
APPENDIX F

COST ESTIMATE

Prepared For:

HONEYWELL

101 Columbia Road
P.O. Box 2105
Morristown, NJ 07962

Prepared By:

PARSONS

290 Elwood Davis Road, Suite 312
Liverpool, New York 13088
(315) 451-9560 Fax (315) 451-9570

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SECTION F.1

GENERAL

This appendix provides cost estimating backup for the cost estimates for the thirteen lake-wide Alternatives, B through J, presented in Section 5 of the FS. Tables F.1 through F.26 include cost estimate input data and the detailed cost summary for each Alternative B through J. Tables F.27 through F.58 present the cost input data and the detailed cost summary sheets used to evaluate the cost sensitivity of Alternative C. Cost sensitivity analysis was done only for the recommended lake-wide remedial Alternative C. Table F.59 presents the calculated net present value of the lake-wide Alternatives B through J, and Table F.60 presents the source of vendor quotes used in the cost estimates.

The following subsections describe the basis of the cost estimates. Section F.2 describes the basis of estimate for each task for each alternative. Section F.3 describes the cost sensitivity factors that were evaluated.

SECTION F.2

COST ESTIMATE BASIS

Capital costs and annual operation and maintenance (O&M) costs were used to estimate total costs for lake-wide Alternatives B through J. Capital costs consisted of direct (construction) costs and indirect (non-construction and overhead) costs and were estimated in 2004 dollars. Direct capital costs included costs associated with construction and equipment; land and site-development; relocation; and disposal. Indirect capital costs included costs associated with engineering and management; licenses or permits; start up and shakedown costs; and contingency allowances.

Annual O&M costs are post-construction costs required to ensure the continued effectiveness of a remedial action and may include such things as operating labor costs; maintenance materials and labor costs; purchased services; administrative costs; insurances, taxes and licensing costs; and costs to conduct periodic site reviews. Operation and maintenance costs, which are estimated for a 30 year period, were discounted to a Net Present Value (NPV) in 2004 dollars. The overall cost for each alternative was also discounted to a NPV in 2004 dollars based on the assumption that the 2004 costs were equally distributed over the estimated project duration. The discounted costs were calculated based on the NPV methods described in the 2000 EPA guidance document, "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." The cost estimates provided have an accuracy of +50 percent to -30 percent in compliance with the 1988 EPA guidance document, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA."

The cost for each alternative was calculated by estimating applicable labor, equipment, materials, and subcontractor costs, which took into account crew size, production rates, and estimated material quantities that would be needed to implement each lake-wide alternative on a task by task basis. Craft labor costs were obtained from published prevailing wage rates; and equipment, material, and subcontractor costs were obtained from vendor quotes. Table F.56 presents the source of data for vendor unit costs. Fuel costs were included for tasks that used equipment.

Critical input data used to develop cost estimates for lake-wide Alternatives B through J are presented in odd-number tables up to F.25. These data include capping areas and dredging volumes for each Sediment Management Unit (SMU) (also see Appendix E, areas and volumes); crew size; production rates for dredging and capping; alternative duration; and sediment consolidation area (SCA) size and dike height. Even-numbered tables up to F.26 present the totals for each cost category based on estimated unit quantities necessary to complete project tasks and the resulting total remediation project costs in 2004 dollars. Costs shown in these tables include appropriate markups. Note the NPV calculation was used to convert the O&M costs to 2004 dollars. The actual duration of each alternative is difficult to accurately estimate at

this time because the duration is highly dependent on final design and construction approach. The total duration for each alternative was computed by adding one year to the in-lake construction duration for each alternative to account for time required to prepare the support areas and construct the Sediment Consolidation Area (SCA). Significantly more time may be required to build the SCA for some of the higher-dredge-volume alternatives, however some of the SCA construction work may be phased and may be conducted concurrent with lake work. The NPV for the lake-wide alternatives, based on the currently estimated durations, are presented in Table F.59. The following sections describe the basis of estimate for each project task.

F.2.1 Direct Construction Costs

Direct construction costs were estimated for each task by developing a total quantity, a crew, and a production rate. Direct construction project tasks included mobilization and demobilization of site equipment; site preparation and facility construction activities; dredging SMUs 1 through 7; capping of sediments in applicable areas; backfilling as needed; restoration of habitat and vegetation following remedial activities; and construction of the SCA and water treatment facility. Subtasks for each project task and assumptions that were used to develop cost estimates are briefly described below.

Mobilization and demobilization activities were the first task used to develop total direct capital costs. This line item includes costs associated with equipment fabrication; mobilization; demobilization; and interim year startup costs.

Equipment Fabrication

It was assumed that \$500,000 would be needed to fabricate specialty dredging and dredge-positioning equipment to enable dredging in the deep, soft sediments in Onondaga Lake.

F.2.1.1 Mobilization and Demobilization

Mobilization

Mobilization costs include equipment and labor for dredging and capping operations, and construction of the SCA. Assumptions used to estimate costs for each of these activities are listed below.

Dredging

Mobilization costs for the hydraulic dredging operation included the following tasks:

- Prepare, deliver, and assemble dredge;
- Haul and prepare (fuse) pipe;
- Deliver tug and other equipment by way of the New York State Canal System; and
- Supervise for one month.

As described in Appendix L, dredging issues, each shift of the dredge crew consists of the following persons:

- Captain (1);
- Leverman (1);
- Mate (1); and
- Deckhand (2).

Additional staff for management and handling operations on shore consists of the following persons:

- Operator (1);
- Superintendent (1);
- Surveyor – marine (2);
- Engineer (1); and
- Project manager (1).

Each shift of the dredge operation would use the following equipment:

- Hydraulic dredge with cutter head (1);
- Tug boat (1);
- Derrick barge (1);
- Survey boat (1);
- Front end loader (1); and
- D6 bulldozer (1).

The following expenses are also included for mobilization:

- Crane service;
- Trucking;
- Site trailer (1);
- D6 bulldozer and front end loader;
- Fuel; and
- Pickup truck (2).

Included in mobilization is the cost to procure and install the dredge slurry piping. Double-contained, 14-inch inner diameter, high-density polyethylene (HDPE) piping was assumed. The maximum estimated distance from the SMU to the assumed location of the SCA at Wastebed 13 is 31,433 LF. The number of times the pipeline has to be removed is dependent on the number of SMUs to be dredged. An additional event was included on each estimate to account for demobilization. A crew to deploy and weld pipe sections at 500 LF per day includes:

- Operator (1);
- Laborer (2);
- Front-end loader (1);
- Generator for fusion welder (2); and
- Fusion welder (2).

In addition, mobilization for one booster pump for each mile of slurry pipeline was included (total of 5 booster pumps needed).

Capping

Mobilization costs for the capping operation included the following tasks:

- Prepare, deliver, and assemble hydraulic equipment for sand and gravel cap placement;
- Prepare, deliver, and assemble mechanical equipment for rock cap placement;
- Deliver pump and set up feeder (for hydraulic capping);
- Prepare, deliver, and assemble diffuser barge;
- Deliver tug and other equipment; and
- Supervise for one month.

As described in Appendix H, capping issues, each shift of the hydraulic capping crew (for sand and gravel placement) consists of the following:

- Leverman (1);
- Captain (1);
- Operator;
- Deckhand (2);
- Pump operator (2);
- Laborer (1); and
- Superintendent (1).

Each shift of the mechanical capping crew (for rock placement) consists of the following:

- Captain (1);
- Operator (3);
- Deckhand (2);
- Mate (1); and

- Superintendent (1).

Additional staff for management and handling operations on shore consist of:

- Surveyor – marine (2);
- Engineer (1); and
- Project manager (1).

Each shift of the hydraulic capping operation would use the following equipment:

- Pump (5);
- Derrick barge (1);
- Tug boat (1);
- Dredge barge (1);
- D6 bulldozer (1);
- Skiff (2);
- Survey boat (1); and
- Pickup truck (2).

Each shift of the mechanical capping operation would use the following equipment:

- Long-stick excavator (1);
- Derrick barge (1);
- D6 bulldozer (1);
- Front end loader (1);
- Conveyor (1);
- Tug boat (1);
- Skiff (2);
- Survey boat (1); and
- Pickup truck (2).

SCA Construction

Mobilization for the SCA construction crew is one day. It was assumed that this craft labor will be available close to Syracuse. The following personnel are mobilized for SCA construction:

- Project manager (1);

- Superintendent (1);
- Operator (4);
- Laborer (2);
- Engineer (1); and
- Surveyor (2).

The following equipment would be mobilized for SCA construction:

- D6 bulldozer (1);
- 330 excavator (1);
- 815 compactor (1); and
- Water truck (1).

One week for oversight management to set up at the site was included and accounts for the following persons:

- Project manager (1);
- Superintendent (1);
- Engineer (2);
- Industrial hygiene technician (2);
- Scheduler (1); and
- Clerk (2).

Demobilization

Costs associated with demobilization include one month for each dredge and capping crew (as described above) to disassemble and return equipment and personnel to their home office. In addition, costs associated with demobilization of one booster pump for each mile of slurry pipeline (total of five) was included.

Demobilization for the SCA construction crew (as described above) is one day. Since it was assumed that this craft labor is locally available (close to Syracuse) demobilization costs associated with their relocation do not apply.

One week for oversight management of demobilization activities from the site was also included. Additional costs for barge and dredge sandblasting and repainting are also estimated.

Interim Year Startup

Interim year startup costs vary for each lake-wide alternative. Some of the alternatives include dredging and capping over multiple years, and some alternatives include SCAs that will

take more than one year to construct. For those alternatives, a cost to startup in interim years was calculated. It was assumed that startup included 40 hours for each dredge and capping crew to return to the site and set up equipment. Additionally, it was assumed that remobilization for the SCA construction crew was one day and craft labor was locally available (close to Syracuse). Finally, one week for oversight management to remobilize to the site was included.

F.2.1.2 Site Preparation and Facility Construction

Site preparation and facility construction was the second task used to develop total direct capital costs. This line item included clearing and grubbing, installation and removal of the security fence; construction of a gravel road to the equipment and administration areas; installation of lighting on utility poles; connection to electrical power supply and water lines; and construction of the water treatment and decontamination facilities.

Clearing and Grubbing

It was assumed that clearing and grubbing would be required where the SCA will be constructed. This area is specific to each lake-wide alternative as shown in odd-numbered tables up to F.25. Additionally, clearing and grubbing will be required over an additional three acres to be developed as office space and a laydown yard.

Install Fence

It was assumed that a fence would be installed around the SCA. The linear feet (LF) required is specific to each lake-wide alternative as shown in odd-numbered tables up to F.25. An additional 2,000 LF would be installed around an office area and laydown yard.

Barrier Wall

A sheet pile barrier for a depth of 50 feet and a length of 1300 linear feet along SMU 7 was included.

Construct Gravel Road to Equipment Area

The office area was estimated to require 200 LF of gravel road.

Construct Gravel Road to Administration Area

The laydown yard was estimated to require 200 LF of gravel road.

Install Work Lighting

Costs to install work lighting included costs to construct lighting around the perimeter of the SCA and around the office area and laydown yard. It is estimated that lighting would be needed to accommodate 16 hour-per-day work shifts. Lighting would be installed on wood utility poles at a spacing of one every 150 ft around the SCA.

Electrical Power to the Water Treatment Plant

Costs associated with this task include costs to provide electrical hookups to existing power sources.

Water Line to the Water Treatment Plant

Costs associated with this task include costs to provide hookups to existing water sources.

Water Control System

Costs associated with this task include the cost to build a water control system around the laydown yard that incorporates the labor and cost of materials to build a system of ditches, catch basins, and piping.

Decontamination Facility

Costs associated with this task assumed that a 10,000 square foot, bermed area lined with geomembrane would be required for equipment decontamination. Costs include miscellaneous materials such as pipes and fittings; hourly wages for one laborer; and clearing 0.25 acres of land.

F.2.1.3 Dredging – SMU 1 through SMU 7

Dredging SMUs 1 through 7 was the third task used to develop total direct capital costs. This line item included costs associated with performing bathymetry surveys both before and after dredging; collecting sediment samples before and after dredging; recovering and removing a barge; hydraulically dredging designated areas with a cutter head; transfer of dredged material to the SCA; operation of the SCA, sheen treatment; containment of dredging areas; and monitoring during dredging activities.

Bathymetry Survey – Pre-Dredging

Costs associated with this task assumed that a bathymetry survey would be performed over the dredge area using boat-mounted geophysical equipment. The number of acres to be dredged is specific to each lake-wide alternative as shown in odd-numbered tables up to F.25.

Sediment Sampling – Pre-Dredging

Sediment samples will be collected over the capping area prior to initiation of dredging activities. The number of samples to be collected is specific to each lake-wide alternative. However, for each alternative, estimated sampling was based on a spacing of 80 ft over the capping area and it was assumed that a crew could sample at a frequency of one core every two hours. Samples will be tested for mercury, volatile organic compounds (VOCs), and geotechnical parameters (grain size analysis, specific gravity, and moisture content). Quality control samples (i.e., matrix spike/matrix spike duplicate; field duplicate; trip blanks; and equipment blanks) were also included in the analytical costs. Labor costs were developed for a

crew consisting of two laborers, a part-time clerk, an engineer, a part-time project manager, and the full time use of a survey boat.

Recover and Remove Barge

Based on the geophysical report from PTI (1992a), a sunken barge, located in SMU 4, would need to be removed prior to dredging activities. Vendor quotes from a similar scope of work performed by Parsons were used as the basis for this cost.

Hydraulic Dredging With Cutter Head

A dredge crew and production rate, based on the information presented in Appendix L, dredging issues, were used to estimate the cost of this activity. A production rate of 150 *in situ* CY per hour was assumed for the dredging crew.

The labor for the dredge crew would consist of:

- Captain (1);
- Leverman (1);
- Mate (1); and
- Deckhand (2).

Additional staff for management and handling operations on shore would consist of:

- Operator (1);
- Superintendent (1);
- Surveyor – Marine (2);
- Engineer (1); and
- Project Manager (one at part time).

Each shift of the dredge operation would use the following equipment:

- Hydraulic dredge with cutter head;
- Tug boat;
- Derrick barge;
- Pickup truck;
- Skiff;
- Office Trailer;
- Survey boat; and
- Front end loader.

Transfer to SCA

This task includes the cost to install and operate booster pumps to hydraulically transfer dredged sediments from the lake bottom to the SCA. Costs are included for one booster pump with fuel, with two operators, for each mile of slurry pipeline (31,433 total) for the duration of the dredging operation. Costs associated with an inspection team, consisting of two part-time laborers, a part-time superintendent (for one half of the dredging duration) and a two person dive team (for the other half of the dredging duration) were estimated. Costs associated with equipment to be utilized during this task included a pickup truck, a skiff and fuel for each.

Operation of SCA

Labor costs for operation of the SCA include a full-time laborer and operator to control and move the pumps for diverting water and for collection of air samples. It was assumed that three air samples would be collected per shift and analyzed for mercury and VOCs. An additional 20 percent would be collected and analyzed for quality control. In addition, costs to operate booster pumps through completion of dredging were also included. The duration of the SCA operation varies for each lake-wide alternative and is dependent on the total volume to be removed.

Sheen Treatment

Costs associated with this task include that for a vacuum truck with an operator and two laborers with skiff and boom to stand by during dredging of SMUs 1, 2, 6, and 7. The required treatment time is dependent on the total sediment volume to be removed for each SMU and therefore varies for each lake-wide alternative.

Dredge Containment

Costs associated with dredge containment require the use of silt curtains around 10-acre sections (2,640 LF) of dredged area. For costing purposes it was assumed that a full-time crew of three laborers with a boat and a derrick barge would remove and reposition the dredge containment cell at a rate of 300 LF per day. Additionally, each time the silt curtain was moved, 25 percent of the silt curtain, anchors, and floats material must be replaced. Costs for anchors and floats were also included. The quantity of material needed for proper dredge containment was dependent on the size of the area to be dredged and therefore, varied between each lake-wide alternative.

Dredge Monitoring

Costs associated with dredge monitoring assume a full-time two person crew in a survey boat (2 boats at a time) performing field monitoring for turbidity and collecting water samples to be sent to an off-site laboratory for analysis of Total Suspended Solids (TSS), metals, VOCs, sulfides, chlorides, and turbidity. An additional 20 percent would be collected for quality control. For costing purposes it was assumed that two samples would be collected for each 8 hour shift and would extend through completion of dredging.

Bathymetry Survey – Post Dredging

Costs associated with this task assumed that a bathymetry survey would be performed over the bottom of the dredge area using boat-mounted geophysical equipment. The number of acres to be dredged is specific to each lake-wide alternative as shown in odd-numbered tables up to F.25.

Sediment Sampling – Post Dredging

Sediment samples will be collected on a spacing of 80 ft over the dredge area. The number of samples to be collected is specific to each lake-wide alternative. Samples will be tested for mercury and VOCs. An additional 20 percent for quality control was included. Labor costs were developed for a crew consisting of two full-time laborers, a part-time clerk, a full-time engineer, a part-time project manager, and a survey boat with fuel. For costing purposes it was assumed that a crew could sample at a frequency of one core every two hours.

F.2.1.4 Sediment Cap

Installation of sediment caps was the fourth task used to develop total direct capital costs. This line item included costs associated with cap containment; and placement of sand, rock, and gravel. It was assumed that four crews were in operation at all times during placement of the sand and gravel and two crews during placement of rock.

Cap Containment

Costs associated with cap containment require the use of silt curtains around 10-acre sections (2,640 LF) of area to be capped. For costing purposes it was assumed that a crew of three full-time laborers, a boat, and a derrick barge would remove and reposition the cap containment at a rate of 300 LF per day. It was assumed that each time the silt curtain was moved, 25 percent of the curtain material must be replaced. Costs for anchors and floats were also included. The quantity of cap area varies between lake-wide alternatives and so does the cost of cap containment.

Sand

A hydraulic capping crew and rate for sand, based on the information presented in Appendix H, capping issues, were used to estimate the cost of this activity. For costing purposes it was assumed that each hydraulic capping crew can place sand at a rate of 100 CY per hour. Additionally, it was assumed that the pipelines used for dredging would also be used to distribute the capping material. The duration of this task is dependent on the required volume of sand cap material. A full-time hydraulic capping crew would consist of the following persons:

- Leverman (1);
- Captain (1);
- Operator (2);
- Deckhand (2);

- Laborer (1); and
- Superintendent (1).

Additional full-time staff for management and handling operations on shore would consist of the following persons:

- Surveyor – Marine (2);
- Engineer (1); and
- Project Manager (1).

Each shift of the hydraulic capping operation would use the following equipment:

- Hydraulic dredge with cutter head (1);
- Derrick barge (1);
- Tug boat (1)
- Dredge barge (1);
- D6 bulldozer (1);
- Skiff (2);
- Survey boat (1); and
- Pickup truck (2).

Rock

A full-time mechanical capping crew and production rate for rock, based on the information presented in Appendix H, capping issues, were used to estimate the cost of this activity. For costing purposes it was assumed that each mechanical capping crew could place rock at a rate of 70 CY per hour. Additionally, rock would be placed at an average thickness of 2 ft. The mass of rock needed was based on a density of 1.5 tons per cubic yard. The duration of this task is dependent on the required volume of rock cap material. Each shift of the mechanical capping crew consisted of the following full-time persons:

- Captain (1);
- Operator (3);
- Deckhand (2);
- Mate (1); and
- Superintendent (1).

Additional full-time staff for management and handling operations on shore would consist of the following persons:

- Surveyor – marine (2);
- Engineer (1); and
- Project manager (1).

Each shift of the mechanical capping operation would use the following equipment:

- Long-stick excavator (1);
- Derrick barge (1);
- D6 bulldozer (1);
- Front end loader (1);
- Conveyor (1);
- Tug boat (1);
- Skiff (2);
- Survey boat (1); and
- Pickup truck (2).

Gravel

A hydraulic capping crew and production rate for gravel, based on the information presented in Appendix H, capping issues, were used to estimate the cost of this activity. For costing purposes it was assumed that each hydraulic capping crew could place gravel at a rate of 95 CY per hour. The mass of gravel needed was based on a density of 1.4 tons per cubic yard. The duration of this task is dependent on the required volume of gravel cap material. Gravel cap material would be placed with the same crew as the sand capping crew.

F.2.1.5 Backfill

Installation of backfill was the fifth task used to develop total direct capital costs. This line item includes costs associated with backfill only.

Backfill

Backfill was included in lake-wide Alternatives E, I and J. The hydraulic capping crew and rate used for sand cap placement, as described in Appendix H, capping issues, is used for backfill placement. Backfill can be placed at a rate of 100 CY per hour. The duration of this task is dependent on the required volume of backfill material.

F.2.1.6 Habitat and Vegetation Restoration

Habitat and vegetation restoration was the sixth task used to develop total direct capital costs. This line item includes costs associated with habitat and vegetation restoration and rip rap placement as provided by vendor quotes and crew estimates.

