APPENDIX E:

VOLUME ESTIMATES

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APPENDIX E

TABLE OF CONTENTS

Page

APPENDIX E
TABLE OF CONTENTS
(CONTINUED)

LIST OF TABLES

Dredging Volume Tables

APPENDIX E
TABLE OF CONTENTS
(CONTINUED)

LIST OF TABLES (CONTINUED)

Dredging Volume Tables (continued)

Capping Material Volume Tables

APPENDIX E
TABLE OF CONTENTS
(CONTINUED)

LIST OF TABLES (CONTINUED)

Capping Material Volume Tables (continued)

APPENDIX E
TABLE OF CONTENTS
(CONTINUED)

LIST OF FIGURES

APPENDIX E
TABLE OF CONTENTS
(CONTINUED)

LIST OF FIGURES (CONTINUED)

APPENDIX E

TABLE OF CONTENTS (CONTINUED)

SECTION E.1

INTRODUCTION

To support the detailed evaluation of alternatives, including cost estimating, volumes are estimated in this appendix for the following materials:

- Dredged sediments,
- Capping material, and
- Backfill material.

The details regarding all of the calculations for these materials are outlined in the following sections.

SECTION E.2

DREDGE VOLUME ESTIMATES

Dredge volumes for remedial alternatives presented in Section 4 include *in situ* volumes, overdredge volumes, and side-sloughing volumes, which account for the anticipated volume of material that would slough into the dredged area from the surrounding sediments. There are six different types of dredging scenarios presented in Section 4:

- Dredging for No-Loss of Lake Surface Area (NLSA) (e.g., SMU 1 Alternative 4.A.2);
- Dredging for NLSA & Habitat Optimization and Erosive Protection (H&E) (e.g., SMU 2 Alternative 4.A.3);
- Targeted Dredging (e.g., SMU 6 Alternative 4.D.1);
- Dredge for Mass Removal (e.g., SMU 1 Alternative 4.B.5);
- Dredge for Non-Aqueous Phase Liquid (NAPL) Removal (e.g., SMU 2 Alternative 4.B.4); and
- Dredging to a specific Sediment Effects Concentration (SEC) (e.g., SMU 1 Alternative 5.A).

The details and assumptions used in the calculation of the dredge volumes for each dredging scenario are discussed below. In general, there was no distinction made between dredging hydraulically or mechanically when estimating the dredge volumes. The precision of the two techniques are comparable, therefore the associated dredge volumes are assumed to be unaffected if one technique is assumed over another. Table E.1 summarizes the dredge volume estimates associated with each alternative, which are presented in Tables E.2 to E.34. Figures E.1 to E.33 present the dredging areas corresponding to each of the estimates provided in Tables E.2 to E.34.

E.2.1 DREDGE FOR NLSA

Description of Dredge Scenario

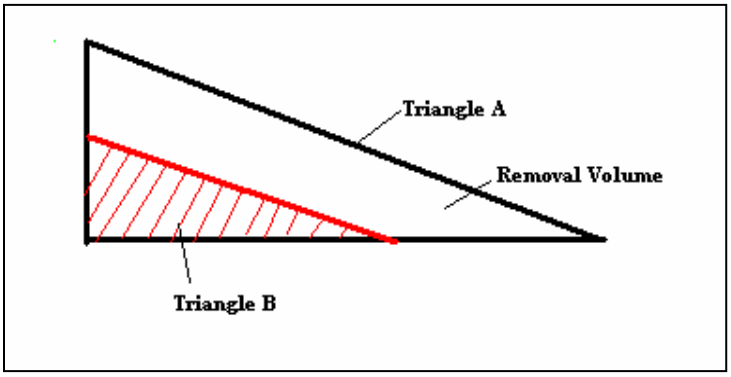
Dredging for NLSA includes a dredging/capping combination that, following remediation, would result in no loss of lake surface area. To achieve this, it is assumed that a uniform dredge cut is removed over the portion of the SMU which directly corresponds to where large stone is required in the cap to provide erosive protection. SMU 1 is the only SMU where a NLSA Alternative has been retained. Large stone would be required to a water depth of 5 feet (Figure 4.19). To ensure no loss of lake surface area above this large stone, approximately 1 and a half feet of sediment must be removed in this area. At the 5 foot depth, stone is no longer required; therefore, no further dredging is necessary. Appendix H Attachment C presents estimated

Settlement vs. Dredge Cut graphs for subsurface caps of varying thickness on a SMU by SMU basis. The depth of the dredge cut is estimated using these graphs and the required thickness of the cap. For the purposes of consistency, estimated settlements were rounded to the nearest half-foot.

The area of the dredge cut is assumed to be from the shoreline, out to the current bathymetry line matching the given limit of dredge depth. In SMU 1, the given limit of dredge depth would be 5 feet; therefore approximately 1 and a half feet of sediment would be removed in the area of SMU 1 from the current shoreline to the current 5 foot bathymetry line. Each volume estimate includes the *in situ* volume, along with the overdredge volume and the side-sloughing volume.

In Situ Volume

The dredging area for each SMU alternative was broken up into sub-areas to increase the accuracy of the volume estimate. A shoreline length and an average width (distance from shore) were estimated for each sub-area. The removal volume was estimated as the difference of two triangular shaped "wedges" of sediment. A simple calculation of the removal cut multiplied by the dredge area would be inaccurate, due to the fact that as the dredge cut reaches its limit, the cut gradually wanes in thickness until the toe of the cut, where it terminates. Therefore, as shown in the figure below, a removal cross-section is estimated as the difference between Triangle A and Triangle B. This removal cross-section area was multiplied by the approximate shoreline length to obtain the *in situ* volume.



Overdredge Volume

Overdredge volumes are assumed to be 1 ft (0.3m) over the entire dredged area. This volume was added to the total dredge volume for this dredging scenario.

Side-sloughing Volume

Side sloughing volumes are sediment volumes expected to "slough" in from outside of the *in situ* dredging area, sloping up at a 1:10 slope to the current bathymetry. This volume was added to the total dredge volume for this dredging scenario.

Toe-sloughing Volume

No toe-sloughing results from this dredging scenario due to the fact that as the dredge cut reaches its limit, the cut wanes in thickness until the toe, where it terminates. Therefore, there would be no sediment at the toe to slope "up" to.

E.2.2 DREDGE FOR NLSA & H&E

Description of Dredge Scenario

Dredging for NLSA & H&E includes a dredging/capping combination that would, following remediation, result in no loss of lake surface area, create specific areas of optimized habitat at specific water depths, and provide reduced erosive forces. To achieve this, it is assumed that a "wedge" of sediment would be dredged to a given water depth. The nature of the "wedge" creates a shelf at a desired depth near the shoreline of the particular SMU. The ultimate goal for the shelf is to create an ideal habitat for submerged macrophytes (< 6 foot depth) however, the actual depth is determined by several factors. The depth of removal needed to achieve this depth varies by SMU. The estimated settlement for the isolation cap can be estimated using the Settlement vs. Dredge Cut graphs presented in Appendix H Attachment C. Since the dredge cut is assumed to be a "wedge", the average dredge cut used to determine the estimated settlement in the SMU is assumed to be one-half the height of the wedge (e.g., a wedge cut of 6 feet near-shore would result in an average 3 foot cut over the entire area dredged).

The area of this dredge cut is assumed to be from the shoreline, out to the current bathymetry line matching the given limit of dredge depth. For example, for SMU 1 Alternative 4.A.3, Figure 4.20 shows the average dredge cut line is 6.5 ft deep. The associated dredge area would be from the current shoreline, to the current 6.5 ft (2m) bathymetry line. The *in situ* volume is estimated, along with overdredge and side-sloughing volumes.

***In Situ* Volume**

The dredging area for each SMU alternative was broken up into sub-areas to increase the accuracy of the volume estimate. A shoreline length and an average width (distance from shore) were estimated for each sub area. The removal volume was estimated as a triangular "wedge" of sediment. The removal cross section was estimated by using the known dredge depths, and the average width of the subarea. For most SMUs, the cross-section area was calculated as one-half the product of the width and height of the cut.

However, for SMU 1 Alternative 4.A.3 (Table E.3), volumes were checked for accuracy by computing the volumes using a different method. Although the description for Alternative 4.A.3 is "dredging for 25% removal", the associated dredge cut is similar with the H&E "wedge" cut. In the method used for this estimate, the areas of bathymetry (i.e. area between the 0 and 3 ft (1 m) lines) were determined using GIS modeling. The areas were then multiplied by the average dredge cut of that area (e.g. the average dredge cut for dredging to a 6 ft (2 m) depth in the 0 to 1 meter bathymetry area is 1.5 meters). The *in situ* volume from this estimate was

considerably greater than the method of triangular wedges. Further evaluation of the current bathymetry in SMU 1 indicated that a "hump" exists in the SMU cross section. Figure E.34 depicts a scaled cross-section of SMU 1 and the dredge cut associated with Alternative 4.A.3, developed using GIS. The volumes shown on the Figure, 671,000 cy for the triangular "wedge" and 190,000 cy for the "hump", were also calculated using GIS. Estimating the volume of the wedge shape dredge cut, the formula would be:

(Depth of Dredge x Width (horizontal distance from shore) / 2) x Length of shoreline

To determine the correct factor of division to account for the "hump" volume in the dredge volume estimates presented in this Appendix, the following manipulation was made:

Eliminating the factor of division of two would essentially create a uniformly thick dredge cut, or if depicted on a profile, a rectangular shaped dredge cut. The total volume of this dredge cut would be equal to 2 times the volume of the wedge cut, or 1,342,000 cy (671,000 * 2). The sum of the volumes shown on the profile equals 861,000 cy. Dividing this 861,000 by 1,342,000 demonstrates that the sum of the "wedge" and "hump" volumes equal approximately 64% of the rectangular dredge cut. Therefore, to define the volume of the "wedge" and "hump" with an equation, the result would be the following:

(Depth of Cut x Width of Cut x 64%) x Length of shoreline

Or:

(Depth x Width / 1.6) x Length

Applying this to the dredge volume estimates for SMU 1 Alternative 4.A.4 yields an *in situ* volume of 883,000 yd^3, or a 2.5% margin of error from the GIS estimated 861,000 Further analysis of the bathymetry in SMU 1 indicated it appropriate to apply the dividing factor of 1.6 to all sub areas in SMU 1. This was also applied to SMU 1 Alternative 4.A.3.

Overdredge Volume

Overdredge volumes are assumed to be 1 ft (0.3 m) over the entire dredged area. This volume was added to the total dredge volume for this dredging scenario.

Side-sloughing Volume

Side sloughing volumes are sediment volumes expected to "slough" in from outside of the *in situ* dredging area, sloping up at a 1:10 slope to the current bathymetry. This volume was added to the total dredge volume for this dredging scenario.

Toe-sloughing Volume

No toe-sloughing results from this dredging scenario due to the fact that as the dredge cut reaches its limit, the cut wanes in thickness until the toe, where it terminates. Therefore, there would be no sediment at the toe to slope "up" to.

E.2.3 TARGETED DREDGING

Description of Dredge Scenario

Targeted Dredging includes a dredging/capping combination that removes specified volumes of sediment. The purpose of the removal is to enhance the effectiveness of the underwater cap by removing specific areas and/or volumes of material which may decrease the effectiveness of the cap due to high contaminant concentrations and/or high groundwater upwelling rates. This is achieved by removing uniform sediment cut over the specified area. SMUs 3, and 6 are the only SMUs where Targeted Dredging has been developed as an option. The basis for estimating the area associated with each SMU varies for the two SMUs.

Targeted Dredging in SMUs 3 and 6 may be required to ensure the effectiveness of the isolation cap. The distance offshore that is required to be dredged is determined using tables presented in Appendix D: Part A. The cap model predicts the maximum upwelling velocity that the isolation cap can be exposed to and remain effective. Using the table presented in Section DA.13, the maximum velocity tolerable directly corresponds to a required distance offshore to be dredged. The dredge area extends from the shoreline to the distance required by Section DA.13 (e.g., SMU 3 Targeted Dredging distance offshore is 220 ft.). These areas are applied to all polygons required to be capped for the associated alternative. The *in situ* volume is estimated, along with overdredge and side-sloughing volumes.

***In Situ* Volume**

The dredging area for each SMU alternative was established using a given width, or distance from shore, and applicable shoreline lengths. For targeted dredging scenarios, the depth of dredging was constant over the entire SMU, regardless of distance from shore. Therefore, the *in situ* volume was calculated by multiplying the shoreline length, the known dredging depth, and the width of the area.

Overdredge Volume

Overdredge volumes are assumed to be 1 ft (0.3 m) over the entire dredged area (including side or toe-sloughing areas). This volume was added to the total dredge volume for this dredging scenario.

Side-Sloughing Volume

Side sloughing volumes are sediment volumes expected to "slough" in from outside of the *in situ* dredging area, sloping up at a 1:10 slope to the current bathymetry. This volume was added to the total dredge volume for this dredging scenario.

Toe-sloughing Volume

Toe-sloughing volumes are cuts at the toe of the *in situ* dredge cut to allow 1:10 sloping into the remaining lake-ward sediment outside of the targeted dredging area. This volume was added to the total dredge volume for this dredging scenario.

E.2.4 DREDGING FOR MASS REMOVAL IN SMU 1

Description of Dredge Scenario

Dredging for Mass Removal in SMU 1 includes a dredging/backfilling combination that removes specified volumes of sediment over a given area. This dredging scenario is applied to SMU 1, in dredge cuts of 3, 4, and 5 meters, and is applied to the entire SMU. The purpose of the removal is to remove mass of contaminants in areas where sediments are known to contain elevated concentrations of the CPOIs. This is achieved by removing uniform sediment cut over the specified area. The *in situ* volume is estimated, along with overdredge and side-sloughing volumes.

***In Situ* Volume**

The dredging area for each SMU alternative was established using the full area of SMU 1, which is approximately 84.4 acres. The *in situ* volume was calculated by multiplying the applicable meter depth interval (3, 4, or 5), and the area of the SMU.

Overdredge Volume

Overdredge volumes are assumed to be 1 ft (0.3 m) over the entire dredged area (including side or toe-sloughing areas). This volume was added to the total dredge volume for this dredging scenario.

Side-Sloughing Volume

Side sloughing volumes are sediment volumes expected to "slough" in from outside of the *in situ* dredging area, sloping up at a 1:10 slope to the current bathymetry. This volume was added to the total dredge volume for this dredging scenario.

Toe-sloughing Volume

Toe-sloughing volumes are cuts at the toe of the *in situ* dredge cut to allow 1:10 sloping into the remaining lake-ward sediment outside of the dredging area. This volume was added to the total dredge volume for this dredging scenario.

E.2.5 DREDGING FOR NAPL REMOVAL

Description of Dredge Scenario

Dredging for NAPL removal includes a dredging/backfilling combination that removes material known, or anticipated to contain, NAPL. This dredging scenario is applied to the southeast portion of SMU 2, in the area directly offshore of the causeway. There are two NAPL removal scenarios. The areal footprint for the two scenarios is the same; along the causeway from the shoreline to approximately 240' offshore. This area corresponds to areas believed to be impacted by an on-shore NAPL plume. Sediment concentrations of VOCs in samples collected immediately adjacent to the causeway are significantly higher than elsewhere in SMU 2. The two scenarios developed for SMU 2 are Alternative 4.A.3, which includes Targeted Dredging to a depth of 4 Meters (13 feet), and Alternative 4.A.4, which includes full removal of NAPL materials, estimated to be approximately 30 feet deep (both Alternatives include dredging for NLSA & H&E in other areas of the SMU). Full removal of the NAPL-containing sediments is assumed to be achieved by removing a uniform sediment cut over the dredging area. The *in situ* volume is estimated, along with overdredge and side-sloughing volumes.

In Situ Volume

The dredging area for each SMU alternative was established using the area directly offshore from the causeway, from the shoreline to approximately 240' offshore. Just upland from this area, NAPL is known to exist in the "marl" layer, down to approximately 30 feet below ground surface. For the purposes of the Alternative 4.A.4 dredging estimate, it is assumed that the inlake conditions are similar to the upland conditions, and the removal in this area will extend to the bottom of the marl layer. The *in situ* volumes for both alternatives were calculated by multiplying the removal area and the appropriate removal depth.

Overdredge Volume

Overdredge volumes are assumed to be 1 ft (0.3 m) over the entire dredged area (including side or toe-sloughing areas). This volume was added to the total dredge volume for this dredging scenario.

Side-Sloughing Volume

Side sloughing volumes are sediment volumes expected to "slough" in from outside of the *in situ* dredging area, sloping up at a 1:10 slope to the current bathymetry. This volume was added to the total dredge volume for this dredging scenario.

Toe-Sloughing Volume

Toe-sloughing volumes are cuts at the toe of the *in situ* dredge cut to allow 1:10 sloping into the remaining lake-ward sediment outside of dredging area. This volume was added to the total dredge volume for this dredging scenario.

