000,000 | | 5.98 | | 23,920,000 | 370,921 | 0.01551 | 49 |
| 59 | 2042 | 4,000,000 | | 5.98 | | 23,920,000 | 340,685 | 0.01424 | 50 |
| 60 | 2043 | 4,000,000 | | 5.98 | | 23,920,000 | 312,914 | 0.01308 | 51 |
| 61 | 2044 | 4,000,000 | | 5.98 | | 23,920,000 | 287,406 | 0.01202 | 52 |
| 62 | 2045 | 4,000,000 | | 5.98 | | 23,920,000 | 263,978 | 0.01104 | 53 |
| 63 | 2046 | 4,000,000 | | 5.98 | | 23,920,000 | 242,460 | 0.01014 | 54 |
| 64 | 2047 | 4,000,000 | | 5.98 | | 23,920,000 | 222,696 | 0.00931 | 55 |
| 65 | 2048 | 4,000,000 | | 5.98 | | 23,920,000 | 204,543 | 0.00855 | 56 |
| 66 | | | | | | | | | |
| 67 | | | | | | Total | $267,216,421 | | |
| 68 | TOTAL | 224,000,000 | | | | | | | |

*Calculation of Yearly Dredging*

*Costs of all Plans Under*

*Dredging Scenario 2*

Summary - DS 2 Options

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | Dredging Scenario S2 - 55' Out. & Maintenance | | | | 6/20/90 | | |
| 2 | | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 | EXP F - Site 6 |
| 3 | Construction Costs (w/o IDC) | $53,504,000 | $55,538,000 | $24,688,000 | $45,158,000 | $22,396,000 | $25,780,000 |
| 4 | | | | | | | |
| 5 | NUMBER OF ACRES | 1,700 | 2,500 | 1,500 | 740 | 660 | 1000 |
| 6 | | | | | | | |
| 7 | # Years Site Receives Material | 26 | 49 | 20 | 4 | 3 | 8 |
| 8 | | | | | | | |
| 9 | Amount of Material Site Holds | 123,347,000 | 219,947,000 | 98,147,000 | 30,947,000 | 26,747,000 | 47,747,000 |
| 10 | | | | | | | |
| 11 | Average annual cost per yard | 5.42 | 5.37 | 4.97 | 6.93 | 6.64 | 5.89 |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | Ocean Disposal | | | | | |
| 16 | | with Confined | | | | | |
| 17 | | Unsuitable | Buckroe Beach | Ocean View | Chesapeake Bay | | |
| 18 | Construction Costs (w/o IDC) | 0 | $82,833,000 | $89,636,000 | $128,025,200 | | |
| 19 | | | | | | | |
| 20 | NUMBER OF ACRES | OCEAN | 2,500 | 2,000 | 2,000 | | |
| 21 | | | | | | | |
| 22 | # Years Site Receives Material | 49 | 49 | 49 | 49 | | |
| 23 | | | | | | | |
| 24 | Amount of Material Site Holds | n.a. | 219,947,000 | 219,947,000 | 219,947,000 | | |
| 25 | | | | | | | |
| 26 | Average annual cost per yard | 7.20 | 8.96 | 9.40 | 11.53 | | |

Ocean Disposal Costs - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 55' OUTBOUND | | Evaluate costs for period equal to life of Site B under DS - 2 | | | | | | |
| 2 | | 6/19/90 | | | | | | | |
| 3 | | | | | | | (F +G) | (C * E) | (D * H) |
| 4 | | Cubic Yards of Material | | New Work Unit Prices | | New Work | Total Unit | | |
| 5 | | NEW WORK | | For Dredging Only | | Unit Price | Cost for | Total Cost of New Work Elements | |
| 6 | | | | | | Cost for Use | Ocean | | |
| 7 | | Ocean Suitable | Material to | Ocean | Confined | of Reserved, | Unsuitable | Ocean | Confined |
| 8 | | Disposal | be Confined | Suitable | CI Exist. | Confined site | Material | Suitable | CI Extens. |
| 9 | | | | | | | | | |
| 10 | 1993 | 4,893,000 | | 4.82 | | | | 23,584,260 | |
| 11 | 1994 | 5,131,000 | | 4.80 | | | | 24,628,800 | |
| 12 | 1995 | 4,523,000 | | na | | | | 22,857,310 | |
| 13 | 1996 | | | | | | | | |
| 14 | 1997 | | | | | | | | |
| 15 | 1998 | | | | | | | | |
| 16 | 1999 | | | | | | | | |
| 17 | 2000 | | | | | | | | |
| 18 | 2001 | | NO NEW WORK ASSUMED AFTER 1995. ALL SUITABLE MATERIAL IS TAKEN TO THE OCEAN | | | | | | |
| 19 | 2002 | | SPACE IS RESERVED IN CRANEY ISLAND FOR THE UNSUITABLE MATERIAL. | | | | | | |
| 20 | 2003 | The $2/yard charge for remaining site costs is based on certain assumptions about the amount of sunk costs to be recovered. | | | | | | | |
| 21 | 2004 | | | | | | | | |
| 22 | 2005 | | Maintenance - Unsuitable: Quantities derived from Tables 16 and 19 in LTDS report. | | | | | | |
| 23 | 2006 | | In determining the average annual mainteance costs associated with ocean disposal | | | | | | |
| 24 | 2007 | | the following yards were used: | | | | | | |
| 25 | 2008 | | | | For all dredging scenarios which include only | | | | |
| 26 | 2009 | | | | | | | | |
| 27 | 2010 | | 355,000 | UNSUITABLE | 40' and 35' (existing channels) So. Branch maintenance | | | | |
| 28 | 2011 | | | | or, DS-1 (50 outbound & maintenance) | | | | |
| 29 | 2012 | | ADD TO THIS | | and DS-2 (55' outbound and maintenance). | | | | |
| 30 | 2013 | | | | | | | | |
| 31 | 2014 | | 113,000 | UNSUITABLE | 45' and 40' (new work depths) So. Branch maintenance, | | | | |
| 32 | 2015 | | | | or, DS-4 (50' Out. & So. Br. 45' and 40' and maintenance) and | | | | |
| 33 | 2016 | | | | DS-5 (55' outbound and So. Br. 45' and 40' and maintenance). | | | | |
| 34 | 2017 | | | | | | | | |
| 35 | 2018 | | | | Source: WES report Table 1 (February 1989) | | | | |
| 36 | 2019 | | | | | | | | |

2-3-2

Ocean Disposal Costs - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | |
| 2 | | 55' Outbound only | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 3 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 4 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 5 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 6 | | Ocean Suitable | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 7 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | 1993 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 49,685,860 | 45,635,692 | 0.9185 | 1 |
| 11 | 1994 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 50,730,400 | 42,796,864 | 0.8436 | 2 |
| 12 | 1995 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 50,224,910 | 38,916,580 | 0.7748 | 3 |
| 13 | 1996 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 19,477,089 | 0.7117 | 4 |
| 14 | 1997 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 17,889,404 | 0.6537 | 5 |
| 15 | 1998 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 16,431,140 | 0.6004 | 6 |
| 16 | 1999 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 15,091,748 | 0.5514 | 7 |
| 17 | 2000 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 13,861,536 | 0.5065 | 8 |
| 18 | 2001 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 12,731,606 | 0.4652 | 9 |
| 19 | 2002 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 11,693,783 | 0.4273 | 10 |
| 20 | 2003 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 10,740,559 | 0.3925 | 11 |
| 21 | 2004 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 9,865,037 | 0.3605 | 12 |
| 22 | 2005 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 9,060,883 | 0.3311 | 13 |
| 23 | 2006 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 8,322,281 | 0.3041 | 14 |
| 24 | 2007 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 7,643,886 | 0.2793 | 15 |
| 25 | 2008 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 7,020,791 | 0.2565 | 16 |
| 26 | 2009 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 6,448,487 | 0.2356 | 17 |
| 27 | 2010 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 5,922,836 | 0.2164 | 18 |
| 28 | 2011 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 5,440,033 | 0.1988 | 19 |
| 29 | 2012 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 4,996,586 | 0.1826 | 20 |
| 30 | 2013 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 4,589,287 | 0.1677 | 21 |
| 31 | 2014 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 4,215,189 | 0.1540 | 22 |
| 32 | 2015 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 3,871,585 | 0.1415 | 23 |
| 33 | 2016 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 3,555,991 | 0.1299 | 24 |
| 34 | 2017 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 3,266,123 | 0.1193 | 25 |
| 35 | 2018 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 2,999,883 | 0.1096 | 26 |
| 36 | 2019 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 2,755,346 | 0.1007 | 27 |

Ocean Disposal Costs - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | | | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 38 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 39 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 40 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 41 | | Ocean Suitable | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 42 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 43 | 2020 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 2,530,743 | 0.0925 | 28 |
| 44 | 2021 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 2,324,448 | 0.0849 | 29 |
| 45 | 2022 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 2,134,969 | 0.0780 | 30 |
| 46 | 2023 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,960,936 | 0.0717 | 31 |
| 47 | 2024 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,801,090 | 0.0658 | 32 |
| 48 | 2025 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,654,273 | 0.0604 | 33 |
| 49 | 2026 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,519,424 | 0.0555 | 34 |
| 50 | 2027 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,395,567 | 0.0510 | 35 |
| 51 | 2028 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,281,807 | 0.0468 | 36 |
| 52 | 2029 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,177,320 | 0.0430 | 37 |
| 53 | 2030 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 1,081,350 | 0.0395 | 38 |
| 54 | 2031 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 993,203 | 0.0363 | 39 |
| 55 | 2032 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 912,242 | 0.0333 | 40 |
| 56 | 2033 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 837,880 | 0.0306 | 41 |
| 57 | 2034 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 769,580 | 0.0281 | 42 |
| 58 | 2035 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 706,847 | 0.0258 | 43 |
| 59 | 2036 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 649,228 | 0.0237 | 44 |
| 60 | 2037 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 596,306 | 0.0218 | 45 |
| 61 | 2038 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 547,698 | 0.0200 | 46 |
| 62 | 2039 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 503,052 | 0.0184 | 47 |
| 63 | 2040 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 462,045 | 0.0169 | 48 |
| 64 | 2041 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 27,367,600 | 424,382 | 0.0155 | 49 |
| 65 | | | | | | | | | | | | | |
| 66 | | | | | | | | | | | $358,321,905 | | |
| 67 | | | | | | | | | | | | | |
| 68 | | 188,005,000 | 17,395,000 | | | | | | | | Total of discounted | | |
| 69 | | | | | | | | | | | amounts equals | | |
| 70 | | 14,547,000 | New Work | | | | | | | | Present Worth | | |
| 71 | | | | | | | | | | | | | |
| 72 | | 219,947,000 | | | | | | | | | | | |

2-3-4

Plan A-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-2 | PLAN A - EXP. (#1) | | 55' Out - DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site - | | | | |
| 3 | | 6/19/90 | | | | | Deduct 3 years of life to account for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr. |
| 7 | Year | Quantities | To Site 1 | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | (see tota | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,937,330 | 0.71168 | 4 |
| 13 | 1997 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,208,799 | 0.65367 | 5 |
| 14 | 1998 | | 4,200,000 | | | 2.99 | | 12,558,000 | 7,539,655 | 0.60039 | 6 |
| 15 | 1999 | | 4,200,000 | | | 2.99 | | 12,558,000 | 6,925,056 | 0.55145 | 7 |
| 16 | 2000 | | 4,200,000 | | | 2.99 | | 12,558,000 | 6,360,557 | 0.50649 | 8 |
| 17 | 2001 | | 4,200,000 | | | 2.99 | | 12,558,000 | 5,842,073 | 0.46521 | 9 |
| 18 | 2002 | | 4,200,000 | | | 2.99 | | 12,558,000 | 5,365,853 | 0.42729 | 10 |
| 19 | 2003 | | 4,200,000 | | | 2.99 | | 12,558,000 | 4,928,453 | 0.39246 | 11 |
| 20 | 2004 | | 4,200,000 | | | 2.99 | | 12,558,000 | 4,526,708 | 0.36046 | 12 |
| 21 | 2005 | | 4,200,000 | | | 2.99 | | 12,558,000 | 4,157,711 | 0.33108 | 13 |
| 22 | 2006 | | 4,200,000 | | | 2.99 | | 12,558,000 | 3,818,793 | 0.30409 | 14 |
| 23 | 2007 | | 4,200,000 | | | 2.99 | | 12,558,000 | 3,507,502 | 0.27930 | 15 |
| 24 | 2008 | | 4,200,000 | | | 2.99 | | 12,558,000 | 3,221,586 | 0.25654 | 16 |
| 25 | 2009 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,958,977 | 0.23562 | 17 |
| 26 | 2010 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,717,775 | 0.21642 | 18 |
| 27 | 2011 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,496,234 | 0.19878 | 19 |
| 28 | 2012 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,292,752 | 0.18257 | 20 |
| 29 | 2013 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,105,857 | 0.16769 | 21 |
| 30 | 2014 | | 4,200,000 | | | 2.99 | | 12,558,000 | 1,934,197 | 0.15402 | 22 |
| 31 | 2015 | | 4,200,000 | | | 2.99 | | 12,558,000 | 1,776,530 | 0.14147 | 23 |
| 32 | 2016 | | 4,200,000 | | | 2.99 | | 12,558,000 | 1,631,716 | 0.12993 | 24 |
| 33 | 2017 | | 4,200,000 | | | 2.99 | | 12,558,000 | 1,498,705 | 0.11934 | 25 |
| 34 | 2018 | | 4,200,000 | | | 2.99 | | 12,558,000 | 1,376,538 | 0.10961 | 26 |
| 35 | 2019 | | | 4,200,000 | | | 27,367,600 | 0 | 2,755,346 | 0.10068 | 27 |

2-3-5

Plan A-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr. |
| 38 | Year | Quantities | To Site 1 | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,200,000 | | | 27,367,600 | 0 | 2,530,743 | 0.09247 | 28 |
| 41 | 2021 | | | 4,200,000 | | | 27,367,600 | 0 | 2,324,448 | 0.08493 | 29 |
| 42 | 2022 | | | 4,200,000 | | | 27,367,600 | 0 | 2,134,969 | 0.07801 | 30 |
| 43 | 2023 | | | 4,200,000 | | | 27,367,600 | 0 | 1,960,936 | 0.07165 | 31 |
| 44 | 2024 | | | 4,200,000 | | | 27,367,600 | 0 | 1,801,090 | 0.06581 | 32 |
| 45 | 2025 | | | 4,200,000 | | | 27,367,600 | 0 | 1,654,273 | 0.06045 | 33 |
| 46 | 2026 | | | 4,200,000 | | | 27,367,600 | 0 | 1,519,424 | 0.05552 | 34 |
| 47 | 2027 | | | 4,200,000 | | | 27,367,600 | 0 | 1,395,567 | 0.05099 | 35 |
| 48 | 2028 | | | 4,200,000 | | | 27,367,600 | 0 | 1,281,807 | 0.04684 | 36 |
| 49 | 2029 | | | 4,200,000 | | | 27,367,600 | 0 | 1,177,320 | 0.04302 | 37 |
| 50 | 2030 | | | 4,200,000 | | | 27,367,600 | 0 | 1,081,350 | 0.03951 | 38 |
| 51 | 2031 | | | 4,200,000 | | | 27,367,600 | 0 | 993,203 | 0.03629 | 39 |
| 52 | 2032 | | | 4,200,000 | | | 27,367,600 | 0 | 912,242 | 0.03333 | 40 |
| 53 | 2033 | | | 4,200,000 | | | 27,367,600 | 0 | 837,880 | 0.03062 | 41 |
| 54 | 2034 | | | 4,200,000 | | | 27,367,600 | 0 | 769,580 | 0.02812 | 42 |
| 55 | 2035 | | | 4,200,000 | | | 27,367,600 | 0 | 706,847 | 0.02583 | 43 |
| 56 | 2036 | | | 4,200,000 | | | 27,367,600 | 0 | 649,228 | 0.02372 | 44 |
| 57 | 2037 | | | 4,200,000 | | | 27,367,600 | 0 | 596,306 | 0.02179 | 45 |
| 58 | 2038 | | | 4,200,000 | | | 27,367,600 | 0 | 547,698 | 0.02001 | 46 |
| 59 | 2039 | | | 4,200,000 | | | 27,367,600 | 0 | 503,052 | 0.01838 | 47 |
| 60 | 2040 | | | 4,200,000 | | | 27,367,600 | 0 | 462,045 | 0.01688 | 48 |
| 61 | 2041 | | | 4,200,000 | | | 27,367,600 | 0 | 424,382 | 0.01551 | 49 |
| 62 | 2042 | | | | | | | | | | |
| 63 | | | | | | | | | $189,085,655 | | Total |
| 64 | TOTAL | 14,547,000 | 108,800,000 | 96,600,000 | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | | | 219,947,000 | | | | | | | | |
| 67 | | | | | | | | | | | |
| 68 | | The life of the site has been shortened three years from WES' expected fill year (2021) to save | | | | | | | | | |
| 69 | | room for material which must be confined. The three years are assumed to provide enough storage | | | | | | | | | |
| 70 | | for this material so that ocean disposal of suitable material can continue for at the least the | | | | | | | | | |
| 71 | | number of years necessary to make the life of this dual plan option equal to the life of Site B. | | | | | | | | | |

2-3-6

Plan B-DS2 - 55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN B - EXP. (#2) | 55' Out - DREDGING COSTS ONLY | | | | 6/19/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 10 | 1996 | | 4,200,000 | | 2.99 | | 12,558,000 | 8,937,330 | 0.71168 | 4 |
| 11 | 1997 | | 4,200,000 | | 2.99 | | 12,558,000 | 8,208,799 | 0.65367 | 5 |
| 12 | 1998 | | 4,200,000 | | 2.99 | | 12,558,000 | 7,539,655 | 0.60039 | 6 |
| 13 | 1999 | | 4,200,000 | | 2.99 | | 12,558,000 | 6,925,056 | 0.55145 | 7 |
| 14 | 2000 | | 4,200,000 | | 2.99 | | 12,558,000 | 6,360,557 | 0.50649 | 8 |
| 15 | 2001 | | 4,200,000 | | 2.99 | | 12,558,000 | 5,842,073 | 0.46521 | 9 |
| 16 | 2002 | | 4,200,000 | | 2.99 | | 12,558,000 | 5,365,853 | 0.42729 | 10 |
| 17 | 2003 | | 4,200,000 | | 2.99 | | 12,558,000 | 4,928,453 | 0.39246 | 11 |
| 18 | 2004 | | 4,200,000 | | 2.99 | | 12,558,000 | 4,526,708 | 0.36046 | 12 |
| 19 | 2005 | | 4,200,000 | | 2.99 | | 12,558,000 | 4,157,711 | 0.33108 | 13 |
| 20 | 2006 | | 4,200,000 | | 2.99 | | 12,558,000 | 3,818,793 | 0.30409 | 14 |
| 21 | 2007 | | 4,200,000 | | 2.99 | | 12,558,000 | 3,507,502 | 0.27930 | 15 |
| 22 | 2008 | | 4,200,000 | | 2.99 | | 12,558,000 | 3,221,586 | 0.25654 | 16 |
| 23 | 2009 | | 4,200,000 | | 2.99 | | 12,558,000 | 2,958,977 | 0.23562 | 17 |
| 24 | 2010 | | 4,200,000 | | 2.99 | | 12,558,000 | 2,717,775 | 0.21642 | 18 |
| 25 | 2011 | | 4,200,000 | | 2.99 | | 12,558,000 | 2,496,234 | 0.19878 | 19 |
| 26 | 2012 | | 4,200,000 | | 2.99 | | 12,558,000 | 2,292,752 | 0.18257 | 20 |
| 27 | 2013 | | 4,200,000 | | 2.99 | | 12,558,000 | 2,105,857 | 0.16769 | 21 |
| 28 | 2014 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,934,197 | 0.15402 | 22 |
| 29 | 2015 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,776,530 | 0.14147 | 23 |
| 30 | 2016 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,631,716 | 0.12993 | 24 |
| 31 | 2017 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,498,705 | 0.11934 | 25 |
| 32 | 2018 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,376,538 | 0.10961 | 26 |
| 33 | 2019 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,264,329 | 0.10068 | 27 |
| 34 | 2020 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,161,266 | 0.09247 | 28 |
| 35 | 2021 | | 4,200,000 | | 2.99 | | 12,558,000 | 1,066,605 | 0.08493 | 29 |

2-3-7

Plan B-DS2 - 55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,200,000 | | 2.99 | | 12,558,000 | 979,660 | 0.07801 | 30 |
| 40 | 2023 | | 4,200,000 | | 2.99 | | 12,558,000 | 899,803 | 0.07165 | 31 |
| 41 | 2024 | | 4,200,000 | | 2.99 | | 12,558,000 | 826,455 | 0.06581 | 32 |
| 42 | 2025 | | 4,200,000 | | 2.99 | | 12,558,000 | 759,086 | 0.06045 | 33 |
| 43 | 2026 | | 4,200,000 | | 2.99 | | 12,558,000 | 697,209 | 0.05552 | 34 |
| 44 | 2027 | | 4,200,000 | | 2.99 | | 12,558,000 | 640,375 | 0.05099 | 35 |
| 45 | 2028 | | 4,200,000 | | 2.99 | | 12,558,000 | 588,175 | 0.04684 | 36 |
| 46 | 2029 | | 4,200,000 | | 2.99 | | 12,558,000 | 540,229 | 0.04302 | 37 |
| 47 | 2030 | | 4,200,000 | | 2.99 | | 12,558,000 | 496,192 | 0.03951 | 38 |
| 48 | 2031 | | 4,200,000 | | 2.99 | | 12,558,000 | 455,745 | 0.03629 | 39 |
| 49 | 2032 | | 4,200,000 | | 2.99 | | 12,558,000 | 418,595 | 0.03333 | 40 |
| 50 | 2033 | | 4,200,000 | | 2.99 | | 12,558,000 | 384,473 | 0.03062 | 41 |
| 51 | 2034 | | 4,200,000 | | 2.99 | | 12,558,000 | 353,132 | 0.02812 | 42 |
| 52 | 2035 | | 4,200,000 | | 2.99 | | 12,558,000 | 324,347 | 0.02583 | 43 |
| 53 | 2036 | | 4,200,000 | | 2.99 | | 12,558,000 | 297,907 | 0.02372 | 44 |
| 54 | 2037 | | 4,200,000 | | 2.99 | | 12,558,000 | 273,623 | 0.02179 | 45 |
| 55 | 2038 | | 4,200,000 | | 2.99 | | 12,558,000 | 251,319 | 0.02001 | 46 |
| 56 | 2039 | | 4,200,000 | | 2.99 | | 12,558,000 | 230,832 | 0.01838 | 47 |
| 57 | 2040 | | 4,200,000 | | 2.99 | | 12,558,000 | 212,016 | 0.01688 | 48 |
| 58 | 2041 | | 4,200,000 | | 2.99 | | 12,558,000 | 194,733 | 0.01551 | 49 |
| 59 | 2042 | | | | | | | | | |
| 60 | | | | | | | Total | $173,382,024 | | |
| 61 | TOTAL | 14,547,000 | 205,400,000 | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | 219,947,000 | | | | | | | |

2-3-8

Plan C-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN C - EXP. (#3) | | 55' Out - DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/19/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | New | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site C | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | see total | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,937,330 | 0.71168 | 4 |
| 13 | 1997 | | | 4,200,000 | | | | 27,367,600 | 17,889,404 | 0.65367 | 5 |
| 14 | 1998 | | | 4,200,000 | | | | 27,367,600 | 16,431,140 | 0.60039 | 6 |
| 15 | 1999 | | | 4,200,000 | | | | 27,367,600 | 15,091,748 | 0.55145 | 7 |
| 16 | 2000 | | | 4,200,000 | | | | 27,367,600 | 13,861,536 | 0.50649 | 8 |
| 17 | 2001 | | | 4,200,000 | | | | 27,367,600 | 12,731,606 | 0.46521 | 9 |
| 18 | 2002 | | | 4,200,000 | | | | 27,367,600 | 11,693,783 | 0.42729 | 10 |
| 19 | 2003 | | | 4,200,000 | | | | 27,367,600 | 10,740,559 | 0.39246 | 11 |
| 20 | 2004 | | | 4,200,000 | | | | 27,367,600 | 9,865,037 | 0.36046 | 12 |
| 21 | 2005 | | | 4,200,000 | | | | 27,367,600 | 9,060,883 | 0.33108 | 13 |
| 22 | 2006 | | | 4,200,000 | | | | 27,367,600 | 8,322,281 | 0.30409 | 14 |
| 23 | 2007 | | | 4,200,000 | | | | 27,367,600 | 7,643,886 | 0.27930 | 15 |
| 24 | 2008 | | | 4,200,000 | | | | 27,367,600 | 7,020,791 | 0.25654 | 16 |
| 25 | 2009 | | | 4,200,000 | | | | 27,367,600 | 6,448,487 | 0.23562 | 17 |
| 26 | 2010 | | | 4,200,000 | | | | 27,367,600 | 5,922,836 | 0.21642 | 18 |
| 27 | 2011 | | | 4,200,000 | | | | 27,367,600 | 5,440,033 | 0.19878 | 19 |
| 28 | 2012 | | | 4,200,000 | | | | 27,367,600 | 4,996,586 | 0.18257 | 20 |
| 29 | 2013 | | | 4,200,000 | | | | 27,367,600 | 4,589,287 | 0.16769 | 21 |
| 30 | 2014 | | | 4,200,000 | | | | 27,367,600 | 4,215,189 | 0.15402 | 22 |
| 31 | 2015 | | | 4,200,000 | | | | 27,367,600 | 3,871,585 | 0.14147 | 23 |
| 32 | 2016 | | | 4,200,000 | | | | 27,367,600 | 3,555,991 | 0.12993 | 24 |
| 33 | 2017 | | | 4,200,000 | | | | 27,367,600 | 3,266,123 | 0.11934 | 25 |
| 34 | 2018 | | | 4,200,000 | | | | 27,367,600 | 2,999,883 | 0.10961 | 26 |
| 35 | 2019 | | | 4,200,000 | | | | 27,367,600 | 2,755,346 | 0.10068 | 27 |

Plan C-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | New | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,200,000 | | | | 27,367,600 | 2,530,743 | 0.09247 | 28 |
| 41 | 2021 | | | 4,200,000 | | | | 27,367,600 | 2,324,448 | 0.08493 | 29 |
| 42 | 2022 | | | 4,200,000 | | | | 27,367,600 | 2,134,969 | 0.07801 | 30 |
| 43 | 2023 | | | 4,200,000 | | | | 27,367,600 | 1,960,936 | 0.07165 | 31 |
| 44 | 2024 | | | 4,200,000 | | | | 27,367,600 | 1,801,090 | 0.06581 | 32 |
| 45 | 2025 | | | 4,200,000 | | | | 27,367,600 | 1,654,273 | 0.06045 | 33 |
| 46 | 2026 | | | 4,200,000 | | | | 27,367,600 | 1,519,424 | 0.05552 | 34 |
| 47 | 2027 | | | 4,200,000 | | | | 27,367,600 | 1,395,567 | 0.05099 | 35 |
| 48 | 2028 | | | 4,200,000 | | | | 27,367,600 | 1,281,807 | 0.04684 | 36 |
| 49 | 2029 | | | 4,200,000 | | | | 27,367,600 | 1,177,320 | 0.04302 | 37 |
| 50 | 2030 | | | 4,200,000 | | | | 27,367,600 | 1,081,350 | 0.03951 | 38 |
| 51 | 2031 | | | 4,200,000 | | | | 27,367,600 | 993,203 | 0.03629 | 39 |
| 52 | 2032 | | | 4,200,000 | | | | 27,367,600 | 912,242 | 0.03333 | 40 |
| 53 | 2033 | | | 4,200,000 | | | | 27,367,600 | 837,880 | 0.03062 | 41 |
| 54 | 2034 | | | 4,200,000 | | | | 27,367,600 | 769,580 | 0.02812 | 42 |
| 55 | 2035 | | | 4,200,000 | | | | 27,367,600 | 706,847 | 0.02583 | 43 |
| 56 | 2036 | | | 4,200,000 | | | | 27,367,600 | 649,228 | 0.02372 | 44 |
| 57 | 2037 | | | 4,200,000 | | | | 27,367,600 | 596,306 | 0.02179 | 45 |
| 58 | 2038 | | | 4,200,000 | | | | 27,367,600 | 547,698 | 0.02001 | 46 |
| 59 | 2039 | | | 4,200,000 | | | | 27,367,600 | 503,052 | 0.01838 | 47 |
| 60 | 2040 | | | 4,200,000 | | | | 27,367,600 | 462,045 | 0.01688 | 48 |
| 61 | 2041 | | | 4,200,000 | | | | 27,367,600 | 424,382 | 0.01551 | 49 |
| 62 | 2042 | | | | | | | | | | |
| 63 | | | | | | | | Total | $289,552,279 | | |
| 64 | TOTAL | 14,547,000 | 16,400,000 | 189,000,000 | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | | | 219,947,000 | | | | | | 6/19/90 | | |

2-3-10

Plan D-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN D - EXP. (#4) | | 55' Out - DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/19/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | New | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site D | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | see totals | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | | | 4,200,000 | | | | 27,367,600 | 19,477,089 | 0.71168 | 4 |
| 13 | 1997 | | | 4,200,000 | | | | 27,367,600 | 17,889,404 | 0.65367 | 5 |
| 14 | 1998 | | | 4,200,000 | | | | 27,367,600 | 16,431,140 | 0.60039 | 6 |
| 15 | 1999 | | | 4,200,000 | | | | 27,367,600 | 15,091,748 | 0.55145 | 7 |
| 16 | 2000 | | | 4,200,000 | | | | 27,367,600 | 13,861,536 | 0.50649 | 8 |
| 17 | 2001 | | | 4,200,000 | | | | 27,367,600 | 12,731,606 | 0.46521 | 9 |
| 18 | 2002 | | | 4,200,000 | | | | 27,367,600 | 11,693,783 | 0.42729 | 10 |
| 19 | 2003 | | | 4,200,000 | | | | 27,367,600 | 10,740,559 | 0.39246 | 11 |
| 20 | 2004 | | | 4,200,000 | | | | 27,367,600 | 9,865,037 | 0.36046 | 12 |
| 21 | 2005 | | | 4,200,000 | | | | 27,367,600 | 9,060,883 | 0.33108 | 13 |
| 22 | 2006 | | | 4,200,000 | | | | 27,367,600 | 8,322,281 | 0.30409 | 14 |
| 23 | 2007 | | | 4,200,000 | | | | 27,367,600 | 7,643,886 | 0.27930 | 15 |
| 24 | 2008 | | | 4,200,000 | | | | 27,367,600 | 7,020,791 | 0.25654 | 16 |
| 25 | 2009 | | | 4,200,000 | | | | 27,367,600 | 6,448,487 | 0.23562 | 17 |
| 26 | 2010 | | | 4,200,000 | | | | 27,367,600 | 5,922,836 | 0.21642 | 18 |
| 27 | 2011 | | | 4,200,000 | | | | 27,367,600 | 5,440,033 | 0.19878 | 19 |
| 28 | 2012 | | | 4,200,000 | | | | 27,367,600 | 4,996,586 | 0.18257 | 20 |
| 29 | 2013 | | | 4,200,000 | | | | 27,367,600 | 4,589,287 | 0.16769 | 21 |
| 30 | 2014 | | | 4,200,000 | | | | 27,367,600 | 4,215,189 | 0.15402 | 22 |
| 31 | 2015 | | | 4,200,000 | | | | 27,367,600 | 3,871,585 | 0.14147 | 23 |
| 32 | 2016 | | | 4,200,000 | | | | 27,367,600 | 3,555,991 | 0.12993 | 24 |
| 33 | 2017 | | | 4,200,000 | | | | 27,367,600 | 3,266,123 | 0.11934 | 25 |
| 34 | 2018 | | | 4,200,000 | | | | 27,367,600 | 2,999,883 | 0.10961 | 26 |
| 35 | 2019 | | | 4,200,000 | | | | 27,367,600 | 2,755,346 | 0.10068 | 27 |

Plan D-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | New | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,200,000 | | | | 27,367,600 | 2,530,743 | 0.09247 | 28 |
| 41 | 2021 | | | 4,200,000 | | | | 27,367,600 | 2,324,448 | 0.08493 | 29 |
| 42 | 2022 | | | 4,200,000 | | | | 27,367,600 | 2,134,969 | 0.07801 | 30 |
| 43 | 2023 | | | 4,200,000 | | | | 27,367,600 | 1,960,936 | 0.07165 | 31 |
| 44 | 2024 | | | 4,200,000 | | | | 27,367,600 | 1,801,090 | 0.06581 | 32 |
| 45 | 2025 | | | 4,200,000 | | | | 27,367,600 | 1,654,273 | 0.06045 | 33 |
| 46 | 2026 | | | 4,200,000 | | | | 27,367,600 | 1,519,424 | 0.05552 | 34 |
| 47 | 2027 | | | 4,200,000 | | | | 27,367,600 | 1,395,567 | 0.05099 | 35 |
| 48 | 2028 | | | 4,200,000 | | | | 27,367,600 | 1,281,807 | 0.04684 | 36 |
| 49 | 2029 | | | 4,200,000 | | | | 27,367,600 | 1,177,320 | 0.04302 | 37 |
| 50 | 2030 | | | 4,200,000 | | | | 27,367,600 | 1,081,350 | 0.03951 | 38 |
| 51 | 2031 | | | 4,200,000 | | | | 27,367,600 | 993,203 | 0.03629 | 39 |
| 52 | 2032 | | | 4,200,000 | | | | 27,367,600 | 912,242 | 0.03333 | 40 |
| 53 | 2033 | | | 4,200,000 | | | | 27,367,600 | 837,880 | 0.03062 | 41 |
| 54 | 2034 | | | 4,200,000 | | | | 27,367,600 | 769,580 | 0.02812 | 42 |
| 55 | 2035 | | | 4,200,000 | | | | 27,367,600 | 706,847 | 0.02583 | 43 |
| 56 | 2036 | | | 4,200,000 | | | | 27,367,600 | 649,228 | 0.02372 | 44 |
| 57 | 2037 | | | 4,200,000 | | | | 27,367,600 | 596,306 | 0.02179 | 45 |
| 58 | 2038 | | | 4,200,000 | | | | 27,367,600 | 547,698 | 0.02001 | 46 |
| 59 | 2039 | | | 4,200,000 | | | | 27,367,600 | 503,052 | 0.01838 | 47 |
| 60 | 2040 | | | 4,200,000 | | | | 27,367,600 | 462,045 | 0.01688 | 48 |
| 61 | 2041 | | | 4,200,000 | | | | 27,367,600 | 424,382 | 0.01551 | 49 |
| 62 | 2042 | | | | | | | | | | |
| 63 | | | | | | | | | $300,092,038 | Total | |
| 64 | TOTAL | 14,547,000 | 12,200,000 | 193,200,000 | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | | | 219,947,000 | | | | | | 6/19/90 | | |

2-3-12

Plan E-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN E - EXP. (#5) | | 55' Out - DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/19/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | New | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site E | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | see total | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,937,330 | 0.71168 | 4 |
| 13 | 1997 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,208,799 | 0.65367 | 5 |
| 14 | 1998 | | 4,200,000 | | | 2.99 | | 12,558,000 | 7,539,655 | 0.60039 | 6 |
| 15 | 1999 | | 4,200,000 | | | 2.99 | | 12,558,000 | 6,925,056 | 0.55145 | 7 |
| 16 | 2000 | | 4,200,000 | | | 2.99 | | 12,558,000 | 6,360,557 | 0.50649 | 8 |
| 17 | 2001 | | 4,200,000 | | | 2.99 | | 12,558,000 | 5,842,073 | 0.46521 | 9 |
| 18 | 2002 | | 4,200,000 | | | 2.99 | | 12,558,000 | 5,365,853 | 0.42729 | 10 |
| 19 | 2003 | | 4,200,000 | | | 2.99 | | 12,558,000 | 4,928,453 | 0.39246 | 11 |
| 20 | 2004 | | 4,200,000 | | | 2.99 | | 12,558,000 | 4,526,708 | 0.36046 | 12 |
| 21 | 2005 | | 4,200,000 | | | 2.99 | | 12,558,000 | 4,157,711 | 0.33108 | 13 |
| 22 | 2006 | | 4,200,000 | | | 2.99 | | 12,558,000 | 3,818,793 | 0.30409 | 14 |
| 23 | 2007 | | 4,200,000 | | | 2.99 | | 12,558,000 | 3,507,502 | 0.27930 | 15 |
| 24 | 2008 | | 4,200,000 | | | 2.99 | | 12,558,000 | 3,221,586 | 0.25654 | 16 |
| 25 | 2009 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,958,977 | 0.23562 | 17 |
| 26 | 2010 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,717,775 | 0.21642 | 18 |
| 27 | 2011 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,496,234 | 0.19878 | 19 |
| 28 | 2012 | | 4,200,000 | | | 2.99 | | 12,558,000 | 2,292,752 | 0.18257 | 20 |
| 29 | 2013 | | | 4,200,000 | | | 27,367,600 | 0 | 4,589,287 | 0.16769 | 21 |
| 30 | 2014 | | | 4,200,000 | | | 27,367,600 | 0 | 4,215,189 | 0.15402 | 22 |
| 31 | 2015 | | | 4,200,000 | | | 27,367,600 | 0 | 3,871,585 | 0.14147 | 23 |
| 32 | 2016 | | | 4,200,000 | | | 27,367,600 | 0 | 3,555,991 | 0.12993 | 24 |
| 33 | 2017 | | | 4,200,000 | | | 27,367,600 | 0 | 3,266,123 | 0.11934 | 25 |
| 34 | 2018 | | | 4,200,000 | | | 27,367,600 | 0 | 2,999,883 | 0.10961 | 26 |
| 35 | 2019 | | | 4,200,000 | | | 27,367,600 | 0 | 2,755,346 | 0.10068 | 27 |

2-3-13

Plan E-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | New | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,200,000 | | | 27,367,600 | 0 | 2,530,743 | 0.09247 | 28 |
| 41 | 2021 | | | 4,200,000 | | | 27,367,600 | 0 | 2,324,448 | 0.08493 | 29 |
| 42 | 2022 | | | 4,200,000 | | | 27,367,600 | 0 | 2,134,969 | 0.07801 | 30 |
| 43 | 2023 | | | 4,200,000 | | | 27,367,600 | 0 | 1,960,936 | 0.07165 | 31 |
| 44 | 2024 | | | 4,200,000 | | | 27,367,600 | 0 | 1,801,090 | 0.06581 | 32 |
| 45 | 2025 | | | 4,200,000 | | | 27,367,600 | 0 | 1,654,273 | 0.06045 | 33 |
| 46 | 2026 | | | 4,200,000 | | | 27,367,600 | 0 | 1,519,424 | 0.05552 | 34 |
| 47 | 2027 | | | 4,200,000 | | | 27,367,600 | 0 | 1,395,567 | 0.05099 | 35 |
| 48 | 2028 | | | 4,200,000 | | | 27,367,600 | 0 | 1,281,807 | 0.04684 | 36 |
| 49 | 2029 | | | 4,200,000 | | | 27,367,600 | 0 | 1,177,320 | 0.04302 | 37 |
| 50 | 2030 | | | 4,200,000 | | | 27,367,600 | 0 | 1,081,350 | 0.03951 | 38 |
| 51 | 2031 | | | 4,200,000 | | | 27,367,600 | 0 | 993,203 | 0.03629 | 39 |
| 52 | 2032 | | | 4,200,000 | | | 27,367,600 | 0 | 912,242 | 0.03333 | 40 |
| 53 | 2033 | | | 4,200,000 | | | 27,367,600 | 0 | 837,880 | 0.03062 | 41 |
| 54 | 2034 | | | 4,200,000 | | | 27,367,600 | 0 | 769,580 | 0.02812 | 42 |
| 55 | 2035 | | | 4,200,000 | | | 27,367,600 | 0 | 706,847 | 0.02583 | 43 |
| 56 | 2036 | | | 4,200,000 | | | 27,367,600 | 0 | 649,228 | 0.02372 | 44 |
| 57 | 2037 | | | 4,200,000 | | | 27,367,600 | 0 | 596,306 | 0.02179 | 45 |
| 58 | 2038 | | | 4,200,000 | | | 27,367,600 | 0 | 547,698 | 0.02001 | 46 |
| 59 | 2039 | | | 4,200,000 | | | 27,367,600 | 0 | 503,052 | 0.01838 | 47 |
| 60 | 2040 | | | 4,200,000 | | | 27,367,600 | 0 | 462,045 | 0.01688 | 48 |
| 61 | 2041 | | | 4,200,000 | | | 27,367,600 | 0 | 424,382 | 0.01551 | 49 |
| 62 | 2042 | | | | | | | | | | |
| 63 | | | | | | | | | $201,260,169 | Total | |
| 64 | TOTAL | 14,547,000 | 83,600,000 | 121,800,000 | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | | | 219,947,000 | | | | | | 6/19/90 | | |
| 67 | | | | | | | | | | | |
| 68 | | The life of the site has been shortened three years from WES' expected fill year (2015) to save room for material | | | | | | | | | |
| 69 | | which must be confined. The three years are assumed to provide enough storage for this material so that ocean | | | | | | | | | |
| 70 | | disposal of suitable material can continue for at the least the number of years necessary to make the life of this | | | | | | | | | |
| 71 | | dual plan option equal to the life of Site B (2)-Craney Island Extension. | | | | | | | | | |

