

VILLAGE OF WEST SALEM



LA CROSSE COUNTY, WISCONSIN

WEST SALEM WATER QUALITY TRADING PLAN AMENDMENT

FEBRUARY 2021



2820 WALTON COMMONS WEST
SUITE 142
MADISON, WI 53718



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February 17, 2021

via email: benjamin.hartenbower@wisconsin.gov

Wisconsin Department of Natural Resources
Attn: Ben Hartenbower
1300 W. Clairemont Avenue
Eau Claire, WI 54701-6127

Dear Ben:

RE: Village of West Salem WPDES Permit No. WI-0020389
Water Quality Trading Plan Amendment – February 2021

On behalf of the Village of West Salem, we are submitting the Water Quality Trading Plan Amendment and required documents for your review. This plan addresses comments received from the Department regarding the Water Quality Trading Plan dated November 2020.

Approval of this Phosphorus Trading Plan is very important for the Village. Your timely approval of this plan is requested.

Please let me know if you have any questions concerning this submittal at 608-358-7140.

Sincerely,

A handwritten signature in black ink that reads "David K. Sauer". The signature is written in a cursive, flowing style.

David K. Sauer, P.E.
Cedar Corporation

CC: Teresa DeLong, Village of West Salem
Loren Schwier, Village of West Salem
Julia Stephenson, WDNR
Matt Claucherty, WDNR
Jim Leicht, Lake Neshonoc Protection and Rehabilitation District Chair
Joe Martirano, Cedar Corporation
Joe Pingel, Cedar Corporation

WEST SALEM WATER QUALITY TRADING PLAN AMENDMENT

PROJECT ID: W4896-0052

PREPARED FOR:

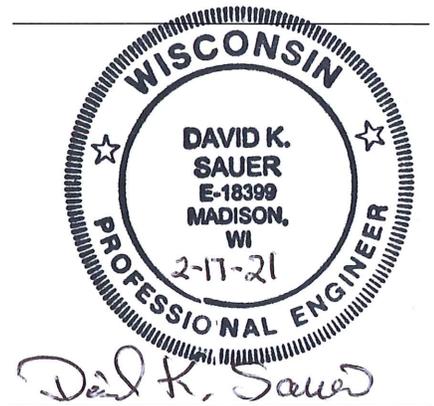
VILLAGE OF WEST SALEM

175 LEONARD STREET S.
WEST SALEM, WI 54669

PREPARED BY:

CEDAR CORPORATION

FEBRUARY 2021



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WEST SALEM WATER QUALITY TRADING PLAN AMENDMENT

FEBRUARY 2021

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1	Joe Martirano, Cedar Corporation
1	Joe Pingel, Cedar Corporation

WEST SALEM WATER QUALITY TRADING PLAN AMENDMENT

FEBRUARY 2021

PREPARED FOR:

VILLAGE OF WEST SALEM
175 LEONARD STREET S.
WEST SALEM, WI 54669

LA CROSSE COUNTY, WISCONSIN

PREPARED BY:

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PROJECT No. W4896-0052

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1 WATER QUALITY TRADING CHECKLIST

1.1 Water Quality Trading Checklist

On behalf of the Village of West Salem, a completed Water Quality Trading Checklist is located in Appendix A. The Village is proposing to complete sediment removal from Neshonoc Lake starting the Fall 2020 and completing the project in 2021.

1.2 Sediment Removal from Neshonoc Lake

The Village of West Salem (Village) and the Lake Neshonoc Protection and Rehabilitation District (LNPRD) have recognized the need to remove sediment from the Neshonoc Lake to restore the original constructed sediment trap and adjacent areas along the shoreland which were created when the lake was dredged in 2000. Neshonoc Lake has a total area of approximately 606 acres. The sediment trap is located on the inlet of the La Crosse River into the lake on the east end of the lake. Flow through the lake travels to the west where water flows through an existing dam structure located by Highway 16. Water continues to flow to the west/southwest where the West Salem wastewater treatment facility (WWTF) discharges into the river approximately 7,500 LF downstream from Neshonoc Lake. Land use in the watershed is predominately agricultural. Erosion along the streambanks of the La Crosse River contribute sediment loads to Neshonoc Lake.

The Village submitted a Facility Plan for the wastewater treatment facility and phosphorus compliance to the Wisconsin Department of Natural Resources (WDNR) on January 18, 2018. This plan identified non-point phosphorus trading using sediment removal from Neshonoc Lake as a compliance method to help meet proposed phosphorus limitations in the Village's WPDES Permit WI-0020389. The West Salem HUC 12 map is the Neshonoc Lake-La Crosse River watershed, number 070400060310. Refer to Appendixes B and C for the WDNR approval of the Facility Plan (dated March 20, 2018), excerpts from the Facility Plan which provide detailed phosphorus and flow information and the HUC 12 map for the La Crosse River. Appendix D contains the WDNR submittal for the Final Compliance Alternative Plan for Phosphorus and the Notice of Intent to Conduct Water Quality Trading.

The Village has a signed contract to hydraulically dredge 400,000 CY of sediment from Neshonoc Lake. Depths of sediment removal for the project range from 14' at the sediment trap area where the La Crosse River enters the lake to 6' or 8' in other areas of the lake along the south shoreline. In the calculation of the impact of this sediment column and phosphorus content of the sediment on the water quality phosphorus content, the Wisconsin Department of Natural Resources has provided guidance that only the top 1' of sediment is active in the release of phosphorus. In addition, based on other published information sited below, an average mobile phosphorus content for current conditions has been assumed to 41% for this project. The references sited show mobile phosphorus to be as high as 60 - 61 percent and as low as 13%.

Author(s), Citation	Mobile P (% of Total P)
Rydin C (1999)	36%
Randall MC, Carling GT, Dastrup DB, Miller T, Nelson ST, Rey KA, et al. (2019)	41 - 61%
Kapanen G (2012)	13 - 60%

The area of sediment removal from Neshonoc Lake for the 400,000 CY is approximately 37 acres. See Appendix L Map. Phosphorus content of the sediment was initially found to be 567 mg/kg based on 6 samples collected May 2019. These samples represented a composite of samples taken at various depths. Additional information from the collected soil samples included that over 72% of the sediment falls within the fine sand material classification. This leads to the fact that most of the phosphorus will be in the orthophosphate form since there is low organic content. This data is also attached. Additional sediment samples were taken in September 2020. See attached calculations and the lab phosphorus test results from the UW Soils Laboratory located in Appendix M. This does not account for phosphorus content of the water from the lake that will be hydraulically pumped from the lake during the dredging operation. This would add additional phosphorus removal however would be difficult to quantify.

Dredge water and dredge sediment will be pumped to an area adjacent to the lake referred to as the BOWL disposal area. Following settlement of the material from the water, the dredge water will be returned to the lake via an existing outfall structure originally used in the 2000 dredge project. Refer to Appendix F for the dredge material disposal area and related geotechnical information.

We have stated that it is a well know phenomenon in the hypolimnion of lakes that there is a release of phosphorus when the sediment-water interface become anoxic. References that support this include a text book titled "Wetlands" by William Mitsch and James Gosselink, Chapter 5, technical papers titled, "Potential Availability of Sedimentary Phosphorus to Sediment Resuspension in Florida Bay", by Zhang, Fischer and Ortner, Copyright 2004 by the American Geophysical Union and "Relating Sediment Phosphorus mobility to seasonal and dial redox fluctuations at the sediment water interface in a eutrophic freshwater lake", by Smith, Watzin and Druschel, Copyright 2011, Association for the Science of Limnology and Oceanography, Inc. These references state that "even in oxygenated bottom waters, a layer of oxic surface sediments is always buried by setting particles, eventually becomes anoxic and thereby releases reductant-soluble phosphorus" and "anoxic conditions promote the reductive dissolution of insoluble Fe Oxide minerals to soluble FE II, resulting in phosphorus release from the surface into the surrounding water". Neshonoc Lake sediment phosphorus concentrations as high as 1,900 mg/kg were documented in September 2020. This compares to some background

sediment phosphorus concentrations as low as 100 mg/kg also documented in September 2020. We believe these elevated phosphorus concentrations supports the belief that anoxic conditions do exist in the lake.

The accumulation of sediment and phosphorus within the lake is known and the above references document that this phosphorus is released to the water column. Flux of phosphorus release will be lower following sediment removal. There will be lower sediment phosphorus content and a smaller area of sediment deposit (sediment trap area) within the lake than current conditions. Further detailed discussion about phosphorus flux rates is included in Appendix E along with phosphorus calculations. Discussion concerning other potential trading partners is also included in Appendix E.

2 STANDARDS, PLAN APPROVALS, EASEMENTS

2.1 Standards and Plan Approvals

The Lake Neshonoc sediment removal project has been approved by WDNR with the issuance of the Chapter 30 permit, dated December 13, 2019 and the U.S. Army Corps of Engineers approval dated December 27, 2019 to discharge return water into Neshonoc Lake. See Appendixes G and H. As stated before, the removed sediment will be disposed of in an existing sediment disposal area that was approved when the lake was first dredged in 2000. This area is located southeast of and adjacent to the lake. The disposal area is now owned by the Village as La Crosse County has recently deeded this property to the Village. The Village is planning to maintain this area going forward.

The sediment disposal area is identified in detail with several plan sheets included in Appendix K. The disposal area (BOWL) is approximately 40 acres in area of which the north section will receive the hydraulic dredge material. From this section the material will dewater with liquid drainage allowed to flow to the south end of the BOWL which has a water surface and a water control structure which drains water after settling back to Neshonoc Lake. Specific reference is made to sheet 5 of 22 of the plans in Appendix K. All removed sediment will be retained within the BOWL area. Erosion control for the BOWL area has been proposed by the contractor (J. F. Brennan) and approved by Cedar Corporation. This plan is attached and is added by attachment to Appendix K.

2.2 Easements

Neshonoc Lake is on land owned by La Crosse County. To complete this project, the Village has obtained a construction easement from the County to complete this project. A copy of the easement from La Crosse County is located in Appendix I.

3 WATER QUALITY TRADE AGREEMENT

3.1 General Information

The water quality trade agreement between the Village of West Salem, La Crosse County and the Lake Neshonoc Protection and Rehabilitation District (District) was signed in January 2020. La Crosse County legally owns the land under the lake since the lake was created by the Neshonoc Dam. The County has deeded to the Village of West Salem the dredge BOWL land area which will be used to contain the dredge material removed from the lake. The Village of West Salem has taken the lead on preparing the dredge plans and the calculation of available phosphorus credits which are to be used by the Village to help comply with phosphorus limitations at the Village's wastewater treatment facility (WWTF). The District is supporting the lake dredge to help restore, protect and rehabilitate the lake. The agreement outlines several items between the Village, County and the District. One item to note is that the Village Sewer Utility and the Lake District will provide initial funding for the project. La Crosse County will provide no funding for the project. Phosphorus credits from the dredging project will be shared between the Village and the Lake District based on the percentage of funds they contribute to the final cost of the project.

The signed agreement between the Village, County and the Lake District is included in Appendix J.

3.2 Plans for the Lake Neshonoc Sediment Removal Project

The approved plans for the project are included in Appendix K. Sediment removal areas were determined following a May 2019 bathymetric survey of the lake. Due to bid costs, the project was reduced to a dredge volume of approximately 400,000 CY. The 400,000 CY volume will be taken from the sediment trap area, the south fish habitat area and from an area along the south shore/boat landing area. Total estimated area where sediment is planned to be removed is 37 acres (See Appendix L). Exact areas of sediment removal will be documented during construction. A pre-construction bathymetric survey of the lake was completed to determine if any major changes have occurred since May 2019. A post-construction bathymetric survey of the lake will also be completed when construction is completed in 2021. The two bathymetric surveys will be used to determine the quantity of sediment removed from the lake and the area of the removed sediment.

To aid in determining final phosphorus credits, additional phosphorus sediment sampling will be completed with the post-bathymetric lake survey in 2021.

The pre-dredge bathometric survey and sediment sampling was completed on September 10, 2020. Start of hydraulic dredging was October 2020 and will continue until freezing conditions. Work will then be suspended for the winter. Start of dredging for 2021 will be soon after May 15, 2021. Dredging will continue until the project is completed. A total of approximately 78 days of dredging is expected by the contractor given what is known today. This may change once dredge production rates become more established. Dredging operations are expected to be completed by approximately August 1, 2021 at which time the phosphorus credits will be available for the Village.

Phosphorus credits will be dependent upon the actual areas of the lake that sediment is removed which will be documented daily by the contractor. Phosphorus credits have been calculated based on the sediment phosphorus test results and the volume of sediment removed (area of the sediment removed x a 1' depth as recommended by WDNR). Total area to be dredged is planned to be 37 acres. This includes the sediment trap area, the South Fish Habitat area and the south shore boat landing area.

The area of the lake which is planned to have dredging operations is identified in in Appendix L. The actual areas will be dependent upon the actual amount of sediment removed in each of the planned dredge areas. At this time, the calculation of credits in Appendix E, assumes an area of 37 acres.

3.3 Long Term Maintenance

The Village and the Lake District will assume responsibility for long term maintenance of the lake and the BOWL sediment disposal areas. The Lake District and the Village plan to look into future stream bank stabilization projects along the La Crosse River upstream from Neshonoc Lake. These projects will help minimize the future release of sediment and phosphorus into the lake and improve water quality. This is a long-term plan for the Village and Lake District.

3.4 Village WPDES Discharge Permit

The current Village WPDES Discharge Permit, WI-0020389, expired June 30, 2020. Reissuance of the permit will require the recognition of the Village's Water Quality Trading Plan for non-point phosphorus reductions resulting from the proposed sediment removal from Neshonoc Lake. The Village is also upgrading the WWTF starting in 2020. This upgrade includes the addition of a biological phosphorus removal system which will supplement the existing chemical addition processes for phosphorus reduction at the WWTF. The Village's plan to achieve compliance with the proposed phosphorus limitations to complete both the Neshonoc Lake sediment removal (non-point phosphorus credits) and the upgrades at the WWTF.

In response to WDNR comments related to water quality trading, we offer the following. The Facilities Plan was approved by WDNR in March 2018. Phosphorus credits were calculated at that time based on historical flow and phosphorus concentrations discharged at the WWTF. The phosphorus compliance calculations included in Appendix E of the Water Quality Trading Plan

were reflective of what we now believe the WWTF will be discharging after completion of the WWTF upgrade which includes a new biological phosphorus removal system in addition to the existing chemical phosphorus removal system.

3.5 Phosphorus Testing of Sediment

The proposed testing of the phosphorus content of the removed sediment includes the collection of sediment samples in conjunction with the pre-construction bathymetric survey of the areas of the lake which will have sediment removed. Sediment samples were taken of the top 1 foot of sediment in the areas of the lake where sediment will be removed. Some additional sediment samples were also taken about 8- or 9-foot depth. These samples were sent to the U.W. Soils and Forage Lab in Marshfield for sediment and phosphorus testing. Test results were received from the lab on September 30, 2020 and are included in Appendix M. This information will be used in conjunction with the bathymetric survey information to calculate the mass of phosphorus removed.

As recommended in WDNR comments dated July 2020, additional sediment samples will be taken of the remaining sediment in the areas of the lake which were dredged during the post bathymetric survey. This is projected to take place in about August 2021 when the dredge operations are planned to be completed.

3.6 Habitat Restoration

The lake dredging project that was completed in 2000 for Neshonoc Lake included several fish habitat structures along the south shore of the lake. These structures are still in place and their condition is believed to be good today. During the sediment removal process, we plan to verify the good condition of these fish habitat structures and make improvements to these existing structures or construct additional fish habitat structures if necessary. The Lake District is committed to include this work scope using local support resources including the La Crosse County Land Conservation Services group.

As part of the 2000 Neshonoc Lake Dredge project, several fish crib structures were built and set in place along the south shore of the lake. These extended between the West Fishery Habitat and the East Fishery Habitat areas as shown on sheet 7R of 22 of the plans located in Appendix K. These structures will be checked and upgraded as needed as part of the proposed dredging project at this time. It is understood that these fish cribs were constructed with wooden slats back in 2000 with the help of WDNR staff.

The Lake District is planning to construct and install 6 additional fish cribs, each 3' high in the South Fish Habitat area and 4 additional fish cribs, each 6' high in the sediment trap area of the lake. A map showing the location of these additional fish cribs is located in Appendix N.

APPENDIXES

- Appendix A: Water Quality Tracking Checklist - Form 8700-nnn**
- Appendix B: WDNR Facility Plan Information, March 20, 2018**
- Appendix C: Village of West Salem HUC 12 Map**
- Appendix D: July 1, 2019 Final Compliance Plan for Phosphorus and Notice of Intent to Conduct Water Quality Trading**
- Appendix E: Village Phosphorus Compliance Calculations, February 2021**
- Appendix F: Geotechnical Information and Dredge Material Disposal Area**
- Appendix G: WDNR Dredge Permit Approval Issued December 13, 2019**
- Appendix H: US Army COE Approval, December 27, 2019**
- Appendix I: La Crosse County Easement Approval, September 23, 2019**
- Appendix J: Phosphorus Credit Agreement between La Crosse County, Village of West Salem, and Lake Neshonoc Protection and Rehabilitation District**
- Appendix K: Plans for the Lake Neshonoc Sediment Removal Project**
- Appendix L: Sediment Removal Areas, Sediment Sample Locations**
- Appendix M: Laboratory Test Results for Sediment Testing**
- Appendix N: Habitat Improvements Map**

Appendix A: Water Quality Tracking Checklist – Form 8700-nnn

Appendix C. Water Quality Trading Checklist

State of Wisconsin
 Department of Natural Resources
 101 South Webster Street
 Madison, WI 53707

Water Quality Trading Checklist
 Form 8700-nnn (R10/12)

Notice: Any personally identifiable information submitted on this form will be used for program purposes only, but is available for inspection and copying under Wisconsin's public records laws. This form should be completed by any permittee that intends to pursue pollutant trading as a method for complying with a permit limitation. Failure to complete this form would not result in penalties.

Applicant Information

Permittee Name Village of West Salem		Permit Number WI- 0020389	Facility Site Number	
Facility Address 900 West Avenue North		City West Salem	State WI	ZIP Code 54669
Project Contact Name(if applicable) Address Teresa DeLong, Vill. Adm. 175 Leonard Street S.		City West Salem	State WI	Zip Code 54669

Project Name

West Salem Water Quality Trading Plan		
Receiving Water Name La Crosse River	Parameter(s) being traded Phosphorus	HUC 12(s) 070400060310

Credit Generator Information

Credit generator type (check all that apply):

<input type="checkbox"/> Permitted Discharge (non-MS4)	<input type="checkbox"/> Non-permitted urban discharge
<input type="checkbox"/> Permitted MS4	<input type="checkbox"/> Agricultural nonpoint source discharge
<input type="checkbox"/> CAFOs	<input checked="" type="checkbox"/> Other- Specify: <u>Ag/Urban non-point source discharge</u>

Are any of the credit generators in a different HUC 12 than the applicant? Yes; HUC 12: _____
 No

Are any of the credit generators downstream of the applicant? Yes
 No

Was a broker/exchange be used to facilitate trade? Yes (include description and contact information in WQT plan)
 No

Point to Point Trades (Traditional Municipal/Industrial Discharge, MS4, CAFO):

Are each of the point sources identified in this section are in compliance with their WDPES permit requirements? Yes
 No **N/A**

Discharge Type	Permit Number	Name	Contact Information	Trade Agreement Number
<input type="checkbox"/> Traditional <input type="checkbox"/> MS4 <input type="checkbox"/> CAFO				
<input type="checkbox"/> Traditional <input type="checkbox"/> MS4 <input type="checkbox"/> CAFO				
<input type="checkbox"/> Traditional <input type="checkbox"/> MS4 <input type="checkbox"/> CAFO				

<input type="checkbox"/> Traditional <input type="checkbox"/> MS4 <input type="checkbox"/> CAFO				
<input type="checkbox"/> Traditional <input type="checkbox"/> MS4 <input type="checkbox"/> CAFO				

Does plan have a narrative that describes:			Plan Section
a. Summary of discharge and existing treatment including optimization	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Appendix B
b. Amount of credit being generated	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Appendix E
c. Timeline for credits and agreements	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Section 1.1
d. Method for quantifying credits	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Section 1.2
e. Tracking and verification procedures	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Section 3.2
f. Location of credit generator in proximity to receiving water and credit user	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Appendix C
g. Other: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Point to Nonpoint Trades (Non-permitted urban, agricultural, other):

Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input type="checkbox"/> Other				<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Only in part
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input checked="" type="checkbox"/> Other	Sediment Removal from Neshonoc Lake	Dredge Volume X Soil Phosphorus Test		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Only in part
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input type="checkbox"/> Other				<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Only in part
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input type="checkbox"/> Other				<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Only in part
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input type="checkbox"/> Other				<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Only in part
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input type="checkbox"/> Other				<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Only in part
<input type="checkbox"/> Urban NPS <input type="checkbox"/> Agricultural NPS <input type="checkbox"/> Other				<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Only in part

<input type="checkbox"/> Urban NPS			<input type="checkbox"/> Yes
<input type="checkbox"/> Agricultural NPS			<input type="checkbox"/> No
<input type="checkbox"/> Other			<input type="checkbox"/> Only in part

Does plan have a narrative that describes:			Plan Section
a. Description of existing land uses	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
b. Management practices used to generate credits	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
c. Amount of credit being generated	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
d. Description of applicable trade ratio per agreement/management practice	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
e. Location where credits will be generated	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
f. Timeline for credits and agreements	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
g. Method for quantifying credits	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
h. Tracking procedures	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
i. Conditions under which the management practices may be inspected	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
j. Reporting requirements should the management practice fail	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
k. Operation and maintenance plan for each management practice	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
l. Location of credit generator in proximity to receiving water and credit user	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
m. Practice registration documents, if available	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
n. History of project site(s)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
o. Other: _____	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

The preparer and owner certify all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer David K. Sauer, P.E. <i>David K. Sauer</i>	Date Signed 6-30-2020
--	---------------------------------

Authorized Representative Signature:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative <i>Teresa D. Dedmon</i>	Date Signed 6-30-2020
---	---------------------------------

NOTE: The *Authorized Representative* is someone who is authorized to sign all applications, reports or other information submitted to the DNR. This person may be; for a corporation, a responsible corporate officer including a president, secretary, treasurer, vice president or manager; and for a municipality, a ranking elected official; for a corporation or a municipality, another person authorized by one of those officers or officials and who has responsibility for the overall operation of the facility or activity regulated by the permit. This is the person to whom we will send information regarding the application, the draft permit and permit reissuance.

Appendix B: WDNR Facility Plan Information, March 20, 2018

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Scott Walker, Governor
Daniel L. Meyer, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711



March 20, 2018

Project No. S-2018-0038

CWF No. 4547-05

Ms. Teresa Schnitzler, Admin.
Village of West Salem
175 S. Leonard St.
West Salem, WI 54669

Subject: Facilities Planning Report Approval For Proposed Wastewater Treatment Facility Improvements --
Village of West Salem, Wisconsin

Dear Ms. Schnitzler:

The Department of Natural Resources (hereafter Department) has completed the review of the facilities planning report addressing the evaluation of wastewater treatment facility improvements for the Village of West Salem. The facilities planning report is hereby approved. The Department concurs in concept with the recommended planning alternative calling for various improvements to the existing wastewater treatment facility that will be implemented in two separate stages. The recommended near-term stage 1 improvements include construction of new anaerobic and anoxic treatment tanks for enhanced biological phosphorus reduction treatment capability, construction of a new influent flow splitter box structure upstream from the existing activated sludge process aeration basins, and installation of a new infrared heat treatment process for digested sludge volume reduction. The recommended future stage 2 improvements (projected to occur in approximately 5 - 10 years) include construction of two new additional activated sludge process aeration basins and construction of two new final clarifier tanks. The Village will also address compliance with the applicable water quality based phosphorus standards for continued effluent discharge to the La Crosse River in accordance with the schedules included in their WPDES discharge permit with primary focus on phosphorus water quality trading.

If you believe that you have a right to challenge this decision, you should know that the Wisconsin statutes, administrative rules and case law establish time periods within which requests to review Department decisions must be filed.

To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. All requests for contested case hearings must be made in accordance with s. NR 2.05(5), Wis. Adm. Code, and served on the Secretary in accordance with section s. NR 2.03, Wis. Adm. Code. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the time period for filing a petition for judicial review.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis. Stats., you must file your petition with the appropriate circuit court and serve the petition on the Department within the prescribed time period. A petition for judicial review must name the Department of Natural Resources as the respondent.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
For the Secretary

A handwritten signature in black ink that reads 'Jason R. Knutson'.

Jason Knutson
Wastewater Section Chief
Bureau of Water Quality

A handwritten signature in black ink that reads 'Stephen J. Smith'.

Stephen J. Smith, P.E.
Wastewater Section
Bureau of Water Quality

Cc: Mr. David Sauer, P.E. -- Cedar Corporation, 2820 Walton Commons W., Suite 142, Madison, WI 53718
Julla Stephenson -- La Crosse Service Center (e-copy)
Kimberly Leizinger -- CF/2 (e-copy)

Wastewater Treatment Facility and Phosphorus Facility Plan

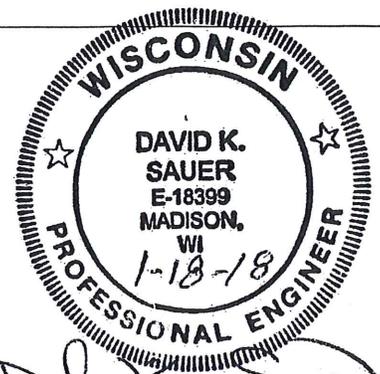
Project ID: 4896-0038

Prepared for
Village of West Salem

175 S. Leonard Street
West Salem, WI 54669

Prepared by
Cedar Corporation

January 2018



David K. Sauer

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5.1.5 Non-Point Phosphorus Trading

Non-point phosphorus trading is applicable when a project is completed that reduces sediment and soil phosphorus entering a receiving water. Non-point phosphorus trading is an option for the Village of West Salem to pursue in order to satisfy the proposed discharge limit for total phosphorus. Potential upgrades such as stream bank stabilization, Neshonoc Lake sediment removal, grade stabilization structures, grassed buffer strips, and other miscellaneous erosion control practices are eligible projects to receive phosphorus credits.