Habitat and Vegetation Restoration

Costs associated with habitat and vegetation restoration were provided by a specialty subcontractor quote that included submerged macrophyte tubers, and submerged macrophyte seeds over the proposed restoration area, and 14,250 LF of woody debris structures. These quantities and habitat and vegetation restoration techniques are based on information contained in Appendix M, habitat issues.

Rip Rap

Costs associated with this task include installing riprap along 6,000 LF of shoreline, placed 9 ft from shore at a depth of one ft. For costing purposes it was assumed that each hydraulic capping crew could place rip-rap at a rate of 140 CY per hour. The mass of rip-rap needed was based on a density of 1.5 tons per CY. The crew used for rip rap placement included three operators, a long-stick excavator, a front end loader, and a dump truck.

F.2.1.7 SCA Construction

SCA construction was the seventh task used to develop total direct capital costs. This line item includes costs associated with construction of the SCA; preloading; stabilization under dikes; and construction of a cap over the SCA.

Construct SCA

Costs to construct the SCA included four items: costs for dike construction, finish grading, the liner and leachate collection system, and installation of monitoring wells around the SCA perimeter. The necessary size of the SCA is dependent upon the rate and volume of dredging for each lake-wide alternative. The basis of the calculations used to size the SCA for each alternative is described in Appendix K, sediment management and water treatment cost estimates.

Costs were estimated to construct one dike around the perimeter of the SCA, the office area and laydown yards; and two internal dikes within the SCA. These dikes would be constructed using imported soil based on the calculated size of the SCA. For costing purposes it was assumed that the height of the dikes was 14 ft and the average dike area per linear foot was based on 3:1 (horizontal:vertical) side slopes with a 10 ft wide top. A dike height of 50 ft was estimated for lake-wide Alternatives E, I, and J in order to maximize cost efficiency. Additionally, it was assumed that fill material for dike construction could be placed at a rate of 125 CY per hour. The costs required for fill material vary for the different lake-wide alternatives since the size of the SCA varies depending on the volume of sediments to be dredged. A mostly full-time crew for dike construction consisted of:

- Superintendent (1);
- Operator (9);
- Laborer (2);

- Engineer (1);
- Project Manager (1 at part-time); and
- Surveyor (2 at part-time).

Each shift for the dike construction would use the following equipment:

- D6 Bulldozer (2);
- 330 Excavator (2);
- 815 Compactor (2);
- Dump Truck (2); and
- Water Truck (1).

Costs associated with labor and equipment to finish grade the SCA bottom and the dike sides was estimated to include a full-time crew consisting of a superintendent, 2 operators, a laborer, an 815 compactor, and a motor 140 G motor grader. For costing purposes, the finish grade production rate was estimated to be 1 acre per eight-hour workday. Time required to complete finish grading is dependent on the size of the SCA and therefore, varies for each lake-wide alternative.

Costs associated with labor and equipment to construct the SCA liner system was estimated to include a full-time crew consisting of a superintendent, 2 operators, a laborer, an 815 compactor, and a D6 bulldozer. For costing purposes, the sand layer placement rate was estimated to be 125 CY per hour. Additionally, it was assumed that sand would be placed to a depth of 2 ft. Costs for a geosynthetic liner were included. Costs also took into account shipment and installation of HDPE piping for the leachate collection system, which assumed that 500 LF of piping would be needed.

Finally, the costs for a gravel road and monitoring wells every 200 ft around the perimeter of the SCA were included. The road length was dependent on the perimeter of the SCA for each lake-wide alternative. The required number of monitoring wells was also dependent on the size of the SCA for each alternative.

Preloading

Preloading was included as part of the SCA construction costs to improve the geotechnical characteristics of the wastebed materials under the bottom of the SCA. Preloading consists of the temporary placement of imported soil over the footprint of the bottom of the SCA (not including the area under the dike). The depth of preloaded soil placement was estimated to be equal to the calculated depth of sediments to be placed in the SCA. Costs for removal of the soil were included. It was estimated that the soil could be removed after three years of preloading. For costing purposes it was assumed that 250 CY of sand could be imported per hour. A full-time crew is required for importing and placing preloading soil consisting of the following persons:

- Superintendent (1);
- Operator (2);
- Laborer (1);
- Engineer (1);
- Surveyor (2); and
- Project Manager (1 at part-time).

Each shift for the preloading task would use the following equipment:

- D6 Bulldozer (1); and
- Water Truck (1).

Stabilization under Dikes

Costs associated with dike stabilization to improve the geotechnical characteristics of the wastebed materials under the SCA were estimated. For costing purposes, it was assumed that to obtain sufficient stabilization, the material used must consist of 25 percent dry soil mixed to the estimated depth of the wastebed materials in Wastebed 13. This depth is approximately 50 ft. *In situ* materials would be mixed with cement or fly ash. Vendor costs were obtained based on site conditions. The area under the dikes was estimated by assuming the SCA was a square, and that the dikes have 3:1 (horizontal:vertical) sides and a 10 ft top. Costs associated with the volume of soil to be mixed were dependent on the size of the SCA and varied for each lake-wide alternative.

Construct Cap over SCA

Costs associated with this task include those needed to construct a cap over the SCA after dredging is complete and all sediments have been placed. Total costs for this task are dependent on the size of the SCA and vary for each lake-wide alternative. It is expected that the dredged sediments in the SCA will have sufficient strength one year after placement to allow construction of the cap over the SCA. The cap over the SCA was estimated as a sand foundation layer, followed by a geosynthetic clay liner, a geomembrane, a geocomposite drainage layer, a soil layer, and a topsoil layer. For costing purposes it was assumed that the foundation layer would be 2.5 ft thick, the soil layer 1.5 ft thick, and the topsoil layer 0.5 ft thick. Costs for geosynthetic supply and installation were based on vendor quotes on a per square foot basis. Additionally, the SCA cap placement crew can import and place 250 CY of sand per hour. A mostly full-time crew to construct the cap over the SCA included the following persons:

- Superintendent (1);
- Operator (4); and
- Project Manager (1 at part-time).

Each shift would use the following equipment:

- D6 Bulldozer (1);
- 330 Excavator (1);
- 815 Compactor (1);
- Water Truck (1);
- Tractor and Disc (1); and
- 140G Motor Grader (1 at part-time).

F.2.1.8 Water Treatment

Construction of the water treatment facility was the eighth task used to develop total direct capital costs. This line item includes costs associated with construction of the water treatment facility; treatment of water associated with dredged material; and dismantling of the treatment plant at the end of operation.

Construct Water Treatment Facility

The proposed water treatment facility is described in Subsection 4.12 of the FS. The proposed water treatment facility consists of the following components:

- Flocculator;
- Secondary clarifier;
- Chemical feed system for adjusting pH;
- Multi-media filtration;
- Air stripping; and
- Filtration with granular activated carbon.

The estimated cost for construction of the proposed water treatment facility consisted of costs for procurement and installation of the above components. Additionally, costs for ancillary equipment, such as ladders, piping, and instrumentation, were also included. Furthermore, costs associated with procurement and installation of piping from the water treatment facility, located at Wastebed 13, to each SMU in the lake were included. As described in Subsection F.2.1.1, the following full-time crew and equipment would be needed to deploy and weld pipe sections, at a rate of 500 LF per day (31,433 LF total):

- Operator (1);
- Laborer (2);
- Front-end loader (1);
- Generator for fusion welder (2); and
- Fusion welder (2).

It is estimated that portions of the pipeline would have to be moved periodically to keep the discharge from the water treatment plant near the dredging operation. For costing purposes it was estimated that for the number of SMUs dredged, the piping would have to be moved twice and once again for demobilization. The labor associated with this task was dependent on the labor hours required to move the piping from SMU to SMU.

Water Treatment For Dredged Material

Water treatment costs were estimated on a per-gallon-treated basis. Costs associated with this task were dependent on the volume of sediment to be dredged and treated. For costing purposes it was estimated that for each *in situ* cubic yard of sediment dredged, 1,295 gallons of water would need to be treated based on Table K.1 in Appendix K, sediment management and water treatment cost estimates. Water treatment costs consist of labor, electrical usage, wear and tear on equipment, and treatment materials such as polymers, caustic, and alum. Additionally, costs were included for collection of treated water samples, which were analyzed for metals, sulfides, TSS, and turbidity. For costing purposes it was assumed that 10 water samples would be collected per week with an additional 20 percent for quality control. The duration of treatment is dependent on the volume of material to be dredged. Since the samples would be collected at the water treatment plant by personnel stationed there, additional labor costs were not included.

Dismantle Water Treatment Plant

A lump sum cost was included for dismantling the water treatment plant and restoring the site after completion of dredging and consolidation of material in the SCA.

F.2.2 Indirect Construction Costs

Indirect construction costs were estimated for each task by developing a total quantity, a crew, and a production rate. Indirect construction project tasks included implementation of institutional controls; studies, designs and plans; engineering and construction oversight; and construction cost contingencies. Subtasks for each project task and assumptions that were used to develop cost estimates are briefly described below.

F.2.2.1 Institutional Controls

Institutional controls were the first task used to develop total indirect capital costs. Institutional controls consisted of establishing and updating deed restrictions, navigational restrictions, and installing signage as necessary. The cost for the crew, for duration of four months, was estimated to include the following persons:

- Project manager (1);
- Engineer (1);
- Certified industrial hygienist (1);
- Contract administrator (1);

- Technical writer (1); and
- Clerk (1).

F.2.2.2 Studies, Design, and Planning

Studies, Design, and Planning was the second task used to develop total indirect capital costs. This line item included costs associated with pre-design, remedial design, and agency oversight.

Pre-Design, Remedial Design, Agency Oversight

This activity was estimated at 4 percent of the direct construction cost for lake-wide Alternatives B, C, D, D2, F1 through F4, G and H, and at 3 percent of the direct construction cost for lake-wide Alternatives E, I, and J. These values are below the minimum recommended value of 6 percent in "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study," (EPA, 2000), but were determined to be reasonable based on the scale of the alternatives

F.2.2.3 Engineering and Construction Oversight

Engineering and construction oversight was the third task used to develop total indirect capital costs. This line item included costs associated with project management; construction management; and health and safety.

Project Management

This activity was estimated at 3 percent of the direct construction costs for lake-wide Alternatives B, C, D, D2, F1 through F4, G and H, and at 2 percent of the direct construction cost for lake-wide Alternatives E, I, and J. These values are below the minimum recommended value of 5 percent in "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA, 2000), but were determined to be reasonable based on the scale of the alternatives

Construction Management

This activity is estimated at 4 percent of the direct construction cost for lake-wide Alternatives B, C, D, D2, F1 through F4, G and H, and at 3 percent of the direct construction cost for lake-wide Alternatives E, I, and J. These values are below the minimum recommended value of 6 percent in "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, " (EPA, 2000) but were determined to be reasonable based on the scale of the alternatives.

Health and Safety

Labor costs associated with health and safety management were dependent on the dredging duration and varied for each lake-wide alternative and included time for a certified industrial hygienist and an industrial hygiene technician. Costs associated with personal protective equipment (PPE) supplies for worker health and safety were based on the number of personnel

days during hydraulic dredging; transfer of dredged material to the SCA; during sheen treatment; dredge containment and monitoring; and during sediment sampling activities before and after dredging. PPE included three portable showers and three portable eyewash stations. Hard hats, safety glasses, face shields, and Tyvek boot covers were priced based on a consumption rate of one set per person per month whereas Tyvek coveralls and latex and PVC gloves were priced based on a consumption rate of two per person per month. Other costs associated with this task included the rental of 2 pickup trucks.

F.2.2.4 Construction Cost Contingency

Construction cost contingency was estimated as 25 percent of the sum of direct construction costs plus remedial design, project management, and construction management costs.

F.2.3 Operation And Maintenance

Operation and maintenance costs were estimated for each task by developing a total quantity, a crew, and a production rate. Operation and maintenance project tasks included O&M during construction; long-term O&M (30 years); and waste and O&M contingency.

F.2.3.1 O&M During Construction

Operation and maintenance during construction was the first task used to develop total O&M costs. This line item includes costs associated with off-hour security.

Off-Hour Security

Costs associated with off-hour security included labor for all off-work hours during the construction season (7 months) and labor for full-time (24-hours per day) security during the winter season (5 months). During the construction months (when laydown areas are mostly shut down and secured), a crew of three laborers was estimated for all non-work hours. During the winter season, a crew of one laborer was estimated for all non-work hours. For those lake-wide alternatives that occur over more than one year, full time security with a one-person crew, was estimated. The total costs for off-hour security during the construction season and winter seasons were dependent on the total duration of the construction season including dredging, capping and backfilling for each lake-wide alternative.

F.2.3.2 Long-Term O&M (30 years)

Long-term O&M was the second task used to develop total O&M costs. This line item includes costs associated with O&M management and technical support; natural recovery monitoring in the profundal zone; O&M for SCA for the first five years; O&M for the SCA for the remaining 25 years; lake cap monitoring; 5 year reviews; lake cap maintenance; sequenced capital and O&M costs associated with aeration in the profundal zone; and a pilot habitat study in SMU 5.

O&M Management and Technical Support

Costs associated with this task include annual labor costs for management and technical support including data management and reporting during the 30-year O&M period. The annual cost was converted to a NPV by multiplying the annual cost by 12.409. The estimated crew for management and technical support includes the following persons:

- Project Manager (1);
- Operations Manager (1);
- Engineer (1);
- Contract Administrator (1);
- Technical Writer (1);
- Purchasing Agent (1);
- Accountants (1);
- Scheduler (1); and
- Clerk (1).

The personnel on this list work less than half-time on the task each year, with the exception of the technical writer (full time) and the engineer (half-time).

Natural Recovery Monitoring - Profundal Zone

Costs associated with natural recovery monitoring in the profundal zone, included labor and analytical to collect and analyze sediment and water samples from the profundal zone. For costing purposes, it was assumed that sediment samples would be collected at a distribution of one sample per 10 acres and at a rate of one sample every two hours. Therefore, 5 acres could be sampled per hour. Costs for analysis included tests for mercury, VOCs, total solids, and total organic carbon (TOC). Water samples would also be collected at each sediment sample location and tested for metals (totals and dissolved), dissolved sulfides, chlorobenzenes, TSS, and turbidity. An additional 20 percent would be collected and analyzed for quality control. The estimated crew to collect the samples consisted of the following persons:

- Project Manager (1 at part time);
- Engineer (1);
- Clerk (1 at part time); and
- Laborer (2).

Each shift would use one survey boat. The annual cost was converted to a NPV by multiplying the annual cost by 12.409.

O&M for SCA – First Five years

Costs associated with O&M of the SCA for the first five years following capping of the SCA included, labor, equipment, supplies, and analytical costs. For costing purposes, it was assumed that monitoring would occur quarterly. Costs for this task were dependent on the number of groundwater monitoring wells installed around the perimeter of the SCA, which was dependent on the quantity of material to be dredged and consequently the size of the SCA. Therefore, these costs varied for each lake-wide alternative. One water sample would be collected from each monitoring well during each event and analyzed for total metals, VOCs, and dissolved sulfides. An additional 20 percent would be collected and analyzed for quality control.

Operation and maintenance costs for the SCA also include quarterly inspection of the cap over the SCA. For costing purposes it was assumed that annual replacement of a 0.5 acre of cap to a depth of 0.5 ft would be required (400 CY).

It was estimated that the O&M crew for the SCA could inspect the SCA and obtain the monitoring well samples in 80 hours per event. The full-time crew for O&M of the SCA includes one engineer and three laborers. Two pickup trucks would be used during the sampling events. The annual cost was calculated by converting to a NPV by multiplying the annual cost by 4.10.

O&M for SCA – Remaining 25 Years

Costs associated with O&M of the SCA for the remaining 25 years included, labor, equipment, supplies, and analytical costs after capping of the SCA. For costing purposes, it was assumed that inspections would occur semi-annually. One water sample would be collected from each monitoring well during each event and analyzed for total metals, VOCs, and dissolved sulfides. Quality control samples (i.e., matrix spike/matrix spike duplicate; field duplicate; trip blanks; and equipment blanks) were also included in the analytical costs. For costing purposes it was estimated that the O&M crew would obtain groundwater samples in 80 hours per event. The full-time crew for O&M of the SCA includes one engineer and three laborers. Two pickup trucks would be used during the sampling events. The annual cost was calculated by converting to a NPV by multiplying the annual cost by 8.309.

Lake Cap Monitoring

Costs associated with this task included labor and analytical costs to collect and analyze sediment and water samples from the capped area. For costing purposes, it was assumed that lake cap locations would be sampled at a frequency of one sample per year per two acres. Two samples will be collected from each location. It was estimated that the lake cap monitoring crew could obtain one sample every two hours.

Cap material will be tested for mercury, chlorobenzenes, total solids, and TOC. Water samples will be collected at each location and tested for metals (totals and dissolved), dissolved sulfides, chlorobenzenes, TSS, and turbidity. An additional 20 percent would be included for quality control. The crew estimated for lake cap monitoring is:

- Project Manager (1 at part time);
- Engineer (1);
- Clerk (1 at part time); and
- Laborer (2).

Each shift would use one survey boat. In addition, the cost for a bathymetric survey over the capped area was also included. Costs associated with this strategy were dependent on the total capped area and therefore, varied for each lake-wide alternative. The annual cost was converted to a NPV by multiplying the annual cost by 12.409.

Five-Year Reviews

Costs associated with this task included labor and supplies to perform a review of the effectiveness of the remedy every five years for 30 years after the end of construction. A duration of two months was estimated for each five-year review. The assumed crew for the five-year reviews includes the following persons:

- Project Manager (1);
- Operations Manager (1);
- Engineer (4);
- Certified Industrial Hygienist (1);
- Contract Administrator (1 at part time);
- Purchasing Agent (1 at part time);
- Accountants (1 at part time);
- Scheduler (1 at part time); and
- Clerk (1 at part time).

The annual cost for this task was converted to a NPV by multiplying the annual cost by 2.156.

Lake Cap Maintenance

Costs associated with this task included labor, materials and equipment to repair 10 acres of the lake cap every five years. Costs include maintenance on the sand, rock and gravel that makeup the cap. Costs for dredging were not included in this cost estimate. The annual cost for this task was converted to a NPV by multiplying the annual cost by 2.156. Crews for sand and gravel cap repair (placed hydraulically) and rock cap repair (placed mechanically) were estimated. The cap repair crews and production rates were equivalent to the crews identified in the descriptions of Sediment Cap tasks in Section F.2.1.4. For costing purposes it was assumed that the volume of lake cap requiring sand maintenance would be 10 acres by 0.5 ft in depth

(8,000 CY). Additionally, it was assumed that forty hours would be required to mobilize, forty hours to demobilize, and eighty hours for material placement for each crew.

For maintenance of the rock and gravel layers it was assumed that the volume requiring maintenance would be 10 acres by 1.0 ft in depth (16,000 CY). Additionally, it was assumed that forty hours would be required to mobilize, forty hours to demobilize, 229 hours for rock placement, and 168 hours for gravel placement for each crew.

Aeration in Profundal Zone - Capital

The capital costs of aeration in the profundal zone were estimated as a lump sum based on vendor quotes. These estimates were based on similar scopes of work at other lakes.

Aeration in Profundal Zone - Operation

The annual O&M cost of the aeration system was estimated as a lump sum cost. The cost was estimated by vendors, based on a similar scope of work at other lakes. The annual cost was estimated to be incurred for five years. As stated in Sections 3, 4, and 5 of the FS, aeration has been proposed for implementation following a pilot study. It is unknown at this time if aeration would be effective and/or would have any negative consequences. The negative consequences have been defined in Section 3.3.9. Since the proposed implementation is based on a pilot study followed by possible full-scale implementation, it was determined that it would not be appropriate to include full-scale operation for 30-years in the cost estimates. The actual cost of the operation cannot be accurately estimated at this time. In the event long-term operation is considered necessary, operation will be continued. A net present value factor of 4.1 was applied to the annual cost.

SMU 5 Habitat Pilot Study

The details of the habitat pilot study to be conducted in SMU 5 have not been developed. The goal of the pilot study is to establish vegetation in the SMU. A lump sum cost of \$100,000 per year for five years was included in the cost estimate. A net present value factor of 4.1 was applied to the annual cost.

SMU 7 Barrier Wall Pump and Treat

An estimate for the pumping rate from behind the barrier wall to be constructed along the SMU 7 was developed based on the estimated pumping rate behind the Willis/Semet IRM barrier wall. The estimated pumping rate behind the Willis/Semet wall is 90 gpm and the approximate length of the Willis/Semet barrier wall is 3,000 linear feet. The pumping rate behind the wall to be constructed along SMU 7 was estimated by scaling the estimated rate for the Willis/Semet wall by the ratio of the length of the two walls. The cost is calculated by multiplying the estimated annual pumping volume by the estimated water treatment cost per gallon described in Section 2.2 above, and then applying the appropriate net present value factor.