2-3-14

Plan F-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN F - EXP. (#6) | | 55' Out - DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/19/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site F | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | (see tota | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,937,330 | 0.71168 | 4 |
| 13 | 1997 | | 4,200,000 | | | 2.99 | | 12,558,000 | 8,208,799 | 0.65367 | 5 |
| 14 | 1998 | | 4,200,000 | | | 2.99 | | 12,558,000 | 7,539,655 | 0.60039 | 6 |
| 15 | 1999 | | 4,200,000 | | | 2.99 | | 12,558,000 | 6,925,056 | 0.55145 | 7 |
| 16 | 2000 | | 4,200,000 | | | 2.99 | | 12,558,000 | 6,360,557 | 0.50649 | 8 |
| 17 | 2001 | | | 4,200,000 | | | | 27,367,600 | 12,731,606 | 0.46521 | 9 |
| 18 | 2002 | | | 4,200,000 | | | | 27,367,600 | 11,693,783 | 0.42729 | 10 |
| 19 | 2003 | | | 4,200,000 | | | | 27,367,600 | 10,740,559 | 0.39246 | 11 |
| 20 | 2004 | | | 4,200,000 | | | | 27,367,600 | 9,865,037 | 0.36046 | 12 |
| 21 | 2005 | | | 4,200,000 | | | | 27,367,600 | 9,060,883 | 0.33108 | 13 |
| 22 | 2006 | | | 4,200,000 | | | | 27,367,600 | 8,322,281 | 0.30409 | 14 |
| 23 | 2007 | | | 4,200,000 | | | | 27,367,600 | 7,643,886 | 0.27930 | 15 |
| 24 | 2008 | | | 4,200,000 | | | | 27,367,600 | 7,020,791 | 0.25654 | 16 |
| 25 | 2009 | | | 4,200,000 | | | | 27,367,600 | 6,448,487 | 0.23562 | 17 |
| 26 | 2010 | | | 4,200,000 | | | | 27,367,600 | 5,922,836 | 0.21642 | 18 |
| 27 | 2011 | | | 4,200,000 | | | | 27,367,600 | 5,440,033 | 0.19878 | 19 |
| 28 | 2012 | | | 4,200,000 | | | | 27,367,600 | 4,996,586 | 0.18257 | 20 |
| 29 | 2013 | | | 4,200,000 | | | | 27,367,600 | 4,589,287 | 0.16769 | 21 |
| 30 | 2014 | | | 4,200,000 | | | | 27,367,600 | 4,215,189 | 0.15402 | 22 |
| 31 | 2015 | | | 4,200,000 | | | | 27,367,600 | 3,871,585 | 0.14147 | 23 |
| 32 | 2016 | | | 4,200,000 | | | | 27,367,600 | 3,555,991 | 0.12993 | 24 |
| 33 | 2017 | | | 4,200,000 | | | | 27,367,600 | 3,266,123 | 0.11934 | 25 |
| 34 | 2018 | | | 4,200,000 | | | | 27,367,600 | 2,999,883 | 0.10961 | 26 |
| 35 | 2019 | | | 4,200,000 | | | | 27,367,600 | 2,755,346 | 0.10068 | 27 |

2-3-15

Plan F-DS2 - 55' Outbound New Work and NH Maint. - P W of Dredging Costs Based on Life of Site, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,200,000 | | | | 27,367,600 | 2,530,743 | 0.09247 | 28 |
| 41 | 2021 | | | 4,200,000 | | | | 27,367,600 | 2,324,448 | 0.08493 | 29 |
| 42 | 2022 | | | 4,200,000 | | | | 27,367,600 | 2,134,969 | 0.07801 | 30 |
| 43 | 2023 | | | 4,200,000 | | | | 27,367,600 | 1,960,936 | 0.07165 | 31 |
| 44 | 2024 | | | 4,200,000 | | | | 27,367,600 | 1,801,090 | 0.06581 | 32 |
| 45 | 2025 | | | 4,200,000 | | | | 27,367,600 | 1,654,273 | 0.06045 | 33 |
| 46 | 2026 | | | 4,200,000 | | | | 27,367,600 | 1,519,424 | 0.05552 | 34 |
| 47 | 2027 | | | 4,200,000 | | | | 27,367,600 | 1,395,567 | 0.05099 | 35 |
| 48 | 2028 | | | 4,200,000 | | | | 27,367,600 | 1,281,807 | 0.04684 | 36 |
| 49 | 2029 | | | 4,200,000 | | | | 27,367,600 | 1,177,320 | 0.04302 | 37 |
| 50 | 2030 | | | 4,200,000 | | | | 27,367,600 | 1,081,350 | 0.03951 | 38 |
| 51 | 2031 | | | 4,200,000 | | | | 27,367,600 | 993,203 | 0.03629 | 39 |
| 52 | 2032 | | | 4,200,000 | | | | 27,367,600 | 912,242 | 0.03333 | 40 |
| 53 | 2033 | | | 4,200,000 | | | | 27,367,600 | 837,880 | 0.03062 | 41 |
| 54 | 2034 | | | 4,200,000 | | | | 27,367,600 | 769,580 | 0.02812 | 42 |
| 55 | 2035 | | | 4,200,000 | | | | 27,367,600 | 706,847 | 0.02583 | 43 |
| 56 | 2036 | | | 4,200,000 | | | | 27,367,600 | 649,228 | 0.02372 | 44 |
| 57 | 2037 | | | 4,200,000 | | | | 27,367,600 | 596,306 | 0.02179 | 45 |
| 58 | 2038 | | | 4,200,000 | | | | 27,367,600 | 547,698 | 0.02001 | 46 |
| 59 | 2039 | | | 4,200,000 | | | | 27,367,600 | 503,052 | 0.01838 | 47 |
| 60 | 2040 | | | 4,200,000 | | | | 27,367,600 | 462,045 | 0.01688 | 48 |
| 61 | 2041 | | | 4,200,000 | | | | 27,367,600 | 424,382 | 0.01551 | 49 |
| 62 | 2042 | | | | | | | | | | |
| 63 | | | | | | | | | $255,312,518 | Total | |
| 64 | TOTAL | 14,547,000 | 33,200,000 | 172,200,000 | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | | | 219,947,000 | | | | | | 6/19/90 | | |

2-3-16

Plan Buckroe Beach - DS2-55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN Buckroe Beach - 55' Out - DREDGING COSTS ONLY | | | | | 6/19/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 5.49 | 21,627,060 | 21,960,000 | 40,034,039 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 5.49 | 22,576,400 | 21,960,000 | 37,571,521 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 5.49 | 21,383,640 | 23,058,000 | 34,435,435 | 0.77485 | 3 |
| 10 | 1996 | | 4,200,000 | | 5.49 | | 23,058,000 | 16,410,014 | 0.71168 | 4 |
| 11 | 1997 | | 4,200,000 | | 5.49 | | 23,058,000 | 15,072,344 | 0.65367 | 5 |
| 12 | 1998 | | 4,200,000 | | 5.49 | | 23,058,000 | 13,843,714 | 0.60039 | 6 |
| 13 | 1999 | | 4,200,000 | | 5.49 | | 23,058,000 | 12,715,237 | 0.55145 | 7 |
| 14 | 2000 | | 4,200,000 | | 5.49 | | 23,058,000 | 11,678,748 | 0.50649 | 8 |
| 15 | 2001 | | 4,200,000 | | 5.49 | | 23,058,000 | 10,726,749 | 0.46521 | 9 |
| 16 | 2002 | | 4,200,000 | | 5.49 | | 23,058,000 | 9,852,353 | 0.42729 | 10 |
| 17 | 2003 | | 4,200,000 | | 5.49 | | 23,058,000 | 9,049,233 | 0.39246 | 11 |
| 18 | 2004 | | 4,200,000 | | 5.49 | | 23,058,000 | 8,311,581 | 0.36046 | 12 |
| 19 | 2005 | | 4,200,000 | | 5.49 | | 23,058,000 | 7,634,058 | 0.33108 | 13 |
| 20 | 2006 | | 4,200,000 | | 5.49 | | 23,058,000 | 7,011,764 | 0.30409 | 14 |
| 21 | 2007 | | 4,200,000 | | 5.49 | | 23,058,000 | 6,440,196 | 0.27930 | 15 |
| 22 | 2008 | | 4,200,000 | | 5.49 | | 23,058,000 | 5,915,221 | 0.25654 | 16 |
| 23 | 2009 | | 4,200,000 | | 5.49 | | 23,058,000 | 5,433,038 | 0.23562 | 17 |
| 24 | 2010 | | 4,200,000 | | 5.49 | | 23,058,000 | 4,990,162 | 0.21642 | 18 |
| 25 | 2011 | | 4,200,000 | | 5.49 | | 23,058,000 | 4,583,386 | 0.19878 | 19 |
| 26 | 2012 | | 4,200,000 | | 5.49 | | 23,058,000 | 4,209,769 | 0.18257 | 20 |
| 27 | 2013 | | 4,200,000 | | 5.49 | | 23,058,000 | 3,866,608 | 0.16769 | 21 |
| 28 | 2014 | | 4,200,000 | | 5.49 | | 23,058,000 | 3,551,419 | 0.15402 | 22 |
| 29 | 2015 | | 4,200,000 | | 5.49 | | 23,058,000 | 3,261,923 | 0.14147 | 23 |
| 30 | 2016 | | 4,200,000 | | 5.49 | | 23,058,000 | 2,996,026 | 0.12993 | 24 |
| 31 | 2017 | | 4,200,000 | | 5.49 | | 23,058,000 | 2,751,804 | 0.11934 | 25 |
| 32 | 2018 | | 4,200,000 | | 5.49 | | 23,058,000 | 2,527,489 | 0.10961 | 26 |
| 33 | 2019 | | 4,200,000 | | 5.49 | | 23,058,000 | 2,321,459 | 0.10068 | 27 |
| 34 | 2020 | | 4,200,000 | | 5.49 | | 23,058,000 | 2,132,225 | 0.09247 | 28 |
| 35 | 2021 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,958,415 | 0.08493 | 29 |

2-3-17

Plan Buckroe Beach - DS2-55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,798,774 | 0.07801 | 30 |
| 40 | 2023 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,652,146 | 0.07165 | 31 |
| 41 | 2024 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,517,471 | 0.06581 | 32 |
| 42 | 2025 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,393,773 | 0.06045 | 33 |
| 43 | 2026 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,280,159 | 0.05552 | 34 |
| 44 | 2027 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,175,806 | 0.05099 | 35 |
| 45 | 2028 | | 4,200,000 | | 5.49 | | 23,058,000 | 1,079,960 | 0.04684 | 36 |
| 46 | 2029 | | 4,200,000 | | 5.49 | | 23,058,000 | 991,926 | 0.04302 | 37 |
| 47 | 2030 | | 4,200,000 | | 5.49 | | 23,058,000 | 911,069 | 0.03951 | 38 |
| 48 | 2031 | | 4,200,000 | | 5.49 | | 23,058,000 | 836,803 | 0.03629 | 39 |
| 49 | 2032 | | 4,200,000 | | 5.49 | | 23,058,000 | 768,590 | 0.03333 | 40 |
| 50 | 2033 | | 4,200,000 | | 5.49 | | 23,058,000 | 705,938 | 0.03062 | 41 |
| 51 | 2034 | | 4,200,000 | | 5.49 | | 23,058,000 | 648,393 | 0.02812 | 42 |
| 52 | 2035 | | 4,200,000 | | 5.49 | | 23,058,000 | 595,539 | 0.02583 | 43 |
| 53 | 2036 | | 4,200,000 | | 5.49 | | 23,058,000 | 546,994 | 0.02372 | 44 |
| 54 | 2037 | | 4,200,000 | | 5.49 | | 23,058,000 | 502,405 | 0.02179 | 45 |
| 55 | 2038 | | 4,200,000 | | 5.49 | | 23,058,000 | 461,451 | 0.02001 | 46 |
| 56 | 2039 | | 4,200,000 | | 5.49 | | 23,058,000 | 423,836 | 0.01838 | 47 |
| 57 | 2040 | | 4,200,000 | | 5.49 | | 23,058,000 | 389,287 | 0.01688 | 48 |
| 58 | 2041 | | 4,200,000 | | 5.49 | | 23,058,000 | 357,554 | 0.01551 | 49 |
| 59 | 2042 | | | | | | | | | |
| 60 | | | | | | | | $309,323,805 | | Tota |
| 61 | TOTAL | 14,547,000 | 205,400,000 | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | 219,947,000 | | | | | | | |

2-3-18

Plan Ocean View - DS2-55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN Ocean View - 55' Out - DREDGING COSTS ONLY | | | | | 6/19/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 5.57 | 22,018,500 | 22,280,000 | 40,687,486 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 5.57 | 23,038,190 | 22,280,000 | 38,231,049 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 5.57 | 21,627,790 | 23,394,000 | 34,884,962 | 0.77485 | 3 |
| 10 | 1996 | | 4,200,000 | | 5.57 | | 23,394,000 | 16,649,140 | 0.71168 | 4 |
| 11 | 1997 | | 4,200,000 | | 5.57 | | 23,394,000 | 15,291,977 | 0.65367 | 5 |
| 12 | 1998 | | 4,200,000 | | 5.57 | | 23,394,000 | 14,045,444 | 0.60039 | 6 |
| 13 | 1999 | | 4,200,000 | | 5.57 | | 23,394,000 | 12,900,523 | 0.55145 | 7 |
| 14 | 2000 | | 4,200,000 | | 5.57 | | 23,394,000 | 11,848,930 | 0.50649 | 8 |
| 15 | 2001 | | 4,200,000 | | 5.57 | | 23,394,000 | 10,883,059 | 0.46521 | 9 |
| 16 | 2002 | | 4,200,000 | | 5.57 | | 23,394,000 | 9,995,921 | 0.42729 | 10 |
| 17 | 2003 | | 4,200,000 | | 5.57 | | 23,394,000 | 9,181,098 | 0.39246 | 11 |
| 18 | 2004 | | 4,200,000 | | 5.57 | | 23,394,000 | 8,432,696 | 0.36046 | 12 |
| 19 | 2005 | | 4,200,000 | | 5.57 | | 23,394,000 | 7,745,301 | 0.33108 | 13 |
| 20 | 2006 | | 4,200,000 | | 5.57 | | 23,394,000 | 7,113,939 | 0.30409 | 14 |
| 21 | 2007 | | 4,200,000 | | 5.57 | | 23,394,000 | 6,534,043 | 0.27930 | 15 |
| 22 | 2008 | | 4,200,000 | | 5.57 | | 23,394,000 | 6,001,417 | 0.25654 | 16 |
| 23 | 2009 | | 4,200,000 | | 5.57 | | 23,394,000 | 5,512,208 | 0.23562 | 17 |
| 24 | 2010 | | 4,200,000 | | 5.57 | | 23,394,000 | 5,062,878 | 0.21642 | 18 |
| 25 | 2011 | | 4,200,000 | | 5.57 | | 23,394,000 | 4,650,175 | 0.19878 | 19 |
| 26 | 2012 | | 4,200,000 | | 5.57 | | 23,394,000 | 4,271,114 | 0.18257 | 20 |
| 27 | 2013 | | 4,200,000 | | 5.57 | | 23,394,000 | 3,922,952 | 0.16769 | 21 |
| 28 | 2014 | | 4,200,000 | | 5.57 | | 23,394,000 | 3,603,170 | 0.15402 | 22 |
| 29 | 2015 | | 4,200,000 | | 5.57 | | 23,394,000 | 3,309,456 | 0.14147 | 23 |
| 30 | 2016 | | 4,200,000 | | 5.57 | | 23,394,000 | 3,039,684 | 0.12993 | 24 |
| 31 | 2017 | | 4,200,000 | | 5.57 | | 23,394,000 | 2,791,903 | 0.11934 | 25 |
| 32 | 2018 | | 4,200,000 | | 5.57 | | 23,394,000 | 2,564,319 | 0.10961 | 26 |
| 33 | 2019 | | 4,200,000 | | 5.57 | | 23,394,000 | 2,355,288 | 0.10068 | 27 |
| 34 | 2020 | | 4,200,000 | | 5.57 | | 23,394,000 | 2,163,295 | 0.09247 | 28 |
| 35 | 2021 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,986,953 | 0.08493 | 29 |

2-3-19

Plan Ocean View - DS2-55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,824,986 | 0.07801 | 30 |
| 40 | 2023 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,676,221 | 0.07165 | 31 |
| 41 | 2024 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,539,583 | 0.06581 | 32 |
| 42 | 2025 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,414,083 | 0.06045 | 33 |
| 43 | 2026 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,298,813 | 0.05552 | 34 |
| 44 | 2027 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,192,940 | 0.05099 | 35 |
| 45 | 2028 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,095,697 | 0.04684 | 36 |
| 46 | 2029 | | 4,200,000 | | 5.57 | | 23,394,000 | 1,006,381 | 0.04302 | 37 |
| 47 | 2030 | | 4,200,000 | | 5.57 | | 23,394,000 | 924,345 | 0.03951 | 38 |
| 48 | 2031 | | 4,200,000 | | 5.57 | | 23,394,000 | 848,997 | 0.03629 | 39 |
| 49 | 2032 | | 4,200,000 | | 5.57 | | 23,394,000 | 779,790 | 0.03333 | 40 |
| 50 | 2033 | | 4,200,000 | | 5.57 | | 23,394,000 | 716,225 | 0.03062 | 41 |
| 51 | 2034 | | 4,200,000 | | 5.57 | | 23,394,000 | 657,842 | 0.02812 | 42 |
| 52 | 2035 | | 4,200,000 | | 5.57 | | 23,394,000 | 604,217 | 0.02583 | 43 |
| 53 | 2036 | | 4,200,000 | | 5.57 | | 23,394,000 | 554,964 | 0.02372 | 44 |
| 54 | 2037 | | 4,200,000 | | 5.57 | | 23,394,000 | 509,726 | 0.02179 | 45 |
| 55 | 2038 | | 4,200,000 | | 5.57 | | 23,394,000 | 468,176 | 0.02001 | 46 |
| 56 | 2039 | | 4,200,000 | | 5.57 | | 23,394,000 | 430,012 | 0.01838 | 47 |
| 57 | 2040 | | 4,200,000 | | 5.57 | | 23,394,000 | 394,959 | 0.01688 | 48 |
| 58 | 2041 | | 4,200,000 | | 5.57 | | 23,394,000 | 362,764 | 0.01551 | 49 |
| 59 | 2042 | | | | | | | | | |
| 60 | | | | | | | | $313,961,102 | | Tota |
| 61 | TOTAL | 14,547,000 | 205,400,000 | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | 219,947,000 | | | | | | | |

2-3-20

Plan Chesapeake Bay - DS2-55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 2 | PLAN Chesapeake Bay - 55' Out - DREDGING COSTS ONLY | | | | | 6/19/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 5.98 | 24,073,560 | 23,920,000 | 44,081,341 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 5.98 | 25,193,210 | 23,920,000 | 41,432,581 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 5.98 | 23,445,760 | 25,116,000 | 37,627,894 | 0.77485 | 3 |
| 10 | 1996 | | 4,200,000 | | 5.98 | | 25,116,000 | 17,874,661 | 0.71168 | 4 |
| 11 | 1997 | | 4,200,000 | | 5.98 | | 25,116,000 | 16,417,599 | 0.65367 | 5 |
| 12 | 1998 | | 4,200,000 | | 5.98 | | 25,116,000 | 15,079,310 | 0.60039 | 6 |
| 13 | 1999 | | 4,200,000 | | 5.98 | | 25,116,000 | 13,850,112 | 0.55145 | 7 |
| 14 | 2000 | | 4,200,000 | | 5.98 | | 25,116,000 | 12,721,114 | 0.50649 | 8 |
| 15 | 2001 | | 4,200,000 | | 5.98 | | 25,116,000 | 11,684,146 | 0.46521 | 9 |
| 16 | 2002 | | 4,200,000 | | 5.98 | | 25,116,000 | 10,731,707 | 0.42729 | 10 |
| 17 | 2003 | | 4,200,000 | | 5.98 | | 25,116,000 | 9,856,906 | 0.39246 | 11 |
| 18 | 2004 | | 4,200,000 | | 5.98 | | 25,116,000 | 9,053,416 | 0.36046 | 12 |
| 19 | 2005 | | 4,200,000 | | 5.98 | | 25,116,000 | 8,315,422 | 0.33108 | 13 |
| 20 | 2006 | | 4,200,000 | | 5.98 | | 25,116,000 | 7,637,586 | 0.30409 | 14 |
| 21 | 2007 | | 4,200,000 | | 5.98 | | 25,116,000 | 7,015,005 | 0.27930 | 15 |
| 22 | 2008 | | 4,200,000 | | 5.98 | | 25,116,000 | 6,443,173 | 0.25654 | 16 |
| 23 | 2009 | | 4,200,000 | | 5.98 | | 25,116,000 | 5,917,954 | 0.23562 | 17 |
| 24 | 2010 | | 4,200,000 | | 5.98 | | 25,116,000 | 5,435,549 | 0.21642 | 18 |
| 25 | 2011 | | 4,200,000 | | 5.98 | | 25,116,000 | 4,992,468 | 0.19878 | 19 |
| 26 | 2012 | | 4,200,000 | | 5.98 | | 25,116,000 | 4,585,504 | 0.18257 | 20 |
| 27 | 2013 | | 4,200,000 | | 5.98 | | 25,116,000 | 4,211,715 | 0.16769 | 21 |
| 28 | 2014 | | 4,200,000 | | 5.98 | | 25,116,000 | 3,868,395 | 0.15402 | 22 |
| 29 | 2015 | | 4,200,000 | | 5.98 | | 25,116,000 | 3,553,061 | 0.14147 | 23 |
| 30 | 2016 | | 4,200,000 | | 5.98 | | 25,116,000 | 3,263,431 | 0.12993 | 24 |
| 31 | 2017 | | 4,200,000 | | 5.98 | | 25,116,000 | 2,997,411 | 0.11934 | 25 |
| 32 | 2018 | | 4,200,000 | | 5.98 | | 25,116,000 | 2,753,075 | 0.10961 | 26 |
| 33 | 2019 | | 4,200,000 | | 5.98 | | 25,116,000 | 2,528,657 | 0.10068 | 27 |
| 34 | 2020 | | 4,200,000 | | 5.98 | | 25,116,000 | 2,322,532 | 0.09247 | 28 |
| 35 | 2021 | | 4,200,000 | | 5.98 | | 25,116,000 | 2,133,210 | 0.08493 | 29 |

2-3-21

Plan Chesapeake Bay - DS2-55' Outbnd New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,959,320 | 0.07801 | 30 |
| 40 | 2023 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,799,605 | 0.07165 | 31 |
| 41 | 2024 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,652,910 | 0.06581 | 32 |
| 42 | 2025 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,518,172 | 0.06045 | 33 |
| 43 | 2026 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,394,417 | 0.05552 | 34 |
| 44 | 2027 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,280,751 | 0.05099 | 35 |
| 45 | 2028 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,176,350 | 0.04684 | 36 |
| 46 | 2029 | | 4,200,000 | | 5.98 | | 25,116,000 | 1,080,459 | 0.04302 | 37 |
| 47 | 2030 | | 4,200,000 | | 5.98 | | 25,116,000 | 992,385 | 0.03951 | 38 |
| 48 | 2031 | | 4,200,000 | | 5.98 | | 25,116,000 | 911,490 | 0.03629 | 39 |
| 49 | 2032 | | 4,200,000 | | 5.98 | | 25,116,000 | 837,189 | 0.03333 | 40 |
| 50 | 2033 | | 4,200,000 | | 5.98 | | 25,116,000 | 768,946 | 0.03062 | 41 |
| 51 | 2034 | | 4,200,000 | | 5.98 | | 25,116,000 | 706,265 | 0.02812 | 42 |
| 52 | 2035 | | 4,200,000 | | 5.98 | | 25,116,000 | 648,693 | 0.02583 | 43 |
| 53 | 2036 | | 4,200,000 | | 5.98 | | 25,116,000 | 595,815 | 0.02372 | 44 |
| 54 | 2037 | | 4,200,000 | | 5.98 | | 25,116,000 | 547,246 | 0.02179 | 45 |
| 55 | 2038 | | 4,200,000 | | 5.98 | | 25,116,000 | 502,637 | 0.02001 | 46 |
| 56 | 2039 | | 4,200,000 | | 5.98 | | 25,116,000 | 461,665 | 0.01838 | 47 |
| 57 | 2040 | | 4,200,000 | | 5.98 | | 25,116,000 | 424,032 | 0.01688 | 48 |
| 58 | 2041 | | 4,200,000 | | 5.98 | | 25,116,000 | 389,467 | 0.01551 | 49 |
| 59 | 2042 | | | | | | | | | |
| 60 | | | | | | | | $338,032,746 | | Tota |
| 61 | TOTAL | 14,547,000 | 205,400,000 | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | 219,947,000 | | | | | | | |

2-3-22

*Calculation of Yearly Dredging*

*Costs of all Plans Under*

*Dredging Scenario 4*

Summary of All Plans Evaluated Under Dredging Scenario 4

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | Dredging Scenario S4 - 45' and 40' Southern Branch & NH Maintenance | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | Construction Costs | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 | EXP F - Site 6 |
| 5 | (w/o Envir. Mitigation or IDC) | $53,504,000 | $55,538,000 | $24,688,000 | $45,158,000 | $22,396,000 | $25,780,000 |
| 6 | | | | | | | |
| 7 | NUMBER OF ACRES | **1,700** | **2,500** | **1,500** | **740** | **660** | **1000** |
| 8 | | | | | | | |
| 9 | # Years Site Receives Material | **31** | **51** | **22** | **8** | **5** | **10** |
| 10 | | | | | | | |
| 11 | Amount of Material Site Holds | 136,746,000 | 219,006,000 | 99,729,000 | 42,147,000 | 29,808,000 | 50,373,000 |
| 12 | | | | | | | |
| 13 | Average annual cost per yard | 5.31 | 5.36 | 4.87 | 6.47 | 6.29 | 5.65 |
| 14 | | | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | Ocean Disposal | | | | | |
| 19 | | with Confined | | | | | |
| 20 | | Unsuitable | Buckroe Beach | Ocean View | Chesapeake Bay | | |
| 21 | Construction Costs (w/o IDC) | 0 | $93,627,000 | $112,708,000 | $184,447,000 | | |
| 22 | | | | | | | |
| 23 | NUMBER OF ACRES | **OCEAN** | **2,500** | **2000 *** | **2000 *** | | |
| 24 | | | | | | | |
| 25 | # Years Site Receives Material | **51** | **51** | **51** | **51** | | |
| 26 | | | | | | | |
| 27 | Amount of Material Site Holds | n.a. | 219,006,000 | 219,006,000 | 219,006,000 | | |
| 28 | | | | | | | |
| 29 | Average annual cost per yard | 7.04 | 8.86 | 9.29 | 11.42 | | |
| 30 | | | | | | | |
| 31 | | | | | | | |
| 32 | * The 2000 acre sites hold the same amount of material | | | | | | |
| 33 | as the 2500 acre sites because of their greater depth. | | | | | | |
| 34 | | | | | | | |

Ocean Disposal Costs (DS 4) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Ocean Disposal - 45' and 40' Southern Branch | | | | Evaluate costs for period equal to life of Site B under DS - 4 | | | | |
| 2 | | 6/18/90 | | | | | | | |
| 3 | | | | | | | (F +G) | (C * E) | (D * H) |
| 4 | | Cubic Yards of Material | | New Work Unit Prices | | New Work | Total Unit | | |
| 5 | | NEW WORK | | For Dredging Only | | Unit Price | Cost for | Total Cost of New Work Elements | |
| 6 | | | | | | Cost for Use | Ocean | | |
| 7 | | Ocean Suitable | Material to | Ocean | Confined | of Reserved, | Unsuitable | Ocean | Confined |
| 8 | | Disposal | be Confined | Suitable | CI Exist. | Confined site | Material | Suitable | CI Extens. |
| 9 | | | | | | | | | |
| 10 | 1993 | | | | | | | | |
| 11 | 1994 | | | | | | | | |
| 12 | 1995 | | | | | | | | |
| 13 | 1996 | 1,500,000 | 2,239,000 | 5.15 | 4.10 | 2.00 | 6.10 | 7,725,000 | 13,657,900 |
| 14 | 1997 | | 5,974,000 | | (see pg.2) | 2.00 | (see pg.2) | | 36,029,350 |
| 15 | 1998 | | | | | | | | |
| 16 | 1999 | | | | | | | | |
| 17 | 2000 | | | | | | | | |
| 18 | 2001 | | NO NEW WORK ASSUMED AFTER 1997. ALL SUITABLE MATERIAL IS TAKEN TO THE OCEAN | | | | | | |
| 19 | 2002 | | SPACE IS RESERVED IN CRANEY ISLAND FOR THE UNSUITABLE MATERIAL. | | | | | | |
| 20 | 2003 | The $2/yard charge for remaining site costs is based on certain assumptions about the amount of sunk costs to be recovered. | | | | | | | |
| 21 | 2004 | | | | | | | | |
| 22 | 2005 | | Maintenance - Unsuitable: Quantities derived from Tables 16 and 19 in LTDS report. | | | | | | |
| 23 | 2006 | | In determining the average annual mainteance costs associated with ocean disposal | | | | | | |
| 24 | 2007 | | the following yards were used: | | | | | | |
| 25 | 2008 | | | | For all dredging scenarios which include only | | | | |
| 26 | 2009 | | | | | | | | |
| 27 | 2010 | | 355,000 | UNSUITABLE | 40' and 35' (existing channels) So. Branch maintenance | | | | |
| 28 | 2011 | | | | or, DS-1 (50 outbound & maintenance) | | | | |
| 29 | 2012 | | ADD TO THIS | | and DS-2 (55' outbound and maintenance). | | | | |
| 30 | 2013 | | | | | | | | |
| 31 | 2014 | | 113,000 | UNSUITABLE | 45' and 40' (new work depths) So. Branch maintenance, | | | | |
| 32 | 2015 | | | | or, DS-4 (50' Out. & So. Br. 45' and 40' and maintenance) and | | | | |
| 33 | 2016 | | | | DS-5 (55' outbound and So. Br. 45' and 40' and maintenance). | | | | |
| 34 | 2017 | | | | | | | | |
| 35 | 2018 | | | | Source: WES report Table 1 (February 1989) | | | | |
| 36 | 2019 | | | | | | | | |
| 37 | | | | | | | | | |

2-4-3

Ocean Disposal Costs (DS 4) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 38 | | | | | | | | Add $2 per yd to payoff | |
| 39 | | | | Unit | Type of | | Method of | remaining site costs | TOTAL OF |
| 40 | | | Quantities | Cost | material | Total Cost | Disposal | and perform O & M | ALL CHARGES |
| 41 | | | | | | | | | |
| 42 | **1996** | **45** | **1,500,000** | **5.15** | Clean | **7,725,000** | DNODS (buck) | | |
| 43 | **1996** | **45** | **2,239,000** | **4.10** | unsuit | **9,179,900** | CI/via BBR | 4,478,000 | 13,657,900 |
| 44 | 1997 | 45 | 3,467,000 | 3.85 | unsuit | 13,347,950 | " | 6,934,000 | 20,281,950 |
| 45 | 1997 | 45 | 272,000 | 5.10 | unsuit | 1,387,200 | " | 544,000 | 1,931,200 |
| 46 | 1997 | 40 | 2,135,000 | 4.12 | unsuit | 8,796,200 | " | 4,270,000 | 13,066,200 |
| 47 | 1997 | 40 | 100,000 | 5.50 | unsuit | 550,000 | " | 200,000 | 750,000 |
| 48 | | | | | | | | | |
| 49 | | | 9,713,000 | | | 40,986,250 | | | |
| 50 | | | | | | | | | |
| 51 | | Total | Total dredging | | **Total of all Unsuitable** | | | **Total of all** | |
| 52 | | Quantities | Costs | | **Material Costs** | | | **Ocean suitable costs** | |
| 53 | 1996 | 3,739,000 | 16,904,900 | | 1996 | 13,657,900 | | 7,725,000 | |
| 54 | 1997 | 5,974,000 | 24,081,350 | | 1997 | 36,029,350 | | | |
| 55 | | | | | | | | | |
| 56 | | | 40,986,250 | | | 49,687,250 | | | |
| 57 | | | | | | | | | |
| 58 | | NOTE: CI/via BBR means material was bucket dredged and deposited intoCraney Island by Barge Rehandler | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | | | | | | | | |
| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |

2-4-3

Ocean Disposal Costs (DS 4) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | |
| 2 | | 45' and 40' Southern Branch | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 3 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 4 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 5 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 6 | | Ocean Suitable | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 7 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | 1993 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 23,973,915 | 0.9185 | 1 |
| 11 | 1994 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 22,019,669 | 0.8436 | 2 |
| 12 | 1995 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 26,101,600 | 20,224,725 | 0.7748 | 3 |
| 13 | 1996 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 47,484,500 | 33,793,969 | 0.7117 | 4 |
| 14 | 1997 | 3,645,000 | 450,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,712,500 | 62,914,700 | 41,125,509 | 0.6537 | 5 |
| 15 | 1998 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 16,230,761 | 0.6004 | 6 |
| 16 | 1999 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 14,907,703 | 0.5514 | 7 |
| 17 | 2000 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 13,692,494 | 0.5065 | 8 |
| 18 | 2001 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 12,576,343 | 0.4652 | 9 |
| 19 | 2002 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 11,551,176 | 0.4273 | 10 |
| 20 | 2003 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 10,609,577 | 0.3925 | 11 |
| 21 | 2004 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 9,744,732 | 0.3605 | 12 |
| 22 | 2005 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 8,950,385 | 0.3311 | 13 |
| 23 | 2006 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 8,220,790 | 0.3041 | 14 |
| 24 | 2007 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 7,550,668 | 0.2793 | 15 |
| 25 | 2008 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 6,935,172 | 0.2565 | 16 |
| 26 | 2009 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 6,369,848 | 0.2356 | 17 |
| 27 | 2010 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 5,850,606 | 0.2164 | 18 |
| 28 | 2011 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 5,373,691 | 0.1988 | 19 |
| 29 | 2012 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 4,935,652 | 0.1826 | 20 |
| 30 | 2013 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 4,533,320 | 0.1677 | 21 |
| 31 | 2014 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 4,163,784 | 0.1540 | 22 |
| 32 | 2015 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 3,824,371 | 0.1415 | 23 |
| 33 | 2016 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 3,512,626 | 0.1299 | 24 |
| 34 | 2017 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 3,226,292 | 0.1193 | 25 |
| 35 | 2018 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 2,963,299 | 0.1096 | 26 |
| 36 | 2019 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 2,721,745 | 0.1007 | 27 |
| 37 | | | | | | | | | | | | | |

Ocean Disposal Costs (DS 4) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | | 45' and 40' Southern Branch | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 39 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 40 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 41 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 42 | | Ocean Suitable | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 43 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 44 | 2020 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 2,499,880 | 0.0925 | 28 |
| 45 | 2021 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 2,296,101 | 0.0849 | 29 |
| 46 | 2022 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 2,108,933 | 0.0780 | 30 |
| 47 | 2023 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,937,023 | 0.0717 | 31 |
| 48 | 2024 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,779,125 | 0.0658 | 32 |
| 49 | 2025 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,634,099 | 0.0604 | 33 |
| 50 | 2026 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,500,895 | 0.0555 | 34 |
| 51 | 2027 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,378,548 | 0.0510 | 35 |
| 52 | 2028 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,266,175 | 0.0468 | 36 |
| 53 | 2029 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,162,962 | 0.0430 | 37 |
| 54 | 2030 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 1,068,163 | 0.0395 | 38 |
| 55 | 2031 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 981,091 | 0.0363 | 39 |
| 56 | 2032 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 901,117 | 0.0333 | 40 |
| 57 | 2033 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 827,662 | 0.0306 | 41 |
| 58 | 2034 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 760,195 | 0.0281 | 42 |
| 59 | 2035 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 698,227 | 0.0258 | 43 |
| 60 | 2036 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 641,311 | 0.0237 | 44 |
| 61 | 2037 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 589,034 | 0.0218 | 45 |
| 62 | 2038 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 541,019 | 0.0200 | 46 |
| 63 | 2039 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 496,917 | 0.0184 | 47 |
| 64 | 2040 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 456,411 | 0.0169 | 48 |
| 65 | 2041 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 419,206 | 0.0155 | 49 |
| 66 | 2042 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 385,034 | 0.0142 | 50 |
| 67 | 2043 | 3,645,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 3,861,000 | 27,033,850 | 353,648 | 0.0131 | 51 |
| 68 | | | | | | | | | | | | | |
| 69 | | 185,895,000 | 23,398,000 | | | | | | | | | | |
| 70 | | | | | | | | | | | | | |
| 71 | | 9,713,000 | New Work | | | | | | | | | | |
| 72 | | | | | | | | | Total of discounted | | | | |
| 73 | | 219,006,000 | | | | | | | amounts equals Present Worth | | $336,265,599 | | |

2-4-5

Plan A -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-4 | PLAN A - EXP. (#1) | | SB 45' & 40'- DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site - | | | | |
| 3 | | 6/18/90 | | | | | Deduct 3 years of life to account for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | New Work | | | | | | |
| 6 | | New Work | Quantities | per Ocean | $ per Yd | Maintenance | Total Cost | Total Cost | Annual Discounted | Discount | Yr. |
| 7 | Year | Quantities | To Site 1 | Disposal Plan | (see totals) | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,000,000 | | | 2.99 | 15,554,900 | 11,960,000 | 19,581,920 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,095,000 | | | 2.99 | 24,081,350 | 12,244,050 | 23,744,857 | 0.65367 | 5 |
| 14 | 1998 | | 4,113,000 | | | 2.99 | | 12,297,870 | 7,383,476 | 0.60039 | 6 |
| 15 | 1999 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,781,609 | 0.55145 | 7 |
| 16 | 2000 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,228,802 | 0.50649 | 8 |
| 17 | 2001 | | 4,113,000 | | | 2.99 | | 12,297,870 | 5,721,058 | 0.46521 | 9 |
| 18 | 2002 | | 4,113,000 | | | 2.99 | | 12,297,870 | 5,254,704 | 0.42729 | 10 |
| 19 | 2003 | | 4,113,000 | | | 2.99 | | 12,297,870 | 4,826,364 | 0.39246 | 11 |
| 20 | 2004 | | 4,113,000 | | | 2.99 | | 12,297,870 | 4,432,940 | 0.36046 | 12 |
| 21 | 2005 | | 4,113,000 | | | 2.99 | | 12,297,870 | 4,071,587 | 0.33108 | 13 |
| 22 | 2006 | | 4,113,000 | | | 2.99 | | 12,297,870 | 3,739,690 | 0.30409 | 14 |
| 23 | 2007 | | 4,113,000 | | | 2.99 | | 12,297,870 | 3,434,847 | 0.27930 | 15 |
| 24 | 2008 | | 4,113,000 | | | 2.99 | | 12,297,870 | 3,154,854 | 0.25654 | 16 |
| 25 | 2009 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,897,684 | 0.23562 | 17 |
| 26 | 2010 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,661,478 | 0.21642 | 18 |
| 27 | 2011 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,444,526 | 0.19878 | 19 |
| 28 | 2012 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,245,259 | 0.18257 | 20 |
| 29 | 2013 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,062,236 | 0.16769 | 21 |
| 30 | 2014 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,894,132 | 0.15402 | 22 |
| 31 | 2015 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,739,731 | 0.14147 | 23 |
| 32 | 2016 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,597,916 | 0.12993 | 24 |
| 33 | 2017 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,467,661 | 0.11934 | 25 |
| 34 | 2018 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,348,024 | 0.10961 | 26 |
| 35 | 2019 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,238,139 | 0.10068 | 27 |

2-4-6

Plan A -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | | Annual | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr. |
| 38 | Year | Quantities | To Site 1 | Disposal Plan | $ per Yd | $ per Yd | Ocean Mainten | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,137,211 | 0.09247 | 28 |
| 41 | 2021 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,044,511 | 0.08493 | 29 |
| 42 | 2022 | | 4,113,000 | | | 2.99 | | 12,297,870 | 959,367 | 0.07801 | 30 |
| 43 | 2023 | | 4,113,000 | | | 2.99 | | 12,297,870 | 881,164 | 0.07165 | 31 |
| 44 | 2024 | | | 4,113,000 | | | 27,033,850 | 0 | 1,779,125 | 0.06581 | 32 |
| 45 | 2025 | | | 4,113,000 | | | 27,033,850 | 0 | 1,634,099 | 0.06045 | 33 |
| 46 | 2026 | | | 4,113,000 | | | 27,033,850 | 0 | 1,500,895 | 0.05552 | 34 |
| 47 | 2027 | | | 4,113,000 | | | 27,033,850 | 0 | 1,378,548 | 0.05099 | 35 |
| 48 | 2028 | | | 4,113,000 | | | 27,033,850 | 0 | 1,266,175 | 0.04684 | 36 |
| 49 | 2029 | | | 4,113,000 | | | 27,033,850 | 0 | 1,162,962 | 0.04302 | 37 |
| 50 | 2030 | | | 4,113,000 | | | 27,033,850 | 0 | 1,068,163 | 0.03951 | 38 |
| 51 | 2031 | | | 4,113,000 | | | 27,033,850 | 0 | 981,091 | 0.03629 | 39 |
| 52 | 2032 | | | 4,113,000 | | | 27,033,850 | 0 | 901,117 | 0.03333 | 40 |
| 53 | 2033 | | | 4,113,000 | | | 27,033,850 | 0 | 827,662 | 0.03062 | 41 |
| 54 | 2034 | | | 4,113,000 | | | 27,033,850 | 0 | 760,195 | 0.02812 | 42 |
| 55 | 2035 | | | 4,113,000 | | | 27,033,850 | 0 | 698,227 | 0.02583 | 43 |
| 56 | 2036 | | | 4,113,000 | | | 27,033,850 | 0 | 641,311 | 0.02372 | 44 |
| 57 | 2037 | | | 4,113,000 | | | 27,033,850 | 0 | 589,034 | 0.02179 | 45 |
| 58 | 2038 | | | 4,113,000 | | | 27,033,850 | 0 | 541,019 | 0.02001 | 46 |
| 59 | 2039 | | | 4,113,000 | | | 27,033,850 | 0 | 496,917 | 0.01838 | 47 |
| 60 | 2040 | | | 4,113,000 | | | 27,033,850 | 0 | 456,411 | 0.01688 | 48 |
| 61 | 2041 | | | 4,113,000 | | | 27,033,850 | 0 | 419,206 | 0.01551 | 49 |
| 62 | 2042 | | | 4,113,000 | | | 27,033,850 | 0 | 385,034 | 0.01424 | 50 |
| 63 | 2043 | | | 4,113,000 | | | 27,033,850 | 0 | 353,648 | 0.01308 | 51 |
| 64 | | | | | | | | | | | |
| 65 | TOTAL | 9,713,000 | 127,033,000 | 82,260,000 | | | | | | | Tota |
| 66 | | | | | | | | | | | |
| 67 | | | | | | | | | $172,158,442 | | |
| 68 | | | 219,006,000 | | | | | | | | |