For the Village, Neshonoc Lake sediment removal and streambank stabilization projects appear to be especially promising. It is expected that the Lake has large sediment deposits, which would likely contain high amounts of phosphorus. For streambank stabilization projects, the Village has the La Crosse River, the Neshonoc Creek, and the Larson Coulee Creek upstream of the WWTF discharge and within the WWTF's HUC12. Trading within the HUC12 is the best option for acquiring trading credits, as projects in these boundaries will directly impact the water quality in the river as it flows past the WWTF. The HUC12 map for the Village is included in this section as Figure 4-2.

Other non-point phosphorus reduction projects such as grade stabilization structures, grassed buffer strips, and utilization of cover crops may be worthwhile if the Village is able to find willing landowner partners. These partners must be willing to work with the Village and County to implement the improvements on their land and also commit to maintain the improvements on a long-term basis.

One benefit of the non-point trading option is that it may be pursued in conjunction with upgrades at the WWTF. Any credits for non-point phosphorus projects would reduce the operating costs of phosphorus removal at the WWTF, and may allow for a relaxation of the final effluent TP limit if given WDNR approval.

In order to pursue non-point phosphorus trading, the Village would need to begin the following general process:

- Submit this facility plan to the WDNR for review and approval
- Prepare a phosphorus trading plan and submit to the WDNR for review and approval
- Complete non-point phosphorus trading projects each year and submit an annual documentation report to WDNR that shows the work done and the calculated amount of phosphorus credits.
- Each year's phosphorus trading credits would be used to reduce the amount of required phosphorus reductions at the WWTF. This work could take place for as many years as needed.

5.1.5.1 Phosphorus Loading in the La Crosse River

The Wisconsin Department of Natural Resources (WDNR) has assembled information (PRESTO) which shows current phosphorus loading in the La Crosse River at the location where the Village of West Salem discharges treated wastewater. Based on data collected from 2009 – 2011, the current total phosphorus load at this point is 172,933 lbs./year. The average in-stream phosphorus concentration per WDNR data collected in 2013 is listed below:

	La Crosse River at CTH J	Neshonoc Lake-Deep Hole
Phosphorus Mean (mg/L)	0.143	0.165

The Village's phosphorus load contribution to the river from the WWTF is approximately 727 lbs./year (based on effluent data from 2012 – 2016), which corresponds to an average phosphorus concentration of 0.725 mg/L at an average effluent flow of 0.329 MGD. Based on these numbers, the Village is currently contributing approximately 0.42% of the total phosphorus load that currently exists in the river. This is a very low amount of phosphorus in the La Crosse River. The majority of the instream phosphorus is from the numerous non-point sources in the watershed.

5.1.5.2 La Crosse River Watershed

The West Salem WWTF discharges treated wastewater to the La Crosse River at a point approximately 7,500 linear feet (LF) downstream from Neshonoc Lake, which is partially located within the Village boundaries. This discharge location is in the NE ¼ Section 33, T17N, R6W in La Crosse County, Wisconsin. Other approximate references to existing land features include the following:

- 900 LF downstream from where Larson Coulee Creek drains into the La Crosse River
- 6,000 LF downstream from where Neshonoc Creek drains into the La Crosse River
- 2.1 miles upstream from where Gill Coulee Creek drains into the La Crosse River
- 5.4 miles upstream from where Bostwick Creek drains into the La Crosse River

The size of the watershed upstream from the WWTF discharge point is approximately 391 square miles, or 250,000 acres. The entire drainage basin can be divided into two sub-drainage basins that will be referenced in this report. The first sub-basin is defined as the fraction of the HUC12 sub-watershed which contains the WWTF discharge point that is found upstream of the WWTF discharge point. The name of this HUC12 is the Neshonoc Creek, and is part of the Lower La Crosse River HUC10. The ID for the Neshonoc Creek HUC12 is 070400060402. For the purposes of this report, this sub-basin will be referred to as the Upper Neshonoc Creek sub-basin.

The second sub-basin is defined as the rest of the upstream watershed that is not located the HUC12 of the WWTF discharge. This sub-basin encompasses many HUC12 sub-watersheds, and will henceforth be referred to as the Upstream La Crosse River basin.

Contribution of flow for the two sub-basins is dependent upon the areas of each sub-basin. The Upstream La Crosse River basin covers approximately 94.7% of the total drainage basin area. The Upper Neshonoc Creek sub-basin encompasses the remaining 5.3% of the total drainage basin area.

There have been initial conversations with La Crosse County Land Conservation Service about phosphorus testing on the various receiving waters. Figure 5-1 shows the locations of current county-wide sampling locations. Figure 5-2 shows the HUC12 map for the Village of West Salem. It is noted that Neshonoc Lake is located just upstream from the Village's WWTF.

5.1.5.3 Water Quality Trading Option and Calculations

The following are calculations for the amount of phosphorus reductions needed if the water quality trading option is used. The goal of this option is to reduce the Village WWTF's phosphorus load by the calculated amount through the reduction of non-point phosphorus inputs. For this evaluation, an effluent limit of 0.075 mg/L will be used as the basis for analysis, since this is the effluent phosphorus concentration for the 0.4 lbs./day limit at the WWTF design flow.

Current Discharge P Load from Village

$$Q_{\text{design}} = 0.450 \text{ MGD (WWTF average design flow)}$$

$$Q_{\text{current}} = 0.290 \text{ MGD (January 2012 – December 2016 average flow)}$$

$$\text{Effluent TP} = 0.725 \text{ mg/L (January 2012 – December 2016 average concentration)}$$

$$\text{P Load @ } Q_{\text{design}} = (0.450) * (0.725) * (8.34) * (365) = 994 \text{ lb.-P/yr.}$$

$$\text{P Load @ } Q_{\text{current}} = (0.290) * (0.725) * (8.34) * (365) = 640 \text{ lb.-P/yr.}$$

Village's P Load at Discharge Limit of 0.075 mg/L

$$\text{P Load @ } Q_{\text{design}} = (0.450) * (0.075) * (8.34) * (365) = 103 \text{ lb.-P/yr.}$$

$$\text{P Load @ } Q_{\text{current}} = (0.290) * (0.075) * (8.34) * (365) = 67 \text{ lb.-P/yr.}$$

Required P Load Reduction at WWTF

$$\text{At } Q_{\text{design}}, \text{ P load reduction} = 994 - 103 = 891 \text{ lb.-P/yr.}$$

$$\text{At } Q_{\text{current}}, \text{ P load reduction} = 640 - 67 = 573 \text{ lb.-P/yr.}$$

For the water quality trading option, there is a trading ratio between 2:1 and 3:1 which is required by the WDNR. This means that for every pound of required phosphorus reduction at the WWTF, there must be 2 to 3 pounds of non-point phosphorus reduction which will be traded for. Example tables are shown below which show the required non-point P reduction loads.

Non-point phosphorus reduction and land use for 3:1 Trading Ratio

	P Reduction at WWTF (lbs./yr.)	Non-Point P Reduction at 3:1 ratio (lbs./yr.)
Design Flow (0.450 MGD)	891	2,673
Current Flow (0.290 MGD)	573	1,719

Non-point phosphorus reduction for 2:1 Trading Ratio

	P Reduction at WWTF (lbs./yr.)	Non-Point P Reduction at 2:1 ratio (lbs./yr.)
Design Flow (0.450 MGD)	891	1,782
Current Flow (0.290 MGD)	673	1,146

These calculations show that the Village of West Salem would need to acquire at least 1,304 lb.-P/yr. of phosphorus trading credits in order to achieve compliance solely through this method. If credits are acquired through projects at the 3:1 rate, the number of required credits would increase.

Projected costs of projects are included in Section 6 of this facilities plan, and are also contained in Appendix B.

5.1.5.6 Status of Initial Non-Point Trading Projects

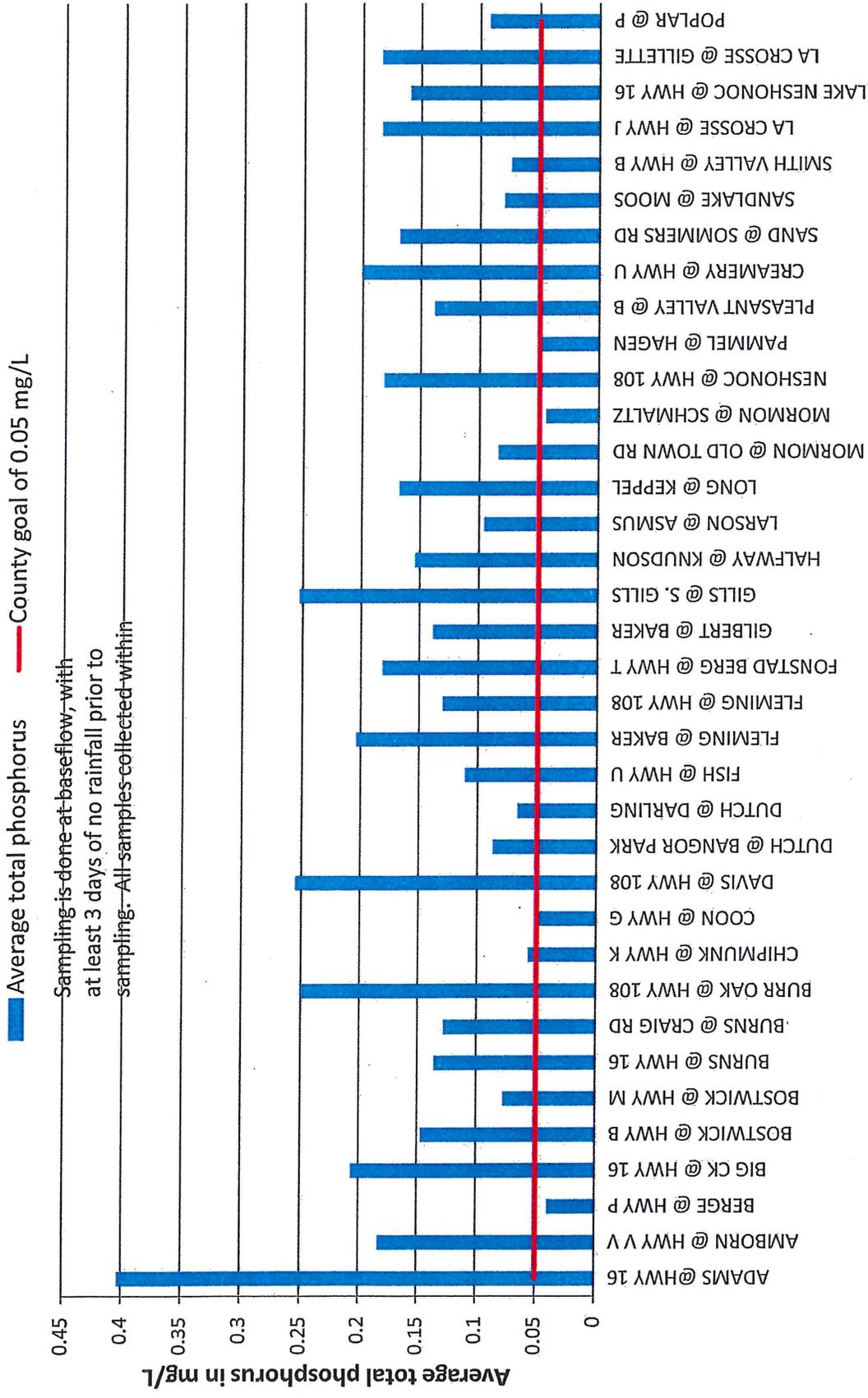
Initial efforts have been completed to date to pursue the water quality phosphorus trading option for the Village of West Salem. Meetings have occurred with Greg Stangl, La Crosse County Land Conservation Office and who has provided some phosphorus monitoring information collected by the County. Several soil samples were collected in 2016 along Neshonoc Creek, Neshonoc Lake, Adams Creek, Burns Creek and Dutch Creek and have been tested for phosphorus concentrations. Phosphorus test results for Neshonoc Lake showed an average phosphorus concentration of 450 mg/kg.

Neshonoc Lake had sediment removal in the 2000/2001 time-period. It is estimated that approximately 10,000 CY of sediment enters Neshonoc Lake each year. A potential future lake dredging project could produce some significant phosphorus credits for the village. This would be dependent upon the phosphorus content of the sediment, the volume of sediment removed and the trading ratio which would be approved for such a project by WDNR.

Based on 2016 soil phosphorus test results for Neshonoc, if the soil phosphorus is between 225 and 450 mg/kg, a 1,000 CY of sediment removal would contain 607-1,214 lb. phosphorus. At a trading ratio of 4:1 which is very conservative, the actual phosphorus credit for the WWTF would be approximately 152-304 phosphorus lbs. At design flow rates, the Village needs to reduce phosphorus by 891 lbs. at the WWTF. To get this amount of phosphorus credits, the Village would need to remove approximately 60,000 to 120,000 CY of sediment once every 20 years.

It appears the best trading option is for Neshonoc Lake dredging. Estimated volume of dredging is 200,000 CY to 400,000 CY which should provide the amount of phosphorus credits at the WWTF to comply with the 0.1 mg/l future limitation. Estimated cost for lake dredging is in the \$5.00 to \$8.00 per CY range depending upon whether the project size is 200,000 CY or 400,000 CY. Total cost would be then in the \$1 million to \$2 million range. The sewer utility would contribute some funding toward this work with the rest of the funding coming from Lake Association and La Crosse County. Details for this trading need to be worked out.

Long-term average total phosphorus levels in La Crosse County streams (1998-2011)





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National Water Information System: Web Interface

USGS Water Resources

Data Category:

Surface Water ▼

Geographic Area:

Wisconsin ▼

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USGS Surface-Water Annual Statistics for Wisconsin

The statistics generated from this site are based on approved daily-mean data and may not match those published by the USGS in official publications. The user is responsible for assessment and use of statistics from this site. For more details on why the statistics may not match, [click here](#).

USGS 05383000 LA CROSSE RIVER NEAR WEST SALEM, WI

Available data for this site

Time-series: Annual statistics ▼

GO

La Crosse County, Wisconsin
 Hydrologic Unit Code 07040006
 Latitude 43°54'05", Longitude 91°07'05" NAD27
 Drainage area 398.00 square miles
 Gage datum 668.0 feet above NGVD29

Output formats

[HTML table of all data](#)

[Tab-separated data](#)

[Reselect output format](#)

Water Year	00060, Discharge, cubic feet per second
Period-of-record for statistical calculation restricted by user	
1951	272.7
1952	317.5
1953	289.3
1954	265.3
1955	283.6
1956	243.5
1957	199.2
1958	182.0
1959	259.6
1960	294.6

Water Year	00060, Discharge, cubic feet per second
1961	275.9
1962	275.2
1963	246.4
1964	216.6
1965	326.8
1966	332.7
1967	294.8
1968	280.0
1969	306.9
1970	272.0
** No Incomplete data have been used for statistical calculation	

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Title: Surface Water data for Wisconsin: USGS Surface-Water Annual Statistics

URL: <https://waterdata.usgs.gov/wi/nwis/annual?>



Page Contact Information: [Wisconsin Water Data Support Team](#)

Page Last Modified: 2017-02-28 13:25:00 EST

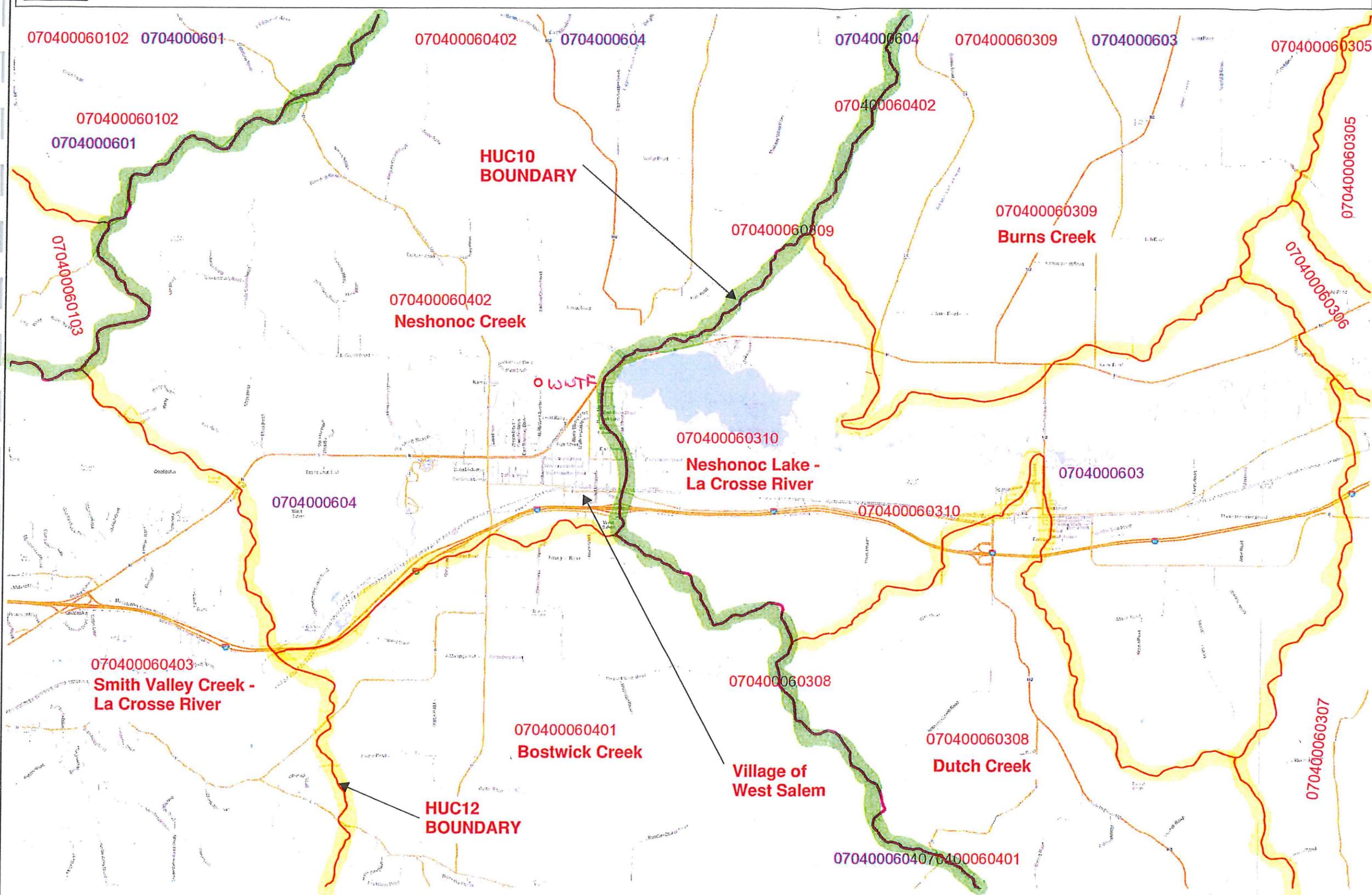
0.38 0.31 sdww01

Average = 272 cfs

Appendix C: Village of West Salem HUC 12 Map



Figure 5-2: Village of West Salem HUC12 Map



Legend

- 12-digit HUCs (Subwatersheds)
- 10-digit HUCs (Watersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads**
- Interstate Highway
- State Highway
- US Highway
- County and Local Roads**
- County HWY
- Local Road
- Railroads
- Tribal Lands

2.0 0 1.00 2.0
 Miles
 NAD_1983_HARN_Wisconsin_TM
 © Latitude Geographics Group Ltd.
 1:63,360

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

Notes

**Appendix D: July 1, 2019 Final Compliance Plan for Phosphorus and
Notice of Intent to Conduct Water Quality Trading**

July 1, 2019

COPY

Julia A. Stephenson
WDNR - Bureau of Water Quality
3550 Mormon Coulee Road
La Crosse, WI 54601

Dear Julia:

RE: Village of West Salem
WPDES Permit No. WI-0020389
Final Compliance Alternatives Plan for Phosphorus

On behalf of the Village of West Salem, we are submitting several documents which we believe complies with the permit required Final Compliance Alternatives Plan for Phosphorus which is required July 1, 2019. Much of this information was submitted with the Wastewater Treatment Facility and Phosphorus Facility Plan dated January 2018 which was approved by the Wisconsin Department of Natural Resources on March 20, 2018. The final compliance alternatives plan was to treat for phosphorus at the WWTF using a new biological phosphorus removal system along with FeCl chemical addition and also to complete water quality trading for all remaining phosphorus credits by completing a sediment removal (dredging) of Neshonoc Lake. To complete these projects, we are currently in the process of designing the WWTF upgrades for construction in 2020 and are collecting the required information for the Chapter 30 Dredging Application for Neshonoc Lake. Plans and specifications for the WWTF upgrade are planned to be submitted to the WDNR by September 30, 2019 with construction to begin in 2020. The Chapter 30 Dredging Application is planned to be submitted to WDNR in August 2019 with construction to begin in Summer 2020.

We have included several documents with this submittal and have listed these documents as follows:

- Select pages of the Wastewater Treatment Facility and Phosphorus Facility Plan dated January 2018 related to phosphorus trading to secure non-point source phosphorus credits for the WWTF.
- The WDNR approval letter of the Facility Plan dated March 20, 2018 by Jason Knutson, Wastewater Section Chief, WDNR.
- Notice of Intent to Conduct Water Quality Trading dated July 1, 2019.
- Neshonoc Lake Dredging Project Pre-Application to Camille Bruhn, WDNR.
- Neshonoc Lake Engineering Services document outlining our work scope and schedule to the Village.
- Phosphorus testing results for an additional 6 sample borings from Neshonoc Lake dated May 14, 2019.

We look forward to completing these projects which will allow us to comply with the new phosphorus water quality based effluent limits. Should you have any additional questions, please contact me directly at 608-237-5831 or email at dave.sauer@cedarcorp.com.

Sincerely,

A handwritten signature in black ink that reads "Dave Sauer". The signature is fluid and cursive, with a large loop at the end of the last name.

Dave Sauer, P.E.
Cedar Corporation

CC: Teresa Schnitzler, Village of West Salem
Loren Schwier, Village of West Salem
Joe Martirano, Cedar Corporation

Notice: Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name Village of West Salem		Permit Number WI- -0020389-09-0	Facility Site Number	
Facility Address 900 West Avenue North		City West Salem	State WI	ZIP Code 54669
Project Contact Name (if applicable) Dave Sauer	Address 2820 Walton Commons West, 142	City Madison	State WI	ZIP Code 53718
Project Name Village of West Salem - Water Quality Trading				
Receiving Water Name La Crosse River	Parameter(s) being traded Phosphorus	HUC 12(s) 070400060402		

Is the permittee in a point or nonpoint source dominated watershed? Point source dominated
 (See PRESTO results - <http://dnr.wi.gov/topic/surfacewater/presto.html>) Nonpoint source dominated

Credit Generator Information

Credit generator type (select all that apply):
 Permitted Discharge (non-MS4/CAFO) Urban nonpoint source discharge
 Permitted MS4 Agricultural nonpoint source discharge
 Permitted CAFO Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant? Yes; HUC 12: 070400060310
 No
 Unsure

Are any of the credit generators downstream of the applicant? Yes
 No
 Unsure

Will a broker/exchange be used to facilitate trade? Yes; Name: _____
 No
 Unsure

Point to Point Trades (Traditional Municipal / Industrial Discharge, MS4, CAFO)

Discharge Type	Permit Number	Name	Contact Address	Is the point source credit generator currently in compliance with their permit requirements?
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure

Point to Nonpoint Trades (Non-permitted Agricultural, Non-Permitted Urban, etc.)

List the practices that will be used to generate credits:

Dredging of Neshonoc Lake

Method for quantifying credits generated: Monitoring
 Modeling, Names: _____
 Other: Soil phosphorus content _____

Projected date credits will be available: 07/01/2020

The preparer certifies all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer

D. K. Sawe

Date Signed

7-1-2019

Authorized Representative Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative

Nancy A. Schmitzler

Date Signed

July 1, 2019



engineering | architecture | environmental | surveying
landscape architecture | planning | economic development

MEMO

1695 Bellevue Street
Green Bay, WI 54311-4251
920-491-9081
800-472-7372
FAX 920-491-9020
www.cedarcorp.com

DATE: May 8, 2019
TO: Camille Bruhn, WI DNR
FROM: Kevin Bartel, Cedar Corporation
SUBJECT: Lake Neshonoc Dredging Project Pre-Application

Dear Ms. Camille Bruhn,

This letter summarizes the completion of the six required soil borings constructed in the lakebed of Lake Neshonoc in West Salem, WI. These borings were constructed in accordance with the approval correspondence/memorandum from February 20, 2019 and were completed on April 25, 2019.

The work completed at the site included analysis for total organic carbon of thirty-one total samples (one sample for each two-foot interval of each boring location) and grain size analysis of eleven total samples (one sample adjusted to match the different soil strata encountered in each boring, with a minimum of one sample per boring location). The samples were properly preserved on ice and shipped in laboratory supplied coolers for analysis. Samples were individual logged on a chain of custody (CoC) and shipped to a WDNR certified laboratory (Test America, Inc. University Park, IL DNR Cert. 999580010) The full laboratory analytical reports are attached, and the data are summarized in Table 1.

Cedar Corporation has completed the work approved by the DNR for the Lake Neshonoc dredging project pre-application. Cedar Corporation will await the WI DNRs recommendation for additional analyses of the Lake Neshonoc lake sediment borings as indicated in the February 20, 2019 memo from Ryan Pappas (see attached).

If you have any questions, please feel free to call me or Dave Sauer at 715-235-9081.