F.2.3.3 Waste and O&M Contingency

Waste and O&M contingency was the third task used to develop total O&M costs. This line item includes costs associated with waste management and disposal and O&M contingency only.

O&M Contingency

An O&M contingency in the amount of 25 percent of the net present value O&M costs was included.

SECTION F.3

COST SENSITIVITY

Sensitivity analyses have been performed to assess the significance of changing principal features of the lake-wide Alternative C. Factors that have a relatively high degree of uncertainty and that, with only a small change in their value, could significantly affect the overall cost of the alternatives are evaluated. Factors considered in the cost sensitivity analysis are:

- stabilization and preload of SCA area
- inclusion of geosynthetics in SCA cover
- levels of supernatant treatment
- volume of sediments to be dredged
- areal extent of sediment cap
- scope of work in profundal zone
- duration of O&M period
- remedy failure by damage to sediment cap
- remedy failure of chemical isolation effectiveness of the cap
- habitat failure

F.3.1 Stabilization And Preload Of SCA Area

Due to the condition of the existing materials in the wastebeds, some improvement of geotechnical properties may be desired prior to construction of the SCA. The cost for stabilization of the wastebed materials under the SCA dikes by deep soil mixing over 25 percent of the area to a depth of 50 ft is estimated. Also, the cost for preloading to a depth equal to the sediment depth, over the footprint of the bottom of the SCA is included. Soil would be imported, placed over the footprint of the bottom of the SCA (not over the dike area) and then removed prior to filling of the SCA. This would allow the existing wastebed materials to consolidate and most likely improve in geotechnical properties. It is possible that, upon further investigation and analysis, this work would not be necessary. It is considered likely that some work to improve the geotechnical properties of the existing wastebed materials will be necessary, therefore, the cost for stabilization and preloading are included in the estimate for each alternative presented in Tables F.1 through F.26. The cost of Alternative C with the cost of stabilization and preloading is \$243 million. The cost of Alternative C without the cost of stabilization and preloading is \$221 million and presented in Table F.28. The cost difference for stabilization and preloading is \$22 million.

F.3.2 Inclusion of Geosynthetics in SCA Cover

Geosynthetics have been included in the lake-wide cost estimates for the SCA liner but not the cover. The cost of Alternative C with geosynthetics in the liner and without geosynthetics in the cover system is \$243 million. The cost of Alternative C with a composite geosynthetic cover system (consisting of geosynthetic clay liner, geomembrane, and geocomposite drainage net) in the SCA cover is \$248 million. The cost difference for geosynthetics in the SCA cover is \$5 million.

F.3.3 Levels of Supernatant Treatment

Five levels of supernatant treatment have been described in Subsection 4.12 of the FS. The cost of Alternative C with the five water treatment levels: primary, enhanced primary, enhanced primary with multi-media filtration, advanced, and enhanced primary with organics removal; is \$202 million, \$213 million, \$220 million, and \$243 million, and \$218 million. The cost sensitivity for water treatment is a range of \$0 to \$41 million.

F.3.4 Volume of Sediments to be Dredged

The volume to be dredged for each alternative was estimated based on existing analytical data available for Onondaga Lake. The volumes include side sloughing and an overdredge factor. Additional data may be collected which would require an increase in the areal extent of dredging or an increase in the depth of dredging. The cost of Alternative C with the current estimate of dredge volumes is \$243 million. The cost of Alternative C with a 30% increase in the estimated volume of the material to be dredged is \$257 million. The cost sensitivity for dredge volumes is \$14 million.

F.3.5 Areal Extent of Sediment Cap

The cost of a 25 percent increase in the extent of the lake area to be capped is presented in Table F.42. The extent of each SMU to be capped is based on existing analytical data available for Onondaga Lake. Additional data may be collected which might require an increase in the areal extent of capping. The cost of Alternative C with the current estimated cap area is \$243 million. The cost of Alternative C with a 25% increase in the area of cap is \$267 million. The cost sensitivity for area of cap is \$24 million.

F.3.6 Scope of Work in Profundal Zone

The scope of work in the profundal zone consists of aeration (oxygenation) and thin-layer capping. The scope of the aeration (oxygenation) effort was based on available data, and would be confirmed during the proposed pilot aeration study. Similarly, the area subject to thin-layer capping was estimated at 20 acres for cost estimating purposes in this FS. Both items could vary depending on the success of the aeration (oxygenation) pilot study and MNR. The projected cost of doubling the number of aeration units (from 4 units to 8 units) needed to aerate the profundal zone, and the cost of increasing the thin layer cap in the profundal zone from 20 acres to 80 acres, is presented in Table F.44. The cost of Alternative C with the current estimated scope in the profundal zone is \$243 million. The cost of Alternative C with the increased scope in the

profundal zone is \$246 million. The cost sensitivity for the scope of work in the profundal zone is \$3 million.

F.3.7 Duration of O&M Period

The cost decrease as a result of decreasing the O&M period from 30 years to 20 years is presented in Table F.46. The cost of Alternative C with the 30 year O&M period is \$243 million. The cost of Alternative C with a 20 year O&M period is \$239 million. The cost sensitivity for the O&M period is \$4 million.

F.3.8 Discount Factor

The discount factor is used to calculate the net present value of cost elements that occur in the estimated 30 year O&M period. The cost of Alternative C, at the EPA-recommended discount factor of 7 percent, is \$243 million. Assuming this discount factor could vary from 5 percent to 9 percent, the cost of Alternative C could vary from \$239 million to \$248 million. The cost sensitivity of the discount factor is \$9 million. Tables F.50 and F.52 present the costs at 5 percent and 9 percent discount factors, respectively.

F.3.9 Remedy Failure By Damage to Sediment Cap

Potential failure modes of the sediment cap by an extreme episodic event are described in Appendix H, capping issues. The first mode of cap failure is caused by damage due to ice or wave action. Repair from this type of event would require reconstruction of the sediment cap. In accounting for such damage repair, it was assumed that no more than 10% of the total area capped in any SMU would require repair, and that such repairs would be made to similar specifications and using similar materials as the original construction.

SMU 6 is used as the basis for calculating the area requiring repair because it is the largest lake-edge SMU and will give the largest area and therefore the most conservative cost. The cap that would be constructed on SMU 6 is 94 acres. The cost to re-construct a cap over 10% of this area, or 9.4 acres, is \$4 million and presented in Table F.52. Such a major repair should be considered in addition to normal cap maintenance and should be limited to a one-time occurrence for purposes of cost estimates.

F.3.10 Remedy Failure By Slope Failure in the ILWD

The unlikely event of slope failure of the sediment cap in the ILWD is described in Subsection 4.4.1.2.4. Any damage to the cap resulting from a slump could be repaired by some material removal at the head of the slump and subsequent replacement of the cap. It was assumed that no more than 10 percent of the total area capped in SMU 1 would require repair, and that such repairs would be made to similar specifications and using similar materials as the original construction. It is estimated that the head of the slope requiring removal would be 5 percent of the area of SMU 1 and require a depth of removal of 5 ft. It was assumed that a pit would be excavated into the SCA and the removed material would be consolidated in the excavation and the SCA cover reconstructed over this area. The cost for this repair is estimated

at \$11 million. Such a major repair should be considered in addition to normal cap maintenance and should be limited to a one-time occurrence for purposes of cost estimates.

F.3.11 Remedy Failure of Chemical Isolation Effectiveness of Cap

Potential failure modes of the chemical isolation effectiveness of the cap are described in Appendix H, capping issues. The cause for such an effectiveness failure might be the mischaracterization of sediment physical and chemical properties during design. Since any design of a capping remedy would be based on a refined sediment characterization effort, such a mischaracterization would be limited to a missed hotspot of high sediment contaminant concentrations or pooled NAPL. The area subject to any such mischaracterization was assumed limited to no more than 5 percent of the total area capped in any SMU. Since, the mischaracterization would essentially be in the form of isolated hotspot(s), two repair approaches are possible. First, the hotspot could be removed. In this case, the cost estimate of repair would be based on an isolation of the area using sheet piles, removal of both the cap and contaminated material by dredging, disposal of the removed material at either the SCA or at an off-site landfill, and replacement of the cap. A second approach would involve the replacement or supplement of the existing cap with a new reactive cap. The cost of such a repair (or construction upgrade) would be based on the isolation of the hotspot with sheet piles, removal of the existing cap, and subsequent placement of the reactive layer followed by conventional sand isolation layers and armor layer. Removal of the existing cap would be necessary if the hotspot is in shallow water, but in deeper water, the reactive cap could be placed over the existing cap.

SMU 6 is used as the basis for calculating the area requiring repair because it is the largest lake-edge SMU and will give the largest area and therefore the most conservative cost. The area of SMU to be capped is 94 acres. The cost to remediate a failure of chemical isolation over 5% of this area through the first remediation approach (removal of hotspot and recapping within sheet piles) is \$ 16 million and is presented in Table F.56. The cost to remediate a failure of chemical isolation of this area through the second remediation approach (removal of contaminated cap material, reactive cap placement, and cap replacement) is \$17 million and is presented in Table F.58. Such a major repair should be considered in addition to normal cap maintenance and should be limited to a one-time occurrence for purposes of cost estimates.

F.3.12 Habitat Failure

It is possible that some habitat features installed during remediation would have to be replaced due to damage from natural events. The cost for habitat construction in Alternative C (including planting of vegetation, setting large woody debris structures, and installing riprap) is approximately \$2 million. It is estimated that up to 50 percent of this work could possibly have to be reconstructed, for a cost sensitivity of \$1 million.

APPENDIX F

TABLES

**TABLE F.1
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE B**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Total Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 0 | 0 | 84 | 646,000 | 45,700 | 87,400 |
| 2 | 0 | 0 | 16 | 116,600 | 4,200 | 1,000 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | 0 | 0 | 20 | 11,831 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 22 | 223,000 | 356 | 1,837,931 | 226,000 | 195,100 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 743 | | 4,595 | 595 | 1,394 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 46 | | 287 | 37 | 87 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 2 | | 14 | 2 | 4 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.3 | | 2.1 | 0.3 | 0.6 |

| | | |
|-----------------|----|----|
| SCA Size | 28 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 2 MO |
| Capping Duration: | 16 MO |
| In Lake Construction Duration ⁽²⁾ : | 18 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.2
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE B**

| Direct Construction Costs | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,396,136 | 650,016 | 1,510,918 | 11,666 | 3,568,737 | |
| Demobilization | 1 | LS | 1,224,899 | 421,500 | 48,470 | 43,276 | 1,738,145 | |
| Interim Year Startup | 2 | EA | 795,723 | 738,261 | 19,958 | 0 | 1,553,943 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | |
| Clearing and Grubbing | 31 | AC | 0 | 0 | 0 | 165,527 | 165,527 | |
| Install Fence | 5,887 | LF | 0 | 0 | 0 | 106,033 | 106,033 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 40 | EA | 0 | 144,033 | 0 | 0 | 144,033 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 223,000 | CY | 1,363,568 | 567,233 | 79,477 | 0 | 2,010,278 | |
| Transfer to SCA | 223,000 | CY | 553,714 | 100,260 | 36,427 | 0 | 690,402 | |
| Operation of SCA | 1 | LS | 59,590 | 23,834 | 6,623 | 61,355 | 151,403 | |
| Sheen Treatment | 2 | MO | 55,047 | 1,272 | 4,503 | 77,404 | 138,225 | |
| Dredge Containment | 223,000 | CY | 20,180 | 14,058 | 115,318 | 0 | 149,556 | |
| Dredge Monitoring | 223,000 | CY | 132,095 | 115,966 | 13,246 | 53,346 | 314,653 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Post Dredging | 22 | AC | 83,771 | 22,097 | 4,455 | 23,150 | 133,473 | |
| <i>Sediment Cap</i> | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | |
| Sand | 356 | AC | 20,396,727 | 7,597,860 | 16,943,703 | 0 | 44,938,290 | |
| Rock | 356 | AC | 3,112,123 | 1,084,065 | 6,032,601 | 469,352 | 10,698,141 | |
| Gravel | 356 | AC | 2,656,850 | 925,421 | 5,371,870 | 0 | 8,954,141 | |
| <i>Backfill</i> | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | |
| Construct SCA | 28 | AC | 1,685,252 | 642,472 | 2,258,502 | 819,837 | 5,406,064 | |
| Preloading | 1 | LS | 566,181 | 72,958 | 2,365,399 | 16,121 | 3,020,659 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 5,650,045 | 5,650,045 | |
| Construct Cap over SCA | 28 | AC | 268,060 | 110,542 | 1,567,382 | 0 | 1,945,984 | |
| <i>Water Treatment</i> | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 456,713 | 375,717 | 1,482,263 | 22,465,080 | 24,779,773 | |
| Water treatment for dredged material | 288,785,000 | GA | 0 | 0 | 0 | 1,734,542 | 1,734,542 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 5,163,514 | 0 | 0 | 0 | 5,163,514 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | |
| Project Management | 1 | LS | 3,872,635 | 0 | 0 | 0 | 3,872,635 | |
| Construction Management | 1 | LS | 5,163,514 | 0 | 0 | 0 | 5,163,514 | |
| Health and Safety | 743 | HR | 172,642 | 8,831 | 164,719 | 0 | 346,192 | |
| <i>Construction Cost Contingency</i> | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 35,965,734 | 0 | 0 | 0 | 35,965,734 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 180,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | |
| Rail spur O&M | | 0 | LS | 0 | 0 | 0 | 0 | 0 |
| Road repairs | | 0 | MI | 0 | 0 | 0 | 0 | 0 |
| Off-hour security | 1.000 | 19 | MO | 647,853 | 0 | 0 | 0 | 647,853 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 26,051 | 250,848 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 13,025 | 239,755 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,066 | 52,443 | 10,573 | 162,117 | 4,246,362 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 413,835 | 164,209 | 944,075 | 1,522,118 | 3,281,687 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 1,510,926 |
| activity | 12.409 | 0 | YR | 0 | 0 | 0 | 0 | 0 |
| <i>Waste and O&M Contingency</i> | | | | | | | | |
| Waste and O&M Contingency | 1.00 | 1 | LS | 6,071,039 | 0 | 0 | 0 | 6,071,039 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 31,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | 211,000,000 | |

**TABLE F.3
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.4
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C**

| Direct Construction Costs | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | |
| <i>Backfill</i> | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | |
| <i>Water Treatment</i> | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | |
| Project Management | 1 | LS | 4,510,393 | 0 | 0 | 0 | 4,510,393 | |
| Construction Management | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | |
| <i>Construction Cost Contingency</i> | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 41,955,279 | 0 | 0 | 0 | 41,955,279 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 210,000,000 | |
| Operation and Maintenance | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 289,360 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,336,278 | 0 | 0 | 0 | 6,336,278 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 33,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | 243,000,000 | |

**TABLE F.5
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE D**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 45 | 354,000 | 84 | 655,800 | 73,600 | 12,000 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | 0 | 0 | 20 | 11,831 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 99 | 881,000 | 356 | 1,870,451 | 278,100 | 106,300 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 2,937 | | 4,676 | 732 | 759 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 184 | | 292 | 46 | 47 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 9 | | 15 | 2 | 2 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 1.3 | | 2.1 | 0.3 | 0.3 |

| | | |
|-----------------|----|----|
| SCA Size | 84 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 9 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.6
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE D**

| Direct Construction Costs | | | | | | | | |
|---|---------------|------|------------|-----------|------------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,396,136 | 650,016 | 1,510,918 | 11,666 | 3,568,737 | |
| Demobilization | 1 | LS | 1,224,899 | 421,500 | 48,470 | 43,276 | 1,738,145 | |
| Interim Year Startup | 3 | EA | 995,804 | 771,984 | 19,958 | 477 | 1,788,224 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | |
| Clearing and Grubbing | 87 | AC | 0 | 0 | 0 | 466,220 | 466,220 | |
| Install Fence | 9,165 | LF | 0 | 0 | 0 | 165,062 | 165,062 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 62 | EA | 0 | 223,251 | 0 | 0 | 223,251 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 881,000 | CY | 4,685,077 | 2,232,099 | 313,988 | 0 | 7,231,164 | |
| Transfer to SCA | 881,000 | CY | 2,187,320 | 396,096 | 143,911 | 0 | 2,727,328 | |
| Operation of SCA | 1 | LS | 235,422 | 94,162 | 26,166 | 242,122 | 597,871 | |
| Sheen Treatment | 7 | MO | 249,396 | 5,766 | 4,503 | 350,931 | 610,596 | |
| Dredge Containment | 881,000 | CY | 73,541 | 63,133 | 261,254 | 0 | 397,928 | |
| Dredge Monitoring | 881,000 | CY | 782,571 | 458,144 | 52,331 | 211,090 | 1,504,136 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Post Dredging | 99 | AC | 373,591 | 99,141 | 19,988 | 103,919 | 596,639 | |
| <i>Sediment Cap</i> | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 750,177 | 0 | 1,230,039 | |
| Sand | 356 | AC | 16,944,931 | 7,733,447 | 17,243,651 | 0 | 41,922,029 | |
| Rock | 356 | AC | 1,489,448 | 591,025 | 3,286,924 | 255,726 | 5,623,123 | |
| Gravel | 356 | AC | 2,671,179 | 1,138,501 | 6,558,028 | 0 | 10,367,708 | |
| <i>Backfill</i> | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | |
| Construct SCA | 84 | AC | 3,457,474 | 1,269,238 | 5,044,923 | 2,530,448 | 12,302,083 | |
| Preloading | 1 | LS | 2,315,457 | 298,399 | 9,674,458 | 65,933 | 12,354,247 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 10,191,686 | 10,191,686 | |
| Construct Cap over SCA | 84 | AC | 932,703 | 384,625 | 5,478,086 | 0 | 6,795,415 | |
| <i>Water Treatment</i> | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 22,465,080 | 26,219,436 | |
| Water treatment for dredged material | 1,140,895,000 | GA | 0 | 0 | 0 | 6,852,354 | 6,852,354 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,613,578 | 0 | 0 | 0 | 6,613,578 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | |
| Project Management | 1 | LS | 4,960,183 | 0 | 0 | 0 | 4,960,183 | |
| Construction Management | 1 | LS | 6,613,578 | 0 | 0 | 0 | 6,613,578 | |
| Health and Safety | 2,937 | HR | 682,053 | 34,888 | 360,009 | 0 | 1,076,949 | |
| <i>Construction Cost Contingency</i> | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 46,227,344 | 0 | 0 | 0 | 46,227,344 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 231,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | |
| Off-hour security | 1.000 | 26 | MO | 1,244,589 | 0 | 0 | 0 | 1,244,589 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 46,946 | 336,517 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 23,609 | 327,692 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,352,038 | 0 | 0 | 0 | 6,352,038 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 33,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | 264,000,000 | |

**TABLE F.7
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE D2**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 45 | 354,000 | 84 | 655,800 | 73,600 | 12,000 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 20 | 124,000 | 36 | 153,800 | 29,700 | 0 |
| 6 | 28 | 234,000 | 94 | 375,000 | 83,600 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 20 | 11,831 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 149 | 1,180,000 | 392 | 2,059,151 | 314,300 | 17,200 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 3,933 | | 5,148 | 827 | 123 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 246 | | 322 | 52 | 8 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 12 | | 16 | 3 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 1.8 | | 2.3 | 0.4 | 0.1 |

| | | |
|-----------------|-----|----|
| SCA Size | 112 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | | |
|--|----|----|
| Dredging Duration: | 12 | MO |
| Capping Duration: | 19 | MO |
| In Lake Construction Duration ⁽²⁾ : | 21 | MO |
| In Lake Construction Duration ⁽³⁾ : | 3 | YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.8
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE D2**