2-4-1

Plan B - DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 4 | PLAN B - EXP. (#2) SB 45' & 40' - DREDGING COSTS | | | | | 6/18/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 0 | 4,000,000 | | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 8 | 1994 | 0 | 4,000,000 | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 9 | 1995 | 0 | 4,000,000 | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,000,000 | | 2.99 | 15,554,900 | 11,960,000 | 19,581,920 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,095,000 | | 2.99 | 24,081,350 | 12,244,050 | 23,744,857 | 0.65367 | 5 |
| 12 | 1998 | | 4,113,000 | | 2.99 | | 12,297,870 | 7,383,476 | 0.60039 | 6 |
| 13 | 1999 | | 4,113,000 | | 2.99 | | 12,297,870 | 6,781,609 | 0.55145 | 7 |
| 14 | 2000 | | 4,113,000 | | 2.99 | | 12,297,870 | 6,228,802 | 0.50649 | 8 |
| 15 | 2001 | | 4,113,000 | | 2.99 | | 12,297,870 | 5,721,058 | 0.46521 | 9 |
| 16 | 2002 | | 4,113,000 | | 2.99 | | 12,297,870 | 5,254,704 | 0.42729 | 10 |
| 17 | 2003 | | 4,113,000 | | 2.99 | | 12,297,870 | 4,826,364 | 0.39246 | 11 |
| 18 | 2004 | | 4,113,000 | | 2.99 | | 12,297,870 | 4,432,940 | 0.36046 | 12 |
| 19 | 2005 | | 4,113,000 | | 2.99 | | 12,297,870 | 4,071,587 | 0.33108 | 13 |
| 20 | 2006 | | 4,113,000 | | 2.99 | | 12,297,870 | 3,739,690 | 0.30409 | 14 |
| 21 | 2007 | | 4,113,000 | | 2.99 | | 12,297,870 | 3,434,847 | 0.27930 | 15 |
| 22 | 2008 | | 4,113,000 | | 2.99 | | 12,297,870 | 3,154,854 | 0.25654 | 16 |
| 23 | 2009 | | 4,113,000 | | 2.99 | | 12,297,870 | 2,897,684 | 0.23562 | 17 |
| 24 | 2010 | | 4,113,000 | | 2.99 | | 12,297,870 | 2,661,478 | 0.21642 | 18 |
| 25 | 2011 | | 4,113,000 | | 2.99 | | 12,297,870 | 2,444,526 | 0.19878 | 19 |
| 26 | 2012 | | 4,113,000 | | 2.99 | | 12,297,870 | 2,245,259 | 0.18257 | 20 |
| 27 | 2013 | | 4,113,000 | | 2.99 | | 12,297,870 | 2,062,236 | 0.16769 | 21 |
| 28 | 2014 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,894,132 | 0.15402 | 22 |
| 29 | 2015 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,739,731 | 0.14147 | 23 |
| 30 | 2016 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,597,916 | 0.12993 | 24 |
| 31 | 2017 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,467,661 | 0.11934 | 25 |
| 32 | 2018 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,348,024 | 0.10961 | 26 |
| 33 | 2019 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,238,139 | 0.10068 | 27 |
| 34 | 2020 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,137,211 | 0.09247 | 28 |
| 35 | 2021 | | 4,113,000 | | 2.99 | | 12,297,870 | 1,044,511 | 0.08493 | 29 |

Plan B - DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,113,000 | | 2.99 | | 12,297,870 | 959,367 | 0.07801 | 30 |
| 40 | 2023 | | 4,113,000 | | 2.99 | | 12,297,870 | 881,164 | 0.07165 | 31 |
| 41 | 2024 | | 4,113,000 | | 2.99 | | 12,297,870 | 809,335 | 0.06581 | 32 |
| 42 | 2025 | | 4,113,000 | | 2.99 | | 12,297,870 | 743,362 | 0.06045 | 33 |
| 43 | 2026 | | 4,113,000 | | 2.99 | | 12,297,870 | 682,766 | 0.05552 | 34 |
| 44 | 2027 | | 4,113,000 | | 2.99 | | 12,297,870 | 627,110 | 0.05099 | 35 |
| 45 | 2028 | | 4,113,000 | | 2.99 | | 12,297,870 | 575,991 | 0.04684 | 36 |
| 46 | 2029 | | 4,113,000 | | 2.99 | | 12,297,870 | 529,039 | 0.04302 | 37 |
| 47 | 2030 | | 4,113,000 | | 2.99 | | 12,297,870 | 485,914 | 0.03951 | 38 |
| 48 | 2031 | | 4,113,000 | | 2.99 | | 12,297,870 | 446,305 | 0.03629 | 39 |
| 49 | 2032 | | 4,113,000 | | 2.99 | | 12,297,870 | 409,924 | 0.03333 | 40 |
| 50 | 2033 | | 4,113,000 | | 2.99 | | 12,297,870 | 376,509 | 0.03062 | 41 |
| 51 | 2034 | | 4,113,000 | | 2.99 | | 12,297,870 | 345,817 | 0.02812 | 42 |
| 52 | 2035 | | 4,113,000 | | 2.99 | | 12,297,870 | 317,628 | 0.02583 | 43 |
| 53 | 2036 | | 4,113,000 | | 2.99 | | 12,297,870 | 291,736 | 0.02372 | 44 |
| 54 | 2037 | | 4,113,000 | | 2.99 | | 12,297,870 | 267,955 | 0.02179 | 45 |
| 55 | 2038 | | 4,113,000 | | 2.99 | | 12,297,870 | 246,113 | 0.02001 | 46 |
| 56 | 2039 | | 4,113,000 | | 2.99 | | 12,297,870 | 226,051 | 0.01838 | 47 |
| 57 | 2040 | | 4,113,000 | | 2.99 | | 12,297,870 | 207,624 | 0.01688 | 48 |
| 58 | 2041 | | 4,113,000 | | 2.99 | | 12,297,870 | 190,700 | 0.01551 | 49 |
| 59 | 2042 | | 4,113,000 | | 2.99 | | 12,297,870 | 175,155 | 0.01424 | 50 |
| 60 | 2043 | | 4,113,000 | | 2.99 | | 12,297,870 | 160,877 | 0.01308 | 51 |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | TOTAL | 9,713,000 | 209,293,000 | | | | | | | |
| 64 | | | | | | | | | | Tota |
| 65 | | | 219,006,000 | | | | | $162,433,513 | | |

2-4-9

Plan C -DS4- 45' AND 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-4 | PLAN C - EXP. (#3) | | SB 45' & 40'- DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/18/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | Total Cost | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | New Work & | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site C | Disposal Plan | $ per Yd | $ per Yd | Ocean Maint. | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 0 | 4,000,000 | | (see totals | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,000,000 | | | 2.99 | 15,554,900 | 11,960,000 | 19,581,920 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,095,000 | | | 2.99 | 24,081,350 | 12,244,050 | 23,744,857 | 0.65367 | 5 |
| 14 | 1998 | | 4,113,000 | | | 2.99 | | 12,297,870 | 7,383,476 | 0.60039 | 6 |
| 15 | 1999 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,781,609 | 0.55145 | 7 |
| 16 | 2000 | | 4,113,000 | | | 2.99 | | 12,297,870 | 13,692,494 | 0.50649 | 8 |
| 17 | 2001 | | | 4,113,000 | | | 27,033,850 | | 12,576,343 | 0.46521 | 9 |
| 18 | 2002 | | | 4,113,000 | | | 27,033,850 | | 11,551,176 | 0.42729 | 10 |
| 19 | 2003 | | | 4,113,000 | | | 27,033,850 | | 10,609,577 | 0.39246 | 11 |
| 20 | 2004 | | | 4,113,000 | | | 27,033,850 | | 9,744,732 | 0.36046 | 12 |
| 21 | 2005 | | | 4,113,000 | | | 27,033,850 | | 8,950,385 | 0.33108 | 13 |
| 22 | 2006 | | | 4,113,000 | | | 27,033,850 | | 8,220,790 | 0.30409 | 14 |
| 23 | 2007 | | | 4,113,000 | | | 27,033,850 | | 7,550,668 | 0.27930 | 15 |
| 24 | 2008 | | | 4,113,000 | | | 27,033,850 | | 6,935,172 | 0.25654 | 16 |
| 25 | 2009 | | | 4,113,000 | | | 27,033,850 | | 6,369,848 | 0.23562 | 17 |
| 26 | 2010 | | | 4,113,000 | | | 27,033,850 | | 5,850,606 | 0.21642 | 18 |
| 27 | 2011 | | | 4,113,000 | | | 27,033,850 | | 5,373,691 | 0.19878 | 19 |
| 28 | 2012 | | | 4,113,000 | | | 27,033,850 | | 4,935,652 | 0.18257 | 20 |
| 29 | 2013 | | | 4,113,000 | | | 27,033,850 | | 4,533,320 | 0.16769 | 21 |
| 30 | 2014 | | | 4,113,000 | | | 27,033,850 | | 4,163,784 | 0.15402 | 22 |
| 31 | 2015 | | | 4,113,000 | | | 27,033,850 | | 3,824,371 | 0.14147 | 23 |
| 32 | 2016 | | | 4,113,000 | | | 27,033,850 | | 3,512,626 | 0.12993 | 24 |
| 33 | 2017 | | | 4,113,000 | | | 27,033,850 | | 3,226,292 | 0.11934 | 25 |
| 34 | 2018 | | | 4,113,000 | | | 27,033,850 | | 2,963,299 | 0.10961 | 26 |
| 35 | 2019 | | | 4,113,000 | | | 27,033,850 | | 2,721,745 | 0.10068 | 27 |

2-4-10

Plan C -DS4- 45' AND 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site C | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,113,000 | | | 27,033,850 | | 2,499,880 | 0.09247 | 28 |
| 41 | 2021 | | | 4,113,000 | | | 27,033,850 | | 2,296,101 | 0.08493 | 29 |
| 42 | 2022 | | | 4,113,000 | | | 27,033,850 | | 2,108,933 | 0.07801 | 30 |
| 43 | 2023 | | | 4,113,000 | | | 27,033,850 | | 1,937,023 | 0.07165 | 31 |
| 44 | 2024 | | | 4,113,000 | | | 27,033,850 | | 1,779,125 | 0.06581 | 32 |
| 45 | 2025 | | | 4,113,000 | | | 27,033,850 | | 1,634,099 | 0.06045 | 33 |
| 46 | 2026 | | | 4,113,000 | | | 27,033,850 | | 1,500,895 | 0.05552 | 34 |
| 47 | 2027 | | | 4,113,000 | | | 27,033,850 | | 1,378,548 | 0.05099 | 35 |
| 48 | 2028 | | | 4,113,000 | | | 27,033,850 | | 1,266,175 | 0.04684 | 36 |
| 49 | 2029 | | | 4,113,000 | | | 27,033,850 | | 1,162,962 | 0.04302 | 37 |
| 50 | 2030 | | | 4,113,000 | | | 27,033,850 | | 1,068,163 | 0.03951 | 38 |
| 51 | 2031 | | | 4,113,000 | | | 27,033,850 | | 981,091 | 0.03629 | 39 |
| 52 | 2032 | | | 4,113,000 | | | 27,033,850 | | 901,117 | 0.03333 | 40 |
| 53 | 2033 | | | 4,113,000 | | | 27,033,850 | | 827,662 | 0.03062 | 41 |
| 54 | 2034 | | | 4,113,000 | | | 27,033,850 | | 760,195 | 0.02812 | 42 |
| 55 | 2035 | | | 4,113,000 | | | 27,033,850 | | 698,227 | 0.02583 | 43 |
| 56 | 2036 | | | 4,113,000 | | | 27,033,850 | | 641,311 | 0.02372 | 44 |
| 57 | 2037 | | | 4,113,000 | | | 27,033,850 | | 589,034 | 0.02179 | 45 |
| 58 | 2038 | | | 4,113,000 | | | 27,033,850 | | 541,019 | 0.02001 | 46 |
| 59 | 2039 | | | 4,113,000 | | | 27,033,850 | | 496,917 | 0.01838 | 47 |
| 60 | 2040 | | | 4,113,000 | | | 27,033,850 | | 456,411 | 0.01688 | 48 |
| 61 | 2041 | | | 4,113,000 | | | 27,033,850 | | 419,206 | 0.01551 | 49 |
| 62 | 2042 | | | 4,113,000 | | | 27,033,850 | | 385,034 | 0.01424 | 50 |
| 63 | 2043 | | | 4,113,000 | | | 27,033,850 | | 353,648 | 0.01308 | 51 |
| 64 | | | | | | | | | | | |
| 65 | TOTAL | 9,713,000 | 32,434,000 | 176,859,000 | | | | | $251,823,066 | Total | |
| 66 | | | | | | | | | | | |
| 67 | | | 219,006,000 | | | | | | | | |
| 68 | | | | | | | | | 6/18/90 | | |

2-4-11

Plan D -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-4 | PLAN D - EXP. (#4) | | SB 45' & 40'- DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/18/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site D | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 0 | 4,000,000 | | (see total) | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,000,000 | | | 2.99 | 15,554,900 | 11,960,000 | 19,581,920 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,095,000 | | | 2.99 | 24,081,350 | 12,244,050 | 23,744,857 | 0.65367 | 5 |
| 14 | 1998 | | | 4,113,000 | | | | 27,033,850 | 16,230,761 | 0.60039 | 6 |
| 15 | 1999 | | | 4,113,000 | | | | 27,033,850 | 14,907,703 | 0.55145 | 7 |
| 16 | 2000 | | | 4,113,000 | | | | 27,033,850 | 13,692,494 | 0.50649 | 8 |
| 17 | 2001 | | | 4,113,000 | | | | 27,033,850 | 12,576,343 | 0.46521 | 9 |
| 18 | 2002 | | | 4,113,000 | | | | 27,033,850 | 11,551,176 | 0.42729 | 10 |
| 19 | 2003 | | | 4,113,000 | | | | 27,033,850 | 10,609,577 | 0.39246 | 11 |
| 20 | 2004 | | | 4,113,000 | | | | 27,033,850 | 9,744,732 | 0.36046 | 12 |
| 21 | 2005 | | | 4,113,000 | | | | 27,033,850 | 8,950,385 | 0.33108 | 13 |
| 22 | 2006 | | | 4,113,000 | | | | 27,033,850 | 8,220,790 | 0.30409 | 14 |
| 23 | 2007 | | | 4,113,000 | | | | 27,033,850 | 7,550,668 | 0.27930 | 15 |
| 24 | 2008 | | | 4,113,000 | | | | 27,033,850 | 6,935,172 | 0.25654 | 16 |
| 25 | 2009 | | | 4,113,000 | | | | 27,033,850 | 6,369,848 | 0.23562 | 17 |
| 26 | 2010 | | | 4,113,000 | | | | 27,033,850 | 5,850,606 | 0.21642 | 18 |
| 27 | 2011 | | | 4,113,000 | | | | 27,033,850 | 5,373,691 | 0.19878 | 19 |
| 28 | 2012 | | | 4,113,000 | | | | 27,033,850 | 4,935,652 | 0.18257 | 20 |
| 29 | 2013 | | | 4,113,000 | | | | 27,033,850 | 4,533,320 | 0.16769 | 21 |
| 30 | 2014 | | | 4,113,000 | | | | 27,033,850 | 4,163,784 | 0.15402 | 22 |
| 31 | 2015 | | | 4,113,000 | | | | 27,033,850 | 3,824,371 | 0.14147 | 23 |
| 32 | 2016 | | | 4,113,000 | | | | 27,033,850 | 3,512,626 | 0.12993 | 24 |
| 33 | 2017 | | | 4,113,000 | | | | 27,033,850 | 3,226,292 | 0.11934 | 25 |
| 34 | 2018 | | | 4,113,000 | | | | 27,033,850 | 2,963,299 | 0.10961 | 26 |
| 35 | 2019 | | | 4,113,000 | | | | 27,033,850 | 2,721,745 | 0.10068 | 27 |

C-4-12

Plan D -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,113,000 | | | | 27,033,850 | 2,499,880 | 0.09247 | 28 |
| 41 | 2021 | | | 4,113,000 | | | | 27,033,850 | 2,296,101 | 0.08493 | 29 |
| 42 | 2022 | | | 4,113,000 | | | | 27,033,850 | 2,108,933 | 0.07801 | 30 |
| 43 | 2023 | | | 4,113,000 | | | | 27,033,850 | 1,937,023 | 0.07165 | 31 |
| 44 | 2024 | | | 4,113,000 | | | | 27,033,850 | 1,779,125 | 0.06581 | 32 |
| 45 | 2025 | | | 4,113,000 | | | | 27,033,850 | 1,634,099 | 0.06045 | 33 |
| 46 | 2026 | | | 4,113,000 | | | | 27,033,850 | 1,500,895 | 0.05552 | 34 |
| 47 | 2027 | | | 4,113,000 | | | | 27,033,850 | 1,378,548 | 0.05099 | 35 |
| 48 | 2028 | | | 4,113,000 | | | | 27,033,850 | 1,266,175 | 0.04684 | 36 |
| 49 | 2029 | | | 4,113,000 | | | | 27,033,850 | 1,162,962 | 0.04302 | 37 |
| 50 | 2030 | | | 4,113,000 | | | | 27,033,850 | 1,068,163 | 0.03951 | 38 |
| 51 | 2031 | | | 4,113,000 | | | | 27,033,850 | 981,091 | 0.03629 | 39 |
| 52 | 2032 | | | 4,113,000 | | | | 27,033,850 | 901,117 | 0.03333 | 40 |
| 53 | 2033 | | | 4,113,000 | | | | 27,033,850 | 827,662 | 0.03062 | 41 |
| 54 | 2034 | | | 4,113,000 | | | | 27,033,850 | 760,195 | 0.02812 | 42 |
| 55 | 2035 | | | 4,113,000 | | | | 27,033,850 | 698,227 | 0.02583 | 43 |
| 56 | 2036 | | | 4,113,000 | | | | 27,033,850 | 641,311 | 0.02372 | 44 |
| 57 | 2037 | | | 4,113,000 | | | | 27,033,850 | 589,034 | 0.02179 | 45 |
| 58 | 2038 | | | 4,113,000 | | | | 27,033,850 | 541,019 | 0.02001 | 46 |
| 59 | 2039 | | | 4,113,000 | | | | 27,033,850 | 496,917 | 0.01838 | 47 |
| 60 | 2040 | | | 4,113,000 | | | | 27,033,850 | 456,411 | 0.01688 | 48 |
| 61 | 2041 | | | 4,113,000 | | | | 27,033,850 | 419,206 | 0.01551 | 49 |
| 62 | 2042 | | | 4,113,000 | | | | 27,033,850 | 385,034 | 0.01424 | 50 |
| 63 | 2043 | | | 4,113,000 | | | | 27,033,850 | 353,648 | 0.01308 | 51 |
| 64 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | TOTAL | 9,713,000 | 20,095,000 | 189,198,000 | | | | | $268,796,445 | Total | |
| 67 | | | | | | | | | | | |
| 68 | | | 219,006,000 | | | | | | 6/18/90 | | |

2-4-13

Plan E -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS -4 | PLAN E - EXP. (#5) | | 45' & 40' SB - DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/18/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site E | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 0 | 4,000,000 | | (see totals) | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,000,000 | | | 2.99 | 15,554,900 | 11,960,000 | 19,581,920 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,095,000 | | | 2.99 | 24,081,350 | 12,244,050 | 23,744,857 | 0.65367 | 5 |
| 14 | 1998 | | 4,113,000 | | | 2.99 | | 12,297,870 | 7,383,476 | 0.60039 | 6 |
| 15 | 1999 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,781,609 | 0.55145 | 7 |
| 16 | 2000 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,228,802 | 0.50649 | 8 |
| 17 | 2001 | | 4,113,000 | | | 2.99 | | 12,297,870 | 5,721,058 | 0.46521 | 9 |
| 18 | 2002 | | 4,113,000 | | | 2.99 | | 12,297,870 | 5,254,704 | 0.42729 | 10 |
| 19 | 2003 | | 4,113,000 | | | 2.99 | | 12,297,870 | 4,826,364 | 0.39246 | 11 |
| 20 | 2004 | | 4,113,000 | | | 2.99 | | 12,297,870 | 4,432,940 | 0.36046 | 12 |
| 21 | 2005 | | 4,113,000 | | | 2.99 | | 12,297,870 | 4,071,587 | 0.33108 | 13 |
| 22 | 2006 | | 4,113,000 | | | 2.99 | | 12,297,870 | 3,739,690 | 0.30409 | 14 |
| 23 | 2007 | | 4,113,000 | | | 2.99 | | 12,297,870 | 3,434,847 | 0.27930 | 15 |
| 24 | 2008 | | 4,113,000 | | | 2.99 | | 12,297,870 | 3,154,854 | 0.25654 | 16 |
| 25 | 2009 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,897,684 | 0.23562 | 17 |
| 26 | 2010 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,661,478 | 0.21642 | 18 |
| 27 | 2011 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,444,526 | 0.19878 | 19 |
| 28 | 2012 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,245,259 | 0.18257 | 20 |
| 29 | 2013 | | 4,113,000 | | | 2.99 | | 12,297,870 | 2,062,236 | 0.16769 | 21 |
| 30 | 2014 | | 4,113,000 | | | 2.99 | | 12,297,870 | 1,894,132 | 0.15402 | 22 |
| 31 | 2015 | | | 4,113,000 | | | 27,033,850 | 0 | 3,824,371 | 0.14147 | 23 |
| 32 | 2016 | | | 4,113,000 | | | 27,033,850 | 0 | 3,512,626 | 0.12993 | 24 |
| 33 | 2017 | | | 4,113,000 | | | 27,033,850 | 0 | 3,226,292 | 0.11934 | 25 |
| 34 | 2018 | | | 4,113,000 | | | 27,033,850 | 0 | 2,963,299 | 0.10961 | 26 |
| 35 | 2019 | | | 4,113,000 | | | 27,033,850 | 0 | 2,721,745 | 0.10068 | 27 |

2-4-14

Plan E -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site E | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,113,000 | | | 27,033,850 | 0 | 2,499,880 | 0.09247 | 28 |
| 41 | 2021 | | | 4,113,000 | | | 27,033,850 | 0 | 2,296,101 | 0.08493 | 29 |
| 42 | 2022 | | | 4,113,000 | | | 27,033,850 | 0 | 2,108,933 | 0.07801 | 30 |
| 43 | 2023 | | | 4,113,000 | | | 27,033,850 | 0 | 1,937,023 | 0.07165 | 31 |
| 44 | 2024 | | | 4,113,000 | | | 27,033,850 | 0 | 1,779,125 | 0.06581 | 32 |
| 45 | 2025 | | | 4,113,000 | | | 27,033,850 | 0 | 1,634,099 | 0.06045 | 33 |
| 46 | 2026 | | | 4,113,000 | | | 27,033,850 | 0 | 1,500,895 | 0.05552 | 34 |
| 47 | 2027 | | | 4,113,000 | | | 27,033,850 | 0 | 1,378,548 | 0.05099 | 35 |
| 48 | 2028 | | | 4,113,000 | | | 27,033,850 | 0 | 1,266,175 | 0.04684 | 36 |
| 49 | 2029 | | | 4,113,000 | | | 27,033,850 | 0 | 1,162,962 | 0.04302 | 37 |
| 50 | 2030 | | | 4,113,000 | | | 27,033,850 | 0 | 1,068,163 | 0.03951 | 38 |
| 51 | 2031 | | | 4,113,000 | | | 27,033,850 | 0 | 981,091 | 0.03629 | 39 |
| 52 | 2032 | | | 4,113,000 | | | 27,033,850 | 0 | 901,117 | 0.03333 | 40 |
| 53 | 2033 | | | 4,113,000 | | | 27,033,850 | 0 | 827,662 | 0.03062 | 41 |
| 54 | 2034 | | | 4,113,000 | | | 27,033,850 | 0 | 760,195 | 0.02812 | 42 |
| 55 | 2035 | | | 4,113,000 | | | 27,033,850 | 0 | 698,227 | 0.02583 | 43 |
| 56 | 2036 | | | 4,113,000 | | | 27,033,850 | 0 | 641,311 | 0.02372 | 44 |
| 57 | 2037 | | | 4,113,000 | | | 27,033,850 | 0 | 589,034 | 0.02179 | 45 |
| 58 | 2038 | | | 4,113,000 | | | 27,033,850 | 0 | 541,019 | 0.02001 | 46 |
| 59 | 2039 | | | 4,113,000 | | | 27,033,850 | 0 | 496,917 | 0.01838 | 47 |
| 60 | 2040 | | | 4,113,000 | | | 27,033,850 | 0 | 456,411 | 0.01688 | 48 |
| 61 | 2041 | | | 4,113,000 | | | 27,033,850 | 0 | 419,206 | 0.01551 | 49 |
| 62 | 2042 | | | 4,113,000 | | | 27,033,850 | 0 | 385,034 | 0.01424 | 50 |
| 63 | 2043 | | | 4,113,000 | | | 27,033,850 | 0 | 353,648 | 0.01308 | 51 |
| 64 | | | | | | | | | | | |
| 65 | | | | | | | | | $185,834,989 | Total | |
| 66 | TOTAL | 9,713,000 | 90,016,000 | 119,277,000 | | | | | | | |
| 67 | | | | | | | | | | | |
| 68 | | | 219,006,000 | | | | | | 6/18/90 | | |

2-4-15

Plan F -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 4 | PLAN F - EXP. (#6) | SB 45' and 40' DREDGING COSTS ONLY | | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/18/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site F | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 0 | 4,000,000 | | (see totals) | 2.99 | | 11,960,000 | 10,985,075 | 0.91848 | 1 |
| 10 | 1994 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 10,089,621 | 0.84361 | 2 |
| 11 | 1995 | 0 | 4,000,000 | | | 2.99 | | 11,960,000 | 9,267,160 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,000,000 | | | 2.99 | 15,554,900 | 11,960,000 | 19,581,920 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,095,000 | | | 2.99 | 24,081,350 | 12,244,050 | 23,744,857 | 0.65367 | 5 |
| 14 | 1998 | | 4,113,000 | | | 2.99 | | 12,297,870 | 7,383,476 | 0.60039 | 6 |
| 15 | 1999 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,781,609 | 0.55145 | 7 |
| 16 | 2000 | | 4,113,000 | | | 2.99 | | 12,297,870 | 6,228,802 | 0.50649 | 8 |
| 17 | 2001 | | 4,113,000 | | | 2.99 | | 12,297,870 | 5,721,058 | 0.46521 | 9 |
| 18 | 2002 | | 4,113,000 | | | 2.99 | | 12,297,870 | 5,254,704 | 0.42729 | 10 |
| 19 | 2003 | | | 4,113,000 | | | | 27,033,850 | 10,609,577 | 0.39246 | 11 |
| 20 | 2004 | | | 4,113,000 | | | | 27,033,850 | 9,744,732 | 0.36046 | 12 |
| 21 | 2005 | | | 4,113,000 | | | | 27,033,850 | 8,950,385 | 0.33108 | 13 |
| 22 | 2006 | | | 4,113,000 | | | | 27,033,850 | 8,220,790 | 0.30409 | 14 |
| 23 | 2007 | | | 4,113,000 | | | | 27,033,850 | 7,550,668 | 0.27930 | 15 |
| 24 | 2008 | | | 4,113,000 | | | | 27,033,850 | 6,935,172 | 0.25654 | 16 |
| 25 | 2009 | | | 4,113,000 | | | | 27,033,850 | 6,369,848 | 0.23562 | 17 |
| 26 | 2010 | | | 4,113,000 | | | | 27,033,850 | 5,850,606 | 0.21642 | 18 |
| 27 | 2011 | | | 4,113,000 | | | | 27,033,850 | 5,373,691 | 0.19878 | 19 |
| 28 | 2012 | | | 4,113,000 | | | | 27,033,850 | 4,935,652 | 0.18257 | 20 |
| 29 | 2013 | | | 4,113,000 | | | | 27,033,850 | 4,533,320 | 0.16769 | 21 |
| 30 | 2014 | | | 4,113,000 | | | | 27,033,850 | 4,163,784 | 0.15402 | 22 |
| 31 | 2015 | | | 4,113,000 | | | | 27,033,850 | 3,824,371 | 0.14147 | 23 |
| 32 | 2016 | | | 4,113,000 | | | | 27,033,850 | 3,512,626 | 0.12993 | 24 |
| 33 | 2017 | | | 4,113,000 | | | | 27,033,850 | 3,226,292 | 0.11934 | 25 |
| 34 | 2018 | | | 4,113,000 | | | | 27,033,850 | 2,963,299 | 0.10961 | 26 |
| 35 | 2019 | | | 4,113,000 | | | | 27,033,850 | 2,721,745 | 0.10068 | 27 |

2-4-16

Plan F -DS4- 45' and 40' SB New Work and NH Maint. - Pres. Worth Dredging Costs Based on Site Life, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,113,000 | | | | 27,033,850 | 2,499,880 | 0.09247 | 28 |
| 41 | 2021 | | | 4,113,000 | | | | 27,033,850 | 2,296,101 | 0.08493 | 29 |
| 42 | 2022 | | | 4,113,000 | | | | 27,033,850 | 2,108,933 | 0.07801 | 30 |
| 43 | 2023 | | | 4,113,000 | | | | 27,033,850 | 1,937,023 | 0.07165 | 31 |
| 44 | 2024 | | | 4,113,000 | | | | 27,033,850 | 1,779,125 | 0.06581 | 32 |
| 45 | 2025 | | | 4,113,000 | | | | 27,033,850 | 1,634,099 | 0.06045 | 33 |
| 46 | 2026 | | | 4,113,000 | | | | 27,033,850 | 1,500,895 | 0.05552 | 34 |
| 47 | 2027 | | | 4,113,000 | | | | 27,033,850 | 1,378,548 | 0.05099 | 35 |
| 48 | 2028 | | | 4,113,000 | | | | 27,033,850 | 1,266,175 | 0.04684 | 36 |
| 49 | 2029 | | | 4,113,000 | | | | 27,033,850 | 1,162,962 | 0.04302 | 37 |
| 50 | 2030 | | | 4,113,000 | | | | 27,033,850 | 1,068,163 | 0.03951 | 38 |
| 51 | 2031 | | | 4,113,000 | | | | 27,033,850 | 981,091 | 0.03629 | 39 |
| 52 | 2032 | | | 4,113,000 | | | | 27,033,850 | 901,117 | 0.03333 | 40 |
| 53 | 2033 | | | 4,113,000 | | | | 27,033,850 | 827,662 | 0.03062 | 41 |
| 54 | 2034 | | | 4,113,000 | | | | 27,033,850 | 760,195 | 0.02812 | 42 |
| 55 | 2035 | | | 4,113,000 | | | | 27,033,850 | 698,227 | 0.02583 | 43 |
| 56 | 2036 | | | 4,113,000 | | | | 27,033,850 | 641,311 | 0.02372 | 44 |
| 57 | 2037 | | | 4,113,000 | | | | 27,033,850 | 589,034 | 0.02179 | 45 |
| 58 | 2038 | | | 4,113,000 | | | | 27,033,850 | 541,019 | 0.02001 | 46 |
| 59 | 2039 | | | 4,113,000 | | | | 27,033,850 | 496,917 | 0.01838 | 47 |
| 60 | 2040 | | | 4,113,000 | | | | 27,033,850 | 456,411 | 0.01688 | 48 |
| 61 | 2041 | | | 4,113,000 | | | | 27,033,850 | 419,206 | 0.01551 | 49 |
| 62 | 2042 | | | 4,113,000 | | | | 27,033,850 | 385,034 | 0.01424 | 50 |
| 63 | 2043 | | | 4,113,000 | | | | 27,033,850 | 353,648 | 0.01308 | 51 |
| 64 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 66 | TOTAL | 9,713,000 | 40,660,000 | 168,633,000 | | | | | $231,207,616 | Total | |
| 67 | | | | | | | | | | | |
| 68 | | | 219,006,000 | | | | | | | | |
| 69 | | | | | | | | | 6/18/90 | | |

2-4-17

Plan Ocean View- DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Site Life

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 4 | PLAN Ocean View | SB 45' & 40' - DREDGING COSTS ONLY | | | | 6/18/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Annual Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 0 | 4,000,000 | | 5.57 | | 22,280,000 | 20,463,835 | 0.91848 | 1 |
| 8 | 1994 | 0 | 4,000,000 | | 5.57 | | 22,280,000 | 18,795,715 | 0.84361 | 2 |
| 9 | 1995 | 0 | 4,000,000 | | 5.57 | | 22,280,000 | 17,263,573 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,000,000 | n.a. | 5.57 | 21,335,570 | 22,280,000 | 31,040,512 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,095,000 | n.a. | 5.57 | 33,586,450 | 22,809,150 | 36,864,163 | 0.65367 | 5 |
| 12 | 1998 | | 4,113,000 | | 5.57 | | 22,909,410 | 13,754,503 | 0.60039 | 6 |
| 13 | 1999 | | 4,113,000 | | 5.57 | | 22,909,410 | 12,633,298 | 0.55145 | 7 |
| 14 | 2000 | | 4,113,000 | | 5.57 | | 22,909,410 | 11,603,488 | 0.50649 | 8 |
| 15 | 2001 | | 4,113,000 | | 5.57 | | 22,909,410 | 10,657,624 | 0.46521 | 9 |
| 16 | 2002 | | 4,113,000 | | 5.57 | | 22,909,410 | 9,788,862 | 0.42729 | 10 |
| 17 | 2003 | | 4,113,000 | | 5.57 | | 22,909,410 | 8,990,918 | 0.39246 | 11 |
| 18 | 2004 | | 4,113,000 | | 5.57 | | 22,909,410 | 8,258,019 | 0.36046 | 12 |
| 19 | 2005 | | 4,113,000 | | 5.57 | | 22,909,410 | 7,584,863 | 0.33108 | 13 |
| 20 | 2006 | | 4,113,000 | | 5.57 | | 22,909,410 | 6,966,579 | 0.30409 | 14 |
| 21 | 2007 | | 4,113,000 | | 5.57 | | 22,909,410 | 6,398,695 | 0.27930 | 15 |
| 22 | 2008 | | 4,113,000 | | 5.57 | | 22,909,410 | 5,877,102 | 0.25654 | 16 |
| 23 | 2009 | | 4,113,000 | | 5.57 | | 22,909,410 | 5,398,027 | 0.23562 | 17 |
| 24 | 2010 | | 4,113,000 | | 5.57 | | 22,909,410 | 4,958,004 | 0.21642 | 18 |
| 25 | 2011 | | 4,113,000 | | 5.57 | | 22,909,410 | 4,553,850 | 0.19878 | 19 |
| 26 | 2012 | | 4,113,000 | | 5.57 | | 22,909,410 | 4,182,641 | 0.18257 | 20 |
| 27 | 2013 | | 4,113,000 | | 5.57 | | 22,909,410 | 3,841,691 | 0.16769 | 21 |
| 28 | 2014 | | 4,113,000 | | 5.57 | | 22,909,410 | 3,528,533 | 0.15402 | 22 |
| 29 | 2015 | | 4,113,000 | | 5.57 | | 22,909,410 | 3,240,903 | 0.14147 | 23 |
| 30 | 2016 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,976,719 | 0.12993 | 24 |
| 31 | 2017 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,734,070 | 0.11934 | 25 |
| 32 | 2018 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,511,201 | 0.10961 | 26 |
| 33 | 2019 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,306,500 | 0.10068 | 27 |
| 34 | 2020 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,118,484 | 0.09247 | 28 |
| 35 | 2021 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,945,795 | 0.08493 | 29 |

2-4-18

Plan Ocean View- DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Site Life

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,787,182 | 0.07801 | 30 |
| 40 | 2023 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,641,499 | 0.07165 | 31 |
| 41 | 2024 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,507,692 | 0.06581 | 32 |
| 42 | 2025 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,384,791 | 0.06045 | 33 |
| 43 | 2026 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,271,909 | 0.05552 | 34 |
| 44 | 2027 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,168,229 | 0.05099 | 35 |
| 45 | 2028 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,073,000 | 0.04684 | 36 |
| 46 | 2029 | | 4,113,000 | | 5.57 | | 22,909,410 | 985,534 | 0.04302 | 37 |
| 47 | 2030 | | 4,113,000 | | 5.57 | | 22,909,410 | 905,198 | 0.03951 | 38 |
| 48 | 2031 | | 4,113,000 | | 5.57 | | 22,909,410 | 831,410 | 0.03629 | 39 |
| 49 | 2032 | | 4,113,000 | | 5.57 | | 22,909,410 | 763,637 | 0.03333 | 40 |
| 50 | 2033 | | 4,113,000 | | 5.57 | | 22,909,410 | 701,389 | 0.03062 | 41 |
| 51 | 2034 | | 4,113,000 | | 5.57 | | 22,909,410 | 644,215 | 0.02812 | 42 |
| 52 | 2035 | | 4,113,000 | | 5.57 | | 22,909,410 | 591,702 | 0.02583 | 43 |
| 53 | 2036 | | 4,113,000 | | 5.57 | | 22,909,410 | 543,469 | 0.02372 | 44 |
| 54 | 2037 | | 4,113,000 | | 5.57 | | 22,909,410 | 499,168 | 0.02179 | 45 |
| 55 | 2038 | | 4,113,000 | | 5.57 | | 22,909,410 | 458,478 | 0.02001 | 46 |
| 56 | 2039 | | 4,113,000 | | 5.57 | | 22,909,410 | 421,105 | 0.01838 | 47 |
| 57 | 2040 | | 4,113,000 | | 5.57 | | 22,909,410 | 386,778 | 0.01688 | 48 |
| 58 | 2041 | | 4,113,000 | | 5.57 | | 22,909,410 | 355,250 | 0.01551 | 49 |
| 59 | 2042 | | 4,113,000 | | 5.57 | | 22,909,410 | 326,291 | 0.01424 | 50 |
| 60 | 2043 | | 4,113,000 | | 5.57 | | 22,909,410 | 299,694 | 0.01308 | 51 |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | TOTAL | 9,713,000 | 209,293,000 | | | | | $289,785,786 | | Total |
| 64 | | | | | | | | | | |
| 65 | | | 219,006,000 | | | | | | | |

2-4-19

Plan Buckroe Beach - DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Site LifeSite

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 4 | PLAN Buckroe Beach | | SB 45' & 40' - DREDGING COSTS ONLY | | | 6/18/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 0 | 4,000,000 | | 5.49 | | 21,960,000 | 20,169,920 | 0.91848 | 1 |
| 8 | 1994 | 0 | 4,000,000 | | 5.49 | | 21,960,000 | 18,525,759 | 0.84361 | 2 |
| 9 | 1995 | 0 | 4,000,000 | | 5.49 | | 21,960,000 | 17,015,622 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,000,000 | n.a. | 5.49 | 21,208,400 | 21,960,000 | 30,722,268 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,095,000 | n.a. | 5.49 | 33,573,950 | 22,481,550 | 36,641,850 | 0.65367 | 5 |
| 12 | 1998 | | 4,113,000 | | 5.49 | | 22,580,370 | 13,556,952 | 0.60039 | 6 |
| 13 | 1999 | | 4,113,000 | | 5.49 | | 22,580,370 | 12,451,850 | 0.55145 | 7 |
| 14 | 2000 | | 4,113,000 | | 5.49 | | 22,580,370 | 11,436,831 | 0.50649 | 8 |
| 15 | 2001 | | 4,113,000 | | 5.49 | | 22,580,370 | 10,504,552 | 0.46521 | 9 |
| 16 | 2002 | | 4,113,000 | | 5.49 | | 22,580,370 | 9,648,268 | 0.42729 | 10 |
| 17 | 2003 | | 4,113,000 | | 5.49 | | 22,580,370 | 8,861,785 | 0.39246 | 11 |
| 18 | 2004 | | 4,113,000 | | 5.49 | | 22,580,370 | 8,139,412 | 0.36046 | 12 |
| 19 | 2005 | | 4,113,000 | | 5.49 | | 22,580,370 | 7,475,924 | 0.33108 | 13 |
| 20 | 2006 | | 4,113,000 | | 5.49 | | 22,580,370 | 6,866,520 | 0.30409 | 14 |
| 21 | 2007 | | 4,113,000 | | 5.49 | | 22,580,370 | 6,306,792 | 0.27930 | 15 |
| 22 | 2008 | | 4,113,000 | | 5.49 | | 22,580,370 | 5,792,691 | 0.25654 | 16 |
| 23 | 2009 | | 4,113,000 | | 5.49 | | 22,580,370 | 5,320,497 | 0.23562 | 17 |
| 24 | 2010 | | 4,113,000 | | 5.49 | | 22,580,370 | 4,886,794 | 0.21642 | 18 |
| 25 | 2011 | | 4,113,000 | | 5.49 | | 22,580,370 | 4,488,445 | 0.19878 | 19 |
| 26 | 2012 | | 4,113,000 | | 5.49 | | 22,580,370 | 4,122,567 | 0.18257 | 20 |
| 27 | 2013 | | 4,113,000 | | 5.49 | | 22,580,370 | 3,786,514 | 0.16769 | 21 |
| 28 | 2014 | | 4,113,000 | | 5.49 | | 22,580,370 | 3,477,854 | 0.15402 | 22 |
| 29 | 2015 | | 4,113,000 | | 5.49 | | 22,580,370 | 3,194,355 | 0.14147 | 23 |
| 30 | 2016 | | 4,113,000 | | 5.49 | | 22,580,370 | 2,933,966 | 0.12993 | 24 |
| 31 | 2017 | | 4,113,000 | | 5.49 | | 22,580,370 | 2,694,802 | 0.11934 | 25 |
| 32 | 2018 | | 4,113,000 | | 5.49 | | 22,580,370 | 2,475,134 | 0.10961 | 26 |
| 33 | 2019 | | 4,113,000 | | 5.49 | | 22,580,370 | 2,273,372 | 0.10068 | 27 |
| 34 | 2020 | | 4,113,000 | | 5.49 | | 22,580,370 | 2,088,057 | 0.09247 | 28 |
| 35 | 2021 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,917,848 | 0.08493 | 29 |

2-4-20

Plan Buckroe Beach - DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Site LifeSite

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,761,514 | 0.07801 | 30 |
| 40 | 2023 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,617,923 | 0.07165 | 31 |
| 41 | 2024 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,486,037 | 0.06581 | 32 |
| 42 | 2025 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,364,902 | 0.06045 | 33 |
| 43 | 2026 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,253,641 | 0.05552 | 34 |
| 44 | 2027 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,151,450 | 0.05099 | 35 |
| 45 | 2028 | | 4,113,000 | | 5.49 | | 22,580,370 | 1,057,589 | 0.04684 | 36 |
| 46 | 2029 | | 4,113,000 | | 5.49 | | 22,580,370 | 971,379 | 0.04302 | 37 |
| 47 | 2030 | | 4,113,000 | | 5.49 | | 22,580,370 | 892,197 | 0.03951 | 38 |
| 48 | 2031 | | 4,113,000 | | 5.49 | | 22,580,370 | 819,469 | 0.03629 | 39 |
| 49 | 2032 | | 4,113,000 | | 5.49 | | 22,580,370 | 752,670 | 0.03333 | 40 |
| 50 | 2033 | | 4,113,000 | | 5.49 | | 22,580,370 | 691,315 | 0.03062 | 41 |
| 51 | 2034 | | 4,113,000 | | 5.49 | | 22,580,370 | 634,962 | 0.02812 | 42 |
| 52 | 2035 | | 4,113,000 | | 5.49 | | 22,580,370 | 583,203 | 0.02583 | 43 |
| 53 | 2036 | | 4,113,000 | | 5.49 | | 22,580,370 | 535,663 | 0.02372 | 44 |
| 54 | 2037 | | 4,113,000 | | 5.49 | | 22,580,370 | 491,998 | 0.02179 | 45 |
| 55 | 2038 | | 4,113,000 | | 5.49 | | 22,580,370 | 451,893 | 0.02001 | 46 |
| 56 | 2039 | | 4,113,000 | | 5.49 | | 22,580,370 | 415,056 | 0.01838 | 47 |
| 57 | 2040 | | 4,113,000 | | 5.49 | | 22,580,370 | 381,223 | 0.01688 | 48 |
| 58 | 2041 | | 4,113,000 | | 5.49 | | 22,580,370 | 350,147 | 0.01551 | 49 |
| 59 | 2042 | | 4,113,000 | | 5.49 | | 22,580,370 | 321,605 | 0.01424 | 50 |
| 60 | 2043 | | 4,113,000 | | 5.49 | | 22,580,370 | 295,389 | 0.01308 | 51 |
| 61 | | | | | | | | | | |
| 62 | TOTAL | 9,713,000 | 209,293,000 | | | | | | | |
| 63 | | | | | | | | | | |
| 64 | | | 219,006,000 | | | | | $286,058,427 | | Tota |