Sincerely,
CEDAR CORPORATION

Kevin Bartel
Staff Geologist

cc. Ryan Pappas – WI DNR
Aaron Kent – WI DNR
Dave Sauer – Cedar Corporation

Appendix E: Village Phosphorus Compliance Calculations, February 2021

Village of West Salem
Lake Neshonoc Sediment Removal Project
Phosphorus Calculations for Removed Sediment
Supplemental Data Information in Response to December 16, 2020 Review Comments by WDNR
February 2021

1. I have updated the calculations to show dry weight phosphorus test results and converting the wet bulk densities to dry weight bulk densities. This assumes several variables including phosphorus flux rates to the water column.
2. I have returned to the literature studies to understand the basis of phosphorus flux rates from accumulated sediments in water. Three articles stand out to me.

The M.C. Randall 2019 study noted that Ca-associated phosphorus may act as a permanent sink for phosphorus and Fe-bound phosphorus is mobile and may be released to the water under anoxic conditions which develop locally near the sediment-water interface during summer when microbial activity is high. This study was for a lake in Utah with a lake depth of 10' to 20'. Mobility percent was estimated at 41% to 61%.

The G. Kapanen 2012 study also noted the various phosphorus complexes found in Lake Peipsi located on Eastern Europe which were deposited over a 100-years of time. This study reported a range of 13% to 60% of total phosphorus contained in the sediment is mobilized during accumulation and could be exported to the overlying water.

The E. Rydin 2000 study also noted the Na and Ca-associated phosphorus and Fe-phosphorus forms found in Lake Erken located in Sweden and looked at the mobility of these phosphorus forms. They reported that redox potential declined with sediment depth in the lake which produces a more anoxic condition. Under these anoxic conditions, it is possible to mobilize the loosely bound phosphorus. Study tests showed that about 60% of the extractable organic phosphorus was mobile.

3. I next went back to the sediment samples collected in May 2019 from Neshonoc Lake. These samples were collected and tested for minerals and grain size. Borings B-2, B-3 and B-4 were taken from the sediment trap area. Average grain size showed the deposited material to be fine sand with silt and Fe tests were 3,638 mg/kg and average Ca tests were 0.103%. Compare this to boring B-1 which showed grain size material to be mostly silt and clay and Fe test of 25,444 mg/kg and Ca test of 0.64%. I have attached this data. It appears the Boring B-1 data represents the majority of the bottom lake material which is more silty with clay with higher native Fe and Ca content. This would represent a more strongly bound phosphorus content, ie., less phosphorus release to the water. In contrast, the sediment material in the sediment trap is largely fine sand with lower Fe and Ca content which would cause Fe and Ca bound phosphorus to be more mobile.

4. Given the above information, I first assumed that the area outside the sediment trap will not fill with new sediment over the next 20 years and that the future phosphorus release rate will remain low due to the higher Fe and Ca lake bottom material.
5. Given the information from the literature showing 60% phosphorus mobility of lake sediment material. The attached calculations used the 60% phosphorus mobility at the end of 20 years and an average phosphorus mobility of 36.5% over the 20-year period. This also assumed the area outside the sediment trap area will not fill with new sediment over the next 20 years. The resulting calculated annual phosphorus reduction is 1,806 lbs./year.

In summary, I believe we are trying to generate an empirical model which represents what we believe to be representative of the information we know about Neshonoc Lake and use available literature information to support phosphorus reductions from the lake dredging project. Although we are removing 400,000 CY of sediment, the calculations use only 59,694 CY (top 1' of sediment). The calculations have been corrected to report results on a dry weight basis. Given the additional review of the literature and the sediment material Fe and Ca content in both the sediment trap and the lakebed, we propose the attached calculations be reviewed and approved for this project.

Village of West Salem
Lake Neshonoc Sediment Removal Project
Phosphorus Calculations for Removed Sediment
February 2021

A. Area of the planned sediment removal is 37 acres (sediment trap area -18.5 acres, south fish habitat area -15.6 acres, boat landing area -2.9 acres).

B. Volume of assumed active phosphorus release from the lake – 1' depth over the area of the planned sediment removal.

- Sediment Volume = 37 acres x 43,560 SF/acre x 1 = 1,611,720 CF

C. Bulk density – 1.36174 g/cm³ (23 sample average of lab test data for top 1' of sediment)

Note: Bulk density data was calculated from the weights of the samples with jar container and subtracting the weight of the jar to determine sample weight. The jar had a volume of 950 cc. This was completed prior to sample shipment to the lab. See lab test data, Appendix M.

D. Solids content – 64.96% (15 sample average of lab test data for top 1' of sediment).

Note: Solids content was calculated on only 15 samples since there were 8 broken jars in transit to the lab. Percent moisture tests were completed at the lab however since 8 jars were broken, this data was not used.

E. Phosphorus content per unit weight from September 2020 tests

Shallow Samples:

- 0.08826 % or 0.8826 mg P/g sediment (dry weight) for 23 shallow samples
- $0.8826 / 0.6496 = 1.35868$ mg P/g sediment (dry weight)

Note: Typical values are 1-4 mg P/g sediment (dry weight), reference Paul Hanson, UW Madison Limnology Department.

Deep Samples:

- 0.050 % or 0.50 mg/g (dry weight) for 4 deep samples
- $0.050 / 0.6496 = 0.76970$ mg P/g sediment (dry weight)

F. Phosphorus content per unit volume (mg P/cubic centimeters, cm³)

- Shallow samples – $0.8826 \text{ mg P/g sediment} \times 1.36174 \text{ g/cm}^3 = 0.6496 = 0.78 \text{ P/cm}^3$
- Deep samples – $0.50 \text{ mg P/g sediment} \times 1.36174 \text{ g/cm}^3 \times 0.6496 = 0.44 \text{ P/cm}^3$

- G. Phosphorus content per unit volume (g P/CF)
- Shallow samples – $0.78 \text{ mg P/cm}^3 \times 28,316.8 \text{ cm}^3/\text{CF} \times 1 \text{ g}/1,000 \text{ mg} = 22.11 \text{ g P/CF}$
 - Deep samples – $0.44 \text{ mg P/cm}^3 \times 28,316.8 \text{ cm}^3/\text{CF} \times 1 \text{ g}/1,000 \text{ mg} = 12.52 \text{ g P/CF}$
- H. Phosphorus content per unit volume (lb./CF)
- Shallow samples – $22.11 \text{ g P/CF} \times 1 \text{ lb.}/453.592 \text{ g} = 0.04874 \text{ P/CF}$
 - Deep samples – $12.52 \text{ g P} \times 1 \text{ lb.}/453.492 \text{ g} = 0.02760 \text{ lb. P/CF}$
- I. Sediment Phosphorus for current condition
- $1.611,720 \text{ CF} \times 0.04874 \text{ lb. P/CF} = 78,556 \text{ lb. P}$
- J. Sediment Phosphorus for future condition (after dredging)
- $1.611,720 \text{ CF} \times 0.02760 \text{ lb. P/CF} = 44,483 \text{ lb. P}$
- K. Current Phosphorus release rate
- Assume 60% Phosphorus mobility based on previous studies by Rydin, Randall, Kapanen
 - $78,556 \text{ lb. P} \times 0.60/20 = 2,356 \text{ lb. P/year}$ (assume over a 20-year time period)
- L. Future Phosphorus release rate estimates
- Assume initial phosphorus release rate is minimum (13%) since the sediment trap will collect sediment only during the first years following dredging and the bottom of the sediment trap is 15' below the water surface. There will be little mixing and low temperatures at this depth. Over 20 years of time, sediment will accumulate in the sediment trap resulting in higher temperatures and more mixing of the sediment. With the Lake District completing some upstream stream bank stabilization projects, it is expected that the sediment trap will NOT fill in 20 years as it did between 2000 and 2020. Given this information, it has been conservatively assumed that at the end of 20 years, the phosphorus mobility will could approach 60%. An average phosphorus mobility over the 20-year period is calculated to be 36.5%.
 - Also assume the area outside the sediment area does not fill with new sediment and the annual release rate remains low at 13% due to higher Fe content of existing lake bottom soil material consisting of mostly silt and clay as documented from April 2019 lake sediment tests.
 - Sediment Trap Area = 18.5 acre or 805,860 CF
Area outside Sediment Trap Area – 18.5 Acres or 805,860 CF

Phosphorus Release Rate Calculations:

- Sediment Trap = $805,860 \text{ CF} \times 0.02760 \text{ lb. P/CF} \times 0.365/20 = 405.91$
- Area Outside Sediment Trap = $805,860 \text{ CF} \times 0.02760 \text{ lb. P/CF} \times 0.13/20 = 144.57$
- Total = 550

M. Annual Phosphorus reduction

- $2,356 \text{ lb. P/year} - 550 \text{ lb. P/year} = 1,806 \text{ lb. P/year}$

N. Phosphorus Credits:

- $1,806 \text{ lb. P/year/Trade Ratio (2:1)} = 903 \text{ lb. P/year}$

O. Required phosphorus credits for the Village wastewater treatment facility (WWTF)
Assume new biological phosphorus system + chemical feed achieves an effluent phosphorus = 0.4 mg/l (current effluent phosphorus discharge is 0.725 mg/l). Additional required reduction is:

- At current flow - $.29 \times 8.34 \times (0.4-0.075) \times 365 = 286 \text{ lbs./year}$
- At 20-year design flow - $.45 \times 8.34 \times (0.4-0.075) \times 365 = 445 \text{ lbs./year}$

P. Other Trading Partners

With the Village of West Salem using 445 lbs./year of the projected 903 lbs./year phosphorus credits, there is a potential 458 lbs./year of phosphorus credit that will be owned by the Lake District. The Lake District is planning to sell these phosphorus credits to the next La Crosse River discharger, the City of La Crosse. Revenue from this sale is planned to be used by the Lake District to do additional streambank stabilization projects in the watershed upstream from Neshonoc Lake. It is understood that use of the phosphorus credits by the City of La Crosse will require a signed trading agreement before the completion of the Neshonoc Lake sediment removal project.

Appendix F: Geotechnical Information and Dredge Material Disposal Area



DATE: September 20, 2019
TO: Design File
FROM: Dave Sauer, P.E., Cedar Corporation
REGARDING: Geotechnical Information - Lake Neshonoc
PROJECT # 4896-0052

Several soil borings were taken within the proposed dredge areas of Lake Neshonoc on April 15, 2019. From these borings, several soil sediment samples were taken and were tested for grain size. Sample depths ranged from 1' to 10' to collect enough samples that represented the projected dredge solids that would be removed from Lake Neshonoc.

Table 1 and Table 2 list out the grain size test results. Table 1 lists out each sample taken, and Table 2 is a summary of the test sampling. The majority of the sediment to be removed from Lake Neshonoc will be fine sand as documented from borings B-2, B-3, and B-4 which were taken from the sediment trap area of the lake and which contains the majority of the sediment volume to be dredged from the lake. It also appears that the areas further downstream from the sediment trap area shows soil grain sizes more in the silt classification. The percent coarse sand, medium sand and clay is relatively low which is what was expected.

Comparing these grain size test results from those tests taken in 1999 (when the lake was last dredged), it confirms that the dredge solids to be removed are very similar to the dredge solids removed in 1999.

Given this confirmation of grain size for the lake sediment samples, we are referencing and attaching the settling tests completed in 1999 (See attached). We expect settling of dredge solids to be very similar to the settling rates documented in 1999. With this information, we believe the settling methods employed in 1999 for the lake dredge can be relied upon again for the proposed lake dredge.

Settling methods employed in 1999 included removing the sediment from the lake using a hydraulic dredge system. Discharge from the hydraulic dredge will be to the north end of the dredge disposal area where liquid will drain to the south through a series of sediment removal structures and devices chosen by the contractor. Final discharge of water back to Lake Neshonoc will be required to meet a TSS concentrate of 80 mg/l and will be through the storm sewer system that was installed in 1999 and is still in good operating condition. The existing water control structure located in the SE corner of the dredge disposal area is to be used to discharge settled dredge water to the storm sewer and to the lake. It is expected that the contractor will need to install a floating weir control structure in the south end of the dredge disposal area to ensure compliance with the 80 mg/l TSS discharge standard.

Table 1.
Summary of Lake Sediment Results (TOC and Grain Size)
Lake Neshonoc - West Salem, Wisconsin

Sample ID Lab ID Date	B1 1-2'		B1 3-4'		B1 5-6'		B1 7'		B2 1-2'		B2 3-4'		B2 5-6'	
	500-161741-1 4/15/2019	600	500-161741-2 4/15/2019	22,000	500-161741-3 4/15/2019	24,000	500-161741-4 4/15/2019	21,000	<	500-161741-5 4/15/2019	600	500-161741-6 4/15/2019	1,900	500-161741-7 4/15/2019
Method														
9060A														
Units														
mg/Kg														
Total Organic Carbon														
Incremental Percent														
Sieve Size (Particle Size, um)														
Method														
D422														
3 inch (75,000)														
%														
D422														
2 inch (50,000)														
%														
D422														
1.5 inch (37,500)														
%														
D422														
1 inch (25,000)														
%														
D422														
3/4 inch (19,000)														
%														
D422														
3/8 inch (9,500)														
%														
D422														
#4 (4,750)														
%														
D422														
#10 (2,000)														
%														
D422														
#20 (850)														
%														
D422														
#40 (425)														
%														
D422														
#60 (250)														
%														
D422														
#80 (180)														
%														
D422														
#100 (150)														
%														
D422														
#200 (75)														
%														
D422														
Hyd1 (33.9)														
%														
D422														
Hyd2 (22.5)														
%														
D422														
Hyd3 (13.3)														
%														
D422														
Hyd4 (9.3)														
%														
D422														
Hyd5 (6.8)														
%														
D422														
Hyd6 (3.4)														
%														
D422														
Hyd7 (1.4)														
%														
D422														
Soil Classification														
Method														
D422														
Gravel														
%														
D422														
Sand														
%														
D422														
Coarse Sand														
%														
D422														
Medium Sand														
%														
D422														
Fine Sand														
%														
D422														
Silt														
%														
D422														
Clay														
%														

Table 1.
Summary of Lake Sediment Results (TOC and Grain Size)
Lake Neshonoc - West Salem, Wisconsin

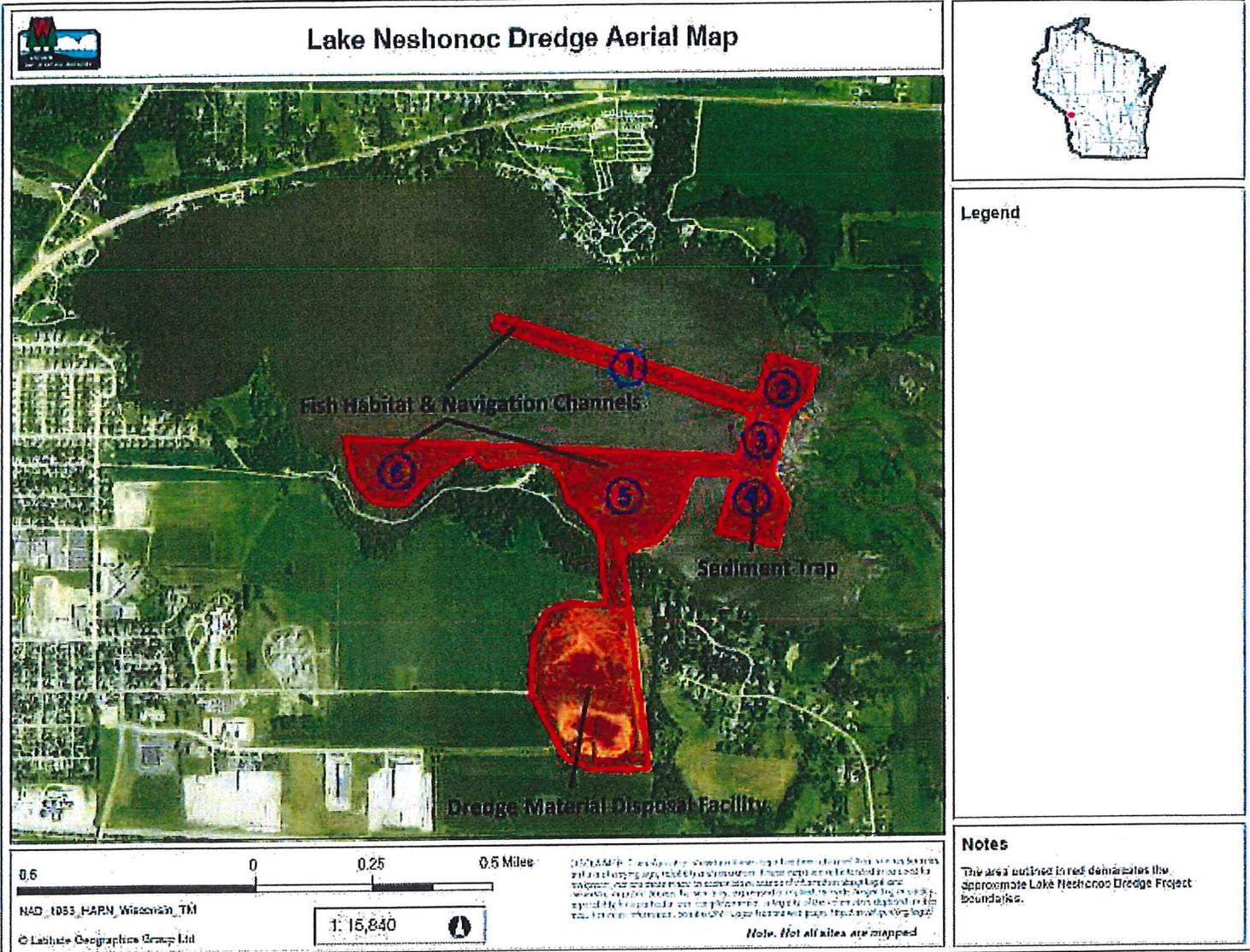
Analyte	Method	Units	B3 11-12'		B3 13-14'		B4 1-2'		B4 3-4'		B4 5-6'		B4 7-8'		B4 9-10'	
			Sample ID Lab ID Date	600	600	500-161741-15 4/15/2019	500-161741-16 4/15/2019	500-161741-17 4/15/2019	500-161741-18 4/15/2019	500-161741-19 4/15/2019	500-161741-20 4/15/2019	500-161741-21 4/15/2019				
Total Organic Carbon	9060A	mg/Kg	<	600	<	600	72,000	4,800	29,000	5,800	1,900					
Sieve Size (Particle Size, um)	Method	Incremental Percent														
3 inch (75,000)	D422	%					0									
2 inch (50,000)	D422	%					0									
1.5 inch (37,500)	D422	%					0									
1.1 inch (25,000)	D422	%					0									
3/4 inch (19,000)	D422	%					0									
3/8 inch (9,500)	D422	%					0									
#4 (4,750)	D422	%					0									
#10 (2,000)	D422	%					0.1					0.4				
#20 (850)	D422	%					0.6					0.8				
#40 (425)	D422	%					3					1.8				
#60 (250)	D422	%					15.5					10.3				
#80 (180)	D422	%					42.1					14.2				
#100 (150)	D422	%					12.9					6.4				
#200 (75)	D422	%					8.3					6.4				
Hyd1 (33.9)	D422	%					7.1					3.3				
Hyd2 (22.5)	D422	%					4.3					7.2				
Hyd3 (13.3)	D422	%					2.1					8.3				
Hyd4 (9.3)	D422	%					0.9					2.2				
Hyd5 (6.8)	D422	%					0.9					3.6				
Hyd6 (3.4)	D422	%					0.4					8.3				
Hyd7 (1.4)	D422	%					0.4					6.1				
Soil Classification	Method	Percent														
Gravel	D4222	%					0					0				
Sand	D4222	%					82.5					40.3				
Coarse Sand	D4222	%					0.1					0.4				
Medium Sand	D4222	%					3.6					2.6				
Fine Sand	D4222	%					78.8					37.3				
Silt	D4222	%					15.3					31.1				
Clay	D4222	%					2.2					28.6				

Table 1.
 Summary of Lake Sediment Results (TOC and Grain Size)
 Lake Neshonoc - West Salem, Wisconsin

Analyte	Method	Sample ID		Units	B6 3-4'		B6 5-6'		B6 7'	
		Lab ID	Date		500-161741-29	4/15/2019	500-161741-30	4/15/2019	500-161741-31	4/15/2019
Total Organic Carbon	9060A			mg/Kg	6,200		8,900		10,000	
Sieve Size (Particle Size, um)	Method	Incremental Percent								
3 inch (75,000)	D422	%					0			0
2 inch (50,000)	D422	%					0			0
1.5 inch (37,500)	D422	%					0			0
1 inch (25,000)	D422	%					0			0
3/4 inch (19,000)	D422	%					0			0
3/8 inch (9,500)	D422	%					0			0
#4 (4,750)	D422	%					0			0
#10 (2,000)	D422	%					0.2			0.2
#20 (850)	D422	%					0.6			0.3
#40 (425)	D422	%					2.7			2.6
#60 (250)	D422	%					9.5			9.1
#80 (180)	D422	%					16.3			17.5
#100 (150)	D422	%					16.6			16.1
#200 (75)	D422	%					35.6			38.2
Hyd1 (33.9)	D422	%					5.8			0.6
Hyd2 (22.5)	D422	%					1.4			1.6
Hyd3 (13.3)	D422	%					1.5			2.7
Hyd4 (9.3)	D422	%					1.9			1.6
Hyd5 (6.8)	D422	%					1.5			1.1
Hyd6 (3.4)	D422	%					1.5			1.6
Hyd7 (1.4)	D422	%					1			1.6
Soil Classification	Method	Percent								
Gravel	D422	%					0			0
Sand	D422	%					81.5			84
Coarse Sand	D422	%					0.2			0.2
Medium Sand	D422	%					3.3			2.9
Fine Sand	D422	%					78			80.9
Silt	D422	%					12.1			7.6
Clay	D422	%					6.4			8.4

Lake Neshonoc - West Salem
Sediment Grain Size Testing
April 15, 2019 Samples
Table 2 - Summary

Description	% Coarse Sand	% Medium Sand	% Fine Sand	% Silt	% Clay
Boring B-1	0-0.3	0.5-0.8	1.4-6.1	50.8-73.7	19.7-47.5
Notes:	B-1 B-1 B-1	location is within boat channel of dredge sample depths - 1' - 7' 4 samples tested			
Boring B-2	0-0.3	0.6-14.6	28.9-74.4	7.7-42.5	3.2-22.4
Notes:	B-2 B-2 B-2	location is within sediment trap area sample depths - 1' - 9' 3 samples tested			
Boring B-3	0	0.7	95.8	2.6	1
Notes:	B-3 B-3 B-3	location is within sediment trap area sample depth - 1' - 2' 1 sample tested			
Boring B-4	0-0.4	1.4-3.6	37.3-89.7	5.2-31.1	2.2-28.6
Notes:	B-4 B-4 B-4	location is within sediment trap area sample depth - 1' - 10' 4 samples tested			
Boring B-5	0.1-0.8	2.8-6.9	11.2-72.2	13.3-60.0	7.4-26.0
Notes:	B-5 B-5 B-5	location is within east fish habitat area sample depth - 1' - 7' 4 samples tested			
Boring B-6	0-0.2	2.9-5.6	78-83.8	6.6-12.1	4-8.4
Notes:	B-6 B-6 B-6	location is within west fish habitat area sample depth - 1' - 7' 3 samples tested			



Map 1: shows approximate location of cores to be collected in the proposed dredging area. Proposed core depths are based on maps provided to the Wisconsin DNR (maps 2 and 3 from Cedar Corporation are attached below). If dredging depths vary from the initial maps, core depths should be adjusted accordingly to obtain the entire depth to be removed plus an additional two feet below the dredge depth.

- Core 1: 7ft core (5ft material to be removed and 2ft of what will remain exposed)
- Core 2: 9ft core
- Core 3: 14ft core
- Core 4: 13ft core
- Core 5: 7ft core
- Core 6: 7ft core

Appendix G: WDNR Dredge Permit Approval Issued December 13, 2019



December 13, 2019

IP-WC-2019-32-03439

Charles Handy
La Crosse County Planning Department
212 6th Street N RM 2400
La Crosse, WI 54601

Dear Mr. Handy:

The Department of Natural Resources has completed its review of your application for a permit to remove materials from the bed of Neshonoc Lake, in the Village of West Salem, La Crosse County. You will be pleased to know your application is approved.

I am attaching a copy of your permit, which lists the many important conditions that must be followed to protect water quality and habitat. A copy of the permit must be posted for reference at the project site. Please read your permit conditions carefully so that you are fully aware of what is expected of you.

Please note you are required to submit photographs of the completed project within 7 days after you've finished construction. This helps both of us to document the completion of the project and compliance with the permit conditions.

Your next step will be to notify me of the date on which you plan to start construction and again after your project is complete.

If you have any questions about your permit, please call me at (715) 596-0110 or email KatieM.Mallum@wisconsin.gov.

Sincerely,

Katie Mallum
Water Management Specialist

cc: Kevin Bartel, Cedar Corporation

STATE OF WISCONSIN Dredging PERMIT
DEPARTMENT OF NATURAL RESOURCES

IP-WC-2019-32-03439

Charles Handy and the La Crosse County Planning Department is hereby granted under Section 30.20(2), Wisconsin Statutes, a permit to remove materials from the bed of Neshonoc Lake, in the Village of West Salem, La Crosse County, also described as being in the NE1/4 of the SE1/4 of Section 35, Township 17 North, Range 06 West, subject to the following conditions:

PERMIT

1. You must notify Katie Mallum at phone (715) 596-0110 or email KatieM.Mallum@wisconsin.gov before starting construction and again not more than 5 days after the project is complete.
2. You must complete the project as described **on or before 12/13/2022**. If you will not complete the project by this date, you must submit a written request for an extension prior to expiration of the initial time limit specified in the permit. Your request must identify the requested extension date. The Department shall extend the time limit for an individual permit or contract for no longer than an additional 5 years if you request the extension before the initial time limit expires. You may not begin or continue construction after the original permit expiration date unless the Department extends the permit in writing or grants a new permit.
3. This permit does not authorize any work other than what you specifically describe in your application and plans, and as modified by the conditions of this permit. If you wish to alter the project or permit conditions, you must first obtain written approval of the Department.
4. Before you start your project, you must first obtain any permit or approval that may be required for your project by local zoning ordinances and by the U.S. Army Corps of Engineers. You are responsible for contacting these local and federal authorities to determine if they require permits or approvals for your project. These local and federal authorities are responsible for determining if your project complies with their requirements.
5. Upon reasonable notice, you shall allow access to your project site during reasonable hours to any Department employee who is investigating the project's construction, operation, maintenance or permit compliance.
6. The Department may modify or revoke this permit for good cause, including if the project is not completed according to the terms of the permit or if the Department determines the activity is detrimental to the public interest.
7. You must post a copy of this permit at a conspicuous location on the project site, visible from the waterway, for at least five days prior to construction, and remaining

at least five days after construction. You must also have a copy of the permit and approved plan available at the project site at all times until the project is complete.