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|-----------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| Mobilization/ Demobilization | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | | 594,000 | |
| Mobilization | 1 | LS | 1,396,136 | 650,016 | 1,510,918 | 11,666 | | 3,568,737 | |
| Demobilization | 1 | LS | 1,224,899 | 421,500 | 48,470 | 43,276 | | 1,738,145 | |
| Interim Year Startup | 3 | EA | 995,804 | 771,984 | 19,958 | 477 | | 1,788,224 | |
| Site Preparation and Facility Construction | | | | | | | | | |
| Clearing and Grubbing | 115 | AC | 0 | 0 | 0 | 615,503 | | 615,503 | |
| Install Fence | 10,344 | LF | 0 | 0 | 0 | 186,303 | | 186,303 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Install Work Lighting | 69 | EA | 0 | 248,457 | 0 | 0 | | 248,457 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | | 3,427,024 | |
| Dredging - SMU 1 thru SMU 7 | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Pre-Dredging | 392 | AC | 1,481,610 | 392,881 | 79,210 | 1,066,264 | | 3,019,965 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | | 154,440 | |
| Hydraulic Dredging with Cutter Head | 1,180,000 | CY | 6,276,010 | 2,989,644 | 420,552 | 0 | | 9,686,206 | |
| Transfer to SCA | 1,180,000 | CY | 2,929,910 | 530,526 | 192,753 | 0 | | 3,653,189 | |
| Operation of SCA | 1 | LS | 315,321 | 126,119 | 35,046 | 324,588 | | 801,074 | |
| Sheen Treatment | 9 | MO | 314,413 | 7,270 | 4,503 | 442,456 | | 768,641 | |
| Dredge Containment | 1,180,000 | CY | 108,281 | 95,083 | 356,264 | 0 | | 559,629 | |
| Dredge Monitoring | 1,180,000 | CY | 1,048,407 | 613,632 | 70,092 | 282,218 | | 2,014,349 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Post Dredging | 149 | AC | 562,444 | 149,227 | 30,086 | 156,393 | | 898,150 | |
| Sediment Cap | | | | | | | | | |
| Cap Containment | 392 | AC | 277,049 | 250,297 | 817,824 | 0 | | 1,345,170 | |
| Sand | 392 | AC | 18,651,569 | 8,512,248 | 18,983,093 | 0 | | 46,146,911 | |
| Rock | 392 | AC | 240,240 | 95,653 | 531,849 | 41,378 | | 909,119 | |
| Gravel | 392 | AC | 3,021,355 | 1,287,813 | 7,411,833 | 0 | | 11,721,001 | |
| Backfill | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | | 0 | |
| Habitat & Vegetation Restoration | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | | 64,417 | |
| SCA Construction | | | | | | | | | |
| Construct SCA | 112 | AC | 4,174,650 | 1,513,695 | 6,265,733 | 3,384,978 | | 15,339,056 | |
| Preloading | 1 | LS | 3,174,124 | 408,972 | 13,259,401 | 90,365 | | 16,932,863 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 11,841,693 | | 11,841,693 | |
| Construct Cap over SCA | 112 | AC | 1,274,205 | 525,452 | 7,485,799 | 0 | | 9,285,457 | |
| Water Treatment | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 22,465,080 | | 26,219,436 | |
| Water treatment for dredged material | 1,528,100,000 | GA | 0 | 0 | 0 | 9,177,839 | | 9,177,839 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | | 305,649 | |
| Studies, Design, and Planning | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 7,423,466 | 0 | 0 | 0 | | 7,423,466 | |
| Engineering and Const. Oversight | | | | | | | | | |
| Project Management | 1 | LS | 5,567,600 | 0 | 0 | 0 | | 5,567,600 | |
| Construction Management | 1 | LS | 7,423,466 | 0 | 0 | 0 | | 7,423,466 | |
| Health and Safety | 3,933 | HR | 913,532 | 46,728 | 460,280 | 0 | | 1,420,540 | |
| Construction Cost Contingency | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 51,931,843 | 0 | 0 | 0 | | 51,931,843 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 260,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| O&M During Construction and Off Season | | | | | | | | | |
| Off-hour security | 1.000 | 31 | MO | 1,415,311 | 0 | 0 | 0 | 1,415,311 | 1,415,311 |
| Long Term O&M (30 years) | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 54,815 | 89,947 | 368,782 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 27,408 | 43,237 | 359,259 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 128,905 | 57,746 | 11,642 | 178,231 | 376,525 | 4,672,297 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| Waste and O&M Contingency | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,473,695 | 0 | 0 | 0 | 6,473,695 | 6,473,695 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 34,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 294,000,000 | |

**TABLE F.9
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE E**

| SMU | DREDGING | | CAPPING | | | | |
|--------------------------|-------------------|-------------------|---------------|--------------------------|-------------|-----------|------------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) | Backfill (CY) |
| <i>Quantities</i> | | | | | | | |
| 1 | 84 | 4,028,000 | 0 | 0.0 | 0.0 | 0.0 | 2,955,000 |
| 2 | 16 | 533,000 | 0 | 0.0 | 0.0 | 0.0 | 146,200 |
| 3 | 29 | 380,000 | 0 | 0.0 | 0.0 | 0.0 | 141,000 |
| 4 | 75 | 2,170,000 | 0 | 0.0 | 0.0 | 0.0 | 1,885,000 |
| 5 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0 |
| 6 | 94 | 2,650,000 | 0 | 0.0 | 0.0 | 0.0 | 2,104,000 |
| 7 | 38 | 1,485,000 | 0 | 0.0 | 0.0 | 0.0 | 359,300 |
| 8 | | | 20 | 11,831 | 0 | 0.0 | |
| 9 | | | | | | | |
| TOTAL | 336 | 11,246,000 | 20 | 11,831 | 0 | 0 | 7,590,500 |
| <i>Durations</i> | | | | | | | |
| Number Crews: | | 4 | | 0 | 0 | 0 | 4 |
| Production Rate (CY/HR): | | 600 | | 0 | 0 | 0 | 400 |
| Duration (HR): | | 18,743 | | 0 | 0 | 0 | 18,977 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 | 8 |
| Duration (DA): | | 1,171 | | 0 | 0 | 0 | 1,186 |
| Days/Month: | | 20 | | 20 | 20 | 20 | 20 |
| Duration (MO): | | 59 | | 0 | 0 | 0 | 59 |
| Months/Year: | | 7 | | 7 | 7 | 7 | 7 |
| Duration (YR): | | 8.4 | | 0.0 | 0.0 | 0.0 | 8.5 |

| | | |
|-----------------|-----|----|
| SCA Size | 262 | AC |
| SCA Dike Height | 50 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 59 MO |
| Capping/Backfilling Duration: | 59 MO |
| In Lake Construction Duration ⁽²⁾ : | 61 MO |
| In Lake Construction Duration ⁽³⁾ : | 9 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.10
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE E

| Direct Construction Costs | | | | | | | | | |
|---|----------------|------|-------------|------------|-------------|-------------|-----------|----------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,336,158 | 692,087 | 1,508,067 | 11,666 | 0 | 3,547,979 | |
| Demobilization | 1 | LS | 1,164,921 | 463,927 | 45,619 | 43,276 | 0 | 1,717,743 | |
| Interim Year Startup | 8 | EA | 3,521,443 | 950,753 | 57,024 | 477 | 0 | 4,529,697 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 265 | AC | 0 | 0 | 0 | 1,414,692 | 0 | 1,414,692 | |
| Install Fence | 14,143 | LF | 0 | 0 | 0 | 254,725 | 0 | 254,725 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 95 | EA | 0 | 342,079 | 0 | 0 | 0 | 342,079 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 336 | AC | 1,270,539 | 336,903 | 67,924 | 914,369 | 0 | 2,589,734 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 11,246,000 | CY | 64,086,297 | 28,605,815 | 4,008,074 | 0 | 0 | 96,700,187 | |
| Transfer to SCA | 11,246,000 | CY | 13,960,948 | 2,528,093 | 918,517 | 0 | 0 | 17,407,558 | |
| Operation of SCA | 1 | LS | 1,502,583 | 600,988 | 167,003 | 1,545,752 | 0 | 3,816,326 | |
| Sheen Treatment | 45 | MO | 1,615,960 | 37,363 | 4,503 | 2,273,992 | 0 | 3,931,818 | |
| Dredge Containment | 11,246,000 | CY | 238,348 | 214,704 | 711,983 | 0 | 0 | 1,165,036 | |
| Dredge Monitoring | 11,246,000 | CY | 8,715,937 | 5,848,226 | 668,012 | 1,343,977 | 0 | 16,576,153 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 336 | AC | 1,270,539 | 336,903 | 67,924 | 353,042 | 0 | 2,028,408 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 20 | AC | 13,896 | 12,780 | 1,247 | 0 | 0 | 27,923 | |
| Sand | 20 | AC | 117,619 | 48,907 | 109,070 | 0 | 0 | 275,596 | |
| Rock | 20 | AC | 0 | 0 | 0 | 0 | 0 | 0 | |
| Gravel | 20 | AC | 0 | 0 | 0 | 0 | 0 | 0 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 7,590,500 | CY | 68,750,737 | 31,378,582 | 70,652,409 | 0 | 0 | 170,781,728 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 262 | AC | 50,843,711 | 20,105,441 | 55,850,541 | 8,430,652 | 0 | 135,230,345 | |
| Preloading | 1 | LS | 27,123,203 | 3,494,322 | 113,290,310 | 772,096 | 0 | 144,679,931 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 56,580,228 | 0 | 56,580,228 | |
| Stabilization under entire SCA | 1 | LS | 0 | 0 | 0 | 0 | 0 | 0 | |
| Construct Cap over SCA | 262 | AC | 2,241,075 | 972,163 | 13,840,203 | 0 | 0 | 17,053,441 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | 0 | 48,684,516 | |
| Water treatment for dredged material | 22,492,000,000 | GA | 0 | 0 | 0 | 134,083,501 | 0 | 134,083,501 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | 0 | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 26,116,226 | 0 | 0 | 0 | 0 | 26,116,226 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 17,410,818 | 0 | 0 | 0 | 0 | 17,410,818 | |
| Construction Management | 1 | LS | 26,116,226 | 0 | 0 | 0 | 0 | 26,116,226 | |
| Health and Safety | 18,743 | HR | 4,353,214 | 222,671 | 1,646,820 | 0 | 0 | 6,222,705 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 236,678,126 | 0 | 0 | 0 | 0 | 236,678,126 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 1,183,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 118 | MO | 5,897,081 | 0 | 0 | 0 | 5,897,081 | 5,897,081 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 86,420 | 5,702 | 4,424 | 79,509 | 176,056 | 721,828 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 39,890 | 55,719 | 462,979 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 6,577 | 2,946 | 594 | 12,732 | 22,849 | 283,538 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 158,443 | 66,140 | 924,758 | 0 | 1,149,342 | 2,477,981 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 5,052,958 | 0 | 0 | 0 | 5,052,958 | 5,052,958 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 31,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 1,214,000,000 | |

**TABLE F.11
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE F1**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 45 | 354,000 | 84 | 655,800 | 73,600 | 12,000 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 24 | 140,000 | 60 | 248,900 | 40,900 | 0 |
| 6 | 33 | 245,000 | 123 | 471,000 | 103,900 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 154 | 91,100 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 158.0 | 1,207,000 | 579 | 2,329,520 | 345,800 | 17,200 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 4,023 | | 5,824 | 910 | 123 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 251 | | 364 | 57 | 8 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 13 | | 18 | 3 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 1.8 | | 2.6 | 0.4 | 0.1 |

| | | |
|-----------------|-----|----|
| SCA Size | 112 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | | |
|--|----|----|
| Dredging Duration: | 13 | MO |
| Capping Duration: | 21 | MO |
| In Lake Construction Duration ⁽²⁾ : | 23 | MO |
| In Lake Construction Duration ⁽³⁾ : | 4 | YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.12
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE F1

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|-----------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | | 594,000 | |
| Mobilization | 1 | LS | 1,396,136 | 650,016 | 1,510,918 | 11,666 | | 3,568,737 | |
| Demobilization | 1 | LS | 1,224,899 | 421,500 | 48,470 | 43,276 | | 1,738,145 | |
| Interim Year Startup | 4 | EA | 1,375,152 | 1,141,115 | 29,938 | 477 | | 2,546,682 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 115 | AC | 0 | 0 | 0 | 615,503 | | 615,503 | |
| Install Fence | 10,344 | LF | 0 | 0 | 0 | 186,303 | | 186,303 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Install Work Lighting | 69 | EA | 0 | 248,457 | 0 | 0 | | 248,457 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Pre-Dredging | 579 | AC | 2,187,813 | 580,115 | 116,959 | 1,574,246 | | 4,459,133 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | | 154,440 | |
| Hydraulic Dredging with Cutter Head | 1,207,000 | CY | 6,419,047 | 3,058,051 | 430,175 | 0 | | 9,907,273 | |
| Transfer to SCA | 1,207,000 | CY | 2,996,810 | 542,666 | 197,163 | 0 | | 3,736,639 | |
| Operation of SCA | 1 | LS | 322,536 | 129,005 | 35,848 | 331,845 | | 819,233 | |
| Sheen Treatment | 9 | MO | 318,522 | 7,364 | 4,503 | 448,209 | | 778,598 | |
| Dredge Containment | 1,207,000 | CY | 114,673 | 100,962 | 373,746 | 0 | | 589,382 | |
| Dredge Monitoring | 1,207,000 | CY | 1,072,256 | 627,673 | 71,696 | 288,528 | | 2,060,152 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Post Dredging | 158 | AC | 597,664 | 158,508 | 31,957 | 166,168 | | 954,296 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 579 | AC | 406,838 | 369,662 | 1,172,783 | 0 | | 1,949,283 | |
| Sand | 579 | AC | 21,099,535 | 9,630,018 | 21,475,604 | 0 | | 52,205,158 | |
| Rock | 579 | AC | 240,240 | 95,653 | 531,849 | 41,378 | | 909,119 | |
| Gravel | 579 | AC | 3,319,920 | 1,415,350 | 8,154,457 | 0 | | 12,889,726 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 112 | AC | 4,174,650 | 1,513,695 | 6,265,733 | 3,384,978 | | 15,339,056 | |
| Preloading | 1 | LS | 3,174,124 | 408,972 | 13,259,401 | 90,365 | | 16,932,863 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 11,841,693 | | 11,841,693 | |
| Construct Cap over SCA | 112 | AC | 1,274,205 | 525,452 | 7,485,799 | 0 | | 9,285,457 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 22,465,080 | | 26,219,436 | |
| Water treatment for dredged material | 1,563,065,000 | GA | 0 | 0 | 0 | 9,387,926 | | 9,387,926 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 7,851,591 | 0 | 0 | 0 | | 7,851,591 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 5,888,694 | 0 | 0 | 0 | | 5,888,694 | |
| Construction Management | 1 | LS | 7,851,591 | 0 | 0 | 0 | | 7,851,591 | |
| Health and Safety | 4,023 | HR | 934,435 | 47,797 | 522,353 | 0 | | 1,504,585 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 54,922,973 | 0 | 0 | 0 | | 54,922,973 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 275,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 34 | MO | 1,619,186 | 0 | 0 | 0 | 1,619,186 | 1,619,186 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 54,815 | 89,947 | 368,782 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 27,408 | 43,237 | 359,259 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 190,233 | 85,220 | 17,181 | 261,059 | 553,693 | 6,870,780 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,023,316 | 0 | 0 | 0 | 7,023,316 | 7,023,316 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 37,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 312,000,000 | |

**TABLE F.13
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE F2**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|--------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 63 | 1,015,000 | 84 | 681,587 | 98,100 | 0 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 24 | 140,000 | 60 | 248,900 | 40,900 | 0 |
| 6 | 33 | 245,000 | 123 | 471,000 | 103,900 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 154 | 91,100 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 175 | 1,868,000 | 579 | 2,355,307 | 370,300 | 5,200 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 6,227 | | 5,888 | 974 | 37 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 389 | | 368 | 61 | 2 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 19 | | 18 | 3 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 2.8 | | 2.6 | 0.4 | 0.0 |

| | | |
|-----------------|-----|----|
| SCA Size | 172 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | | |
|--|----|----|
| Dredging Duration: | 19 | MO |
| Capping Duration: | 21 | MO |
| In Lake Construction Duration ⁽²⁾ : | 23 | MO |
| In Lake Construction Duration ⁽³⁾ : | 4 | YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.14
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE F2**

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|-----------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | | 594,000 | |
| Mobilization | 1 | LS | 1,396,136 | 650,016 | 1,510,918 | 11,666 | | 3,568,737 | |
| Demobilization | 1 | LS | 1,224,899 | 421,500 | 48,470 | 43,276 | | 1,738,145 | |
| Interim Year Startup | 5 | EA | 1,605,359 | 1,173,828 | 29,938 | 477 | | 2,809,603 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 175 | AC | 0 | 0 | 0 | 937,604 | | 937,604 | |
| Install Fence | 12,465 | LF | 0 | 0 | 0 | 224,497 | | 224,497 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Install Work Lighting | 84 | EA | 0 | 302,470 | 0 | 0 | | 302,470 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Pre-Dredging | 579 | AC | 2,187,813 | 580,115 | 116,959 | 1,574,246 | | 4,459,133 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | | 154,440 | |
| Hydraulic Dredging with Cutter Head | 1,868,000 | CY | 9,933,458 | 4,732,758 | 665,755 | 0 | | 15,331,972 | |
| Transfer to SCA | 1,868,000 | CY | 4,637,728 | 839,850 | 305,138 | 0 | | 5,782,716 | |
| Operation of SCA | 1 | LS | 499,168 | 199,653 | 55,480 | 513,272 | | 1,267,572 | |
| Sheen Treatment | 16 | MO | 564,159 | 13,044 | 4,503 | 793,910 | | 1,375,615 | |
| Dredge Containment | 1,868,000 | CY | 126,624 | 111,953 | 406,430 | 0 | | 645,007 | |
| Dredge Monitoring | 1,868,000 | CY | 1,659,214 | 971,411 | 110,959 | 446,845 | | 3,188,429 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Post Dredging | 175 | AC | 662,425 | 175,743 | 35,432 | 184,174 | | 1,057,773 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 579 | AC | 406,838 | 369,662 | 1,172,783 | 0 | | 1,949,283 | |
| Sand | 579 | AC | 21,334,749 | 9,737,496 | 21,713,445 | 0 | | 52,785,691 | |
| Rock | 579 | AC | 75,016 | 29,551 | 160,907 | 12,510 | | 277,985 | |
| Gravel | 579 | AC | 3,556,746 | 1,516,446 | 8,732,314 | 0 | | 13,805,506 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 172 | AC | 5,591,997 | 1,987,546 | 8,744,602 | 5,235,269 | | 21,559,414 | |
| Preloading | 1 | LS | 5,056,770 | 651,542 | 21,123,807 | 143,963 | | 26,976,082 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 14,808,528 | | 14,808,528 | |
| Construct Cap over SCA | 172 | AC | 2,023,305 | 834,364 | 11,882,830 | 0 | | 14,740,499 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 22,465,080 | | 26,219,436 | |
| Water treatment for dredged material | 2,419,060,000 | GA | 0 | 0 | 0 | 14,528,987 | | 14,528,987 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 9,498,489 | 0 | 0 | 0 | | 9,498,489 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 7,123,867 | 0 | 0 | 0 | | 7,123,867 | |
| Construction Management | 1 | LS | 9,498,489 | 0 | 0 | 0 | | 9,498,489 | |
| Health and Safety | 6,227 | HR | 1,446,168 | 73,973 | 701,885 | 0 | | 2,222,026 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 66,527,684 | 0 | 0 | 0 | | 66,527,684 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 333,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 41 | MO | 1,984,949 | 0 | 0 | 0 | 1,984,949 | 1,984,949 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 69,198 | 104,329 | 427,749 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 34,734 | 50,563 | 420,138 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 190,233 | 85,220 | 17,181 | 261,059 | 553,693 | 6,870,780 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,053,278 | 0 | 0 | 0 | 7,053,278 | 7,053,278 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 37,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 370,000,000 | |

**TABLE F.15
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE F3**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 84 | 1,566,000 | 84 | 635,200 | 80,700 | 5,100 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 24 | 140,000 | 60 | 248,900 | 40,900 | 0 |
| 6 | 33 | 245,000 | 123 | 471,000 | 103,900 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 154 | 91,100 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 197 | 2,419,000 | 579 | 2,308,920 | 352,900 | 10,300 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 4 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 600 | | 400 | 380 | 140 |
| Duration (HR): | | 4,032 | | 5,772 | 929 | 74 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 252 | | 361 | 58 | 5 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 13 | | 18 | 3 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 1.8 | | 2.6 | 0.4 | 0.0 |

| | | |
|-----------------|-----|----|
| SCA Size | 215 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | | |
|--|----|----|
| Dredging Duration: | 13 | MO |
| Capping Duration: | 21 | MO |
| In Lake Construction Duration ⁽²⁾ : | 23 | MO |
| In Lake Construction Duration ⁽³⁾ : | 4 | YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.16
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE F3