2-4-21

Plan Ocean View- DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Site Life

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 4 | PLAN Ocean View | SB 45' & 40' - DREDGING COSTS ONLY | | | | 6/21/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 0 | 4,000,000 | | 5.57 | | 22,280,000 | 20,463,835 | 0.91848 | 1 |
| 8 | 1994 | 0 | 4,000,000 | | 5.57 | | 22,280,000 | 18,795,715 | 0.84361 | 2 |
| 9 | 1995 | 0 | 4,000,000 | | 5.57 | | 22,280,000 | 17,263,573 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,000,000 | n.a. | 5.57 | 21,335,570 | 22,280,000 | 31,040,512 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,095,000 | n.a. | 5.57 | 33,586,450 | 22,809,150 | 36,864,163 | 0.65367 | 5 |
| 12 | 1998 | | 4,113,000 | | 5.57 | | 22,909,410 | 13,754,503 | 0.60039 | 6 |
| 13 | 1999 | | 4,113,000 | | 5.57 | | 22,909,410 | 12,633,298 | 0.55145 | 7 |
| 14 | 2000 | | 4,113,000 | | 5.57 | | 22,909,410 | 11,603,488 | 0.50649 | 8 |
| 15 | 2001 | | 4,113,000 | | 5.57 | | 22,909,410 | 10,657,624 | 0.46521 | 9 |
| 16 | 2002 | | 4,113,000 | | 5.57 | | 22,909,410 | 9,788,862 | 0.42729 | 10 |
| 17 | 2003 | | 4,113,000 | | 5.57 | | 22,909,410 | 8,990,918 | 0.39246 | 11 |
| 18 | 2004 | | 4,113,000 | | 5.57 | | 22,909,410 | 8,258,019 | 0.36046 | 12 |
| 19 | 2005 | | 4,113,000 | | 5.57 | | 22,909,410 | 7,584,863 | 0.33108 | 13 |
| 20 | 2006 | | 4,113,000 | | 5.57 | | 22,909,410 | 6,966,579 | 0.30409 | 14 |
| 21 | 2007 | | 4,113,000 | | 5.57 | | 22,909,410 | 6,398,695 | 0.27930 | 15 |
| 22 | 2008 | | 4,113,000 | | 5.57 | | 22,909,410 | 5,877,102 | 0.25654 | 16 |
| 23 | 2009 | | 4,113,000 | | 5.57 | | 22,909,410 | 5,398,027 | 0.23562 | 17 |
| 24 | 2010 | | 4,113,000 | | 5.57 | | 22,909,410 | 4,958,004 | 0.21642 | 18 |
| 25 | 2011 | | 4,113,000 | | 5.57 | | 22,909,410 | 4,553,850 | 0.19878 | 19 |
| 26 | 2012 | | 4,113,000 | | 5.57 | | 22,909,410 | 4,182,641 | 0.18257 | 20 |
| 27 | 2013 | | 4,113,000 | | 5.57 | | 22,909,410 | 3,841,691 | 0.16769 | 21 |
| 28 | 2014 | | 4,113,000 | | 5.57 | | 22,909,410 | 3,528,533 | 0.15402 | 22 |
| 29 | 2015 | | 4,113,000 | | 5.57 | | 22,909,410 | 3,240,903 | 0.14147 | 23 |
| 30 | 2016 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,976,719 | 0.12993 | 24 |
| 31 | 2017 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,734,070 | 0.11934 | 25 |
| 32 | 2018 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,511,201 | 0.10961 | 26 |
| 33 | 2019 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,306,500 | 0.10068 | 27 |
| 34 | 2020 | | 4,113,000 | | 5.57 | | 22,909,410 | 2,118,484 | 0.09247 | 28 |
| 35 | 2021 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,945,795 | 0.08493 | 29 |

2-4-22

Plan Ocean View- DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Site Life

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,787,182 | 0.07801 | 30 |
| 40 | 2023 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,641,499 | 0.07165 | 31 |
| 41 | 2024 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,507,692 | 0.06581 | 32 |
| 42 | 2025 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,384,791 | 0.06045 | 33 |
| 43 | 2026 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,271,909 | 0.05552 | 34 |
| 44 | 2027 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,168,229 | 0.05099 | 35 |
| 45 | 2028 | | 4,113,000 | | 5.57 | | 22,909,410 | 1,073,000 | 0.04684 | 36 |
| 46 | 2029 | | 4,113,000 | | 5.57 | | 22,909,410 | 985,534 | 0.04302 | 37 |
| 47 | 2030 | | 4,113,000 | | 5.57 | | 22,909,410 | 905,198 | 0.03951 | 38 |
| 48 | 2031 | | 4,113,000 | | 5.57 | | 22,909,410 | 831,410 | 0.03629 | 39 |
| 49 | 2032 | | 4,113,000 | | 5.57 | | 22,909,410 | 763,637 | 0.03333 | 40 |
| 50 | 2033 | | 4,113,000 | | 5.57 | | 22,909,410 | 701,389 | 0.03062 | 41 |
| 51 | 2034 | | 4,113,000 | | 5.57 | | 22,909,410 | 644,215 | 0.02812 | 42 |
| 52 | 2035 | | 4,113,000 | | 5.57 | | 22,909,410 | 591,702 | 0.02583 | 43 |
| 53 | 2036 | | 4,113,000 | | 5.57 | | 22,909,410 | 543,469 | 0.02372 | 44 |
| 54 | 2037 | | 4,113,000 | | 5.57 | | 22,909,410 | 499,168 | 0.02179 | 45 |
| 55 | 2038 | | 4,113,000 | | 5.57 | | 22,909,410 | 458,478 | 0.02001 | 46 |
| 56 | 2039 | | 4,113,000 | | 5.57 | | 22,909,410 | 421,105 | 0.01838 | 47 |
| 57 | 2040 | | 4,113,000 | | 5.57 | | 22,909,410 | 386,778 | 0.01688 | 48 |
| 58 | 2041 | | 4,113,000 | | 5.57 | | 22,909,410 | 355,250 | 0.01551 | 49 |
| 59 | 2042 | | 4,113,000 | | 5.57 | | 22,909,410 | 326,291 | 0.01424 | 50 |
| 60 | 2043 | | 4,113,000 | | 5.57 | | 22,909,410 | 299,694 | 0.01308 | 51 |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | TOTAL | 9,713,000 | 209,293,000 | | | | | $289,785,786 | | Total |
| 64 | | | | | | | | | | |
| 65 | | | 219,006,000 | | | | | | | |

2-4-23

Plan Chesapeake Bay - DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 4 | PLAN Chesapeake Bay | | SB 45' & 40' - DREDGING COSTS ONLY | | | 6/18/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 0 | 4,000,000 | | 5.98 | | 23,920,000 | 21,970,149 | 0.91848 | 1 |
| 8 | 1994 | 0 | 4,000,000 | | 5.98 | | 23,920,000 | 20,179,242 | 0.84361 | 2 |
| 9 | 1995 | 0 | 4,000,000 | | 5.98 | | 23,920,000 | 18,534,321 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,000,000 | n.a. | 5.98 | 21,986,200 | 23,920,000 | 32,670,718 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,095,000 | n.a. | 5.98 | 34,563,110 | 24,488,100 | 38,600,058 | 0.65367 | 5 |
| 12 | 1998 | | 4,113,000 | | 5.98 | | 24,595,740 | 14,766,953 | 0.60039 | 6 |
| 13 | 1999 | | 4,113,000 | | 5.98 | | 24,595,740 | 13,563,217 | 0.55145 | 7 |
| 14 | 2000 | | 4,113,000 | | 5.98 | | 24,595,740 | 12,457,605 | 0.50649 | 8 |
| 15 | 2001 | | 4,113,000 | | 5.98 | | 24,595,740 | 11,442,117 | 0.46521 | 9 |
| 16 | 2002 | | 4,113,000 | | 5.98 | | 24,595,740 | 10,509,407 | 0.42729 | 10 |
| 17 | 2003 | | 4,113,000 | | 5.98 | | 24,595,740 | 9,652,727 | 0.39246 | 11 |
| 18 | 2004 | | 4,113,000 | | 5.98 | | 24,595,740 | 8,865,881 | 0.36046 | 12 |
| 19 | 2005 | | 4,113,000 | | 5.98 | | 24,595,740 | 8,143,174 | 0.33108 | 13 |
| 20 | 2006 | | 4,113,000 | | 5.98 | | 24,595,740 | 7,479,379 | 0.30409 | 14 |
| 21 | 2007 | | 4,113,000 | | 5.98 | | 24,595,740 | 6,869,694 | 0.27930 | 15 |
| 22 | 2008 | | 4,113,000 | | 5.98 | | 24,595,740 | 6,309,707 | 0.25654 | 16 |
| 23 | 2009 | | 4,113,000 | | 5.98 | | 24,595,740 | 5,795,368 | 0.23562 | 17 |
| 24 | 2010 | | 4,113,000 | | 5.98 | | 24,595,740 | 5,322,956 | 0.21642 | 18 |
| 25 | 2011 | | 4,113,000 | | 5.98 | | 24,595,740 | 4,889,053 | 0.19878 | 19 |
| 26 | 2012 | | 4,113,000 | | 5.98 | | 24,595,740 | 4,490,519 | 0.18257 | 20 |
| 27 | 2013 | | 4,113,000 | | 5.98 | | 24,595,740 | 4,124,472 | 0.16769 | 21 |
| 28 | 2014 | | 4,113,000 | | 5.98 | | 24,595,740 | 3,788,264 | 0.15402 | 22 |
| 29 | 2015 | | 4,113,000 | | 5.98 | | 24,595,740 | 3,479,461 | 0.14147 | 23 |
| 30 | 2016 | | 4,113,000 | | 5.98 | | 24,595,740 | 3,195,831 | 0.12993 | 24 |
| 31 | 2017 | | 4,113,000 | | 5.98 | | 24,595,740 | 2,935,322 | 0.11934 | 25 |
| 32 | 2018 | | 4,113,000 | | 5.98 | | 24,595,740 | 2,696,047 | 0.10961 | 26 |
| 33 | 2019 | | 4,113,000 | | 5.98 | | 24,595,740 | 2,476,278 | 0.10068 | 27 |
| 34 | 2020 | | 4,113,000 | | 5.98 | | 24,595,740 | 2,274,423 | 0.09247 | 28 |
| 35 | 2021 | | 4,113,000 | | 5.98 | | 24,595,740 | 2,089,022 | 0.08493 | 29 |

2-4-24

Plan Chesapeake Bay - DS4- 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,918,734 | 0.07801 | 30 |
| 40 | 2023 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,762,328 | 0.07165 | 31 |
| 41 | 2024 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,618,671 | 0.06581 | 32 |
| 42 | 2025 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,486,724 | 0.06045 | 33 |
| 43 | 2026 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,365,533 | 0.05552 | 34 |
| 44 | 2027 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,254,221 | 0.05099 | 35 |
| 45 | 2028 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,151,982 | 0.04684 | 36 |
| 46 | 2029 | | 4,113,000 | | 5.98 | | 24,595,740 | 1,058,078 | 0.04302 | 37 |
| 47 | 2030 | | 4,113,000 | | 5.98 | | 24,595,740 | 971,828 | 0.03951 | 38 |
| 48 | 2031 | | 4,113,000 | | 5.98 | | 24,595,740 | 892,609 | 0.03629 | 39 |
| 49 | 2032 | | 4,113,000 | | 5.98 | | 24,595,740 | 819,848 | 0.03333 | 40 |
| 50 | 2033 | | 4,113,000 | | 5.98 | | 24,595,740 | 753,017 | 0.03062 | 41 |
| 51 | 2034 | | 4,113,000 | | 5.98 | | 24,595,740 | 691,635 | 0.02812 | 42 |
| 52 | 2035 | | 4,113,000 | | 5.98 | | 24,595,740 | 635,256 | 0.02583 | 43 |
| 53 | 2036 | | 4,113,000 | | 5.98 | | 24,595,740 | 583,473 | 0.02372 | 44 |
| 54 | 2037 | | 4,113,000 | | 5.98 | | 24,595,740 | 535,911 | 0.02179 | 45 |
| 55 | 2038 | | 4,113,000 | | 5.98 | | 24,595,740 | 492,226 | 0.02001 | 46 |
| 56 | 2039 | | 4,113,000 | | 5.98 | | 24,595,740 | 452,102 | 0.01838 | 47 |
| 57 | 2040 | | 4,113,000 | | 5.98 | | 24,595,740 | 415,248 | 0.01688 | 48 |
| 58 | 2041 | | 4,113,000 | | 5.98 | | 24,595,740 | 381,399 | 0.01551 | 49 |
| 59 | 2042 | | 4,113,000 | | 5.98 | | 24,595,740 | 350,309 | 0.01424 | 50 |
| 60 | 2043 | | 4,113,000 | | 5.98 | | 24,595,740 | 321,754 | 0.01308 | 51 |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | TOTAL | 9,713,000 | 209,293,000 | | | | | $309,484,248 | | Tota |
| 64 | | | | | | | | | | |
| 65 | | | 219,006,000 | | | | | | | |

*Calculation of Yearly Dredging*

*Costs of all Plans Under*

*Dredging Scenario 5*

Summary of All Plans Evaluated under Dredging Scenario 5

| Dredging Scenario S5 - 55' Outbound and 45' and 40' Southern Branch & NH Maintenance | | | | | 6/21/90 | |
|---|---|---|---|---|---|---|
| Construction Costs | EXP A - Site 1 | EXP B - Site 2 | EXP E - Site 5 | EXP C - Site 3 | EXP D - Site 4 | EXP F - Site 6 |
| (w/o Envir. Mitigation or IDC) | $53,504,000 | $55,538,000 | $24,688,000 | | | |
| NUMBER OF ACRES | 1,700 | 2,500 | 1,500 | Not Evaluated Life Too Short | Not Evaluated Life Too Short | Not Evaluated Life Too Short |
| # Years Site Receives Material | 22 | 43 | 14 | | | |
| Amount of Material Site Holds | 113,963,000 | 208,849,000 | 79,459,000 | | | |
| Average annual cost per yard | 5.74 | 5.53 | 5.60 | | | |
| | Ocean Disposal with Confined Unsuitable | Buckroe Beach | Ocean View | Chesapeake Bay | | |
| Construction Costs (w/o IDC) | 0 | $82,883,000 | $89,636,000 | $128,025,200 | | |
| NUMBER OF ACRES | OCEAN | 2,500 | 2000 * | 2000 * | | |
| # Years Site Receives Material | 43 | 43 | 43 | 43 | | |
| Amount of Material Site Holds | 208,849,000 | 208,849,000 | 208,849,000 | 208,849,000 | | |
| Average annual cost per yard | 7.58 | 8.98 | 9.41 | 11.45 | | |

* The assumption that the 2000 acre sites can hold the same amount of material as the 2500 acre sites is based on their greater depth.

1-5-2

Ocean Disposal Costs (DS 5) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | So. Branch 45' and 40' & 55' Out | | | | Evaluate costs for period equal to life of Site B under DS - 5 | | | | |
| 2 | | 6/20/90 | | | | | | | |
| 3 | | | | | | | (F +G) | (C * E) | (D * H) |
| 4 | | Cubic Yards of Material | | New Work Unit Prices | | New Work | Total Unit | | |
| 5 | | NEW WORK | | For Dredging Only | | Unit Price | Cost for | Total Cost of New Work Elements | |
| 6 | | | | | | Cost for Use | Ocean | | |
| 7 | | Ocean Suitable | Material to | Ocean | Confined | of Reserved, | Unsuitable | Ocean | Confined |
| 8 | | Disposal | be Confined | Suitable | CI Exist. | Confined site | Material | Suitable | CI Extens. |
| 9 | | | | | | | | | |
| 10 | 1993 | 4,893,000 | | 4.82 | | | | 23,584,260 | |
| 11 | 1994 | 5,131,000 | | 4.80 | | | | 24,628,800 | |
| 12 | 1995 | 4,523,000 | | n.a. | | | | 22,677,000 | |
| 13 | 1996 | 1,500,000 | 2,239,000 | 5.15 | 4.10 | 2.00 | 6.10 | 7,725,000 | 13,657,900 |
| 14 | 1997 | | 5,974,000 | | (see pg. 2) | 2.00 | n.a. | | 36,029,350 |
| 15 | 1998 | | | | | | | | |
| 16 | 1999 | | | | | | | | |
| 17 | 2000 | | | | | | | | |
| 18 | 2001 | | NO NEW WORK ASSUMED AFTER 1997. ALL SUITABLE MATERIAL IS TAKEN TO THE OCEAN | | | | | | |
| 19 | 2002 | | SPACE IS RESERVED IN CRANEY ISLAND FOR THE UNSUITABLE MATERIAL. | | | | | | |
| 20 | 2003 | The $2/yard charge for remaining site costs is based on certain assumptions about the amount of sunk costs to be recovered. | | | | | | | |
| 21 | 2004 | | | | | | | | |
| 22 | 2005 | | Maintenance - Unsuitable: Quantities derived from Tables 16 and 19 in LTDS report. | | | | | | |
| 23 | 2006 | | In determining the average annual mainteance costs associated with ocean disposal | | | | | | |
| 24 | 2007 | | the following yards were used: | | | | | | |
| 25 | 2008 | | | | For all dredging scenarios which include only | | | | |
| 26 | 2009 | | | | | | | | |
| 27 | 2010 | | 355,000 | UNSUITABLE | 40' and 35' (existing channels) So. Branch maintenance | | | | |
| 28 | 2011 | | | | or, DS-1 (50 outbound & maintenance) | | | | |
| 29 | 2012 | | ADD TO THIS | | and DS-2 (55' outbound and maintenance). | | | | |
| 30 | 2013 | | | | | | | | |
| 31 | 2014 | | 113,000 | UNSUITABLE | 45' and 40' (new work depths) So. Branch maintenance, | | | | |
| 32 | 2015 | | | | or, DS-4 (50' Out. & So. Br. 45' and 40' and maintenance) and | | | | |
| 33 | 2016 | | | | DS-5 (55' outbound and So. Br. 45' and 40' and maintenance). | | | | |
| 34 | 2017 | | | | | | | | |
| 35 | 2018 | | | | Source: WES report Table 1 (February 1989) | | | | |
| 36 | 2019 | | | | | | | | |
| 37 | | | | | | | | | |

2-5-2

Ocean Disposal Costs (DS 5) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 38 | From Ed Rich's Costs - New work Dredging (Rich & Assoc. report, 24 Oct. 1988) | | | | | | | | |
| 39 | Yards from WES report | | | 29-Mar-89 | | | | | |
| 40 | | | | | | | | | |
| 41 | Ocean Disposal | | | | | | | | |
| 42 | | | Quantities, CY. | | Cost | | | | |
| 43 | Year | Depth Ft. | Clean | Not Suitable | Per C.Y. | Total Cost | Place/Method | | |
| 44 | 1993 | 55 | 4,893,000 | | 4.82 | 23,584,260 | Dam Neck/Buck/Scow | | |
| 45 | 1994 | 55 | 5,131,000 | | 4.80 | 24,628,800 | Dam Neck/Buck/Scow | | |
| 46 | 1995 | 55 | 2,723,000 | | 4.97 | 13,533,310 | Dam Neck/Buck/Scow | | |
| 47 | 1995 | 55 | 1,800,000 | (berth area) | 5.18 | 9,324,000 | Dam Neck/Buck/Scow | | |
| 48 | | | | | | | | | |
| 49 | NOTE: CI/via BBR means material was bucket dredged and deposited intoCraney Island by Barge Rehandler | | | | | | | | |
| 50 | | | | | | | | Add $2 per yd to payoff | |
| 51 | | | | Unit | Type of | Estimated | Method of | remaining site costs | TOTAL OF |
| 52 | | | Quantities | Cost | material | Dredging Costs | Disposal | and perform O & M | ALL CHARGES |
| 53 | | | | | | | | | |
| 54 | **1996** | **45** | **1,500,000** | **5.15** | Clean | **7,725,000** | DNODS (buck) | | |
| 55 | **1996** | **45** | **2,239,000** | **4.10** | unsuit | **9,179,900** | CI/via BBR | 4,478,000 | 13,657,900 |
| 56 | 1997 | 45 | 3,467,000 | 3.85 | unsuit | 13,347,950 | " | 6,934,000 | 20,281,950 |
| 57 | 1997 | 45 | 272,000 | 5.10 | unsuit | 1,387,200 | " | 544,000 | 1,931,200 |
| 58 | 1997 | 40 | 2,135,000 | 4.12 | unsuit | 8,796,200 | " | 4,270,000 | 13,066,200 |
| 59 | 1997 | 40 | 100,000 | 5.50 | unsuit | 550,000 | " | 200,000 | 750,000 |
| 60 | | | | | | | | | |
| 61 | | | 9,713,000 | | | 40,986,250 | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | Total | Total dredging | | | **Total of all** | | **Total of all Unsuitable** | |
| 65 | | Quantities | Costs | | | **Ocean suitable costs** | | **Material Costs** | |
| 66 | 1993 | 4,893,000 | 23,584,260 | | 1993 | 23,584,260 | | | |
| 67 | 1994 | 5,131,000 | 24,628,800 | | 1994 | 24,628,800 | | | |
| 68 | 1995 | 4,523,000 | 22,857,310 | | 1995 | 22,857,310 | | | |
| 69 | 1996 | 3,739,000 | 16,904,900 | | 1996 | 7,725,000 | | 13,657,900 | |
| 70 | 1997 | 5,974,000 | 24,081,350 | | 1997 | | | 36,029,350 | |
| 71 | | | | | | | | | |
| 72 | | | 112,056,620 | | | 78,795,370 | | 49,687,250 | |

Ocean Disposal Costs (DS 5) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | |
| 2 | | S.B. 40/45' and 55' Out. | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 3 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 4 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 5 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 6 | | Ocean Suitabl | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 7 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | 1993 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 49,685,860 | 45,635,692 | 0.9185 | 1 |
| 11 | 1994 | 3,645,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 23,072,850 | 2,928,750 | 50,730,400 | 42,796,864 | 0.8436 | 2 |
| 12 | 1995 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 50,044,600 | 38,776,867 | 0.7748 | 3 |
| 13 | 1996 | 3,845,000 | 355,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 2,928,750 | 48,750,500 | 34,694,961 | 0.7117 | 4 |
| 14 | 1997 | 3,845,000 | 450,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,712,500 | 64,180,700 | 41,953,057 | 0.6537 | 5 |
| 15 | 1998 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 16,990,851 | 0.6004 | 6 |
| 16 | 1999 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 15,605,833 | 0.5514 | 7 |
| 17 | 2000 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 14,333,716 | 0.5065 | 8 |
| 18 | 2001 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 13,165,296 | 0.4652 | 9 |
| 19 | 2002 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 12,092,120 | 0.4273 | 10 |
| 20 | 2003 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 11,106,425 | 0.3925 | 11 |
| 21 | 2004 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 10,201,079 | 0.3605 | 12 |
| 22 | 2005 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 9,369,533 | 0.3311 | 13 |
| 23 | 2006 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 8,605,771 | 0.3041 | 14 |
| 24 | 2007 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 7,904,267 | 0.2793 | 15 |
| 25 | 2008 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 7,259,947 | 0.2565 | 16 |
| 26 | 2009 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 6,668,149 | 0.2356 | 17 |
| 27 | 2010 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 6,124,591 | 0.2164 | 18 |
| 28 | 2011 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 5,625,342 | 0.1988 | 19 |
| 29 | 2012 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 5,166,790 | 0.1826 | 20 |
| 30 | 2013 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 4,745,616 | 0.1677 | 21 |
| 31 | 2014 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 4,358,775 | 0.1540 | 22 |
| 32 | 2015 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 4,003,467 | 0.1415 | 23 |
| 33 | 2016 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 3,677,123 | 0.1299 | 24 |
| 34 | 2017 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 3,377,380 | 0.1193 | 25 |
| 35 | 2018 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 3,102,071 | 0.1096 | 26 |
| 36 | 2019 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 2,849,204 | 0.1007 | 27 |
| 37 | | | | | | | | | | | | | |

2-5-4

Ocean Disposal Costs (DS 5) - Including Dredging and Deposit of Unsuitable Material in Space Remaining in CI or Another Confined Site

| | J | K | L | M | N | O | P | Q | R | S | T | U | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | | | | **Maintenance** | | | | | | ADD I+J+S+T | | | |
| 39 | | Cubic Yards of Material | | **Unit Prices** | | Unit | Total | Total Cost of | | Tot. Annual Cost | | | |
| 40 | | **MAINTENANCE WORK** | | **Dredging Only** | | Cost | Unit | Maintenance Dredging | | of all Methods | **Annual** | | |
| 41 | | | | | | Confine. | Cost | and Disposal | | (Add $100,000 | **Discounted** | Discount | Yr. |
| 42 | | Ocean Suitable | Material to | Ocean | Confin. | Site | Ocean | Ocean | Confined | per year-ocean | **Amount** | Factor | # |
| 43 | | Disposal | be Confined | Suitable | CI Ext. | Reserve | Unsuit | Suitable | CI Extens. | monitoring) | | | |
| 44 | 2020 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 2,616,950 | 0.0925 | 28 |
| 45 | 2021 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 2,403,628 | 0.0849 | 29 |
| 46 | 2022 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 2,207,695 | 0.0780 | 30 |
| 47 | 2023 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 2,027,734 | 0.0717 | 31 |
| 48 | 2024 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,862,442 | 0.0658 | 32 |
| 49 | 2025 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,710,624 | 0.0604 | 33 |
| 50 | 2026 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,571,182 | 0.0555 | 34 |
| 51 | 2027 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,443,106 | 0.0510 | 35 |
| 52 | 2028 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,325,471 | 0.0468 | 36 |
| 53 | 2029 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,217,424 | 0.0430 | 37 |
| 54 | 2030 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,118,185 | 0.0395 | 38 |
| 55 | 2031 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 1,027,036 | 0.0363 | 39 |
| 56 | 2032 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 943,316 | 0.0333 | 40 |
| 57 | 2033 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 866,422 | 0.0306 | 41 |
| 58 | 2034 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 795,795 | 0.0281 | 42 |
| 59 | 2035 | 3,845,000 | 468,000 | 6.33 | 6.25 | 2.00 | 8.25 | 24,338,850 | 3,861,000 | 28,299,850 | 730,925 | 0.0258 | 43 |
| 60 | | | | | | | | | | | | | |
| 61 | | | | | | | | | | | | | |
| 62 | | | | | | | | | | | | | |
| 63 | | | | | | | | | | | | | |
| 64 | | 164,935,000 | 19,654,000 | | | | | | Total of discounted | | | | |
| 65 | | | | | | | | | amounts equals Present Worth | | $404,058,722 | | |
| 66 | | 24,260,000 | New Work | | | | | | | | | | |
| 67 | | | | | | | | | | | | | |
| 68 | | 208,849,000 | | | | | | | | | | | |
| 69 | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | |
| 71 | | | | | | | | | | | | | |
| 72 | | | | | | | | | | | | | |

Plan A-DS5- 50' and 45' 40 SB New Work and Maint. - P W of Dredging Costs, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-5 | PLAN A - EXP. (#1) | | SB 45' & 40'- DREDGING COSTS ONLY | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site - | | | | |
| 3 | | 6/20/90 | | | | | Deduct 3 years of life to account for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Annual Discounted | Discount | Yr. |
| 7 | Year | Quantities | To Site 1 | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | (see totals) | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,200,000 | | | 2.99 | 15,554,900 | 12,558,000 | 20,007,507 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,295,000 | | | 2.99 | 24,081,350 | 12,842,050 | 24,135,753 | 0.65367 | 5 |
| 14 | 1998 | | 4,313,000 | | | 2.99 | | 12,895,870 | 7,742,508 | 0.60039 | 6 |
| 15 | 1999 | | 4,313,000 | | | 2.99 | | 12,895,870 | 7,111,373 | 0.55145 | 7 |
| 16 | 2000 | | 4,313,000 | | | 2.99 | | 12,895,870 | 6,531,686 | 0.50649 | 8 |
| 17 | 2001 | | 4,313,000 | | | 2.99 | | 12,895,870 | 5,999,252 | 0.46521 | 9 |
| 18 | 2002 | | 4,313,000 | | | 2.99 | | 12,895,870 | 5,510,220 | 0.42729 | 10 |
| 19 | 2003 | | 4,313,000 | | | 2.99 | | 12,895,870 | 5,061,052 | 0.39246 | 11 |
| 20 | 2004 | | 4,313,000 | | | 2.99 | | 12,895,870 | 4,648,498 | 0.36046 | 12 |
| 21 | 2005 | | 4,313,000 | | | 2.99 | | 12,895,870 | 4,269,573 | 0.33108 | 13 |
| 22 | 2006 | | 4,313,000 | | | 2.99 | | 12,895,870 | 3,921,537 | 0.30409 | 14 |
| 23 | 2007 | | 4,313,000 | | | 2.99 | | 12,895,870 | 3,601,871 | 0.27930 | 15 |
| 24 | 2008 | | 4,313,000 | | | 2.99 | | 12,895,870 | 3,308,262 | 0.25654 | 16 |
| 25 | 2009 | | 4,313,000 | | | 2.99 | | 12,895,870 | 3,038,588 | 0.23562 | 17 |
| 26 | 2010 | | 4,313,000 | | | 2.99 | | 12,895,870 | 2,790,896 | 0.21642 | 18 |
| 27 | 2011 | | 4,313,000 | | | 2.99 | | 12,895,870 | 2,563,395 | 0.19878 | 19 |
| 28 | 2012 | | 4,313,000 | | | 2.99 | | 12,895,870 | 2,354,438 | 0.18257 | 20 |
| 29 | 2013 | | 4,313,000 | | | 2.99 | | 12,895,870 | 2,162,515 | 0.16769 | 21 |
| 30 | 2014 | | | 4,313,000 | | | 28,299,850 | 0 | 4,358,775 | 0.15402 | 22 |
| 31 | 2015 | | | 4,313,000 | | | 28,299,850 | 0 | 4,003,467 | 0.14147 | 23 |
| 32 | 2016 | | | 4,313,000 | | | 28,299,850 | 0 | 3,677,123 | 0.12993 | 24 |
| 33 | 2017 | | | 4,313,000 | | | 28,299,850 | 0 | 3,377,380 | 0.11934 | 25 |
| 34 | 2018 | | | 4,313,000 | | | 28,299,850 | 0 | 3,102,071 | 0.10961 | 26 |
| 35 | 2019 | | | 4,313,000 | | | 28,299,850 | 0 | 2,849,204 | 0.10068 | 27 |

2-5-6

Plan A-DS5- 50' and 45' 40 SB New Work and Maint. - P W of Dredging Costs, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr. |
| 38 | Year | Quantities | To Site 1 | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,313,000 | | | 28,299,850 | 0 | 2,616,950 | 0.09247 | 28 |
| 41 | 2021 | | | 4,313,000 | | | 28,299,850 | 0 | 2,403,628 | 0.08493 | 29 |
| 42 | 2022 | | | 4,313,000 | | | 28,299,850 | 0 | 2,207,695 | 0.07801 | 30 |
| 43 | 2023 | | | 4,313,000 | | | 28,299,850 | 0 | 2,027,734 | 0.07165 | 31 |
| 44 | 2024 | | | 4,313,000 | | | 28,299,850 | 0 | 1,862,442 | 0.06581 | 32 |
| 45 | 2025 | | | 4,313,000 | | | 28,299,850 | 0 | 1,710,624 | 0.06045 | 33 |
| 46 | 2026 | | | 4,313,000 | | | 28,299,850 | 0 | 1,571,182 | 0.05552 | 34 |
| 47 | 2027 | | | 4,313,000 | | | 28,299,850 | 0 | 1,443,106 | 0.05099 | 35 |
| 48 | 2028 | | | 4,313,000 | | | 28,299,850 | 0 | 1,325,471 | 0.04684 | 36 |
| 49 | 2029 | | | 4,313,000 | | | 28,299,850 | 0 | 1,217,424 | 0.04302 | 37 |
| 50 | 2030 | | | 4,313,000 | | | 28,299,850 | 0 | 1,118,185 | 0.03951 | 38 |
| 51 | 2031 | | | 4,313,000 | | | 28,299,850 | 0 | 1,027,036 | 0.03629 | 39 |
| 52 | 2032 | | | 4,313,000 | | | 28,299,850 | 0 | 943,316 | 0.03333 | 40 |
| 53 | 2033 | | | 4,313,000 | | | 28,299,850 | 0 | 866,422 | 0.03062 | 41 |
| 54 | 2034 | | | 4,313,000 | | | 28,299,850 | 0 | 795,795 | 0.02812 | 42 |
| 55 | 2035 | | | 4,313,000 | | | 28,299,850 | 0 | 730,925 | 0.02583 | 43 |
| 56 | | | | | | | | | | | |
| 57 | | | | | | | | | | | |
| 58 | | | | | | | | | | | |
| 59 | | | | | | | | | | | |
| 60 | TOTAL | 24,260,000 | 89,703,000 | 94,886,000 | | | | | $225,931,437 | Total | |
| 61 | | | | | | | | | | | |
| 62 | | | 208,849,000 | | | | | | | | |

Plan B-DS5- 50' Outbound and 45' and 40' SB New Work and Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS - 5 | PLAN B - EXP. (#2) 55' & SB 45' & 40' - DREDGING COSTS ONLY | | | | | 6/20/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,200,000 | | 2.99 | 15,554,900 | 12,558,000 | 20,007,507 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,295,000 | | 2.99 | 24,081,350 | 12,842,050 | 24,135,753 | 0.65367 | 5 |
| 12 | 1998 | | 4,313,000 | | 2.99 | | 12,895,870 | 7,742,508 | 0.60039 | 6 |
| 13 | 1999 | | 4,313,000 | | 2.99 | | 12,895,870 | 7,111,373 | 0.55145 | 7 |
| 14 | 2000 | | 4,313,000 | | 2.99 | | 12,895,870 | 6,531,686 | 0.50649 | 8 |
| 15 | 2001 | | 4,313,000 | | 2.99 | | 12,895,870 | 5,999,252 | 0.46521 | 9 |
| 16 | 2002 | | 4,313,000 | | 2.99 | | 12,895,870 | 5,510,220 | 0.42729 | 10 |
| 17 | 2003 | | 4,313,000 | | 2.99 | | 12,895,870 | 5,061,052 | 0.39246 | 11 |
| 18 | 2004 | | 4,313,000 | | 2.99 | | 12,895,870 | 4,648,498 | 0.36046 | 12 |
| 19 | 2005 | | 4,313,000 | | 2.99 | | 12,895,870 | 4,269,573 | 0.33108 | 13 |
| 20 | 2006 | | 4,313,000 | | 2.99 | | 12,895,870 | 3,921,537 | 0.30409 | 14 |
| 21 | 2007 | | 4,313,000 | | 2.99 | | 12,895,870 | 3,601,871 | 0.27930 | 15 |
| 22 | 2008 | | 4,313,000 | | 2.99 | | 12,895,870 | 3,308,262 | 0.25654 | 16 |
| 23 | 2009 | | 4,313,000 | | 2.99 | | 12,895,870 | 3,038,588 | 0.23562 | 17 |
| 24 | 2010 | | 4,313,000 | | 2.99 | | 12,895,870 | 2,790,896 | 0.21642 | 18 |
| 25 | 2011 | | 4,313,000 | | 2.99 | | 12,895,870 | 2,563,395 | 0.19878 | 19 |
| 26 | 2012 | | 4,313,000 | | 2.99 | | 12,895,870 | 2,354,438 | 0.18257 | 20 |
| 27 | 2013 | | 4,313,000 | | 2.99 | | 12,895,870 | 2,162,515 | 0.16769 | 21 |
| 28 | 2014 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,986,236 | 0.15402 | 22 |
| 29 | 2015 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,824,327 | 0.14147 | 23 |
| 30 | 2016 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,675,616 | 0.12993 | 24 |
| 31 | 2017 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,539,028 | 0.11934 | 25 |
| 32 | 2018 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,413,573 | 0.10961 | 26 |
| 33 | 2019 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,298,345 | 0.10068 | 27 |
| 34 | 2020 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,192,510 | 0.09247 | 28 |
| 35 | 2021 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,095,302 | 0.08493 | 29 |

Plan B-DS5- 50' Outbound and 45' and 40' SB New Work and Maint. - Present Worth of Dredging Costs Based on Life of Site

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,313,000 | | 2.99 | | 12,895,870 | 1,006,018 | 0.07801 | 30 |
| 40 | 2023 | | 4,313,000 | | 2.99 | | 12,895,870 | 924,012 | 0.07165 | 31 |
| 41 | 2024 | | 4,313,000 | | 2.99 | | 12,895,870 | 848,690 | 0.06581 | 32 |
| 42 | 2025 | | 4,313,000 | | 2.99 | | 12,895,870 | 779,509 | 0.06045 | 33 |
| 43 | 2026 | | 4,313,000 | | 2.99 | | 12,895,870 | 715,967 | 0.05552 | 34 |
| 44 | 2027 | | 4,313,000 | | 2.99 | | 12,895,870 | 657,604 | 0.05099 | 35 |
| 45 | 2028 | | 4,313,000 | | 2.99 | | 12,895,870 | 604,000 | 0.04684 | 36 |
| 46 | 2029 | | 4,313,000 | | 2.99 | | 12,895,870 | 554,764 | 0.04302 | 37 |
| 47 | 2030 | | 4,313,000 | | 2.99 | | 12,895,870 | 509,542 | 0.03951 | 38 |
| 48 | 2031 | | 4,313,000 | | 2.99 | | 12,895,870 | 468,007 | 0.03629 | 39 |
| 49 | 2032 | | 4,313,000 | | 2.99 | | 12,895,870 | 429,857 | 0.03333 | 40 |
| 50 | 2033 | | 4,313,000 | | 2.99 | | 12,895,870 | 394,817 | 0.03062 | 41 |
| 51 | 2034 | | 4,313,000 | | 2.99 | | 12,895,870 | 362,633 | 0.02812 | 42 |
| 52 | 2035 | | 4,313,000 | | 2.99 | | 12,895,870 | 333,073 | 0.02583 | 43 |
| 53 | | | | | | | | | | |
| 54 | | | | | | | | | | |
| 55 | | | | | | | | | | |
| 56 | | | | | | | | | | |
| 57 | | | | | | | | | | |
| 58 | | | | | | | | | | |
| 59 | | | | | | | | | | |
| 60 | | | | | | | | $201,308,912 | | Tota |
| 61 | TOTAL | 24,260,000 | 184,589,000 | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | 208,849,000 | | | | | | | |

2-5-9

Plan E - DS5 - 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS -5 | PLAN E - EXP. (#5) 55' & 45' & 40' SB - DREDGING COSTS ONLY | | | | | EXPANSION OF CI - Material goes to ocean when site full | | | | |
| 2 | | | | | | | Portion of material unsuitable continues going to the site | | | | |
| 3 | | 6/20/90 | | | | | Deduct 3 years of life to allow space for this | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | Maintenance | Maintenance | | | | | Annual | | |
| 6 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 7 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 8 | | | | | | | | | | | |
| 9 | 1993 | 4,893,000 | 4,000,000 | | see totals | 2.99 | 13,700,400 | 11,960,000 | 23,568,680 | 0.91848 | 1 |
| 10 | 1994 | 5,131,000 | 4,000,000 | | | 2.99 | 14,366,800 | 11,960,000 | 22,209,651 | 0.84361 | 2 |
| 11 | 1995 | 4,523,000 | 4,200,000 | | | 2.99 | 13,457,780 | 12,558,000 | 20,158,228 | 0.77485 | 3 |
| 12 | 1996 | 3,739,000 | 4,200,000 | | | 2.99 | 15,554,900 | 12,558,000 | 20,007,507 | 0.71168 | 4 |
| 13 | 1997 | 5,974,000 | 4,295,000 | | | 2.99 | 24,081,350 | 12,842,050 | 24,135,753 | 0.65367 | 5 |
| 14 | 1998 | | 4,313,000 | | | 2.99 | | 12,895,870 | 7,742,508 | 0.60039 | 6 |
| 15 | 1999 | | 4,313,000 | | | 2.99 | | 12,895,870 | 7,111,373 | 0.55145 | 7 |
| 16 | 2000 | | 4,313,000 | | | 2.99 | | 12,895,870 | 6,531,686 | 0.50649 | 8 |
| 17 | 2001 | | 4,313,000 | | | 2.99 | | 12,895,870 | 5,999,252 | 0.46521 | 9 |
| 18 | 2002 | | 4,313,000 | | | 2.99 | | 12,895,870 | 5,510,220 | 0.42729 | 10 |
| 19 | 2003 | | 4,313,000 | | | 2.99 | | 12,895,870 | 5,061,052 | 0.39246 | 11 |
| 20 | 2004 | | 4,313,000 | | | 2.99 | | 12,895,870 | 4,648,498 | 0.36046 | 12 |
| 21 | 2005 | | 4,313,000 | | | 2.99 | | 12,895,870 | 4,269,573 | 0.33108 | 13 |
| 22 | 2006 | | | 4,313,000 | | | | 28,299,850 | 8,605,771 | 0.30409 | 14 |
| 23 | 2007 | | | 4,313,000 | | | | 28,299,850 | 7,904,267 | 0.27930 | 15 |
| 24 | 2008 | | | 4,313,000 | | | | 28,299,850 | 7,259,947 | 0.25654 | 16 |
| 25 | 2009 | | | 4,313,000 | | | | 28,299,850 | 6,668,149 | 0.23562 | 17 |
| 26 | 2010 | | | 4,313,000 | | | | 28,299,850 | 6,124,591 | 0.21642 | 18 |
| 27 | 2011 | | | 4,313,000 | | | | 28,299,850 | 5,625,342 | 0.19878 | 19 |
| 28 | 2012 | | | 4,313,000 | | | | 28,299,850 | 5,166,790 | 0.18257 | 20 |
| 29 | 2013 | | | 4,313,000 | | | | 28,299,850 | 4,745,616 | 0.16769 | 21 |
| 30 | 2014 | | | 4,313,000 | | | | 28,299,850 | 4,358,775 | 0.15402 | 22 |
| 31 | 2015 | | | 4,313,000 | | | | 28,299,850 | 4,003,467 | 0.14147 | 23 |
| 32 | 2016 | | | 4,313,000 | | | | 28,299,850 | 3,677,123 | 0.12993 | 24 |
| 33 | 2017 | | | 4,313,000 | | | | 28,299,850 | 3,377,380 | 0.11934 | 25 |
| 34 | 2018 | | | 4,313,000 | | | | 28,299,850 | 3,102,071 | 0.10961 | 26 |
| 35 | 2019 | | | 4,313,000 | | | | 28,299,850 | 2,849,204 | 0.10068 | 27 |

