State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
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Superior, WI 54880

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January 24, 2020

IP-NO-2019-16-04003
IP-NO-2019-16-04350

United States Environmental Protection Agency
Great Lakes National Program Office
c/o William Murray & Diana Mally
77 West Jackson Blvd. G-9J
Chicago, IL60604-3590

Dear Mr. Murray and Ms. Mally:

The Department of Natural Resources has completed its review of your application for a permit to remove materials from the bed and place miscellaneous structures on the bed of the St Louis River, in the City of Superior, Douglas 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 also be aware that the approved application and plans were issued for the permit process and not for construction. Prior to beginning construction, final plan sets issued for construction certified in accordance with ch. NR 712, Wis. Adm. Code (i.e., certification statement, P.E. stamp, signed and dated) shall be submitted to the Department for written approval.

Joe Graham is the Department's designated project manager (DNR PM) for this contaminated sediment remediation project. All submittals requiring DNR PM approval under the permit shall be submitted to Mr. Graham electronically at Joseph.Graham@Wisconisn.gov or by delivery to 810 W. Maple St., Spooner, WI 54801, with a courtesy copy to me. You shall notify me of the of the date you plan to start work and when the project is complete

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.

If you have any questions about your permit, please call me at (715) 392-0803 or email Steven.LaValley@wisconsin.gov.

Sincerely,

Steven LaValley
Water Management Specialist

cc: Bill Sande - Project Manager, U.S. Army Corps of Engineers
Douglas County Zoning Administrator
Steve Rumple – USACE PM, Stephen.T.Rumple@usace.army.mil Eric Dievendorf – Consulting Engineer, eric.dievendorf@arcadis.com
Joseph Graham – DNR PM, joseph.graham@wisconsin.gov
Sean Smith – Fraser Shipyards PM, ssmith@noengwks.com
Darienne McNamara – City of Superior PM, mcnamarad@ci.superior.wi.us

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

Dredging PERMIT
Miscellaneous structure PERMIT
IP-NO-2019-16-04003
IP-NO-2019-16-04350

The United State Environmental Protection Agency (EPA) is hereby granted under Section 30.20(2) and Section 30.12(3m), Wisconsin Statutes, a permit to remove materials from the bed of the St. Louis River and to place structures on the bed of the river within Howards Bay, in the City of Superior, Douglas County, generally described as being in the E ½ of the SE ¼ of Section 10, the SW ¼ of the SE ¼ and the SW ¼ of Section 11, and the NW ¼ of the NE ¼ of Section 14, Township 49 North, Range 14 West, subject to the following conditions:

PERMIT

1. You must notify Steven LaValley at phone (715) 392-0803 or email Steven.LaValley@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 December 31, 2021. 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 provided for the permit process prepared by Arcadis U.S., Inc., under contract to the United States Army Corps of Engineers (USACE), 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. Prior to beginning construction, final plan sets issued for construction that are certified in accordance with ch. NR 712, Wis. Adm. Code (i.e., certification statement, P.E. stamp, signed and dated) shall be submitted to the Department for approval.

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. A pre-construction meeting will be held in which the applicants, riparian owners, consultants, contractors, subcontractors, resident/project engineers, City of Superior, Fraser Shipyards, Inc., USACE, and the Department are invited to attend. You shall notify the Department a minimum of 10 working days prior to the date of the meeting.

6. 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.

7. 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.

8. 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.

9. 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.

10. You shall supply a copy of this permit to all parties associated with the project, including, but not limited to, contractors, subcontractors, and riparian owners in the project area.

11. 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.

12. You must submit to the Department bathymetric survey results and a contour map(s) showing the elevations of the bed for the entire project area after work is complete.

13. 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.

14. Permissions by riparian owners must be obtained and submitted to the DNR before the installation of monitoring buoys or placement of sand cover material on the river bed adjacent to their property.