E.2.6 DREDGING TO SPECIFIC SECS

Description of Dredge Scenario

Dredging to Specific SECs includes a dredging only scenario, which entails removal of all sediments known to exceed a specific SEC. To evaluate dredge volumes, each SMU was divided into Thiessen polygons based on historic sampling stations. For some sample stations, locations differed slightly for grab samples collected in the surface interval and samples collected from cores. For these stations, surface grab sample locations were designated with the prefix "S" while core sample locations were designated with the prefix "P". Figures E.32 and E.33 present the Thiessen polygons as they fall within the SMU boundaries for the surface interval. The surface area for each polygon in the surface interval is presented in Table E.33.

Figures E.34 and E.35 present the Thiessen polygons as they fall within SMU boundaries for the 1-2 m depth interval. The surface area for each polygon in Figures E.34 and E.35 is presented in Table E.34. For deeper intervals (i.e., 2 m or greater), the number of station locations decreases because fewer deep cores were collected during the remedial investigation. Because there are fewer station locations at depth, the areas associated with each polygon at depth will differ from those shown in Table E.34.

Results from the samples from each of the Thiessen polygons were compared to several SECs to determine the approximate areas of SEC exceedance. Areas of exceedance are presented in Figures E.36 to E.75. These figures show, for each SEC, areas of exceedance in 1-meter intervals. For figures showing exceedances in the surface interval, Figures E.32 and E.33 provide sample station location and justification. For figures showing exceedance in other intervals, Figures E.34 and E.35 provide sample station location and identification. As discussed, the number of station locations decreases with depth because there were fewer deep cores collected during the remedial investigation. As with other depictions of sediment concentrations in the lake, the SMU boundaries are fixed (i.e., analyte concentrations in one SMU do not influence concentrations in adjacent SMUs).

The data used to prepare these figures were from the 1992 and 2000 remedial investigations. In general, the data used for any particular interval are those from near the surface of that particular interval (i.e., the bioactive zone, generally the top 15 cm). For the surface interval (i.e., the 0-1 m interval), only the 0-2 cm samples from 1992, and 0-15 cm samples from 2000 were used. The following 0-2 cm samples were excluded from the analysis: SF0123 (S340), SF0123R (S340) and SF0173 (S351) because 0-15 cm samples were also collected at these stations.

For deeper intervals, the data set included the profile samples from 1992 and the 2 m and 8 m core samples from 2000. Many of the sampling intervals did not exactly match the 1-m intervals to be plotted and professional judgment was used to select appropriate intervals. The rule of thumb was that most of the sampling interval, if the interval spanned the boundary between two 1-m intervals, had to be in the lower interval in order to be included.

The rationale for using the near surface data for each 1-m interval was that removal to any particular depth would result in residual CPOI concentrations at the surface equal to those observed in the interval directly below. For example, if 2 meters of sediment are removed from SMU 1, the remaining sediment will have, at its surface, contaminant concentrations that are represented by the data currently in the 2 to 3m interval. All dredge volumes discussed in this section are assumed to be done in 1 meter intervals. Dredge cuts of less than 1 meter (e.g., 2 feet) are not considered for this dredging scenario.

Consistent with the recalculation of the mean PEC quotient in March 2004, undetected values were omitted from the dataset. The exception to this was when CPOIs represented sums of analytes (e.g., PCBs, dichlorobenzenes). In this case, undetected values were treated as described on page 5-7 of the Onondaga Lake RI report.

In situ dredge volumes were estimated using the areas of exceedance presented in these figures and the known depth of exceedances. The known depths of exceedances are based on Figures E.36 – E.75, with some consideration given to the limited amount of data available at deeper depths. In many alternatives, a non-exceeding polygon(s) was surrounded by exceeding polygons. In these alternatives, consideration was given to the practicality of dredging a specific area, and the surrounded non-exceeding polygon was included as a "dredged area." Additionally, there were instances within a particular sample location where a "contaminated" (e.g., exceeding a Mean PECQ of 2) sample was at a deeper depth than a "clean" (e.g., less than a Mean PECQ of 2) sample. In many cases, these situations were impacted by the lack of data available at deeper depths. Therefore, the *in situ* dredge volumes associated with these situations was assumed to include all material to the deepest known exceedance. The result of this assumption may be a slight overestimation of the *in situ* dredge volume, however, it is assumed that Pre-Design Investigation would include a thorough sampling protocol which would more accurately delineate the areal and depth extent of the impacted sediments to be dredged.

In several cases, SEC exceedances were detected at the deepest sample interval, suggesting that vertical boundary of the SEC exceeding sediment may not be accurately defined by the existing data. In these alternatives, dredge volumes are noted with a "+" qualifier on the volume estimated table, indicating that the volume may be greater, pending further delineation of the vertical boundary of SEC exceeding sediment.

Overdredge Volume

Overdredge volumes are assumed to be 1 ft (0.3 m) over the entire dredged area. This volume was added to the total dredge volume for this dredging scenario.

Side-Sloughing Volume

Side sloughing volumes are sediment volumes expected to "slough" in from outside of the *in situ* dredging area, sloping up at a 1:10 slope to the current bathymetry. This volume was added to the total dredge volume for this dredging scenario. In certain alternatives (e.g., SMU 5 Alternative 5.D), where the exceeding polygons create many random areas of exceedance, no side-sloughing volumes have been estimated for this dredging scenario due to the complexity of the calculations.

Toe-sloughing Volume

In most scenarios, toe-sloughing volumes were calculated in a similar manner to the side-sloughing volumes, as the amount of material expected to slough into the dredge area from the surrounding area. In certain alternatives (e.g., SMU 5 Alternative 5.D), where the exceeding polygons create many random areas of exceedance, no toe-sloughing volumes have been estimated for this dredging scenario due to the complexity of the calculations.

SECTION E.3

DOUBLE COUNTED SLOUGHING VOLUMES

Dredge volumes are estimated individually for each SMU alternative. Each alternative includes *in situ*, overdredging, side-sloughing, and toe-sloughing volumes. To simplify the complex process of developing and evaluating the lake-wide alternatives, it was necessary to combine SMU-specific alternatives easily for the purposes of alternative development and comparison. Therefore, SMU-specific alternatives were combined into the various lake-wide alternatives with their corresponding total dredge volumes, estimated as described above. As SMU alternatives are combined with alternatives from adjacent SMUs, there exists the potential for double counting of the side-sloughing volumes. The volumes of double-counted material were estimated for lake-wide Alternatives C, E, F1, and G. For these four Alternatives, the total double-counted volume accounted for an average 1.4% of the total volume associated with that Alternative, with none accounting for more than 2.3%. Due to these relatively small volumes, no modifications were made to the SMU-specific or lake-wide alternatives to account for the double-counted sloughing volumes.

SECTION E.4

CAPPING MATERIAL ESTIMATES

Capping material volumes for remedial alternatives presented in Section 4 are estimated using the areal figures and cross-sections presented in Section 4. Total areas requiring capping were typically based on the exceedances in the 0 to 6-inch (15-cm) interval, as noted in Figures E.36 to E.75, with the exception of SMU 4, where the cap area was based on exceedances of the mercury PEC in deeper samples within the 0 to 3-ft (1-m) interval. Similar to the dredge-only scenarios, there were several alternatives where an area not requiring capping was surrounded by areas that did require capping. In consideration of practicality, it was assumed these areas would be capped.

For each alternative, the respective cap was broken into different functional areas. The material components for each functional area were estimated and converted into a unit yd^3/acre value. This unit value was then multiplied by the corresponding area of the cap to obtain the estimated volume of material needed to achieve the thickness detailed in the cap cross-sections presented in Section 4. In most cases, the physical makeup of the cap in each functional area was consistent from SMU to SMU, with the exception of the thickness of the sand chemical isolation layer, which varied by SMU. One function area which is not consistent, however, is the habitat buffer zone located near the shoreline of each capping scenario. The material makeup of this portion of the cap is unique for each SMU and is influenced by several factors. Several SMUs required additional protection from shoreline erosion due to the nature of the shoreline material (e.g., SMUs 1, 2, etc). A wind-wave analysis was performed in these areas to determine the size of the armoring stone required for each of the applicable SMUs, which was unique for each SMU. Additionally, the nature of the dredging alternative (NLSA, H&E, etc) also influenced the physical nature of the habitat buffer zone. Dredging for NLSA, or capping-only alternatives required an increased volume of stone to provide erosion protection.

To account for uneven application, mixing with the underlying sediment, and material displacement during installation, it was assumed that the amount of material needing to be placed to obtain a desired thickness would be greater than the actual layer thickness. Therefore, it is assumed that approximately 6 inches (15 cm) of additional material would need to be added to achieve the desired layer thickness.

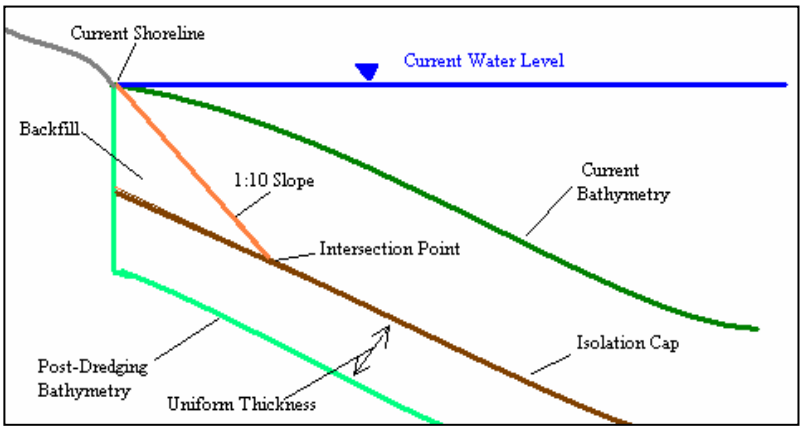
Cap material volume estimates are presented in Tables E.37 to E.70.

SECTION E.5

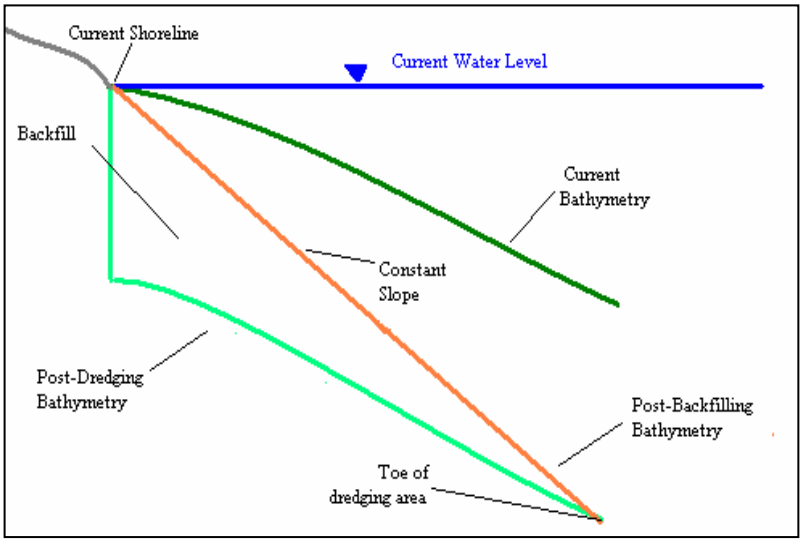
BACKFILL VOLUMES

Backfill is associated with several alternatives. SMU 1 Alternatives 4.A.4 through 4.A.7, SMU 2 Alternatives 4.A.3, 4.A.4, 4.D.3, and 4.D.4, and all dredging to a specific SEC dredging scenarios included backfill as part of the alternative.

Backfill for Mass Removal and NAPL removal alternatives is included to ensure a vertical face does not exist at the shoreline and along the borders of other SMUs Backfill is assumed to be placed on a constant 1:10 slope from the current shoreline to the intersection with isolation cap placed following dredging. The simple figure below illustrates the general concept of backfilling in these scenarios. These volumes were calculated by modeling the post-capping and post-backfill surfaces in GIS and computing the volume difference. The simulated post-removal surface was established using the dredging criteria for the particular dredging scenario, as described in Section E.2.4.



Backfill for dredging to a specific SEC dredging scenarios is included to ensure a vertical face does not exist at the shoreline and along the borders of other SMUs. The simple figure below illustrates the general concept of backfilling in these scenarios. These volumes were calculated by modeling the post-removal and post-backfill surfaces in GIS and computing the volume difference. The simulated post-removal surface was established using the dredging criteria for the particular dredging scenario, as described in Section E.2.4. In addition, a post-backfilling surface was created using a constant slope from the shore, to the toe of the dredging area. The difference of these two surfaces results in the volume of material needed to backfill to the assumed slope conditions.



APPENDIX E

TABLES

TABLE E.1
ONONDAGA LAKE REMEDIAL ALTERNATIVES
DREDGING VOLUME SUMMARY

SMU	Alternative No.	Description	Area of Dredging Surface (acres)	Total In-situ Dredging Volume (CY) [5]	
1	1	No Action	NA	NA	
	3.A	Capping of Entire SMU	NA	NA	
	4.A.2	Dredging for NLSA[1]/Capping of Entire SMU	36	151,000	
	4.A.3	Dredging for NLSA & H&E[2]/Capping of Entire SMU	45	354,000	
	4.A.4	Dredging to Remove 25% of ILWD/Capping of Entire SMU	63	1,015,000	
	4.A.5	Dredge for 3 Meter Removal/Capping of Entire SMU	84	1,566,000	
	4.A.6	Dredge for 4 Meter Removal/Capping of Entire SMU	84	2,094,000	
	4.A.7	Dredge for 5 Meter Removal/Capping of Entire SMU	84	2,637,000	
	5.A	Full Removal (to Mean PECQ2[3], Mean PECQ1[4], AET, PEC, or ERL)	84	4,028,000	+
2	1	No Action	NA	NA	
	3.A	Capping to Mean PECQ2, Mean PECQ1, or AET	NA	NA	
	3.D	Capping of Entire SMU	NA	NA	
	4.A.3	Dredging for NLSA & H&E & Targeted Dredging to 4 Meter Depth (for NAPL Removal)/Capping to Mean PECQ2, Mean PECQ1, or AET	9.8	169,000	
	4.A.4	Dredging for NLSA & H&E & Full NAPL Removal/Capping to Mean PECQ2, Mean PECQ1, or AET	9.8	403,000	
	4.D.3	Dredging for NLSA & H&E & Targeted Dredging to 4 Meter Depth (for NAPL Removal)/Capping of Entire SMU	16.6	223,000	
	4.D.4	Dredging for NLSA & H&E & Full NAPL Removal/Capping of Entire SMU	16.6	459,000	
	5.A	Full Removal (to Mean PECQ2, Mean PECQ1, or AET)	15.7	533,000	+
	5.D	Full Removal (to PEC or ERL)	33.8	1,016,000	+
3	1	No Action	NA	NA	
	2	Habitat Enhancement	NA	NA	
	4.A.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to Mean PECQ2 or PEC	10.8	75,000	
	4.E.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to ERL	31.4	341,000	
	5.A	Full Removal (to Mean PECQ2, Mean PECQ1 or PEC)	29	380,000	
	5.E	Full Removal (to ERL)	113	1,427,000	+
4	1	No Action	NA	NA	
	3.A	Capping of Entire SMU	NA	NA	
	4.A.3	Dredging for NLSA & H&E/Capping of Entire SMU	22	135,000	
	5.A	Full Removal (to Mean PECQ2, Mean PECQ1, or AET)	75	2,170,000	
	5.D	Full Removal (to PEC or ERL)	75	3,563,000	+

TABLE E.1 (Continued)
ONONDAGA LAKE REMEDIAL ALTERNATIVES
DREDGING VOLUME SUMMARY

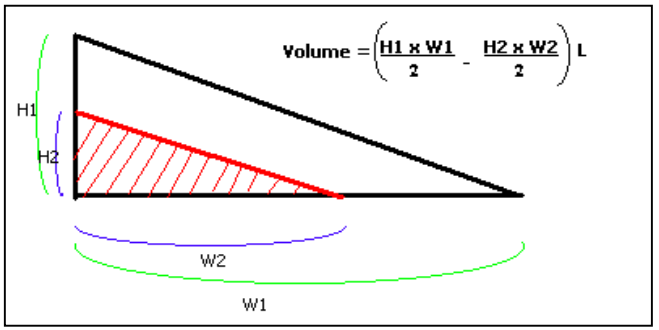
SMU	Alternative No.	Description	Area of Dredging Surface (acres)	Total In-situ Dredging Volume (CY) (5)	
5	1	No Action	NA	NA	
	2	Habitat Enhancement	NA	NA	
	3.A	Capping to Mean PECQ2	NA	NA	
	3.B	Capping to Mean PECQ1	NA	NA	
	3.D	Capping to PEC	NA	NA	
	3.E	Capping to ERL	NA	NA	
	4.A.3	Dredging for H&E/Capping to Mean PECQ2	20.0	124,000	
	4.B.3	Dredging for H&E/Capping to Mean PECQ1	23.7	140,000	
	4.D.3	Dredging for H&E/Capping to PEC	75	429,000	
	4.E.3	Dredging for H&E/Capping to ERL	108	610,000	
	5.A	Full Removal (to Mean PECQ2)	35	242,000	
	5.B	Full Removal (to Mean PECQ1)	60	410,000	
	5.D	Full Removal (to PEC)	234	1,615,000	+
	5.E	Full Removal (to ERL)	349	2,407,000	+
6	1	No Action	NA	NA	
	4.A.1	Targeted Dredging/Capping to Mean PECQ2	11	148,000	
	4.A.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to Mean PECQ2	28	234,000	
	4.B.1	Targeted Dredging/Capping to PECQ1	11	148,000	
	4.B.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to PECQ1	33	245,000	
	4.D.1	Targeted Dredging/Capping of Entire SMU	20	346,000	
	4.D.3	Dredging for NLSA & H&E & Targeted Dredging/Capping of Entire SMU	67	617,000	
	5.A	Full Removal (to Mean PECQ2)	94	2,650,000	
	5.B	Full Removal (to Mean PECQ1)	123	3,447,000	
	5.D	Full Removal (to PEC or ERL)	156	7,309,000	+
7	1	No Action	NA	NA	
	3.A	Capping of Entire SMU	NA	NA	
	4.A.3	Dredging for NLSA & H&E/Capping of Entire SMU	13	89,000	
	5.A	Full Removal (to Mean PECQ2 or Mean PECQ1)	38	1,485,000	+
	5.C	Full Removal (to AET, PEC or ERL)	38	2,168,000	+

Notes:
(1) Dredging sufficient sediments such that there is no loss of lake surface area following Capping placement.
(2) Dredging sufficient sediments such that the depth after capping optimizes habitat potential and minimizes erosion potential.
(3) Mean PEC quotient of 2 + mercury PEC
(4) Mean PEC quotient of 1 + mercury PEC
(5) Includes volumes associated with overdredging (1 foot) and sloughing (based on 10% side slope)
NA - Not applicable
(+) Indicates that the volume is based on the limits of the data, but the depth of SEC exceedance has not been delineated.