2-5-10

Plan E - DS5 - 45' and 40' SB New Work and NH Maint. - Present Worth of Dredging Costs, Supplemented by Ocean Disposal

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | Maintenance | Maintenance | | | | | Annual | | |
| 37 | | New Work | Quantities | per Ocean | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | Yr |
| 38 | Year | Quantities | To Site A | Disposal Plan | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | # |
| 39 | | | | | | | | | | | |
| 40 | 2020 | | | 4,313,000 | | | 28,299,850 | 0 | 2,616,950 | 0.09247 | 28 |
| 41 | 2021 | | | 4,313,000 | | | 28,299,850 | 0 | 2,403,628 | 0.08493 | 29 |
| 42 | 2022 | | | 4,313,000 | | | 28,299,850 | 0 | 2,207,695 | 0.07801 | 30 |
| 43 | 2023 | | | 4,313,000 | | | 28,299,850 | 0 | 2,027,734 | 0.07165 | 31 |
| 44 | 2024 | | | 4,313,000 | | | 28,299,850 | 0 | 1,862,442 | 0.06581 | 32 |
| 45 | 2025 | | | 4,313,000 | | | 28,299,850 | 0 | 1,710,624 | 0.06045 | 33 |
| 46 | 2026 | | | 4,313,000 | | | 28,299,850 | 0 | 1,571,182 | 0.05552 | 34 |
| 47 | 2027 | | | 4,313,000 | | | 28,299,850 | 0 | 1,443,106 | 0.05099 | 35 |
| 48 | 2028 | | | 4,313,000 | | | 28,299,850 | 0 | 1,325,471 | 0.04684 | 36 |
| 49 | 2029 | | | 4,313,000 | | | 28,299,850 | 0 | 1,217,424 | 0.04302 | 37 |
| 50 | 2030 | | | 4,313,000 | | | 28,299,850 | 0 | 1,118,185 | 0.03951 | 38 |
| 51 | 2031 | | | 4,313,000 | | | 28,299,850 | 0 | 1,027,036 | 0.03629 | 39 |
| 52 | 2032 | | | 4,313,000 | | | 28,299,850 | 0 | 943,316 | 0.03333 | 40 |
| 53 | 2033 | | | 4,313,000 | | | 28,299,850 | 0 | 866,422 | 0.03062 | 41 |
| 54 | 2034 | | | 4,313,000 | | | 28,299,850 | 0 | 795,795 | 0.02812 | 42 |
| 55 | 2035 | | | 4,313,000 | | | 28,299,850 | 0 | 730,925 | 0.02583 | 43 |
| 56 | | | | | | | | | | | |
| 57 | | | | | | | | | | | |
| 58 | | | | | | | | | | | |
| 59 | | | | | | | | | | | |
| 60 | TOTAL | 24,260,000 | 55,199,000 | 129,390,000 | | | | | $254,290,408 | Total | |
| 61 | | | | | | | | | | | |
| 62 | | | 208,849,000 | | | | | | | | |
| 63 | | | | | | | | | 6/20/90 | | |

2-5-11

Chesapeake Bay Site-DS 5 55' Outbound and 45' and 40' Channel

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-5 | 50' Outbound | and SB 40' and 45' | | | | 6/20/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 5.98 | 24,073,560 | 23,920,000 | 44,081,341 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 5.98 | 25,193,210 | 23,920,000 | 41,432,581 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 5.98 | 23,445,760 | 25,116,000 | 37,627,894 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,200,000 | | 5.98 | 19,645,410 | 25,116,000 | 31,855,989 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,295,000 | | 5.98 | 30,985,300 | 25,684,100 | 37,043,138 | 0.65367 | 5 |
| 12 | 1998 | | 4,313,000 | | 5.98 | | 25,791,740 | 15,485,015 | 0.60039 | 6 |
| 13 | 1999 | | 4,313,000 | | 5.98 | | 25,791,740 | 14,222,746 | 0.55145 | 7 |
| 14 | 2000 | | 4,313,000 | | 5.98 | | 25,791,740 | 13,063,372 | 0.50649 | 8 |
| 15 | 2001 | | 4,313,000 | | 5.98 | | 25,791,740 | 11,998,505 | 0.46521 | 9 |
| 16 | 2002 | | 4,313,000 | | 5.98 | | 25,791,740 | 11,020,441 | 0.42729 | 10 |
| 17 | 2003 | | 4,313,000 | | 5.98 | | 25,791,740 | 10,122,104 | 0.39246 | 11 |
| 18 | 2004 | | 4,313,000 | | 5.98 | | 25,791,740 | 9,296,996 | 0.36046 | 12 |
| 19 | 2005 | | 4,313,000 | | 5.98 | | 25,791,740 | 8,539,146 | 0.33108 | 13 |
| 20 | 2006 | | 4,313,000 | | 5.98 | | 25,791,740 | 7,843,074 | 0.30409 | 14 |
| 21 | 2007 | | 4,313,000 | | 5.98 | | 25,791,740 | 7,203,742 | 0.27930 | 15 |
| 22 | 2008 | | 4,313,000 | | 5.98 | | 25,791,740 | 6,616,525 | 0.25654 | 16 |
| 23 | 2009 | | 4,313,000 | | 5.98 | | 25,791,740 | 6,077,176 | 0.23562 | 17 |
| 24 | 2010 | | 4,313,000 | | 5.98 | | 25,791,740 | 5,581,792 | 0.21642 | 18 |
| 25 | 2011 | | 4,313,000 | | 5.98 | | 25,791,740 | 5,126,789 | 0.19878 | 19 |
| 26 | 2012 | | 4,313,000 | | 5.98 | | 25,791,740 | 4,708,876 | 0.18257 | 20 |
| 27 | 2013 | | 4,313,000 | | 5.98 | | 25,791,740 | 4,325,030 | 0.16769 | 21 |
| 28 | 2014 | | 4,313,000 | | 5.98 | | 25,791,740 | 3,972,473 | 0.15402 | 22 |
| 29 | 2015 | | 4,313,000 | | 5.98 | | 25,791,740 | 3,648,655 | 0.14147 | 23 |
| 30 | 2016 | | 4,313,000 | | 5.98 | | 25,791,740 | 3,351,233 | 0.12993 | 24 |
| 31 | 2017 | | 4,313,000 | | 5.98 | | 25,791,740 | 3,078,055 | 0.11934 | 25 |
| 32 | 2018 | | 4,313,000 | | 5.98 | | 25,791,740 | 2,827,146 | 0.10961 | 26 |
| 33 | 2019 | | 4,313,000 | | 5.98 | | 25,791,740 | 2,596,690 | 0.10068 | 27 |
| 34 | 2020 | | 4,313,000 | | 5.98 | | 25,791,740 | 2,385,020 | 0.09247 | 28 |
| 35 | 2021 | | 4,313,000 | | 5.98 | | 25,791,740 | 2,190,603 | 0.08493 | 29 |

2-5-12

Chesapeake Bay Site-DS 5 55' Outbound and 45' and 40' Channel

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,313,000 | | 5.98 | | 25,791,740 | 2,012,035 | 0.07801 | 30 |
| 40 | 2023 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,848,023 | 0.07165 | 31 |
| 41 | 2024 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,697,381 | 0.06581 | 32 |
| 42 | 2025 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,559,018 | 0.06045 | 33 |
| 43 | 2026 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,431,934 | 0.05552 | 34 |
| 44 | 2027 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,315,209 | 0.05099 | 35 |
| 45 | 2028 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,207,999 | 0.04684 | 36 |
| 46 | 2029 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,109,528 | 0.04302 | 37 |
| 47 | 2030 | | 4,313,000 | | 5.98 | | 25,791,740 | 1,019,085 | 0.03951 | 38 |
| 48 | 2031 | | 4,313,000 | | 5.98 | | 25,791,740 | 936,013 | 0.03629 | 39 |
| 49 | 2032 | | 4,313,000 | | 5.98 | | 25,791,740 | 859,714 | 0.03333 | 40 |
| 50 | 2033 | | 4,313,000 | | 5.98 | | 25,791,740 | 789,634 | 0.03062 | 41 |
| 51 | 2034 | | 4,313,000 | | 5.98 | | 25,791,740 | 725,266 | 0.02812 | 42 |
| 52 | 2035 | | 4,313,000 | | 5.98 | | 25,791,740 | 666,146 | 0.02583 | 43 |
| 53 | | | | | | | | | | |
| 54 | | | | | | | | | | |
| 55 | TOTAL | 24,260,000 | 184,589,000 | | | | | | | |
| 56 | | | | | | | | $374,499,131 | | Total |
| 57 | | | 208,849,000 | | | | | | | |

2-5-13

Ocean View Site - DS 5 55' Outbound and 45' and 40 Channels

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-5 | 50' Outbound and SB 40' and 45' | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Annual Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 5.57 | 22,018,500 | 22,280,000 | 40,687,486 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 5.57 | 23,038,190 | 22,280,000 | 38,231,049 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 5.57 | 21,627,790 | 23,394,000 | 34,884,962 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,200,000 | | 5.57 | 18,172,200 | 23,394,000 | 29,582,008 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,295,000 | | 5.57 | 28,514,880 | 23,923,150 | 34,277,215 | 0.65367 | 5 |
| 12 | 1998 | | 4,313,000 | | 5.57 | | 24,023,410 | 14,423,333 | 0.60039 | 6 |
| 13 | 1999 | | 4,313,000 | | 5.57 | | 24,023,410 | 13,247,608 | 0.55145 | 7 |
| 14 | 2000 | | 4,313,000 | | 5.57 | | 24,023,410 | 12,167,723 | 0.50649 | 8 |
| 15 | 2001 | | 4,313,000 | | 5.57 | | 24,023,410 | 11,175,865 | 0.46521 | 9 |
| 16 | 2002 | | 4,313,000 | | 5.57 | | 24,023,410 | 10,264,859 | 0.42729 | 10 |
| 17 | 2003 | | 4,313,000 | | 5.57 | | 24,023,410 | 9,428,114 | 0.39246 | 11 |
| 18 | 2004 | | 4,313,000 | | 5.57 | | 24,023,410 | 8,659,576 | 0.36046 | 12 |
| 19 | 2005 | | 4,313,000 | | 5.57 | | 24,023,410 | 7,953,687 | 0.33108 | 13 |
| 20 | 2006 | | 4,313,000 | | 5.57 | | 24,023,410 | 7,305,338 | 0.30409 | 14 |
| 21 | 2007 | | 4,313,000 | | 5.57 | | 24,023,410 | 6,709,840 | 0.27930 | 15 |
| 22 | 2008 | | 4,313,000 | | 5.57 | | 24,023,410 | 6,162,884 | 0.25654 | 16 |
| 23 | 2009 | | 4,313,000 | | 5.57 | | 24,023,410 | 5,660,513 | 0.23562 | 17 |
| 24 | 2010 | | 4,313,000 | | 5.57 | | 24,023,410 | 5,199,094 | 0.21642 | 18 |
| 25 | 2011 | | 4,313,000 | | 5.57 | | 24,023,410 | 4,775,287 | 0.19878 | 19 |
| 26 | 2012 | | 4,313,000 | | 5.57 | | 24,023,410 | 4,386,027 | 0.18257 | 20 |
| 27 | 2013 | | 4,313,000 | | 5.57 | | 24,023,410 | 4,028,498 | 0.16769 | 21 |
| 28 | 2014 | | 4,313,000 | | 5.57 | | 24,023,410 | 3,700,113 | 0.15402 | 22 |
| 29 | 2015 | | 4,313,000 | | 5.57 | | 24,023,410 | 3,398,496 | 0.14147 | 23 |
| 30 | 2016 | | 4,313,000 | | 5.57 | | 24,023,410 | 3,121,466 | 0.12993 | 24 |
| 31 | 2017 | | 4,313,000 | | 5.57 | | 24,023,410 | 2,867,018 | 0.11934 | 25 |
| 32 | 2018 | | 4,313,000 | | 5.57 | | 24,023,410 | 2,633,312 | 0.10961 | 26 |
| 33 | 2019 | | 4,313,000 | | 5.57 | | 24,023,410 | 2,418,656 | 0.10068 | 27 |
| 34 | 2020 | | 4,313,000 | | 5.57 | | 24,023,410 | 2,221,498 | 0.09247 | 28 |
| 35 | 2021 | | 4,313,000 | | 5.57 | | 24,023,410 | 2,040,412 | 0.08493 | 29 |

2-5-14

Ocean View Site - DS 5 55' Outbound and 45' and 40 Channels

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,874,086 | 0.07801 | 30 |
| 40 | 2023 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,721,319 | 0.07165 | 31 |
| 41 | 2024 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,581,005 | 0.06581 | 32 |
| 42 | 2025 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,452,129 | 0.06045 | 33 |
| 43 | 2026 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,333,758 | 0.05552 | 34 |
| 44 | 2027 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,225,036 | 0.05099 | 35 |
| 45 | 2028 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,125,176 | 0.04684 | 36 |
| 46 | 2029 | | 4,313,000 | | 5.57 | | 24,023,410 | 1,033,457 | 0.04302 | 37 |
| 47 | 2030 | | 4,313,000 | | 5.57 | | 24,023,410 | 949,214 | 0.03951 | 38 |
| 48 | 2031 | | 4,313,000 | | 5.57 | | 24,023,410 | 871,839 | 0.03629 | 39 |
| 49 | 2032 | | 4,313,000 | | 5.57 | | 24,023,410 | 800,770 | 0.03333 | 40 |
| 50 | 2033 | | 4,313,000 | | 5.57 | | 24,023,410 | 735,495 | 0.03062 | 41 |
| 51 | 2034 | | 4,313,000 | | 5.57 | | 24,023,410 | 675,541 | 0.02812 | 42 |
| 52 | 2035 | | 4,313,000 | | 5.57 | | 24,023,410 | 620,474 | 0.02583 | 43 |
| 53 | | | | | | | | | | |
| 54 | | | | | | | | | | |
| 55 | TOTAL | 24,260,000 | 184,589,000 | | | | | $347,611,233 | | Total |
| 56 | | | | | | | | | | |
| 57 | | | 208,849,000 | | | | | | | |
| 58 | | | | | | | | | | |
| 59 | | | | | | | | | | |
| 60 | | | | | | | | | | |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | | | | | | | | |
| 64 | | | | | | | | | | |
| 65 | | | | | | | | | | |
| 66 | | | | | | | | | | |
| 67 | | | | | | | | | | |
| 68 | | | | | | | | | | |
| 69 | | | | | | | | | | |
| 70 | | | | | | | | | | |

2-5-15

Buckroe Beach Site - DS 5 55' Outbound and 45' and 40' Channel

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DS-5 | 50' Outbound | and SB 40' and 45' | | | | 6/20/90 | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | Annual | | |
| 4 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 5 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 6 | | | | | | | | | | |
| 7 | 1993 | 4,893,000 | 4,000,000 | | 5.49 | 21,627,060 | 21,960,000 | 40,034,039 | 0.91848 | 1 |
| 8 | 1994 | 5,131,000 | 4,000,000 | | 5.49 | 22,576,400 | 21,960,000 | 37,571,521 | 0.84361 | 2 |
| 9 | 1995 | 4,523,000 | 4,200,000 | | 5.49 | 21,383,640 | 23,058,000 | 34,435,435 | 0.77485 | 3 |
| 10 | 1996 | 3,739,000 | 4,200,000 | | 5.49 | 17,918,080 | 23,058,000 | 29,162,029 | 0.71168 | 4 |
| 11 | 1997 | 5,974,000 | 4,295,000 | | 5.49 | 27,968,340 | 23,579,550 | 33,695,356 | 0.65367 | 5 |
| 12 | 1998 | | 4,313,000 | | 5.49 | | 23,678,370 | 14,216,176 | 0.60039 | 6 |
| 13 | 1999 | | 4,313,000 | | 5.49 | | 23,678,370 | 13,057,337 | 0.55145 | 7 |
| 14 | 2000 | | 4,313,000 | | 5.49 | | 23,678,370 | 11,992,962 | 0.50649 | 8 |
| 15 | 2001 | | 4,313,000 | | 5.49 | | 23,678,370 | 11,015,350 | 0.46521 | 9 |
| 16 | 2002 | | 4,313,000 | | 5.49 | | 23,678,370 | 10,117,428 | 0.42729 | 10 |
| 17 | 2003 | | 4,313,000 | | 5.49 | | 23,678,370 | 9,292,701 | 0.39246 | 11 |
| 18 | 2004 | | 4,313,000 | | 5.49 | | 23,678,370 | 8,535,202 | 0.36046 | 12 |
| 19 | 2005 | | 4,313,000 | | 5.49 | | 23,678,370 | 7,839,450 | 0.33108 | 13 |
| 20 | 2006 | | 4,313,000 | | 5.49 | | 23,678,370 | 7,200,414 | 0.30409 | 14 |
| 21 | 2007 | | 4,313,000 | | 5.49 | | 23,678,370 | 6,613,468 | 0.27930 | 15 |
| 22 | 2008 | | 4,313,000 | | 5.49 | | 23,678,370 | 6,074,368 | 0.25654 | 16 |
| 23 | 2009 | | 4,313,000 | | 5.49 | | 23,678,370 | 5,579,213 | 0.23562 | 17 |
| 24 | 2010 | | 4,313,000 | | 5.49 | | 23,678,370 | 5,124,421 | 0.21642 | 18 |
| 25 | 2011 | | 4,313,000 | | 5.49 | | 23,678,370 | 4,706,701 | 0.19878 | 19 |
| 26 | 2012 | | 4,313,000 | | 5.49 | | 23,678,370 | 4,323,032 | 0.18257 | 20 |
| 27 | 2013 | | 4,313,000 | | 5.49 | | 23,678,370 | 3,970,638 | 0.16769 | 21 |
| 28 | 2014 | | 4,313,000 | | 5.49 | | 23,678,370 | 3,646,969 | 0.15402 | 22 |
| 29 | 2015 | | 4,313,000 | | 5.49 | | 23,678,370 | 3,349,685 | 0.14147 | 23 |
| 30 | 2016 | | 4,313,000 | | 5.49 | | 23,678,370 | 3,076,634 | 0.12993 | 24 |
| 31 | 2017 | | 4,313,000 | | 5.49 | | 23,678,370 | 2,825,840 | 0.11934 | 25 |
| 32 | 2018 | | 4,313,000 | | 5.49 | | 23,678,370 | 2,595,490 | 0.10961 | 26 |
| 33 | 2019 | | 4,313,000 | | 5.49 | | 23,678,370 | 2,383,918 | 0.10068 | 27 |
| 34 | 2020 | | 4,313,000 | | 5.49 | | 23,678,370 | 2,189,591 | 0.09247 | 28 |
| 35 | 2021 | | 4,313,000 | | 5.49 | | 23,678,370 | 2,011,106 | 0.08493 | 29 |

2-5-16

Buckroe Beach Site - DS 5 55' Outbound and 45' and 40' Channel

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | New Work | Maintenance | New Work | Maintenance | Total Cost | Total Cost | Discounted | Discount | # |
| 37 | Year | Quantities | Quantities | $ per Yd | $ per Yd | New Work | Maintenance | Amount | Factor | Yr. |
| 38 | | | | | | | | | | |
| 39 | 2022 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,847,170 | 0.07801 | 30 |
| 40 | 2023 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,696,597 | 0.07165 | 31 |
| 41 | 2024 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,558,298 | 0.06581 | 32 |
| 42 | 2025 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,431,272 | 0.06045 | 33 |
| 43 | 2026 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,314,601 | 0.05552 | 34 |
| 44 | 2027 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,207,441 | 0.05099 | 35 |
| 45 | 2028 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,109,016 | 0.04684 | 36 |
| 46 | 2029 | | 4,313,000 | | 5.49 | | 23,678,370 | 1,018,614 | 0.04302 | 37 |
| 47 | 2030 | | 4,313,000 | | 5.49 | | 23,678,370 | 935,581 | 0.03951 | 38 |
| 48 | 2031 | | 4,313,000 | | 5.49 | | 23,678,370 | 859,317 | 0.03629 | 39 |
| 49 | 2032 | | 4,313,000 | | 5.49 | | 23,678,370 | 789,269 | 0.03333 | 40 |
| 50 | 2033 | | 4,313,000 | | 5.49 | | 23,678,370 | 724,931 | 0.03062 | 41 |
| 51 | 2034 | | 4,313,000 | | 5.49 | | 23,678,370 | 665,838 | 0.02812 | 42 |
| 52 | 2035 | | 4,313,000 | | 5.49 | | 23,678,370 | 611,562 | 0.02583 | 43 |
| 53 | | | | | | | | | | |
| 54 | | | | | | | | | | |
| 55 | | | | | | | | $342,405,981 | | Total |
| 56 | TOTAL | 24,260,000 | 184,589,000 | | | | | | | |
| 57 | | | | | | | | | | |
| 58 | | | 208,849,000 | | | | | 6/20/90 | | |

2-5-17

# ATTACHMENT 3

# SUMMARY OF COSTS TO

# VPA, THE CORPS OF ENGINEERS,

# COMMERCIAL INTERESTS, AND U.S. NAVY

## Analysis of costs to Port Authority for Disposal Plans

The purpose of this exercise is to examine the total dollar resources required for two disposal options under 2 financing plans and 2 cost sharing plans. The first disposal option (also the NED option) is confined site A with either Federal or State financing. This is the least expensive in terms of total resources required. The second option is ocean disposal with the State picking up any costs incurred by the Federal government in excess of the Federally financed NED option. The other variation on the ocean disposal option would involve the Federal government continuing to bear all the cost associated with dredging channels down to a depth of 45' and splitting the 45' to 50' increment of maintenance with the State 50/50. This last variation of option 2 would be the least costly for the State.

All of the comparisons which follow involve Site A as the confined site. It is compared with ocean disposal under the following conditions:

Site A was assumed to last 30 years for the purpose of this analysis. WES study of useful life indicated that maximum possible life was 39 years if dewatering efficiency was 100%. Because financing site with bonds may limit payback period to 30 years, the annual repayment was calculated based on that limit. It also makes sense to use a conservative assumption for this variable because of the uncertainty of achieving the maximum theoretical benefit from site management practices.

Price level for the estimates in this exercise is October 1988. Analysis is in constant dollars. Because the yardage is the same each year, annual estimates of total costs apply for each year. All relevant costs for Site A are included (dredging and deposition of material in the site, and site construction and maintenance). The ocean plan includes bucket dredging, barging to the site (and return), and dumping of all clean material. The 355,000 cubic yards of material which is unsuitable for the ocean is taken to the existing Craney Island site (which must have space remaining) and deposited by barge rehandler. A $2 per yard charge is included to

maintain the site. This is a preliminary estimate; it would be revised once a detailed management plan was developed.

Average annual costs per cubic yard for Site A (construction and operation) were developed based on sets of assumptions:

1) Federal financing at 8 7/8%, with recovery of interest, amortization, and operation and maintenance costs (of site).

2) Bond financing at 11%, with tolls set to generate a revenue stream 1.2 times greater than expenses remaining after operating costs are paid. In this case remaining expenses are debt service (interest and amortization). A rate of 11% may be at the high end of the range. It is not clear where the extra 20% of toll revenue goes since it is excess of interest and amortization which actually has to be paid. One way to view this is that the Federal and State financing assumptions bracket the range of possible costs of for borrowing money to construct and operate Site A.

Calculations are shown for two fuel costs, $.90 and $4 per gallon. (These are inputs used to develop average dredging costs). The $4 estimates are not at the level of detail of those for $.90, but should be accurate enough for gauging the 'risk' of the more fuel intensive ocean option. It is also not entirely accurate to show average dredging costs which were computed for all Hampton Roads dredging jobs as being identical for the three user groups (Feds, State and Commercial/Navy). If average dredging costs were computed for each group, it is likely that the lowest average cost for dredging would belong to the Federal work (because large jobs predominate); the other two would be higher, but without additional calculations it would be impossible to rank these. The estimate of each group's yardage is based on their average dredging over the 10 year period from 1978 to 1987.

Note that although ocean disposal costs increase from $26.1 million to $45.9 million if fuel increases from $.90 to $4, the Commonwealth's bill (under the terms which favor them) is $8.6 million, which is still less than Expansion A with 11% interest rate (cost of $10 million).

FUEL COSTS USED TO

COMPUTE AVERAGE

DREDGING COST

$.90

SUMMARY OF ALL USERS' COSTS (TOTAL RESOURCES REQUIRED FOR EACH OPTION))

| | | TOTAL ( DREDGING AND SITE) COST to users under the following scenarios | | | |
|---|---|---|---|---|---|
| | | | | | Ocean Disposal |
| | Approximate | Expansion A (NED) | Expansion A (VPA) | Ocean Disposal | 50/50 New Work |
| **WHO PAYS** | Yards | Federal Financing | 11% Bond Financing | Feds pay only NED | Feds pay 100% mainten |
| U.S. Army Corps Eng. | 2,100,000 | 6,129,500 | 6,129,500 | 6,129,500 | 13,386,500 |
| Virginia (VPA) | 700,000 | 7,786,500 | 10,054,500 | 12,154,500 | 4,897,500 |
| Commercial/Navy | 1,200,000 | 5,964,000 | 6,936,000 | 7,836,000 | 7,836,000 |
| **TOTAL TO ALL USERS** | **4,000,000** | **$19,880,000** | **$23,120,000** | **$26,120,000** | **$26,120,000** |
| **Total if fuel price is $4** (compared with $.90) | | [31,720,000] | [34,960,000] | [45,880,000] | [45,880,000] |

Yardage is approximate - 100,000 of the Corps 2,100,000 yds is from the 45' to 50' channel increment maintenance. The rest is pre-WRDA-86 maintenance. Virginia includes VPA (500,000 yds) and VDOT (200,000)

| Costs Associated with each scenario | | |
|---|---|---|
| Dredging (Fuel is $.90) | ($ per yard ) | |
| If site is ocean | 6.53 | |
| If site is A | 2.99 | |
| Dredging (Fuel is $4) | | |
| If site is ocean | 11.47 | (These estimates |
| If site is A | 5.95 | are preliminary) |
| Site Costs-30 yr payback | | |
| If 8 7/8% | 1.98 | |
| If 11% with 1.2 factor | 2.79 | |

3-2-1

Distribution of Costs to 3 groups of users: Site A, Federal Discount 8 7/8%, 30 years repayment

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | | NOTE: FEDS PAY NO DISPOSAL SITE COSTS OR TOLLS OF ANY KIND - VIRGINIA PICKS THESE UP. | | | | | |
| 2 | What dredging and disposal site | | | | | | |
| 3 | would cost if the FEDS financed it | | FEDS PAY | VA/VPA PAYS | VA/VPA PAYS | COMM/NAVY* | COMM/NAVY* |
| 4 | for 30 years at 8 7/8% | | Dredging Costs | Dredging Costs | Cost of Disposa | Dredging Costs | Cost of Disposal |
| 5 | | **QUANTITY** | (Average #/yd) | (Average #/yd) | Site (Toll) | (Average #/yd) | Site (Toll) |
| 6 | AVERAGE DREDGING PER YEAR BY: | Cubic Yards | 2.99 | 2.99 | 1.98 | 2.99 | 1.98 |
| 7 | | | | | | | |
| 8 | U.S. ARMY CORPS OF ENGINEERS | | | | | | |
| 9 | FOR regular maintenance (down to 45' | 2,000,000 | 5,980,000 | | 3,960,000 | | |
| 10 | | | | | | | |
| 11 | FOR Additional maintenance (45' to 5( | 100,000 | 149,500 | 149,500 | 198,000 | | |
| 12 | | | | | | | |
| 13 | VIRGINIA PORT AUTHORITY | 500,000 | | 1,495,000 | 990,000 | | |
| 14 | VA DEPT OF TRANSPORTATION | 200,000 | | 598,000 | 396,000 | | |
| 15 | | | | | | | |
| 16 | COMMERCIAL / NAVY / LOCAL GOV'T | 1,200,000 | | | | 3,588,000 | 2,376,000 |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | 4,000,000 | $6,129,500 | $2,242,500 | $5,544,000 | $3,588,000 | $2,376,000 |
| 20 | | | | | | | |
| 21 | | | | **$7,786,500** | | $5,964,000 | |
| 22 | | | | **VPA TOTAL** | | Comm/Navy Tot | |
| 23 | | | | | | | |
| 24 | What's the total bill (everyone)? | | | | | | |
| 25 | | | | $7,920,000 | Site Cost Recovery Total | | |
| 26 | **$19,880,000** | | | | | | |
| 27 | | | | | | | |
| 28 | | | | *Private commercial, Navy & local government | | | |
| 29 | AVERAGE DREDGING COST IS BASED ON FUEL PRICE OF: | | | # Average unit cost of all types of dredging, for all jobs | | | |
| 30 | | **$0.90** | | performed in Hampton Roads is heavily weighted by the cost | | | |
| 31 | | | | of hydraulic dredging since this is the method which accounts | | | |
| 32 | Portion for site cost recovery | **1.98** | | for the largest portion of total yardage. This would continue with | | | |
| 33 | Portion for average dredging cost | **2.99** | | the availability of confined site adjacent to CI. | | | |
| 34 | Total NED unit cost | **4.97** | | | | | |

3-2-2

2/1/90 Huber

VPA/VA FINANCES SITE: Interest rate of 11%, 30 year repayment - Distribution of Costs to three groups of users

| | | | | | | |
|---|---|---|---|---|---|---|
| | NOTE: FEDS PAY NO DISPOSAL SITE COSTS OR TOLLS OF ANY KIND - VIRGINIA PICKS THESE UP. | | | | | |
| What dredging and disposal site would cost if VA/VPA financed it for 30 years at 11% | | FEDS PAY Dredging Costs (Average #/yd) | VA/VPA PAYS Dredging Costs (Average #/yd) | VA/VPA PAYS Cost of Disposal Site (Toll) | COMM/NAVY* Dredging Costs (Average #/yd) | COMM/NAVY* Cost of Disposal Site (Toll) |
| | **QUANTITY** | | | | | |
| AVERAGE DREDGING PER YEAR BY: | Cubic Yards | 2.99 | 2.99 | 2.79 | 2.99 | 2.79 |
| U.S. ARMY CORPS OF ENGINEERS | | | | | | |
| FOR regular maintenance (down to 45') | 2,000,000 | 5,980,000 | | 5,580,000 | | |
| FOR additional maintenance (45' to 50') | 100,000 | 149,500 | 149,500 | 279,000 | | |
| VIRGINIA PORT AUTHORITY | 500,000 | | 1,495,000 | 1,395,000 | | |
| VA DEPT OF TRANSPORTATION | 200,000 | | 598,000 | 558,000 | | |
| COMMERCIAL / NAVY / LOCAL GOV'T | 1,200,000 | | | | 3,588,000 | 3,348,000 |
| | 4,000,000 | $6,129,500 | $2,242,500 | $7,812,000 | $3,588,000 | $3,348,000 |
| | | | **$10,054,500** | | $6,936,000 | |
| | | | **VPA TOTAL** | | Comm/Navy Tot | |
| What's the TOTAL COST for all groups? | | | | | | |
| | | | $11,160,000 | Site Cost Recovery Total *** | | |
| **$23,120,000** | | | *** (INCLUDES $1,690,060 which is 20% risk or 'coverage' portion of repayment - which may reduce VA $$$) | | | |
| AVERAGE DREDGING COST IS BASED ON FUEL PRICE OF: | | | | | | |
| | **$0.90** | | *Private commercial, Navy & local government | | | |
| Portion for site cost recovery | **2.79** | | # Average unit cost of all types of dredging, for all jobs performed in Hampton Roads is heavily weighted by the cost of hydraulic dredging since this is the method which accounts for the largest portion of total yardage. This would continue with the availability of confined site adjacent to CI. | | | |
| Portion for average dredging cost | **2.99** | | | | | |
| Total NED unit cost | **5.78** | | | | | |

3-2-3

2/1/90 Huber

IF OCEAN DISPOSAL IS THE PLAN - COSTS TO THREE GROUPS OF USERS (with and without NED baseline)

**IF FUEL COSTS $.90 PER GALLON, WHAT IS COST OF OCEAN FOR EACH GROUP ?**

IF VPA (VIRGINIA) Picks OCEAN DISPOSAL and MUST pay portion of Federal cost IN EXCESS OF NED Dredging COST -When Site A is assumed

| AVERAGE DREDGING PER YEAR BY: | | QUANTITY Cubic Yards | Applic. Unit $ | CORPS cost | Applic. Unit $ | VPA cost | Applic. Unit $ | Comm/Navy cost (Yds x Ocean $/yd) |
|---|---|---|---|---|---|---|---|---|
| U.S. ARMY CORPS OF ENGINEERS | | | | | | | | |
| FOR regular maintenance (down to 45') | | 2,000,000 | 2.99 | 5,980,000 | 3.54 | 7,080,000 | | |
| Additional maintenance (45' to 50') | | 100,000 | 2.99/2 | 149,500 | non NED | 503,500 | | |
| VIRGINIA PORT AUTHORITY | | 500,000 | | 0 | 6.53 | 3,265,000 | | |
| VA DEPT OF TRANSPORTATION | | 200,000 | | 0 | 6.53 | 1,306,000 | | |
| COMMERCIAL / NAVY / LOCAL GOV'T | | 1,200,000 | | 0 | | 0 | 6.53 | 7,836,000 |
| Total Cost | **$26,120,000** | 4,000,000 | | **$6,129,500** | | **$12,154,500** | | **$7,836,000** |

IF VPA (VIRGINIA) PICKS OCEAN DISPOSAL AND THEY PAY UNDER SAME PERCENTAGE SPLIT AS IF IT WERE NED PLAN

| AVERAGE DREDGING PER YEAR BY: | | QUANTITY Cubic Yards | Applic. Unit $ | CORPS cost | Applic. Unit $ | VPA cost | Applic. Unit $ | Comm/Navy cost (Yds x Ocean $/yd) |
|---|---|---|---|---|---|---|---|---|
| U.S. ARMY CORPS OF ENGINEERS | | | | | | | | |
| FOR regular maintenance (down to 45') | | 2,000,000 | 6.53 | 13,060,000 | | 0 | | |
| Additional maintenance (45' to 50') | | 100,000 | 3.265 | 326,500 | 3.265 | 326,500 | | |
| | | (split 50/50) | | | | 0 | | |
| VIRGINIA PORT AUTHORITY | | 500,000 | | 0 | 6.53 | 3,265,000 | | |
| VA DEPT OF TRANSPORTATION | | 200,000 | | 0 | 6.53 | 1,306,000 | | |
| COMMERCIAL / NAVY / LOCAL GOV'T | | 1,200,000 | | 0 | | 0 | 6.53 | 7,836,000 |
| Total Cost | **$26,120,000** | 4000000 | | **$13,386,500** | | **$4,897,500** | | **$7,836,000** |

3-2-4

IF OCEAN DISPOSAL IS THE PLAN - COSTS TO THREE GROUPS OF USERS (with and without NED baseline)

| | | | |
|---|---|---|---|
| | All of the previous page's analysis was based on the following unit costs | | |
| NOTE: FEDS NEVER PAY ANY SITE ASSOCIATED COSTS, ONLY DREDGING COSTS | | | |
| NED Dredging | $2.99 | | |
| Site A costs | 1.98 | | |
| Total NED | 4.97 | $.90 per gallon fuel price | IN THE FIRST EXAMPLE THE STATE IS PICKING UP THE DIFFERENCE BETWEEN FEDERAL DREDGING UNDER THE NED ASSUMPTION OF SITE A - AND FEDERAL DREDGING WITH OCEAN DISPOSAL |
| OCEAN | $6.53 | | |
| Difference | 3.54 | | |
| 1/2 Ocean | 3.265 | | |
| NOTE: Unit costs are from the Draft Economics Appendix . An ocean plan includes the provision of disposal for unsuitable material in remaining space at existing CIDA (355,000 yds). It assumes that the applicable site costs associated with this yardage are $2 (not including the cost of dredging). | | | |

3-2-5

FUEL COSTS USED TO

COMPUTE AVERAGE DREDGING

DREDGING COST

$4

IF OCEAN DISPOSAL IS THE PLAN- COSTS TO THREE GROUPS OF USERS (with and without NED baseline)

**IF FUEL COSTS 4.00 PER GALLON, WHAT IS COST OF OCEAN FOR EACH GROUP ?**

IF VPA (VIRGINIA) PICKS OCEAN DISPOSAL AND THEY MUST PICK UP PORTION OF FEDERAL COSTS IN EXCESS OF NED SITE A COST

| AVERAGE DREDGING PER YEAR BY: | | QUANTITY Cubic Yards | Applic. Unit $$ | CORPS cost | Applic. Unit $$ | VPA cost | Applic. Unit $$ | Comm/Navy cost (Yds x Ocean $/yd) |
|---|---|---|---|---|---|---|---|---|
| U.S. ARMY CORPS OF ENGINEERS | | | | | | | | |
| FOR regular maintenance (down to 45') | | 2,000,000 | 5.95 | 11,900,000 | 5.52 | 11,040,000 | | |
| Additional maintenance (45' to 50') | | 100,000 | 5.95/2 | 297,500 | non-NED | 849,500 | | |
| VIRGINIA PORT AUTHORITY | | 500,000 | | 0 | 11.47 | 5,735,000 | | |
| VA DEPT OF TRANSPORTATION | | 200,000 | | 0 | 11.47 | 2,294,000 | | |
| COMMERCIAL / NAVY / LOCAL GOV'T | | 1,200,000 | | 0 | | 0 | 11.47 | 13,764,000 |
| Total Cost | **$45,880,000** | 4,000,000 | | **$12,197,500** | | **$19,918,500** | | **$13,764,000** |

IF VPA (VIRGINIA) PICKS OCEAN DISPOSAL AND THEY PAY UNDER SAME PERCENTAGE SPLIT AS IF IT WERE NED PLAN

| AVERAGE DREDGING PER YEAR BY: | | QUANTITY Cubic Yards | Applic. Unit $$ | CORPS cost | Applic. Unit $$ | VPA cost | Applic. Unit $$ | Comm/Navy cost (Yds x Ocean $/yd) |
|---|---|---|---|---|---|---|---|---|
| U.S. ARMY CORPS OF ENGINEERS | | | | | | | | |
| FOR regular maintenance (down to 45') | | 2,000,000 | 11.47 | 22,940,000 | | 0 | | |
| Additional maintenance (45' to 50') | | 100,000 (split 50/50) | 5.735 | 573,500 | 5.735 | 573,500 | | |
| VIRGINIA PORT AUTHORITY | | 500,000 | | 0 | 11.47 | 5,735,000 | | |
| VA DEPT OF TRANSPORTATION | | 200,000 | | 0 | 11.47 | 2,294,000 | | |
| COMMERCIAL / NAVY / LOCAL GOV'T | | 1,200,000 | | 0 | | 0 | 11.47 | 13,764,000 |
| Total Cost | **$45,880,000** | 4,000,000 | | **$23,513,500** | | **$8,602,500** | | **$13,764,000** |

IF OCEAN DISPOSAL IS THE PLAN- COSTS TO THREE GROUPS OF USERS (with and without NED baseline)

All of the previous page's analysis was based on the following unit costs

| | |
|---|---|
| Dredging NED | $5.95 |
| OCEAN | $11.47 |
| Difference | 5.52 |
| 1/2 Ocean | 5.735 |

IN THE FIRST EXAMPLE THE STATE IS PICKING UP THE DIFFERENCE BETWEEN THE NED COST FOR SITE E - CALCULATED WITH 8 7/8% DISCOUNT RATE

NOTE: Unit costs are from the Draft Economics Appendix . An ocean plan includes the provision of disposal for unsuitable material in remaining space at existing CIDA (355,000 yds). It assumes that the applicable site costs associated with this yardage are $2 (not including the cost of dredging).