15. Air curtains will be installed, operated, and maintained at the entrances to Fraser Slip, Cummings Slip, and Hughitt Slip to contain turbidity and associated contaminants during construction.

16. The project shall monitor water quality in Howards Bay following the procedures described in the November 9, 2018 Department memorandum with the subject line, *Resuspension Performance Monitoring (i.e. Turbidity Requirements) for Sediment Remediation in Howards Bay, Superior, Wisconsin (November 9, 2018 Memo)*. This memorandum is incorporated into this permit by reference. This project is following a performance-based approach that requires turbidity monitoring at a background location and at specific locations during construction that sets action levels and procedures to be taken when those levels are exceeded. The monitoring approach was developed to minimize the potential spread of contamination during construction in consideration of the conditions present at the site. In order to be protective to the resource and to accomplish the project goals, in consideration of site conditions, the DNR PM may require or approve changes to the monitoring and response procedures described in the November 9, 2018 memo. Requests for changes must be submitted in writing.

17. Turbidity shall be measured in Nephelometric Turbidity Units (NTU) and shall be recorded and reported as described in the November 9, 2018 memo. The action levels and required actions are detailed in Table 1 of the November 9, 2018 memo and summarized below.

    a. The Warning Level is 65 NTU. When the Warning Level is exceeded, the project will increase monitoring, inspect & repair BMPs, identify the cause of exceedance, make operational changes, and notify project oversight.

    b. The Action Level is 87 NTU. When the Action Level is exceeded, the project will increase monitoring, inspect & repair BMPs, make operational changes and continue work only if project oversight concurs.

    c. The Not to Exceed (NTE) Level is 110 NTU. When the NTE Level is exceeded in-water activities will stop until operational changes are made, levels drop below the NTE level for 30-minutes, DNR PM is notified by email, and oversight concurs.

18. 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 .

19. As a remedial action to address contaminated sediment the project shall use the procedures, equipment, and contractors appropriate for the work to safely achieve remedial goals in a manner that is protective of human health and the environment.

20. The project shall use sound environmental practices, including environmental controls to prevent and to control releases of fuel, hydraulic fluids, and waste during dredging activities, including but not limited to:

    a. Providing on-site plans and equipment to contain and absorb potential fuel/hydraulic fluid spills such as containment and absorption booms.

    b. Providing on-site plans and equipment to contain and absorb sheen outside the dredging containment system.

    c. Providing on-site plans and equipment to contain any release of dredged material or interstitial/carriage water to areas beyond project limits.

21. Material must be dredged by equipment which is designed to minimize the amount of sediment that is released into the water. Washing of equipment, scows, or debris during or following removal from the bed into the water and overflowing or pumping water from scows into the water are prohibited. Equipment must be properly sized so that excavation conforms to the plans.

22. A confirmation sampling plan must be submitted to the DNR PM for written approval. The sampling plan needs to include details on sampling locations, collection methods, segmentation of sample intervals, sampling parameters, laboratory methods and detection levels, and all other information relevant to sample collection and analysis. Confirmation samples must be collected and analyzed according to the approved plan. A laboratory certified under ch. NR 149 Wis. Adm. Code must be used for chemical analyses. All results, including lab analytical reports, field data, and core logs shall be submitted to the DNR PM.

23. This permit authorizes the placement of clean sand on the bed for management of post-dredge residual contamination. Prior to placement of the sand the project shall provide to the results of post-dredge sediment sampling results, post-dredge bathymetry, and other data necessary to demonstrate compliance with the project remedial goals. The project must receive written arrival from the DNR PM prior to placement of sand.