8. Your acceptance of this permit and efforts to begin work on this project signify that you have read, understood and agreed to follow all conditions of this permit.
9. You must submit a series of photographs to the Department, within one week of completing work on the site. The photographs must be taken from different vantage points and depict all work authorized by this permit.
10. You, your agent, and any involved contractors or consultants may be considered a party to the violation pursuant to Section 30.292, Wis. Stats., for any violations of Chapter 30, Wisconsin Statutes, or this permit.
11. Construction shall be accomplished in such a manner as to minimize erosion and siltation into surface waters. Erosion control measures (such as silt fence and straw bales) must meet or exceed the technical standards of ch. NR 151, Wis. Adm. Code. The technical standards are found at:
http://dnr.wi.gov/topic/stormwater/standards/const_standards.html
12. All of the removed materials must be placed in the location shown on applicant's plan.
13. Bottom materials must be removed by equipment, which is designed to minimize the amount of sediment that can escape into the water. Equipment must be properly sized so that excavation conforms to the plans submitted and allows the work to be done from the banks rather than in the waterway.
14. You must not deposit or store any of the removed materials in any wetland or below the ordinary high watermark of any waterway. All removed materials must be placed out of the floodway of any stream.
15. You must dredge to the dimensions and elevations shown on your approved plans.
16. All equipment used for the project including but not limited to tracked vehicles, barges, boats, hoses, sheet pile and pumps shall be de-contaminated for invasive and exotic viruses and species prior to use and after use.

The following steps must be taken every time you move your equipment to avoid transporting invasive and exotic viruses and species. To the extent practicable, equipment and gear used on infested waters shall not be used on other non-infested waters.

1. **Inspect and remove** aquatic plants, animals, and mud from your equipment.

2. **Drain all water** from your equipment that comes in contact with infested waters, including but not limited to tracked vehicles, barges, boats, hoses, sheet pile and pumps.
3. **Dispose** of aquatic plants, animals in the trash. Never release or transfer aquatic plants, animals or water from one waterbody to another.
4. **Wash your equipment** with hot (>140° F) and/or high pressure water,
- OR -
Allow your equipment to **dry thoroughly for 5 days.**

FINDINGS OF FACT

1. Charles Handy with the La Crosse County Planning Department has filed an application for a permit to remove materials from the bed of Neshonoc Lake, in the Village of West Salem, La Crosse County, also described as being in the NE1/4 of the SE1/4 of Section 35, Township 17 North, Range 06 West.
2. The Lake Neshonoc Protection Rehabilitation District, Village of West Salem, and La Crosse County are proposing to restore a sediment trap, fish habitat and navigational channels which have largely filled with sediment. The proposed project includes dredging approximately 500,000 cu. yds of muck and sediment to a depth ranging from 5 ft to 12 ft. Silt curtains will be installed around the active project area while a hydraulic dredging barge removes the material. The material will then be placed in an existing disposal facility located southeast of the lake. Impacts to the rest of Lake Neshonoc will be mitigated through the use of strict erosion and siltation controls. The project was also scheduled to avoid spawning season for several fish that could inhabit the project area.
3. The Department has completed an investigation of the project site and has evaluated the project as described in the application and plans.
4. Neshonoc Lake is a navigable water (and no bulkhead exists at the project site.)
5. The proposed project, if constructed in accordance with this permit will not adversely affect water quality, will not increase water pollution in surface waters and will not cause environmental pollution as defined in s. 283.01(6m), Wis. Stats.
6. The proposed project will not impact wetlands if constructed in accordance with this permit.
7. The Department of Natural Resources has determined that the agency's review of the proposed project constitutes an equivalent analysis action under s. NR 150.20(2), Wis. Adm. Code. The Department has considered the impacts on the human

environment, alternatives to the proposed projects and has provided opportunities for public disclosure and comment. The Department has completed all procedural requirements of s. 1.11(2)(c), Wis. Stats., and NR 150, Wis. Adm. Code for this project.

8. The Department of Natural Resources has completed all procedural requirements and the project as permitted will comply with all applicable requirements of sections 30.20(2), Wisconsin Statutes and Chapters NR 102, 103, of the Wisconsin Administrative Code.

The applicant was responsible for fulfilling the procedural requirements for publication of notices under s. 30.208(5)(c)1m., Stats., and was responsible for publication of the notice of pending application under s.30.208(3)(a), Stats. or the notice of public informational hearing under s.30.208(3)(c), Stats., or both. S. 30.208(3)(e), Stats., provides that if no public hearing is held, the Department must issue its decision within 30 days of the 30-day public comment period, and if a public hearing is held, the Department must issue its decision within 20 days after the 10-day period for public comment after the public hearing. S. 30.208(5)(bm), Stats., requires the Department to consider the date on which the department publishes a notice on its web site as the date of notice.

9. The activity will not cause environmental pollution as defined in s. 299.01(4).
10. No material injury will result to the riparian rights of any riparian owners of real property that abuts any water body that is affected by the activity.

CONCLUSIONS OF LAW

1. The Department has authority under the above indicated Statutes and Administrative Codes, to issue a permit for the construction and maintenance of this project.

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that the Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions shall be filed. For judicial review of a decision pursuant to sections 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing of any individual permit decision pursuant to section 30.209, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources, P.O. Box 7921, Madison, WI, 53707-7921. The

petition shall be in writing, shall be dated and signed by the petitioner, and shall include as an attachment a copy of the decision for which administrative review is sought. If you are not the applicant, you must simultaneously provide a copy of the petition to the applicant. If you wish to request a stay of the project, you must provide information, as outlined below, to show that a stay is necessary to prevent significant adverse impacts or irreversible harm to the environment. If you are not the permit applicant, you must provide a copy of the petition to the permit applicant at the same time that you serve the petition on the Department.

The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30 day period for filing a petition for judicial review.

A request for contested case hearing must meet the requirements of section 30.209, Wis. Stats., and sections NR 2.03, 2.05, and 310.18, Wis. Admin. Code, and if the petitioner is not the applicant the petition must include the following information:

1. A description of the objection that is sufficiently specific to allow the department to determine which provisions of this section may be violated if the proposed permit or contract is allowed to proceed.
2. A description of the facts supporting the petition that is sufficiently specific to determine how the petitioner believes the project, as proposed, may result in a violation of Chapter 30, Wis. Stats.;
3. A commitment by the petitioner to appear at the administrative hearing and present information supporting the petitioner's objection.

If the petition contains a request for a stay of the project, the petition must also include information showing that a stay is necessary to prevent significant adverse impacts or irreversible harm to the environment.

Dated at Wausau Service Center, Wisconsin on 12/13/2019.

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES
For the Secretary



By _____
Katie Mallum
Water Management Specialist

Appendix H: US Army COE Approval, December 27, 2019



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

December 27, 2019

Regulatory File MVP-2019-02391-KDZ

La Crosse County
c/o Charles Handy
212 6th Street N, Room 2400
La Crosse, Wisconsin 54601

Dear Mr. Handy:

We are responding to your request for authorization to discharge return water into Lake Neshonoc associated with a hydraulic dredging project. The proposed work is located in the NW ¼, SE ¼ of Section 53, Township 17 North, Range 06 East, LaCrosse County, Wisconsin.

The regulated activity associated with the project described above includes the discharge of return water into Lake Neshonoc associated with hydraulically dredging approximately 23 acres of aquatic bed. The work appears to be authorized by a Nationwide Permit (NWP) and/or a Regional General Permit (RGP), specifically, NWP 16, Return Water From Upland Contained Disposal Areas. No application or notification to the St. Paul District Corps of Engineers is required for your project.

This letter does not verify permit eligibility, but indicates that your project may meet the requirements of this permit. It is your responsibility to ensure that the work is performed in accordance with the terms and general conditions of this permit before starting work. **It is also incumbent upon you to verify that your activity has received any necessary Water Quality Certification or waiver prior starting work in waters of the U.S.** If a Water Quality Certification has not been issued for your activity, you are responsible for contacting the water certifying agency. A full list of applicable terms, conditions, issued Water Quality Certifications, and certifying agencies may be found by visiting our website at <http://www.mvp.usace.army.mil/Missions/Regulatory/Permitting-Process-Procedures/>.

A change in location or project plans may require re-evaluation of your project. Proposed changes should be coordinated with this office prior to construction. Failure to comply with all terms and conditions of this permit invalidates this authorization and could result in a violation of Section 301 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. You must also obtain all local, State, and other Federal permits that apply to this project.

If you have any questions, please contact me in our Stevens Point office at (651) 290-5877 or by email at kyle.d.zibung@usace.army.mil.

Sincerely,

A handwritten signature in black ink that reads "Kyle Zibung".

Kyle Zibung
Lead Project Manager

cc:
Katie Mallum, WDNR
Kevin Bartel, Cedar Corporation

Appendix I: La Crosse County Easement Approval, September 23, 2019



LA CROSSE COUNTY, WISCONSIN

ZONING, PLANNING AND LAND INFORMATION OFFICE

La Crosse County Administrative Center
212 6th Street North • 2nd Floor
La Crosse, Wisconsin 54601-3200

Telephone: **(608) 785-5919** FAX: **(608) 785-5922**

September 23, 2019

Dave Sauer:

Dear Mr. Sauer. Please consider this letter as confirmation that La Crosse County has reviewed a request for construction easement and access for the Lake Neshonoc Dredging project on the parcel of Land owned by La Crosse County Township 17N Range 6W section 35. This letter is formal permission for Cedar Corp staff to access this parcel for the purpose of planning and engineering necessary for the study of implementing said program, and that we will proceed to implement an easement on said parcel for the appropriate grading, filling, grubbing and dewatering of said dredge project. This Easement is acceptable to La Crosse County and we should finalize it soon.

If you have any questions regarding this letter, please feel free to contact me at (608) 785-5919.

Sincerely;

Charlie Handy
County Planner

Appendix J: Phosphorus Credit Agreement between La Crosse County, Village of West Salem, and Lake Neshonoc Protection and Rehabilitation District

**PHOSPHORUS CREDIT AGREEMENT
BETWEEN LA CROSSE COUNTY, VILLAGE OF WEST SALEM
AND LAKE NESHONOC PROTECTION AND REHABILITATION DISTRICT
WITH REGARDS TO THE SECOND LAKE NESHONOC
DREDGE PROJECT**

Whereas, in 2000 La Crosse County, Lake Neshonoc Protection and Rehabilitation District and the State of Wisconsin through a boating grant all contributed funds to an initial dredging project of Lake Neshonoc, which primary purpose was to create a sediment trap at the mouth of the La Crosse River where it dumps into Lake Neshonoc and to create additional fish habitat. Because Lake Neshonoc is a lake created by the Neshonoc Dam, most of the bottom of the lake is land that is legally owned by La Crosse County. For the first dredge project a bowl area was created on land owned by La Crosse County for purposes of depositing the water and dredge material so that the dredge material could drop out and then the water could be returned to Lake Neshonoc. At the time of this initial dredge project, there were no phosphorus credits available for such a project and, therefore, no phosphorus credit agreement was entered into by the parties.

Since the original dredge project was completed, the dredge bowl area has been conveyed by La Crosse County to the Village of West Salem for future dredge work and storm water retention issues related to the Lakeview Business Park storm water drainage.

The Village of West Salem Sanitary Sewer Utility (hereinafter "Sewer Utility") has for the last two years been engaging Cedar Corporation to prepare and submit plans to the Wisconsin Department of Natural Resources regarding the renewal of its sanitary

Phosphorus Credit
Agreement

sewer plant licensure. As part of that planning process, the Sewer Utility has been pursuing an alternative with regards to its sewer plant modifications whereby the plant would pursue a limited upgrade to reduce its phosphorus output and would seek sufficient phosphorus credits to meet its phosphorus reduction requirements at the sewer plant through a second dredging project of Lake Neshonoc.

Over the last two years staff of the Village of West Salem, La Crosse County and Lake Neshonoc Protection and Rehabilitation District (hereinafter "Lake District") have discussed generally this proposed second dredge of Lake Neshonoc and potential funding between the parties but up until this date no formal agreement has been reached between the parties with regards to funding of this second dredge of Lake Neshonoc or the rights with regards to any phosphorus credits granted by the Wisconsin Department of Natural Resources as a result of this dredge project.

An application for a permit to remove materials from the bed of Lake Neshonoc was prepared by the Sewer Utility and was submitted by La Crosse County on behalf of the Sewer Utility and the Lake District to the Wisconsin Department of Natural Resources. The Wisconsin Department of Natural Resources grant the permit to Charles Handy and the La Crosse County Planning Department under permit IP-WC-2019-32-03439. Based on the rest of this agreement, the parties desire that the permit grantee be changed to Jim Leicht, Chairman, Lake Neshonoc Protection & Rehabilitation District and Teresa DeLong, Village Administrator, West Salem Sanitary Sewer Utility, and that Charles Handy and the La Crosse County Planning Department be removed as grantee.

This agreement is being entered into between the parties to address the Sewer Utility's right to conduct the dredge of Lake Neshonoc lake bottom owned by La Crosse County and the agreement that La Crosse County will provide no funding for the project but the parties agree to cooperate in the project as described herein.

Therefore, the parties agree as follows:

1. The parties consent to the Wisconsin Department of Natural Resources removing Charles Handy and the La Crosse County Planning Department as grantee under permit IP-WC-2019-32-03439 and adding as co-grantees Jim Leicht Chairman Lake Neshonoc Protection & Rehabilitation District and Teresa DeLong Village Administrator, West Salem Sanitary Sewer Utility.
2. The Sewer Utility and Lake District will take the lead in this dredging operation and will issue plans and specifications for the removal of at most between 400,000 and 600,000 cubic yards of sediment from Lake Neshonoc by dredge and will hire a contractor to complete the work scope and manage the project to completion. La Crosse County agrees to authorize the dredge of the land it owns under the body of water known as Lake Neshonoc and to cooperate with regards to all applications to the Wisconsin Department of Natural Resources and the Corps of Engineers regarding said project. As part of this, the County hereby provides written approval to the Wisconsin Department of Natural Resources that the dredge permit can be issued to the Sewer Utility or Lake District as applicable.

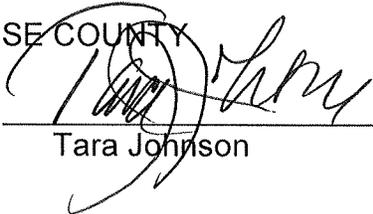
3. The Sewer Utility and the Lake District will provide all of the initial funding for this dredge project through completion on the terms they later agree to. La Crosse County will provide no initial funding for this project.

4. The Sewer Utility and the Lake District will share in the phosphorus credits between themselves based on the percentage of funds they contributed to the complete cost of the dredge project versus the complete cost of the dredge project. (For example, if the Sewer Utility contributes \$500,000 to the dredge project and the total cost of the dredge project is \$2,000,000, the Sewer Utility will receive one-quarter of the credits and the Lake District will receive three-quarters of the credits.) (Complete cost of dredge project to include all engineering, legal, administrative costs, filing and permit fees and all funds paid to contractor's engaged to complete the project) The Sewer Utility will cooperate in this such that if it initially receives more credits than called for by this allocation agreement, it will then, upon completion of payment for the project, provide the documentation to the Wisconsin Department of Natural Resources to assign the credits to the Lake District to which it is entitled. If, on the other hand, the Lake District receives credits for this project in a greater amount than called for by this allocation agreement, they agree to file with the Wisconsin Department of Natural Resources whatever documentation is necessary to assign those credits to the Sewer Utility pursuant to this initial apportionment agreement. If for some reason the Wisconsin Department of Natural Resources awards phosphorus credits to La Crosse County as a result of this dredge project, La Crosse County agrees to file with the Wisconsin Department of Natural Resources whatever documentation is necessary to

assign those credits to the Sewer Utility and the Lake District pursuant to the terms of this initial apportionment agreement.

5. The Lake District agrees that if the sale of its credits results in funds in excess of debt, the Lake District will work with La Crosse County Land Conservation to try to develop projects to reduce future sedimentation of Lake Neshonoc.

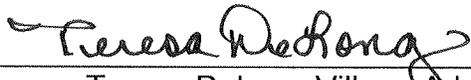
Dated: Jan 14, 2020

LA CROSSE COUNTY
By: 
Tara Johnson

Dated: 1/16/2020

VILLAGE OF WEST SALEM - SEWER UTILITY
By: 
Dennis Manthei, Village President

Dated: 1/16/2020


Teresa DeLong, Village Administrator

LAKE NESHONOC PROTECTION AND
REHABILITATION DISTRICT

Dated: 1-16-20

By: Jim Leicht
Jim Leicht - Chairman

Dated: 1-16-2020

Lill Twining
Lill Twining – Secretary/Treasurer

Appendix K: Plans for the Lake Neshonoc Sediment Removal Project



VILLAGE OF WEST SALEM

LAKE NESHONOC

SEDIMENT REMOVAL PROJECT

CONTRACT "19W-03"

LA CROSSE COUNTY, WISCONSIN

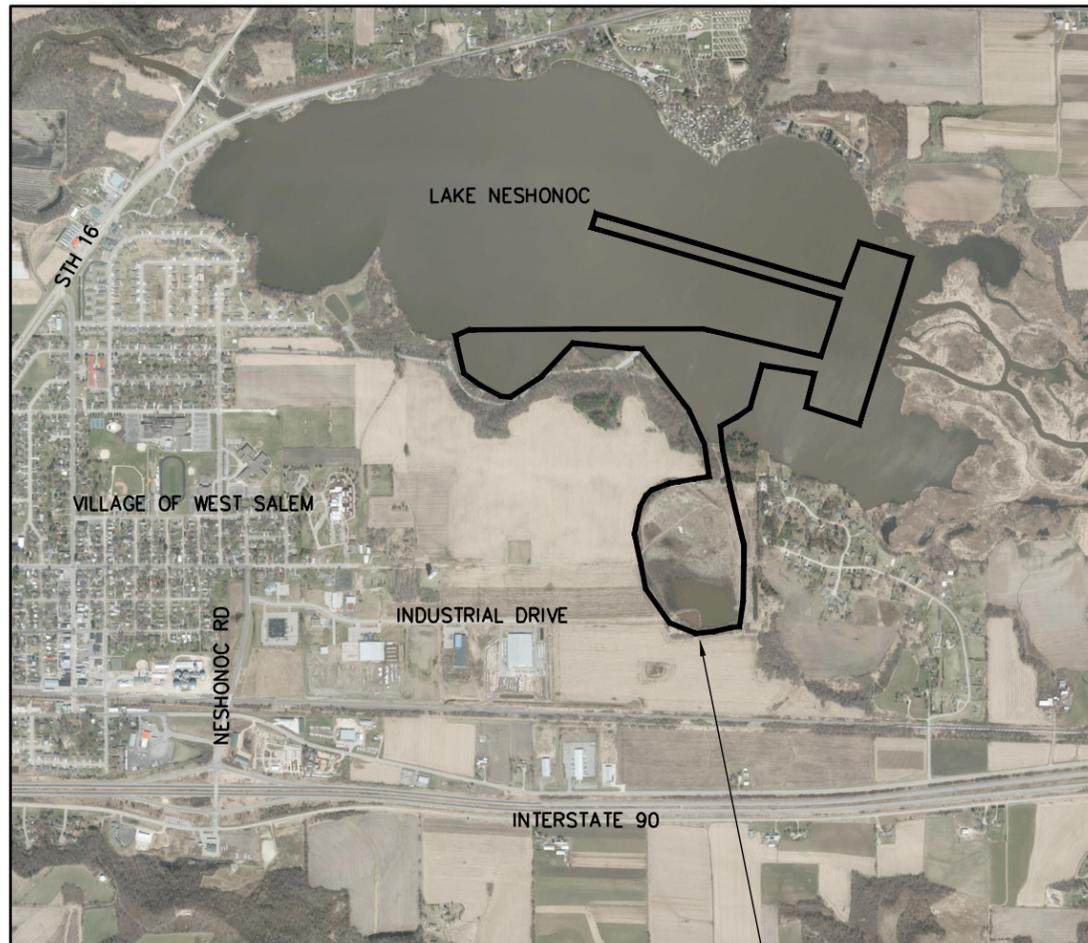
JANUARY 2020

STANDARD SYMBOLS

EXISTING WATERVALVE	BENCHMARK OR SECTION CORNER LOCATION	MAILBOX
PROPOSED WATERVALVE	PROPOSED MANHOLE	R/W MONUMENT
EXISTING CURBSTOP	EX. SAN. MANHOLE	
PROPOSED CURBSTOP	EX. STORM MANHOLE	COMBUSTIBLE FLUID
EXISTING CLEANOUT	EXISTING PROPOSED CATCH BASIN OR INLET	TREE LINE
PROPOSED CLEANOUT	1 POST SIGN	BARBED WIRE FENCE
TELEPHONE PED	2 POST SIGN	TEXT
UTILITY POLE	TRAFFIC SIGNAL	UTILITY LINE WITH TEXT (SIZE) STM=STORM SEWER
GUY WIRE ANCHOR	IRON ROD	(SIZE) SAN=SANITARY SEWER
ELECTRIC PEDESTAL	IRON PIPE	TV=CABLE TELEVISION
LIGHT POLE	CONTROL POINT	ELEC=ELECTRIC
CABLE TV PEDESTAL	EXISTING CONTOURS	TEL=TELEPHONE
CONIFEROUS TREE	PROPOSED CONTOURS	G=GAS
DECIDUOUS TREE		(SIZE) W=WATER
		PROPOSED SANITARY SEWER
		PROPOSED STORM SEWER
		PROPOSED WATERMAIN
		PROPOSED FORCEMAIN

SHEET INDEX

SHEET	SHEET DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	OVERVIEW
4	PROPOSED PROPERTY LINE EASEMENT
5	EXISTING SITE PLAN
6	EXISTING LAKE BOTTOM ELEVATIONS
7	PROPOSED DREDGING LOCATIONS
8-12	DREDGING DETAIL
13-16	DREDGING PLAN AND PROFILE
17	DREDGE MATERIAL DISPOSAL FACILITY SITE PLAN
18-20	PROPOSED SITE PLAN
21-22	DETAILS



LOCATION MAP
VILLAGE OF WEST SALEM

LOCATION

UTILITIES

VILLAGE OF WEST SALEM
PUBLIC WORKS
ATTN: LOREN SCHWIER
900 WEST AVENUE NORTH
WEST SALEM, WI 54669
PHONE: 608-786-2850
CELL: 608-792-3395
publicworks@westsalemwi.com

ELECTRIC - XCEL ENERGY
ATTN: LAURIE FREEMAN
3215 COMMERCE STREET
LACROSSE, WI 54603
PHONE: 608-789-3622
CELL: 608-789-3608
laurie.a.freeman@xcelenergy.com

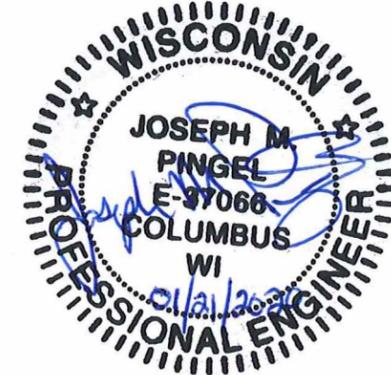
CHARTER COMMUNICATIONS
ATTN: PERRY McCLELLAN
1228 12th AVENUE SOUTH
WISALASKA, WI 54650
P.O. BOX 279
PHONE: 608-317-6213
perry.mcclellan@chartercom.com

LYNX TELECOM
127 STH 12 & 16
CAMP DOUGLAS, WI 54618
PHONE: 608 427-6515

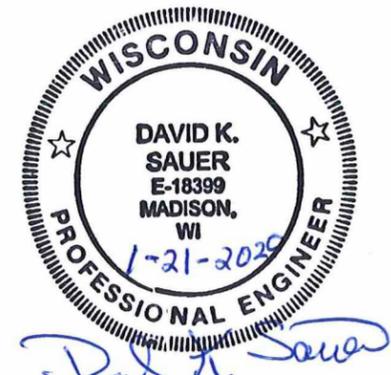
GAS-WE ENERGIES
ATTN: LARRY KOCH
1921 8th STREET S
WISCONSIN RAPIDS, WI 54494
PHONE: 715-421-7259
CELL: 715-421-9882
larry.koch@we-energies.com

VILLAGE OF WEST SALEM
VILLAGE ADMINISTRATOR
ATTN: TERESA DELONG
175 SOUTH LEONARD ST
WEST SALEM, WI 54669
PHONE: 608-786-1858
FAX: 608-786-1988
tdelong@westsalemwi.com

CENTURYLINK
ATTN: BRIAN STELPLUGH
333 NORTH FRONT ST
LA CROSSE, WI 54601
PHONE: 608-796-5142
brian.stelplugh@centurylink.com



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY PERSONAL DIRECTION AND CONTROL AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY PERSONAL DIRECTION AND CONTROL AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.