3-3-2

VPA/VA FINANCES SITE: Interest rate of 11%, 30 year repayment - Distribution of Costs to three groups of users

| | | | | | | |
|---|---|---|---|---|---|---|
| | NOTE: FEDS PAY NO DISPOSAL SITE COSTS OR TOLLS OF ANY KIND - VIRGINIA PICKS THESE UP. | | | | | |
| What dredging and disposal site | | | | | | |
| would cost if VA/VPA financed it | | FEDS PAY | VA/VPA PAYS | VA/VPA PAYS | COMM/NAVY* | COMM/NAVY* |
| for 30 years at 11% | | Dredging Costs | Dredging Costs | Cost of Disposal | Dredging Costs | Cost of Disposal |
| | **QUANTITY** | (Average #/yd) | (Average #/yd) | Site (Toll) | (Average #/yd) | Site (Toll) |
| AVERAGE DREDGING PER YEAR BY: | Cubic Yards | 5.95 | 5.95 | 2.79 | 5.95 | 2.79 |
| | | | | | | |
| U.S. ARMY CORPS OF ENGINEERS | | | | | | |
| FOR regular maintenance (down to 45') | 2,000,000 | 11,900,000 | | 5,580,000 | | |
| | | | | | | |
| FOR additional maintenance (45' to 50') | 100,000 | 297,500 | 297,500 | 279,000 | | |
| | | | | | | |
| VIRGINIA PORT AUTHORITY | 500,000 | | 2,975,000 | 1,395,000 | | |
| VA DEPT OF TRANSPORTATION | 200,000 | | 1,190,000 | 558,000 | | |
| | | | | | | |
| COMMERCIAL / NAVY / LOCAL GOV'T | 1,200,000 | | | | 7,140,000 | 3,348,000 |
| | | | | | | |
| | | | | | | |
| | 4,000,000 | $12,197,500 | $4,462,500 | $7,812,000 | $7,140,000 | $3,348,000 |
| | | | | | | |
| | | | **$12,274,500** | | $10,488,000 | |
| | | | **VPA TOTAL** | | Comm/Navy Tot | |
| | | | | | | |
| What's the TOTAL COST for all groups? | | | | | | |
| | | | $11,160,000 | Site Cost Recovery Total *** | | |
| **$34,960,000** | | | *** (INCLUDES $1,690,060 which is 20% risk or | | | |
| | | | 'coverage' portion of repayment - which may reduce VA $$$) | | | |
| | | | | | | |
| AVERAGE DREDGING COST IS BASED ON FUEL PRICE OF: | | | | | | |
| | **$4.00** | | *Private commercial, Navy & local government | | | |
| | | | # Average unit cost of all types of dredging, for all jobs | | | |
| Portion for site cost recovery | **2.79** | | performed in Hampton Roads is heavily weighted by the cost | | | |
| Portion for average dredging cost | **5.95** | | of hydraulic dredging since this is the method which accounts | | | |
| Total NED unit cost | **8.74** | | for the largest portion of total yardage. This would continue with | | | |
| | | | the availability of confined site adjacent to CI. | | | |

2/1/90 Huber

3.3-3

Distribution of Costs to 3 groups of users: Site A, Federal Discount 8 7/8%, 30 years repayment

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | | NOTE: FEDS PAY NO DISPOSAL SITE COSTS OR TOLLS OF ANY KIND - VIRGINIA PICKS THESE UP. | | | | | |
| 2 | What dredging and disposal site | | | | | | |
| 3 | would cost if the FEDS financed it | | FEDS PAY | VA/VPA PAYS | VA/VPA PAYS | COMM/NAVY* | COMM/NAVY* |
| 4 | for 30 years at 8 7/8% | | Dredging Costs | Dredging Costs | Cost of Disposa | Dredging Costs | Cost of Disposa |
| 5 | | QUANTITY | (Average #/yd) | (Average #/yd) | Site (Toll) | (Average #/yd) | Site (Toll) |
| 6 | AVERAGE DREDGING PER YEAR BY: | Cubic Yards | 5.95 | 5.95 | 1.98 | 5.95 | 1.98 |
| 7 | | | | | | | |
| 8 | U.S. ARMY CORPS OF ENGINEERS | | | | | | |
| 9 | FOR regular maintenance (down to 45') | 2,000,000 | 11,900,000 | | 3,960,000 | | |
| 10 | | | | | | | |
| 11 | FOR Additional maintenance (45' to 50') | 100,000 | 297,500 | 297,500 | 198,000 | | |
| 12 | | | | | | | |
| 13 | VIRGINIA PORT AUTHORITY | 500,000 | | 2,975,000 | 990,000 | | |
| 14 | VA DEPT OF TRANSPORTATION | 200,000 | | 1,190,000 | 396,000 | | |
| 15 | | | | | | | |
| 16 | COMMERCIAL / NAVY / LOCAL GOV'T | 1,200,000 | | | | 7,140,000 | 2,376,000 |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | 4,000,000 | $12,197,500 | $4,462,500 | $5,544,000 | $7,140,000 | $2,376,000 |
| 20 | | | | | | | |
| 21 | | | | $10,006,500 | | $9,516,000 | |
| 22 | | | | VPA TOTAL | | Comm/Navy Tot | |
| 23 | | | | | | | |
| 24 | What's the TOTAL COST for all groups?? | | | | | | |
| 25 | | | | $7,920,000 | Site Cost Recovery Total | | |
| 26 | **$31,720,000** | | | | | | |
| 27 | | | | | | | |
| 28 | | | | *Private commercial, Navy & local government | | | |
| 29 | AVERAGE DREDGING COST IS BASED ON FUEL PRICE OF: | | | # Average unit cost of all types of dredging, for all jobs | | | |
| 30 | | $4.00 | | performed in Hampton Roads is heavily weighted by the cost | | | |
| 31 | | | | of hydraulic dredging since this is the method which accounts | | | |
| 32 | Portion for site cost recovery | 1.98 | | for the largest portion of total yardage. This would continue with | | | |
| 33 | Portion for average dredging cost | 5.95 | | the availability of confined site adjacent to CI. | | | |
| 34 | Total NED unit cost | 7.93 | | | | | |

3-3-4

2/1/90 Huber

# ATTACHMENT 4

# F U E L  P R I C E  S E N S I T I V I T Y  A N A L Y S I S

DREDGING IN HAMPTON ROADS

NORFOLK HARBOR

Prepared by:

Rich and Associates
1825 Cedar Road
Chesapeake, Virginia 23323

14 December 1988

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**Discussion**

**Assumptions concerning equipment sizing, productions working times, efficiency, and overhead and profit are the same as those set forth in Assumptions, Dredging in Hampton Roads, 24 October 1988. This report recalculated costs based on increased fuel costs.**

**Toll charges for Craney Island have not been included in the unit prices.**

COST ESTIMATE HYDRAULIC

PLANT: 27" DREDGE
CHANNEL SEGMENT: NORFOLK HARBOR
DISPOSAL AREA: CRANEY ISLAND
PUMPING DISTANCE (FT): 15,000LF

MONTHLY PLANT COST:

| | | | |
|---|---|---|---|
| DREDGE COST | | | 709,350 |
| FUEL | .90 /GAL | | 347,328 |
| SHORE MEN & EQUIP. | | | 16,400 |
| JACK UP BARGE | | | 5,200 |
| BOOSTER STATION | 1 @ | 55,200 | 55,200 |
| 27" FLOATING PIPE | 1,000 @ | 7.35 | 7,350 |
| 27" SUBMERGED PIPE | 12,000 @ | 4.80 | 57,600 |
| 27" SHORE PIPE | 2,000 @ | 3.25 | 6,500 |
| TOTAL MONTHLY DIRECT COST | | | 1,204,928 |
| 25 % OVERHEAD & PROFIT | | | 301,232 |
| TOTAL MONTHLY PLANT COST | | | 1,506,160 |

PRODUCTION AND COST ESTIMATE:

| | | |
|---|---|---|
| AVERAGE PUMPING DISTANCE /PUMP | 12,250 | |
| CUBIC YARDS/HOUR TABLE B-3 | 1,640 | |
| PUMPING HOURS/DAY | 18 | |
| OPERATING DAYS/MO | 20 | |
| MONTHLY PRODUCTION (CY) | | 590,400 |
| DREDGE QUANTITY (CY) | | 500,000 |
| DREDGING TIME (ONE DREDGE) | | .85 |
| DREDGING COSTS | | 1,280,236 |
| MOBILIZATION/DEMOBILIZATION | | 200,000 |
| JOB COST | | 1,480,236 |
| UNIT COST/CY | | 2.96 |
| ENGINEERING & DESIGN + SUPERVISION AND ADMINISTRATION (9%) | | .27 |
| CONTINGENCY 20% | | .65 |
| TOTAL | | 3.88 |

NOTE: USE PRODUCTION RATES FOR 30" DREDGE FROM TABLE B3 TO COMPENSATE FOR ADDITIONAL POWER OF THIS EQUIPMENT.

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT CO & MKUP BUDGE |
|---|---|---|---|
| .90 | 347,328 | 1,480,236 | 3.88 |
| 1.10 | 424,512 | 1,562,244 | 4.08 |
| 1.25 | 482,400 | 1,623,750 | 4.25 |
| 1.50 | 578,880 | 1,726,260 | 4.51 |
| 1.80 | 694,656 | 1,849,272 | 4.84 |
| 2.00 | 771,840 | 1,931,280 | 5.05 |
| 2.50 | 964,800 | 2,136,300 | 5.58 |
| 3.00 | 1,157,760 | 2,341,320 | 6.12 |
| 4.00 | 1,543,680 | 2,751,360 | 7.20 |

COST ESTIMATE HYDRAULIC

PLANT: 27" DREDGE
CHANNEL SEGMENT: NORFOLK HARBOR
DISPOSAL AREA: CRANEY ISLAND
PUMPING DISTANCE (F 15,000LF

MONTHLY PLANT COST:

| | | | |
|---|---|---|---|
| DREDGE COST | | | 709,350 |
| FUEL | .90 /GAL | | 347,328 |
| SHORE MEN & EQUIP. | | | 16,400 |
| JACK UP BARGE | | | 5,200 |
| BOOSTER STATION | 1 @ | 55,200 | 55,200 |
| 27" FLOATING PIPE | 1,000 @ | 7.35 | 7,350 |
| 27" SUBMERGED PIPE | 12,000 @ | 4.80 | 57,600 |
| 27" SHORE PIPE | 2,000 @ | 3.25 | 6,500 |
| TOTAL MONTHLY DIRECT COST | | | 1,204,928 |
| 24 % OVERHEAD & PROFIT | | | 289,183 |
| TOTAL MONTHLY PLANT COST | | | 1,494,111 |

PRODUCTION AND COST ESTIMATE:

| | | |
|---|---|---|
| AVERAGE PUMPING DISTANCE /PUMP | 12,250 | |
| CUBIC YARDS/HOUR TABLE B-3 | 1,640 | |
| PUMPING HOURS/DAY | 19 | |
| OPERATING DAYS/MO | 21 | |
| MONTHLY PRODUCTION (CY) | | 654,360 |
| DREDGE QUANTITY (CY) | | 750,000 |
| DREDGING TIME (ONE DREDGE) | | 1.15 |
| DREDGING COSTS | | 1,718,228 |
| MOBILIZATION/DEMOBILIZATION | | 200,000 |
| JOB COST | | 1,918,228 |
| UNIT COST/CY | | 2.56 |
| ENGINEERING & DESIGN + SUPERVISION AND ADMINISTRATION (9%) | | .23 |
| CONTINGENCY 20% | | .56 |
| TOTAL | | 3.35 |

NOTE: USE PRODUCTION RATES FOR 30" DREDGE FROM TABLE B3 TO COMPENSATE FOR ADDITIONAL POWER OF THIS EQUIPMENT.

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 347,328 | 1,918,228 | 3.35 |
| 1.10 | 424,512 | 2,028,292 | 3.53 |
| 1.25 | 482,400 | 2,110,840 | 3.67 |
| 1.50 | 578,880 | 2,248,420 | 3.92 |
| 1.80 | 709,350 | 2,413,517 | 4.21 |
| 2.00 | 771,840 | 2,523,582 | 4.39 |
| 2.50 | 709,350 | 2,798,742 | 4.88 |
| 3.00 | 1,157,760 | 3,073,903 | 5.36 |
| 4.00 | 1,543,680 | 3,624,225 | 6.31 |

COST ESTIMATE HYDRAULIC

PLANT: 27" DREDGE
CHANNEL SEGMENT: NORFOLK HARBOR
DISPOSAL AREA: CRANEY ISLAND
PUMPING DISTANCE (FT): 15,000LF

MONTHLY PLANT COST:

| | | | |
|---|---|---|---|
| DREDGE COST | | | 709,350 |
| FUEL | .90 /GAL | | 347,328 |
| SHORE MEN & EQUIP. | | | 16,400 |
| JACK UP BARGE | | | 5,200 |
| BOOSTER STATION | 1 @ | 55,200 | 55,200 |
| 27" FLOATING PIPE | 1,000 @ | 7.35 | 7,350 |
| 27" SUBMERGED PIPE | 12,000 @ | 4.80 | 57,600 |
| 27" SHORE PIPE | 2,000 @ | 3.25 | 6,500 |
| TOTAL MONTHLY DIRECT COST | | | 1,204,928 |
| 24 % OVERHEAD & PROFIT | | | 289,183 |
| TOTAL MONTHLY PLANT COST | | | 1,494,111 |

PRODUCTION AND COST ESTIMATE:

| | | |
|---|---|---|
| AVERAGE PUMPING DISTANCE /PUMP | 12,250 | |
| CUBIC YARDS/HOUR TABLE B-3 | 1,640 | |
| PUMPING HOURS/DAY | 19 | |
| OPERATING DAYS/MO | 22 | |
| MONTHLY PRODUCTION (CY) | | 685,520 |
| DREDGE QUANTITY (CY) | | 1,000,000 |
| DREDGING TIME (ONE DREDGE) | | 1.46 |
| DREDGING COSTS | | 2,181,402 |
| MOBILIZATION/DEMOBILIZATION | | 200,000 |
| JOB COST | | 2,381,402 |
| UNIT COST/CY | | 2.38 |
| ENGINEERING & DESIGN + SUPERVISION AND ADMINISTRATION (9%) | | .21 |
| CONTINGENCY 20% | | .52 |
| TOTAL | | 3.11 |

NOTE: USE PRODUCTION RATES FOR 30" DREDGE FROM TABLE B3 TO COMPENSATE FOR ADDITIONAL POWER OF THIS EQUIPMENT.

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT CO & MKUP BUDGE |
|---|---|---|---|
| .90 | 347,328 | 2,381,402 | 3.11 |
| 1.10 | 424,512 | 2,521,136 | 3.30 |
| 1.25 | 482,400 | 2,625,936 | 3.44 |
| 1.50 | 578,880 | 2,800,603 | 3.66 |
| 1.80 | 694,656 | 3,010,204 | 3.94 |
| 2.00 | 771,840 | 3,149,939 | 4.12 |
| 2.50 | 964,800 | 3,499,273 | 4.58 |
| 3.00 | 1,157,760 | 3,848,607 | 5.04 |
| 4.00 | 1,543,680 | 4,547,277 | 5.95 |

COST ESTIMATE HYDRAULIC

PLANT: 27" DREDGE
CHANNEL SEGMENT: NORFOLK HARBOR
DISPOSAL AREA: CRANEY ISLAND
PUMPING DISTANCE (FT): 15,000LF

MONTHLY PLANT COST:

| | | | |
|---|---|---|---|
| DREDGE COST | | | 709,350 |
| FUEL | .90 /GAL | | 347,328 |
| SHORE MEN & EQUIP. | | | 16,400 |
| JACK UP BARGE | | | 5,200 |
| BOOSTER STATION | 1 @ | 55,200 | 55,200 |
| 27" FLOATING PIPE | 1,000 @ | 7.35 | 7,350 |
| 27" SUBMERGED PIPE | 12,000 @ | 4.80 | 57,600 |
| 27" SHORE PIPE | 2,000 @ | 3.25 | 6,500 |
| TOTAL MONTHLY DIRECT COST | | | 1,204,928 |
| 23 % OVERHEAD & PROFIT | | | 277,133 |
| TOTAL MONTHLY PLANT COST | | | 1,482,061 |

PRODUCTION AND COST ESTIMATE:

| | | |
|---|---|---|
| AVERAGE PUMPING DISTANCE /PUMP | 12,250 | |
| CUBIC YARDS/HOUR TABLE B-3 | 1,640 | |
| PUMPING HOURS/DAY | 20 | |
| OPERATING DAYS/MO | 22 | |
| MONTHLY PRODUCTION (CY) | | 721,600 |
| DREDGE QUANTITY (CY) | | 2,000,000 |
| DREDGING TIME (ONE DREDGE) | | 2.77 |
| DREDGING COSTS | | 4,105,309 |
| MOBILIZATION/DEMOBILIZATION | | 200,000 |
| JOB COST | | 4,305,309 |
| UNIT COST/CY | | 2.15 |
| ENGINEERING & DESIGN + SUPERVISION AND ADMINISTRATION (9%) | | .19 |
| CONTINGENCY 20% | | .47 |
| TOTAL | | 2.81 |

NOTE: USE PRODUCTION RATES FOR 30" DREDGE FROM TABLE B3 TO COMPENSATE FOR ADDITIONAL POWER OF THIS EQUIPMENT.

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT CO & MKUP BUDGE |
|---|---|---|---|
| .90 | 347,328 | 4,305,309 | 2.81 |
| 1.10 | 424,512 | 4,568,284 | 2.99 |
| 1.25 | 482,400 | 4,765,514 | 3.11 |
| 1.50 | 578,880 | 5,094,230 | 3.34 |
| 1.80 | 694,656 | 5,488,692 | 3.59 |
| 2.00 | 771,840 | 5,751,664 | 3.77 |
| 2.50 | 964,800 | 6,409,099 | 4.19 |
| 3.00 | 1,157,760 | 7,066,534 | 4.62 |
| 4.00 | 1,543,680 | 8,381,400 | 5.48 |

COST ESTIMATE HYDRAULIC

PLANT: 27" DREDGE
CHANNEL SEGMENT: NORFOLK HARBOR
DISPOSAL AREA: CRANEY ISLAND
PUMPING DISTANCE (FT): 15,000LF

MONTHLY PLANT COST:

| | | | | |
|---|---|---|---|---|
| DREDGE COST | | | | 709,350 |
| FUEL | .90 | /GAL | | 347,328 |
| SHORE MEN & EQUIP. | | | | 16,400 |
| JACK UP BARGE | | | | 5,200 |
| BOOSTER STATION | 1 @ | | 55,200 | 55,200 |
| 27" FLOATING PIPE | 1,000 @ | | 7.35 | 7,350 |
| 27" SUBMERGED PIPE | 12,000 @ | | 4.80 | 57,600 |
| 27" SHORE PIPE | 2,000 @ | | 3.25 | 6,500 |
| TOTAL MONTHLY DIRECT COST | | | | 1,204,928 |
| 21 % OVERHEAD & PROFIT | | | | 253,035 |
| TOTAL MONTHLY PLANT COST | | | | 1,457,963 |

PRODUCTION AND COST ESTIMATE:

| | | |
|---|---|---|
| AVERAGE PUMPING DISTANCE /PUMP | 12,250 | |
| CUBIC YARDS/HOUR TABLE B-3 | 1,640 | |
| PUMPING HOURS/DAY | 20 | |
| OPERATING DAYS/MO | 22 | |
| MONTHLY PRODUCTION (CY) | | 721,600 |
| DREDGE QUANTITY (CY) | | 4,000,000 |
| DREDGING TIME (ONE DREDGE) | | 5.54 |
| DREDGING COSTS | | 8,077,115 |
| MOBILIZATION/DEMOBILIZATION | | 200,000 |
| JOB COST | | 8,277,115 |
| UNIT COST/CY | | 2.07 |
| ENGINEERING & DESIGN + SUPERVISION AND ADMINISTRATION (9%) | | .19 |
| CONTINGENCY 20% | | .45 |
| TOTAL | | 2.71 |

NOTE: USE PRODUCTION RATES FOR 30" DREDGE FROM TABLE B3 TO COMPENSATE FOR ADDITIONAL POWER OF THIS EQUIPMENT.

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT CO & MKUP BUDGE |
|---|---|---|---|
| .90 | 347,328 | 8,277,115 | 2.71 |
| 1.10 | 424,512 | 8,794,512 | 2.88 |
| 1.25 | 482,400 | 9,182,556 | 3.01 |
| 1.50 | 578,880 | 9,829,301 | 3.22 |
| 1.80 | 694,656 | 10,605,394 | 3.47 |
| 2.00 | 771,840 | 11,122,786 | 3.64 |
| 2.50 | 964,800 | 12,416,276 | 4.06 |
| 3.00 | 1,157,760 | 13,709,766 | 4.49 |
| 4.00 | 1,543,680 | 16,296,741 | 5.33 |

COST ESTIMATE HYDRAULIC

PLANT: 27" DREDGE
CHANNEL SEGMENT: NORFOLK HARBOR
DISPOSAL AREA: CRANEY ISLAND
PUMPING DISTANCE (FT): 15,000LF

MONTHLY PLANT COST:

| | | | |
|---|---|---|---|
| DREDGE COST | | | 709,350 |
| FUEL | .90 /GAL | | 347,328 |
| SHORE MEN & EQUIP. | | | 16,400 |
| JACK UP BARGE | | | 5,200 |
| BOOSTER STATION | 1 @ | 55,200 | 55,200 |
| 27" FLOATING PIPE | 1,000 @ | 7.35 | 7,350 |
| 27" SUBMERGED PIPE | 12,000 @ | 4.80 | 57,600 |
| 27" SHORE PIPE | 2,000 @ | 3.25 | 6,500 |
| TOTAL MONTHLY DIRECT COST | | | 1,204,928 |
| 20 % OVERHEAD & PROFIT | | | 240,986 |
| TOTAL MONTHLY PLANT COST | | | 1,445,914 |

PRODUCTION AND COST ESTIMATE:

| | | |
|---|---|---|
| AVERAGE PUMPING DISTANCE /PUMP | 12,250 | |
| CUBIC YARDS/HOUR TABLE B-3 | 1,640 | |
| PUMPING HOURS/DAY | 20 | |
| OPERATING DAYS/MO | 22 | |
| MONTHLY PRODUCTION (CY) | | 721,600 |
| DREDGE QUANTITY (CY) | | 6,000,000 |
| DREDGING TIME (ONE DREDGE) | | 8.31 |
| DREDGING COSTS | | 12,015,545 |
| MOBILIZATION/DEMOBILIZATION | | 200,000 |
| JOB COST | | 12,215,545 |
| UNIT COST/CY | | 2.04 |
| ENGINEERING & DESIGN + SUPERVISION AND ADMINISTRATION (9%) | | .18 |
| CONTINGENCY 20% | | .44 |
| TOTAL | | 2.66 |

NOTE: USE PRODUCTION RATES FOR 30" DREDGE FROM TABLE B3 TO COMPENSATE FOR ADDITIONAL POWER OF THIS EQUIPMENT.

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT CO & MKUP BUDGE |
|---|---|---|---|
| .90 | 347,328 | 12,215,545 | 2.66 |
| 1.10 | 424,512 | 12,985,218 | 2.82 |
| 1.25 | 482,400 | 13,562,480 | 2.95 |
| 1.50 | 578,880 | 14,524,579 | 3.17 |
| 1.80 | 694,656 | 15,679,095 | 3.41 |
| 2.00 | 771,840 | 16,448,776 | 3.59 |
| 2.50 | 964,800 | 18,372,973 | 4.01 |
| 3.00 | 1,157,760 | 20,297,170 | 4.42 |
| 4.00 | 1,543,680 | 24,145,564 | 5.26 |

COST ESTIMATE 1A2-50 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DIRECTLY INTO CRANEY ISLAND | | | | |
| HAUL DISTANCE (MILES): | | | 6 | | |
| QUANTITY | PAY: | 500,000 | CY | GROSS: | 600,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | | .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | | | 1.2 MIN. |
| CYCLES/HR | | | | | 50 EA |
| CY/HR | | | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | 65 | %) | 16 HRS/DAY |
| CY/DAY | | | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | | | 2 EA |
| HAUL | 6 | MILES @ | 3.00 | MPH | 2.00 HRS |
| LOAD & DUMP | | | | | .14 HRS |
| RETURN | 6 | MILES @ | 3.50 | MPH | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 17.71 HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | 1.13 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | 1.13LOADS/DAY | | 6,435 CY/DAY |
| SCOWS REQ | | | | | 2 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | | 46.6 DAYS |
| LOST TIME | 20% | | | | 9.3 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | | 55.9 DAYS |
| PLANT COST | | | | | 301,000 /MONTH |
| REHANDLER | | | | | 46,800 /MONTH |
| FUEL COST | | | .90 | /GAL | 216,477 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | | 45,000 /MONTH |
| LABOR COST | | | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | | 672,177 /MONTH |
| 25% OVERHEAD & PROFIT | | | | | 168,044 /MONTH |
| TOTAL MONTHLY COST | | | | | 840,221 |
| TOTAL DAILY COST | | | | | 28,007 |
| DREDGING COSTS | | | | | 1,565,612 |
| MOB/DEMOB | 10 | DAYS @ | 25,000 | | 250,000 |
| TOTAL JOB COST | | | | | 1,815,612 |
| UNIT COST/CY | | | | | 3.63 |
| E&D / S&A | 9 | % | | | .33 |
| CONTINGENCIES | @ | | 20% | | .79 |
| TOTAL UNIT COST | | | | | 4.75 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MK BUDGET |
|---|---|---|---|
| .90 | 216,477 | 1,815,612 | 4.75 |
| 1.10 | 264,583 | 1,927,660 | 5.04 |
| 1.25 | 300,663 | 2,011,695 | 5.26 |
| 1.50 | 360,795 | 2,151,753 | 5.63 |
| 1.80 | 432,954 | 2,319,824 | 6.07 |
| 2.00 | 481,060 | 2,431,870 | 6.36 |
| 2.50 | 601,325 | 2,711,987 | 7.09 |
| 3.00 | 721,590 | 2,992,106 | 7.83 |
| 4.00 | 962,120 | 3,552,339 | 9.29 |

COST ESTIMATE 1A2-75 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DIRECTLY INTO CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 750,000 CY GROSS: | 900,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ | 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 14 | HRS |
| RETURN 6 MILES @ | 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 17.71 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | 1.13 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | 1.13LOADS/DAY | 6,435 | CY/DAY |
| SCOWS REQ | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 69.9 | DAYS |
| LOST TIME 19% | | 13 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 83 | DAYS |
| PLANT COST | | 301,000 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST .90 /GAL | | 216,477 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 672,177 | /MONTH |
| 24% OVERHEAD & PROFIT | | 161,322 | /MONTH |
| TOTAL MONTHLY COST | | 833,499 | |
| TOTAL DAILY COST | | 27,783 | |
| DREDGING COSTS | | 2,303,236 | |
| MOB/DEMOB 10 DAYS @ | 25,000 | 250,000 | |
| TOTAL JOB COST | | 2,553,236 | |
| UNIT COST/CY | | 3.40 | |
| E&D / S&A 9 % | | .31 | |
| CONTINGENCIES @ 20% | | .74 | |
| TOTAL UNIT COST | | 4.45 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 2,553,236 | 4.45 |
| 1.10 | 264,583 | 2,718,074 | 4.74 |
| 1.25 | 300,663 | 2,841,701 | 4.96 |
| 1.50 | 360,795 | 3,047,748 | 5.32 |
| 1.80 | 432,954 | 3,295,003 | 5.75 |
| 2.00 | 481,060 | 3,463,710 | 6.04 |
| 2.50 | 601,325 | 3,876,300 | 6.76 |
| 3.00 | 721,590 | 4,288,891 | 7.48 |
| 4.00 | 962,120 | 5,114,068 | 8.92 |

COST ESTIMATE 1A2-100 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DIRECTLY INTO CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 1,000,000 CY | GROSS: | 1,200,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 70 %) | 17 HRS/DAY |
| CY/DAY | | | 13,770 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 6 MILES @ | 3.00 MPH | 2.00 HRS |
| LOAD & DUMP | | | 14 HRS |
| RETURN | 6 MILES @ | 3.50 MPH | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 17.71 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | 1.13 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | 1.13LOADS/DAY | 6,435 CY/DAY |
| SCOWS REQ | | | 2 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 93.2 DAYS |
| LOST TIME | 19% | | 18 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 111.2 DAYS |
| PLANT COST | | | 301,000 /MONTH |
| REHANDLER | | | 46,800 /MONTH |
| FUEL COST | .90 /GAL | | 216,477 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 672,177 /MONTH |
| 24% OVERHEAD & PROFIT | | | 161,322 /MONTH |
| TOTAL MONTHLY COST | | | 833,499 |
| TOTAL DAILY COST | | | 27,783 |
| DREDGING COSTS | | | 3,089,503 |
| MOB/DEMOB | 10 DAYS @ | 25,000 | 250,000 |
| TOTAL JOB COST | | | 3,339,503 |
| UNIT COST/CY | | | 3.34 |
| E&D / S&A | 9 % | | .30 |
| CONTINGENCIES | @ 20% | | .73 |
| TOTAL UNIT COST | | | 4.37 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MK BUDGET |
|---|---|---|---|
| .90 | 216,477 | 3,339,503 | 4.37 |
| 1.10 | 264,583 | 3,560,613 | 4.66 |
| 1.25 | 300,663 | 3,726,444 | 4.87 |
| 1.50 | 360,795 | 4,002,829 | 5.24 |
| 1.80 | 432,954 | 4,334,491 | 5.67 |
| 2.00 | 481,060 | 4,555,597 | 5.96 |
| 2.50 | 601,325 | 5,108,369 | 6.68 |
| 3.00 | 721,590 | 5,661,140 | 7.40 |
| 4.00 | 962,120 | 6,766,680 | 8.85 |

COST ESTIMATE 1A2-200 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DIRECTLY INTO CRANEY ISLAND | | | | |
| HAUL DISTANCE (MILES): | | 6 | | | |
| QUANTITY | PAY: 2,000,000 CY | | GROSS: | 2,400,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | | | 1.2 | MIN. |
| CYCLES/HR | | | | 50 | EA |
| CY/HR | | | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | 75 % | 18 | HRS/DAY |
| CY/DAY | | | | 14,580 | CY |
| NUMBER SCOWS PER TOW | | | | 2 | EA |
| HAUL | 6 | MILES @ | 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | | | 14 | HRS |
| RETURN | 6 | MILES @ | 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | 17.71 | HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | 1.13 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | 1.13LOADS/DAY | 6,435 | CY/DAY |
| SCOWS REQ | | | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | 186.5 | DAYS |
| LOST TIME | 18% | | | 34 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | 220.5 | DAYS |
| PLANT COST | | | | 301,000 | /MONTH |
| REHANDLER | | | | 46,800 | /MONTH |
| FUEL COST | | .90 | /GAL | 216,477 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | 45,000 | /MONTH |
| LABOR COST | | | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | 672,177 | /MONTH |
| 23% OVERHEAD & PROFIT | | | | 154,601 | /MONTH |
| TOTAL MONTHLY COST | | | | 826,778 | |
| TOTAL DAILY COST | | | | 27,559 | |
| DREDGING COSTS | | | | 6,076,818 | |
| MOB/DEMOB | 10 | DAYS @ | 25,000 | 250,000 | |
| TOTAL JOB COST | | | | 6,326,818 | |
| UNIT COST/CY | | | | 3.16 | |
| E&D / S&A | 9 | % | | .28 | |
| CONTINGENCIES | @ | 20% | | .69 | |
| TOTAL UNIT COST | | | | 4.14 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MK BUDGET |
|---|---|---|---|
| .90 | 216,477 | 6,326,818 | 4.14 |
| 1.10 | 264,583 | 6,761,718 | 4.42 |
| 1.25 | 300,663 | 7,087,892 | 4.64 |
| 1.50 | 360,795 | 7,631,524 | 4.99 |
| 1.80 | 432,954 | 8,283,873 | 5.42 |
| 2.00 | 481,060 | 8,718,780 | 5.70 |
| 2.50 | 601,325 | 9,806,036 | 6.41 |
| 3.00 | 721,590 | 10,893,292 | 7.12 |
| 4.00 | 962,120 | 13,067,805 | 8.55 |

COST ESTIMATE 1A2-400 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DIRECTLY INTO CRANEY ISLAND | | | | |
| HAUL DISTANCE (MILES): | | 6 | | | |
| QUANTITY | PAY: 4,000,000 | CY | GROSS: | 4,800,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | | | 1.2 | MIN. |
| CYCLES/HR | | | | 50 | EA |
| CY/HR | | | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 75 | %) | 18 | HRS/DAY |
| CY/DAY | | | | 14,580 | CY |
| NUMBER SCOWS PER TOW | | | | 2 | EA |
| HAUL | 6 | MILES @ | 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | | | 13 | HRS |
| RETURN | 6 | MILES @ | 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | 16.71 | HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | | 1.20 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | 1.20LOADS/DAY | | 6,821 | CY/DAY |
| SCOWS REQ | | | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | 351.9 | DAYS |
| LOST TIME | 18% | | | 63 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | 415 | DAYS |
| PLANT COST | | | | 301,000 | /MONTH |
| REHANDLER | | | | 46,800 | /MONTH |
| FUEL COST | | .90 /GAL | | 216,477 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | 45,000 | /MONTH |
| LABOR COST | | | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | 672,177 | /MONTH |
| 21% OVERHEAD & PROFIT | | | | 141,157 | /MONTH |
| TOTAL MONTHLY COST | | | | 813,334 | |
| TOTAL DAILY COST | | | | 27,111 | |
| DREDGING COSTS | | | | 11,251,120 | |
| MOB/DEMOB | 10 | DAYS @ | 25,000 | 250,000 | |
| TOTAL JOB COST | | | | 11,501,120 | |
| UNIT COST/CY | | | | 2.88 | |
| E&D / S&A | 9 | % | | .26 | |
| CONTINGENCIES | @ | 20% | | .63 | |
| TOTAL UNIT COST | | | | 3.76 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 216,477 | 11,501,120 | 3.76 |
| 1.10 | 264,583 | 12,306,331 | 4.02 |
| 1.25 | 300,663 | 12,910,246 | 4.22 |
| 1.50 | 360,795 | 13,916,766 | 4.55 |
| 1.80 | 432,954 | 15,124,582 | 4.95 |
| 2.00 | 481,060 | 15,929,807 | 5.21 |
| 2.50 | 601,325 | 17,942,833 | 5.87 |
| 3.00 | 721,590 | 19,955,874 | 6.53 |
| 4.00 | 962,120 | 23,981,941 | 7.84 |

COST ESTIMATE 1A2-600 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DIRECTLY INTO CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 6,000,000 CY GROSS: | 7,200,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 75 %) | 18 | HRS/DAY |
| CY/DAY | | 14,580 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ | 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 13 | HRS |
| RETURN 6 MILES @ | 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 16.71 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | 1.20 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | 1.20LOADS/DAY | 6,821 | CY/DAY |
| SCOWS REQ | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 527.8 | DAYS |
| LOST TIME 17% | | 90 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 618 | DAYS |
| PLANT COST | | 301,000 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST .90 /GAL | | 216,477 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 672,177 | /MONTH |
| 20% OVERHEAD & PROFIT | | 134,435 | /MONTH |
| TOTAL MONTHLY COST | | 806,612 | |
| TOTAL DAILY COST | | 26,887 | |
| DREDGING COSTS | | 16,616,207 | |
| MOB/DEMOB 10 DAYS @ | 25,000 | 250,000 | |
| TOTAL JOB COST | | 16,866,207 | |
| UNIT COST/CY | | 2.81 | |
| E&D / S&A 9 % | | .25 | |
| CONTINGENCIES @ | 20% | .61 | |
| TOTAL UNIT COST | | 3.68 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 216,477 | 16,866,207 | 3.68 |
| 1.10 | 264,583 | 18,055,404 | 3.94 |
| 1.25 | 300,663 | 18,947,291 | 4.13 |
| 1.50 | 360,795 | 20,433,756 | 4.45 |
| 1.80 | 432,954 | 22,217,531 | 4.84 |
| 2.00 | 481,060 | 23,406,707 | 5.10 |
| 2.50 | 601,325 | 26,379,658 | 5.75 |
| 3.00 | 721,590 | 29,352,609 | 6.40 |
| 4.00 | 962,120 | 35,298,510 | 7.70 |

COST ESTIMATE 1B500 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 500,000 CY GROSS: | 600,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 37 MILES @ 3.00MPH | | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 37 MILES @ 3.50MPH | | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .65 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .65 LOADS/DAY | | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 46.3 | DAYS |
| LOST TIME 20% | | 9 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 55 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST .90/GAL | | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 25% OVERHEAD & PROFIT | | 220,362 | /MONTH |
| TOTAL MONTHLY COST | | 1,101,809 | |
| TOTAL DAILY COST | | 36,727 | |
| DREDGING COSTS | | 2,031,001 | |
| MOB/DEMOB 10 DAYS @ 25,000 | | 250,000 | |
| TOTAL JOB COST | | 2,281,001 | |
| UNIT COST/CY | | 4.56 | |
| E&D / S&A 9% | | .41 | |
| CONTINGENCIES @ 20% | | .99 | |
| TOTAL UNIT COST | | 5.97 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 2,281,001 | 5.97 |
| 1.10 | 276,891 | 2,397,002 | 6.27 |
| 1.25 | 314,649 | 2,484,002 | 6.50 |
| 1.50 | 377,579 | 2,629,003 | 6.88 |
| 1.80 | 453,094 | 2,803,004 | 7.33 |
| 2.00 | 503,438 | 2,919,005 | 7.64 |
| 2.50 | 629,298 | 3,209,004 | 8.39 |
| 3.00 | 755,157 | 3,499,006 | 9.15 |
| 4.00 | 1,006,876 | 4,079,009 | 10.67 |

COST ESTIMATE 1B750 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 750,000 CY GROSS: | 900,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 37 MILES @ 3.00MPH | | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 37 MILES @ 3.50MPH | | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .65 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .65 LOADS/DAY | | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 69.4 | DAYS |
| LOST TIME 19% | | 13 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 82 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST .90/GAL | | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 24% OVERHEAD & PROFIT | | 211,547 | /MONTH |
| TOTAL MONTHLY COST | | 1,092,994 | |
| TOTAL DAILY COST | | 36,433 | |
| DREDGING COSTS | | 3,002,090 | |
| MOB/DEMOB 10 DAYS @ 25,000 | | 250,000 | |
| TOTAL JOB COST | | 3,252,090 | |
| UNIT COST/CY | | 4.34 | |
| E&D / S&A 9% | | .39 | |
| CONTINGENCIES @ 20% | | .95 | |
| TOTAL UNIT COST | | 5.67 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 3,252,090 | 5.67 |
| 1.10 | 276,891 | 3,423,556 | 5.97 |
| 1.25 | 314,649 | 3,552,155 | 6.19 |
| 1.50 | 377,579 | 3,766,485 | 6.57 |
| 1.80 | 453,094 | 4,023,682 | 7.02 |
| 2.00 | 503,438 | 4,195,144 | 7.32 |
| 2.50 | 629,298 | 4,623,804 | 8.06 |
| 3.00 | 755,157 | 5,052,467 | 8.81 |
| 4.00 | 1,006,876 | 5,909,787 | 10.31 |

COST ESTIMATE 1B1000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | .37 | | |
| QUANTITY PAY: | 1,000,000 CY GROSS: | 1,200,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 70 %) | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 37 MILES @ 3.00MPH | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 37 MILES @ 3.50MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .65 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .65 LOADS/DAY | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 87.1 | DAYS |
| LOST TIME | 19% | 17 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 104 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90/GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 24% OVERHEAD & PROFIT | | 211,547 | /MONTH |
| TOTAL MONTHLY COST | | 1,092,994 | |
| TOTAL DAILY COST | | 36,433 | |
| DREDGING COSTS | | 3,792,690 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 4,042,690 | |
| UNIT COST/CY | | 4.04 | |
| E&D / S&A | 9% | .36 | |
| CONTINGENCIES | @ 20% | .88 | |
| TOTAL UNIT COST | | 5.29 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 4,042,690 | 5.29 |
| 1.10 | 276,891 | 4,259,311 | 5.57 |
| 1.25 | 314,649 | 4,421,775 | 5.78 |
| 1.50 | 377,579 | 4,692,549 | 6.14 |
| 1.80 | 453,094 | 5,017,479 | 6.56 |
| 2.00 | 503,438 | 5,234,096 | 6.85 |
| 2.50 | 629,298 | 5,775,644 | 7.55 |
| 3.00 | 755,157 | 6,317,194 | 8.26 |
| 4.00 | 1,006,876 | 7,400,289 | 9.68 |

COST ESTIMATE 1B2000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 2,000,000 CY GROSS: | 2,400,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR | = .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 70 %) | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 37 MILES @ 3.00MPH | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 37 MILES @ 3.50MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .65 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .65 LOADS/DAY | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 174.3 | DAYS |
| LOST TIME | 18% | 31 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 205 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90/GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 23% OVERHEAD & PROFIT | | 202,733 | /MONTH |
| TOTAL MONTHLY COST | | 1,084,180 | |
| TOTAL DAILY COST | | 36,139 | |
| DREDGING COSTS | | 7,419,406 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 7,669,406 | |
| UNIT COST/CY | | 3.83 | |
| E&D / S&A | 9% | .35 | |
| CONTINGENCIES | @ 20% | .84 | |
| TOTAL UNIT COST | | 5.02 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 7,669,406 | 5.02 |
| 1.10 | 276,891 | 8,093,164 | 5.29 |
| 1.25 | 314,649 | 8,410,981 | 5.50 |
| 1.50 | 377,579 | 8,940,681 | 5.85 |
| 1.80 | 453,094 | 9,576,322 | 6.26 |
| 2.00 | 503,438 | 10,000,080 | 6.54 |
| 2.50 | 629,298 | 11,059,473 | 7.23 |
| 3.00 | 755,157 | 12,118,872 | 7.93 |
| 4.00 | 1,006,876 | 14,237,664 | 9.31 |

COST ESTIMATE 1B4000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 4,000,000 CY GROSS: | 4,800,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 70 %) | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 37 MILES @ 3.00MPH | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 37 MILES @ 3.50MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .65 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .65 LOADS/DAY | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 348.6 | DAYS |
| LOST TIME | 18% | 63 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 412 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90/GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 21% OVERHEAD & PROFIT | | 185,104 | /MONTH |
| TOTAL MONTHLY COST | | 1,066,551 | |
| TOTAL DAILY COST | | 35,552 | |
| DREDGING COSTS | | 14,633,081 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 14,883,081 | |
| UNIT COST/CY | | 3.72 | |
| E&D / S&A | 9% | .33 | |
| CONTINGENCIES | @ 20% | .81 | |
| TOTAL UNIT COST | | 4.87 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 14,883,081 | 4.87 |
| 1.10 | 276,891 | 15,718,846 | 5.14 |
| 1.25 | 314,649 | 16,345,669 | 5.35 |
| 1.50 | 377,579 | 17,390,375 | 5.69 |
| 1.80 | 453,094 | 18,644,036 | 6.10 |
| 2.00 | 503,438 | 19,479,801 | 6.37 |
| 2.50 | 629,298 | 21,569,213 | 7.05 |
| 3.00 | 755,157 | 23,658,639 | 7.74 |
| 4.00 | 1,006,876 | 27,837,476 | 9.10 |

COST ESTIMATE 1B6000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 6,000,000 CY GROSS: | 7,200,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR | = .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 70 %) | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 37 MILES @ | 3.00MPH | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 37 MILES @ | 3.50MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | .65 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | .65 LOADS/DAY | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 522.9 | DAYS |
| LOST TIME 17% | | 89 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 612 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90/GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 20% OVERHEAD & PROFIT | | 176,289 | /MONTH |
| TOTAL MONTHLY COST | | 1,057,736 | |
| TOTAL DAILY COST | | 35,258 | |
| DREDGING COSTS | | 21,574,291 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 21,824,291 | |
| UNIT COST/CY | | 3.64 | |
| E&D / S&A 9% | | .33 | |
| CONTINGENCIES @ | 20% | .79 | |
| TOTAL UNIT COST | | 4.76 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 21,824,291 | 4.76 |
| 1.10 | 276,891 | 23,056,510 | 5.03 |
| 1.25 | 314,649 | 23,980,680 | 5.23 |
| 1.50 | 377,579 | 25,520,950 | 5.56 |
| 1.80 | 453,094 | 27,369,269 | 5.97 |
| 2.00 | 503,438 | 28,601,489 | 6.24 |
| 2.50 | 629,298 | 31,682,028 | 6.91 |
| 3.00 | 755,157 | 34,762,547 | 7.58 |
| 4.00 | 1,006,876 | 40,923,625 | 8.92 |