TABLE E.2
SMU 1
ALTERNATIVE 4.A.2 DREDGING FOR NLSA/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	H1 (Ft)	H2 (Ft)	W1 (Ft)	W2 (Ft)	Area Length (Ft)	Volume (Yd^3)
1	5	3.5	510	357	475	11500
2	5	3.5	540	378	1520	38800
3	5	3.5	448	314	1140	24200
4	5	3.5	260	182	633	7800
5	5	3.5	95	67	190	900

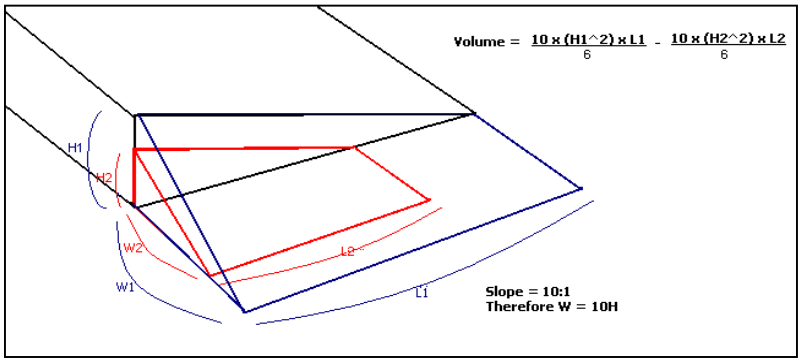
Total *in situ* Volume = 83,200



Side-Sloughing Volumes

Face	H1 (Ft)	H2 (Ft)	L1 (Ft)	L2 (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	5	3.5	981	687	666	1000
West Face	5	3.5	80	56	196	100

Total *sloughing* Volume = 1100



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **67,017 yd^3**

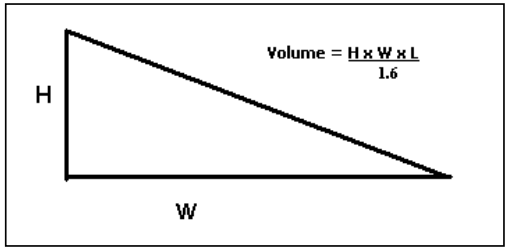
Total Dredging Volume For This Alternative = 151,317 yd^3

Notes:

Refer to Figure E.1 for dredging areas associated with this alternative

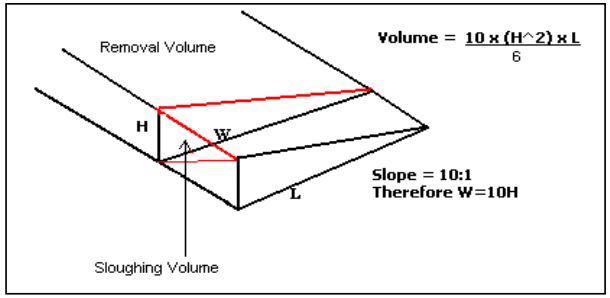
TABLE E.3
SMU 1
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	6.5	400.6	630	38000
2	6.5	694.4	1200	125400
3	6.5	524	1090	86000
4	6.5	316.67	605	28900
5	6.5	58	255	2300
		Total *in situ* Volume =		**280,600**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	6.5	839	2200
West Face	6.5	80	300
		Total sloughing Volume =	**2500**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **71,220 yd^3**

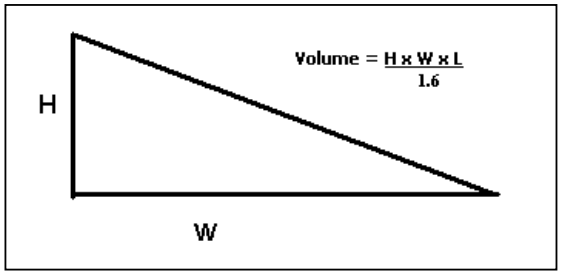
Total Dredging Volume For This Alternative =	**354,320 yd^3**

Notes:

Refer to Figure E.2 for dredging areas associated with this alternative
A dividing factor of 1.6 was used (as opposed to 2) for this volume estimation to account for the "hump" existing in SMU 1.

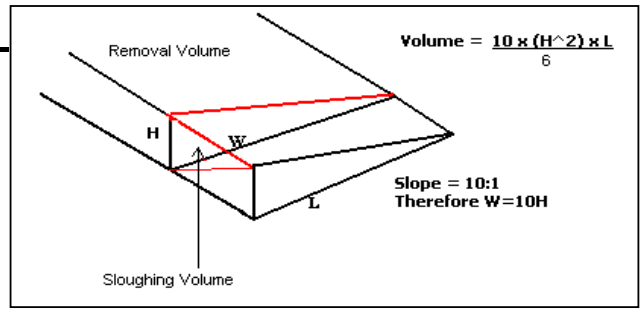
TABLE E.4
SMU 1
ALTERNATIVE 4.A.4 DREDGING TO REMOVE 25% OF ILWD/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	13.5	570	760	135400
2	13.5	1080	1350	455700
3	13.5	633	1045	206800
4	13.5	380	650	77200
5	13.5	190	127	7600
		Total *in situ* Volume =		**882,700**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	13.5	1472.5	16600
West Face	13.5	205	2400
		Total sloughing Volume =	**19000**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **112,973 yd^3**

Total Dredging Volume For This Alternative = 1,014,673 yd^3

Notes

Refer to Figure E.3 for dredging areas associated with this alternative

A dividing factor of 1.6 was used (as opposed to 2) for this volume estimation to account for the "hump" existing in SMU 1.

TABLE E.5
SMU 1
ALTERNATIVE 4.A.5 DREDGING TO 3 METER DEPTH/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
84.4	9.8	+	**1,334,420**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**136,165**
	Side-Sloughing Volume		
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
East Cut	1963	10	**34,912**
West Cut	570	10	**10,138**
Outer Boundary	2850	10	**50,688**
Total Dredging Volume For This Alternative =		**1,566,323 yd^3 +**	

Notes:
Refer to Figure E.4 for dredging areas associated with this alternative

TABLE E.6
SMU 1
ALTERNATIVE 4.A.6 DREDGING TO 4 METER DEPTH/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
84.4	13.12	+	**1,786,489**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**136,165**
	Side-Sloughing Volume		

Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	1963	13	**62,574**
West Cut	570	13	**18,170**
Outer Boundary	2850	13	**90,849**

Total Dredging Volume For This Alternative = 2,094,247 yd^3 +

Notes:
Refer to Figure E.4 for dredging areas associated with this alternative

TABLE E.7
SMU 1
ALTERNATIVE 4.A.7 DREDGING TO 5 METER DEPTH/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
84.4	16.4	+	**2,233,111**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**136,165**
	Side-Sloughing Volume		
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
East Cut	1963	16	**97,772**
West Cut	570	16	**28,390**
Outer Boundary	2850	16	**141,951**
Total Dredging Volume For This Alternative =		**2,637,390 yd^3 +**	

Notes:
Refer to Figure E.4 for dredging areas associated with this alternative

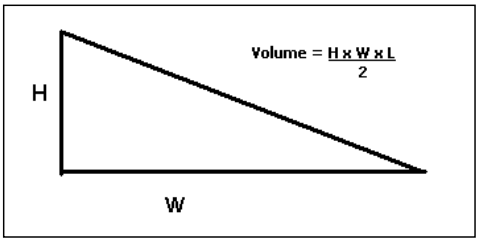
TABLE E.8
SMU 1
ALTERNATIVE 5.A FULL REMOVAL (TO MEAN PECQ2, MEAN PECQ1, AET, PEC OR ERL)
DREDGING VOLUME ESTIMATE

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
84.4	26.25	+	**3,574,340**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**136,165**
	Side-Sloughing Volume		
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
East Cut	1963	26	**245,739**
West Cut	570	26	**71,356**
Total Dredging Volume For This Alternative =		**4,027,599 yd^3 +**	

Notes:
Refer to Figure E.4 for dredging areas associated with this alternative

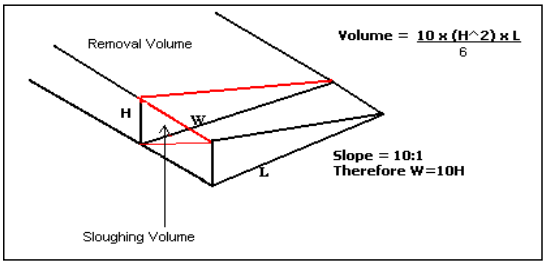
TABLE E.9
SMU 2
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING TO 4 METER DEPTH/CAPPING TO MEAN PECQ2, MEAN PECQ1, OR AET
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	8	320	255	12100
2	8	160	510	12100
		Total *in situ* Volume =		**24200**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	8	86.9	400
West Face	8	149	600
		Total sloughing Volume =	**1000**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **6,743 yd^3**

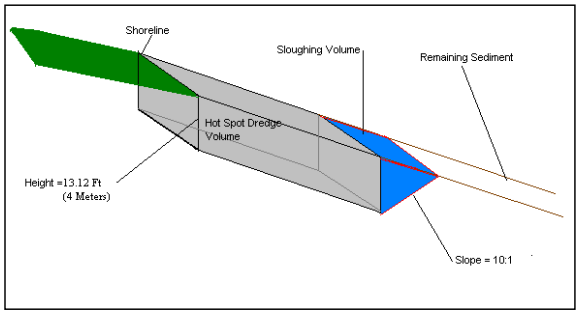
Targeted Dredging

One Area of Targeted Dredging

Area 2:	Length (Ft)	Width (Ft)	Height (Ft)	
Rectangular Area	873	240	13.12	Volume = 101,811 yd^3

Overdredging - 1' over entire area 7,760 yd^3

Sloughing Volume (13.12' x 131.2' x 873')/(2*27) 27,828 yd^3



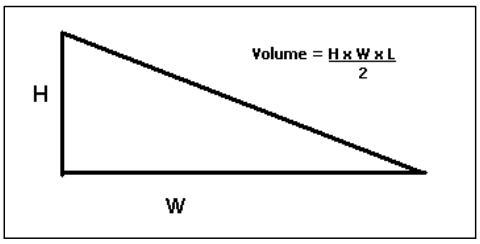
TOTAL VOLUME FOR TARGETED DREDGING: 137,400 yd^3

Total Dredging Volume For This Alternative = 169,343 yd^3

Notes:
Refer to Figure E.5 for dredging areas associated with this alternative

TABLE E.10
SMU 2
ALTERNATIVE 4.A.4 DREDGING FOR NLSA, H&E & FULL NAPL REMOVAL/CAPPING TO MEAN PECQ2, MEAN PECQ1, OR AET
DREDGING VOLUME ESTIMATE

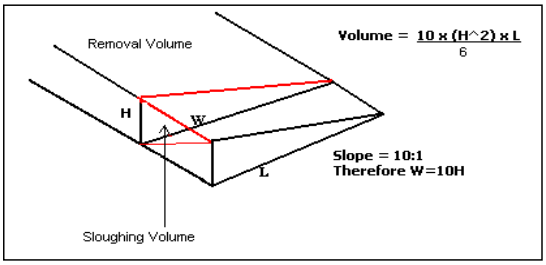
Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	NA	NA	NA	NA
2	8	160	510	12100
		Total *in situ* Volume =		**12100**



NOTE: It is anticipated that the entire area of dredge Area 1 will fall within the "sloughing" zone of the NAPL Targeted Dredging, therefore it has been omitted from this estimate.

Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	8	86.9	400
West Face	8	149	600
		Total sloughing Volume =	**1000**



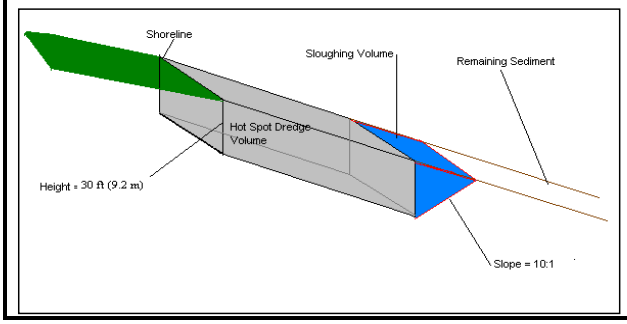
Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **3,721 yd^3**

Targeted Dredging

One Area of Targeted Dredging

Area 2:	Length (Ft)	Width (Ft)	Height (Ft)	
Rectangular Area	873	240	30	Volume = 232,800 yd^3
Overdredging - 1' over entire area				7,760 yd^3
Sloughing Volume	(30' x 300' x 873')/(2*27)			145,500 yd^3



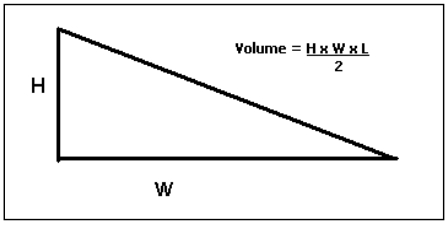
TOTAL VOLUME FOR TARGETED DREDGING: 386,060 yd^3

Total Dredging Volume For This Alternative = 402,881 yd^3

Notes:
Refer to Figure E.5 for dredging areas associated with this alternative

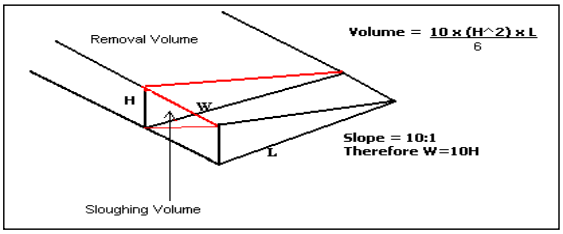
TABLE E.11
SMU 2
ALTERNATIVE 4.D.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING TO 4 METER DEPTH/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	8	220	320	10500
2	8	310	1080	49600
3	8	60	320	2900
4	8	190	160	4600
		Total *in situ* Volume =		**67600**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	7.5	79	300
West Face	7.5	158	600
		Total sloughing Volume =	**900**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **17,503 yd^3**

Targeted Dredging

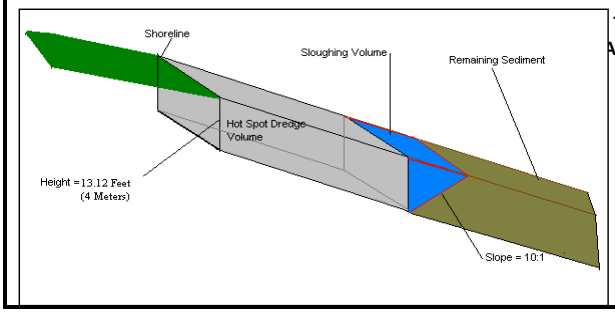
One Area of Targeted Dredging

Area 2:

Rectangular Area 873' x 240' x13.12' — Volume = 101,811 yd^3

Overdredging - 1' over entire area — 7,760 yd^3

Sloughing Volume (13.12' x 131.2' x 873')/(2*27) — 27,828 yd^3



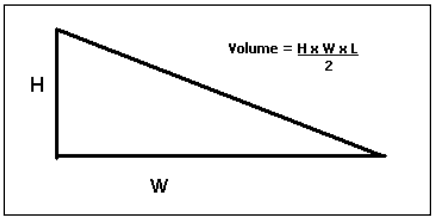
TOTAL VOLUME FOR TARGETED DREDGING: 137,400 yd^3