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|-----------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | new | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,649,726 | 758,951 | 1,519,471 | 11,666 | 0 | 3,939,815 | |
| Demobilization | 1 | LS | 1,478,489 | 530,434 | 57,024 | 43,276 | 0 | 2,109,223 | |
| Interim Year Startup | 3 | EA | 1,059,999 | 798,268 | 19,958 | 477 | 0 | 1,878,703 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 218 | AC | 0 | 0 | 0 | 1,165,401 | 0 | 1,165,401 | |
| Install Fence | 13,745 | LF | 0 | 0 | 0 | 247,549 | 0 | 247,549 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 92 | EA | 0 | 331,276 | 0 | 0 | 0 | 331,276 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 579 | AC | 2,187,813 | 580,115 | 116,959 | 1,574,246 | 0 | 4,459,133 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 2,419,000 | CY | 11,859,557 | 6,128,770 | 862,132 | 0 | 0 | 18,850,458 | |
| Transfer to SCA | 2,419,000 | CY | 3,002,995 | 543,790 | 197,572 | 0 | 0 | 3,744,356 | |
| Operation of SCA | 1 | LS | 323,204 | 129,272 | 35,922 | 332,505 | 0 | 820,902 | |
| Sheen Treatment | 11 | MO | 384,479 | 8,890 | 4,503 | 541,041 | 0 | 938,911 | |
| Dredge Containment | 2,419,000 | CY | 141,771 | 125,883 | 447,854 | 0 | 0 | 715,508 | |
| Dredge Monitoring | 2,419,000 | CY | 1,874,800 | 1,257,946 | 143,689 | 289,101 | 0 | 3,565,535 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 197 | AC | 744,631 | 197,545 | 39,828 | 207,067 | 0 | 1,189,071 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 579 | AC | 406,838 | 369,662 | 1,172,783 | 0 | 0 | 1,949,283 | |
| Sand | 579 | AC | 20,915,585 | 9,545,690 | 21,285,802 | 0 | 0 | 51,747,077 | |
| Rock | 579 | AC | 144,481 | 57,547 | 318,540 | 24,779 | 0 | 545,347 | |
| Gravel | 579 | AC | 3,388,409 | 1,444,901 | 8,321,952 | 0 | 0 | 13,155,263 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 215 | AC | 6,519,403 | 2,291,850 | 10,416,708 | 6,542,096 | 0 | 25,770,056 | |
| Preloading | 1 | LS | 6,405,171 | 825,158 | 26,752,661 | 182,325 | 0 | 34,165,314 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 16,599,202 | 0 | 16,599,202 | |
| Construct Cap over SCA | 215 | AC | 2,559,426 | 1,055,448 | 15,026,202 | 0 | 0 | 18,641,076 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | 0 | 48,684,516 | |
| Water treatment for dredged material | 3,132,605,000 | GA | 0 | 0 | 0 | 18,711,165 | 0 | 18,711,165 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | 0 | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 11,241,827 | 0 | 0 | 0 | 0 | 11,241,827 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 8,431,370 | 0 | 0 | 0 | 0 | 8,431,370 | |
| Construction Management | 1 | LS | 11,241,827 | 0 | 0 | 0 | 0 | 11,241,827 | |
| Health and Safety | 4,032 | HR | 936,371 | 47,896 | 539,064 | 0 | 0 | 1,523,331 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 78,447,420 | 0 | 0 | 0 | 0 | 78,447,420 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 392,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 34 | MO | 1,505,338 | 0 | 0 | 0 | 1,505,338 | 1,505,338 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 77,067 | 112,199 | 460,014 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 38,534 | 54,362 | 451,705 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 190,233 | 85,220 | 17,181 | 261,059 | 553,693 | 6,870,780 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,069,236 | 0 | 0 | 0 | 7,069,236 | 7,069,236 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 37,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 429,000,000 | |

TABLE F.17
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE F4

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 84 | 2,094,000 | 84 | 709,187 | 64,200 | 5,100 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 24 | 140,000 | 60 | 248,900 | 40,900 | 0 |
| 6 | 33 | 245,000 | 123 | 471,000 | 103,900 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 154 | 91,100 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 197 | 2,947,000 | 579 | 2,382,907 | 336,400 | 10,300 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 4 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 600 | | 400 | 380 | 140 |
| Duration (HR): | | 4,912 | | 5,957 | 885 | 74 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 307 | | 372 | 55 | 5 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 15 | | 19 | 3 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 2.2 | | 2.7 | 0.4 | 0.0 |

| | | |
|-----------------|-----|----|
| SCA Size | 257 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 15 MO |
| Capping Duration: | 21 MO |
| In Lake Construction Duration ⁽²⁾ : | 23 MO |
| In Lake Construction Duration ⁽³⁾ : | 4 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.18
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE F4**

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|-----------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| Mobilization/ Demobilization | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | | 594,000 | |
| Mobilization | 1 | LS | 1,649,726 | 758,951 | 1,519,471 | 11,666 | | 3,939,815 | |
| Demobilization | 1 | LS | 1,478,489 | 530,434 | 57,024 | 43,276 | | 2,109,223 | |
| Interim Year Startup | 5 | EA | 1,733,751 | 1,226,395 | 29,938 | 477 | | 2,990,560 | |
| Site Preparation and Facility Construction | | | | | | | | | |
| Clearing and Grubbing | 260 | AC | 0 | 0 | 0 | 1,391,958 | | 1,391,958 | |
| Install Fence | 14,897 | LF | 0 | 0 | 0 | 268,301 | | 268,301 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Install Work Lighting | 100 | EA | 0 | 360,083 | 0 | 0 | | 360,083 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | | 3,427,024 | |
| Dredging - SMU 1 thru SMU 7 | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Pre-Dredging | 579 | AC | 2,188,799 | 580,557 | 117,048 | 1,575,579 | | 4,461,982 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | | 154,440 | |
| Hydraulic Dredging with Cutter Head | 2,947,000 | CY | 14,448,137 | 7,466,509 | 1,050,311 | 0 | | 22,964,957 | |
| Transfer to SCA | 2,947,000 | CY | 3,658,459 | 662,484 | 240,696 | 0 | | 4,561,639 | |
| Operation of SCA | 1 | LS | 393,750 | 157,488 | 43,763 | 405,075 | | 1,000,077 | |
| Sheen Treatment | 14 | MO | 482,593 | 11,158 | 4,503 | 679,112 | | 1,177,366 | |
| Dredge Containment | 2,947,000 | CY | 141,771 | 125,883 | 447,854 | 0 | | 715,508 | |
| Dredge Monitoring | 2,947,000 | CY | 2,284,011 | 1,532,520 | 175,052 | 352,199 | | 4,343,782 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Post Dredging | 197 | AC | 744,631 | 197,545 | 39,828 | 207,067 | | 1,189,071 | |
| Sediment Cap | | | | | | | | | |
| Cap Containment | 579 | AC | 407,116 | 369,918 | 1,173,543 | 0 | | 1,950,576 | |
| Sand | 579 | AC | 21,585,542 | 9,851,588 | 21,967,886 | 0 | | 53,405,017 | |
| Rock | 579 | AC | 144,481 | 57,547 | 318,540 | 24,779 | | 545,347 | |
| Gravel | 579 | AC | 3,232,376 | 1,378,022 | 7,932,949 | 0 | | 12,543,347 | |
| Backfill | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | | 0 | |
| Habitat & Vegetation Restoration | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | | 64,417 | |
| SCA Construction | | | | | | | | | |
| Construct SCA | 257 | AC | 7,392,694 | 2,574,406 | 12,034,660 | 7,846,614 | | 29,848,373 | |
| Preloading | 1 | LS | 7,754,544 | 998,966 | 32,387,728 | 220,729 | | 41,361,967 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 18,211,164 | | 18,211,164 | |
| Construct Cap over SCA | 257 | AC | 3,091,875 | 1,275,017 | 18,170,594 | 0 | | 22,537,486 | |
| Water Treatment | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | | 48,684,516 | |
| Water treatment for dredged material | 3,816,365,000 | GA | 0 | 0 | 0 | 22,795,279 | | 22,795,279 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | | 305,649 | |
| Studies, Design, and Planning | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 12,419,157 | 0 | 0 | 0 | | 12,419,157 | |
| Engineering and Const. Oversight | | | | | | | | | |
| Project Management | 1 | LS | 9,314,368 | 0 | 0 | 0 | | 9,314,368 | |
| Construction Management | 1 | LS | 12,419,157 | 0 | 0 | 0 | | 12,419,157 | |
| Health and Safety | 4,912 | HR | 1,140,754 | 58,351 | 608,777 | 0 | | 1,807,881 | |
| Construction Cost Contingency | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 86,686,285 | 0 | 0 | 0 | | 86,686,285 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 433,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| O&M During Construction and Off Season | | | | | | | | | |
| Off-hour security | 1.000 | 37 | MO | 1,839,140 | 0 | 0 | 0 | 1,839,140 | 1,839,140 |
| Long Term O&M (30 years) | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 84,665 | 119,797 | 491,167 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 42,333 | 58,162 | 483,272 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 190,397 | 85,294 | 17,196 | 261,059 | 553,946 | 6,873,919 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| Waste and O&M Contingency | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,085,701 | 0 | 0 | 0 | 7,085,701 | 7,085,701 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 37,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 470,000,000 | |

**TABLE F.19
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE G**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 84 | 2,637,000 | 84 | 802,578 | 28,900 | 5,100 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 24 | 140,000 | 60 | 248,900 | 40,900 | 0 |
| 6 | 33 | 245,000 | 123 | 471,000 | 103,900 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 154 | 91,100 | | 0 |
| 9 | | 0 | | | | |
| TOTAL | 197 | 3,490,000 | 579 | 2,476,298 | 301,100 | 10,300 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 4 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 600 | | 400 | 380 | 140 |
| Duration (HR): | | 5,817 | | 6,191 | 792 | 74 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 364 | | 387 | 50 | 5 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 18 | | 19 | 2 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 2.6 | | 2.8 | 0.4 | 0.0 |

| | | |
|-----------------|-----|----|
| SCA Size | 308 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 18 MO |
| Capping Duration: | 22 MO |
| In Lake Construction Duration ⁽²⁾ : | 24 MO |
| In Lake Construction Duration ⁽³⁾ : | 4 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.20
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE G

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|------------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,649,726 | 758,951 | 1,519,471 | 11,666 | 0 | 3,939,815 | |
| Demobilization | 1 | LS | 1,478,489 | 530,434 | 57,024 | 43,276 | 0 | 2,109,223 | |
| Interim Year Startup | 5 | EA | 1,733,751 | 1,226,395 | 29,938 | 477 | 0 | 2,990,560 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 311 | AC | 0 | 0 | 0 | 1,662,621 | 0 | 1,662,621 | |
| Install Fence | 16,155 | LF | 0 | 0 | 0 | 290,961 | 0 | 290,961 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 108 | EA | 0 | 388,889 | 0 | 0 | 0 | 388,889 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 579 | AC | 2,187,813 | 580,115 | 116,959 | 1,574,246 | 0 | 4,459,133 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 3,490,000 | CY | 17,109,981 | 8,842,252 | 1,243,836 | 0 | 0 | 27,196,069 | |
| Transfer to SCA | 3,490,000 | CY | 4,332,477 | 784,550 | 285,046 | 0 | 0 | 5,402,073 | |
| Operation of SCA | 1 | LS | 466,300 | 186,506 | 51,827 | 479,625 | 0 | 1,184,258 | |
| Sheen Treatment | 16 | MO | 583,527 | 13,491 | 4,503 | 821,106 | 0 | 1,422,627 | |
| Dredge Containment | 3,490,000 | CY | 141,771 | 125,883 | 447,854 | 0 | 0 | 715,508 | |
| Dredge Monitoring | 3,490,000 | CY | 2,704,780 | 1,814,895 | 207,306 | 417,591 | 0 | 5,144,572 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 197 | AC | 744,631 | 197,545 | 39,828 | 207,067 | 0 | 1,189,071 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 579 | AC | 406,838 | 369,662 | 1,172,783 | 0 | 0 | 1,949,283 | |
| Sand | 579 | AC | 22,429,396 | 10,236,855 | 22,828,745 | 0 | 0 | 55,494,996 | |
| Rock | 579 | AC | 144,481 | 57,547 | 318,540 | 24,779 | 0 | 545,347 | |
| Gravel | 579 | AC | 2,892,327 | 1,233,376 | 7,100,502 | 0 | 0 | 11,226,205 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 308 | AC | 8,402,817 | 2,898,265 | 13,924,500 | 9,403,250 | 0 | 34,628,832 | |
| Preloading | 1 | LS | 9,374,160 | 1,207,722 | 39,155,863 | 266,855 | 0 | 50,004,600 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 19,971,414 | 0 | 19,971,414 | |
| Construct Cap over SCA | 308 | AC | 3,734,486 | 1,540,015 | 21,945,566 | 0 | 0 | 27,220,066 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | 0 | 48,684,516 | |
| Water treatment for dredged material | 4,519,550,000 | GA | 0 | 0 | 0 | 26,995,462 | 0 | 26,995,462 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | 0 | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 13,677,505 | 0 | 0 | 0 | 0 | 13,677,505 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 10,258,129 | 0 | 0 | 0 | 0 | 10,258,129 | |
| Construction Management | 1 | LS | 13,677,505 | 0 | 0 | 0 | 0 | 13,677,505 | |
| Health and Safety | 5,817 | HR | 1,350,944 | 69,102 | 680,876 | 0 | 0 | 2,100,922 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 95,489,337 | 0 | 0 | 0 | 0 | 95,489,337 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 477,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 40 | MO | 1,953,386 | 0 | 0 | 0 | 1,953,386 | 1,953,386 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 92,535 | 127,666 | 523,432 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 46,403 | 62,232 | 517,094 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 190,233 | 85,220 | 17,181 | 261,059 | 553,693 | 6,870,780 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,101,438 | 0 | 0 | 0 | 7,101,438 | 7,101,438 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 37,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 514,000,000 | |

**TABLE F.21
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE H**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|------------------|---------------|--------------------------|----------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 84 | 2,637,000 | 84 | 802,578 | 28,900 | 5,100 |
| 2 | 10 | 403,000 | 16 | 312,523 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 22 | 135,000 | 75 | 300,600 | 60,500 | 0 |
| 5 | 24 | 140,000 | 60 | 248,900 | 40,900 | 0 |
| 6 | 33 | 245,000 | 123 | 471,000 | 103,900 | 0 |
| 7 | 13 | 89,000 | 38 | 293,100 | 38,900 | 900 |
| 8 | 0 | 0 | 154 | 91,100 | | 0 |
| 9 | | 0 | | | | |
| TOTAL | 197 | 3,724,000 | 579 | 2,649,201 | 301,100 | 10,300 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 4 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 600 | | 400 | 380 | 140 |
| Duration (HR): | | 6,207 | | 6,623 | 792 | 74 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 388 | | 414 | 50 | 5 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 20 | | 21 | 3 | 1 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 2.9 | | 3.0 | 0.4 | 0.1 |

| | | |
|-----------------|-----|----|
| SCA Size | 325 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | | |
|--|----|----|
| Dredging Duration: | 20 | MO |
| Capping Duration: | 24 | MO |
| In Lake Construction Duration ⁽²⁾ : | 22 | MO |
| In Lake Construction Duration ⁽³⁾ : | 4 | YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.22
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE H

| Direct Construction Costs | | | | | | | | | |
|---|---------------|------|------------|------------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| Mobilization/ Demobilization | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | | 594,000 | |
| Mobilization | 1 | LS | 1,649,726 | 758,951 | 1,519,471 | 11,666 | | 3,939,815 | |
| Demobilization | 1 | LS | 1,478,489 | 530,434 | 57,024 | 43,276 | | 2,109,223 | |
| Interim Year Startup | 5 | EA | 1,733,751 | 1,226,395 | 29,938 | 477 | | 2,990,560 | |
| Site Preparation and Facility Construction | | | | | | | | | |
| Clearing and Grubbing | 328 | AC | 0 | 0 | 0 | 1,752,605 | | 1,752,605 | |
| Install Fence | 16,550 | LF | 0 | 0 | 0 | 298,076 | | 298,076 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | | 9,302 | |
| Install Work Lighting | 111 | EA | 0 | 399,692 | 0 | 0 | | 399,692 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | | 3,427,024 | |
| Dredging - SMU 1 thru SMU 7 | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Pre-Dredging | 579 | AC | 2,188,471 | 580,409 | 117,018 | 1,574,912 | | 4,460,810 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | | 154,440 | |
| Hydraulic Dredging with Cutter Head | 3,724,000 | CY | 18,257,613 | 9,435,114 | 1,327,234 | 0 | | 29,019,960 | |
| Transfer to SCA | 3,724,000 | CY | 4,623,103 | 837,153 | 304,158 | 0 | | 5,764,414 | |
| Operation of SCA | 1 | LS | 497,565 | 199,011 | 55,301 | 511,952 | | 1,263,830 | |
| Sheen Treatment | 18 | MO | 626,945 | 14,497 | 4,503 | 882,296 | | 1,528,241 | |
| Dredge Containment | 3,724,000 | CY | 141,771 | 125,883 | 447,854 | 0 | | 715,508 | |
| Dredge Monitoring | 3,724,000 | CY | 2,886,271 | 1,936,581 | 221,206 | 445,124 | | 5,489,182 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | | 3,858 | |
| Sediment Sampling - Post Dredging | 197 | AC | 744,631 | 197,545 | 39,828 | 207,067 | | 1,189,071 | |
| Sediment Cap | | | | | | | | | |
| Cap Containment | 579 | AC | 407,046 | 369,854 | 1,173,353 | 0 | | 1,950,253 | |
| Sand | 579 | AC | 23,997,823 | 10,952,823 | 24,422,876 | 0 | | 59,373,521 | |
| Rock | 579 | AC | 144,481 | 57,547 | 318,540 | 24,779 | | 545,347 | |
| Gravel | 579 | AC | 2,892,327 | 1,233,376 | 7,100,502 | 0 | | 11,226,205 | |
| Backfill | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | | 0 | |
| Habitat & Vegetation Restoration | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | | 64,417 | |
| SCA Construction | | | | | | | | | |
| Construct SCA | 325 | AC | 8,730,510 | 3,002,594 | 14,544,202 | 9,921,758 | | 36,199,064 | |
| Preloading | 1 | LS | 9,914,701 | 1,277,344 | 41,413,094 | 282,238 | | 52,887,378 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 20,524,049 | | 20,524,049 | |
| Construct Cap over SCA | 325 | AC | 3,947,465 | 1,627,843 | 23,204,033 | 0 | | 28,779,341 | |
| Water Treatment | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | | 48,684,516 | |
| Water treatment for dredged material | 4,822,580,000 | GA | 0 | 0 | 0 | 28,805,382 | | 28,805,382 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | | 305,649 | |
| Studies, Design, and Planning | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 14,280,703 | 0 | 0 | 0 | | 14,280,703 | |
| Engineering and Const. Oversight | | | | | | | | | |
| Project Management | 1 | LS | 10,710,527 | 0 | 0 | 0 | | 10,710,527 | |
| Construction Management | 1 | LS | 14,280,703 | 0 | 0 | 0 | | 14,280,703 | |
| Health and Safety | 6,207 | HR | 1,441,523 | 73,735 | 711,913 | 0 | | 2,227,171 | |
| Construction Cost Contingency | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 99,705,583 | 0 | 0 | 0 | | 99,705,583 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 499,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| O&M During Construction and Off Season | | | | | | | | | |
| Off-hour security | 1.000 | 44 | MO | 2,093,140 | 0 | 0 | 0 | 2,093,140 | 2,093,140 |
| Long Term O&M (30 years) | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 95,248 | 130,380 | 534,558 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 47,760 | 63,589 | 528,368 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 190,397 | 85,294 | 17,196 | 261,059 | 553,946 | 6,873,919 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 714,294 | 282,720 | 964,461 | 0 | 1,961,475 | 4,228,941 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| Waste and O&M Contingency | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,107,822 | 0 | 0 | 0 | 7,107,822 | 7,107,822 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 38,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 537,000,000 | |