24. The sand used as a sediment cover for post-dredge residual contamination and enhanced natural recovery must be of a specific quality to ensure the protection of natural resources during construction and long-term, or otherwise be clean. The Department established specific testing and quality needs for sand used on this project in a March 27, 2017 memorandum with the subject line, *Recommendations for the Sand to be used for Residual Cover and Enhanced Natural Recovery in Howards Bay, Superior, Wisconsin*. In summary, a sample shall be analyzed for every 1,000 cubic yards from a commercial quarry or one sample from every 500 yards from noncommercial sources. The level of metals and total polycyclic aromatic hydrocarbons must be below threshold effects concentrations for benthic invertebrates. The gradation needs to have a fines content of 1% or less passing the #200 sieve for residual cover, and 3.5% of less pass the #200 sieve for enhanced natural recovery.

25. The following contractor submittals identified in the project specifications will be submitted to the DNR PM for review: Environmental Protection Plan, Confirmation Sampling Plan, Sampling & Analysis Plan, On-Site Material Handling Plan, Waste Transportation and Disposal Plan, Work Sequence Schedule, Erosion Control Plan, Dust & Dust Control Plan, Environmental Dredging Plan, Cover Placement Plan, and Cover Placement Safety Plan, Erosion Control and Stormwater Management Compliance Notebook, Stormwater Notice of Termination, Waste Determination Documentation, Disposal Documentation for Hazardous and Regulated Waste, Solid Waste Management Report, As-Built Drawings, Record Drawings, Post-Removal Sampling Test Reports, Closure Report, Waste Test Reports, Certificates of Disposal, Wisconsin Point Landfill Placement Plan, Maintenance Instructions, Turbidity Monitoring Systems, and Daily Report of Environmental Dredging Operations.

26. Operation of vehicles on the bed must be approved by the Department.

27. All material handling and disposal must follow established protocols for the levels of contamination.

28. All material hauling trucks leaving the site must be covered to prevent contaminants from spilling from trucks along the designated disposal route to the disposal facilities. Trucks use to haul contaminated material off-site must be in good working condition, sealed, and the tires cleaned through an onsite tire wash as necessary, to prevent the spread of contaminants to public roads. Public roads must be kept clean and free of contaminated material.

29. All temporary structures must be removed from the project site upon completion of construction activities.

30. 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. The United State Environmental Protection Agency (EPA) filed an application for a permit to remove material from the bed of and to place structures on the bed of the St. Louis River to effectuate construction the Howards Bay Great Lakes Legacy Act (GLLA) project, generally the area is described as being in the E ½ of the SE ¼ of Section 10, the SW ¼ of the SE ¼ and the SW ¼ of Section 11, and the NW ¼ of the NE ¼ of Section 14, Township 49 North, Range 14 West, in the City of Superior, Douglas County,

2. Howards Bay is part of the St. Louis River and includes Hughitt Avenue Slip, Cummings Avenue Slip, and Fraser Slip.

3. In 1987 the St. Louis River was listed as one of 43 Area of Concerns (AOC) due to impairments of beneficial uses due to contamination and habitat degradation. The remedial action plan for the St Louis River AOC identifies the remediation of contaminated sediments in Howards Bay as a management action that needs to be completed to address beneficial use impairments and ultimately delist the AOC.

4. Howards Bay is listed as a site with reported sediment contamination in the Department's Bureau for Remediation and Redevelopment Tracking System (BRRTS) under BRRTS Case # 02-16-563449. Remediation of contaminated sediments is necessary to repair the environment and improve water quality at this site.

5. On May 02, 2019, the EPA executed a partnership agreement with Fraser Shipyards, the City of Superior, and the Department to cost share remedial action of contaminated sediments in Howards Bay under the GLLA. The USACE is providing design and construction services under an interagency agreement with EPA. Arcadis U.S., Inc. is the design contractor for USACE. USACE will also hire and oversee a construction contractor to complete the project.