Total Dredging Volume For This Alternative = 223,402 yd^3

Notes:
Refer to Figure E.6 for dredging areas associated with this alternative

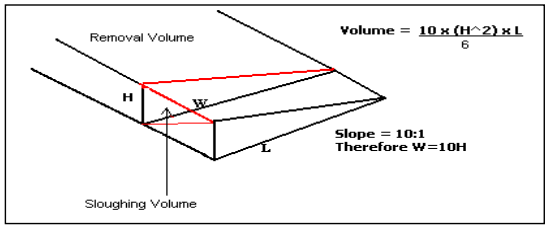
TABLE E.12
SMU 2
ALTERNATIVE 4.D.4 DREDGING FOR NLSA & H&E & FULL NAPL REMOVAL/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	NA	NA	NA	NA
2	8	310	1080	49600
3	8	60	320	2900
4	8	190	160	4600
			Total *in situ* Volume =	**57100**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	7.5	79	300
West Face	7.5	158	600
		Total sloughing Volume =	**900**



Overdredging Volume

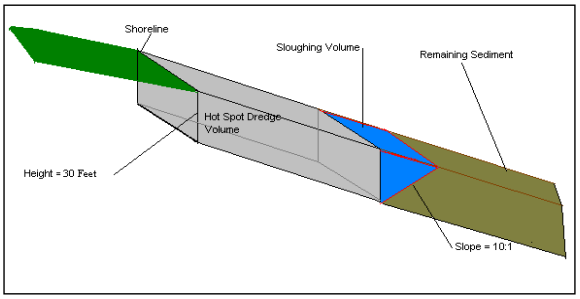
Assumed Overdredging Volume is 1' over the entire area dredged = **14,895 yd^3**

Targeted Dredging

One Area of Targeted Dredging

Area 2:

Rectangular Area	873' x 240' x 30'	Volume =	232,800 yd^3
Overdredging - 1' over entire area			7,760 yd^3
Sloughing Volume	(30' x 300' x 873')/(2*27)		145,500 yd^3



TOTAL VOLUME FOR TARGETED DREDGING: 386,060 yd^3

Total Dredging Volume For This Alternative = 458,955 yd^3

Notes:
Refer to Figure E.6 for dredging areas associated with this alternative

TABLE E.13
SMU 2
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.A FULL REMOVAL (TO MEAN PECQ2, MEAN PECQ1, OR AET)			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
10.9	6.5	+	**114,305**
4.8	30	+	**232,320**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**25,329**
	Side-Sloughing volume		
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
Lakeward Cut Area	823	23.50	**84,167**
West Cut Area 1	120	23.50	**12,272**
East Cut Area 1	120	30.00	**20,000**
East Cut Area 2	110	30.00	**18,333**
West Cut Area 2	158	30.00	**26,333**
Total Dredging Volume For This Alternative = 533,060 yd^3 +			

Notes:

Refer to Figure E.7 for dredging areas associated with this alternative

Area #2 Listed above (4.8 acres) is included as Full NAPL Removal - With the same dredging footprint as in previous SMU 2 Alternatives

TABLE E.14
SMU 2
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.D FULL REMOVAL (TO PEC OR ERL)			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
29	13.12	+	**613,841**
4.8	30	+	**232,320**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**54,531**
	Side-Sloughing volume		
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
Lakeward Cut Area	823	17.00	**44,046**
West Cut Area 1	120	17.00	**6,422**
East Cut Area 1	120	30.00	**20,000**
East Cut Area 2	110	30.00	**18,333**
West Cut Area 2	158	30.00	**26,333**
Total Dredging Volume For This Alternative =		**1,015,826 yd^3 +**	

Notes:

Refer to Figure E.8 for dredging areas associated with this alternative

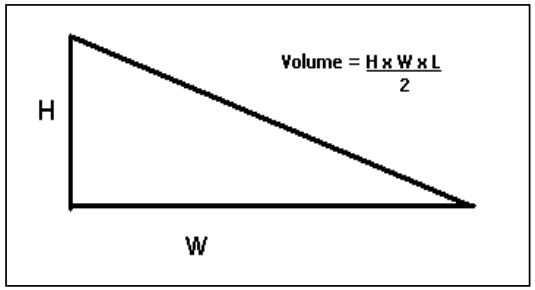
Area #2 Listed above (4.8 acres) is included as Full NAPL Removal - With the same dredging footprint as in previous SMU 2 Alternatives

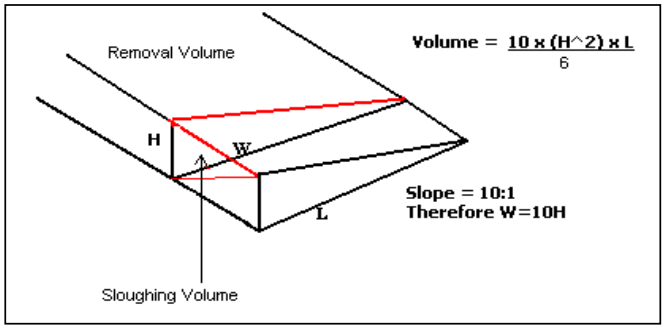
TABLE E.15
SMU 3
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E AND TARGETED DREDGING / CAPPING TO MEAN PECQ2, MEAN PECQ1, or PEC
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	6.5	260	900	28200
2	6.5	260	600	18800
3	6.5	260	300	9400
			Total *in situ* Volume =	**56400**

Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	6.5	136	400
West Face	6.5	178.9	500
		Total sloughing Volume =	**900**





Overdredging Volume

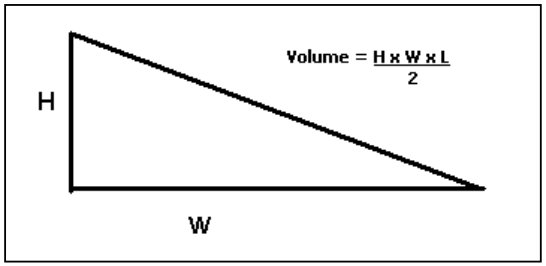
Assumed Overdredging Volume is 1' over the entire area dredged = 18,091 yd^3

Total Dredging Volume For This Alternative = 75,391 yd^3

Notes:
Refer to Figure E.9 for dredging areas associated with this alternative

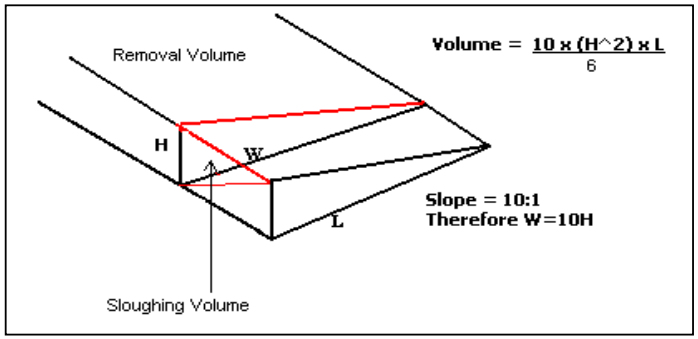
TABLE E.16
SMU 3
ALTERNATIVE 4.E.3 DREDGING FOR NLSA & H&E AND TARGETED DREDGING / CAPPING TO ERL
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	6.5	260	2763	86500
2	6.5	260	1897	59400
3	6.5	260	2650	83000
4	6.5	260	978	30700
			Total *in situ* Volume =	259600



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	6.5	136	400
West Face	6.5	178.9	500
		Total sloughing Volume =	900



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **80,568 yd^3**

Total Dredging Volume For This Alternative = 341,068 yd^3

Notes:
Refer to Figure E.10 for dredging areas associated with this alternative

TABLE E.17
SMU 3
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.A FULL REMOVAL (TO MEAN PECQ2, MEAN PECQ1, or PEC)			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
28.9	6.56	+	**305,862**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**46,625**
	Side-Sloughing volume		
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
Total Sloughing	3500	6.56	**27,892**
Total Dredging Volume For This Alternative =		**380,380 yd^3 +**	

Notes:
Refer to Figure E.11 for dredging areas associated with Alternative 5.A

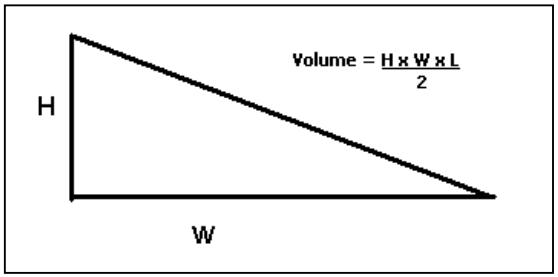
TABLE E.18
SMU 3
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.E FULL REMOVAL (TO ERL)			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
112.91	6.56	+	**1,194,979**
Overdredging volume			
	Assumed Overdredging Volume is 1' over the entire area dredged =		**182,161**
Side-Sloughing volume			
Cut	**Length (Ft)**	**Dredge Height (Ft)**	**Volume = (10 x H^2 x L)/2 (Yd^3)**
Total Sloughing	6219	6.56	**49,560**
Total Dredging Volume For This Alternative =		**1,426,701 yd^3 +**	

Notes:
Refer to Figure E.12 for dredging areas associated with Alternative 5.E

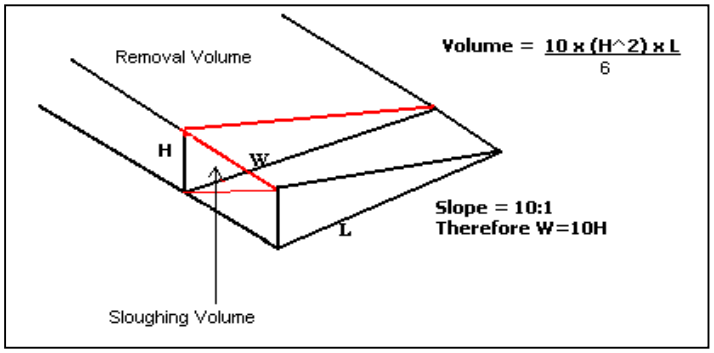
TABLE E.19
SMU 4
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E/ISOLATION CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	4.5	230	1180	22700
2	4.5	518	1430	61800
3	4.5	125	325	3400
4	4.5	81.25	683	4700
			Total *in situ* Volume =	**92600**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	4.5	230	300
West Face	4.5	82	200
		Total sloughing Volume =	**500**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **41,567 yd^3**

Total Dredging Volume For This Alternative = 134,667 yd^3

Notes:
Refer to Figure E.13 for dredging areas associated with this alternative

TABLE E.20
SMU 4
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.A FULL REMOVAL (TO MEAN PECQ2, MEAN PECQ1, OR AET)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
75	16.4	+	**1,984,400**

Overdredging volume

	Assumed Overdredging Volume is 1' over the entire area dredged =		**121,000**

Side-Sloughing volume

Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	780	16.40	**38,850**
West Cut	520	16.40	**25,900**

Total Dredging Volume For This Alternative = 2,170,150 yd^3 +

ALTERNATIVE 5.D FULL REMOVAL (TO PEC OR ERL)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
75	26.25	+	**3,176,250**
	5-acre hot spot excavation =		**100,000**

Overdredging volume

	Assumed Overdredging Volume is 1' over the entire area dredged =		**121,000**

Side-Sloughing volume

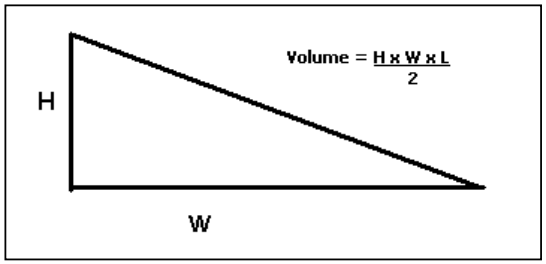
Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	780	26.25	**99,531**
West Cut	520	26.25	**66,354**

Total Dredging Volume For This Alternative = 3,563,135 yd^3 +

Notes:
Refer to Figure E.14 for dredging areas associated with Alternatives 5.A or 5.D

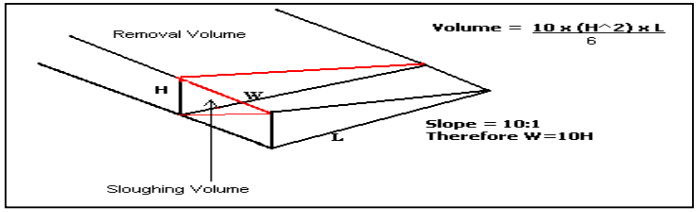
TABLE E.21
SMU 5
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E/CAPPING TO MEAN PECQ2
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	5	400	1000	37100
2	5	267	1933	47800
			Total *in situ* Volume =	**84900**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
1			
East Face	5	533	900
West Face	5	373	600
2			
North Face	5	333	600
South Face	5	133	300
		Total sloughing Volume =	**2400**



Overdredging Volume

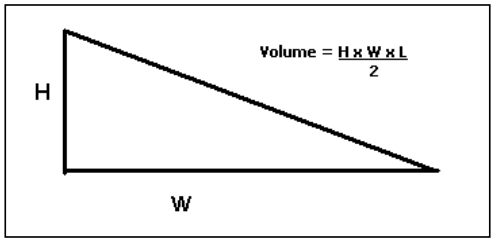
Assumed Overdredging Volume is 1' over the entire area dredged = **36,471 yd^3**

Total Dredging Volume For This Alternative = 123,771 yd^3

Notes:
Refer to Figure E.15 for dredging areas associated with this alternative

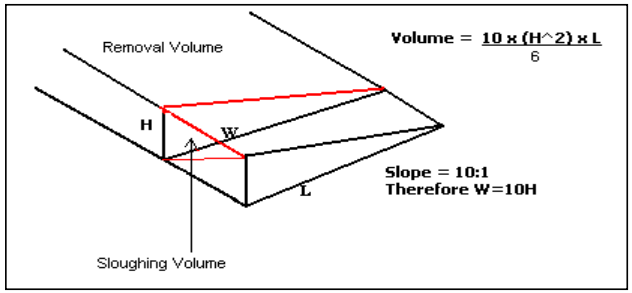
TABLE E.22
SMU 5
ALTERNATIVE 4.B.3 DREDGING FOR NLSA & H&E/CAPPING TO MEAN PECQ1
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	5	400	1000	37100
2	5	267	1933	47800
3	5	133	867	10700
			Total *in situ* Volume =	**95600**



Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
1			
East Face	5	533	900
West Face	5	373	600
3			
North Face	5	333	600
South Face	5	133	300
4			
North Face	5	133	300
South Face	5	200	400
		Total sloughing Volume =	**3100**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **41,358 yd^3**

Total Dredging Volume For This Alternative = 140,058 yd^3

Notes:
Refer to Figure E.16 for dredging areas associated with this alternative

TABLE E.23
SMU 5
ALTERNATIVE 4 DREDGING VOLUME ESTIMATE

ALTERNATIVE 4.D.3 DREDGING FOR NLSA & H&E/CAPPING TO PEC		
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	***In Situ* Sediment Volume (yd^3)**
76	5	**306,533**
	Overdredging volume	
	Assumed Overdredging Volume is 1' over the entire area dredged =	**122,613**
Total Dredging Volume For This Alternative =	**429,147 yd^3 +**	

ALTERNATIVE 4.E.3 DREDGING FOR NSLA & H&E/CAPPING TO ERL		
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	***In Situ* Sediment Volume (yd^3)**
108	5	**435,600**
	Overdredging volume	
	Assumed Overdredging Volume is 1' over the entire area dredged =	**174,240**
Total Dredging Volume For This Alternative =	**609,840 yd^3 +**	

Notes:

Refer to Figure E.17 for dredging areas associated with Alternative 4.D.3

Refer to Figure E.18 for dredging areas associated with Alternative 4.E.3

TABLE E.24
SMU 5
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.A DREDGING TO MEAN PECQ2			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
35	3.28	+	**185,211**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**56,467**
Total Dredging Volume For This Alternative =		**241,677 yd^3 +**	

ALTERNATIVE 5.B DREDGING TO MEAN PECQ1			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
59.33	3.28	+	**313,959**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**95,719**
Total Dredging Volume For This Alternative =		**409,678 yd^3 +**	

Notes:
Refer to Figure E.19 for dredging areas associated with Alternative 5.A
Refer to Figure E.20 for dredging areas associated with Alternative 5.B