TABLE F.23
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE I

| SMU | DREDGING | | CAPPING | | | | |
|--------------------------|-------------------|-------------------|---------------|--------------------------|---------------|-----------|------------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) | Backfill (CY) |
| <i>Quantities</i> | | | | | | | |
| 1 | 84 | 4,028,000 | 0 | 0.0 | 0.0 | 0.0 | 2,955,000 |
| 2 | 16 | 533,000 | 0 | 0.0 | 0.0 | 0.0 | 146,200 |
| 3 | 29 | 380,000 | 0 | 0.0 | 0.0 | 0.0 | 141,000 |
| 4 | 75 | 2,170,000 | 0 | 0.0 | 0.0 | 0.0 | 1,885,000 |
| 5 | 24 | 140,000 | 60 | 248,900.0 | 40,900.0 | 0.0 | 0 |
| 6 | 123 | 3,447,000 | 0 | 0.0 | 0.0 | 0.0 | 2,700,000 |
| 7 | 38 | 1,485,000 | 0 | 0.0 | 0.0 | 0.0 | 359,300 |
| 8 | | | 154 | 91,100 | 0 | 0.0 | |
| 9 | | | | | | | |
| TOTAL | 389 | 12,183,000 | 214 | 340,000 | 40,900 | 0 | 8,186,500 |
| <i>Durations</i> | | | | | | | |
| Number Crews: | | 4 | | 0 | 0 | 0 | 4 |
| Production Rate (CY/HR): | | 600 | | 0 | 0 | 0 | 400 |
| Duration (HR): | | 20,305 | | 0 | 0 | 0 | 20,467 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 | 8 |
| Duration (DA): | | 1,269 | | 0 | 0 | 0 | 1,279 |
| Days/Month: | | 20 | | 20 | 20 | 20 | 20 |
| Duration (MO): | | 63 | | 0 | 0 | 0 | 64 |
| Months/Year: | | 7 | | 7 | 7 | 7 | 7 |
| Duration (YR): | | 9.1 | | 0.0 | 0.0 | 0.0 | 9.1 |

| | | |
|-----------------|-----|----|
| SCA Size | 282 | AC |
| SCA Dike Height | 50 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|----------------------|
| Dredging Duration: | 63 MO |
| Capping/Backfilling Duration: | 64 MO |
| In Lake Construction Duration ⁽²⁾ : | 66 MO |
| In Lake Construction Duration ⁽³⁾ : | 10 YR ⁽¹⁾ |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.24
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE I**

| Direct Construction Costs | | | | | | | | | |
|---|----------------|------|-------------|------------|-------------|-------------|-----------|----------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | TOTAL | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,336,158 | 692,087 | 1,508,067 | 11,666 | 0 | 3,547,979 | |
| Demobilization | 1 | LS | 1,164,921 | 463,927 | 45,619 | 43,276 | 0 | 1,717,743 | |
| Interim Year Startup | 9 | EA | 3,960,761 | 1,069,471 | 64,152 | 477 | 0 | 5,094,861 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 285 | AC | 0 | 0 | 0 | 1,523,596 | 0 | 1,523,596 | |
| Install Fence | 14,659 | LF | 0 | 0 | 0 | 264,015 | 0 | 264,015 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 98 | EA | 0 | 352,881 | 0 | 0 | 0 | 352,881 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 389 | AC | 1,468,937 | 389,640 | 78,557 | 1,057,270 | 0 | 2,994,404 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 12,183,000 | CY | 69,425,445 | 30,989,209 | 4,342,021 | 0 | 0 | 104,756,675 | |
| Transfer to SCA | 12,183,000 | CY | 15,124,036 | 2,738,730 | 995,047 | 0 | 0 | 18,857,813 | |
| Operation of SCA | 1 | LS | 1,627,776 | 651,062 | 180,918 | 1,674,400 | 0 | 4,134,155 | |
| Sheen Treatment | 49 | MO | 1,764,072 | 40,788 | 4,503 | 2,482,406 | 0 | 4,291,768 | |
| Dredge Containment | 12,183,000 | CY | 274,895 | 248,316 | 811,934 | 0 | 0 | 1,335,144 | |
| Dredge Monitoring | 12,183,000 | CY | 9,442,019 | 6,335,491 | 723,670 | 1,456,406 | 0 | 17,957,586 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 389 | AC | 1,468,937 | 389,640 | 78,557 | 408,217 | 0 | 2,345,351 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 214 | AC | 148,688 | 136,746 | 13,347 | 0 | 0 | 298,781 | |
| Sand | 214 | AC | 3,366,918 | 1,405,478 | 3,134,415 | 0 | 0 | 7,906,811 | |
| Rock | 214 | AC | 0 | 0 | 0 | 0 | 0 | 0 | |
| Gravel | 214 | AC | 0 | 0 | 941,464 | 0 | 0 | 941,464 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 8,186,500 | CY | 74,148,254 | 33,842,306 | 76,199,965 | 0 | 0 | 184,190,525 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 282 | AC | 53,117,275 | 20,989,416 | 58,486,435 | 9,080,548 | 0 | 141,673,673 | |
| Preloading | 1 | LS | 29,720,104 | 3,829,018 | 124,141,583 | 846,049 | 0 | 158,536,755 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 58,960,260 | 0 | 58,960,260 | |
| Stabilization under entire SCA | 1 | LS | 0 | 0 | 0 | 0 | 0 | 0 | |
| Construct Cap over SCA | 282 | AC | 2,454,012 | 1,064,533 | 15,157,155 | 0 | 0 | 18,675,701 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | 0 | 48,684,516 | |
| Water treatment for dredged material | 24,366,000,000 | GA | 0 | 0 | 0 | 145,255,089 | 0 | 145,255,089 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| Operation and Maintenance | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | 0 | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 28,242,572 | 0 | 0 | 0 | 0 | 28,242,572 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 28,242,572 | 0 | 0 | 0 | 0 | 28,242,572 | |
| Construction Management | 1 | LS | 28,242,572 | 0 | 0 | 0 | 0 | 28,242,572 | |
| Health and Safety | 20,305 | HR | 4,715,917 | 241,223 | 1,798,659 | 0 | 0 | 6,755,800 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 258,302,062 | 0 | 0 | 0 | 0 | 258,302,062 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 1,292,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 127 | MO | 6,452,624 | 0 | 0 | 0 | 6,452,624 | 6,452,624 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 86,420 | 5,702 | 4,424 | 83,580 | 180,126 | 738,517 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 41,790 | 57,619 | 478,763 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 70,371 | 31,525 | 6,356 | 99,102 | 207,354 | 2,573,053 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 158,443 | 66,140 | 924,758 | 0 | 1,149,342 | 2,477,981 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 5,633,454 | 0 | 0 | 0 | 5,633,454 | 5,633,454 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 35,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 1,327,000,000 | |

**TABLE F.25
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE J**

| SMU | DREDGING | | CAPPING | | | | |
|--------------------------|-------------------|-------------------|---------------|--------------------------|----------------|------------|-------------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) | Backfill (CY) |
| <i>Quantities</i> | | | | | | | |
| 1 | 84 | 4,028,000 | 0 | 0.0 | 0.0 | 0.0 | 2,955,000 |
| 2 | 34 | 1,016,000 | 0 | 0.0 | 0.0 | 0.0 | 313,000 |
| 3 | 113 | 1,427,000 | 0 | 0.0 | 0.0 | 0.0 | 800,000 |
| 4 | 75 | 3,563,000 | 0 | 0.0 | 0.0 | 0.0 | 3,000,000 |
| 5 | 108 | 610,000 | 349 | 1,518,400.0 | 245,200.0 | 0.0 | 0 |
| 6 | 156 | 7,309,000 | 0 | 0.0 | 0.0 | 0.0 | 5,950,000 |
| 7 | 38 | 2,168,000 | 0 | 0.0 | 0.0 | 900.0 | 1,600,000 |
| 8 | | | 1,980 | 1,171,280 | 0 | 0.0 | |
| 9 | | | | | | | |
| TOTAL | 608 | 20,121,000 | 2,329 | 2,689,680 | 245,200 | 900 | 14,618,000 |
| <i>Durations</i> | | | | | | | |
| Number Crews: | | 4 | | 0 | 0 | 0 | 4 |
| Production Rate (CY/HR): | | 600 | | 0 | 0 | 0 | 400 |
| Duration (HR): | | 33,535 | | 0 | 0 | 0 | 36,545 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 | 8 |
| Duration (DA): | | 2,096 | | 0 | 0 | 0 | 2,284 |
| Days/Month: | | 20 | | 20 | 20 | 20 | 20 |
| Duration (MO): | | 105 | | 0 | 0 | 0 | 114 |
| Months/Year: | | 7 | | 7 | 7 | 7 | 7 |
| Duration (YR): | | 15.0 | | 0.0 | 0.0 | 0.0 | 16.3 |

| | | |
|-----------------|-----|----|
| SCA Size | 442 | AC |
| SCA Dike Height | 50 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|----------------------|
| Dredging Duration: | 105 MO |
| Capping/Backfilling Duration: | 114 MO |
| In Lake Construction Duration ⁽²⁾ : | 116 MO |
| In Lake Construction Duration ⁽³⁾ : | 17 YR ⁽¹⁾ |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.26
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE J

| Direct Construction Costs | | | | | | | | | |
|---|----------------|------|-------------|------------|-------------|-------------|-----------|----------------------|------------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | TOTAL | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,336,158 | 692,087 | 1,508,067 | 11,666 | 0 | 3,547,979 | |
| Demobilization | 1 | LS | 1,164,921 | 463,927 | 45,619 | 43,276 | 0 | 1,717,743 | |
| Interim Year Startup | 14 | EA | 6,447,178 | 1,782,503 | 114,048 | 477 | 0 | 8,344,207 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 445 | AC | 0 | 0 | 0 | 2,377,026 | 0 | 2,377,026 | |
| Install Fence | 18,184 | LF | 0 | 0 | 0 | 327,501 | 0 | 327,501 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 122 | EA | 0 | 439,301 | 0 | 0 | 0 | 439,301 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 608 | AC | 2,299,232 | 609,724 | 122,928 | 1,654,524 | 0 | 4,686,409 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 20,121,000 | CY | 114,661,272 | 51,180,651 | 7,171,124 | 0 | 0 | 173,013,047 | |
| Transfer to SCA | 20,121,000 | CY | 24,978,489 | 4,523,187 | 1,643,383 | 0 | 0 | 31,145,058 | |
| Operation of SCA | 1 | LS | 2,688,375 | 1,075,270 | 298,797 | 2,765,597 | 0 | 6,828,039 | |
| Sheen Treatment | 76 | MO | 2,698,390 | 62,391 | 4,503 | 3,797,221 | 0 | 6,562,504 | |
| Dredge Containment | 20,121,000 | CY | 427,334 | 388,513 | 1,228,839 | 0 | 0 | 2,044,686 | |
| Dredge Monitoring | 20,121,000 | CY | 15,594,276 | 10,463,467 | 1,195,187 | 2,404,590 | 0 | 29,657,520 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 608 | AC | 2,299,232 | 609,724 | 122,928 | 638,820 | 0 | 3,670,705 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 2,329 | AC | 1,617,915 | 1,487,979 | 145,235 | 0 | 0 | 3,251,129 | |
| Sand | 2,329 | AC | 26,634,899 | 11,118,505 | 24,795,837 | 0 | 0 | 62,549,240 | |
| Rock | 2,329 | AC | 0 | 0 | 26,912 | 2,165 | 0 | 29,077 | |
| Gravel | 2,329 | AC | 0 | 0 | 5,644,182 | 0 | 0 | 5,644,182 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 14,618,000 | CY | 132,397,136 | 60,427,374 | 136,064,052 | 0 | 0 | 328,888,561 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 442 | AC | 68,834,662 | 27,068,109 | 77,070,214 | 14,131,989 | 0 | 187,104,974 | |
| Preloading | 1 | LS | 50,651,778 | 6,525,695 | 211,571,241 | 1,441,900 | 0 | 270,190,614 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 75,223,695 | 0 | 75,223,695 | |
| Stabilization under entire SCA | 1 | LS | 0 | 0 | 0 | 0 | 0 | 0 | |
| Construct Cap over SCA | 442 | AC | 4,167,981 | 1,808,041 | 25,757,839 | 0 | 0 | 31,733,861 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,187,454 | 976,864 | 1,590,039 | 44,930,160 | 0 | 48,684,516 | |
| Water treatment for dredged material | 40,242,000,000 | GA | 0 | 0 | 0 | 239,898,083 | 0 | 239,898,083 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 305,649 | 0 | 0 | 0 | 0 | 305,649 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 46,040,436 | 0 | 0 | 0 | 0 | 46,040,436 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 30,693,624 | 0 | 0 | 0 | 0 | 30,693,624 | |
| Construction Management | 1 | LS | 46,040,436 | 0 | 0 | 0 | 0 | 46,040,436 | |
| Health and Safety | 33,535 | HR | 7,788,638 | 398,396 | 2,933,154 | 0 | 0 | 11,120,188 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 417,220,381 | 0 | 0 | 0 | 0 | 417,220,381 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 2,086,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 219 | MO | 10,986,603 | 0 | 0 | 0 | 10,986,603 | 10,986,603 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 86,420 | 5,702 | 4,424 | 105,560 | 202,107 | 828,637 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 52,916 | 68,745 | 571,209 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 765,865 | 343,090 | 69,171 | 1,037,565 | 2,215,691 | 27,494,509 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 158,443 | 66,140 | 924,758 | 0 | 1,149,342 | 2,477,981 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 4 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 11,909,460 | 0 | 0 | 0 | 11,909,460 | 11,909,460 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 71,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 2,157,000,000 | |

**TABLE F.27
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITHOUT STABILIZATION AND PRELOADING UNDER SCA**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.28
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITHOUT STABILIZATION AND PRELOADING UNDER SCA

| Direct Construction Costs | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | |
| <i>Backfill</i> | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | |
| Preloading | 1 | LS | 0 | 0 | 0 | 0 | 0 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 0 | 0 | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | |
| <i>Water Treatment</i> | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 5,391,124 | 0 | 0 | 0 | 5,391,124 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | |
| Project Management | 1 | LS | 4,043,343 | 0 | 0 | 0 | 4,043,343 | |
| Construction Management | 1 | LS | 5,391,124 | 0 | 0 | 0 | 5,391,124 | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | |
| <i>Construction Cost Contingency</i> | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 37,635,068 | 0 | 0 | 0 | 37,635,068 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 188,000,000 | |
| Operation and Maintenance | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | TOTAL | NPV TOTAL |
| | | | | Labor | Equipment | Materials | | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 |
| <i>Waste and O&M Contingency</i> | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,336,278 | 0 | 0 | 6,336,278 | 6,336,278 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 33,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | 221,000,000 | |

TABLE F.29
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITH GEOSYNTHETICS IN SCA CAP

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.30
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITH GEOSYNTHETICS IN SCA CAP**

| Direct Construction Costs | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | |
| <i>Backfill</i> | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 3,846,676 | 8,003,843 | |
| <i>Water Treatment</i> | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,167,724 | 0 | 0 | 0 | 6,167,724 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | |
| Project Management | 1 | LS | 4,625,793 | 0 | 0 | 0 | 4,625,793 | |
| Construction Management | 1 | LS | 6,167,724 | 0 | 0 | 0 | 6,167,724 | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | |
| <i>Construction Cost Contingency</i> | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 43,022,732 | 0 | 0 | 0 | 43,022,732 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 215,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | |
| Off-hour security | 1,000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | |
| O&M Management and Technical Support | 12,409 | 1 | YR | 305,668 | 0 | 0 | 0 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12,409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4,100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 299,802 |
| O&M for SCA - Remaining 25 years | 8,309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 289,360 |
| Lake Cap Monitoring | 12,409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 4,249,501 |
| 5-Year Reviews | 2,156 | 1 | YR | 242,656 | 0 | 0 | 0 | 523,167 |
| Lake Cap Maintenance | 2,156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1,000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4,100 | 1 | YR | 0 | 0 | 0 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4,100 | 1 | YR | 0 | 0 | 0 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12,409 | 1 | YR | 0 | 0 | 0 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | |
| Waste and O&M Contingency | 1,000 | 1 | LS | 6,336,278 | 0 | 0 | 0 | 6,336,278 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 33,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | 248,000,000 | |

**TABLE F.31
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITH NO WATER TREATMENT COSTS**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.32
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITH NO WATER TREATMENT

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|-----------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 0 | 3,394,441 | | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 46,528 | 46,528 | | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 0 | 0 | | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 4,900,657 | 0 | 0 | 0 | 4,900,657 | | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 3,675,493 | 0 | 0 | 0 | 3,675,493 | | |
| Construction Management | 1 | LS | 4,900,657 | 0 | 0 | 0 | 4,900,657 | | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 34,232,454 | 0 | 0 | 0 | 34,232,454 | | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 171,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 289,360 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 0 | 0 | 0 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 5,958,546 | 0 | 0 | 0 | 5,958,546 | 5,958,546 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 31,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 202,000,000 | |

**TABLE F.33
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITH ENHANCED PRIMARY WATER TREATMENT**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.34
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITH ENHANCED PRIMARY WATER TREATMENT**

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|-----------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 0 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 0 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 0 | 1,561,184 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 0 | 304,988 | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 0 | 137,626 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 0 | 183,642 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 0 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 0 | 4,888,634 | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 0 | 1,680,867 | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 0 | 368,363 | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 0 | 427,217 | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 0 | 298,712 | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 0 | 927,065 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 0 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 0 | 1,229,779 | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 0 | 41,779,474 | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 0 | 12,999,633 | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 0 | 9,375,128 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 0 | 8,800,268 | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 0 | 7,507,793 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 0 | 8,060,537 | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 0 | 4,157,168 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 6,087,312 | 0 | 9,481,753 | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 380,682 | 0 | 380,682 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 5,205,036 | 0 | 0 | 0 | 0 | 5,205,036 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 3,903,777 | 0 | 0 | 0 | 0 | 3,903,777 | |
| Construction Management | 1 | LS | 5,205,036 | 0 | 0 | 0 | 0 | 5,205,036 | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 0 | 707,350 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 36,344,081 | 0 | 0 | 0 | 0 | 36,344,081 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 182,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 289,360 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 9,741 | 9,741 | 120,874 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 5,988,765 | 0 | 0 | 0 | 5,988,765 | 5,988,765 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 31,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 213,000,000 | |

**TABLE F.35
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITH ENHANCED PRIMARY WATER TREATMENT
WITH MULTI-MEDIA FILTRATION**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | | |
|-----------------|----|----|
| SCA Size | 54 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.36
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITH ENHANCED PRIMARY WATER TREATMENT AND MULTIMEDIA FILTRATION**

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 11,104,236 | 14,498,677 | | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 522,697 | 522,697 | | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 5,411,393 | 0 | 0 | 0 | 5,411,393 | | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,058,545 | 0 | 0 | 0 | 4,058,545 | | |
| Construction Management | 1 | LS | 5,411,393 | 0 | 0 | 0 | 5,411,393 | | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 37,775,687 | 0 | 0 | 0 | 37,775,687 | | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 189,000,000 | | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 289,360 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 13,881 | 13,881 | 172,246 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,001,608 | 0 | 0 | 0 | 6,001,608 | 6,001,608 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 31,000,000 | | |
| Total Lake Remediation Project Costs | | | | | | | 220,000,000 | | |

**TABLE F.37
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITH ENHANCED PRIMARY WATER TREATMENT
WITH ORGANICS REMOVAL**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | | |
|-----------------|----|----|
| SCA Size | 54 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.38
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITH ENHANCED PRIMARY WATER TREATMENT WITH ORGANICS REMOVAL**

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|-----------|--------------------|-----------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 9,738,036 | 13,132,477 | | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 522,697 | 522,697 | | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 5,356,745 | 0 | 0 | 0 | 5,356,745 | | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,017,559 | 0 | 0 | 0 | 4,017,559 | | |
| Construction Management | 1 | LS | 5,356,745 | 0 | 0 | 0 | 5,356,745 | | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 37,396,566 | 0 | 0 | 0 | 37,396,566 | | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 187,000,000 | | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 289,360 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 13,881 | 13,881 | 172,246 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,001,608 | 0 | 0 | 0 | 6,001,608 | 6,001,608 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 31,000,000 | | |
| Total Lake Remediation Project Costs | | | | | | | 218,000,000 | | |

TABLE F.39
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
30 PERCENT DREDGE VOLUME INCREASE

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 196,300 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 219,700 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 97,500 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 192,400 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 705,900 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 2,353 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 147 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 7 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 1.1 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 68 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 7 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.40
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
30 PERCENT DREDGE VOLUME INCREASE

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 0 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 0 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 1,050,199 | 771,984 | 19,958 | 477 | 0 | 1,842,619 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 71 | AC | 0 | 0 | 0 | 381,311 | 0 | 381,311 | |
| Install Fence | 8,405 | LF | 0 | 0 | 0 | 151,371 | 0 | 151,371 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 57 | EA | 0 | 205,247 | 0 | 0 | 0 | 205,247 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 0 | 2,744,484 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 705,900 | CY | 4,315,694 | 1,788,466 | 251,583 | 0 | 0 | 6,355,743 | |
| Transfer to SCA | 705,900 | CY | 1,752,555 | 317,372 | 115,309 | 0 | 0 | 2,185,236 | |
| Operation of SCA | 1 | LS | 188,631 | 75,447 | 20,965 | 193,961 | 0 | 479,004 | |
| Sheen Treatment | 6 | MO | 226,135 | 5,228 | 4,503 | 318,191 | 0 | 554,057 | |
| Dredge Containment | 705,900 | CY | 52,280 | 43,580 | 202,852 | 0 | 0 | 298,712 | |
| Dredge Monitoring | 705,900 | CY | 627,002 | 367,087 | 41,930 | 169,216 | 0 | 1,205,236 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 0 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 0 | 1,229,779 | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 0 | 41,779,474 | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 0 | 12,999,633 | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 0 | 9,375,128 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 68 | AC | 3,012,912 | 1,115,193 | 4,317,184 | 2,044,204 | 0 | 10,489,493 | |
| Preloading | 1 | LS | 1,835,098 | 236,346 | 7,662,634 | 52,222 | 0 | 9,786,300 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 9,128,180 | 0 | 9,128,180 | |
| Construct Cap over SCA | 68 | AC | 741,756 | 305,883 | 4,349,905 | 0 | 0 | 5,397,544 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 0 | 25,859,521 | |
| Water treatment for dredged material | 914,140,500 | GA | 0 | 0 | 0 | 5,490,379 | 0 | 5,490,379 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,430,774 | 0 | 0 | 0 | 0 | 6,430,774 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,823,080 | 0 | 0 | 0 | 0 | 4,823,080 | |
| Construction Management | 1 | LS | 6,430,774 | 0 | 0 | 0 | 0 | 6,430,774 | |
| Health and Safety | 2,353 | HR | 546,494 | 27,954 | 307,964 | 0 | 0 | 882,411 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 44,891,405 | 0 | 0 | 0 | 0 | 44,891,405 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 224,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | TOTAL | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 24 | MO | 1,171,039 | 0 | 0 | 0 | 1,171,039 | 1,171,039 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 41,790 | 76,921 | 315,378 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 20,895 | 36,724 | 305,144 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 4,249,501 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,344,118 | 0 | 0 | 0 | 6,344,118 | 6,344,118 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 33,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 257,000,000 | |