6. The project will consist of over dredging areas of contaminated sediment by a foot and then placing a minimum of 6 and maximum of 9 inches of sand cover over the area where sediment has been removed. Depending on the level of contamination the sediment will be either hauled to the inactive city of Superior Landfill on Wisconsin Point where it will be used to improve the cover layer of the landfill cap or disposed of at an active commercial landfill where contamination levels exceed criteria for use in the landfill cover material. The dredged material placed at the city landfill will be covered with one foot of topsoil, consisting of six inches of commercially purchased topsoil over six inches of reclaimed soil from Erie Pier. Dredge. There are lightly contaminated areas (enhanced natural recovery) that are too shallow to be reached with a barge to remove the material. These areas will be covered with 6 to 9 inches of clean sand (they will all continue to be submerged).

7. A maximum of 100,000 cubic yards of contaminated sediment will be removed via mechanical dredging using an environmental bucket that is designed and operated to minimize the amount of sediment that escapes into the water.

8. A sediment cover consisting of 6 to 9 inches of sand may be placed on up to 20 acres of the bed for management of residual contamination after dredging. The actual area of sediment cover for dredge residuals is contingent on confirmation sampling results and the decision tree for the project. The project will report the locations and volumes of sediment cover to the DNR PM.

9. Enhanced natural recovery will be performed by placing 6 to 9 inches of sand to establish a sediment cover over approximately 1.1 acres of the bed at the locations shown in the plans.

10. The Department has completed an investigation of the project site and has evaluated the project as described in the application and plans.

11. The St. Louis River is a navigable water and a bulkhead line exists adjacent to the site.

12. 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.

13. The proposed project will not impact wetlands if constructed in accordance with this permit.

14. 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.

15. 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), 30.12(3m), Wisconsin Statutes and Chapters NR 102, 103, 345, and 724 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.

16. The placement of sand cover, as described in the final approved project plans, for management of dredged residuals and enhanced natural recovery meets the definition of a sediment cover in s. 292.01(17m), Stats. Financial assurance and continuing obligations for monitoring and maintenance are not applicable for sand cover at this site.

17. Any monitoring buoys and sand cover areas will not materially obstruct navigation because the area will remain open water. Also, the buoys will be marked and are temporary structures that must be removed at the end of the project.

18. The project will not be detrimental to the public interest. It is being undertaken to remove historic contamination and will improve habitat for fish and wildlife.

19. The placement of sand cover in areas of contamination will not materially reduce the flood flow capacity of a stream because the areas are small and located within back water areas with little or no flow.

20. The Dredging will not cause environmental pollution as defined in s. 299.01(4), is being undertaken to remove contaminated sediment, and will monitored and managed to prevent the suspension and spread of contamination.

21. Dredging and the enhanced natural recovery will not material injury rights of any riparian owners of real property that abuts any water body that is affected by the activity. If the conditions are followed.

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.

2. The Department has complied with s. 1.11, Wis. Stats.

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 Superior Service Center, Wisconsin on January 24, 2020.

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES
For the Secretary

By _____
Steven LaValley
Water Management Specialist

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: May 9, 2017 - Revised November 9, 2018 FILE REF: Howards Bay

TO: Howards Bay Project Design Team

FROM: Xiaochun Zhang and Joe Graham, WDNR

SUBJECT: Resuspension Performance Monitoring (i.e., Turbidity Requirements) for Sediment Remediation in Howards Bay, Superior, Wisconsin

The purpose of this memorandum is to provide Wisconsin DNR's requirements on turbidity control, specifically the resuspension performance standard, turbidity monitoring, and sediment resuspension control measures for dredging and cover placement in Howards Bay, Superior, Wisconsin. Recommendations are made based on engineering considerations necessary for the protection of water quality as well as some of the requirements anticipated to be included in a permit for dredging and cover placement activities under ch. 30, Wis. Stats.

Requirements:

1. Dredging and cover placement activities shall be conducted in a manner that prevent dispersal of sediment and associated residual contaminants away from (i) the Howards Bay project site and (ii) the immediate vicinity of active dredging or placement activities within the project site.