TABLE E.25
SMU 5
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

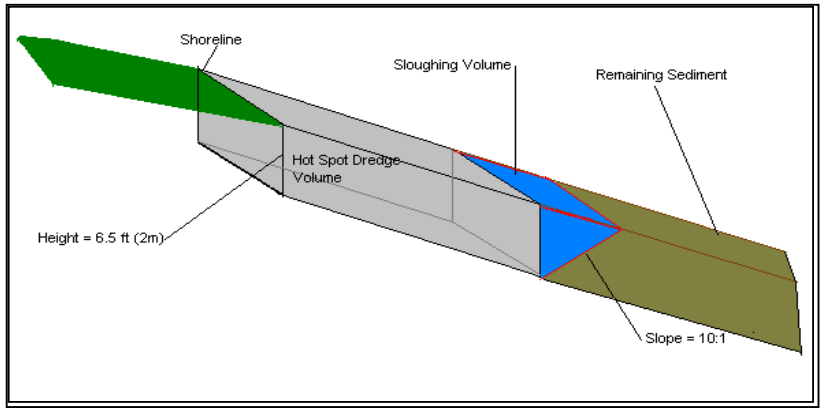
ALTERNATIVE 5.D DREDGING TO PEC			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
233.89	3.28	+	**1,237,684**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**377,343**
Total Dredging Volume For This Alternative =		**1,615,026 yd^3 +**	

ALTERNATIVE 5.E DREDGING TO ERL			
Total Impacted Area (acres)	**Depth of Sediment (known, feet)**	**Volume limited by depth of available data**	***In Situ* Sediment Volume (yd^3)**
348.6	3.28	+	**1,844,698**
	Overdredging volume		
	Assumed Overdredging Volume is 1' over the entire area dredged =		**562,408**
Total Dredging Volume For This Alternative =		**2,407,106 yd^3 +**	

Notes:
Refer to Figure E.21 for dredging areas associated with Alternative 5.D
Refer to Figure E.22 for dredging areas associated with Alternative 5.E

TABLE E.26
SMU 6
ALTERNATIVE 4.A.1 TARGETED DREDGING/CAPPING TO MEAN PECQ2
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
Targeted Dredging	6.5	220	2100	111300
		Total *in situ* Volume =		111,300 yd^3
Overdredging - 1' over entire area				17,111 yd^3
Side-Sloughing Volume = (2100 + 220 + 220) x 6.5' x 65'/(2*27) 10:1 Slope outward from entire perimeter				19,873 yd^3

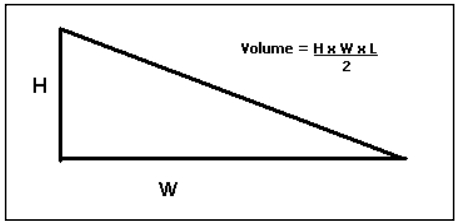


TOTAL VOLUME FOR TARGETED DREDGING: **148,284** yd^3

Notes:
Refer to Figure E.23 for dredging areas associated with this alternative

TABLE E.27
SMU 6
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING TO MEAN PECQ2
DREDGING VOLUME ESTIMATE

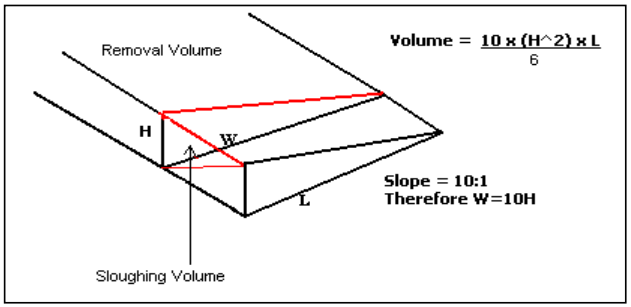
Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	6.5	641	1113	85900
2	6.5	460	857.1	47500
3	1.5	150	150	700
Targeted Dredging	**6.5**	**220**	**1971**	**104400**
1	**6.5**	**220**	**1114**	**-29600**
2	**6.5**	**220**	**857.1**	**-22700**
			Total *in situ* Volume =	**186200**



Bold numbers are corrections for double counted volumes which are caused by the targeted dredging. This volume was calculated by subtracting the portion of normal removal which overlapped the targeted dredging area.

Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	6.5	642.5	1700
West Face	6.5	780	2100
		Total sloughing Volume =	**3800**



Overdredging Volume

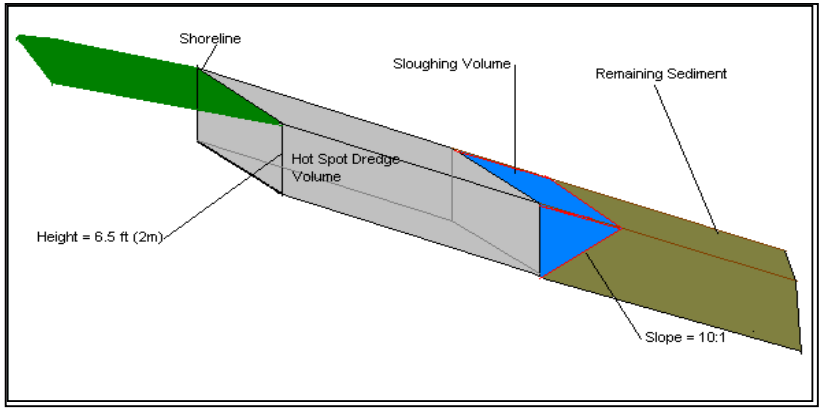
Assumed Overdredging Volume is 1' over the entire area dredged = **44,450 yd^3**

Total Dredging Volume For This Alternative = 234,450 yd^3

Notes:
Refer to Figure E.24 for dredging areas associated with this alternative

TABLE E.28
SMU 6
ALTERNATIVE 4.B.1 TARGETED DREDGING/CAPPING TO MEAN PECQ1
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
Targeted Dredging	6.5	220	2100	111300
		Total *in situ* Volume =		111,300 yd^3
Overdredging - 1' over entire area				17,111 yd^3
Side-Sloughing Volume = (2100 + 220 + 220) x 6.5' x 65'/(2*27) 10:1 Slope outward from entire perimeter				19,873 yd^3

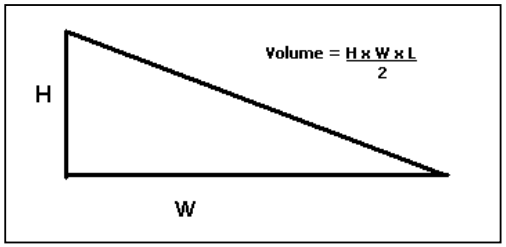


TOTAL VOLUME FOR TARGETED DREDGING: **148,284** yd^3

Notes:
Refer to Figure E.25 for dredging areas associated with this alternative

TABLE E.29
SMU 6
ALTERNATIVE 4.B.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING TO MEAN PECQ1
DREDGING VOLUME ESTIMATE

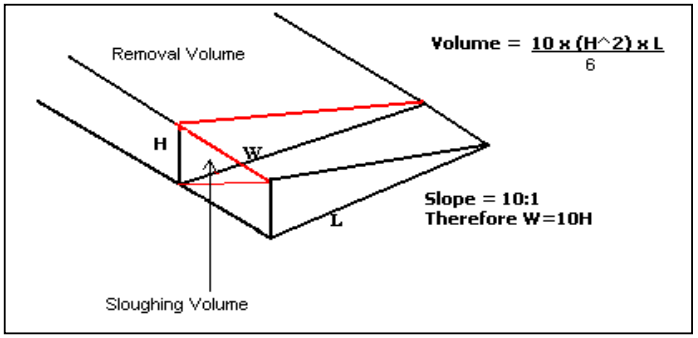
Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	6.5	642	1114	86100
2	6.5	460	857.1	47500
3	6.5	716	100	8700
Targeted Dredging	**6.5**	**220**	**1971**	**104400**
1	**6.5**	**220**	**1114**	**-29600**
2	**6.5**	**220**	**857.1**	**-22700**
			Total *in situ* Volume =	**194400**



Bold numbers are corrections for double counted volumes which are caused by the targeted dredging. This volume was calculated by subtracting the portion of normal removal which overlapped the targeted dredging area.

Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	6.5	642.5	1700
West Face	6.5	780	2100
		Total sloughing Volume =	**3800**



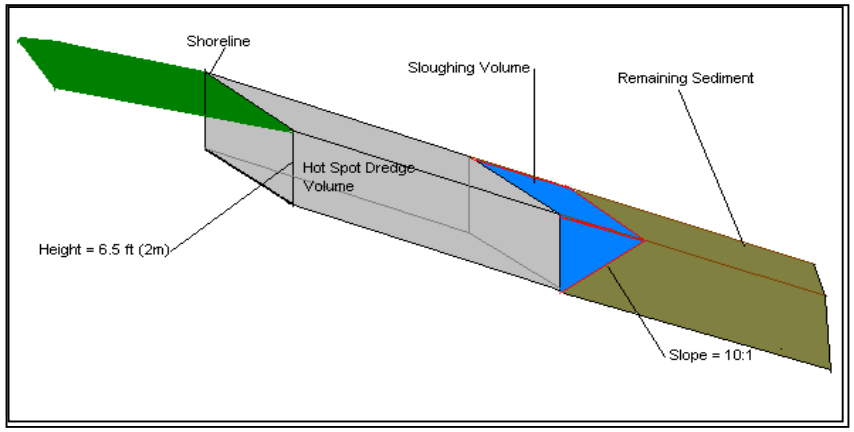
Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **47,166 yd^3**

Total Dredging Volume For This Alternative = 245,366 yd^3

TABLE E.30
SMU 6
ALTERNATIVE 4.D.1 TARGETED DREDGING/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
Targeted Dredging	6.5	220	4969	263200
		Total *in situ* Volume =		263,200 yd^3
Overdredging - 1' over entire area				40,488 yd^3
Side-Sloughing Volume = (4969+ 220 + 220) x 6.5' x 65'/(2*27) 10:1 Slope outward from entire perimeter				42,320 yd^3

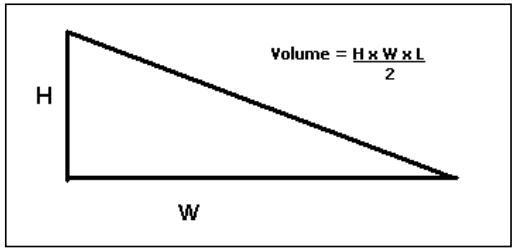


TOTAL VOLUME FOR TARGETED DREDGING: **346,009** yd^3

Notes:
Refer to Figure E.27 for dredging areas associated with this alternative

TABLE E.31
SMU 6
ALTERNATIVE 4.D.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

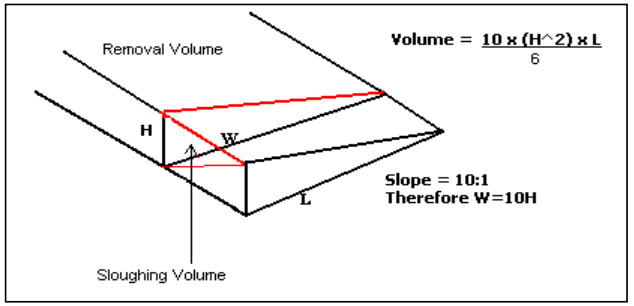
Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	6.5	642	3062	236700
2	6.5	460	840	46600
3	6.5	642	1067.5	82500
Targeted Dredging	**6.5**	**220**	**4969**	**263200**
1	**6.5**	**220**	**3062**	**-81100**
2	**6.5**	**220**	**840**	**-22300**
3	**6.5**	**220**	**1067.5**	**-28300**
		Total *in situ* Volume =		**497300**



Bold indicates Targeted Dredging

Side-Sloughing Volumes

Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
East Face	6.5	642.5	1700
West Face	6.5	780	2100
		Total sloughing Volume =	**3800**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = 115,922 yd^3

Total Dredging Volume For This Alternative = 617,022 yd^3

Notes:
Refer to Figure E.28 for dredging areas associated with this alternative

TABLE E.32
SMU 6
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.A FULL REMOVAL (TO MEAN PECQ2)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
94.4	16.4	+	**2,497,698**

Overdredging volume

	Assumed Overdredging Volume is 1' over the entire area dredged =		**152,299**

Side-Sloughing volume

Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	0	16.40	**0**
West Cut	0	16.40	**0**

Total Dredging Volume For These Alternative = 2,649,997 yd^3 +

ALTERNATIVE 5.B FULL REMOVAL (TO MEAN PECQ1)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
122.8	16.4	+	**3,249,124**

Overdredging volume

	Assumed Overdredging Volume is 1' over the entire area dredged =		**198,117**

Side-Sloughing volume

Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	0	16.40	**0**
West Cut	0	16.40	**0**

Total Dredging Volume For These Alternative = 3,447,242 yd^3 +

ALTERNATIVE 5.D FULL REMOVAL (TO PEC OR ERL)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
156.17	26.25	+	**6,613,800**

Overdredging volume

	Assumed Overdredging Volume is 1' over the entire area dredged =		**251,954**

Side-Sloughing volume

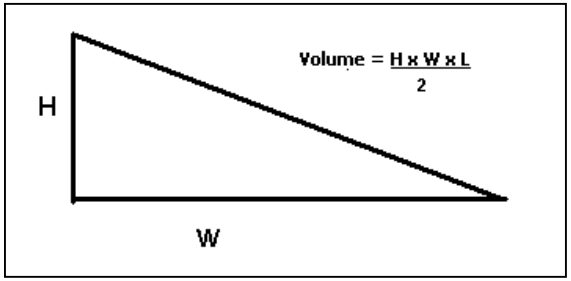
Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	2258	26.25	**288,130**
West Cut	1218	26.25	**155,422**

Total Dredging Volume For These Alternative = 7,309,306 yd^3 +

Notes:
Refer to Figure E.29 for dredging areas associated with Alternative 5.A
Refer to Figure E.30 for dredging areas associated with Alternative 5.B
Refer to Figure E.31 for dredging areas associated with Alternative 5.D

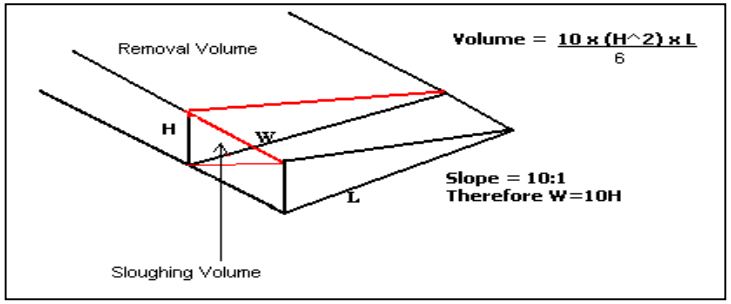
TABLE E.33
SMU 7
ALTERNATIVES 4.A.3 DREDGING FOR NLSA & H&E/CAPPING OF ENTIRE SMU
DREDGING VOLUME ESTIMATE

Area	Height (Ft)	Average Width of Area (Ft)	Area Length (Ft)	Volume (Yd^3)
1	5.75	466	932	46300
2	5.75	500	300	16000
			Total *in situ* Volume =	**62,300**



Side-Sloughing Volumes

Area/Face	Height (Ft)	Area Length (Ft)	Volume (Yd^3)
1			
East Face	5.75	500	1100
West Face	5.75	566	1200
		Total sloughing Volume =	**2,300**



Overdredging Volume

Assumed Overdredging Volume is 1' over the entire area dredged = **23,911 yd^3**

Total Dredging Volume For This Alternative = 88,511 yd^3

Notes:
Refer to Figure E.32 for dredging areas associated with this alternative

TABLE E.34
SMU 7
ALTERNATIVE 5 DREDGING VOLUME ESTIMATE

ALTERNATIVE 5.A FULL REMOVAL (TO MEAN PECQ2 OR MEAN PECQ1)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
37.8	19.7	+	**1,201,385**

Overdredging volume

Assumed Overdredging Volume is 1' over the entire area dredged =		**60,984**

Side-Sloughing volume

Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	1433	19.70	**102,988**
West Cut	1666	19.70	**119,733**

Total Dredging Volume For This Alternative = 1,485,089 yd^3 +

ALTERNATIVE 5.C FULL REMOVAL (TO AET, PEC, OR ERL)

Total Impacted Area (acres)	Depth of Sediment (known, feet)	Volume limited by depth of available data	*In Situ* Sediment Volume (yd^3)
37.8	26.25	+	**1,600,830**

Overdredging volume

Assumed Overdredging Volume is 1' over the entire area dredged =		**60,984**

Side-Sloughing volume

Cut	Length (Ft)	Dredge Height (Ft)	Volume = (10 x H^2 x L)/2 (Yd^3)
East Cut	1966	26.25	**250,870**
West Cut	2000	26.25	**255,208**

Total Dredging Volume For This Alternative = 2,167,892 yd^3 +

Notes:
Refer to Figure E.33 for dredge areas associated with these alternatives

TABLE E.35
ONONDAGA LAKE
THIESSEN POLYGON AREAS (surface interval)

SMU	Polygon Number	Polygon Area (acres)
1	S14	2.49
1	S15	2.49
1	S20	1.62
1	S21	1.30
1	S29	0.91
1	S309	2.92
1	S310	5.69
1	S311	1.81
1	S312	3.39
1	S338	1.49
1	S340	1.65
1	S341	2.63
1	S342	4.19
1	S343	3.87
1	S344	9.55
1	S345	2.04
1	S346	0.69
1	S347	3.89
1	S348	3.51
1	S349	1.11
1	S350	3.50
1	S401	2.41
1	S402	3.36
1	S403	4.23
1	S404	3.97
1	S405	8.64
1	S406	1.11