TABLE F.41
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
25 PERCENT CAP AREA INCREASE

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 105 | 811,500 | 79,625 | 168,500 |
| 2 | 10 | 169,000 | 20 | 174,525 | 13,000 | 5,375 |
| 3 | 11 | 75,000 | 36 | 161,750 | 22,000 | 0 |
| 4 | 0 | 0 | 94 | 376,125 | 53,125 | 20,875 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 118 | 439,250 | 96,750 | 63,000 |
| 7 | 0 | 0 | 48 | 352,250 | 48,250 | 49,500 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 440 | 2,327,231 | 312,750 | 307,250 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 5,818 | 823 | 2,195 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 364 | 51 | 137 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 18 | 3 | 7 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.6 | 0.4 | 1.0 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 21 MO |
| In Lake Construction Duration ⁽²⁾ : | 23 MO |
| In Lake Construction Duration ⁽³⁾ : | 4 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.42
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
25 PERCENT CAP AREA INCREASE**

| Direct Construction Costs | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | |
| | | | Labor | Equipment | Materials | Subcont | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 440 | AC | 1,664,126 | 441,347 | 88,981 | 1,197,840 | 3,392,294 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | |
| Cap Containment | 440 | AC | 310,694 | 281,241 | 909,914 | 0 | 1,501,849 | |
| Sand | 440 | AC | 21,080,605 | 9,621,751 | 21,454,662 | 0 | 52,157,017 | |
| Rock | 440 | AC | 4,300,944 | 1,706,974 | 9,500,296 | 739,151 | 16,247,366 | |
| Gravel | 440 | AC | 3,005,676 | 1,281,592 | 7,434,034 | 0 | 11,721,302 | |
| <i>Backfill</i> | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | |
| <i>Water Treatment</i> | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | |
| <i>Indirect Construction Costs</i> | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,689,510 | 0 | 0 | 0 | 6,689,510 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | |
| Project Management | 1 | LS | 5,017,133 | 0 | 0 | 0 | 5,017,133 | |
| Construction Management | 1 | LS | 6,689,510 | 0 | 0 | 0 | 6,689,510 | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 289,342 | 0 | 731,224 | |
| <i>Construction Cost Contingency</i> | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 46,648,591 | 0 | 0 | 0 | 46,648,591 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 233,000,000 | |
| <i>Operation and Maintenance</i> | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL |
| | | | | Labor | Equipment | Materials | Subcont | |
| <i>O&M During Construction and Off Season</i> | | | | | | | | |
| Off-hour security | 1.000 | 26 | MO | 1,145,033 | 0 | 0 | 0 | 1,145,033 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 144,853 | 64,891 | 13,083 | 199,878 | 5,242,864 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,584,619 | 0 | 0 | 0 | 6,584,619 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 34,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | 267,000,000 | |

TABLE F.43
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
WITH INCREASE IN PROFUNDAL ZONE SCOPE

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 80 | 47,324 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 416 | 1,899,644 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,749 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 297 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.44
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
WITH INCREASE IN PROFUNDAL ZONE SCOPE

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|-----------|--------------------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 0 | 594,000 | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 0 | 3,563,908 | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 0 | 1,733,316 | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 0 | 1,561,184 | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 0 | 304,988 | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 0 | 137,626 | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 0 | 9,302 | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 0 | 183,642 | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 0 | 5,940 | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 0 | 118,800 | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 0 | 10,382 | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 0 | 3,427,024 | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Pre-Dredging | 416 | AC | 1,573,362 | 417,335 | 84,140 | 1,132,551 | 0 | 3,207,388 | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 0 | 154,440 | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 0 | 4,888,634 | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 0 | 1,680,867 | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 0 | 368,363 | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 0 | 427,217 | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 0 | 298,712 | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 0 | 927,065 | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 0 | 3,858 | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 0 | 412,134 | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 416 | AC | 294,002 | 265,888 | 864,173 | 0 | 0 | 1,424,064 | |
| Sand | 416 | AC | 17,209,127 | 7,854,153 | 17,512,784 | 0 | 0 | 42,576,065 | |
| Rock | 416 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 0 | 12,999,633 | |
| Gravel | 416 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 0 | 9,375,128 | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | 0 | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 0 | 1,526,272 | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 0 | 64,417 | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 0 | 8,800,268 | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 0 | 7,507,793 | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 0 | 8,060,537 | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 0 | 4,157,168 | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 0 | 25,859,521 | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 0 | 4,223,447 | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 0 | 1,188,000 | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 0 | 229,236 | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,072,008 | 0 | 0 | 0 | 0 | 6,072,008 | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,554,006 | 0 | 0 | 0 | 0 | 4,554,006 | |
| Construction Management | 1 | LS | 6,072,008 | 0 | 0 | 0 | 0 | 6,072,008 | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 282,657 | 0 | 0 | 724,540 | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 42,363,000 | 0 | 0 | 0 | 0 | 42,363,000 | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | | 212,000,000 | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 23 | MO | 1,010,341 | 0 | 0 | 0 | 1,010,341 | 1,010,341 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 12.409 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,793,030 |
| Natural recovery monitoring - Profundal Zone | 12.409 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,994,373 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 299,802 |
| O&M for SCA - Remaining 25 years | 8.309 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 289,360 |
| Lake Cap Monitoring | 12.409 | 1 | YR | 136,961 | 61,355 | 12,370 | 188,741 | 399,427 | 4,956,492 |
| 5-Year Reviews | 2.156 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 523,167 |
| Lake Cap Maintenance | 2.156 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 4,240,946 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 6,513,026 | 0 | 0 | 0 | 6,513,026 | 6,513,026 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | | 34,000,000 | |
| Total Lake Remediation Project Costs | | | | | | | | 246,000,000 | |

**TABLE F.45
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
20 YEAR O&M PERIOD**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.46
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
20 YEAR O&M PERIOD**

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | | |
| Indirect Construction Costs | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,510,393 | 0 | 0 | 0 | 4,510,393 | | |
| Construction Management | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 41,955,279 | 0 | 0 | 0 | 41,955,279 | | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 210,000,000 | | |
| Operation and Maintenance | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 10.594 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,238,243 |
| Natural recovery monitoring - Profundal Zone | 10.594 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,556,402 |
| O&M for SCA - 1st 5 years | 4.100 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 299,802 |
| O&M for SCA - Remaining 25 years | 6.494 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 226,145 |
| Lake Cap Monitoring | 10.594 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 3,627,948 |
| 5-Year Reviews | 1.841 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 446,730 |
| Lake Cap Maintenance | 1.841 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 3,621,327 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.100 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 779,328 |
| SMU 5 Pilot Study | 4.100 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 487,080 |
| SMU 7 Barrier Wall Pump and Treat | 10.594 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,289,931 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 5,687,634 | 0 | 0 | 0 | 5,687,634 | 5,687,634 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 29,000,000 | | |
| Total Lake Remediation Project Costs | | | | | | | 239,000,000 | | |

TABLE F.47
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
5 PERCENT DISCOUNT FACTOR INSTEAD OF 7 PERCENT

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.48
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
5 PERCENT DISCOUNT FACTOR INSTEAD OF 7 PERCENT

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,510,393 | 0 | 0 | 0 | 4,510,393 | | |
| Construction Management | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 41,955,279 | 0 | 0 | 0 | 41,955,279 | | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 210,000,000 | | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 15.372 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 4,698,723 |
| Natural recovery monitoring - Profundal Zone | 15.372 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 3,709,364 |
| O&M for SCA - 1st 5 years | 4.329 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 316,547 |
| O&M for SCA - Remaining 25 years | 11.043 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 384,566 |
| Lake Cap Monitoring | 15.372 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 5,264,189 |
| 5-Year Reviews | 2.782 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 675,076 |
| Lake Cap Maintenance | 2.782 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 5,472,366 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 4.329 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 822,856 |
| SMU 5 Pilot Study | 4.329 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 514,285 |
| SMU 7 Barrier Wall Pump and Treat | 12.409 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,510,926 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 7,386,625 | 0 | 0 | 0 | 7,386,625 | 7,386,625 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 38,000,000 | | |
| Total Lake Remediation Project Costs | | | | | | | 248,000,000 | | |

TABLE F.49
COST ESTIMATE INPUT DATA FOR
LAKE-WIDE ALTERNATIVE C
9 PERCENT DISCOUNT FACTOR INSTEAD OF 7 PERCENT

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|----------------|---------------|--------------------------|----------------|----------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 36 | 151,000 | 84 | 649,200 | 63,700 | 134,800 |
| 2 | 10 | 169,000 | 16 | 139,620 | 10,400 | 4,300 |
| 3 | 11 | 75,000 | 29 | 129,400 | 17,600 | 0 |
| 4 | 0 | 0 | 75 | 300,900 | 42,500 | 16,700 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 11 | 148,000 | 94 | 351,400 | 77,400 | 50,400 |
| 7 | 0 | 0 | 38 | 281,800 | 38,600 | 39,600 |
| 8 | | 0 | 20 | 11,831 | | |
| 9 | | | | | | |
| TOTAL | 68 | 543,000 | 356 | 1,864,151 | 250,200 | 245,800 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 2 | | 4 | 4 | 2 |
| Production Rate (CY/HR): | | 300 | | 400 | 380 | 140 |
| Duration (HR): | | 1,810 | | 4,660 | 658 | 1,756 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 113 | | 291 | 41 | 110 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 6 | | 15 | 2 | 5 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.8 | | 2.1 | 0.3 | 0.8 |

| | |
|-----------------|-------|
| SCA Size | 54 AC |
| SCA Dike Height | 14 FT |

| TOTAL CONSTRUCTION DURATION | |
|--|-------|
| Dredging Duration: | 6 MO |
| Capping Duration: | 17 MO |
| In Lake Construction Duration ⁽²⁾ : | 19 MO |
| In Lake Construction Duration ⁽³⁾ : | 3 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.50
COST SUMMARY FOR
LAKE-WIDE ALTERNATIVE C
9 PERCENT DISCOUNT FACTOR INSTEAD OF 7 PERCENT

| Direct Construction Costs | | | | | | | | | |
|---|-------------|------|------------|-------------|------------|------------|--------------------|-----------|-----------|
| Task | Qty | Unit | Cost | | | | TOTAL | | |
| | | | Labor | Equipment | Materials | Subcont | | | |
| <i>Mobilization/ Demobilization</i> | | | | | | | | | |
| Equipment Fabrication | 1 | LS | 0 | 594,000 | 0 | 0 | 594,000 | | |
| Mobilization | 1 | LS | 1,394,990 | 646,333 | 1,510,918 | 11,666 | 3,563,908 | | |
| Demobilization | 1 | LS | 1,223,753 | 417,817 | 48,470 | 43,276 | 1,733,316 | | |
| Interim Year Startup | 2 | EA | 801,477 | 739,271 | 19,958 | 477 | 1,561,184 | | |
| <i>Site Preparation and Facility Construction</i> | | | | | | | | | |
| Clearing and Grubbing | 57 | AC | 0 | 0 | 0 | 304,988 | 304,988 | | |
| Install Fence | 7,642 | LF | 0 | 0 | 0 | 137,626 | 137,626 | | |
| Construct Gravel Equipment Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Construct Gravel Admin. Area | 200 | LF | 0 | 0 | 9,302 | 0 | 9,302 | | |
| Install Work Lighting | 51 | EA | 0 | 183,642 | 0 | 0 | 183,642 | | |
| Electrical Power | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Water Line | 1 | LS | 0 | 0 | 0 | 5,940 | 5,940 | | |
| Contaminated Water Control System | 1 | LS | 0 | 0 | 118,800 | 0 | 118,800 | | |
| Decon Facility | 1 | LS | 1,323 | 0 | 594 | 8,465 | 10,382 | | |
| Barrier Wall | 65,000 | SF | 0 | 0 | 0 | 3,427,024 | 3,427,024 | | |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | | | |
| Bathymetry Survey - Pre-Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Pre-Dredging | 356 | AC | 1,346,409 | 357,084 | 71,993 | 968,998 | 2,744,484 | | |
| Recover and Remove Barge | 1 | LS | 0 | 0 | 0 | 154,440 | 154,440 | | |
| Hydraulic Dredging with Cutter Head | 543,000 | CY | 3,319,366 | 1,375,743 | 193,525 | 0 | 4,888,634 | | |
| Transfer to SCA | 543,000 | CY | 1,348,036 | 244,132 | 88,699 | 0 | 1,680,867 | | |
| Operation of SCA | 1 | LS | 145,101 | 58,036 | 16,127 | 149,099 | 368,363 | | |
| Sheen Treatment | 5 | MO | 173,930 | 4,022 | 4,503 | 244,763 | 427,217 | | |
| Dredge Containment | 543,000 | CY | 52,280 | 43,580 | 202,852 | 0 | 298,712 | | |
| Dredge Monitoring | 543,000 | CY | 482,226 | 282,375 | 32,254 | 130,210 | 927,065 | | |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 | | |
| Sediment Sampling - Post Dredging | 68 | AC | 258,057 | 68,500 | 13,811 | 71,766 | 412,134 | | |
| <i>Sediment Cap</i> | | | | | | | | | |
| Cap Containment | 356 | AC | 252,314 | 227,548 | 749,917 | 0 | 1,229,779 | | |
| Sand | 356 | AC | 16,886,965 | 7,706,991 | 17,185,518 | 0 | 41,779,474 | | |
| Rock | 356 | AC | 3,442,495 | 1,365,579 | 7,600,237 | 591,321 | 12,999,633 | | |
| Gravel | 356 | AC | 2,402,996 | 1,024,962 | 5,947,170 | 0 | 9,375,128 | | |
| <i>Backfill</i> | | | | | | | | | |
| Backfill | 0 | CY | 0 | 0 | 0 | 0 | 0 | | |
| <i>Habitat & Vegetation Restoration</i> | | | | | | | | | |
| Habitat & Vegetation Restoration | 1 | LS | 0 | 0 | 0 | 1,526,272 | 1,526,272 | | |
| Rip Rap | 1 | LF | 1,977 | 2,262 | 60,178 | 0 | 64,417 | | |
| <i>SCA Construction</i> | | | | | | | | | |
| Construct SCA | 54 | AC | 2,586,701 | 965,786 | 3,633,668 | 1,614,113 | 8,800,268 | | |
| Preloading | 1 | LS | 1,407,811 | 181,319 | 5,878,598 | 40,064 | 7,507,793 | | |
| Stabilization under Dikes | 1 | LS | 0 | 0 | 0 | 8,060,537 | 8,060,537 | | |
| Construct Cap over SCA | 54 | AC | 572,841 | 236,226 | 3,348,100 | 0 | 4,157,168 | | |
| <i>Water Treatment</i> | | | | | | | | | |
| Construct Water Treatment Facility | 1 | LS | 1,004,769 | 826,577 | 1,563,095 | 22,465,080 | 25,859,521 | | |
| Water treatment for dredged material | 703,185,000 | GA | 0 | 0 | 0 | 4,223,447 | 4,223,447 | | |
| Dismantle WTP | 1 | LS | 0 | 0 | 0 | 1,188,000 | 1,188,000 | | |
| <i>Indirect Construction Costs</i> | | | | | | | | | |
| Institutional Controls | 1 | LS | 229,236 | 0 | 0 | 0 | 229,236 | | |
| <i>Studies, Design, and Planning</i> | | | | | | | | | |
| [Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | | |
| <i>Engineering and Const. Oversight</i> | | | | | | | | | |
| Project Management | 1 | LS | 4,510,393 | 0 | 0 | 0 | 4,510,393 | | |
| Construction Management | 1 | LS | 6,013,857 | 0 | 0 | 0 | 6,013,857 | | |
| Health and Safety | 1,810 | HR | 420,380 | 21,503 | 265,468 | 0 | 707,350 | | |
| <i>Construction Cost Contingency</i> | | | | | | | | | |
| Construction Cost Contingency | 1 | LS | 41,955,279 | 0 | 0 | 0 | 41,955,279 | | |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 210,000,000 | | |
| <i>Operation and Maintenance</i> | | | | | | | | | |
| Task | NPV Factor | Qty | Unit | Annual Cost | | | | NPV TOTAL | |
| | | | | Labor | Equipment | Materials | Subcont | | TOTAL |
| <i>O&M During Construction and Off Season</i> | | | | | | | | | |
| Off-hour security | 1.000 | 22 | MO | 1,000,614 | 0 | 0 | 0 | 1,000,614 | 1,000,614 |
| <i>Long Term O&M (30 years)</i> | | | | | | | | | |
| O&M Management and Technical Support | 10.274 | 1 | YR | 305,668 | 0 | 0 | 0 | 305,668 | 3,140,429 |
| Natural recovery monitoring - Profundal Zone | 10.274 | 1 | YR | 65,768 | 29,462 | 5,940 | 140,136 | 241,307 | 2,479,184 |
| O&M for SCA - 1st 5 years | 3.890 | 1 | YR | 28,807 | 1,901 | 4,424 | 37,991 | 73,122 | 284,446 |
| O&M for SCA - Remaining 25 years | 5.864 | 1 | YR | 14,403 | 950 | 475 | 18,995 | 34,824 | 204,221 |
| Lake Cap Monitoring | 10.274 | 1 | YR | 117,231 | 52,517 | 10,588 | 162,117 | 342,453 | 3,518,363 |
| 5-Year Reviews | 1.717 | 1 | YR | 242,656 | 0 | 0 | 0 | 242,656 | 416,641 |
| Lake Cap Maintenance | 1.717 | 1 | YR | 719,862 | 282,720 | 964,461 | 0 | 1,967,043 | 3,377,414 |
| Aeration in Profundal Zone - Capital | 1.000 | 4 | LS | 0 | 0 | 0 | 6,177,600 | 6,177,600 | 6,177,600 |
| Aeration in Profundal Zone - Operation | 3.890 | 1 | YR | 0 | 0 | 0 | 190,080 | 190,080 | 739,411 |
| SMU 5 Pilot Study | 3.890 | 1 | YR | 0 | 0 | 0 | 118,800 | 118,800 | 462,132 |
| SMU 7 Barrier Wall Pump and Treat | 10.274 | 1 | YR | 0 | 0 | 0 | 121,760 | 121,760 | 1,250,967 |
| <i>Waste and O&M Contingency</i> | | | | | | | | | |
| Waste and O&M Contingency | 1.000 | 1 | LS | 5,512,702 | 0 | 0 | 0 | 5,512,702 | 5,512,702 |
| OPERATION AND MAINTENANCE COSTS SUBTOTAL | | | | | | | 29,000,000 | | |
| Total Lake Remediation Project Costs | | | | | | | 239,000,000 | | |