2. Operational sequencing must be considered to prevent contamination of areas outside designated management units and particularly recontamination of areas where dredging has been completed. For example, suspended sediment from dredging in slips has a high potential to be transported outside of the dredge area, settle and recontaminate completed areas in the navigation channel.

3. In consideration of the configuration of Howards Bay, assuming low unidirectional current and seiche effects under baseline condition, the point of application for the performance standard shall be applied at (i) the project site boundary towards St. Louis River and (ii) a distance of 150 feet from areas of active dredging or cover placement.

4. Dredging shall be conducted to minimize re-suspension of sediment to the maximum extent practicable to prevent total suspended solids (TSS) concentrations in excess of 80 mg/L above background at the point of standards application. This numerical value is the Not to Exceed (NTE) level to suspend operations and resolve the issues. Warning and Action levels at TSS concentrations of 50 and 65 mg/L, respectively, above the 0.5-hour average background will be used as a trigger to implement preventative action(s) to mitigate TSS levels prior to reaching the Action or NTE levels.

5. It is expected that the performance standard will be met through a combination of best management practices including temporary control measures, sequencing and operational controls.

6. Temporary control measures such as air curtains (bubble curtains), moon pools, turbidity barriers or silt curtains must be used as needed to meet the performance standard. <u>In addition, air curtains must be installed, operated and maintained at the entrances to Fraser slip, Cummings Slip, and Hughitt slip to contain contaminants.</u> Temporary control measures shall be installed prior to dredging or cover placement and removed from the waterbody after the water on both sides of the barrier is visually indiscernible. Standard specifications should be applied for bubble curtains,

moon pools, turbidity barriers and silt curtains including details for the type of materials, installation methods, and operations and maintenance.

7. Dredging must be done in a manner to minimize the amount of leakage returned to the water body due to the concern of suspended solids release that is preventable. An environmental bucket must be utilized for all contaminated sediment where the quality of the dredged material allows it (no interfering debris) and is recommended for uncontaminated sediment. The bucket should be moved quickly to deposit the dredged material onto a barge or onshore receiving area to minimize leakage into the water body. The bucket should not have holes for intentional drainage to promote dewatering unless it is operated within a dredging area containment BMP.

8. Turbidity monitoring and trigger levels do not apply to cover placement activities where the sand being placed meets the March 27, 2017 DNR recommendations for the Howards Bay project (i.e., clean-washed sand).

9. Table 1 summarizes the turbidity Warning, Action, and NTE level responses that are described in detail below.

10. The Not to Exceed (NTE) level is an 80-mg/L increase in TSS above the 0.5-hour average background and is equivalent to a field turbidity measurement of approximately 110 NTU based on a model (Eq. 1) developed by Groten et. al. for the 21st Avenue West Channel Embayment in Duluth, Minnesota.

    $$SSC = 1.1876 * Turb^{0.8872} * 1.04 \qquad \text{(Eq. 1)}$$

    where, SSC is the average concentration of suspended solids in mg/l and Turb is turbidity in NTU.

    The correlation of SSC to Turbidity developed for the 21st Avenue pilot project is adopted for the Howards Bay project to estimate TSS based on field measurement of turbidities assuming the samples contains less than 25% sand (Kreitinger et. al. 2017). Sustained turbidity above the trigger level for 30 minutes constitutes an exceedance.

11. A background monitoring station must be located in the area close to the confluence of Howards Bay and the St. Louis River. Turbidity at the background station must be continuously monitored in 10-minute intervals with calculated 0.5-hour running average turbidity levels and online data access capability. Figure 1 shows the recommended background location. Background turbidity data may also be supplemented using data collected by others for the St Louis River at the bridge crossings at the Bong (Highway 2) or Blatnick (Highway 53/535) bridges.

    Figure 1 shows a potential location of the background station and illustrates buffer areas of increasing radii at the mouth of Fraser slip. The performance standards-turbidity trigger levels (Warning, Action, and NTE) are applied at a distance of 150 feet.