SMU	Polygon Number	Polygon Area (acres)
2	S28	0.58
2	S307	0.33
2	S308	3.83
2	S325	0.68
2	S326	1.83
2	S328	1.22
2	S329	2.67
2	S330	1.32
2	S331	4.44
2	S332	2.28
2	S333	0.80
2	S334	0.49
2	S335	0.25
2	S336	0.54
2	S337	3.06
2	S339	0.99
2	S35	1.20
2	S36	1.07
2	S37	1.63
2	S38	0.97
2	S39	0.87
2	S400	0.89
2	S434	0.80
2	S435	0.31
2	S47	0.70

TABLE E.35
ONONDAGA LAKE
THIESSEN POLYGON AREAS (surface interval)

SMU	Polygon Number	Polygon Area (acres)
3	S306	9.96
3	S324	5.83
3	S361	10.29
3	S362	7.41
3	S363	4.50
3	S364	11.91
3	S365	6.24
3	S48	9.04
3	S53	2.95
3	S54	1.73
3	S55	0.99
3	S62	12.02
3	S67	8.23
3	S68	14.43
3	S74	7.38
4	S301	9.49
4	S302	3.74
4	S304	5.62
4	S305	5.96
4	S358	3.30
4	S359	5.64
4	S360	7.47
4	S75	6.66
4	S76	7.24
4	S77	7.45
4	S81	5.28
4	S82	2.43
4	S83	1.90
4	S84	2.77

SMU	Polygon Number	Polygon Area (acres)
5	S100	8.35
5	S101	15.75
5	S104	8.16
5	S105	6.75
5	S108	6.53
5	S109	2.21
5	S110	7.35
5	S111	21.61
5	S112	32.57
5	S113	8.64
5	S26	12.25
5	S34	18.50
5	S356	13.05
5	S357	4.82
5	S366	14.46
5	S367	8.93
5	S368	20.90
5	S369	17.45
5	S370	8.30
5	S371	27.09
5	S372	16.94
5	S373	13.63
5	S374	40.89
5	S45	7.52
5	S46	3.26
5	S61	31.38
5	S66	23.27
5	S71	6.95
5	S72	5.38
5	S73	10.64
5	S87	14.36
5	S92	13.57
5	S93	15.08
5	S94	11.29
5	S95	7.91

TABLE E.35
ONONDAGA LAKE
THIESSEN POLYGON AREAS (surface interval)

SMU	Polygon Number	Polygon Area (acres)
6	S10	5.81
6	S11	7.41
6	S12	9.10
6	S13	14.52
6	S16	4.50
6	S17	8.47
6	S18	6.94
6	S19	11.73
6	S316	5.41
6	S317	7.89
6	S318	3.42
6	S319	10.87
6	S320	12.39
6	S321	12.87
6	S322	8.14
6	S323	4.33
6	S6	7.50
6	S7	2.24
6	S8	4.38
6	S9	8.25
7	S1	1.16
7	S2	1.85
7	S22	4.29
7	S3	2.13
7	S313	0.60
7	S314	1.45
7	S315	3.45
7	S351	0.20
7	S352	2.52
7	S353	5.42
7	S4	4.51
7	S407	4.47
7	S5	5.51

SMU	Polygon Number	Polygon Area (acres)
8	S102	83.53
8	S103	75.69
8	S106	64.24
8	S107	82.47
8	S23	12.13
8	S24	22.93
8	S25	45.22
8	S27	16.47
8	S30	24.71
8	S303	24.37
8	S31	38.86
8	S32	40.66
8	S327	14.09
8	S33	52.58
8	S354	26.56
8	S355	13.29
8	S40	22.25
8	S41	26.99
8	S42	43.01
8	S43	50.55
8	S44	53.38
8	S49	46.37
8	S50	35.60
8	S51	42.89
8	S52	66.01
8	S56	29.88
8	S57	29.27
8	S58	58.78
8	S59	48.45
8	S60	42.91
8	S63	56.23
8	S64	50.56
8	S65	58.61
8	S69	74.94
8	S70	55.75
8	S78	28.93
8	S79	33.44
8	S80	71.47
8	S85	20.76
8	S86	10.66
8	S88	25.31
8	S89	21.81
8	S90	31.65
8	S91	49.43
8	S96	45.88
8	S97	29.36
8	S98	44.22
8	S99	37.27

TABLE E.36
ONONDAGA LAKE
THIESSEN POLYGON AREAS (1–2m interval)

SMU	Polygon Number	Polygon Area (acres)
1	P15	9.60
1	P22	3.24
1	P23	5.14
1	P29	2.67
1	S309	3.84
1	S310	3.81
1	S311	3.47
1	S312	7.37
1	S338	1.69
1	S340	1.76
1	S341	4.02
1	S342	5.54
1	S343	5.38
1	S344	6.48
1	S345	3.39
1	S347	6.53
1	S348	4.22
1	S349	1.15
1	S350	5.15
2	S307	4.81
2	S308	3.83
2	S325	1.36
2	S326	2.15
2	S328	1.23
2	S329	3.48
2	S330	1.67
2	S331	4.44
2	S332	2.97
2	S333	0.97
2	S334	0.50
2	S335	0.25
2	S336	0.54
2	S337	3.06
2	S339	1.56
2	S434	0.94
3	S306	51.58
3	S324	61.33
4	P83	7.12
4	P84	3.58
4	S301	12.94
4	S302	1.55
4	S304	19.90
4	S305	29.84

SMU	Polygon Number	Polygon Area (acres)
6	P12	10.46
6	P19	16.14
6	S316	16.98
6	S317	17.23
6	S318	14.15
6	S319	12.07
6	S320	4.70
6	S321	16.73
6	S322	22.72
6	S323	24.99
7	P3	6.40
7	P4	5.17
7	P8	5.26
7	P9	2.07
7	S313	1.35
7	S314	2.56
7	S315	3.63
7	S351	0.20
7	S352	2.82
7	S353	8.46

TABLE E.36
ONONDAGA LAKE
THIESSEN POLYGON AREAS (1–2m interval)

SMU	Polygon Number	Polygon Area (acres)
8	P102	348.72
8	P25	45.13
8	P30	26.72
8	P31	38.88
8	P32	43.16
8	P33	51.61
8	P39	10.54
8	P41	28.30
8	P42	44.44
8	P43	48.10
8	P44	55.33
8	P49	44.26
8	P50	38.10
8	P52	69.90
8	P56	28.61
8	P57	29.69
8	P58	57.24
8	P59	83.80
8	P63	54.81
8	P64	48.44
8	P65	61.14
8	P69	74.09
8	P70	51.37
8	P78	56.29
8	P80	98.08
8	P85	20.54
8	P86	20.14
8	P88	56.80
8	P89	25.63
8	P90	138.90
8	S24	32.61
8	S27	15.63
8	S303	24.97
8	S327	11.82
8	S354	24.76
8	S355	14.94
8	S40	14.75
8	S51	42.15

TABLE E.37
ONONDAGA LAKE REMEDIAL ALTERNATIVES
CAPPING MATERIAL VOLUME SUMMARY

SMU	Alternative No.	Description	Capped Area (Acres)	Sand Required for Capping Alternative (Yd^3)	Gravel Required for Capping Alternative (Yd^3)	Stone Required for Capping Alternative (Yd^3)	Wetland Material or Backfill Required for Capping Alternative (Yd^3)
1	1	No Action	NA	NA	NA	NA	NA
	3.A	Capping of Entire SMU	84	626,200	45,700	87,400	19,800
	4.A.2	Dredging for NLSA[(1)]/Capping of Entire SMU	84	649,200	63,700	134,800	NA
	4.A.3	Dredging for NLSA & H&E[(2)]/Capping of Entire SMU	84	654,000	73,600	12,000	1,800
	4.A.4	Dredging to Remove 25% of ILWD/Capping of Entire SMU	84	610,000	98,100	0	71,587
	4.A.5	Dredge for 3 Meter Removal/Capping of Entire SMU	84	615,700	80,700	5,100	19,500
	4.A.6	Dredge for 4 Meter Removal/Capping of Entire SMU	84	637,600	64,200	5,100	71,587
	4.A.7	Dredge for 5 Meter Removal/Capping of Entire SMU	84	657,700	28,900	5,100	144,878
	5.A	Full Removal (to Mean PECQ2[(3)], Mean PECQ1[(3)], AET, PEC, or ERL)	NA	NA	NA	NA	NA
2	1	No Action	NA	NA	NA	NA	NA
	3.A	Capping to Mean PECQ2, Mean PECQ1, or AET	16	123,100	8,400	2,000	3,400
	3.D	Capping of Entire SMU	34	269,100	15,200	7,100	7,600
	4.A.3	Dredging for NLSA & H&E & Targeted Dredging to 4 Meter Depth (for NAPL Removal)/Capping to Mean PECQ2, Mean PECQ1, or AET	16	124,100	10,400	4,300	15,520
	4.A.4	Dredging for NLSA & H&E & Full NAPL Removal/Capping to Mean PECQ2, Mean PECQ1, or AET	16	124,100	10,400	4,300	188,423
	4.D.3	Dredging for NLSA & H&E & Targeted Dredging to 4 Meter Depth (for NAPL Removal)/Capping of Entire SMU	34	261,400	20,300	8,000	15,520
	4.D.4	Dredging for NLSA & H&E & Full NAPL Removal/Capping of Entire SMU	34	261,400	20,300	8,000	188,423
	5.A	Full Removal (to Mean PECQ2, Mean PECQ1, or AET)	NA	NA	NA	NA	NA
	5.D	Full Removal (to PEC or ERL)	NA	NA	NA	NA	NA
3	1	No Action	NA	NA	NA	NA	NA
	2	Habitat Enhancement	NA	NA	NA	NA	NA
	4.A.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to Mean PECQ2 or PEC	29	129,400	17,600	NA	NA
	4.E.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to ERL	113	494,600	77,200	NA	NA
	5.A	Full Removal (to Mean PECQ2, Mean PECQ1 or PEC)	NA	NA	NA	NA	NA
	5.E	Full Removal (to ERL)	NA	NA	NA	NA	NA
4	1	No Action	NA	NA	NA	NA	NA
	3.A	Capping of Entire SMU	75	275,000	42,500	16,700	25,900
	4.A.3	Dredging for NLSA & H&E/Capping of Entire SMU	75	300,300	60,500	0	300
	5.A	Full Removal (to Mean PECQ2, Mean PECQ1, or AET)	NA	NA	NA	NA	NA
	5.D	Full Removal (to PEC or ERL)	NA	NA	NA	NA	NA

TABLE E.37 (Continued)
ONONDAGA LAKE REMEDIAL ALTERNATIVES
CAPPING MATERIAL VOLUME SUMMARY

SMU	Alternative No.	Description	Capped Area (Acres)	Sand Required for Capping Alternative (Yd^3)	Gravel Required for Capping Alternative (Yd^3)	Stone Required for Capping Alternative (Yd^3)	Wetland Material or Backfill Required for Capping Alternative (Yd^3)
5	1	No Action	NA	NA	NA	NA	NA
	2	Habitat Enhancement	NA	NA	NA	NA	NA
	3.A	Capping to Mean PECQ2	36	123,700	18,100	17,200	13,400
	3.B	Capping to Mean PECQ1	60	210,900	25,700	22,300	17,900
	3.D	Capping to PEC	220	827,400	101,500	92,000	58,700
	3.E	Capping to ERL	349	1,341,900	152,200	250,800	102,800
	4.A.3	Dredging for H&E/Capping to Mean PECQ2	36	153,800	29,700	NA	NA
	4.B.3	Dredging for H&E/Capping to Mean PECQ1	60	248,900	40,900	NA	NA
	4.D.3	Dredging for H&E/Capping to PEC	220	924,600	141,500	NA	NA
	4.E.3	Dredging for H&E/Capping to ERL	349	1,518,400	245,200	NA	NA
	5.A	Full Removal (to Mean PECQ2)	NA	NA	NA	NA	NA
	5.B	Full Removal (to Mean PECQ1)	NA	NA	NA	NA	NA
	5.D	Full Removal (to PEC)	NA	NA	NA	NA	NA
	5.E	Full Removal (to ERL)	NA	NA	NA	NA	NA
6	1	No Action	NA	NA	NA	NA	NA
	4.A.1	Targeted Dredging/Capping to Mean PECQ2	94	351,400	77,400	50,400	NA
	4.A.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to Mean PECQ2	94	375,000	83,600	NA	NA
	4.B.1	Targeted Dredging/Capping to PECQ1	123	457,400	97,800	50,800	NA
	4.B.3	Dredging for NLSA & H&E & Targeted Dredging/Capping to PECQ1	123	471,000	103,900	NA	NA
	4.D.1	Targeted Dredging/Capping of Entire SMU	156	598,600	128,600	139,900	NA
	4.D.3	Dredging for NLSA & H&E & Targeted Dredging/Capping of Entire SMU	156	632,800	132,500	NA	NA
	5.A	Full Removal (to Mean PECQ2)	NA	NA	NA	NA	NA
	5.B	Full Removal (to Mean PECQ1)	NA	NA	NA	NA	NA
	5.D	Full Removal (to PEC or ERL)	NA	NA	NA	NA	NA
7	1	No Action	NA	NA	NA	NA	NA
	3.A	Capping of Entire SMU	38	281,800	38,600	39,600	NA
	4.A.3	Dredging for NLSA & H&E/Capping of Entire SMU	38	291,200	38,900	900	1,900
	5.A	Full Removal (to Mean PECQ2 or Mean PECQ1)	NA	NA	NA	NA	NA
	5.C	Full Removal (to AET, PEC or ERL)	NA	NA	NA	NA	NA

Notes:

(1) Dredging sufficient sediments such that there is no loss of lake surface area following Capping placement.
(2) Dredging sufficient sediments such that the depth after capping optimizes habitat potential and minimizes erosion potential.
(3) Mean PEC quotient of 2 + mercury PEC
(4) Mean PEC quotient of 1 + mercury PEC
NA - Not applicable
(+) Indicates that the volume is based on the limits of the data, but the depth of SEC exceedance has not been delineated.

TABLE E.38
SMU 1
ALTERNATIVE 3.A CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Upland Area	5	Wetland Substrate	12	100	1613	8,100
			Sand (Chemical Isolation)	51	100	6857	34,300
	Emergent Wetland Area	7.2	Wetland Substrate	12	100	1613	11,700
			Sand (Chemical Isolation)	51	100	6857	49,400
	Recreation/Habitat Buffer Area & Submerged Macrophyte	23.2	Sand (Habitat)	12	100	1613	37,500
			14" Dia. Stone (Armoring)	28	100	3764	87,400
			Sand (Chemical Isolation)	51	100	6857	159,100
	Fish Spawing Habitat	28.3	Fine Gravel (Habitat & Armor)	12	100	1613	45,700
			Sand (Chemical Isolation)	51	100	6857	194,100
	Benthic Substrate	19.8	Sand (Chemical Isolation)	57	100	7663	151,800

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	626,200	45,700	87,400	19,800

Notes:
Refer to Figures 4.3 & 4.4 for areas and cap details associated with this alternative

TABLE E.39
SMU 1
ALTERNATIVE 4.A.2 DREDGING FOR NLSA/CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Recreational/Habitat Buffer Area + Submerged Macrophyte	35.8	Sand (Habitat)	12	100	1613	57,800
			14" Dia. Stone (Armoring)	28	100	3764	134,800
			Sand (Chemical Isolation)	51	100	6857	245,500
			Fine Gravel (Habitat & Armor)	6	62	500	18,000
	Fish Spawing Habitat	28.3	Fine Gravel (Habitat & Armor)	12	100	1613	45,700
			Sand (Chemical Isolation)	51	100	6857	194,100
	Benthic Substrate	19.8	Sand (Chemical Isolation)	57	100	7663	151,800

Volume Totals (yd^3):	Sand	Gravel	Stone
	649,200	**63,700**	**134,800**

Notes:
Refer to Figures 4.16 & 4.19 for areas and cap details associated with this alternative

TABLE E.40
SMU 1
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E/CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Recreational/Habitat Buffer	4.2	Sand (Buffer)	30	100	4033	17,000
			14" Dia. Stone (Armoring)	28	70	2635	11,100
			Sand (Habitat)	6	50	403	1,700
			Fine Gravel (Habitat & Armor)	6	58	468	2,000
			Sand (Chemical Isolation)	51	58	3977	16,800
	Submerged Macrophyte	31.6	Sand (Habitat)	12	100	1613	51,000
			Sand (Chemical Isolation)	51	100	6857	216,700
			Fine Gravel (Habitat & Armor)	6	100	807	25,500
	Fish Spawing Habitat	28.3	Fine Gravel (Habitat & Armor)	12	100	1613	45,700
			Sand (Chemical Isolation)	51	100	6857	194,100
	Benthic Substrate	19.8	Sand (Chemical Isolation)	57	100	7663	151,800