TABLE F.51
COST ESTIMATE INPUT DATA FOR
CAP REPLACEMENT IN 10 PERCENT OF SMU 6 DUE TO CAP FAILURE

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|---------------|---------------|--------------------------|---------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0.0 | 9 | 30,331 | 15,165 | 15,165 |
| 7 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0.0 | 0 | 0 | 0 | 0 |
| 9 | | | | | | |
| TOTAL | 0 | 0 | 9 | 30,331 | 15,165 | 15,165 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 0 | | 1 | 1 | 1 |
| Production Rate (CY/HR): | | 0 | | 100 | 95 | 70 |
| Duration (HR): | | 0 | | 303 | 160 | 217 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 0 | | 19 | 10 | 14 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 0 | | 1 | 1 | 1 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.0 | | 0.1 | 0.1 | 0.1 |

| | | |
|-----------------|----|----|
| SCA Size | NA | AC |
| SCA Dike Height | NA | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|------|
| Dredging Duration: | 0 MO |
| Capping Duration: | 1 MO |
| In Lake Construction Duration ⁽²⁾ : | 3 MO |
| In Lake Construction Duration ⁽³⁾ : | 1 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.52
COST SUMMARY FOR
CAP REPLACEMENT IN 10 PERCENT OF SMU 6 DUE TO CAP FAILURE

| Direct Construction Costs | | | | | | | |
|---|-----|------|---------|-----------|-----------|---------|------------------|
| Task | Qty | Unit | Cost | | | | TOTAL |
| | | | Labor | Equipment | Materials | Subcont | |
| <i>Mobilization/ Demobilization</i> | | | | | | | |
| Mobilization | 1 | LS | 207,314 | 99,303 | 16,038 | 0 | 322,655 |
| Demobilization | 1 | LS | 120,321 | 29,221 | 3,208 | 0 | 152,750 |
| Sediment Sampling - Pre-Dredging | 9 | AC | 35,549 | 9,428 | 1,901 | 25,649 | 72,526 |
| Sediment Sampling - Post Dredging | 9 | AC | 35,549 | 9,428 | 1,901 | 9,903 | 56,781 |
| <i>Sediment Cap</i> | | | | | | | |
| Cap Containment | 9 | AC | 11,426 | 6,007 | 91,617 | 0 | 109,050 |
| Sand | 9 | AC | 337,338 | 125,666 | 279,652 | 0 | 742,656 |
| Rock | 9 | AC | 241,871 | 84,377 | 468,941 | 36,483 | 831,672 |
| Gravel | 9 | AC | 178,539 | 62,213 | 360,500 | 0 | 601,251 |
| Indirect Construction Costs | | | | | | | |
| <i>Studies, Design, and Planning</i> | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 115,574 | 0 | 0 | 0 | 115,574 |
| <i>Engineering and Const. Oversight</i> | | | | | | | |
| Project Management | 1 | LS | 86,680 | 0 | 0 | 0 | 86,680 |
| Construction Management | 1 | LS | 115,574 | 0 | 0 | 0 | 115,574 |
| Health and Safety | 0 | HR | 0 | 0 | 7,628 | 0 | 7,628 |
| <i>Construction Cost Contingency</i> | | | | | | | |
| Construction Cost Contingency | 1 | LS | 803,699 | 0 | 0 | 0 | 803,699 |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 4,000,000 |

**TABLE F.53
COST ESTIMATE INPUT DATA FOR
SLOPE FAILURE IN ILWD
DREDGING AND CAP REPLACEMENT**

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|---------------|---------------|--------------------------|---------------|---------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 4 | 67,760 | 8 | 27,104 | 13,552 | 13,552 |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | 0 | | | | |
| 9 | | | | | | |
| TOTAL | 4 | 67,760 | 8 | 27,104 | 13,552 | 13,552 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 1 | | 1 | 1 | 1 |
| Production Rate (CY/HR): | | 150 | | 100 | 95 | 70 |
| Duration (HR): | | 452 | | 271 | 143 | 194 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 28 | | 17 | 9 | 12 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 1 | | 1 | 0 | 1 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.2 | | 0.1 | 0.1 | 0.1 |

| | | |
|-----------------|----|----|
| SCA Size | NA | AC |
| SCA Dike Height | NA | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|------|
| Dredging Duration: | 1 MO |
| Capping Duration: | 1 MO |
| In Lake Construction Duration ⁽²⁾ : | 3 MO |
| In Lake Construction Duration ⁽³⁾ : | 1 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.54 COST SUMMARY FOR SLOPE FAILURE IN ILWD DREDGING AND CAP REPLACEMENT

| Direct Construction Costs | | | | | | | |
|---|------------|------|-----------|-----------|-----------|-----------|-------------------|
| Task | Qty | Unit | Cost | | | | TOTAL |
| | | | Labor | Equipment | Materials | Subcont | |
| <i>Mobilization/ Demobilization</i> | | | | | | | |
| Mobilization | 1 | LS | 254,738 | 126,793 | 17,107 | 2,793 | 401,431 |
| Demobilization | 1 | LS | 190,406 | 43,847 | 4,277 | 2,387 | 240,917 |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | |
| Sediment Sampling - Pre-Dredging | 4 | AC | 15,881 | 4,272 | 861 | 11,659 | 32,673 |
| Hydraulic Dredging with Cutter Head | 67,760 | CY | 827,591 | 343,353 | 48,299 | 0 | 1,219,243 |
| Transfer to SCA | 67,760 | CY | 336,218 | 60,930 | 22,137 | 0 | 419,285 |
| Operation of SCA | 1 | LS | 36,214 | 14,484 | 4,025 | 36,945 | 91,668 |
| Dredge Containment | 67,760 | CY | 7,813 | 2,684 | 81,385 | 0 | 91,882 |
| Dredge Monitoring | 67,760 | CY | 75,288 | 35,256 | 4,027 | 32,696 | 147,267 |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 |
| Sediment Sampling - Post Dredging | 4 | AC | 15,881 | 4,272 | 861 | 4,501 | 25,516 |
| <i>Sediment Cap</i> | | | | | | | |
| Cap Containment | 8 | AC | 11,843 | 6,390 | 92,516 | 0 | 110,748 |
| Sand | 8 | AC | 301,829 | 112,438 | 249,920 | 0 | 664,187 |
| Rock | 8 | AC | 215,934 | 75,433 | 419,060 | 32,602 | 743,029 |
| Gravel | 8 | AC | 159,841 | 55,603 | 322,146 | 0 | 537,589 |
| <i>SCA Construction</i> | | | | | | | |
| Construct Pit on SCA | NA | AC | 181,065 | 72,664 | 12,830 | 9,547 | 276,106 |
| Construct Cap over Pit on SCA | NA | AC | 143,210 | 59,057 | 823,153 | 0 | 1,025,420 |
| <i>Water Treatment</i> | | | | | | | |
| Construct Water Treatment Facility | 0 | LS | 0 | 0 | 0 | 0 | 0 |
| Water treatment for dredged material | 87,749,200 | GA | 0 | 0 | 0 | 1,888,061 | 1,888,061 |
| Indirect Construction Costs | | | | | | | |
| <i>Studies, Design, and Planning</i> | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 316,755 | 0 | 0 | 0 | 316,755 |
| <i>Engineering and Const. Oversight</i> | | | | | | | |
| Project Management | 1 | LS | 237,566 | 0 | 0 | 0 | 237,566 |
| Construction Management | 1 | LS | 316,755 | 0 | 0 | 0 | 316,755 |
| <i>Construction Cost Contingency</i> | | | | | | | |
| Construction Cost Contingency | 1 | LS | 2,197,490 | 0 | 0 | 0 | 2,197,490 |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 11,000,000 |

TABLE F.55
COST ESTIMATE INPUT DATA FOR
FAILURE OF CAP CHEMICAL ISOLATION
EXCAVATION OF HOTSPOT AND RECAP

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|---------------|---------------|--------------------------|--------------|--------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 5 | 40,333 | 5 | 16,133 | 8,067 | 8,067 |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | 0 | | | | |
| 9 | | | | | | |
| TOTAL | 5 | 40,333 | 5 | 16,133 | 8,067 | 8,067 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 1 | | 1 | 1 | 1 |
| Production Rate (CY/HR): | | 150 | | 100 | 95 | 70 |
| Duration (HR): | | 269 | | 161 | 85 | 115 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 17 | | 10 | 5 | 7 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 1 | | 1 | 0 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.1 | | 0.1 | 0.0 | 0.1 |

| | | |
|-----------------|----|----|
| SCA Size | 0 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|------|
| Dredging Duration: | 1 MO |
| Capping Duration: | 1 MO |
| In Lake Construction Duration ⁽²⁾ : | 3 MO |
| In Lake Construction Duration ⁽³⁾ : | 1 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

TABLE F.56 COST SUMMARY FOR FAILURE OF CAP CHEMICAL ISOLATION EXCAVATION OF HOTSPOT AND RECAP

| Direct Construction Costs | | | | | | | |
|---|------------|------|-----------|-----------|-----------|-----------|-------------------|
| Task | Qty | Unit | Cost | | | | TOTAL |
| | | | Labor | Equipment | Materials | Subcont | |
| <i>Mobilization/ Demobilization</i> | | | | | | | |
| Equipment Fabrication | 0 | LS | 0 | 0 | 0 | 0 | 0 |
| Mobilization | 1 | LS | 254,738 | 126,793 | 17,107 | 2,793 | 401,431 |
| Demobilization | 1 | LS | 190,406 | 43,847 | 4,277 | 2,387 | 240,917 |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | |
| Sediment Sampling - Pre-Dredging | 5 | AC | 19,667 | 5,156 | 1,040 | 13,990 | 39,853 |
| Hydraulic Dredging with Cutter Head | 40,333 | CY | 494,025 | 204,377 | 28,750 | 0 | 727,152 |
| Transfer to SCA | 40,333 | CY | 200,492 | 36,268 | 13,177 | 0 | 249,937 |
| Operation of SCA | 1 | LS | 21,556 | 8,622 | 2,396 | 22,431 | 55,004 |
| Dredge Containment | 40,333 | CY | 0 | 0 | 0 | 6,653,139 | 6,653,139 |
| Dredge Monitoring | 40,333 | CY | 45,192 | 20,983 | 2,397 | 19,503 | 88,074 |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 |
| Sediment Sampling - Post Dredging | 5 | AC | 19,667 | 5,156 | 1,040 | 5,402 | 31,265 |
| <i>Sediment Cap</i> | | | | | | | |
| Cap Containment | 5 | AC | 8,369 | 3,195 | 83,198 | 0 | 94,761 |
| Sand | 5 | AC | 179,222 | 66,967 | 148,767 | 0 | 394,956 |
| Rock | 5 | AC | 130,528 | 45,105 | 249,478 | 19,406 | 444,516 |
| Gravel | 5 | AC | 95,664 | 33,051 | 191,754 | 0 | 320,469 |
| <i>SCA Construction</i> | | | | | | | |
| Construct Pit on SCA | 6 | AC | 181,065 | 72,664 | 12,830 | 9,547 | 276,106 |
| Construct Cap over Pit on SCA | 0 | AC | 84,457 | 34,828 | 489,895 | 0 | 609,181 |
| <i>Water Treatment</i> | | | | | | | |
| Water treatment for dredged material | 52,231,667 | GA | 0 | 0 | 0 | 1,123,935 | 1,123,935 |
| Indirect Construction Costs | | | | | | | |
| <i>Studies, Design, and Planning</i> | | | | | | | |
| Pre-Design, Remedial Design, Agency Oversight | 1 | LS | 470,182 | 0 | 0 | 0 | 470,182 |
| <i>Engineering and Const. Oversight</i> | | | | | | | |
| Project Management | 1 | LS | 352,637 | 0 | 0 | 0 | 352,637 |
| Construction Management | 1 | LS | 470,182 | 0 | 0 | 0 | 470,182 |
| <i>Construction Cost Contingency</i> | | | | | | | |
| Construction Cost Contingency | 1 | LS | 3,261,889 | 0 | 0 | 0 | 3,261,889 |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 16,000,000 |

TABLE F.57
COST ESTIMATE INPUT DATA FOR
FAILURE OF CAP CHEMICAL ISOLATION
EXCAVATION OF CONTAMINATED CAP, RECAP WITH REACTIVE CAP

| SMU | DREDGING | | CAPPING | | | |
|--------------------------|-------------------|---------------|---------------|--------------------------|--------------|--------------|
| | Dredged Area (AC) | Sediment (CY) | Cap Area (AC) | Sand ⁽¹⁾ (CY) | Gravel (CY) | Rock (CY) |
| <i>Quantities</i> | | | | | | |
| 1 | 5 | 37,913 | 5 | 15,165 | 7,583 | 7,583 |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | 0 | | | | |
| 9 | | | | | | |
| TOTAL | 5 | 37,913 | 5 | 15,165 | 7,583 | 7,583 |
| <i>Durations</i> | | | | | | |
| Number Crews: | | 1 | | 1 | 1 | 1 |
| Production Rate (CY/HR): | | 150 | | 100 | 95 | 70 |
| Duration (HR): | | 253 | | 152 | 80 | 108 |
| Shifts/Day: | | 2 | | 2 | 2 | 2 |
| Hours/Shift: | | 8 | | 8 | 8 | 8 |
| Duration (DA): | | 16 | | 10 | 5 | 7 |
| Days/Month: | | 20 | | 20 | 20 | 20 |
| Duration (MO): | | 1 | | 0 | 0 | 0 |
| Months/Year: | | 7 | | 7 | 7 | 7 |
| Duration (YR): | | 0.1 | | 0.1 | 0.0 | 0.0 |

| | | |
|-----------------|----|----|
| SCA Size | 0 | AC |
| SCA Dike Height | 14 | FT |

| TOTAL CONSTRUCTION DURATION | |
|--|------|
| Dredging Duration: | 1 MO |
| Capping Duration: | 1 MO |
| In Lake Construction Duration ⁽²⁾ : | 3 MO |
| In Lake Construction Duration ⁽³⁾ : | 1 YR |

Notes:

- (1) Sand volume includes volume of wetland substrate material, when applicable (See Appendix E)
- (2) assumes capping can be performed concurrent with dredging after a two month lag
- (3) based on 7 working months per year

**TABLE F.58
COST SUMMARY FOR
FAILURE OF CAP CHEMICAL ISOLATION
EXCAVATION OF CONTAMINATED CAP AND RECAP WITH REACTIVE CAP**

| Direct Construction Costs | | | | | | | |
|---|------------|------|-----------|-----------|-----------|-----------|-------------------|
| Task | Qty | Unit | Cost | | | | TOTAL |
| | | | Labor | Equipment | Materials | Subcont | |
| <i>Mobilization/ Demobilization</i> | | | | | | | |
| Mobilization | 1 | LS | 254,738 | 126,793 | 17,107 | 2,793 | 401,431 |
| Demobilization | 1 | LS | 190,406 | 43,847 | 4,277 | 2,387 | 240,917 |
| <i>Dredging - SMU 1 thru SMU 7</i> | | | | | | | |
| Sediment Sampling - Pre-Dredging | 5 | AC | 17,774 | 4,714 | 950 | 12,991 | 36,430 |
| Hydraulic Dredging with Cutter Head | 37,913 | CY | 464,441 | 192,114 | 27,025 | 0 | 683,580 |
| Transfer to SCA | 37,913 | CY | 188,485 | 34,092 | 12,386 | 0 | 234,962 |
| Operation of SCA | 1 | LS | 20,262 | 8,104 | 2,252 | 21,111 | 51,730 |
| Dredge Containment | 37,913 | CY | 0 | 0 | 0 | 6,450,458 | 6,450,458 |
| Dredge Monitoring | 37,913 | CY | 42,483 | 19,735 | 2,254 | 18,356 | 82,828 |
| Bathymetry Survey - Post Dredging | 1 | LS | 0 | 0 | 0 | 3,858 | 3,858 |
| Sediment Sampling - Post Dredging | 5 | AC | 17,774 | 4,714 | 950 | 5,016 | 28,455 |
| <i>Sediment Cap</i> | | | | | | | |
| Reactive Cap | 5 | AC | 480,468 | 79,172 | 351,729 | 0 | 911,369 |
| Sand | 41 | AC | 168,669 | 62,833 | 139,826 | 0 | 371,328 |
| Rock | 41 | AC | 122,445 | 42,383 | 234,506 | 18,242 | 417,576 |
| Gravel | 41 | AC | 89,269 | 31,107 | 180,250 | 0 | 300,626 |
| <i>SCA Construction</i> | | | | | | | |
| Create Pit on SCA | 6 | AC | 181,065 | 72,664 | 12,830 | 9,547 | 276,106 |
| Construct Cap over SCA Pit | 6 | AC | 80,785 | 33,314 | 460,638 | 0 | 574,737 |
| <i>Water Treatment</i> | | | | | | | |
| Water treatment for dredged material | 49,097,767 | GA | 0 | 0 | 0 | 1,056,407 | 1,056,407 |
| Indirect Construction Costs | | | | | | | |
| <i>Studies, Design, and Planning</i> | | | | | | | |
| Pre-Design, Remedial Design, Agency Overs | 1 | LS | 484,912 | 0 | 0 | 0 | 484,912 |
| <i>Engineering and Const. Oversight</i> | | | | | | | |
| Project Management | 1 | LS | 363,684 | 0 | 0 | 0 | 363,684 |
| Construction Management | 1 | LS | 484,912 | 0 | 0 | 0 | 484,912 |
| <i>Construction Cost Contingency</i> | | | | | | | |
| Construction Cost Contingency | 1 | LS | 3,364,076 | 0 | 0 | 0 | 3,364,076 |
| CONSTRUCTION COSTS SUBTOTAL | | | | | | | 17,000,000 |

TABLE F.59
NET PRESENT VALUE
LAKE-WIDE ALTERNATIVES COST

| Lake-wide Alternative | B | C | D | D2 | E | F1 | F2 | F3 | F4 | G | H | I | J |
|--------------------------|-------------|-------------|-------------|-------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|
| Cost in 2004 Dollars | 211,000,000 | 243,000,000 | 264,000,000 | 294,000,000 | 1,214,000,000 | 312,000,000 | 370,000,000 | 429,000,000 | 470,000,000 | 514,000,000 | 537,000,000 | 1,327,000,000 | 2,157,000,000 |
| In Lake Duration | 3 | 3 | 3 | 3 | 9 | 4 | 4 | 4 | 4 | 4 | 4 | 10 | 17 |
| Construction Duration | 4 | 4 | 4 | 4 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 11 | 18 |
| Average Annual Cost | 52,750,000 | 60,750,000 | 66,000,000 | 73,500,000 | 121,400,000 | 62,400,000 | 74,000,000 | 85,800,000 | 94,000,000 | 102,800,000 | 107,400,000 | 120,636,364 | 119,833,333 |
| Net Present Value Factor | 3.387 | 3.387 | 3.387 | 3.387 | 7.024 | 4.100 | 4.100 | 4.100 | 4.100 | 4.100 | 4.100 | 7.499 | 10.059 |
| Net Present Value | 179,000,000 | 206,000,000 | 224,000,000 | 249,000,000 | 853,000,000 | 256,000,000 | 303,000,000 | 352,000,000 | 385,000,000 | 421,000,000 | 440,000,000 | 905,000,000 | 1,205,000,000 |

TABLE F.60
COST DATA SOURCES
LAKE-WIDE ALTERNATIVES

| Item | Source |
|--|--|
| Labor: | |
| Management and Design Costs | EPA Superfund Cost Estimating Guidance Document |
| Craft Labor | Onondaga County Prevailing Wages |
| Per Diem | DOD Conus: http://www.dtic.mil/cgi-bin/cpdrates.pl |
| Dive Crew | Pelligrino Marine |
| Equipment: | |
| Lighting | NYSDOT average weighted bid price, 2004 |
| Boat, Tug Boat, Survey Boat, Dredge Barge 100-400 tn | Hudson FS, App I |
| Hydraulic Dredge | Brennan Dredging |
| Booster Pumps | Godwin Pumps, 04 Feb 2004 |
| Heavy Equipment | Hertz quote, 04 Feb 2004 |
| Motor Grader | Southworth Milton, 9 Feb 2003 |
| Water Truck | L. Hiffa, 1 Apr 2002 |
| Office Trailers | Williams Scotsman, 05 Feb 2004 |
| Conveyor | Emerald Screening and Crushing, 04 Feb 2004 |
| Turbidity Meter | Enviro Equipment 03 Feb 2004 |
| Fusion Welder | Lee Supply Quote, 06 Nov 2003 |
| Materials: | |
| Silt Curtains, floats, and anchors | Hudson FS. App I |
| Gravel, Rock | Hanson, Jamesville Quarry |
| Gravel Road | Means |
| Sand and Soil | J. Brown and Sons |
| Safety Supplies | www.allsafetyproducts.biz |
| HPDE pipe | Lee Supply |
| Boom for sheen | www.mysupplydepot.com |
| Double-contained HDPE pipe | Varitech, 12/23/03 |
| Subcontractors: | |
| Barge Removal | Bids for Barge Removal at Cherry Farms Site, 4/98, "Barge Bids.pdf" |
| Geotextile | Chenango |
| Geocomposite | Colorado Lining Systems, 3/22/04 |
| Geomembrane and GCL | GSE, 12/30/03 |
| Habitat Restoration | Ecological Restoration, Inc. |
| Vacuum Truck rental | Optech, 04 Feb 2004 |
| Bathymetry Survey | CLE Engineering |
| Soil and Water Analytical | Accutest 4 December 2003 |
| Air Analytical | Air Toxics, 3 December 2003 |
| Soil and Water Analytical | STL Quote ny03, line 9 |
| Soil and Water Analytical | Aqua System Pipeline Bid |
| Soil and Water Analytical | CES, Syracuse |
| Geotechnical Testing | PW Laboratories, 04 Feb 2004 |
| Soil Stabilization | Hayward Baker |
| Fencing | Atlas Fence, 03 Feb 2004 |
| Monitoring Wells | Parrat Wolf, 16 Sep 2 |