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920-481-9811
715-235-9081
FAX 715-235-2727

VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
TITLE SHEET

I:\Standards\Cedar Forms\Admin\File Structures\dwg\DETAILS.dwg 7/15/2011 11:01:20 AM CDT

GENERAL NOTES

- UNDERGROUND UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATIONS ONLY. CONTRACTOR SHALL NOTIFY UTILITIES AND HAVE ALL UTILITIES LOCATED A MINIMUM OF 3 DAYS PRIOR TO CONSTRUCTION.
- ALL EQUIPMENT SHALL BE OPERATED WITHIN DESIGNATED CONSTRUCTION EASEMENTS, RIGHT OF WAY OR PROPOSED SITE.
- EROSION CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH THE WDNR STORMWATER CONSTRUCTION TECHNICAL STANDARDS.
- ALL DISTURBED AREAS SHALL BE RESTORED WITH TOPSOIL AND SEED/MULCH/SOD OR EROSION CONTROL BLANKETS AS SOON AS POSSIBLE TO REDUCE EROSION POTENTIAL.
- CONTRACTOR SHALL NOT DISTURB R/W IRONS. IF R/W IRONS ARE TO BE REMOVED, REMOVAL WILL BE APPROVED BY THE ENGINEER OR THE CONTRACTOR WILL BE BILLED FOR THEIR REPLACEMENT.

CONSTRUCTION SEQUENCE

- INSTALL EROSION CONTROL MEASURES
- CORE DRILL STORM POND CONTROL STRUCTURE
- CLEAR AND GRUB, STRIP TOPSOIL
- DREDGE NESHONOC LAKE
- SHAPE/ COMPACT DREDGE MATERIAL IN DREDGE MATERIAL DISPOSAL FACILITY
- TOPSOIL, SEED, AND MULCH

STANDARD EROSION CONTROL PROVISIONS

- IMPLEMENT EROSIONS CONTROL MEASURES AS SPECIFIED HERIN. INSTALL SILT FENCE WHERE CALLED OUT ON THE PLANS PER THE STANDARD DETAIL AND AS DIRECTED BY THE ENGINEER. THE QUANTITY OF SILT FENCE AT ANY LOCATION MAY VARY BASED ON FIELD CONDITIONS.
- INSTALL EROSION CONTROL MEASURES PRIOR TO ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL. ADJUST ALL SEDIMENT CONTROL MEASURES TO MEET FIELD CONDITIONS AT THE TIME OF CONSTRUCTION.
- CONDUCT WEEKLY INSPECTION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES TO ENSURE INTENDED PURPOSE IS ACCOMPLISHED. SEDIMENT CONTROL MEASURES ARE TO BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
- INSPECT EROSION CONTROL MEASURE AFTER ANY RAINFALL OF 1/2" OR GREATER. CORRECT ANY DAMAGED STRUCTURES FOR INTEGRITY.
- DO NOT REMOVE EROSION CONTROL MEASURES UNTIL THE AREAS SERVED HAVE ESTABLISHED VEGETATIVE COVER.
- PREVENT TRACKING SOIL ON PAVED ROADS LOCATED NEAR THE CONSTRUCTION SITE. ALL STREETS SHALL BE SWEEPED AND CLEARED OF ALL DIRT AND DEBRIS IMMEDIATELY.

ABBREVIATIONS

- | | |
|------------|--------------------------------|
| AD | SLOPE CHANGE |
| ADJ | ADJUST |
| APPROX | APPROXIMATE |
| B-B | BACK OF CURB TO BACK OF CURB |
| BC | BACK OF CURB |
| BEG | BEGIN |
| BM | BENCH MARK |
| BR | BEGIN RADIUS |
| C&G | CURB AND GUTTER |
| CL | CENTERLINE |
| CONC | CONCRETE |
| CP | CONTROL POINT |
| CY | CUBIC YARD |
| DIA | DIAMETER |
| DWY | DRIVEWAY |
| EA | EACH |
| EL / ELEV | ELEVATION |
| ER | END RADIUS |
| EXIST. | EXISTING |
| FL | FLOW LINE |
| FT | FEET |
| HP | HIGH POINT |
| HYD | HYDRANT |
| INL | INLET |
| INV | INVERT |
| K | RATE OF VERTICAL CURVATURE |
| L | LENGTH |
| LAT | LATERAL |
| LF | LINEAR FEET |
| LP | LOW POINT |
| LT | LEFT |
| MAX | MAXIMUM |
| MH | MANHOLE |
| MIN | MINIMUM |
| MR | MID RADIUS |
| NTS/N.T.S. | NOT TO SCALE |
| OE | OVERHEAD ELECTRIC |
| O/S | OFFSET |
| PC | POINT OF CURVATURE |
| PCC | POINT OF COMPOUND CURVATURE |
| PI | POINT OF INTERSECTION |
| PROP | PROPOSED |
| PT | POINT OF TANGENCY |
| PVC | POINT OF VERTICAL CURVATURE |
| PVC | POLY-VINYL CHLORIDE |
| PVI | POINT OF VERTICAL INTERSECTION |
| PVT | POINT OF VERTICAL TANGENCY |
| QTY | QUANTITY |
| R | RADIUS |
| RCP | RE-INFORCED CONCRETE PIPE |
| PL | PROPERTY LINE |
| R/W | RIGHT-OF-WAY |
| RAD | RADIUS POINT |
| RT | RIGHT |
| SAN | SANITARY |
| SDWK | SIDEWALK |
| SF | SQUARE FEET |
| STA | STATION |
| STH | STATE TRUNK HIGHWAY |
| STM | STORM |
| SY | SQUARE YARDS |
| TBOC | TOP BACK OF CURB |
| TC | TOP OF CURB |
| TEL | TELEPHONE |
| TYP | TYPICAL |
| UGE | UNDERGROUND ELECTRIC |
| VAR | VARIABLE OR VARIABLE |
| VC | VERTICAL CURVE |
| WM | WATERMAIN |
| WTR | WATER |

DREDGING FLOWRATE/DISCHARGE TABLE

DREDGING FLOWRATE		MAX STORM POND WATER SURFACE	EX WATER CONTROL STRUCTURE ORIFICE MODIFICATIONS			RESIDENCE TIME (HOURS)	DREDGING TIME REQUIRED (DAYS)	
(GPM)	(CFS)		INVERT ELEVATION	# OF ORIFICES	DIAMETER		400,000 CY	500,000 CY
4,000	8.91	725.50	719	2	6"	70.3	140	175
			720.36	2	6"			
6,000	13.37	725.50	719	3	6"	46.9	94	117
			720.36	3	6"			
8,000	17.82	725.50	719	4	6"	35.2	70	88
			720.36	4	6"			
8,247	18.37	725.50	719	4	6"	34.1	68	85
			720.36	4	6"			
			724.90	1	6"			

NOTES:

- MAX WATER SURFACE ELEVATION OF THE WATER SETTLING POND SHALL NOT EXCEED 725.50 FEET DURING NORMAL OPERATIONS.
- DREDGING TIME IS BASED ON 10% SOLIDS IN THE DREDGING FLOW.
- CONTRACTOR SHALL CORE DRILL EX WATER CONTROL STRUCTURE BASED ON DREDGING FLOW RATE.

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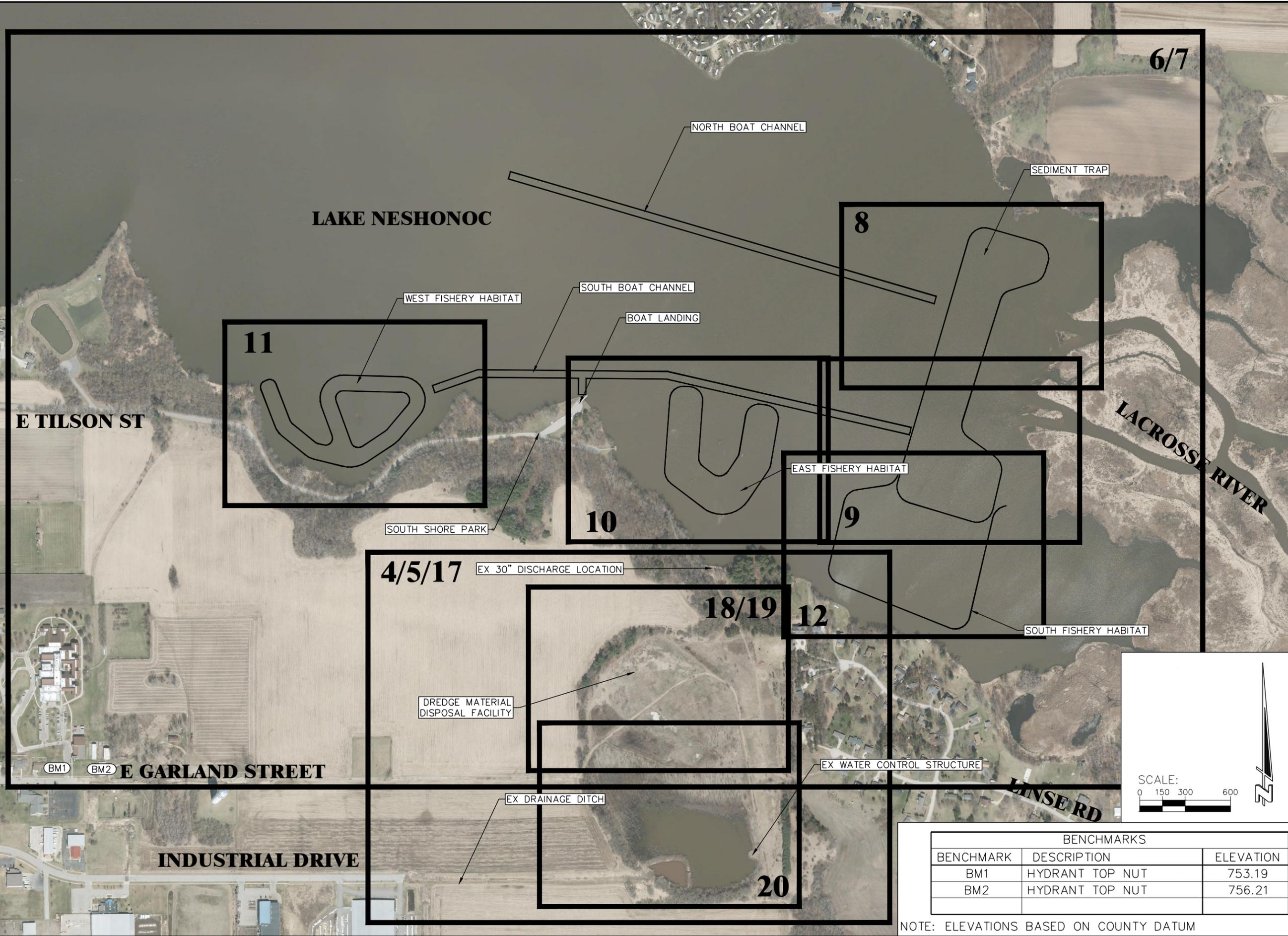
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corporation

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Madison, WI 53718
608-354-0037
FAX 608-249-5854

1638 Baltimore Street
Green Bay, WI 54311
920-491-9081
715-232-9081
FAX 715-232-2727

VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
GENERAL NOTES

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FAX 920-491-9020

604 Wilson Ave.
Menomonee, WI 54751
715-235-3081
FAX 715-235-2727

VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
OVERVIEW

SHEET NO.
3 OF 22

BENCHMARKS		
BENCHMARK	DESCRIPTION	ELEVATION
BM1	HYDRANT TOP NUT	753.19
BM2	HYDRANT TOP NUT	756.21

NOTE: ELEVATIONS BASED ON COUNTY DATUM

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LACROSSE COUNTY
16-1054-200

LACROSSE COUNTY
16-1054-100

LACROSSE COUNTY
16-1054-300

LACROSSE COUNTY
16-1054-400

PROPOSED TEMPORARY CONSTRUCTION EASEMENT

EXISTING PROPERTY LINE

PROPOSED PROPERTY LINE

PROPOSED PARCEL "A"

100'

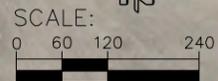
PROPOSED PARCEL "B"

PROPOSED PROPERTY LINE

LACROSSE COUNTY
16-1046-100

APPLESHORE PROPERTIES LLC
7-6-0

LACROSSE COUNTY
16-1046-0



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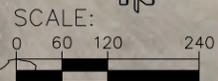
2820 Walton Commons W.
Madison, WI 53718
608-354-0037
FAX 608-295-5624

1605 Balfour Street
Green Bay, WI 54311
920-491-9081
FAX 920-491-9020

604 Weber Ave.
Menomonee, WI 54751
715-235-9081
FAX 715-235-2727

VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
PROPOSED PROPERTY LINE EASEMENT

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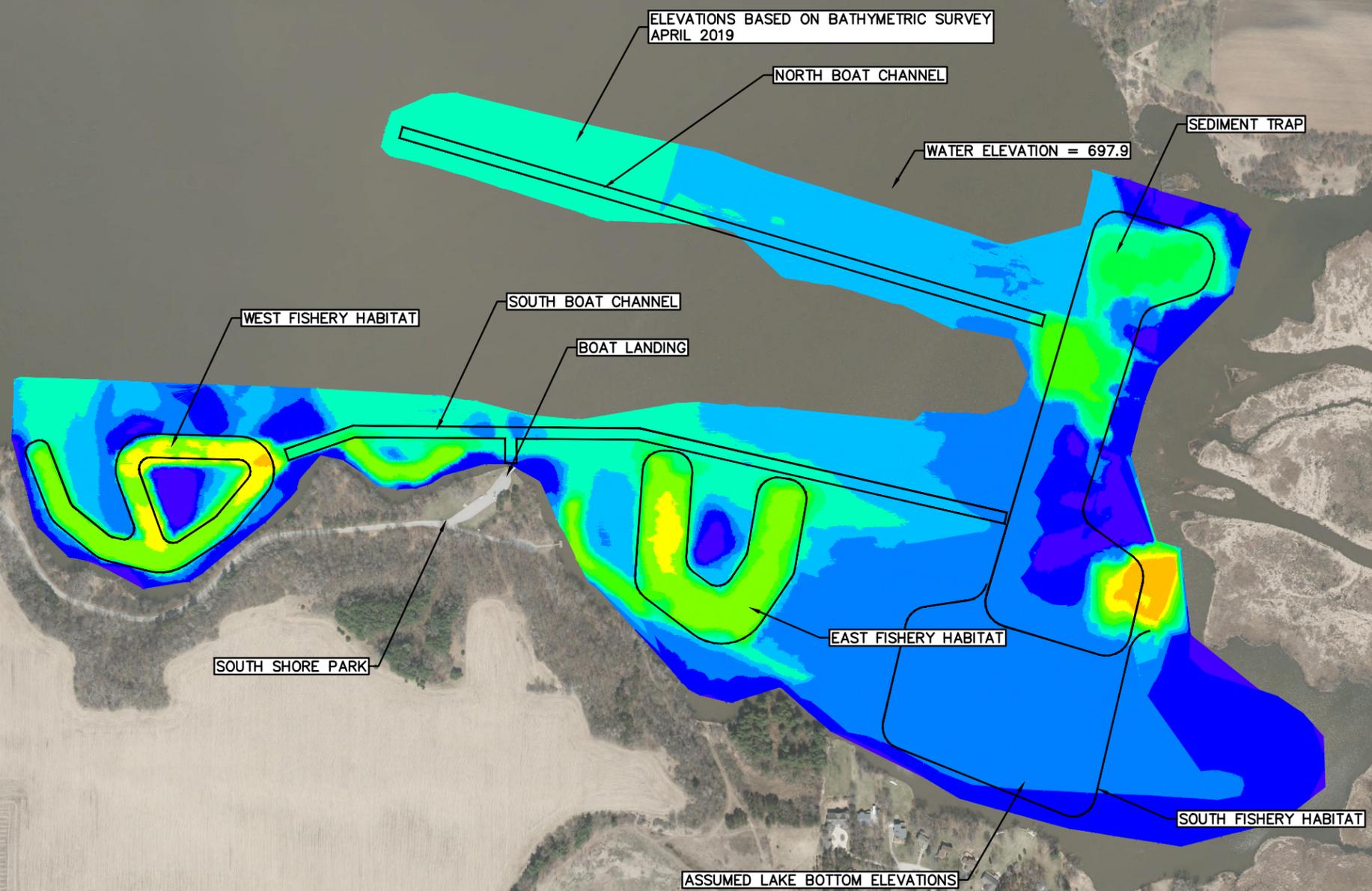
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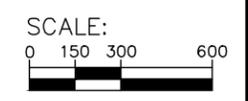
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VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
EXISTING SITE PLAN

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ELEVATION TABLE		
MIN ELEV	MAX ELEV	COLOR
683	684	Red
684	685	Dark Red
685	686	Orange
686	687	Yellow
687	688	Light Green
688	689	Green
689	690	Dark Green
690	691	Cyan
691	692	Blue
692	693	Light Blue
693	694	Dark Blue
694	695	Purple
695	696	Dark Purple



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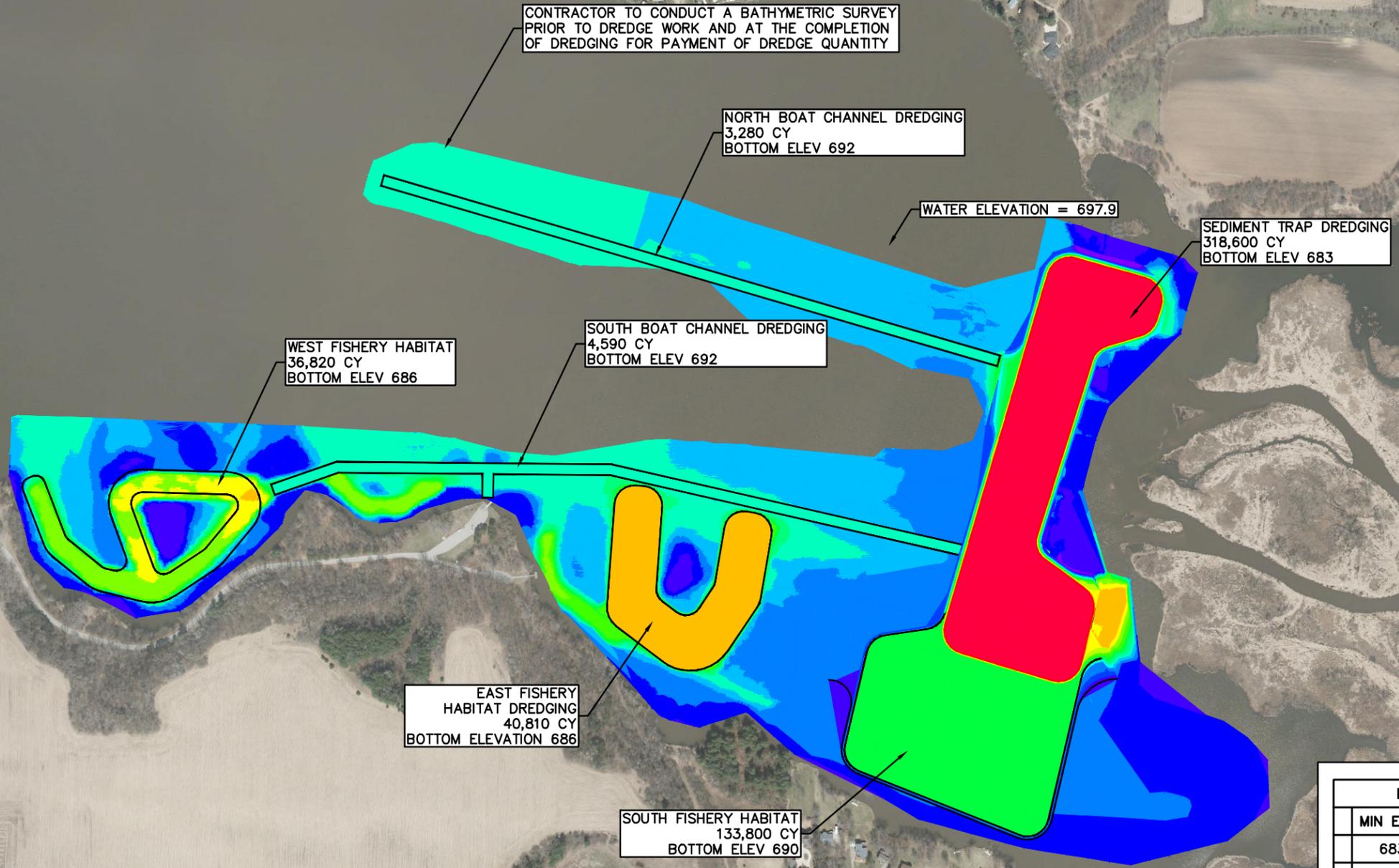
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VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
EXISTING LAKE BOTTOM ELEVATIONS

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EAST FISHERY HABITAT DREDGING
40,810 CY
BOTTOM ELEVATION 686

WEST FISHERY HABITAT
36,820 CY
BOTTOM ELEV 686

SOUTH BOAT CHANNEL DREDGING
4,590 CY
BOTTOM ELEV 692

NORTH BOAT CHANNEL DREDGING
3,280 CY
BOTTOM ELEV 692

SEDIMENT TRAP DREDGING
318,600 CY
BOTTOM ELEV 683

WATER ELEVATION = 697.9

SOUTH FISHERY HABITAT
133,800 CY
BOTTOM ELEV 690

PROPOSED DREDGING SUMMARY BASE BID

SEDIMENT TRAP	318,600 CY
WEST FISHERY HABITAT	36,820 CY
EAST FISHERY HABITAT	40,810 CY
SOUTH FISHERY HABITAT	133,800 CY
NORTH BOAT CHANNEL	3,280 CY
SOUTH BOAT CHANNEL	4,590 CY
TOTAL	537,900 CY

ELEVATION TABLE

MIN ELEV	MAX ELEV	COLOR
683	684	Red
684	685	Orange
685	686	Yellow
686	687	Light Green
687	688	Green
688	689	Dark Green
689	690	Light Blue
690	691	Blue
691	692	Dark Blue
692	693	Very Dark Blue
693	694	Black
694	695	Dark Purple
695	696	Light Purple



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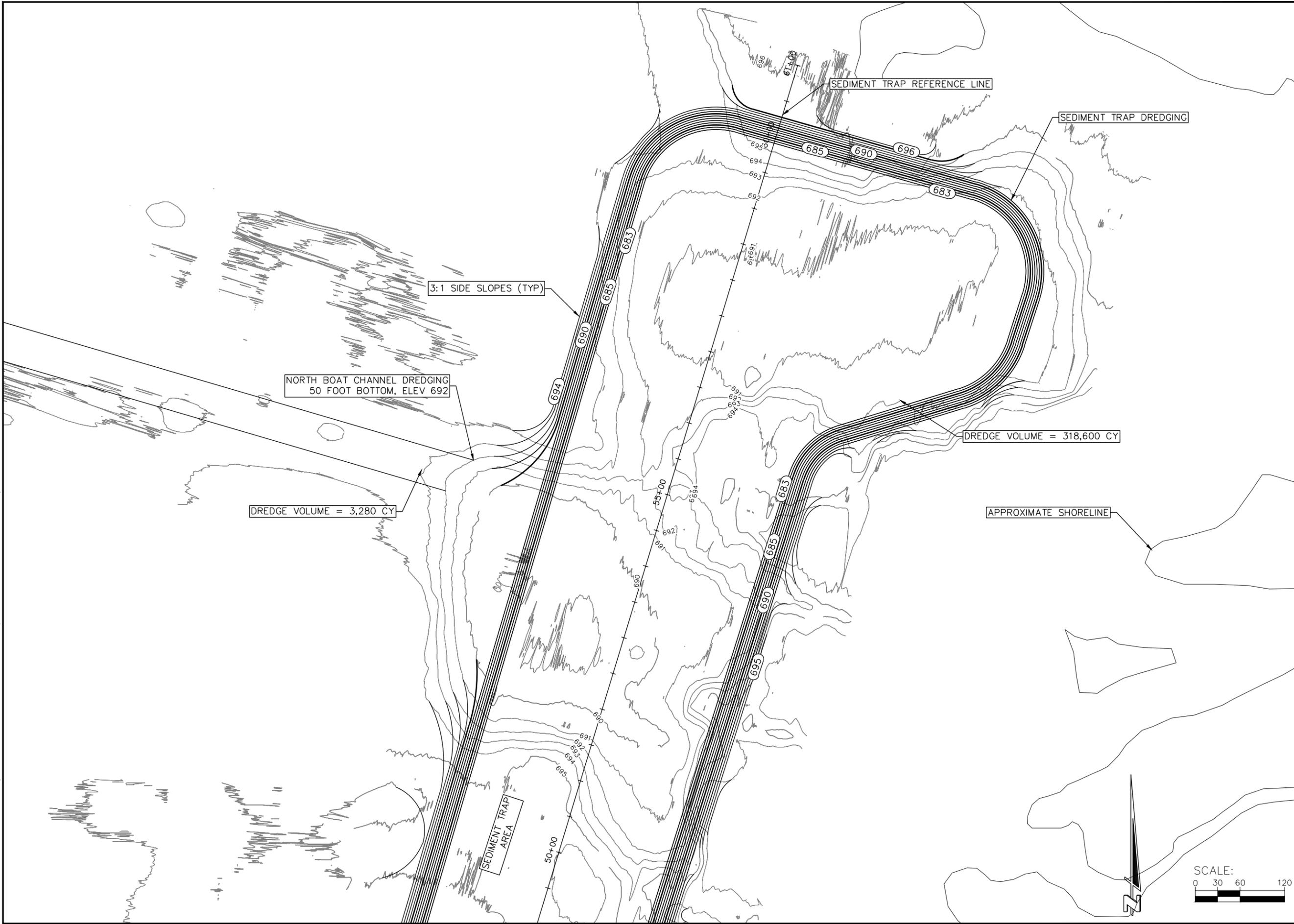
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PROPOSED DREDGING LOCATIONS