COST ESTIMATE 1C500 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 500,000 CY | GROSS: | 600,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR | = .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00MPH | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 45 MILES @ | 3.50MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .56 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .56 LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 47.2 DAYS |
| LOST TIME | 20% | | 9 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 56 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | | .90/GAL | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 2,064,056 |
| MOB/DEMOB | 10 | DAYS @ 25,000 | 250,000 |
| TOTAL JOB COST | | | 2,314,056 |
| UNIT COST/CY | | | 4.63 |
| E&D / S&A | 9% | | .42 |
| CONTINGENCIES | @ | 20% | 1.01 |
| TOTAL UNIT COST | | | 6.05 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 2,314,056 | 6.05 |
| 1.10 | 276,891 | 2,431,944 | 6.36 |
| 1.25 | 314,649 | 2,520,360 | 6.59 |
| 1.50 | 377,579 | 2,667,721 | 6.98 |
| 1.80 | 453,094 | 2,844,554 | 7.44 |
| 2.00 | 503,438 | 2,962,442 | 7.75 |
| 2.50 | 629,298 | 3,257,162 | 8.52 |
| 3.00 | 755,157 | 3,551,883 | 9.29 |
| 4.00 | 1,006,876 | 4,141,325 | 10.83 |

COST ESTIMATE 1C750 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 750,000 CY GROSS: | 900,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 45 MILES @ 3.00MPH | 15.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 45 MILES @ 3.50MPH | 12.86 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 35.86 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .56 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .56 LOADS/DAY | 3,179 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 70.8 | DAYS |
| LOST TIME | 19% | 13 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 84 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90/GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 24% OVERHEAD & PROFIT | | 211,547 | /MONTH |
| TOTAL MONTHLY COST | | 1,092,994 | |
| TOTAL DAILY COST | | 36,433 | |
| DREDGING COSTS | | 3,053,097 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 3,303,097 | |
| UNIT COST/CY | | 4.40 | |
| E&D / S&A | 9% | .40 | |
| CONTINGENCIES | @ 20% | .96 | |
| TOTAL UNIT COST | | 5.76 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 3,303,097 | 5.76 |
| 1.10 | 276,891 | 3,477,476 | 6.06 |
| 1.25 | 314,649 | 3,608,259 | 6.29 |
| 1.50 | 377,579 | 3,826,231 | 6.67 |
| 1.80 | 453,094 | 4,087,798 | 7.13 |
| 2.00 | 503,438 | 4,262,174 | 7.43 |
| 2.50 | 629,298 | 4,698,117 | 8.19 |
| 3.00 | 755,157 | 5,134,062 | 8.95 |
| 4.00 | 1,006,876 | 6,005,948 | 10.47 |

COST ESTIMATE 1C1000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 1,000,000 CY GROSS: | 1,200,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR | = .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 70 %) | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 45 MILES @ 3.00MPH | 15.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 45 MILES @ 3.50MPH | 12.86 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 35.86 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .56 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .56 LOADS/DAY | 3,179 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 94.4 | DAYS |
| LOST TIME | 19% | 18 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 112 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90/GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 24% OVERHEAD & PROFIT | | 211,547 | /MONTH |
| TOTAL MONTHLY COST | | 1,092,994 | |
| TOTAL DAILY COST | | 36,433 | |
| DREDGING COSTS | | 4,095,085 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 4,345,085 | |
| UNIT COST/CY | | 4.35 | |
| E&D / S&A | 9% | .39 | |
| CONTINGENCIES | @ 20% | .95 | |
| TOTAL UNIT COST | | 5.68 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 4,345,085 | 5.68 |
| 1.10 | 276,891 | 4,578,977 | 5.99 |
| 1.25 | 314,649 | 4,754,395 | 6.22 |
| 1.50 | 377,579 | 5,046,758 | 6.60 |
| 1.80 | 453,094 | 5,397,595 | 7.06 |
| 2.00 | 503,438 | 5,631,483 | 7.37 |
| 2.50 | 629,298 | 6,216,209 | 8.13 |
| 3.00 | 755,157 | 6,800,938 | 8.90 |
| 4.00 | 1,006,876 | 7,970,389 | 10.43 |

COST ESTIMATE 1C2000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 2,000,000 CY GROSS: | 2,400,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 70 %) | | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 45 MILES @ 3.00MPH | | 15.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 45 MILES @ 3.50MPH | | 12.86 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 35.86 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .56 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .56 LOADS/DAY | | 3,179 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 188.7 | DAYS |
| LOST TIME 18% | | 34 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 223 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST .90/GAL | | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 23% OVERHEAD & PROFIT | | 202,733 | /MONTH |
| TOTAL MONTHLY COST | | 1,084,180 | |
| TOTAL DAILY COST | | 36,139 | |
| DREDGING COSTS | | 8,048,230 | |
| MOB/DEMOB 10 DAYS @ 25,000 | | 250,000 | |
| TOTAL JOB COST | | 8,298,230 | |
| UNIT COST/CY | | 4.15 | |
| E&D / S&A 9% | | .37 | |
| CONTINGENCIES @ 20% | | .90 | |
| TOTAL UNIT COST | | 5.43 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 8,298,230 | 5.43 |
| 1.10 | 276,891 | 8,757,904 | 5.73 |
| 1.25 | 314,649 | 9,102,657 | 5.95 |
| 1.50 | 377,579 | 9,677,251 | 6.33 |
| 1.80 | 453,094 | 10,366,765 | 6.78 |
| 2.00 | 503,438 | 10,826,439 | 7.08 |
| 2.50 | 629,298 | 11,975,619 | 7.83 |
| 3.00 | 755,157 | 13,124,807 | 8.58 |
| 4.00 | 1,006,876 | 15,423,175 | 10.09 |

COST ESTIMATE 1C4000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 4,000,000 CY GROSS: | 4,800,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 70 %) | | 17 | HRS/DAY |
| CY/DAY | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 45 MILES @ 3.00MPH | | 15.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 45 MILES @ 3.50MPH | | 12.86 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 35.86 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .56 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .56 LOADS/DAY | | 3,179 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 377.4 | DAYS |
| LOST TIME 18% | | 68 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 445 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST .90/GAL | | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 21% OVERHEAD & PROFIT | | 185,104 | /MONTH |
| TOTAL MONTHLY COST | | 1,066,551 | |
| TOTAL DAILY COST | | 35,552 | |
| DREDGING COSTS | | 15,834,729 | |
| MOB/DEMOB 10 DAYS @ 25,000 | | 250,000 | |
| TOTAL JOB COST | | 16,084,729 | |
| UNIT COST/CY | | 4.02 | |
| E&D / S&A 9% | | .36 | |
| CONTINGENCIES @ 20% | | .88 | |
| TOTAL UNIT COST | | 5.26 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 16,084,729 | 5.26 |
| 1.10 | 276,891 | 16,989,125 | 5.56 |
| 1.25 | 314,649 | 17,667,423 | 5.78 |
| 1.50 | 377,579 | 18,797,918 | 6.15 |
| 1.80 | 453,094 | 20,154,528 | 6.59 |
| 2.00 | 503,438 | 21,058,925 | 6.89 |
| 2.50 | 629,298 | 23,319,916 | 7.63 |
| 3.00 | 755,157 | 25,580,922 | 8.36 |
| 4.00 | 1,006,876 | 30,102,920 | 9.84 |

COST ESTIMATE 1C6000 BUCKET DREDGE

| | | |
|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | |
| DISPOSAL AREA: | NORFOLK | |
| HAUL DISTANCE (MILES): | 45 | |
| QUANTITY PAY: | 6,000,000 CY GROSS: | 7,200,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR | = .90 | 18 CY |
| CYCLE TIME (MINUTES): | | 1.2 MIN. |
| CYCLES/HR | | 50 EA |
| CY/HR | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X 70 %) | 17 HRS/DAY |
| CY/DAY | | 13,770 CY |
| NUMBER SCOWS PER TOW | | 2 EA |
| HAUL | 45 MILES @ 3.00MPH | 15.00 HRS |
| LOAD & DUMP | | 8 HRS |
| RETURN | 45 MILES @ 3.50MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | 35.86 HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .56 LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .56 LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 566.2 DAYS |
| LOST TIME | 17% | 96 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 662 DAYS |
| PLANT COST | | 547,000 /MONTH |
| FUEL COST | .90/GAL | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 /MONTH |
| LABOR COST | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 /MONTH |
| 20% OVERHEAD & PROFIT | | 176,289 /MONTH |
| TOTAL MONTHLY COST | | 1,057,736 |
| TOTAL DAILY COST | | 35,258 |
| DREDGING COSTS | | 23,347,762 |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 |
| TOTAL JOB COST | | 23,597,762 |
| UNIT COST/CY | | 3.93 |
| E&D / S&A | 9% | .35 |
| CONTINGENCIES | @ 20% | .86 |
| TOTAL UNIT COST | | 5.14 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COSTS | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 23,597,762 | 5.14 |
| 1.10 | 276,891 | 24,931,273 | 5.44 |
| 1.25 | 314,649 | 25,931,413 | 5.65 |
| 1.50 | 377,579 | 27,598,297 | 6.02 |
| 1.80 | 453,094 | 29,598,554 | 6.45 |
| 2.00 | 503,438 | 30,932,066 | 6.74 |
| 2.50 | 629,298 | 34,265,834 | 7.47 |
| 3.00 | 755,157 | 37,599,581 | 8.20 |
| 4.00 | 1,006,876 | 44,267,118 | 9.65 |

COST ESTIMATE 2A5 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 5,000 CY GROSS: | 6,750 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 %) | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ | 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 12 | HRS |
| RETURN 6 MILES @ | 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 15.71 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | 1.27 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | 1.27LOADS/DAY | 7,255 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | .9 | DAYS |
| LOST TIME 23% | | .2 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 1.1 | DAYS |
| PLANT COST | | 170,850 | /MONTH |
| FUEL COST | .90 /GAL | 81,424 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 354,324 | /MONTH |
| 27% OVERHEAD & PROFIT | | 95,667 | /MONTH |
| TOTAL MONTHLY COST | | 449,991 | |
| TOTAL DAILY COST | | 15,000 | |
| DREDGING COSTS | | 16,500 | |
| MOB/DEMOB 2 DAYS @ | 4,000 | 8,000 | |
| TOTAL JOB COST | | 24,500 | |
| UNIT COST/CY | | 4.90 | |
| E&D / S&A 9 % | | .44 | |
| CONTINGENCIES @ | 20% | 1.07 | |
| TOTAL UNIT COST | | 6.41 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 81,424 | 24,500 | 6.41 |
| 1.10 | 99,518 | 25,342 | 6.63 |
| 1.25 | 113,088 | 25,974 | 6.79 |
| 1.50 | 135,706 | 27,027 | 7.07 |
| 1.80 | 162,847 | 28,291 | 7.40 |
| 2.00 | 180,942 | 29,134 | 7.62 |
| 2.50 | 226,177 | 31,240 | 8.17 |
| 3.00 | 271,412 | 33,347 | 8.72 |
| 4.00 | 361,883 | 37,560 | 9.83 |

COST ESTIMATE 2A10 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 10,000 CY GROSS: | 13,500 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 | HRS |
| LOAD & DUMP | | 12 | HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 15.71 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | 1.27 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X 1.27LOADS/DAY | | 7,255 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 1.9 | DAYS |
| LOST TIME 22% | | .4 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 2.3 | DAYS |
| PLANT COST | | 170,850 | /MONTH |
| FUEL COST .90 /GAL | | 81,424 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 354,324 | /MONTH |
| 26% OVERHEAD & PROFIT | | 92,124 | /MONTH |
| TOTAL MONTHLY COST | | 446,448 | |
| TOTAL DAILY COST | | 14,882 | |
| DREDGING COSTS | | 34,228 | |
| MOB/DEMOB 2 DAYS @ 5,000 | | 10,000 | |
| TOTAL JOB COST | | 44,228 | |
| UNIT COST/CY | | 4.42 | |
| E&D / S&A 9 % | | .40 | |
| CONTINGENCIES @ 20% | | .96 | |
| TOTAL UNIT COST | | 5.78 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 81,424 | 44,228 | 5.78 |
| 1.10 | 99,518 | 45,976 | 6.01 |
| 1.25 | 113,088 | 47,286 | 6.19 |
| 1.50 | 135,706 | 49,471 | 6.47 |
| 1.80 | 162,847 | 52,093 | 6.81 |
| 2.00 | 180,942 | 53,841 | 7.04 |
| 2.50 | 226,177 | 58,211 | 7.61 |
| 3.00 | 271,412 | 62,581 | 8.19 |
| 4.00 | 361,883 | 71,320 | 9.33 |

COST ESTIMATE 2A20 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 20,000 CY GROSS: | 26,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 | HRS |
| LOAD & DUMP | | 12 | HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 15.71 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | 1.27 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X 1.27LOADS/DAY | | 7,255 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 3.6 | DAYS |
| LOST TIME 21% | | .8 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 4.4 | DAYS |
| PLANT COST | | 170,850 | /MONTH |
| FUEL COST .90 /GAL | | 81,424 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 354,324 | /MONTH |
| 26% OVERHEAD & PROFIT | | 92,124 | /MONTH |
| TOTAL MONTHLY COST | | 446,448 | |
| TOTAL DAILY COST | | 14,882 | |
| DREDGING COSTS | | 65,479 | |
| MOB/DEMOB 2 DAYS @ 7,500 | | 15,000 | |
| TOTAL JOB COST | | 80,479 | |
| UNIT COST/CY | | 4.02 | |
| E&D / S&A 9 % | | .36 | |
| CONTINGENCIES @ 20% | | .88 | |
| TOTAL UNIT COST | | 5.26 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 81,424 | 80,479 | 5.26 |
| 1.10 | 99,518 | 83,823 | 5.48 |
| 1.25 | 113,088 | 86,331 | 5.65 |
| 1.50 | 135,706 | 90,510 | 5.92 |
| 1.80 | 162,847 | 95,526 | 6.25 |
| 2.00 | 180,942 | 98,870 | 6.47 |
| 2.50 | 226,177 | 107,229 | 7.01 |
| 3.00 | 271,412 | 115,589 | 7.56 |
| 4.00 | 361,883 | 132,308 | 8.65 |

COST ESTIMATE 2A50 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | | | |
| HAUL DISTANCE (MILES): | | 6 | | | |
| QUANTITY | PAY: | 50,000 | CY | GROSS: | 65,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | | .90 | 10 CY |
| CYCLE TIME (MINUTES): | | | | | 1 MIN. |
| CYCLES/HR | | | | | 60 EA |
| CY/HR | | | | | 540 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | | 65 | %) 16 HRS/DAY |
| CY/DAY | | | | | 8,640 CY |
| NUMBER SCOWS PER TOW | | | | | 2 EA |
| HAUL | 6 | MILES @ | 3.00 | MPH | 2.00 HRS |
| LOAD & DUMP | | | | | 12 HRS |
| RETURN | 6 | MILES @ | 3.50 | MPH | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 15.71 HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | 1.27 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | 1.27LOADS/DAY | | 7,255 CY/DAY |
| SCOWS REQ | | | | | 1 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | | 9 DAYS |
| LOST TIME | 21% | | | | 1.9 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | | 10.9 DAYS |
| PLANT COST | | | | | 170,850 /MONTH |
| FUEL COST | | | .90 | /GAL | 81,424 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | | 39,150 /MONTH |
| LABOR COST | | | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | | 354,324 /MONTH |
| 26% OVERHEAD & PROFIT | | | | | 92,124 /MONTH |
| TOTAL MONTHLY COST | | | | | 446,448 |
| TOTAL DAILY COST | | | | | 14,882 |
| DREDGING COSTS | | | | | 162,209 |
| MOB/DEMOB | 3 | DAYS @ | 10,000 | | 30,000 |
| TOTAL JOB COST | | | | | 192,209 |
| UNIT COST/CY | | | | | 3.84 |
| E&D / S&A | 9 | % | | | .35 |
| CONTINGENCIES | @ | 20% | | | .84 |
| TOTAL UNIT COST | | | | | 5.03 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 81,424 | 192,209 | 5.03 |
| 1.10 | 99,518 | 200,493 | 5.24 |
| 1.25 | 113,088 | 206,706 | 5.41 |
| 1.50 | 135,706 | 217,060 | 5.68 |
| 1.80 | 162,847 | 229,485 | 6.00 |
| 2.00 | 180,942 | 237,769 | 6.22 |
| 2.50 | 226,177 | 258,477 | 6.76 |
| 3.00 | 271,412 | 279,186 | 7.30 |
| 4.00 | 361,883 | 320,604 | 8.39 |

COST ESTIMATE 2A75 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 75,000 CY GROSS: | 93,750 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 6 MILES @ 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 6 MILES @ 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 11.71 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | 1.71 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X 1.71LOADS/DAY | 9,732 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 9.6 | DAYS |
| LOST TIME | 20% | 1.9 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 11.5 | DAYS |
| PLANT COST | | 178,000 | /MONTH |
| FUEL COST | .90 /GAL | 86,621 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 372,521 | /MONTH |
| 25% OVERHEAD & PROFIT | | 93,130 | /MONTH |
| TOTAL MONTHLY COST | | 465,651 | |
| TOTAL DAILY COST | | 15,522 | |
| DREDGING COSTS | | 178,500 | |
| MOB/DEMOB | 4 DAYS @ 20,000 | 80,000 | |
| TOTAL JOB COST | | 258,500 | |
| UNIT COST/CY | | 3.45 | |
| E&D / S&A | 9 % | .31 | |
| CONTINGENCIES | @ 20% | .75 | |
| TOTAL UNIT COST | | 4.51 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 86,621 | 258,500 | 4.51 |
| 1.10 | 105,870 | 267,723 | 4.67 |
| 1.25 | 120,307 | 274,641 | 4.79 |
| 1.50 | 144,368 | 286,170 | 4.99 |
| 1.80 | 173,242 | 300,005 | 5.23 |
| 2.00 | 192,491 | 309,229 | 5.39 |
| 2.50 | 240,614 | 332,288 | 5.80 |
| 3.00 | 288,737 | 355,347 | 6.20 |
| 4.00 | 384,982 | 401,464 | 7.00 |

COST ESTIMATE 2A100 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 100,000 CY GROSS: | 125,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ | 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 6 MILES @ | 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 11.71 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | 1.71 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | 1.71LOADS/DAY | 9,732 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 12.8 | DAYS |
| LOST TIME 20% | | 2.6 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 15.4 | DAYS |
| PLANT COST | | 178,000 | /MONTH |
| FUEL COST | .90 /GAL | 86,621 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 372,521 | /MONTH |
| 25% OVERHEAD & PROFIT | | 93,130 | /MONTH |
| TOTAL MONTHLY COST | | 465,651 | |
| TOTAL DAILY COST | | 15,522 | |
| DREDGING COSTS | | 239,034 | |
| MOB/DEMOB 4 DAYS @ | 20,000 | 80,000 | |
| TOTAL JOB COST | | 319,034 | |
| UNIT COST/CY | | 3.19 | |
| E&D / S&A 9 % | | .29 | |
| CONTINGENCIES @ | 20% | .70 | |
| TOTAL UNIT COST | | 4.17 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 86,621 | 319,034 | 4.17 |
| 1.10 | 105,870 | 331,386 | 4.33 |
| 1.25 | 120,307 | 340,650 | 4.46 |
| 1.50 | 144,368 | 356,089 | 4.66 |
| 1.80 | 173,242 | 374,616 | 4.90 |
| 2.00 | 192,491 | 386,968 | 5.06 |
| 2.50 | 240,614 | 417,846 | 5.47 |
| 3.00 | 288,737 | 448,725 | 5.87 |
| 4.00 | 384,982 | 510,483 | 6.68 |

COST ESTIMATE 2A250 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 250,000 CY GROSS: | 312,500 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 6 MILES @ 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 6 MILES @ 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 11.71 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | 1.71 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X 1.71LOADS/DAY | 9,732 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 32.1 | DAYS |
| LOST TIME | 20% | 6.4 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 38.5 | DAYS |
| PLANT COST | | 178,000 | /MONTH |
| FUEL COST | .90 /GAL | 86,621 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 372,521 | /MONTH |
| 25% OVERHEAD & PROFIT | | 93,130 | /MONTH |
| TOTAL MONTHLY COST | | 465,651 | |
| TOTAL DAILY COST | | 15,522 | |
| DREDGING COSTS | | 597,585 | |
| MOB/DEMOB | 6 DAYS @ 25,000 | 150,000 | |
| TOTAL JOB COST | | 747,585 | |
| UNIT COST/CY | | 2.99 | |
| E&D / S&A | 9 % | .27 | |
| CONTINGENCIES | @ 20% | .65 | |
| TOTAL UNIT COST | | 3.91 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 86,621 | 747,585 | 3.91 |
| 1.10 | 105,870 | 778,465 | 4.07 |
| 1.25 | 120,307 | 801,624 | 4.19 |
| 1.50 | 144,368 | 840,222 | 4.40 |
| 1.80 | 173,242 | 886,540 | 4.64 |
| 2.00 | 192,491 | 917,419 | 4.80 |
| 2.50 | 240,614 | 994,615 | 5.20 |
| 3.00 | 288,737 | 1,071,813 | 5.61 |
| 4.00 | 384,982 | 1,226,207 | 6.42 |

COST ESTIMATE 2A500 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY PAY: | 500,000 CY GROSS: | 625,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 6 MILES @ 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN | 6 MILES @ 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 11.71 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | 1.71 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X 1.71LOADS/DAY | 9,732 | CY/DAY |
| SCOWS REQ | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 64.2 | DAYS |
| LOST TIME | 20% | 12.8 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 77 | DAYS |
| PLANT COST | | 178,000 | /MONTH |
| FUEL COST | .90 /GAL | 86,621 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 372,521 | /MONTH |
| 25% OVERHEAD & PROFIT | | 93,130 | /MONTH |
| TOTAL MONTHLY COST | | 465,651 | |
| TOTAL DAILY COST | | 15,522 | |
| DREDGING COSTS | | 1,195,171 | |
| MOB/DEMOB | 10 DAYS @ 25,000 | 250,000 | |
| TOTAL JOB COST | | 1,445,171 | |
| UNIT COST/CY | | 2.89 | |
| E&D / S&A | 9 % | .26 | |
| CONTINGENCIES | @ 20% | .63 | |
| TOTAL UNIT COST | | 3.78 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 86,621 | 1,445,171 | 3.78 |
| 1.10 | 105,870 | 1,506,930 | 3.94 |
| 1.25 | 120,307 | 1,553,248 | 4.06 |
| 1.50 | 144,368 | 1,630,444 | 4.27 |
| 1.80 | 173,242 | 1,723,079 | 4.51 |
| 2.00 | 192,491 | 1,784,838 | 4.67 |
| 2.50 | 240,614 | 1,939,230 | 5.07 |
| 3.00 | 288,737 | 2,093,625 | 5.48 |
| 4.00 | 384,982 | 2,402,414 | 6.28 |

COST ESTIMATE 2A1000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | |
| HAUL DISTANCE (MILES): | 6 | | |
| QUANTITY | PAY: 1,000,000 CY | GROSS: | 1,250,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |

| | | | | | |
|---|---|---|---|---|---|
| NUMBER SCOWS PER TOW | | | | | 2 EA |
| HAUL | 6 | MILES @ | 3.00 | MPH | 2.00 HRS |
| LOAD & DUMP | | | | | 8 HRS |
| RETURN | 6 | MILES @ | 3.50 | MPH | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 11.71 HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | 1.71 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | 1.71LOADS/DAY | | 9,732 CY/DAY |
| SCOWS REQ | | | | | 1 SETS |

| | | |
|---|---|---|
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 128.4 DAYS |
| LOST TIME | 19% | 24.4 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 152.8 DAYS |

| | | | |
|---|---|---|---|
| PLANT COST | | | 178,000 /MONTH |
| FUEL COST | .90 | /GAL | 86,621 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 372,521 /MONTH |
| 24% OVERHEAD & PROFIT | | | 89,405 /MONTH |
| TOTAL MONTHLY COST | | | 461,926 |
| TOTAL DAILY COST | | | 15,398 |
| DREDGING COSTS | | | 2,352,743 |
| MOB/DEMOB | 10 | DAYS @ 25,000 | 250,000 |
| TOTAL JOB COST | | | 2,602,743 |
| UNIT COST/CY | | | 2.60 |
| E&D / S&A | 9 | % | .23 |
| CONTINGENCIES | @ | 20% | .57 |
| TOTAL UNIT COST | | | 3.40 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 86,621 | 2,602,743 | 3.40 |
| 1.10 | 105,870 | 2,724,316 | 3.56 |
| 1.25 | 120,307 | 2,815,496 | 3.68 |
| 1.50 | 144,368 | 2,967,458 | 3.88 |
| 1.80 | 173,242 | 3,149,818 | 4.12 |
| 2.00 | 192,491 | 3,271,391 | 4.28 |
| 2.50 | 240,614 | 3,575,319 | 4.68 |
| 3.00 | 288,737 | 3,879,252 | 5.07 |
| 4.00 | 384,982 | 4,487,113 | 5.87 |

COST ESTIMATE 2A3000 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | REHANDLING BASIN AT CRANEY ISLAND | | | | |
| HAUL DISTANCE (MILES): | | | 6 | | |
| QUANTITY | PAY: 3,000,000 CY | GROSS: | | 3,750,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | | | 1.2 | MIN. |
| CYCLES/HR | | | | 50 | EA |
| CY/HR | | | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 70 | %) | 17 | HRS/DAY |
| CY/DAY | | | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | | | 2 | EA |
| HAUL | 6 MILES @ | 3.00 | MPH | 2.00 | HRS |
| LOAD & DUMP | | | | 8 | HRS |
| RETURN | 6 MILES @ | 3.50 | MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | 11.71 | HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | | 1.71 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | 1.71LOADS/DAY | | 9,732 | CY/DAY |
| SCOWS REQ | | | | 1 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | 385.3 | DAYS |
| LOST TIME | 18% | | | 69.4 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | 454.7 | DAYS |
| PLANT COST | | | | 178,000 | /MONTH |
| FUEL COST | | .90 | /GAL | 86,621 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | 45,000 | /MONTH |
| LABOR COST | | | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | 372,521 | /MONTH |
| 22% OVERHEAD & PROFIT | | | | 81,955 | /MONTH |
| TOTAL MONTHLY COST | | | | 454,476 | |
| TOTAL DAILY COST | | | | 15,149 | |
| DREDGING COSTS | | | | 6,888,340 | |
| MOB/DEMOB | 10 DAYS @ | 25,000 | | 250,000 | |
| TOTAL JOB COST | | | | 7,138,340 | |
| UNIT COST/CY | | | | 2.38 | |
| E&D / S&A | 9 % | | | .21 | |
| CONTINGENCIES | @ 20% | | | .52 | |
| TOTAL UNIT COST | | | | 3.11 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 86,621 | 7,138,340 | 3.11 |
| 1.10 | 105,870 | 7,494,266 | 3.27 |
| 1.25 | 120,307 | 7,761,233 | 3.38 |
| 1.50 | 144,368 | 8,206,147 | 3.58 |
| 1.80 | 173,242 | 8,740,051 | 3.81 |
| 2.00 | 192,491 | 9,095,991 | 3.97 |
| 2.50 | 240,614 | 9,985,836 | 4.35 |
| 3.00 | 288,737 | 10,875,680 | 4.74 |
| 4.00 | 384,982 | 12,655,368 | 5.52 |

COST ESTIMATE 2B5 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY PAY: | 5,000 CY GROSS: | 6,750 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 6 MILES @ 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 19 | HRS |
| RETURN | 6 MILES @ 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 22.71 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .88 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .88 LOADS/DAY | 5,019 | CY/DAY |
| SCOWS REQ | 2 X 5,019 = 10,038CY/D | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | .8 | DAYS |
| LOST TIME | 23% | .2 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 1 | DAYS |
| PLANT COST: DREDGE | | 293,850 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST | .90 /GAL | 211,280 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 653,980 | /MONTH |
| 27% OVERHEAD & PROFIT | | 176,575 | /MONTH |
| TOTAL MONTHLY COST | | 830,555 | |
| TOTAL DAILY COST | | 27,685 | |
| DREDGING COSTS | | 27,685 | |
| MOB/DEMOB | 2 DAYS @ 4,000 | 8,000 | |
| TOTAL JOB COST | | 35,685 | |
| UNIT COST/CY | | 7.14 | |
| E&D / S&A | 9 % | .64 | |
| CONTINGENCIES | @ 20% | 1.56 | |
| TOTAL UNIT COST | | 9.34 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 211,280 | 35,685 | 9.34 |
| 1.10 | 258,231 | 37,673 | 9.86 |
| 1.25 | 293,444 | 39,163 | 10.25 |
| 1.50 | 293,850 | 41,648 | 10.90 |
| 1.80 | 293,850 | 44,629 | 11.68 |
| 2.00 | 469,511 | 46,617 | 12.19 |
| 2.50 | 293,850 | 51,586 | 13.49 |
| 3.00 | 704,266 | 56,555 | 14.79 |
| 4.00 | 939,021 | 66,493 | 17.39 |

COST ESTIMATE 2B10 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY PAY: | 10,000 CY GROSS: | 13,500 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 | HRS |
| LOAD & DUMP | | 19 | HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 22.71 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .88 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .88 LOADS/DAY | | 5,019 | CY/DAY |
| SCOWS REQ 2 X 5,019 = 10,038CY/D | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 1.6 | DAYS |
| LOST TIME 22% | | .4 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 2 | DAYS |
| PLANT COST: DREDGE | | 293,850 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST .90 /GAL | | 211,280 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 653,980 | /MONTH |
| 26% OVERHEAD & PROFIT | | 170,035 | /MONTH |
| TOTAL MONTHLY COST | | 824,015 | |
| TOTAL DAILY COST | | 27,467 | |
| DREDGING COSTS | | 54,934 | |
| MOB/DEMOB 2 DAYS @ 5,000 | | 10,000 | |
| TOTAL JOB COST | | 64,934 | |
| UNIT COST/CY | | 6.49 | |
| E&D / S&A 9 % | | .58 | |
| CONTINGENCIES @ 20% | | 1.42 | |
| TOTAL UNIT COST | | 8.49 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 211,280 | 64,934 | 8.49 |
| 1.10 | 258,231 | 68,878 | 9.01 |
| 1.25 | 293,444 | 71,836 | 9.40 |
| 1.50 | 293,850 | 76,766 | 10.04 |
| 1.80 | 293,850 | 82,682 | 10.81 |
| 2.00 | 469,511 | 86,626 | 11.33 |
| 2.50 | 293,850 | 96,485 | 12.62 |
| 3.00 | 704,266 | 106,345 | 13.91 |
| 4.00 | 939,021 | 126,065 | 16.49 |

COST ESTIMATE 2B20 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY PAY: | 20,000 CY GROSS: | 26,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL | 6 MILES @ 3.00 MPH | 2.00 | HRS |
| LOAD & DUMP | | 19 | HRS |
| RETURN | 6 MILES @ 3.50 MPH | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 22.71 | HRS |
| 20 | WORK HOURS/DAY / CYCLE TIME | .88 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X .88 LOADS/DAY | 5,019 | CY/DAY |
| SCOWS REQ | 2 X 5,019 = 10,038CY/D | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 3 | DAYS |
| LOST TIME | 21% | .6 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 3.6 | DAYS |
| PLANT COST: | DREDGE | 293,850 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST | .90 /GAL | 211,280 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 653,980 | /MONTH |
| 26% OVERHEAD & PROFIT | | 170,035 | /MONTH |
| TOTAL MONTHLY COST | | 824,015 | |
| TOTAL DAILY COST | | 27,467 | |
| DREDGING COSTS | | 98,882 | |
| MOB/DEMOB | 2 DAYS @ 7,500 | 15,000 | |
| TOTAL JOB COST | | 113,882 | |
| UNIT COST/CY | | 5.69 | |
| E&D / S&A | 9 % | .51 | |
| CONTINGENCIES | @ 20% | 1.24 | |
| TOTAL UNIT COST | | 7.45 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 211,280 | 113,882 | 7.45 |
| 1.10 | 258,231 | 120,981 | 7.91 |
| 1.25 | 293,444 | 126,305 | 8.26 |
| 1.50 | 293,850 | 135,179 | 8.84 |
| 1.80 | 293,850 | 145,827 | 9.54 |
| 2.00 | 469,511 | 152,926 | 10.00 |
| 2.50 | 293,850 | 170,674 | 11.16 |
| 3.00 | 704,266 | 188,421 | 12.32 |
| 4.00 | 939,021 | 223,916 | 14.64 |

COST ESTIMATE 2B50 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY PAY: | 50,000 CY GROSS: | 65,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 | HRS |
| LOAD & DUMP | | 19 | HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 22.71 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .88 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .88 LOADS/DAY | | 5,019 | CY/DAY |
| SCOWS REQ 2 X 5,019 = 10,038CY/D | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 7.5 | DAYS |
| LOST TIME 21% | | 1.6 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 9.1 | DAYS |
| PLANT COST: DREDGE | | 293,850 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST .90 /GAL | | 211,280 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 653,980 | /MONTH |
| 26% OVERHEAD & PROFIT | | 170,035 | /MONTH |
| TOTAL MONTHLY COST | | 824,015 | |
| TOTAL DAILY COST | | 27,467 | |
| DREDGING COSTS | | 249,951 | |
| MOB/DEMOB 3 DAYS @ 10,000 | | 30,000 | |
| TOTAL JOB COST | | 279,951 | |
| UNIT COST/CY | | 5.60 | |
| E&D / S&A 9 % | | .50 | |
| CONTINGENCIES @ 20% | | 1.22 | |
| TOTAL UNIT COST | | 7.32 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 211,280 | 279,951 | 7.32 |
| 1.10 | 258,231 | 297,896 | 7.79 |
| 1.25 | 293,444 | 311,354 | 8.15 |
| 1.50 | 293,850 | 333,785 | 8.73 |
| 1.80 | 293,850 | 360,702 | 9.44 |
| 2.00 | 469,511 | 378,647 | 9.91 |
| 2.50 | 293,850 | 423,509 | 11.08 |
| 3.00 | 704,266 | 468,370 | 12.25 |
| 4.00 | 939,021 | 558,094 | 14.60 |

COST ESTIMATE 2B75 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY | PAY: 75,000 CY | GROSS: | 93,750 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 6 MILES @ | 3.00 MPH | 2.00 HRS |
| LOAD & DUMP | | | 14 HRS |
| RETURN | 6 MILES @ | 3.50 MPH | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 17.71 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | 1.13 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | 1.13 LOADS/DAY | 6,435 CY/DAY |
| SCOWS REQ | 2 X 6,435 | = 12,871CY/D | 2 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 7.3 DAYS |
| LOST TIME | 20% | | 1.5 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 8.8 DAYS |
| PLANT COST: DREDGE | | | 301,000 /MONTH |
| REHANDLER | | | 46,800 /MONTH |
| FUEL COST | .90 /GAL | | 216,477 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 672,177 /MONTH |
| 25% OVERHEAD & PROFIT | | | 168,044 /MONTH |
| TOTAL MONTHLY COST | | | 840,221 |
| TOTAL DAILY COST | | | 28,007 |
| DREDGING COSTS | | | 246,465 |
| MOB/DEMOB | 4 | DAYS @ 20,000 | 80,000 |
| TOTAL JOB COST | | | 326,465 |
| UNIT COST/CY | | | 4.35 |
| E&D / S&A | 9 % | | .39 |
| CONTINGENCIES | @ 20% | | .95 |
| TOTAL UNIT COST | | | 5.69 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 326,465 | 5.69 |
| 1.10 | 264,583 | 344,104 | 6.00 |
| 1.25 | 300,663 | 357,333 | 6.23 |
| 1.50 | 360,795 | 379,382 | 6.62 |
| 1.80 | 432,954 | 405,840 | 7.08 |
| 2.00 | 481,060 | 423,479 | 7.39 |
| 2.50 | 601,325 | 467,576 | 8.15 |
| 3.00 | 721,590 | 511,673 | 8.92 |
| 4.00 | 962,120 | 599,867 | 10.46 |

COST ESTIMATE 2B100 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY PAY: | 100,000 CY GROSS: | 125,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 | HRS |
| LOAD & DUMP | | 14 | HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 17.71 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | 1.13 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X 1.13 LOADS/DAY | | 6,435 | CY/DAY |
| SCOWS REQ 2 X 6,435 = 12,871CY/D | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 9.7 | DAYS |
| LOST TIME 20% | | 1.9 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 11.6 | DAYS |
| PLANT COST: DREDGE | | 301,000 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST .90 /GAL | | 216,477 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 672,177 | /MONTH |
| 25% OVERHEAD & PROFIT | | 168,044 | /MONTH |
| TOTAL MONTHLY COST | | 840,221 | |
| TOTAL DAILY COST | | 28,007 | |
| DREDGING COSTS | | 324,885 | |
| MOB/DEMOB 4 DAYS @ 20,000 | | 80,000 | |
| TOTAL JOB COST | | 404,885 | |
| UNIT COST/CY | | 4.05 | |
| E&D / S&A 9 % | | .36 | |
| CONTINGENCIES @ 20% | | .88 | |
| TOTAL UNIT COST | | 5.30 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 404,885 | 5.30 |
| 1.10 | 264,583 | 428,137 | 5.60 |
| 1.25 | 300,663 | 445,575 | 5.83 |
| 1.50 | 360,795 | 474,639 | 6.21 |
| 1.80 | 432,954 | 509,516 | 6.66 |
| 2.00 | 481,060 | 532,767 | 6.97 |
| 2.50 | 601,325 | 590,895 | 7.73 |
| 3.00 | 721,590 | 649,024 | 8.49 |
| 4.00 | 962,120 | 765,280 | 10.01 |

COST ESTIMATE 2B250 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY PAY: | 250,000 CY GROSS: | 312,500 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 | HRS |
| LOAD & DUMP | | 14 | HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 17.71 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | 1.13 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X 1.13 LOADS/DAY | | 6,435 | CY/DAY |
| SCOWS REQ 2 X 6,435 = 12,871CY/D | | 2 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 24.3 | DAYS |
| LOST TIME 20% | | 4.9 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 29.2 | DAYS |
| PLANT COST: DREDGE | | 301,000 | /MONTH |
| REHANDLER | | 46,800 | /MONTH |
| FUEL COST .90 /GAL | | 216,477 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 672,177 | /MONTH |
| 25% OVERHEAD & PROFIT | | 168,044 | /MONTH |
| TOTAL MONTHLY COST | | 840,221 | |
| TOTAL DAILY COST | | 28,007 | |
| DREDGING COSTS | | 817,815 | |
| MOB/DEMOB 6 DAYS @ 25,000 | | 150,000 | |
| TOTAL JOB COST | | 967,815 | |
| UNIT COST/CY | | 3.87 | |
| E&D / S&A 9 % | | .35 | |
| CONTINGENCIES @ 20% | | .84 | |
| TOTAL UNIT COST | | 5.06 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 967,815 | 5.06 |
| 1.10 | 264,583 | 1,026,345 | 5.37 |
| 1.25 | 300,663 | 1,070,241 | 5.60 |
| 1.50 | 360,795 | 1,143,402 | 5.98 |
| 1.80 | 432,954 | 1,231,196 | 6.44 |
| 2.00 | 481,060 | 1,289,725 | 6.75 |
| 2.50 | 601,325 | 1,436,047 | 7.51 |
| 3.00 | 721,590 | 1,582,370 | 8.28 |
| 4.00 | 962,120 | 1,875,014 | 9.81 |

COST ESTIMATE 2B500 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY | PAY: 500,000 CY | GROSS: | 625,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X 65 %) | | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 6 MILES @ 3.00 MPH | | 2.00 HRS |
| LOAD & DUMP | | | 14 HRS |
| RETURN | 6 MILES @ 3.50 MPH | | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 17.71 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | 1.13 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | 1.13 LOADS/DAY | 6,435 CY/DAY |
| SCOWS REQ | 2 X 6,435 = | 12,871CY/D | 2 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 48.6 DAYS |
| LOST TIME | 20% | | 9.7 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 58.3 DAYS |
| PLANT COST: | DREDGE | | 301,000 /MONTH |
| REHANDLER | | | 46,800 /MONTH |
| FUEL COST | .90 /GAL | | 216,477 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 672,177 /MONTH |
| 25% OVERHEAD & PROFIT | | | 168,044 /MONTH |
| TOTAL MONTHLY COST | | | 840,221 |
| TOTAL DAILY COST | | | 28,007 |
| DREDGING COSTS | | | 1,632,829 |
| MOB/DEMOB | 10 DAYS @ 25,000 | | 250,000 |
| TOTAL JOB COST | | | 1,882,829 |
| UNIT COST/CY | | | 3.77 |
| E&D / S&A | 9 % | | .34 |
| CONTINGENCIES | @ 20% | | .82 |
| TOTAL UNIT COST | | | 4.93 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 1,882,829 | 4.93 |
| 1.10 | 264,583 | 1,999,688 | 5.23 |
| 1.25 | 300,663 | 2,087,331 | 5.46 |
| 1.50 | 360,795 | 2,233,403 | 5.84 |
| 1.80 | 432,954 | 2,408,690 | 6.30 |
| 2.00 | 481,060 | 2,525,546 | 6.61 |
| 2.50 | 601,325 | 2,817,689 | 7.37 |
| 3.00 | 721,590 | 3,109,835 | 8.14 |
| 4.00 | 962,120 | 3,694,121 | 9.66 |

COST ESTIMATE 2B1000 BUCKET DREDGE

| | | |
|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | |
| QUANTITY PAY: | 1,000,000 CY GROSS: | 1,250,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | 1.2 MIN. |
| CYCLES/HR | | 50 EA |
| CY/HR | | 810 CY/HR |
| EFFICIENCY FACTOR (24HRS X 70 %) | | 17 HRS/DAY |
| CY/DAY | | 13,770 CY |
| NUMBER SCOWS PER TOW | | 2 EA |
| HAUL 6 MILES @ 3.00 MPH | | 2.00 HRS |
| LOAD & DUMP | | 14 HRS |
| RETURN 6 MILES @ 3.50 MPH | | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | 17.71 HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | 1.13 LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS 5,700 CY/TRIP X 1.13 LOADS/DAY | | 6,435 CY/DAY |
| SCOWS REQ 2 X 6,435 = 12,871CY/D | | 2 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 97.1 DAYS |
| LOST TIME 19% | | 18.4 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 115.5 DAYS |
| PLANT COST: DREDGE | | 301,000 /MONTH |
| REHANDLER | | 46,800 /MONTH |
| FUEL COST .90 /GAL | | 216,477 /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 /MONTH |
| LABOR COST | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | 672,177 /MONTH |
| 24% OVERHEAD & PROFIT | | 161,322 /MONTH |
| TOTAL MONTHLY COST | | 833,499 |
| TOTAL DAILY COST | | 27,783 |
| DREDGING COSTS | | 3,208,971 |
| MOB/DEMOB 10 DAYS @ 25,000 | | 250,000 |
| TOTAL JOB COST | | 3,458,971 |
| UNIT COST/CY | | 3.46 |
| E&D / S&A 9 % | | .31 |
| CONTINGENCIES @ 20% | | .75 |
| TOTAL UNIT COST | | 4.52 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 3,458,971 | 4.52 |
| 1.10 | 264,583 | 3,688,631 | 4.82 |
| 1.25 | 300,663 | 3,860,875 | 5.05 |
| 1.50 | 360,795 | 4,147,948 | 5.43 |
| 1.80 | 432,954 | 4,492,434 | 5.88 |
| 2.00 | 481,060 | 4,722,091 | 6.18 |
| 2.50 | 601,325 | 5,296,237 | 6.93 |
| 3.00 | 721,590 | 5,870,384 | 7.68 |
| 4.00 | 962,120 | 7,018,673 | 9.18 |