Volume Totals (yd^3):	Sand	Gravel	Stone
	649,100	73,200	11,100

1	Emergent Wetland	0.5	Sand (Buffer)	24	100	3227	1,600
			Wetland Substrate	12	26	419	200
			Fill	42	56	3162	1,600
			14" Dia. Stone (Armoring)	28	46	1732	900
			Sand (Habitat)	6	23	186	100
			Fine Gravel (Habitat & Armor)	6	92	742	400
			Sand (Chemical Isolation)	51	92	6308	3,200

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	4,900	400	900	1,800

Grand Total:	Sand	Gravel	Stone	Various
	654,000	73,600	12,000	1,800

Notes:
Refer to Figures 4.16, 4.20, & 4.21 for areas and cap details associated with this alternative

TABLE E.41
SMU 1
ALTERNATIVE 4.A.4 DREDGING TO REMOVE 25% OF ILWD/CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Recreational/Habitat Buffer	1.9	Sand (Buffer)	30	100	4033	7,700
			Sand (Habitat)	6	50	403	800
			Fine Gravel (Habitat & Armor)	6	58	468	900
			Sand (Chemical Isolation)	51	58	3977	7,600
	Submerged Macrophyte	5.8	Sand (Habitat)	12	100	1613	9,400
			Sand (Chemical Isolation)	51	100	6857	39,800
			Fine Gravel (Habitat & Armor)	6	100	807	4,700
	Fish Spawing Habitat	57.3	Fine Gravel (Habitat & Armor)	12	100	1613	92,500
			Sand (Chemical Isolation)	51	100	6857	392,900
	Benthic Substrate	19.8	Sand (Chemical Isolation)	57	100	7663	151,800

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	610,000	98,100	0	71,587

Notes:
Refer to Figures 4.17 & 4.22 for areas and cap details associated with this alternative

TABLE E.42
SMU 1
ALTERNATIVE 4.A.5 DREDGING TO REMOVE 3 METERS/CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Recreational/Habitat Buffer	1.9	Sand (Buffer)	30	100	4033	7,700
			14" Dia. Stone (Armoring)	28	70	2635	5,100
			Sand (Habitat)	6	50	403	800
			Fine Gravel (Habitat & Armor)	6	58	468	900
			Sand (Chemical Isolation)	51	58	3977	7,600
	Submerged Macrophyte	5.8	Sand (Habitat)	12	100	1613	9,400
			Sand (Chemical Isolation)	51	100	6857	39,800
			Fine Gravel (Habitat & Armor)	6	100	807	4,700
	Fish Spawing Habitat	46.5	Fine Gravel (Habitat & Armor)	12	100	1613	75,100
			Sand (Chemical Isolation)	51	100	6857	318,900
	Benthic Substrate	30.2	Sand (Chemical Isolation)	57	100	7663	231,500

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	615,700	80,700	5,100	19,500

Notes:
Refer to Figures 4.17 & 4.23 for areas and cap details associated with this alternative

TABLE E.43
SMU 1
ALTERNATIVE 4.A.6 DREDGING TO REMOVE 4 METERS/CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Recreational/Habitat Buffer	1.9	Sand (Buffer)	30	100	4033	7,700
			14" Dia. Stone (Armoring)	28	70	2635	5,100
			Sand (Habitat)	6	50	403	800
			Fine Gravel (Habitat & Armor)	6	58	468	900
			Sand (Chemical Isolation)	51	58	3977	7,600
	Submerged Macrophyte	5.8	Sand (Habitat)	12	100	1613	9,400
			Sand (Chemical Isolation)	51	100	6857	39,800
			Fine Gravel (Habitat & Armor)	6	100	807	4,700
	Fish Spawing Habitat	36.3	Fine Gravel (Habitat & Armor)	12	100	1613	58,600
			Sand (Chemical Isolation)	51	100	6857	248,900
	Benthic Substrate	42.2	Sand (Chemical Isolation)	57	100	7663	323,400

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	637,600	64,200	5,100	71,587

Notes:
Refer to Figures 4.18 & 4.24 for areas and cap details associated with this alternative

TABLE E.44
SMU 1
ALTERNATIVE 4.A.7 DREDGING TO REMOVE 5 METERS/CAPPING OF ENTIRE SMU
CAPPING MATERIAL VOLUME

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
1	Recreational/Habitat Buffer	1.9	Sand (Buffer)	30	100	4033	7,700
			14" Dia. Stone (Armoring)	28	70	2635	5,100
			Sand (Habitat)	6	50	403	800
			Fine Gravel (Habitat & Armor)	6	58	468	900
			Sand (Chemical Isolation)	51	58	3977	7,600
	Submerged Macrophyte	5.8	Sand (Habitat)	12	100	1613	9,400
			Sand (Chemical Isolation)	51	100	6857	39,800
			Fine Gravel (Habitat & Armor)	6	100	807	4,700
	Fish Spawing Habitat	14.4	Fine Gravel (Habitat & Armor)	12	100	1613	23,300
			Sand (Chemical Isolation)	51	100	6857	98,800
	Benthic Substrate	64.4	Sand (Chemical Isolation)	57	100	7663	493,600

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	657,700	28,900	5,100	144,878

Notes:
Refer to Figures 4.18 & 4.25 for areas and cap details associated with this alternative

TABLE E.45
SMU 2
ALTERNATIVE 3.A ISOLATION CAPPING TO MEAN PECQ2, MEAN PECQ1, OR AET
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
2	Upland Area	2.7	Upland Area	6	100	807	2,200
			Sand (Chemical Isolation)	51	100	6857	18,600
	Emergent Wetland Area	1.4	Wetland Substrate	6	100	807	1,200
			Sand (Chemical Isolation)	51	100	6857	9,600
	Habitat Buffer	0.6	Sand (Habitat)	6	100	807	500
			14" Dia. Stone (Armoring)	24	100	3227	2,000
			Sand (Chemical Isolation)	51	100	6857	4,200
	Submerged Macrophyte	1.1	Fine Gravel (Habitat & Armor)	6	100	807	4,200
			Sand (Chemical Isolation)	51	100	6857	7,600
	Fish Spawing Habitat	5.1	Fine Gravel (Habitat & Armor)	6	100	807	4,200
			Sand (Chemical Isolation)	51	100	6857	35,000
	Benthic Substrate	6.2	Sand (Chemical Isolation)	57	100	7663	47,600

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	123,100	8,400	2,000	3,400

Notes:
Refer to Figures 4.5 & 4.6 for areas and cap details associated with this alternative

TABLE E.46
SMU 2
ALTERNATIVE 3.D CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
2	Upland Area	5.6	Upland Area	6	100	807	4,600
			Sand (Chemical Isolation)	51	100	6857	38,400
	Emergent Wetland Area	3.6	Wetland Substrate	6	100	807	3,000
			Sand (Chemical Isolation)	51	100	6857	24,700
	Habitat Buffer	2.2	Sand (Habitat)	6	100	807	1,800
			14" Dia. Stone (Armoring)	24	100	3227	7,100
			Sand (Chemical Isolation)	51	100	6857	15,100
	Submerged Macrophyte	2.4	Fine Gravel (Habitat & Armor)	6	100	807	7,600
			Sand (Chemical Isolation)	51	100	6857	16,500
	Fish Spawing Habitat	9.4	Fine Gravel (Habitat & Armor)	6	100	807	7,600
			Sand (Chemical Isolation)	51	100	6857	64,500
	Benthic Substrate	14.1	Sand (Chemical Isolation)	57	100	7663	108,100

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	269,100	15,200	7,100	7,600

Notes:
Refer to Figures 4.5 & 4.6 for areas and cap details associated with this alternative

TABLE E.47
SMU 2

ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING TO 4 METER DEPTH / CAPPING TO MEAN PECQ2, MEAN PECQ1, OR AET
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
2	Recreational/Habitat Buffer	1.6	Sand (Buffer)	30	100	4033	6,500
			14" Dia. Stone (Armoring)	28	70	2635	4,300
			Sand (Habitat)	6	50	403	700
			Fine Gravel (Habitat & Armor)	6	58	468	800
			Sand (Chemical Isolation)	51	58	3977	6,400
	Submerged Macrophyte	2.6	Sand (Habitat)	12	100	1613	4,200
			Sand (Chemical Isolation)	51	100	6857	17,900
			Fine Gravel (Habitat & Armor)	6	100	807	2,100
	Fish Spawing Habitat	4.6	Fine Gravel (Habitat & Armor)	12	100	1613	7,500
			Sand (Chemical Isolation)	51	100	6857	31,600
	Benthic Substrate	7.4	Sand (Chemical Isolation)	57	100	7663	56,800

Volume Totals (yd^3):

Sand	Gravel	Stone	Backfill
124,100	10,400	4,300	15,520

Notes:
Refer to Figures 4.26 & 4.27 for areas and cap details associated with this alternative

TABLE E.48
SMU 2
ALTERNATIVE 4.A.4 DREDGING FOR NLSA, H&E, & FULL NAPL REMOVAL / CAPPING TO PECQ2, MEAN PECQ1, OR AET
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
2	Recreational/Habitat Buffer	1.6	Sand (Buffer)	30	100	4033	6,500
			14" Dia. Stone (Armoring)	28	70	2635	4,300
			Sand (Habitat)	6	50	403	700
			Fine Gravel (Habitat & Armor)	6	58	468	800
			Sand (Chemical Isolation)	51	58	3977	6,400
	Submerged Macrophyte	2.6	Sand (Habitat)	12	100	1613	4,200
			Sand (Chemical Isolation)	51	100	6857	17,900
			Fine Gravel (Habitat & Armor)	6	100	807	2,100
	Fish Spawing Habitat	4.6	Fine Gravel (Habitat & Armor)	12	100	1613	7,500
			Sand (Chemical Isolation)	51	100	6857	31,600
	Benthic Substrate	7.4	Sand (Chemical Isolation)	57	100	7663	56,800

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	124,100	10,400	4,300	188,423

Notes:
Refer to Figures 4.26 & 4.27 for areas and cap details associated with this alternative

TABLE E.49
SMU 2
ALTERNATIVE 4.D.3 DREDGING FOR NLSA, H&E & TARGETED DREDGING TO 4 METER DEPTH / CAPPING TO PEC
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
2	Recreational/Habitat Buffer	3	Sand (Buffer)	30	100	4033	12,100
			14" Dia. Stone (Armoring)	28	70	2635	8,000
			Sand (Habitat)	6	50	403	1,300
			Fine Gravel (Habitat & Armor)	6	58	468	1,500
			Sand (Chemical Isolation)	51	58	3977	12,000
	Submerged Macrophyte	7	Sand (Habitat)	12	100	1613	11,300
			Sand (Chemical Isolation)	51	100	6857	48,000
			Fine Gravel (Habitat & Armor)	6	100	807	5,700
	Fish Spawing Habitat	8.1	Fine Gravel (Habitat & Armor)	12	100	1613	13,100
			Sand (Chemical Isolation)	51	100	6857	55,600
	Benthic Substrate	15.8	Sand (Chemical Isolation)	57	100	7663	121,100

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	261,400	20,300	8,000	15,520

Notes:
Refer to Figures 4.26 & 4.27 for areas and cap details associated with this alternative

TABLE E.50
SMU 2
ALTERNATIVE 4.D.4 DREDGING FOR NLSA, H&E & FULL NAPL REMOVAL / CAPPING TO PEC
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
2	Recreational/Habitat Buffer	3	Sand (Buffer)	30	100	4033	12,100
			14" Dia. Stone (Armoring)	28	70	2635	8,000
			Sand (Habitat)	6	50	403	1,300
			Fine Gravel (Habitat & Armor)	6	58	468	1,500
			Sand (Chemical Isolation)	51	58	3977	12,000
	Submerged Macrophyte	7	Sand (Habitat)	12	100	1613	11,300
			Sand (Chemical Isolation)	51	100	6857	48,000
			Fine Gravel (Habitat & Armor)	6	100	807	5,700
	Fish Spawing Habitat	8.1	Fine Gravel (Habitat & Armor)	12	100	1613	13,100
			Sand (Chemical Isolation)	51	100	6857	55,600
	Benthic Substrate	15.8	Sand (Chemical Isolation)	57	100	7663	121,100

Volume Totals (yd^3):	Sand	Gravel	Stone	Backfill
	261,400	20,300	8,000	188,423

Notes:
Refer to Figures 4.26 & 4.27 for areas and cap details associated with this alternative

TABLE E.51
SMU 3
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING TO MEAN PECQ2, MEAN PECQ1, OR PEC
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
3	Recreational/Habitat Buffer	1.6	Sand (Buffer)	30	100	4033	6,500
			Fine Gravel (Habitat & Armor)	6	58	468	800
			Sand (Chemical Isolation)	24	58	1871	3,000
	Submerged Macrophyte	4.1	Sand (Habitat)	12	100	1613	6,700
			Sand (Chemical Isolation)	24	100	3227	13,300
			Fine Gravel (Habitat & Armor)	6	100	807	3,400
	Fish Spawing Habitat	8.3	Fine Gravel (Habitat & Armor)	12	100	1613	13,400
			Sand (Chemical Isolation)	24	100	3227	26,800
	Benthic Substrate	15.1	Sand (Chemical Isolation)	36	100	4840	73,100

Volume Totals (yd^3):	Sand	Gravel
	129,400	17,600

Notes:
Refer to Figures 4.28 & 4.29 for areas and cap details associated with this scenario

TABLE E.52
SMU 3
ALTERNATIVE 4.E.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING TO ERL
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
3	Recreational/Habitat Buffer	8.2	Sand (Buffer)	30	100	4033	33,100
			Fine Gravel (Habitat & Armor)	6	58	468	3,900
			Sand (Chemical Isolation)	24	58	1871	15,400
	Submerged Macrophyte	23.1	Sand (Habitat)	12	100	1613	37,300
			Sand (Chemical Isolation)	24	100	3227	74,600
			Fine Gravel (Habitat & Armor)	6	100	807	18,700
	Fish Spawing Habitat	33.8	Fine Gravel (Habitat & Armor)	12	100	1613	54,600
			Sand (Chemical Isolation)	24	100	3227	109,100
	Benthic Substrate	46.5	Sand (Chemical Isolation)	36	100	4840	225,100

Volume Totals (yd^3):

Sand	Gravel
494,600	77,200

Notes:
Refer to Figures 4.28 & 4.29 for areas and cap details associated with this scenario

TABLE E.53
SMU 4
ALTERNATIVE 3.A CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
4	Upland Area	5.6	Upland Area	12	100	1613	9,100
			Sand (Chemical Isolation)	24	100	3227	18,100
	Emergent Wetland Area	10.4	Wetland Substrate	12	100	1613	16,800
			Sand (Chemical Isolation)	24	100	3227	33,600
	Recreation/Habitat Buffer Area & Submerged Macrophyte	6.9	Sand (Habitat)	12	100	1613	11,200
			9" Dia. Stone (Armoring)	18	100	2420	16,700
			Sand (Chemical Isolation)	24	100	3227	22,300
	Fish Spawing Habitat	26.3	Fine Gravel (Habitat & Armor)	12	100	1613	42,500
			Sand (Chemical Isolation)	24	100	3227	84,900
	Benthic Substrate	26	Sand (Chemical Isolation)	30	100	4033	104,900

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	275,000	42,500	16,700	25,900

Notes:
Refer to Figures 4.7 & 4.8 for areas and cap details associated with this alternative

TABLE E.54
SMU 4
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E/CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
4	Recreational/Habitat Buffer	2.3	Sand (Buffer)	30	100	4033	9,300
			Fine Gravel (Habitat & Armor)	6	58	468	1,100
			Sand (Chemical Isolation)	24	58	1871	4,400
	Submerged Macrophyte	18.7	Sand (Habitat)	12	100	1613	30,200
			Sand (Chemical Isolation)	24	100	3227	60,400
			Fine Gravel (Habitat & Armor)	6	100	807	15,100
	Fish Spawing Habitat	27.2	Fine Gravel (Habitat & Armor)	12	100	1613	43,900
			Sand (Chemical Isolation)	24	100	3227	87,800
	Benthic Substrate	26	Sand (Chemical Isolation)	30	100	4033	104,900

Volume Totals (yd^3):	Sand	Gravel
	297,000	60,100

4	Emergent Wetland	0.5	Sand (Buffer)	24	100	3227	1,700
			Wetland Substrate	12	26	419	300
			Sand (Habitat)	6	23	186	100
			Fine Gravel (Habitat & Armor)	6	92	742	400
			Sand (Chemical Isolation)	24	92	2969	1,500

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	3,300	400	0	300

Grand Total:	Sand	Gravel	Stone	Various
	300,300	60,500	0	300

Notes:
Refer to Figures 4.30, 4.31, 4.32, & 4.33 for areas and cap details associated with this alternative