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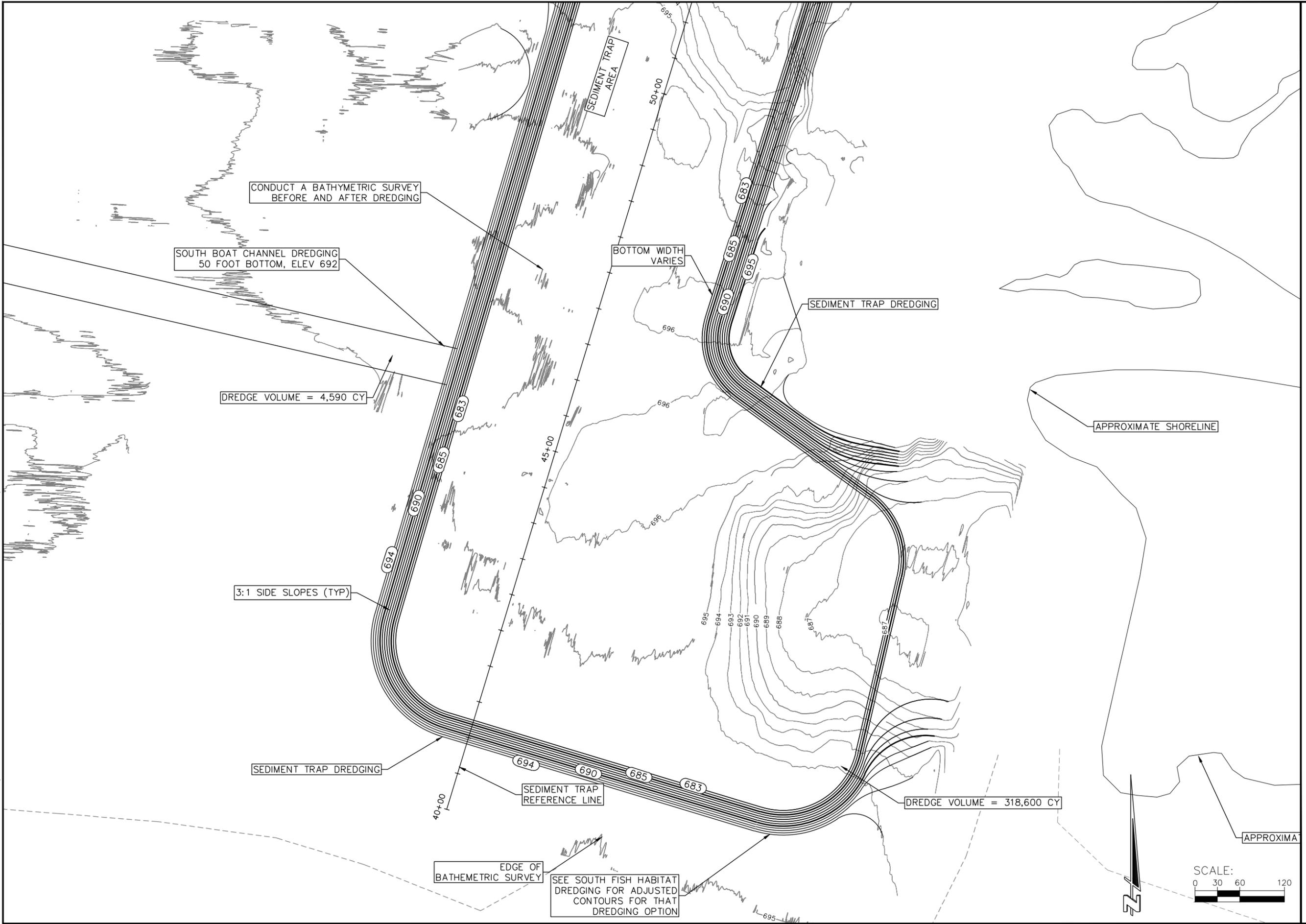
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DREDGING DETAIL

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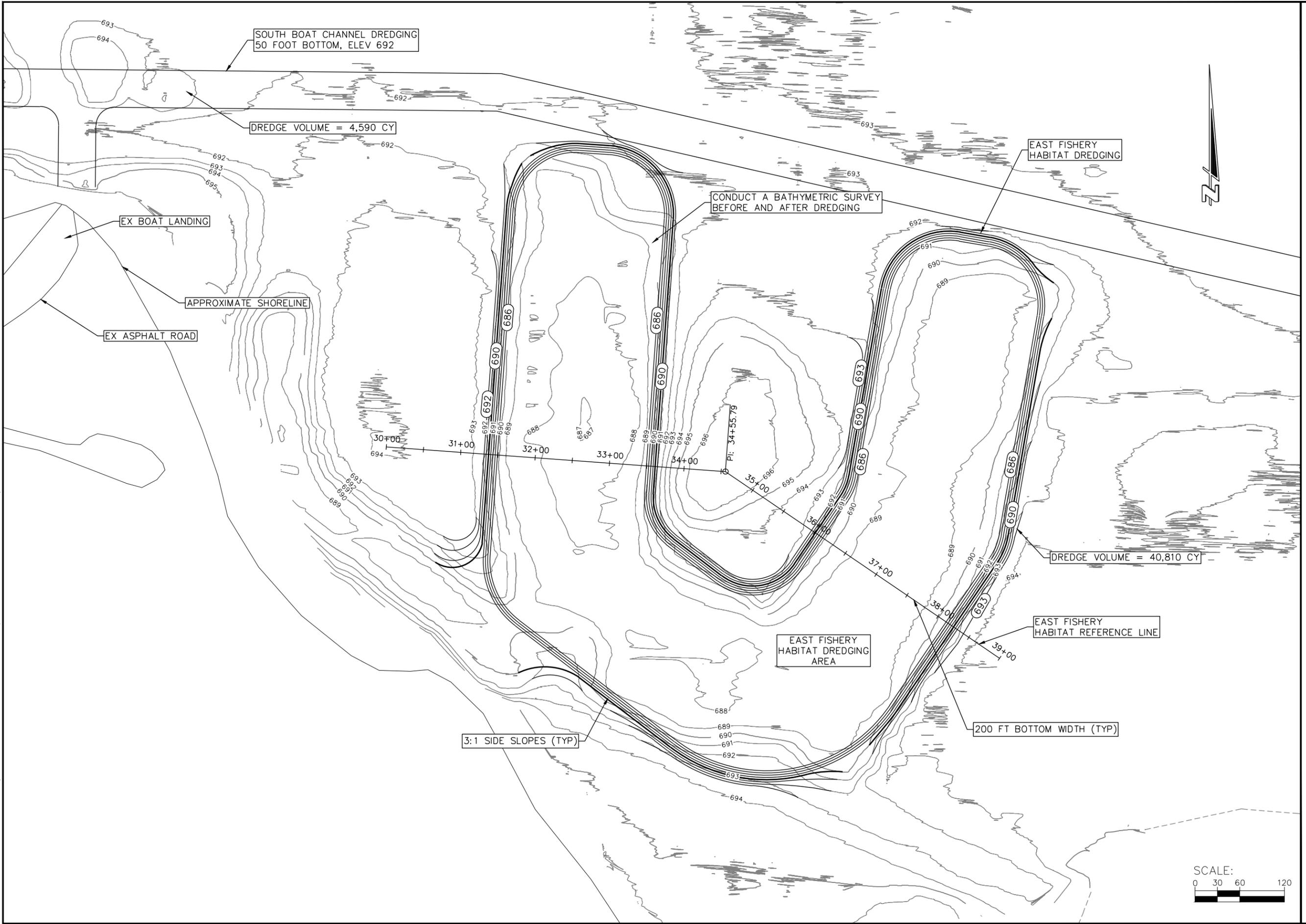
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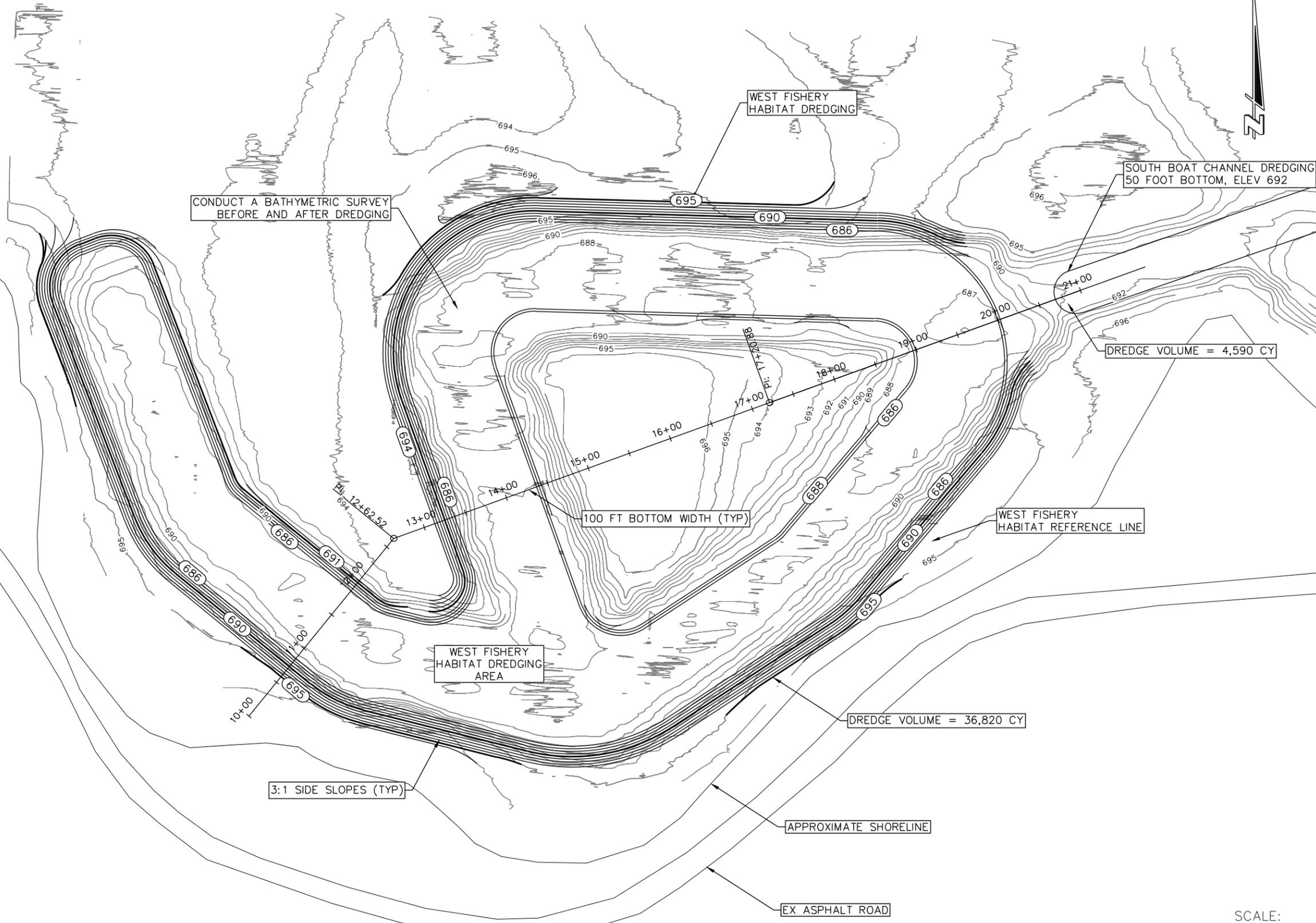
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DREDGING DETAIL

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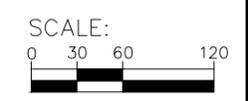
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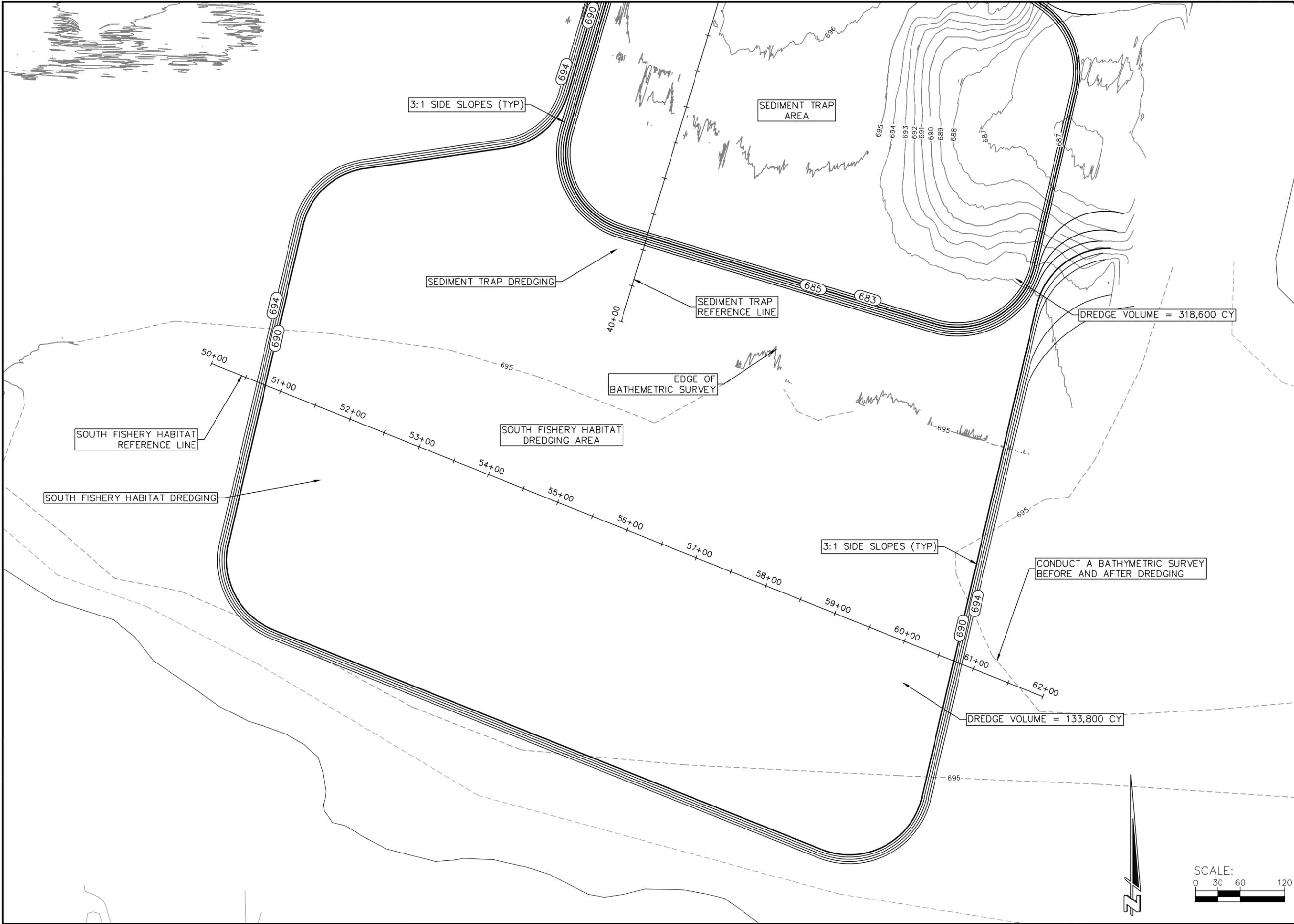
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DREDGING DETAIL



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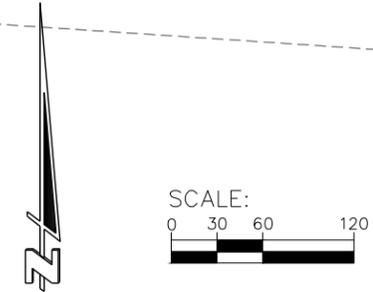
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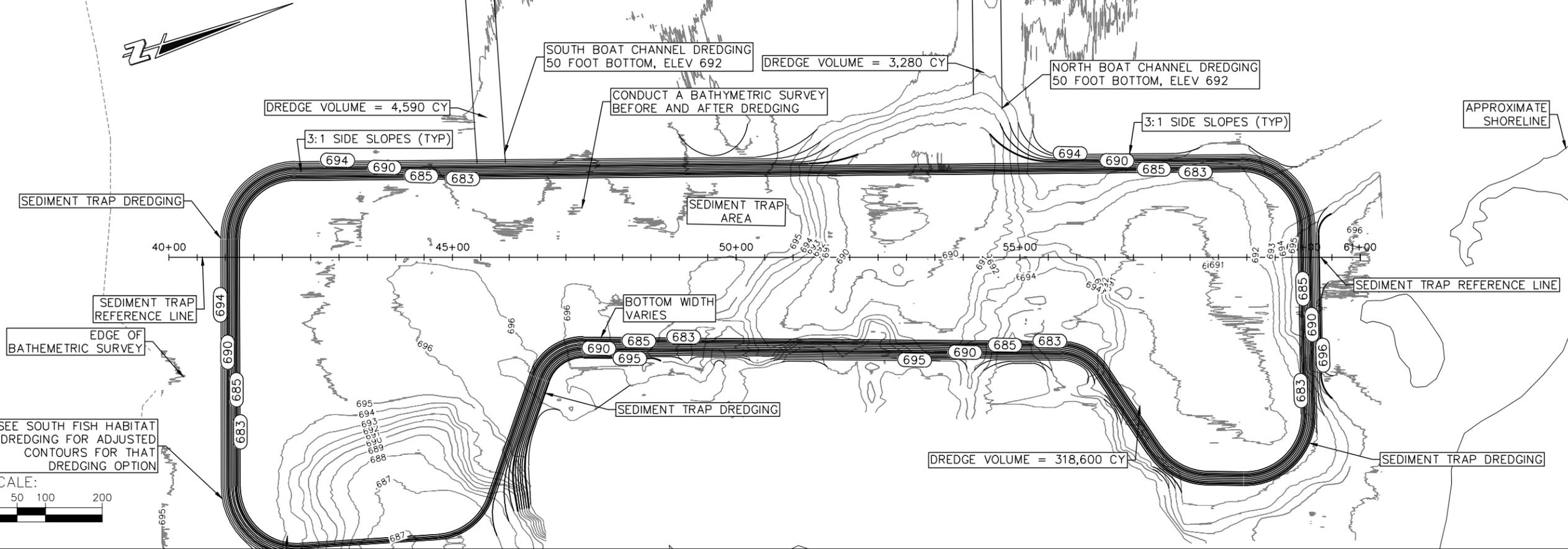
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DREDGING DETAIL



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SEE SOUTH FISH HABITAT DREDGING FOR ADJUSTED CONTOURS FOR THAT DREDGING OPTION

EDGE OF BATHYMETRIC SURVEY

SEDIMENT TRAP REFERENCE LINE

40+00

45+00

50+00

55+00

60+00

63+00

BOTTOM WIDTH VARIES

SEDIMENT TRAP AREA

APPROXIMATE SHORELINE

3:1 SIDE SLOPES (TYP)

DREDGE VOLUME = 3,280 CY

DREDGE VOLUME = 4,590 CY

NORTH BOAT CHANNEL DREDGING
50 FOOT BOTTOM, ELEV 692

SOUTH BOAT CHANNEL DREDGING
50 FOOT BOTTOM, ELEV 692

CONDUCT A BATHYMETRIC SURVEY
BEFORE AND AFTER DREDGING

694

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685

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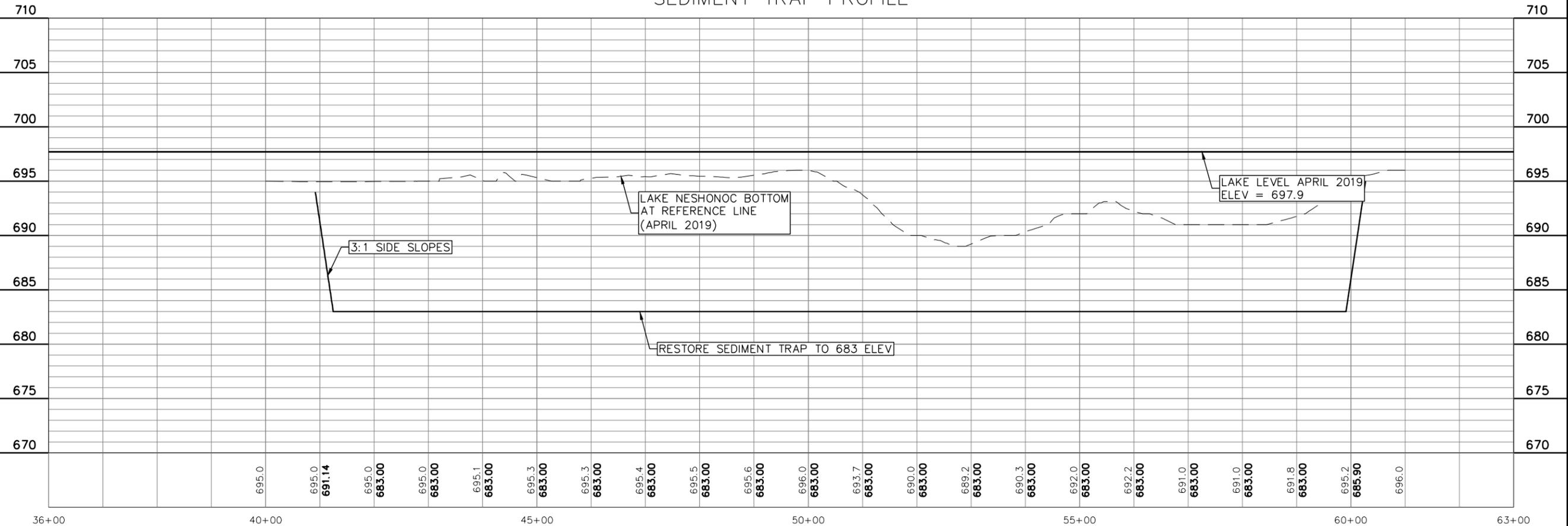
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SEDIMENT TRAP PROFILE



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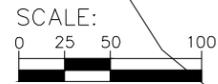
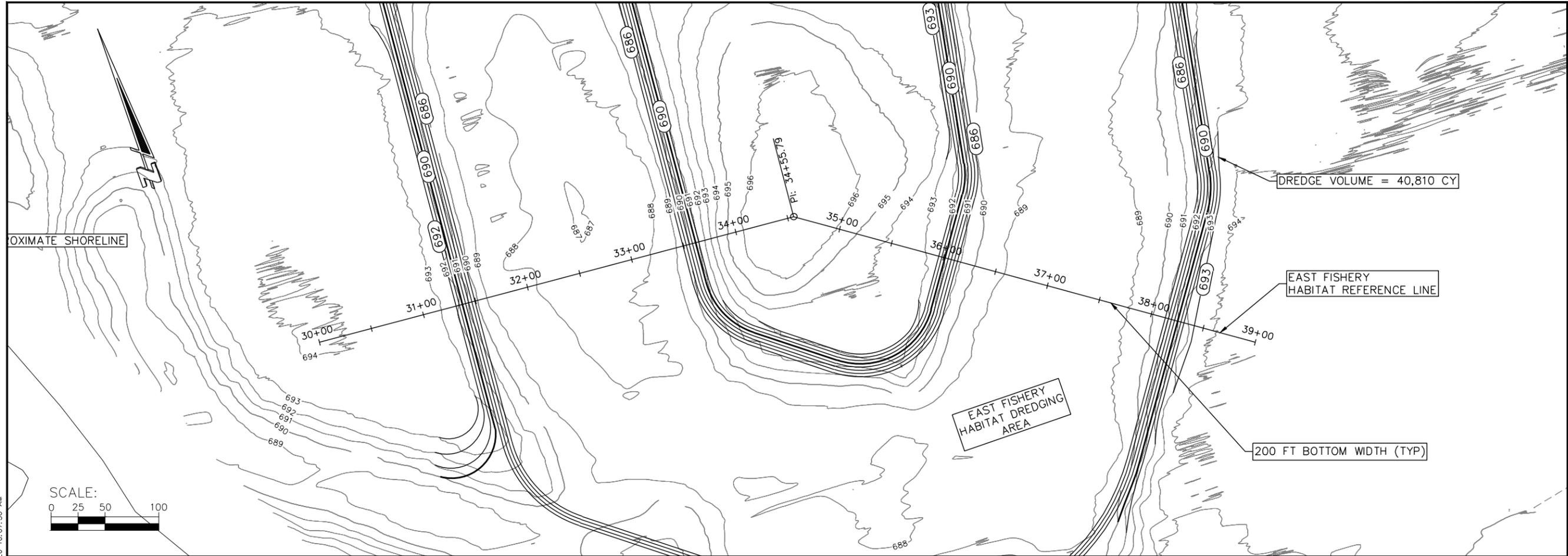
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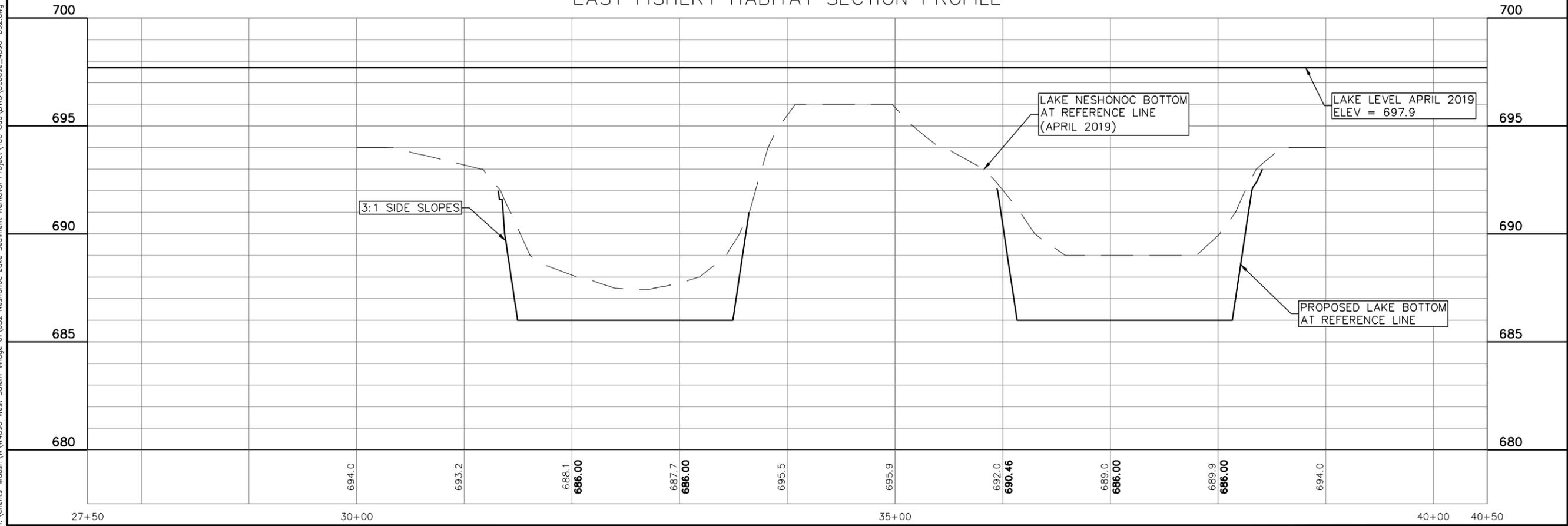
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PLAN & PROFILE SEDIMENT TRAP AREA