COST ESTIMATE 2B3000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | INTO CRANEY ISLAND BY BARGE REHANDLER | | |
| QUANTITY | PAY: 3,000,000 CY | GROSS: | 3,750,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 70 %) | 17 HRS/DAY |
| CY/DAY | | | 13,770 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 6 MILES @ | 3.00 MPH | 2.00 HRS |
| LOAD & DUMP | | | 14 HRS |
| RETURN | 6 MILES @ | 3.50 MPH | 1.71 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 17.71 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | 1.13 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | 1.13 LOADS/DAY | 6,435 CY/DAY |
| SCOWS REQ | 2 X 6,435 | = 12,871CY/D | 2 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 291.4 DAYS |
| LOST TIME | 18% | | 52.5 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 343.9 DAYS |
| PLANT COST: DREDGE | | | 301,000 /MONTH |
| REHANDLER | | | 46,800 /MONTH |
| FUEL COST | .90 /GAL | | 216,477 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 672,177 /MONTH |
| 22% OVERHEAD & PROFIT | | | 147,879 /MONTH |
| TOTAL MONTHLY COST | | | 820,056 |
| TOTAL DAILY COST | | | 27,335 |
| DREDGING COSTS | | | 9,400,575 |
| MOB/DEMOB | 10 | DAYS @ 25,000 | 250,000 |
| TOTAL JOB COST | | | 9,650,575 |
| UNIT COST/CY | | | 3.22 |
| E&D / S&A | 9 % | | .29 |
| CONTINGENCIES | @ 20% | | .70 |
| TOTAL UNIT COST | | | 4.21 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 216,477 | 9,650,575 | 4.21 |
| 1.10 | 264,583 | 10,323,347 | 4.50 |
| 1.25 | 300,663 | 10,827,934 | 4.72 |
| 1.50 | 360,795 | 11,668,901 | 5.09 |
| 1.80 | 432,954 | 12,678,065 | 5.53 |
| 2.00 | 481,060 | 13,350,836 | 5.82 |
| 2.50 | 601,325 | 15,032,782 | 6.55 |
| 3.00 | 721,590 | 16,714,717 | 7.29 |
| 4.00 | 962,120 | 20,078,586 | 8.75 |

COST ESTIMATE 2C5 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | | 37 | |
| QUANTITY PAY: | 5,000 CY | GROSS: | 6,750 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | .90 | 10 CY |
| CYCLE TIME (MINUTES): | | | 1 MIN. |
| CYCLES/HR | | | 60 EA |
| CY/HR | | | 540 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 8,640 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 37 MILES @ | 3.00 MPH | 12.33 HRS |
| LOAD & DUMP | | | 12 HRS |
| RETURN | 37 MILES @ | 3.50 MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 34.90 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .57 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .57LOADS/DAY | 3,266 CY/DAY |
| SCOWS REQ | | | 3 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | .8 DAYS |
| LOST TIME | 23% | | .2 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 1 DAYS |
| PLANT COST | | | 416,850 /MONTH |
| FUEL COST | | .90 /GAL | 174,708 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 39,150 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 693,608 /MONTH |
| 27% OVERHEAD & PROFIT | | | 187,274 /MONTH |
| TOTAL MONTHLY COST | | | 880,882 |
| TOTAL DAILY COST | | | 29,363 |
| DREDGING COSTS | | | 29,363 |
| MOB/DEMOB | 2 DAYS @ | 4,000 | 8,000 |
| TOTAL JOB COST | | | 37,363 |
| UNIT COST/CY | | | 7.47 |
| E&D / S&A | 9 % | | .67 |
| CONTINGENCIES | @ | 20% | 1.63 |
| TOTAL UNIT COST | | | 9.77 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 174,708 | 37,363 | 9.77 |
| 1.10 | 213,532 | 39,006 | 10.20 |
| 1.25 | 242,650 | 40,239 | 10.53 |
| 1.50 | 291,180 | 42,293 | 11.06 |
| 1.80 | 349,416 | 44,759 | 11.71 |
| 2.00 | 388,240 | 46,402 | 12.14 |
| 2.50 | 485,299 | 50,511 | 13.21 |
| 3.00 | 582,359 | 54,620 | 14.29 |
| 4.00 | 776,479 | 62,838 | 16.44 |

COST ESTIMATE 2C10 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 10,000 CY GROSS: | 13,500 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 %) | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 37 MILES @ | 3.00 MPH | 12.33 | HRS |
| LOAD & DUMP | | 12 | HRS |
| RETURN 37 MILES @ | 3.50 MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 34.90 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | .57 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | .57LOADS/DAY | 3,266 | CY/DAY |
| SCOWS REQ | | 3 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 1.6 | DAYS |
| LOST TIME 22% | | .4 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 2 | DAYS |
| PLANT COST | | 416,850 | /MONTH |
| FUEL COST | .90 /GAL | 174,708 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 693,608 | /MONTH |
| 26% OVERHEAD & PROFIT | | 180,338 | /MONTH |
| TOTAL MONTHLY COST | | 873,946 | |
| TOTAL DAILY COST | | 29,132 | |
| DREDGING COSTS | | 58,263 | |
| MOB/DEMOB 2 DAYS @ | 5,000 | 10,000 | |
| TOTAL JOB COST | | 68,263 | |
| UNIT COST/CY | | 6.83 | |
| E&D / S&A 9 % | | .61 | |
| CONTINGENCIES @ | 20% | 1.49 | |
| TOTAL UNIT COST | | 8.93 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 174,708 | 68,263 | 8.93 |
| 1.10 | 213,532 | 71,524 | 9.36 |
| 1.25 | 242,650 | 73,970 | 9.68 |
| 1.50 | 291,180 | 78,047 | 10.21 |
| 1.80 | 349,416 | 82,939 | 10.85 |
| 2.00 | 388,240 | 86,200 | 11.27 |
| 2.50 | 485,299 | 94,353 | 12.34 |
| 3.00 | 582,359 | 102,506 | 13.41 |
| 4.00 | 776,479 | 118,812 | 15.54 |

COST ESTIMATE 2C20 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 20,000 CY | GROSS: | 26,000 CY |
| BUCKET TYPE DREDGE CAPACITY: | LOAD FACTOR = | .90 | 10 CY |
| CYCLE TIME (MINUTES): | | | 1 MIN. |
| CYCLES/HR | | | 60 EA |
| CY/HR | | | 540 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 8,640 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 37 MILES @ | 3.00 MPH | 12.33 HRS |
| LOAD & DUMP | | | 12 HRS |
| RETURN | 37 MILES @ | 3.50 MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 34.90 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .57 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .57LOADS/DAY | 3,266 CY/DAY |
| SCOWS REQ | | | 3 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 3 DAYS |
| LOST TIME | 21% | | .6 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 3.6 DAYS |
| PLANT COST | | | 416,850 /MONTH |
| FUEL COST | .90 /GAL | | 174,708 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 39,150 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 693,608 /MONTH |
| 26% OVERHEAD & PROFIT | | | 180,338 /MONTH |
| TOTAL MONTHLY COST | | | 873,946 |
| TOTAL DAILY COST | | | 29,132 |
| DREDGING COSTS | | | 104,873 |
| MOB/DEMOB | 2 DAYS @ | 7,500 | 15,000 |
| TOTAL JOB COST | | | 119,873 |
| UNIT COST/CY | | | 5.99 |
| E&D / S&A | 9 % | | .54 |
| CONTINGENCIES | @ 20% | | 1.31 |
| TOTAL UNIT COST | | | 7.84 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUI BUDGET |
|---|---|---|---|
| .90 | 174,708 | 119,873 | 7.84 |
| 1.10 | 213,532 | 125,744 | 8.22 |
| 1.25 | 242,650 | 130,146 | 8.51 |
| 1.50 | 291,180 | 137,484 | 8.99 |
| 1.80 | 349,416 | 146,289 | 9.57 |
| 2.00 | 388,240 | 152,159 | 9.95 |
| 2.50 | 485,299 | 166,835 | 10.91 |
| 3.00 | 582,359 | 181,510 | 11.87 |
| 4.00 | 776,479 | 210,861 | 13.79 |

COST ESTIMATE 2C50 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DAM NECK | | | | |
| HAUL DISTANCE (MILES): | | | 37 | | |
| QUANTITY | PAY: | 50,000 | CY | GROSS: | 65,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | | .90 | 10 CY |
| CYCLE TIME (MINUTES): | | | | | 1 MIN. |
| CYCLES/HR | | | | | 60 EA |
| CY/HR | | | | | 540 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | 65 | %) | 16 HRS/DAY |
| CY/DAY | | | | | 8,640 CY |
| NUMBER SCOWS PER TOW | | | | | 2 EA |
| HAUL | 37 | MILES @ | 3.00 | MPH | 12.33 HRS |
| LOAD & DUMP | | | | | 12 HRS |
| RETURN | 37 | MILES @ | 3.50 | MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 34.90 HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | .57 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | .57LOADS/DAY | | 3,266 CY/DAY |
| SCOWS REQ | | | | | 3 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | | 7.5 DAYS |
| LOST TIME | 21% | | | | 1.6 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | | 9.1 DAYS |
| PLANT COST | | | | | 416,850 /MONTH |
| FUEL COST | | | .90 | /GAL | 174,708 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | | 39,150 /MONTH |
| LABOR COST | | | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | | 693,608 /MONTH |
| 26% OVERHEAD & PROFIT | | | | | 180,338 /MONTH |
| TOTAL MONTHLY COST | | | | | 873,946 |
| TOTAL DAILY COST | | | | | 29,132 |
| DREDGING COSTS | | | | | 265,097 |
| MOB/DEMOB | 3 | DAYS @ | 10,000 | | 30,000 |
| TOTAL JOB COST | | | | | 295,097 |
| UNIT COST/CY | | | | | 5.90 |
| E&D / S&A | 9 | % | | | .53 |
| CONTINGENCIES | @ | 20% | | | 1.29 |
| TOTAL UNIT COST | | | | | 7.72 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 174,708 | 295,097 | 7.72 |
| 1.10 | 213,532 | 309,935 | 8.11 |
| 1.25 | 242,650 | 321,064 | 8.40 |
| 1.50 | 291,180 | 339,613 | 8.88 |
| 1.80 | 349,416 | 361,870 | 9.47 |
| 2.00 | 388,240 | 376,709 | 9.85 |
| 2.50 | 485,299 | 413,805 | 10.83 |
| 3.00 | 582,359 | 450,901 | 11.80 |
| 4.00 | 776,479 | 525,094 | 13.74 |

COST ESTIMATE 2C75 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | | 37 | |
| QUANTITY PAY: | 75,000 CY | GROSS: | 93,750 CY |
| BUCKET TYPE DREDGE CAPACITY: | | LOAD FACTOR = .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 37 MILES @ | 3.00 MPH | 12.33 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 37 MILES @ | 3.50 MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 30.90 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .65 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .65LOADS/DAY | 3,689 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 7.2 DAYS |
| LOST TIME | 20% | | 1.4 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 8.6 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 315,852 |
| MOB/DEMOB | 4 DAYS @ | 20,000 | 80,000 |
| TOTAL JOB COST | | | 395,852 |
| UNIT COST/CY | | | 5.28 |
| E&D / S&A | 9 % | | .48 |
| CONTINGENCIES | @ 20% | | 1.15 |
| TOTAL UNIT COST | | | 6.90 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 395,852 | 6.90 |
| 1.10 | 276,891 | 413,892 | 7.22 |
| 1.25 | 314,649 | 427,422 | 7.45 |
| 1.50 | 377,579 | 449,972 | 7.85 |
| 1.80 | 453,094 | 477,031 | 8.32 |
| 2.00 | 503,438 | 495,071 | 8.63 |
| 2.50 | 629,298 | 540,171 | 9.42 |
| 3.00 | 755,157 | 585,270 | 10.21 |
| 4.00 | 1,006,876 | 675,470 | 11.78 |

COST ESTIMATE 2C100 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DAM NECK | | | | |
| HAUL DISTANCE (MILES): | | | 37 | | |
| QUANTITY | PAY: | 100,000 | CY | GROSS: | 125,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | | .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | | | 1.2 MIN. |
| CYCLES/HR | | | | | 50 EA |
| CY/HR | | | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | 65 | %) | 16 HRS/DAY |
| CY/DAY | | | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | | | 2 EA |
| HAUL | 37 | MILES @ | 3.00 | MPH | 12.33 HRS |
| LOAD & DUMP | | | | | 8 HRS |
| RETURN | 37 | MILES @ | 3.50 | MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 30.90 HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | .65 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | .65LOADS/DAY | | 3,689 CY/DAY |
| SCOWS REQ | | | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | | 9.6 DAYS |
| LOST TIME | 20% | | | | 1.9 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | | 11.5 DAYS |
| PLANT COST | | | | | 547,000 /MONTH |
| FUEL COST | | | .90 | /GAL | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | | 45,000 /MONTH |
| LABOR COST | | | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | | | 1,101,809 |
| TOTAL DAILY COST | | | | | 36,727 |
| DREDGING COSTS | | | | | 422,360 |
| MOB/DEMOB | 4 | DAYS @ | 20,000 | | 80,000 |
| TOTAL JOB COST | | | | | 502,360 |
| UNIT COST/CY | | | | | 5.02 |
| E&D / S&A | 9 | % | | | .45 |
| CONTINGENCIES | @ | 20% | | | 1.10 |
| TOTAL UNIT COST | | | | | 6.57 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 502,360 | 6.57 |
| 1.10 | 276,891 | 526,483 | 6.89 |
| 1.25 | 314,649 | 544,575 | 7.12 |
| 1.50 | 377,579 | 574,729 | 7.52 |
| 1.80 | 453,094 | 610,914 | 7.99 |
| 2.00 | 503,438 | 635,037 | 8.31 |
| 2.50 | 629,298 | 695,344 | 9.10 |
| 3.00 | 755,157 | 755,652 | 9.88 |
| 4.00 | 1,006,876 | 876,268 | 11.46 |

COST ESTIMATE 2C250 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | | 37 | |
| QUANTITY PAY: | 250,000 CY | GROSS: | 312,500 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 37 MILES @ | 3.00 MPH | 12.33 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 37 MILES @ | 3.50 MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 30.90 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .65 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .65LOADS/DAY | 3,689 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 24.1 DAYS |
| LOST TIME | 20% | | 4.8 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 28.9 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | | .90 /GAL | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 1,061,409 |
| MOB/DEMOB | 6 DAYS @ | 25,000 | 150,000 |
| TOTAL JOB COST | | | 1,211,409 |
| UNIT COST/CY | | | 4.85 |
| E&D / S&A | 9 % | | .44 |
| CONTINGENCIES | @ | 20% | 1.06 |
| TOTAL UNIT COST | | | 6.34 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 1,211,409 | 6.34 |
| 1.10 | 276,891 | 1,272,032 | 6.66 |
| 1.25 | 314,649 | 1,317,498 | 6.89 |
| 1.50 | 377,579 | 1,393,277 | 7.29 |
| 1.80 | 453,094 | 1,484,210 | 7.77 |
| 2.00 | 503,438 | 1,544,832 | 8.08 |
| 2.50 | 629,298 | 1,696,387 | 8.88 |
| 3.00 | 755,157 | 1,847,943 | 9.67 |
| 4.00 | 1,006,876 | 2,151,055 | 11.25 |

COST ESTIMATE 2C500 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | DAM NECK | | |
| HAUL DISTANCE (MILES): | 37 | | |
| QUANTITY PAY: | 500,000 CY GROSS: | 625,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | 1.2 | MIN. |
| CYCLES/HR | | 50 | EA |
| CY/HR | | 810 | CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 %) | 16 | HRS/DAY |
| CY/DAY | | 12,960 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 37 MILES @ | 3.00 MPH | 12.33 | HRS |
| LOAD & DUMP | | 8 | HRS |
| RETURN 37 MILES @ | 3.50 MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 30.90 | HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | .65 | LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X | .65LOADS/DAY | 3,689 | CY/DAY |
| SCOWS REQ | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 48.2 | DAYS |
| LOST TIME 20% | | 9.6 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 57.8 | DAYS |
| PLANT COST | | 547,000 | /MONTH |
| FUEL COST | .90 /GAL | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 45,000 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 881,447 | /MONTH |
| 25% OVERHEAD & PROFIT | | 220,362 | /MONTH |
| TOTAL MONTHLY COST | | 1,101,809 | |
| TOTAL DAILY COST | | 36,727 | |
| DREDGING COSTS | | 2,122,819 | |
| MOB/DEMOB 10 DAYS @ | 25,000 | 250,000 | |
| TOTAL JOB COST | | 2,372,819 | |
| UNIT COST/CY | | 4.75 | |
| E&D / S&A 9 % | | .43 | |
| CONTINGENCIES @ | 20% | 1.03 | |
| TOTAL UNIT COST | | 6.21 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 2,372,819 | 6.21 |
| 1.10 | 276,891 | 2,494,064 | 6.52 |
| 1.25 | 314,649 | 2,584,996 | 6.76 |
| 1.50 | 377,579 | 2,736,553 | 7.16 |
| 1.80 | 453,094 | 2,918,420 | 7.63 |
| 2.00 | 503,438 | 3,039,665 | 7.95 |
| 2.50 | 629,298 | 3,342,775 | 8.74 |
| 3.00 | 755,157 | 3,645,887 | 9.54 |
| 4.00 | 1,006,876 | 4,252,111 | 11.12 |

COST ESTIMATE 2C1000 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DAM NECK | | | | |
| HAUL DISTANCE (MILES): | | | 37 | | |
| QUANTITY | PAY: 1,000,000 | CY | GROSS: | 1,250,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | .90 | 18 | CY |
| CYCLE TIME (MINUTES): | | | | 1.2 | MIN. |
| CYCLES/HR | | | | 50 | EA |
| CY/HR | | | | 810 | CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | 70 | 17 | HRS/DAY |
| CY/DAY | | | | 13,770 | CY |
| NUMBER SCOWS PER TOW | | | | 2 | EA |
| HAUL | 37 | MILES @ | 3.00 MPH | 12.33 | HRS |
| LOAD & DUMP | | | | 8 | HRS |
| RETURN | 37 | MILES @ | 3.50 MPH | 10.57 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | 30.90 | HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | | .65 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | .65LOADS/DAY | 3,689 | CY/DAY |
| SCOWS REQ | | | | 4 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | 90.8 | DAYS |
| LOST TIME | 19% | | | 17.3 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | 108.1 | DAYS |
| PLANT COST | | | | 547,000 | /MONTH |
| FUEL COST | | .90 /GAL | | 226,547 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | 45,000 | /MONTH |
| LABOR COST | | | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | 881,447 | /MONTH |
| 24% OVERHEAD & PROFIT | | | | 211,547 | /MONTH |
| TOTAL MONTHLY COST | | | | 1,092,994 | |
| TOTAL DAILY COST | | | | 36,433 | |
| DREDGING COSTS | | | | 3,938,422 | |
| MOB/DEMOB | 10 | DAYS @ | 25,000 | 250,000 | |
| TOTAL JOB COST | | | | 4,188,422 | |
| UNIT COST/CY | | | | 4.19 | |
| E&D / S&A | 9 | % | | .38 | |
| CONTINGENCIES | @ | 20% | | .91 | |
| TOTAL UNIT COST | | | | 5.48 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 4,188,422 | 5.48 |
| 1.10 | 276,891 | 4,413,367 | 5.77 |
| 1.25 | 314,649 | 4,582,074 | 5.99 |
| 1.50 | 377,579 | 4,863,252 | 6.36 |
| 1.80 | 453,094 | 5,200,667 | 6.80 |
| 2.00 | 503,438 | 5,425,608 | 7.10 |
| 2.50 | 629,298 | 5,987,964 | 7.83 |
| 3.00 | 755,157 | 6,550,324 | 8.57 |
| 4.00 | 1,006,876 | 7,675,036 | 10.04 |

COST ESTIMATE 2C3000 BUCKET DREDGE

| | | | | | |
|---|---|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | DAM NECK | | | | |
| HAUL DISTANCE (MILES): | | | 37 | | |
| QUANTITY | PAY: | 3,000,000 | CY | GROSS: | 3,750,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | | | | .90 | 18 CY |
| CYCLE TIME (MINUTES): | | | | | 1.2 MIN. |
| CYCLES/HR | | | | | 50 EA |
| CY/HR | | | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | | | 70 | %) 17 HRS/DAY |
| CY/DAY | | | | | 13,770 CY |
| NUMBER SCOWS PER TOW | | | | | 2 EA |
| HAUL | 37 | MILES @ | 3.00 | MPH | 12.33 HRS |
| LOAD & DUMP | | | | | 8 HRS |
| RETURN | 37 | MILES @ | 3.50 | MPH | 10.57 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 30.90 HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | .65 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | .65LOADS/DAY | | 3,689 CY/DAY |
| SCOWS REQ | | | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | | 272.3 DAYS |
| LOST TIME | 18% | | | | 49 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | | 321.3 DAYS |
| PLANT COST | | | | | 547,000 /MONTH |
| FUEL COST | | | .90 | /GAL | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | | 45,000 /MONTH |
| LABOR COST | | | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | | 881,447 /MONTH |
| 22% OVERHEAD & PROFIT | | | | | 193,918 /MONTH |
| TOTAL MONTHLY COST | | | | | 1,075,365 |
| TOTAL DAILY COST | | | | | 35,846 |
| DREDGING COSTS | | | | | 11,517,160 |
| MOB/DEMOB | 10 | DAYS @ | 25,000 | | 250,000 |
| TOTAL JOB COST | | | | | 11,767,160 |
| UNIT COST/CY | | | | | 3.92 |
| E&D / S&A | 9 | % | | | .35 |
| CONTINGENCIES | @ | | 20% | | .86 |
| TOTAL UNIT COST | | | | | 5.13 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 11,767,160 | 5.13 |
| 1.10 | 276,891 | 12,424,966 | 5.42 |
| 1.25 | 314,649 | 12,918,321 | 5.63 |
| 1.50 | 377,579 | 13,740,568 | 5.99 |
| 1.80 | 453,094 | 14,727,277 | 6.42 |
| 2.00 | 503,438 | 15,385,072 | 6.71 |
| 2.50 | 629,298 | 17,029,577 | 7.42 |
| 3.00 | 755,157 | 18,674,092 | 8.14 |
| 4.00 | 1,006,876 | 21,963,101 | 9.58 |

COST ESTIMATE 2D5 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 5,000 CY | GROSS: | 6,750 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 10 CY |
| CYCLE TIME (MINUTES): | | | 1 MIN. |
| CYCLES/HR | | | 60 EA |
| CY/HR | | | 540 CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 | %) | 16 HRS/DAY |
| CY/DAY | | | 8,640 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL 45 MILES @ | 3.00 MPH | | 15.00 HRS |
| LOAD & DUMP | | | 12 HRS |
| RETURN 45 MILES @ | 3.50 MPH | | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 39.86 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | .50 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS 5,700 CY/TRIP X | .50LOADS/DAY | | 2,860 CY/DAY |
| SCOWS REQ | | | 3 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | .8 DAYS |
| LOST TIME 23% | | | .3 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 1.1 DAYS |
| PLANT COST | | | 416,850 /MONTH |
| FUEL COST | .90 /GAL | | 174,708 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 39,150 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 693,608 /MONTH |
| 27% OVERHEAD & PROFIT | | | 187,274 /MONTH |
| TOTAL MONTHLY COST | | | 880,882 |
| TOTAL DAILY COST | | | 29,363 |
| DREDGING COSTS | | | 32,299 |
| MOB/DEMOB 2 DAYS @ | 4,000 | | 8,000 |
| TOTAL JOB COST | | | 40,299 |
| UNIT COST/CY | | | 8.06 |
| E&D / S&A 9 % | | | .73 |
| CONTINGENCIES @ | 20% | | 1.76 |
| TOTAL UNIT COST | | | 10.54 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 174,708 | 40,299 | 10.54 |
| 1.10 | 213,532 | 42,107 | 11.02 |
| 1.25 | 242,650 | 43,463 | 11.37 |
| 1.50 | 291,180 | 45,723 | 11.96 |
| 1.80 | 349,416 | 48,435 | 12.67 |
| 2.00 | 388,240 | 50,242 | 13.14 |
| 2.50 | 485,299 | 54,762 | 14.33 |
| 3.00 | 582,359 | 59,282 | 15.51 |
| 4.00 | 776,479 | 68,321 | 17.87 |

COST ESTIMATE 2D10 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 10,000 CY GROSS: | 13,500 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | 10 | CY |
| CYCLE TIME (MINUTES): | | 1 | MIN. |
| CYCLES/HR | | 60 | EA |
| CY/HR | | 540 | CY/HR |
| EFFICIENCY FACTOR (24HRS X 65 %) | | 16 | HRS/DAY |
| CY/DAY | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | 2 | EA |
| HAUL 45 MILES @ 3.00 MPH | | 15.00 | HRS |
| LOAD & DUMP | | 12 | HRS |
| RETURN 45 MILES @ 3.50 MPH | | 12.86 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | 39.86 | HRS |
| 20 WORK HOURS/DAY / CYCLE TIME | | .50 | LOADS/DAY |
| 2 3000 CY SCOWS @ 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS 5,700 CY/TRIP X .50LOADS/DAY | | 2,860 | CY/DAY |
| SCOWS REQ | | 3 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | 1.6 | DAYS |
| LOST TIME 22% | | .5 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | 2.1 | DAYS |
| PLANT COST | | 416,850 | /MONTH |
| FUEL COST .90 /GAL | | 174,708 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | 39,150 | /MONTH |
| LABOR COST | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | 693,608 | /MONTH |
| 26% OVERHEAD & PROFIT | | 180,338 | /MONTH |
| TOTAL MONTHLY COST | | 873,946 | |
| TOTAL DAILY COST | | 29,132 | |
| DREDGING COSTS | | 61,176 | |
| MOB/DEMOB 2 DAYS @ 5,000 | | 10,000 | |
| TOTAL JOB COST | | 71,176 | |
| UNIT COST/CY | | 7.12 | |
| E&D / S&A 9 % | | .64 | |
| CONTINGENCIES @ 20% | | 1.55 | |
| TOTAL UNIT COST | | 9.31 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 174,708 | 71,176 | 9.31 |
| 1.10 | 213,532 | 74,600 | 9.76 |
| 1.25 | 242,650 | 77,169 | 10.09 |
| 1.50 | 291,180 | 81,449 | 10.65 |
| 1.80 | 349,416 | 86,585 | 11.33 |
| 2.00 | 388,240 | 90,010 | 11.77 |
| 2.50 | 485,299 | 98,570 | 12.89 |
| 3.00 | 582,359 | 107,131 | 14.01 |
| 4.00 | 776,479 | 124,252 | 16.25 |

COST ESTIMATE 2D20 BUCKET DREDGE

| | | | | | | |
|---|---|---|---|---|---|---|
| PLANT: | | 10 CY BUCKET DREDGE | | | | |
| CHANNEL SEGMENT: | | NORFOLK HARBOR | | | | |
| DISPOSAL AREA: | | NORFOLK | | | | |
| HAUL DISTANCE (MILES): | | | 45 | | | |
| QUANTITY | PAY: | 20,000 | CY | GROSS: | 26,000 | CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = .90 | | | | | 10 | CY |
| CYCLE TIME (MINUTES): | | | | | 1 | MIN. |
| CYCLES/HR | | | | | 60 | EA |
| CY/HR | | | | | 540 | CY/HR |
| EFFICIENCY FACTOR | | (24HRS X | 65 | %) | 16 | HRS/DAY |
| CY/DAY | | | | | 8,640 | CY |
| NUMBER SCOWS PER TOW | | | | | 2 | EA |
| HAUL | 45 | MILES @ | 3.00 | MPH | 15.00 | HRS |
| LOAD & DUMP | | | | | 12 | HRS |
| RETURN | 45 | MILES @ | 3.50 | MPH | 12.86 | HRS |
| TOTAL CYCLE TIME (SCOWS) | | | | | 39.86 | HRS |
| 20 | WORK HOURS/DAY / | | CYCLE TIME | | .50 | LOADS/DAY |
| 2 | 3000 CY SCOWS @ | | 2,850 CY/LOAD= | | 5,700 | CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | | .50LOADS/DAY | | 2,860 | CY/DAY |
| SCOWS REQ | | | | | 3 | SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | | | 3 | DAYS |
| LOST TIME | 21% | | | | .8 | DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | | | 3.8 | DAYS |
| PLANT COST | | | | | 416,850 | /MONTH |
| FUEL COST | | | .90 | /GAL | 174,708 | /MONTH |
| MAINTENANCE AND INSURANCE COST | | | | | 39,150 | /MONTH |
| LABOR COST | | | | | 62,900 | /MONTH |
| TOTAL DIRECT MONTHLY COST | | | | | 693,608 | /MONTH |
| 26% OVERHEAD & PROFIT | | | | | 180,338 | /MONTH |
| TOTAL MONTHLY COST | | | | | 873,946 | |
| TOTAL DAILY COST | | | | | 29,132 | |
| DREDGING COSTS | | | | | 110,700 | |
| MOB/DEMOB | 2 | DAYS @ | 7,500 | | 15,000 | |
| TOTAL JOB COST | | | | | 125,700 | |
| UNIT COST/CY | | | | | 6.28 | |
| E&D / S&A | 9 | % | | | .57 | |
| CONTINGENCIES | @ | | 20% | | 1.37 | |
| TOTAL UNIT COST | | | | | 8.22 | |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 174,708 | 125,700 | 8.22 |
| 1.10 | 213,532 | 131,896 | 8.63 |
| 1.25 | 242,650 | 136,543 | 8.93 |
| 1.50 | 291,180 | 144,289 | 9.44 |
| 1.80 | 349,416 | 153,583 | 10.04 |
| 2.00 | 388,240 | 159,779 | 10.45 |
| 2.50 | 485,299 | 175,270 | 11.46 |
| 3.00 | 582,359 | 190,761 | 12.48 |
| 4.00 | 776,479 | 221,743 | 14.50 |

COST ESTIMATE 2D50 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 10 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 50,000 CY | GROSS: | 65,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 10 CY |
| CYCLE TIME (MINUTES): | | | 1 MIN. |
| CYCLES/HR | | | 60 EA |
| CY/HR | | | 540 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 8,640 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00 MPH | 15.00 HRS |
| LOAD & DUMP | | | 12 HRS |
| RETURN | 45 MILES @ | 3.50 MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 39.86 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | .50 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .50LOADS/DAY | 2,860 CY/DAY |
| SCOWS REQ | | | 3 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 7.6 DAYS |
| LOST TIME | 21% | | 1.8 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 9.4 DAYS |
| PLANT COST | | | 416,850 /MONTH |
| FUEL COST | .90 /GAL | | 174,708 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 39,150 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 693,608 /MONTH |
| 26% OVERHEAD & PROFIT | | | 180,338 /MONTH |
| TOTAL MONTHLY COST | | | 873,946 |
| TOTAL DAILY COST | | | 29,132 |
| DREDGING COSTS | | | 273,836 |
| MOB/DEMOB | 3 DAYS @ | 10,000 | 30,000 |
| TOTAL JOB COST | | | 303,836 |
| UNIT COST/CY | | | 6.08 |
| E&D / S&A | 9 % | | .55 |
| CONTINGENCIES | @ 20% | | 1.32 |
| TOTAL UNIT COST | | | 7.95 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MK BUDGET |
|---|---|---|---|
| .90 | 174,708 | 303,836 | 7.95 |
| 1.10 | 213,532 | 319,164 | 8.35 |
| 1.25 | 242,650 | 330,660 | 8.65 |
| 1.50 | 291,180 | 349,820 | 9.15 |
| 1.80 | 349,416 | 372,811 | 9.75 |
| 2.00 | 388,240 | 388,139 | 10.15 |
| 2.50 | 485,299 | 426,458 | 11.16 |
| 3.00 | 582,359 | 464,777 | 12.16 |
| 4.00 | 776,479 | 541,416 | 14.16 |

COST ESTIMATE 2D75 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 75,000 CY | GROSS: | 93,750 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00 MPH | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 45 MILES @ | 3.50 MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .56 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .56LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 7.4 DAYS |
| LOST TIME | 20% | | 1.5 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 8.9 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 326,870 |
| MOB/DEMOB | 4 DAYS @ | 20,000 | 80,000 |
| TOTAL JOB COST | | | 406,870 |
| UNIT COST/CY | | | 5.42 |
| E&D / S&A | 9 % | | .49 |
| CONTINGENCIES | @ 20% | | 1.18 |
| TOTAL UNIT COST | | | 7.10 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 406,870 | 7.10 |
| 1.10 | 276,891 | 425,539 | 7.42 |
| 1.25 | 314,649 | 439,541 | 7.67 |
| 1.50 | 377,579 | 462,878 | 8.07 |
| 1.80 | 453,094 | 490,881 | 8.56 |
| 2.00 | 503,438 | 509,550 | 8.89 |
| 2.50 | 629,298 | 556,223 | 9.70 |
| 3.00 | 755,157 | 602,896 | 10.51 |
| 4.00 | 1,006,876 | 696,242 | 12.14 |

COST ESTIMATE 2D100 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 100,000 CY | GROSS: | 125,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00 MPH | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 45 MILES @ | 3.50 MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | .56 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .56LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 9.8 DAYS |
| LOST TIME | 20% | | 2 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 11.8 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 433,378 |
| MOB/DEMOB | 4 DAYS @ | 20,000 | 80,000 |
| TOTAL JOB COST | | | 513,378 |
| UNIT COST/CY | | | 5.13 |
| E&D / S&A | 9 % | | .46 |
| CONTINGENCIES | @ 20% | | 1.12 |
| TOTAL UNIT COST | | | 6.71 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 513,378 | 6.71 |
| 1.10 | 276,891 | 538,131 | 7.04 |
| 1.25 | 314,649 | 556,695 | 7.28 |
| 1.50 | 377,579 | 587,635 | 7.69 |
| 1.80 | 453,094 | 624,764 | 8.17 |
| 2.00 | 503,438 | 649,516 | 8.50 |
| 2.50 | 629,298 | 711,397 | 9.31 |
| 3.00 | 755,157 | 773,278 | 10.11 |
| 4.00 | 1,006,876 | 897,040 | 11.73 |

COST ESTIMATE 2D250 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 250,000 CY | GROSS: | 312,500 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 65 %) | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00 MPH | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 45 MILES @ | 3.50 MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 | WORK HOURS/DAY / | CYCLE TIME | .56 LOADS/DAY |
| 2 | 3000 CY SCOWS @ | 2,850 CY/LOAD= | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .56LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 24.6 DAYS |
| LOST TIME | 20% | | 4.9 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 29.5 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 1,083,446 |
| MOB/DEMOB | 6 DAYS @ | 25,000 | 150,000 |
| TOTAL JOB COST | | | 1,233,446 |
| UNIT COST/CY | | | 4.93 |
| E&D / S&A | 9 % | | .44 |
| CONTINGENCIES | @ 20% | | 1.08 |
| TOTAL UNIT COST | | | 6.45 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 1,233,446 | 6.45 |
| 1.10 | 276,891 | 1,295,327 | 6.78 |
| 1.25 | 314,649 | 1,341,737 | 7.02 |
| 1.50 | 377,579 | 1,419,089 | 7.42 |
| 1.80 | 453,094 | 1,511,910 | 7.91 |
| 2.00 | 503,438 | 1,573,791 | 8.23 |
| 2.50 | 629,298 | 1,728,492 | 9.04 |
| 3.00 | 755,157 | 1,883,195 | 9.85 |
| 4.00 | 1,006,876 | 2,192,600 | 11.47 |

COST ESTIMATE 2D500 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 500,000 CY | GROSS: | 625,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR (24HRS X | 65 %) | | 16 HRS/DAY |
| CY/DAY | | | 12,960 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL 45 MILES @ | 3.00 MPH | | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN 45 MILES @ | 3.50 MPH | | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | .56 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS 5,700 CY/TRIP X | .56LOADS/DAY | | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 49.1 DAYS |
| LOST TIME 20% | | | 9.8 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 58.9 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 25% OVERHEAD & PROFIT | | | 220,362 /MONTH |
| TOTAL MONTHLY COST | | | 1,101,809 |
| TOTAL DAILY COST | | | 36,727 |
| DREDGING COSTS | | | 2,163,219 |
| MOB/DEMOB 10 DAYS @ | 25,000 | | 250,000 |
| TOTAL JOB COST | | | 2,413,219 |
| UNIT COST/CY | | | 4.83 |
| E&D / S&A 9 % | | | .43 |
| CONTINGENCIES @ | 20% | | 1.05 |
| TOTAL UNIT COST | | | 6.31 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUI BUDGET |
|---|---|---|---|
| .90 | 226,547 | 2,413,219 | 6.31 |
| 1.10 | 276,891 | 2,536,771 | 6.64 |
| 1.25 | 314,649 | 2,629,434 | 6.88 |
| 1.50 | 377,579 | 2,783,875 | 7.28 |
| 1.80 | 453,094 | 2,969,203 | 7.77 |
| 2.00 | 503,438 | 3,092,755 | 8.09 |
| 2.50 | 629,298 | 3,401,634 | 8.90 |
| 3.00 | 755,157 | 3,710,514 | 9.71 |
| 4.00 | 1,006,876 | 4,328,275 | 11.32 |

COST ESTIMATE 2D1000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 1,000,000 CY | GROSS: | 1,250,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 18 CY/ |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 70 %) | 17 HRS/DAY |
| CY/DAY | | | 13,770 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00 MPH | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 45 MILES @ | 3.50 MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | .56 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .56LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 98.3 DAYS |
| LOST TIME | 19% | | 18.7 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 117 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 24% OVERHEAD & PROFIT | | | 211,547 /MONTH |
| TOTAL MONTHLY COST | | | 1,092,994 |
| TOTAL DAILY COST | | | 36,433 |
| DREDGING COSTS | | | 4,262,677 |
| MOB/DEMOB | 10 DAYS @ | 25,000 | 250,000 |
| TOTAL JOB COST | | | 4,512,677 |
| UNIT COST/CY | | | 4.51 |
| E&D / S&A | 9 % | | .41 |
| CONTINGENCIES | @ 20% | | .98 |
| TOTAL UNIT COST | | | 5.90 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKU BUDGET |
|---|---|---|---|
| .90 | 226,547 | 4,512,677 | 5.90 |
| 1.10 | 276,891 | 4,756,142 | 6.22 |
| 1.25 | 314,649 | 4,938,739 | 6.46 |
| 1.50 | 377,579 | 5,243,067 | 6.86 |
| 1.80 | 453,094 | 5,608,261 | 7.34 |
| 2.00 | 503,438 | 5,851,722 | 7.65 |
| 2.50 | 629,298 | 6,460,378 | 8.45 |
| 3.00 | 755,157 | 7,069,037 | 9.25 |
| 4.00 | 1,006,876 | 8,286,348 | 10.84 |

COST ESTIMATE 2D3000 BUCKET DREDGE

| | | | |
|---|---|---|---|
| PLANT: | 18 CY BUCKET DREDGE | | |
| CHANNEL SEGMENT: | NORFOLK HARBOR | | |
| DISPOSAL AREA: | NORFOLK | | |
| HAUL DISTANCE (MILES): | 45 | | |
| QUANTITY PAY: | 3,000,000 CY | GROSS: | 3,750,000 CY |
| BUCKET TYPE DREDGE CAPACITY: LOAD FACTOR = | .90 | | 18 CY |
| CYCLE TIME (MINUTES): | | | 1.2 MIN. |
| CYCLES/HR | | | 50 EA |
| CY/HR | | | 810 CY/HR |
| EFFICIENCY FACTOR | (24HRS X | 70 %) | 17 HRS/DAY |
| CY/DAY | | | 13,770 CY |
| NUMBER SCOWS PER TOW | | | 2 EA |
| HAUL | 45 MILES @ | 3.00 MPH | 15.00 HRS |
| LOAD & DUMP | | | 8 HRS |
| RETURN | 45 MILES @ | 3.50 MPH | 12.86 HRS |
| TOTAL CYCLE TIME (SCOWS) | | | 35.86 HRS |
| 20 WORK HOURS/DAY / | CYCLE TIME | | .56 LOADS/DAY |
| 2 3000 CY SCOWS @ | 2,850 CY/LOAD= | | 5,700 CY/TRIP |
| SCOWS | 5,700 CY/TRIP X | .56LOADS/DAY | 3,179 CY/DAY |
| SCOWS REQ | | | 4 SETS |
| TOT EFFECTIVE TIME=GROSS QTY/DREDGE PROD. | | | 294.9 DAYS |
| LOST TIME | 18% | | 53.1 DAYS |
| TOTAL TIME (EFFECTIVE + LOST) | | | 348 DAYS |
| PLANT COST | | | 547,000 /MONTH |
| FUEL COST | .90 /GAL | | 226,547 /MONTH |
| MAINTENANCE AND INSURANCE COST | | | 45,000 /MONTH |
| LABOR COST | | | 62,900 /MONTH |
| TOTAL DIRECT MONTHLY COST | | | 881,447 /MONTH |
| 22% OVERHEAD & PROFIT | | | 193,918 /MONTH |
| TOTAL MONTHLY COST | | | 1,075,365 |
| TOTAL DAILY COST | | | 35,846 |
| DREDGING COSTS | | | 12,474,235 |
| MOB/DEMOB | 10 DAYS @ | 25,000 | 250,000 |
| TOTAL JOB COST | | | 12,724,235 |
| UNIT COST/CY | | | 4.24 |
| E&D / S&A | 9 % | | .38 |
| CONTINGENCIES | @ 20% | | .92 |
| TOTAL UNIT COST | | | 5.55 |

| UNIT FUEL COST | DIRECT MONTHLY FUEL COST | TOTAL JOB COST & MKUP CONTRACT | $/CY UNIT COST & MKUP BUDGET |
|---|---|---|---|
| .90 | 226,547 | 12,724,235 | 5.55 |
| 1.10 | 276,891 | 13,436,705 | 5.86 |
| 1.25 | 314,649 | 13,971,057 | 6.09 |
| 1.50 | 377,579 | 14,861,633 | 6.48 |
| 1.80 | 453,094 | 15,930,337 | 6.95 |
| 2.00 | 503,438 | 16,642,795 | 7.26 |
| 2.50 | 629,298 | 18,423,958 | 8.03 |
| 3.00 | 755,157 | 20,205,132 | 8.81 |
| 4.00 | 1,006,876 | 23,767,457 | 10.36 |