TABLE E.55
SMU 5
ALTERNATIVE 3.A ISOLATION CAPPING TO MEAN PECQ2
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Upland Area	2.3	Upland Area	12	100	1613	3,800
			Sand (Chemical Isolation)	24	100	3227	7,500
	Emergent Wetland Area	5.9	Wetland Substrate	12	100	1613	9,600
			Sand (Chemical Isolation)	24	100	3227	19,100
	Recreation/Habitat Buffer Area & Submerged Macrophyte	5.3	Sand (Habitat)	12	100	1613	8,600
			12" Dia. Stone (Armoring)	24	100	3227	17,200
			Sand (Chemical Isolation)	24	100	3227	17,200
	Fish Spawing Habitat	11.2	Fine Gravel (Habitat & Armor)	12	100	1613	18,100
			Sand (Chemical Isolation)	24	100	3227	36,200
	Benthic Substrate	8.7	Sand (Chemical Isolation)	30	100	4033	35,100

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	123,700	18,100	17,200	13,400

Notes:
Refer to Figures 4.9 & 4.13 for areas and cap details associated with this alternative

TABLE E.56
SMU 5
ALTERNATIVE 3.B ISOLATION CAPPING TO MEAN PECQ1
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Upland Area	3	Upland Area	12	100	1613	4,900
			Sand (Chemical Isolation)	24	100	3227	9,700
	Emergent Wetland Area	8	Wetland Substrate	12	100	1613	13,000
			Sand (Chemical Isolation)	24	100	3227	25,900
	Recreation/Habitat Buffer Area & Submerged Macrophyte	6.9	Sand (Habitat)	12	100	1613	11,200
			12" Dia. Stone (Armoring)	24	100	3227	22,300
			Sand (Chemical Isolation)	24	100	3227	22,300
	Fish Spawing Habitat	15.9	Fine Gravel (Habitat & Armor)	12	100	1613	25,700
			Sand (Chemical Isolation)	24	100	3227	51,400
	Benthic Substrate	22.4	Sand (Chemical Isolation)	30	100	4033	90,400

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	210,900	25,700	22,300	17,900

Notes:
Refer to Figures 4.10 & 4.13 for areas and cap details associated with this alternative

TABLE E.57
SMU 5
ALTERNATIVE 3.D ISOLATION CAPPING TO PEC
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Upland Area	13.3	Upland Area	12	100	1613	21,500
			Sand (Chemical Isolation)	24	100	3227	43,000
	Emergent Wetland Area	23	Wetland Substrate	12	100	1613	37,200
			Sand (Chemical Isolation)	24	100	3227	74,300
	Recreation/Habitat Buffer Area & Submerged Macrophyte	28.5	Sand (Habitat)	12	100	1613	46,000
			12" Dia. Stone (Armoring)	24	100	3227	92,000
			Sand (Chemical Isolation)	24	100	3227	92,000
	Fish Spawing Habitat	62.9	Fine Gravel (Habitat & Armor)	12	100	1613	101,500
			Sand (Chemical Isolation)	24	100	3227	203,000
	Benthic Substrate	91.5	Sand (Chemical Isolation)	30	100	4033	369,100

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	827,400	101,500	92,000	58,700

Notes:
Refer to Figures 4.11 & 4.13 for areas and cap details associated with this alternative

TABLE E.58
SMU 5
ALTERNATIVE 3.E ISOLATION CAPPING TO ERL
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Upland Area	19.7	Upland Area	12	100	1613	31,800
			Sand (Chemical Isolation)	24	100	3227	63,600
	Emergent Wetland Area	44	Wetland Substrate	12	100	1613	71,000
			Sand (Chemical Isolation)	24	100	3227	142,000
	Recreation/Habitat Buffer Area & Submerged Macrophyte	77.7	Sand (Habitat)	12	100	1613	125,400
			12" Dia. Stone (Armoring)	24	100	3227	250,800
			Sand (Chemical Isolation)	24	100	3227	250,800
	Fish Spawing Habitat	94.3	Fine Gravel (Habitat & Armor)	12	100	1613	152,200
			Sand (Chemical Isolation)	24	100	3227	304,300
	Benthic Substrate	113	Sand (Chemical Isolation)	30	100	4033	455,800

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	1,341,900	152,200	250,800	102,800

Notes:
Refer to Figures 4.12 & 4.13 for areas and cap details associated with this alternative

TABLE E.59
SMU 5
ALTERNATIVE 4.A.3 DREDGING FOR H&E/ISOLATION CAPPING TO MEAN PECQ2
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Recreational/Habitat Buffer	5	Sand (Buffer)	30	100	4033	20,200
			Fine Gravel (Habitat & Armor)	6	58	468	2,400
			Sand (Chemical Isolation)	24	58	1871	9,400
	Submerged Macrophyte	9.7	Sand (Habitat)	12	100	1613	15,700
			Sand (Chemical Isolation)	24	100	3227	31,300
			Fine Gravel (Habitat & Armor)	6	100	807	7,900
	Fish Spawing Habitat	12	Fine Gravel (Habitat & Armor)	12	100	1613	19,400
			Sand (Chemical Isolation)	24	100	3227	38,800
	Benthic Substrate	9.5	Sand (Chemical Isolation)	30	100	4033	38,400

Volume Totals (yd^3):	Sand	Gravel
	153,800	29,700

Notes:
Refer to Figures 4.34 & 4.38 for areas and cap details associated with this alternative

TABLE E.60
SMU 5
ALTERNATIVE 4.B.3 DREDGING FOR H&E/ISOLATION CAPPING TO MEAN PECQ1
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Recreational/Habitat Buffer	6.4	Sand (Buffer)	30	100	4033	25,900
			Fine Gravel (Habitat & Armor)	6	58	468	3,000
			Sand (Chemical Isolation)	24	58	1871	12,000
	Submerged Macrophyte	12.8	Sand (Habitat)	12	100	1613	20,700
			Sand (Chemical Isolation)	24	100	3227	41,400
			Fine Gravel (Habitat & Armor)	6	100	807	10,400
	Fish Spawing Habitat	17	Fine Gravel (Habitat & Armor)	12	100	1613	27,500
			Sand (Chemical Isolation)	24	100	3227	54,900
	Benthic Substrate	23.3	Sand (Chemical Isolation)	30	100	4033	94,000

Volume Totals (yd^3):	Sand	Gravel
	248,900	40,900

Notes:
Refer to Figures 4.35 & 4.38 for areas and cap details associated with this alternative

TABLE E.61
SMU 5
ALTERNATIVE 4.D.3 DREDGING FOR H&E/ISOLATION CAPPING TO PEC
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Recreational/Habitat Buffer	36.3	Sand (Buffer)	30	100	4033	146,500
			Fine Gravel (Habitat & Armor)	6	58	468	17,000
			Sand (Chemical Isolation)	24	58	1871	68,000
	Submerged Macrophyte	28.5	Sand (Habitat)	12	100	1613	46,000
			Sand (Chemical Isolation)	24	100	3227	92,000
			Fine Gravel (Habitat & Armor)	6	100	807	23,000
	Fish Spawing Habitat	62.9	Fine Gravel (Habitat & Armor)	12	100	1613	101,500
			Sand (Chemical Isolation)	24	100	3227	203,000
	Benthic Substrate	91.5	Sand (Chemical Isolation)	30	100	4033	369,100

Volume Totals (yd^3):	Sand	Gravel
	924,600	141,500

Notes:
Refer to Figures 4.36 & 4.38 for areas and cap details associated with this alternative

TABLE E.62
SMU 5
ALTERNATIVE 4.E.3 DREDGING FOR H&E/ISOLATION CAPPING TO ERL
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
5	Recreational/Habitat Buffer	64.7	Sand (Buffer)	30	100	4033	261,000
			Fine Gravel (Habitat & Armor)	6	58	468	30,300
			Sand (Chemical Isolation)	24	58	1871	121,100
	Submerged Macrophyte	77.7	Sand (Habitat)	12	100	1613	125,400
			Sand (Chemical Isolation)	24	100	3227	250,800
			Fine Gravel (Habitat & Armor)	6	100	807	62,700
	Fish Spawing Habitat	94.3	Fine Gravel (Habitat & Armor)	12	100	1613	152,200
			Sand (Chemical Isolation)	24	100	3227	304,300
	Benthic Substrate	113	Sand (Chemical Isolation)	30	100	4033	455,800

Volume Totals (yd^3):

Sand	Gravel
1,518,400	245,200

Notes:
Refer to Figures 4.37 & 4.38 for areas and cap details associated with this alternative

TABLE E.63
SMU 6
ALTERNATIVE 4.A.1 TARGETED DREDGING/CAPPING TO MEAN PECQ2
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
6	Recreation/Habitat Buffer Area & Submerged Macrophyte	11.7	Sand (Habitat)	12	100	1613	18,900
			16" Dia. Stone (Armoring)	32	100	4302	50,400
			Fine Gravel (Habitat & Armor)	6	62	500	5,900
			Sand (Chemical Isolation)	24	100	3227	37,800
	Fish Spawing Habitat	44.3	Fine Gravel (Habitat & Armor)	12	100	1613	71,500
			Sand (Chemical Isolation)	24	100	3227	143,000
	Benthic Substrate	37.6	Sand (Chemical Isolation)	30	100	4033	151,700

Volume Totals (yd^3):	Sand	Gravel	Stone
	351,400	77,400	50,400

Notes:
Refer to Figures 4.39 & 4.41 for areas and cap details associated with this alternative

TABLE E.64
SMU 6
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING TO MEAN PECQ2
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
6	Recreational/Habitat Buffer	3.6	Sand (Buffer)	30	100	4033	14,600
			Fine Gravel (Habitat & Armor)	6	58	468	1,700
			Sand (Chemical Isolation)	24	58	1871	6,800
	Submerged Macrophyte	18.2	Sand (Habitat)	12	100	1613	29,400
			Sand (Chemical Isolation)	24	100	3227	58,800
			Fine Gravel (Habitat & Armor)	6	100	807	14,700
	Fish Spawing Habitat	41.6	Fine Gravel (Habitat & Armor)	12	100	1613	67,200
			Sand (Chemical Isolation)	24	100	3227	134,300
	Benthic Substrate	32.5	Sand (Chemical Isolation)	30	100	4033	131,100

Volume Totals (yd^3):	Sand	Gravel
	375,000	83,600

Notes:
Refer to Figures 4.39 & 4.42 for areas and cap details associated with this alternative

TABLE E.65
SMU 6
ALTERNATIVE 4.B.1 TARGETED DREDGING/CAPPING TO MEAN PECQ1
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
6	Recreation/Habitat Buffer Area & Submerged Macrophyte	11.8	Sand (Habitat)	12	100	1613	19,100
			16" Dia. Stone (Armoring)	32	100	4302	50,800
			Fine Gravel (Habitat & Armor)	6	62	500	6,000
			Sand (Chemical Isolation)	24	100	3227	38,100
	Fish Spawing Habitat	56.9	Fine Gravel (Habitat & Armor)	12	100	1613	91,800
			Sand (Chemical Isolation)	24	100	3227	183,600
	Benthic Substrate	53.7	Sand (Chemical Isolation)	30	100	4033	216,600

Volume Totals (yd^3):	Sand	Gravel	Stone
	457,400	97,800	50,800

Notes:
Refer to Figures 4.39 & 4.41 for areas and cap details associated with this alternative

TABLE E.66
SMU 6
ALTERNATIVE 4.B.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING TO MEAN PECQ1
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
6	Recreational/Habitat Buffer	3.6	Sand (Buffer)	30	100	4033	14,600
			Fine Gravel (Habitat & Armor)	6	58	468	1,700
			Sand (Chemical Isolation)	24	58	1871	6,800
	Submerged Macrophyte	16.9	Sand (Habitat)	12	100	1613	27,300
			Sand (Chemical Isolation)	24	100	3227	54,600
			Fine Gravel (Habitat & Armor)	6	100	807	13,700
	Fish Spawing Habitat	54.8	Fine Gravel (Habitat & Armor)	12	100	1613	88,500
			Sand (Chemical Isolation)	24	100	3227	176,900
	Benthic Substrate	47.3	Sand (Chemical Isolation)	30	100	4033	190,800

Volume Totals (yd^3):	Sand	Gravel
	471,000	103,900

Notes:
Refer to Figures 4.39 & 4.42 for areas and cap details associated with this alternative

TABLE E.67
SMU 6
ALTERNATIVE 4.D.1 TARGETED DREDGING/CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
6	Recreation/Habitat Buffer Area & Submerged Macrophyte	32.5	Sand (Habitat)	12	100	1613	52,500
			16" Dia. Stone (Armoring)	32	100	4302	139,900
			Fine Gravel (Habitat & Armor)	6	62	500	16,300
			Sand (Chemical Isolation)	24	100	3227	104,900
	Fish Spawing Habitat	69.6	Fine Gravel (Habitat & Armor)	12	100	1613	112,300
			Sand (Chemical Isolation)	24	100	3227	224,600
	Benthic Substrate	53.7	Sand (Chemical Isolation)	30	100	4033	216,600

Volume Totals (yd^3):	Sand	Gravel	Stone
	598,600	128,600	139,900

Notes:
Refer to Figures 4.40 & 4.41 for areas and cap details associated with this alternative

TABLE E.68
SMU 6
ALTERNATIVE 4.D.3 DREDGING FOR NLSA & H&E & TARGETED DREDGING/CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
6	Recreational/Habitat Buffer	10	Sand (Buffer)	30	100	4033	40,400
			Fine Gravel (Habitat & Armor)	6	58	468	4,700
			Sand (Chemical Isolation)	24	58	1871	18,800
	Submerged Macrophyte	39.3	Sand (Habitat)	12	100	1613	63,500
			Sand (Chemical Isolation)	24	100	3227	126,900
			Fine Gravel (Habitat & Armor)	6	100	807	31,800
	Fish Spawing Habitat	59.5	Fine Gravel (Habitat & Armor)	12	100	1613	96,000
			Sand (Chemical Isolation)	24	100	3227	192,000
	Benthic Substrate	47.4	Sand (Chemical Isolation)	30	100	4033	191,200

Volume Totals (yd^3):

Sand	Gravel
632,800	132,500

Notes:
Refer to Figures 4.40 & 4.42 for areas and cap details associated with this alternative

TABLE E.69
SMU 7
ALTERNATIVE 3.A CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
7	Recreation/Habitat Buffer Area & Submerged Macrophyte	9.2	Sand (Habitat)	12	100	1613	14,900
			16" Dia. Stone (Armoring)	32	100	4302	39,600
			Fine Gravel (Habitat & Armor)	6	62	500	4,700
			Sand (Chemical Isolation)	51	100	6857	63,100
	Fish Spawing Habitat	21	Fine Gravel (Habitat & Armor)	12	100	1613	33,900
			Sand (Chemical Isolation)	51	100	6857	144,000
	Benthic Substrate	7.8	Sand (Chemical Isolation)	57	100	7663	59,800

Volume Totals (yd^3):

Sand	Gravel	Stone
281,800	38,600	39,600

Notes:

Refer to Figures 4.14 & 4.15 for areas and cap details associated with this alternative

TABLE E.70
SMU 7
ALTERNATIVE 4.A.3 DREDGING FOR NLSA & H&E/CAPPING OF ENTIRE SMU
CAPPING MATERIAL ESTIMATE

SMU Number	Cap Region	Area of Region (acres)	Component of Cap	Component Thickness (inches)	Estimated Coverage of Region (%)	Unit Volume (yd^3/acre)	Total Volume of Component (yd^3)
7	Recreational/Habitat Buffer	1.7	Sand (Buffer)	30	100	4033	6,900
			Fine Gravel (Habitat & Armor)	6	58	468	800
			Sand (Chemical Isolation)	51	58	3977	6,800
	Submerged Macrophyte	12.9	Sand (Habitat)	12	100	1613	20,900
			Sand (Chemical Isolation)	51	100	6857	88,500
			Fine Gravel (Habitat & Armor)	6	100	807	10,500
	Fish Spawing Habitat	16.6	Fine Gravel (Habitat & Armor)	12	100	1613	26,800
			Sand (Chemical Isolation)	51	100	6857	113,900
	Benthic Substrate	6.4	Sand (Chemical Isolation)	57	100	7663	49,100

Volume Totals (yd^3):	Sand	Gravel
	286,100	38,100

7	Emergent Wetland	0.5	Sand (Buffer)	24	100	3227	1,700
			Wetland Substrate	12	26	419	300
			Fill	42	56	3162	1,600
			14" Dia. Stone (Armoring)	28	46	1732	900
			Sand (Habitat)	12	23	371	200
			Fine Gravel (Habitat & Armor)	12	92	1484	800
			Sand (Chemical Isolation)	51	92	6308	3,200

Volume Totals (yd^3):	Sand	Gravel	Stone	Various
	5,100	800	900	1,900

Grand Total:	Sand	Gravel	Stone	Various
	291,200	38,900	900	1,900

Notes:
Refer to Figures 4.43, 4.44 & 4.45 for areas and cap details associated with this alternative

APPENDIX E

FIGURES