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EAST FISHERY HABITAT SECTION PROFILE



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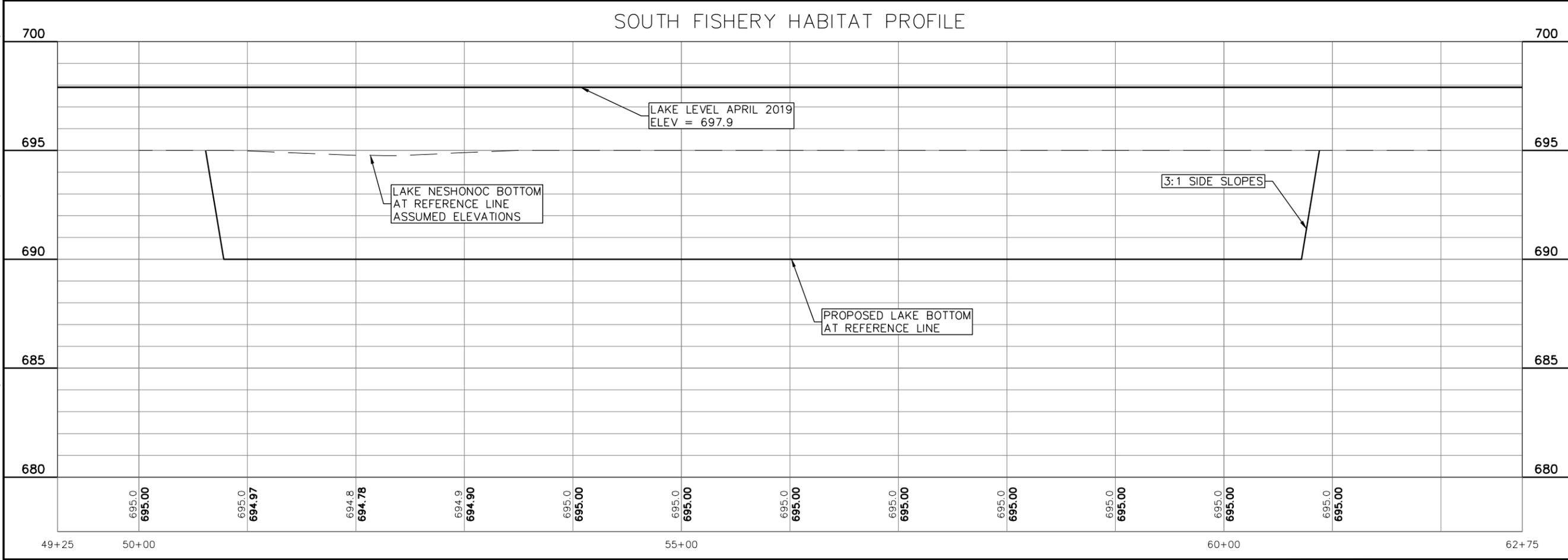
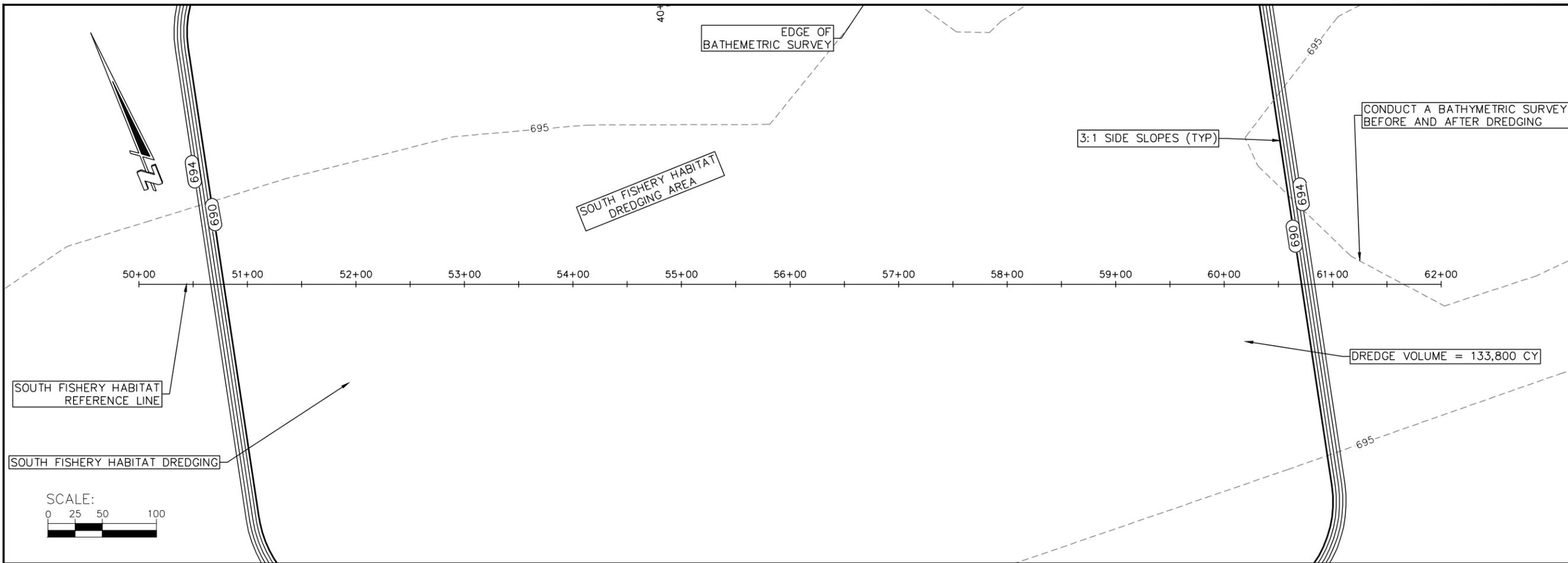
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PLAN & PROFILE EAST FISHERY HABITAT AREA

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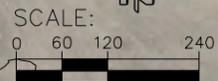
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PLAN & PROFILE SOUTH FISHERY HABITAT AREA

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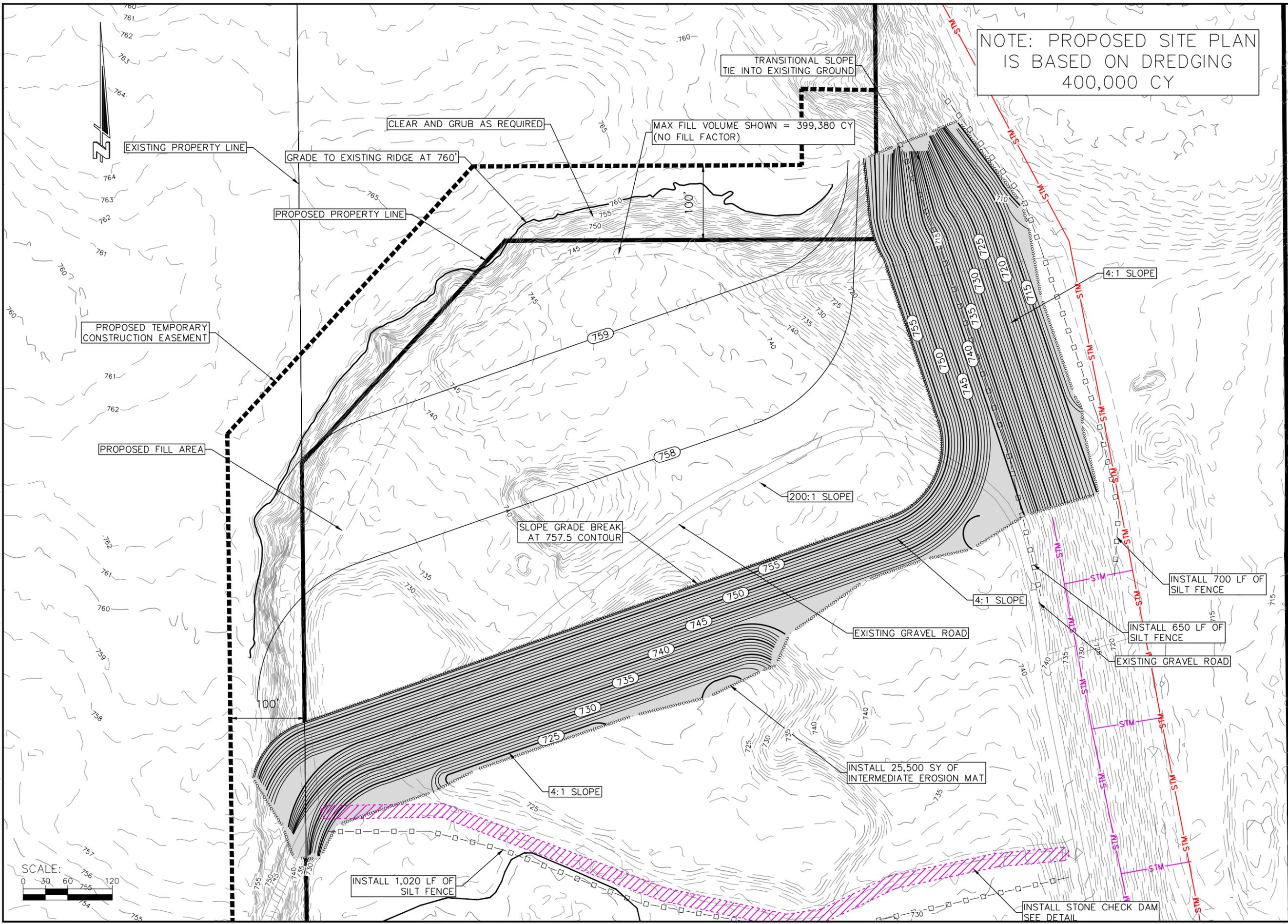
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VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
DREDGE MATERIAL DISPOSAL FACILITY SITE PLAN

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NOTE: PROPOSED SITE PLAN IS BASED ON DREDGING 400,000 CY

EXISTING PROPERTY LINE

GRADE TO EXISTING RIDGE AT 760'

CLEAR AND GRUB AS REQUIRED

MAX FILL VOLUME SHOWN = 399,380 CY (NO FILL FACTOR)

PROPOSED PROPERTY LINE

PROPOSED TEMPORARY CONSTRUCTION EASEMENT

PROPOSED FILL AREA

SLOPE GRADE BREAK AT 757.5 CONTOUR

200:1 SLOPE

EXISTING GRAVEL ROAD

4:1 SLOPE

INSTALL 700 LF OF SILT FENCE

INSTALL 650 LF OF SILT FENCE

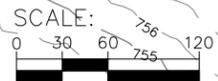
EXISTING GRAVEL ROAD

INSTALL 25,500 SY OF INTERMEDIATE EROSION MAT

4:1 SLOPE

INSTALL 1,020 LF OF SILT FENCE

INSTALL STONE CHECK DAM SEE DETAIL



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VILLAGE OF WEST SALEM
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SEDIMENT REMOVAL PROJECT
PROPOSED SITE PLAN (400,000 CY)

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NOTE: PROPOSED SITE PLAN IS BASED ON DREDGING 500,000 CY

TRANSITIONAL SLOPE TIE INTO EXISTING GROUND

MAX FILL VOLUME SHOWN = 501,015 CY (NO FILL FACTOR)

CLEAR AND GRUB AS REQUIRED

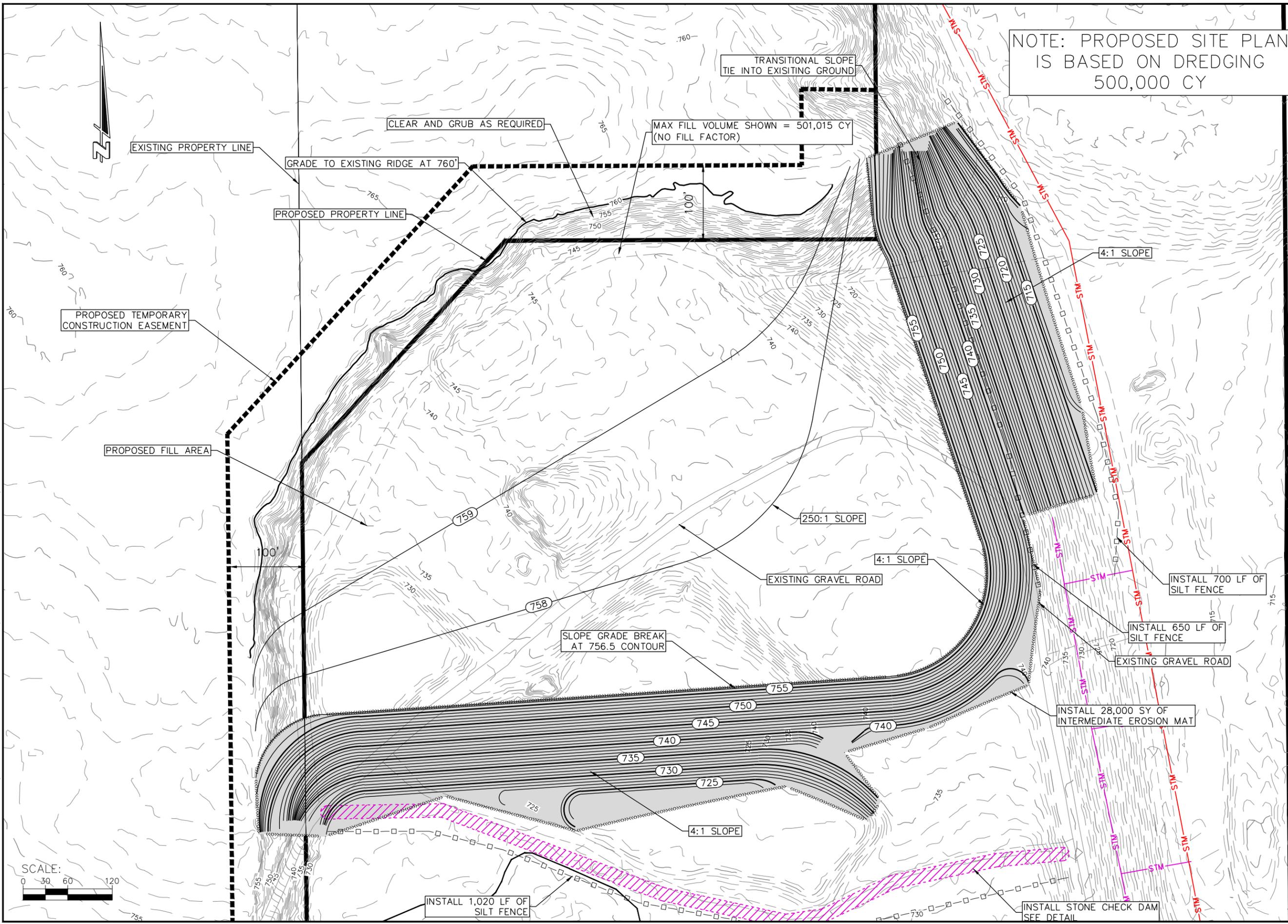
GRADE TO EXISTING RIDGE AT 760'

EXISTING PROPERTY LINE

PROPOSED PROPERTY LINE

PROPOSED TEMPORARY CONSTRUCTION EASEMENT

PROPOSED FILL AREA



INSTALL 1,020 LF OF SILT FENCE

INSTALL STONE CHECK DAM SEE DETAIL

INSTALL 28,000 SY OF INTERMEDIATE EROSION MAT

INSTALL 650 LF OF SILT FENCE

INSTALL 700 LF OF SILT FENCE

EXISTING GRAVEL ROAD

SLOPE GRADE BREAK AT 756.5 CONTOUR

250:1 SLOPE

4:1 SLOPE

4:1 SLOPE

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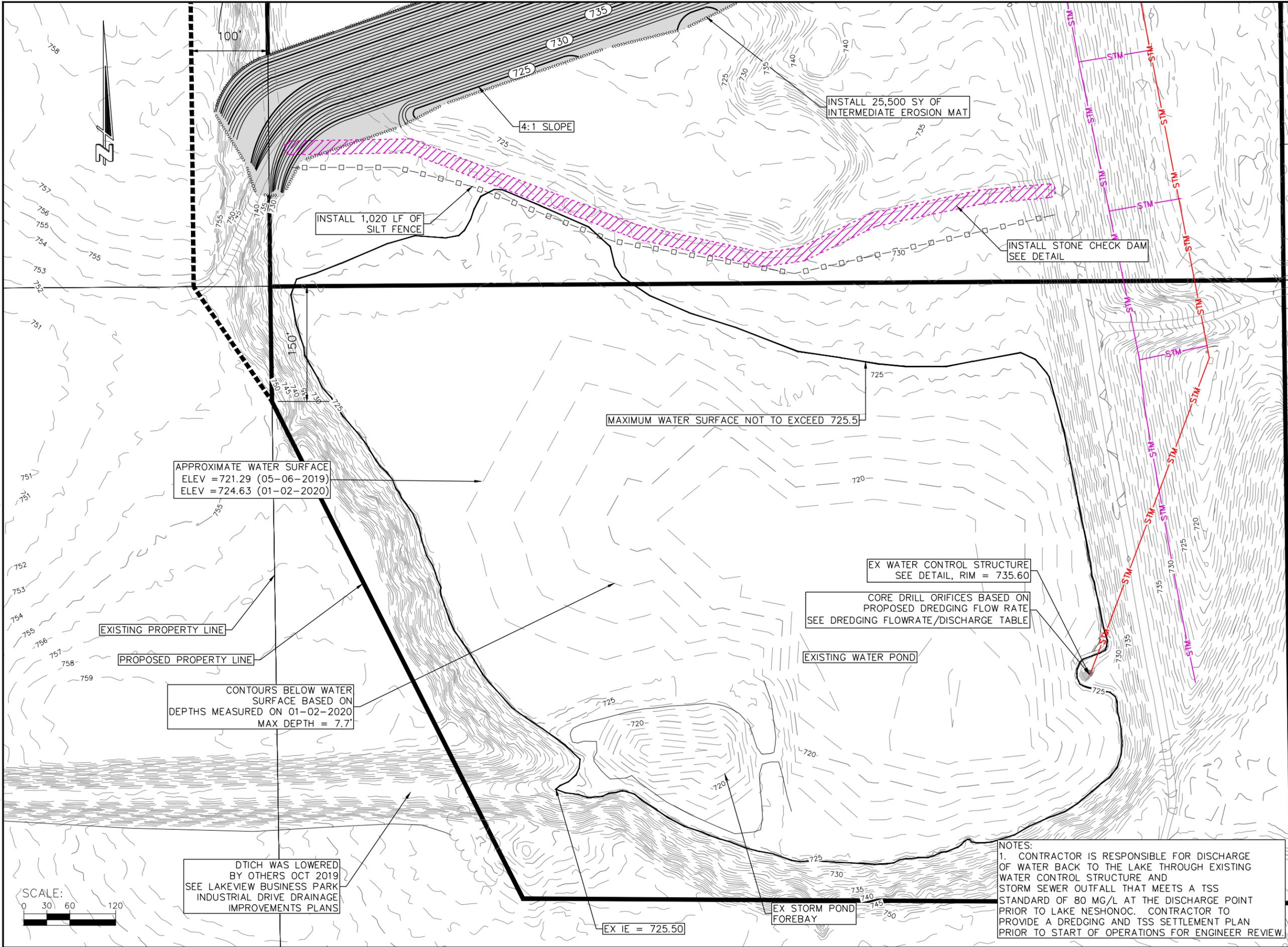
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VILLAGE OF WEST SALEM
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PROPOSED SITE PLAN (500,000 CY)

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APPROXIMATE WATER SURFACE
 ELEV = 721.29 (05-06-2019)
 ELEV = 724.63 (01-02-2020)

EXISTING PROPERTY LINE
 PROPOSED PROPERTY LINE

CONTOURS BELOW WATER SURFACE BASED ON DEPTHS MEASURED ON 01-02-2020
 MAX DEPTH = 7.7'

DTICH WAS LOWERED BY OTHERS OCT 2019
 SEE LAKEVIEW BUSINESS PARK INDUSTRIAL DRIVE DRAINAGE IMPROVEMENTS PLANS

EX IE = 725.50

EX STORM POND FOREBAY

EXISTING WATER POND

CORE DRILL ORIFICES BASED ON PROPOSED DREDGING FLOW RATE
 SEE DREDGING FLOWRATE/DISCHARGE TABLE

EX WATER CONTROL STRUCTURE
 SEE DETAIL, RIM = 735.60

MAXIMUM WATER SURFACE NOT TO EXCEED 725.5

4:1 SLOPE

INSTALL 1,020 LF OF SILT FENCE

INSTALL 25,500 SY OF INTERMEDIATE EROSION MAT

INSTALL STONE CHECK DAM
 SEE DETAIL

NOTES:
 1. CONTRACTOR IS RESPONSIBLE FOR DISCHARGE OF WATER BACK TO THE LAKE THROUGH EXISTING WATER CONTROL STRUCTURE AND STORM SEWER OUTFALL THAT MEETS A TSS STANDARD OF 80 MG/L AT THE DISCHARGE POINT PRIOR TO LAKE NESNONOC. CONTRACTOR TO PROVIDE A DREDGING AND TSS SETTLEMENT PLAN PRIOR TO START OF OPERATIONS FOR ENGINEER REVIEW.

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VILLAGE OF WEST SALEM
 LAKE NESNONOC
 SEDIMENT REMOVAL PROJECT
 PROPOSED SITE PLAN

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RIM ELEV = 735.60

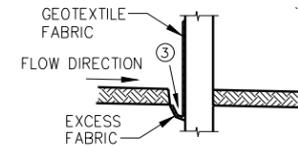
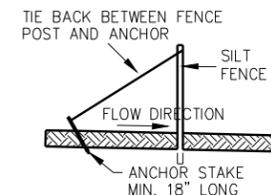
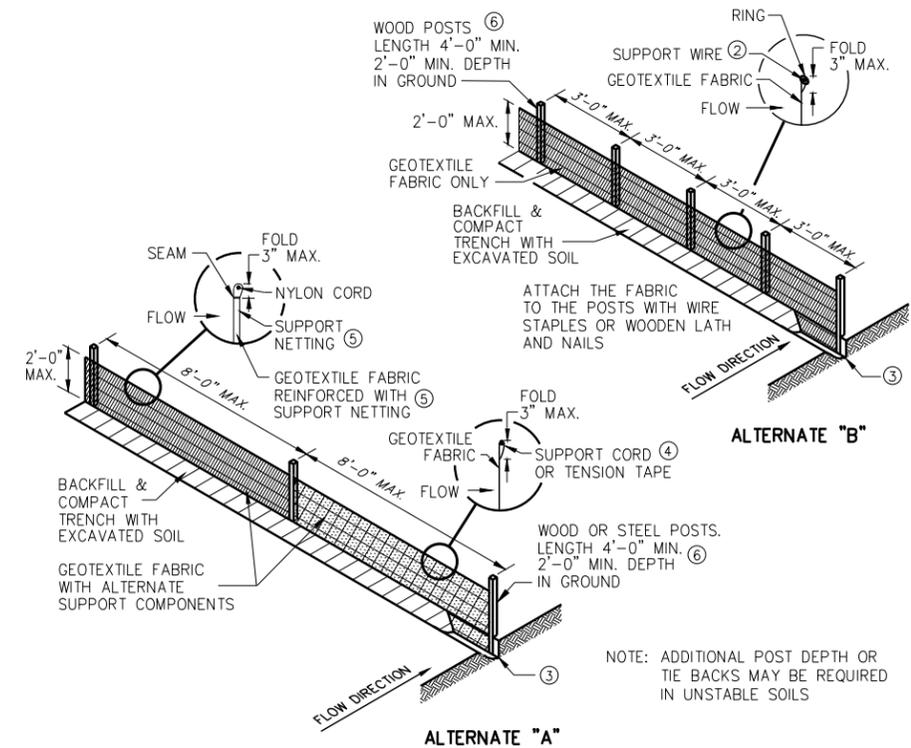
EXISTING ORIFICE SCHEDULE

NUMBER	ELEV
1	728.45
2	728.49
3	728.56
4	728.57
5	729.46
6	729.54
7	729.60
8	729.60
9	730.48
10	730.53
11	730.56

NOTE: PROPOSED ORIFICES SHALL BE CORE DRILLED ACCORDING TO PROPOSED DREDGING RATE SEE DREDGING FLOWRATE/DISCHARGE TABLE

EX WATER CONTROL STRUCTURE DETAIL

NO SCALE



GENERAL NOTES

DETAIL OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

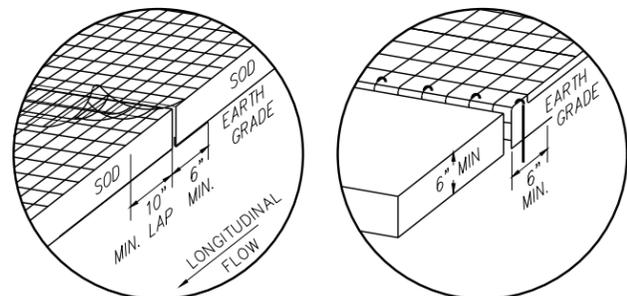
WHEN POSSIBLE THE SILT FENCE SHOULD BE CONSTRUCTED IN AN ARC OR HORSESHOE SHAPE, WITH THE ENDS POINTING UPSLOPE TO MAXIMIZE BOTH STRENGTH AND EFFECTIVENESS.

- CROSS BRACE WITH 2"x4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS AS DIRECTED BY THE ENGINEER.
- MINIMUM 14 GAGE WIRE REQUIRED, FOLD FABRIC 3" OVER THE WIRE AND STAPLE OR PLACE WIRE RINGS ON 12" C-C.
- EXCAVATE A TRENCH A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
- WIRE SUPPORT FENCE SHALL BE 14 GAGE MINIMUM WOVEN WIRE WITH A MAXIMUM MESH SPACING OF 6". SECURE TOP OF GEOTEXTILE FABRIC TO TOP OF FENCE WITH STAPLES OR WIRE RINGS AT 12" C-C.
- GEOTEXTILE FABRIC SHALL BE REINFORCED WITH AN INDUSTRIAL POLYPROPYLENE NETTING WITH A MAXIMUM MESH SPACING OF 3/4" OR EQUAL. A HEAVY DUTY NYLON TOP SUPPORT CORD OR EQUIVALENT IS REQUIRED.
- STEEL POSTS SHALL BE STUDDED "TEE" OF "U" TYPE WITH A MINIMUM WEIGHT OF 1.28 LBS/LINEAL FOOT (WITHOUT ANCHOR). FIN ANCHORS SUFFICIENT TO RESIST POST MOVEMENT ARE REQUIRED. WOOD POSTS FOR GEOTEXTILE FABRIC REINFORCED WITH NETTING SHALL BE A MINIMUM SIZE OF 1-1/8"x1-1/8" OAK OR HICKORY.

ALTERNATES A & B ARE EQUAL AND EITHER MAY BE USED.

SILT FENCE

NO SCALE

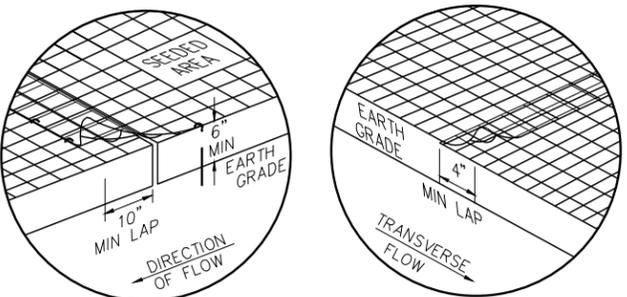


JUNCTION SLOT SOD ONLY

DETAIL A

ANCHOR SLOT AT BEGINNING AND END OF EROSION MAT

DETAIL B

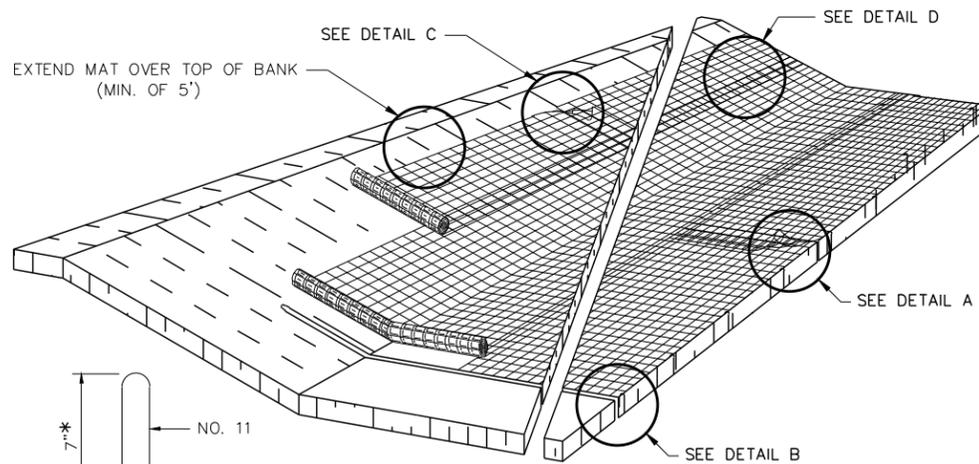


JUNCTION SLOT SEED ONLY

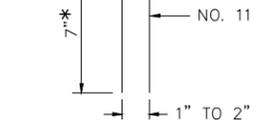
DETAIL C

LAP JOINT SEED AND SOD

DETAIL D



TYPICAL STAPLE



- * 6" MIN (HIGHLY COMPACT SOILS)
- 8" MIN (FRIABLE SOILS)
- 10" MIN (LOOSE AND SANDY SOILS)

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

LAP JOINTS SHALL NOT BE PLACED IN THE BOTTOM OF V-SHAPED DITCHES.

JUNCTION SLOTS ON ADJACENT STRIPS OF MATTING SHALL BE STAGGERED A MINIMUM OF 4 FEET APART.

EDGES OF THE EROSION MAT SHALL BE IMPRESSED IN THE SOIL.

FOR EROSION MAT OVER SEEDING JUNCTION OR ANCHOR SLOTS SHALL BE AT MINIMUM INTERVALS OF 50 FEET.

CLASS	TYPE
A	TEMPORARY
B	INTERMEDIATE
C	PERMANENT

EROSION MAT

JOB NO.	4896-052
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DRAWING FILE	021001_CD_4896-052

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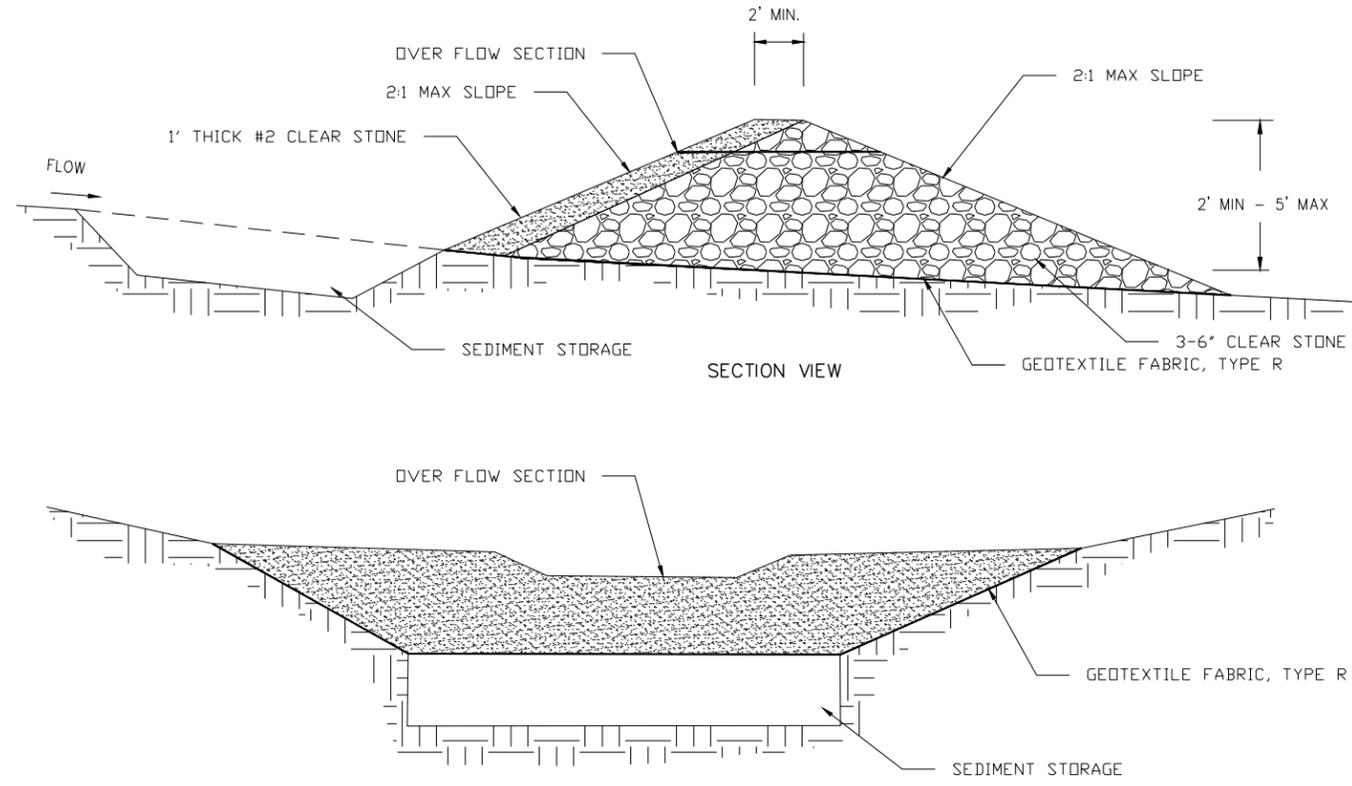
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VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL PROJECT
DETAILS



STONE CHECK DAM
NO SCALE

NOTE: STONE CHECK DAM TO BE MAINTAINED
THROUGHOUT DURATION OF PROJECT
AND IS TO BE LEFT IN PLACE
FOLLOWING PROJECT COMPLETION

JOB NO. 4896-052
BOOK NO.
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CHECKED BY DKS
DATE JANUARY 2020
REVISIONS
REFERENCE FILE
DRAWING FILE 021001_CD_4896-052

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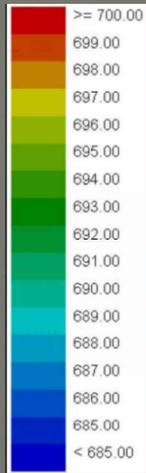
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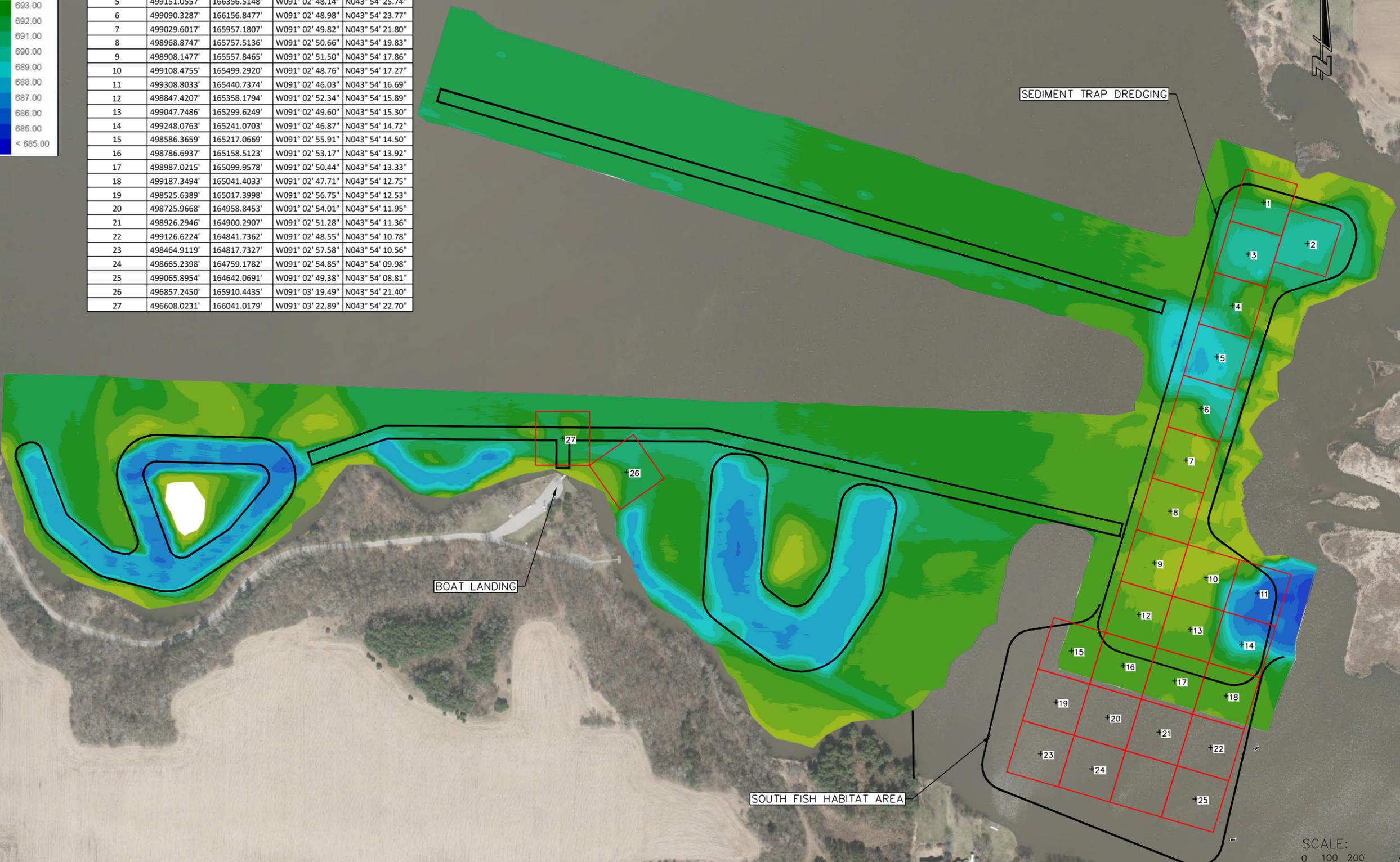
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VILLAGE OF WEST SALEM
 LAKE NESHONOC
 SEDIMENT REMOVAL PROJECT
 DETAILS

Appendix L: Sediment Removal Areas, Sediment Sample Locations



Sample No.	Easting	Northing	Longitude	Latitude
1	499333.2366'	166955.5160'	W091° 02' 45.63"	N043° 54' 31.64"
2	499503.2009'	166797.1279'	W091° 02' 43.31"	N043° 54' 30.08"
3	499272.5096'	166755.8489'	W091° 02' 46.47"	N043° 54' 29.68"
4	499211.7826'	166556.1819'	W091° 02' 47.31"	N043° 54' 27.71"
5	499151.0557'	166356.5148'	W091° 02' 48.14"	N043° 54' 25.74"
6	499090.3287'	166156.8477'	W091° 02' 48.98"	N043° 54' 23.77"
7	499029.6017'	165957.1807'	W091° 02' 49.82"	N043° 54' 21.80"
8	498968.8747'	165757.5136'	W091° 02' 50.66"	N043° 54' 19.83"
9	498908.1477'	165557.8465'	W091° 02' 51.50"	N043° 54' 17.86"
10	499108.4755'	165499.2920'	W091° 02' 48.76"	N043° 54' 17.27"
11	499308.8033'	165440.7374'	W091° 02' 46.03"	N043° 54' 16.69"
12	498847.4207'	165358.1794'	W091° 02' 52.34"	N043° 54' 15.89"
13	499047.7486'	165299.6249'	W091° 02' 49.60"	N043° 54' 15.30"
14	499248.0763'	165241.0703'	W091° 02' 46.87"	N043° 54' 14.72"
15	498586.3659'	165217.0669'	W091° 02' 55.91"	N043° 54' 14.50"
16	498786.6937'	165158.5123'	W091° 02' 53.17"	N043° 54' 13.92"
17	498987.0215'	165099.9578'	W091° 02' 50.44"	N043° 54' 13.33"
18	499187.3494'	165041.4033'	W091° 02' 47.71"	N043° 54' 12.75"
19	498525.6389'	165017.3998'	W091° 02' 56.75"	N043° 54' 12.53"
20	498725.9668'	164958.8453'	W091° 02' 54.01"	N043° 54' 11.95"
21	498926.2946'	164900.2907'	W091° 02' 51.28"	N043° 54' 11.36"
22	499126.6224'	164841.7362'	W091° 02' 48.55"	N043° 54' 10.78"
23	498464.9119'	164817.7327'	W091° 02' 57.58"	N043° 54' 10.56"
24	498665.2398'	164759.1782'	W091° 02' 54.85"	N043° 54' 09.98"
25	499065.8954'	164642.0691'	W091° 02' 49.38"	N043° 54' 08.81"
26	496857.2450'	165910.4435'	W091° 03' 19.49"	N043° 54' 21.40"
27	496608.0231'	166041.0179'	W091° 03' 22.89"	N043° 54' 22.70"



JOB NO.	4896-052
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REVISIONS	OCTOBER 2020
REFERENCE FILE	
DRAWING FILE	00BASE_4896-058

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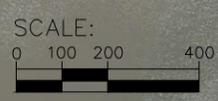
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VILLAGE OF WEST SALEM
LAKE NESHONOC
SEDIMENT REMOVAL AREAS
SEDIMENT SAMPLE LOCATIONS



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Appendix M: Laboratory Test Results for Sediment Testing



Soil and Forage Analysis Lab
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2820 Walton Commons West, Suite 142
Madison, WI 53718
Project 3680-0006

Dave Sauer - Cedar Corporation
2820 Walton Commons West, Suite 142
Madison, WI 53718
Project 3680-0006

Date 9/30/20
Acct # 558202
Lab # 3286

Location: Village of West Salem Lake
Neshonoc

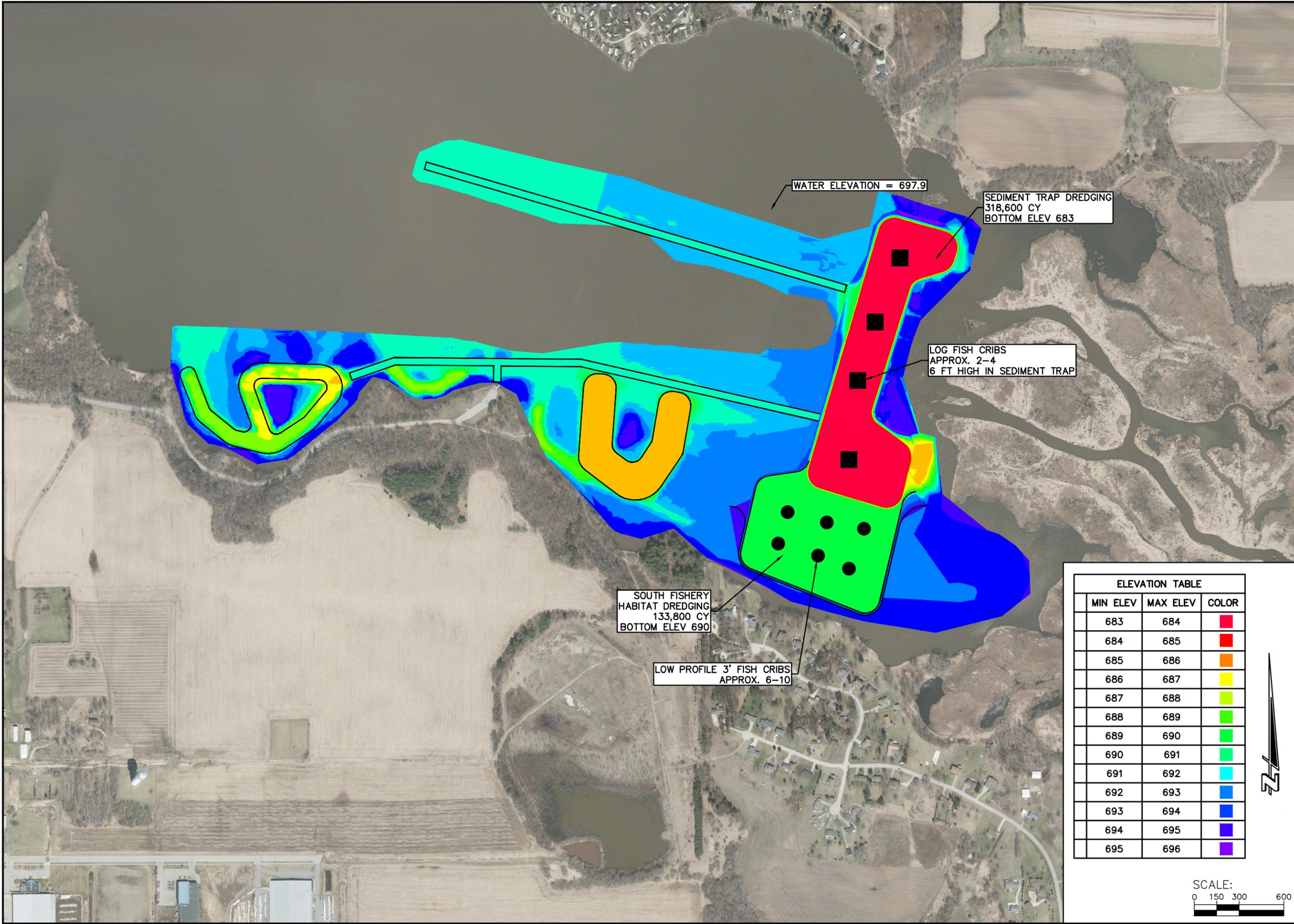
Location: Village of West Salem Lake Neshonoc

Soil - Sieve Analysis

Sample	% by weight retained on Sieve #										Cumulative % by weight passing Sieves			S	Wt	g	S+J Wt	g	Bulk Density	g/cc	nitric/peroxide %	P Bray-1 ppm	Sand %	Silt %	Clay %	Texture Name
	on 10	on 30	on 60	on 200	<200	>10	>30	>60	<200	Sample	Solids %	Moisture %	Broken Jar													
1	7	6	19	40	28	93	87	68	28	1	72.37	27.63		2088.0	1642.3	1.59	0.04	73	75	12	13	sandy loam				
2	43	8	3	9	36	56	49	45	36	2	48.18	51.82		1765.0	1319.3	0.90	0.14	43	21	58	21	silt loam				
3	42	7	3	13	34	57	51	47	34	3	51.03	48.97		1790.0	1344.3	0.96	0.13	53	25	54	21	silt loam				
4	9	5	22	39	26	91	87	65	26	4	66.16	33.84		1989.0	1543.3	1.39	0.06	75	61	24	15	sandy loam				
5	6	6	47	22	20	94	88	41	20	5	69.86	30.14		1946.0	1500.3	1.43	0.04	88	75	12	13	sandy loam				
6	14	6	15	34	31	86	80	65	31	6	64.24	35.76		1981.0	1535.3	1.34	0.07	69	61	24	15	sandy loam				
7 deep	21	5	11	27	36	79	74	63	36	7 deep	64.44	35.56		2002.0	1556.3	1.36	0.10	53	45	36	19	loam				
8	1	2	44	41	12	99	98	54	12	8	82.55	17.45		2278.0	1832.3	1.98	0.03	80	89	4	7	sand				
9	7	2	19	34	38	93	90	72	38	9	67.44	32.56		2054.0	1608.3	1.46	0.08	67	57	30	13	sandy loam				
10 deep	7	7	38	35	12	93	85	47	12	10 deep	80.78	19.22	x	2280.0	1834.3	1.94	0.04	76	81	8	11	sandy loam				
11	27	6	15	30	22	73	66	52	22	11	62.02	37.98	x	1897.0	1451.3	1.24	0.07	58	57	26	17	sandy loam				
12	44	6	3	6	41	56	50	47	41	12	57.17	42.83		1913.0	1467.3	1.15	0.14	36	25	54	21	silt loam				
13	36	5	5	12	42	64	59	54	42	13	60.35	39.65		1944.0	1498.3	1.23	0.14	47	26	56	18	silt loam				
14	69	7	2	3	19	31	24	22	19	14	49.54	50.46	x	1805.0	1359.3	0.94	0.14	31	12	64	24	silt loam				
15	2	1	11	65	21	98	98	86	21	15	76.08	23.92		2333.0	1887.3	1.87	0.04	52	78	10	12	sandy loam				
16	61	6	2	4	27	39	32	30	27	16	54.37	45.63		1869.0	1423.3	1.07	0.19	28	6	68	26	silt loam				
17	7	3	18	49	22	93	90	71	22	17	77.29	22.71		2247.0	1801.3	1.83	0.05	95	70	16	14	sandy loam				
18	7	4	30	35	24	93	89	60	24	18	74.64	25.36	x	2107.0	1661.3	1.66	0.05	94	66	20	14	sandy loam				
19	40	6	6	29	20	60	55	48	20	19	60.41	39.59	x	1892.0	1446.3	1.20	0.12	113	48	32	20	loam				
20	30	7	11	36	16	70	63	52	16	20	61.60	38.40	x	1953.0	1507.3	1.27	0.07	66	54	26	20	sandy clay loam				
21 deep	23	3	7	37	28	76	73	66	28	21 deep	71.15	28.85		2123.0	1677.3	1.59	0.05	45	60	24	16	sandy loam				
22	0	2	20	66	12	99	98	78	12	22	82.99	17.01		2289.0	1843.3	2.00	0.02	61	82	8	10	loamy sand				
23	72	5	2	3	19	28	24	22	19	23	44.33	55.67		1726.0	1280.3	0.81	0.15	32	4	72	24	silt loam				
24	57	7	4	10	23	43	36	32	23	24	52.68	47.32	x	1800.0	1354.3	1.00	0.10	62	36	46	19	loam				
25	55	5	3	8	29	45	40	38	29	25	56.56	43.44	x	1847.0	1401.3	1.10	0.14	47	26	56	19	silt loam				
26 deep	1	2	14	76	7	99	97	83	7	26 deep	81.27	18.73		2219.0	1773.3	1.90	0.01	31	90	4	7	sand				
27	2	2	18	69	8	98	96	77	8	27	82.00	18.00	x	2203.0	1757.3	1.90	0.02	73	88	6	7	loamy sand				

Appendix N: Habitat Improvements Map

I:\Clients-Madsen\W\4896 West Salem Village of\052 Neshonoc Lake Sediment Removal Project\100 Cad\DWG\00base_4896-052-add2.dwg 10/07/20 12:06:11 PM



WATER ELEVATION = 697.9

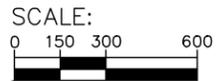
SEDIMENT TRAP DREDGING
318,600 CY
BOTTOM ELEV 683

LOG FISH CRIBS
APPROX. 2-4
6 FT HIGH IN SEDIMENT TRAP

SOUTH FISHERY
HABITAT DREDGING
133,800 CY
BOTTOM ELEV 690

LOW PROFILE 3' FISH CRIBS
APPROX. 6-10

ELEVATION TABLE		
MIN ELEV	MAX ELEV	COLOR
683	684	Red
684	685	Orange
685	686	Yellow
686	687	Light Green
687	688	Green
688	689	Light Blue
689	690	Blue
690	691	Light Purple
691	692	Dark Purple
692	693	Dark Blue
693	694	Blue
694	695	Light Blue
695	696	Light Green



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