12. Performance monitoring station(s) shall be located 150 feet from active dredging or cover placement. Depth integrated turbidity readings will be collected using a hand-held device twice a day near the middle of each shift with active dredging or placement activities. An average value of spatially integrated readings will be compared to the 0.5-hour average background level. Three-depth integrated readings must be collected from three monitoring locations within the

150ft radius. At each monitoring location, turbidity measurements must be taken at three water depths; 1/3 depth from surface, mid-depth, and 2/3 depth from surface.

13. The Warning Level is a 50 mg/L increase in TSS above 0.5-hour average background monitoring results. If turbidity readings from any performance monitoring location (i.e. the project site boundary and 150 feet from active dredging or cover placement activities) indicate an increase of 65 NTU (equivalent to 50 mg/l based on Equation 1) above the 0.5-hour average background level, the contractor shall perform the Warning Level actions in Table 1.

14. The Action Level is 65 mg/L (midpoint between 80 and 50 mg/L) above the 0.5-hour average background TSS levels. This is equivalent to an in-situ turbidity measurement of 87 NTU. When the Action Level is exceeded the contractor must implement preventative action(s) as outlined in Table 1 to mitigate TSS levels prior to reaching the NTE level.

15. If turbidity readings from any performance monitoring location (i.e. the project site boundary and 150 feet from active dredging or cover placement activities) indicate an increase of 110 NTU (equivalent to 80 mg/l based on Equation 1) above the 0.5-hour average background monitoring result, the contractor shall stop dredging or cover placement activity and perform the actions identified in Table 1. The contractor may resume work when any operational changes have been made and turbidity levels in the area where the exceedance was measured drop below the NTE level for 30 minutes, DNR and EPA have been notified, and oversight concurs.

16. Whenever the Warning, Action, or NTE levels are exceeded the contractor must evaluate if the increase was caused by dredging or placement activities. If the increase above the action level is determined to be caused by non-dredging activities, such as storm water runoff or prop wash by non-project related vessel traffic, and project oversight concurs, work can continue. If the turbidity increase is determined to be due to the dredging or cover placement activities, the contractor shall re-assess the effectiveness of BMPs and take corrective measures to mitigate the exceedance of resuspension performance standards as identified in Table 1.

17. WDNR must be notified of the time, location, and level of exceedance in the event the NTE level is reached at a performance monitoring location. The notification must also include the identified cause of the exceedance and any corrective measures taken. The notification must be made to the WDNR project manager with 24-hours of the NTE exceedance and may be done by email.

18. Contingency resuspension control measures and an oil boom are to be kept on site, for emergency use in the event of the failure of resuspension control measures, visible sheen, or exceedance of resuspension performance standards. Dredging operations are not allowed if resuspension control measures are not in place.

19. Sediment resuspension controls and contingency measures shall not cause scouring of the sediment bed, bridge abutments, or have any other deteriorating effect on structures or facilities in the vicinity of the dredging Project area or the offloading platform facility in Howard Bay.

20. All turbidity monitoring data shall be summarized in construction progress reports and made available to Wisconsin DNR, EPA, Fraser, and the City of Superior upon request. The background and 0.5-hour average background turbidity results should be available in real-time via the Internet. All monitoring data for the project must also be appended to the construction completion report.

21. Where residual contamination levels will not be a concern and public interests will still be met, adaptive management may be employed for turbidity requirements in Howards Bay. Specifically, Wisconsin DNR, at its sole discretion, may approve more or less stringent modifications to the performance monitoring locations, depths, frequencies, action levels and warning levels herein, based on the conditions encountered during construction.

References:

Groten, J.T., Ellison, C.A., and Mahoney, M.H., 2016, Three-dimensional visualization maps of suspended-sediment concentrations during placement of dredged material in 21st Avenue West Channel Embayment, Duluth-Superior Harbor, Duluth, Minnesota, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5086, 26 p., http://dx.doi.org/10.3133/sir20165086.

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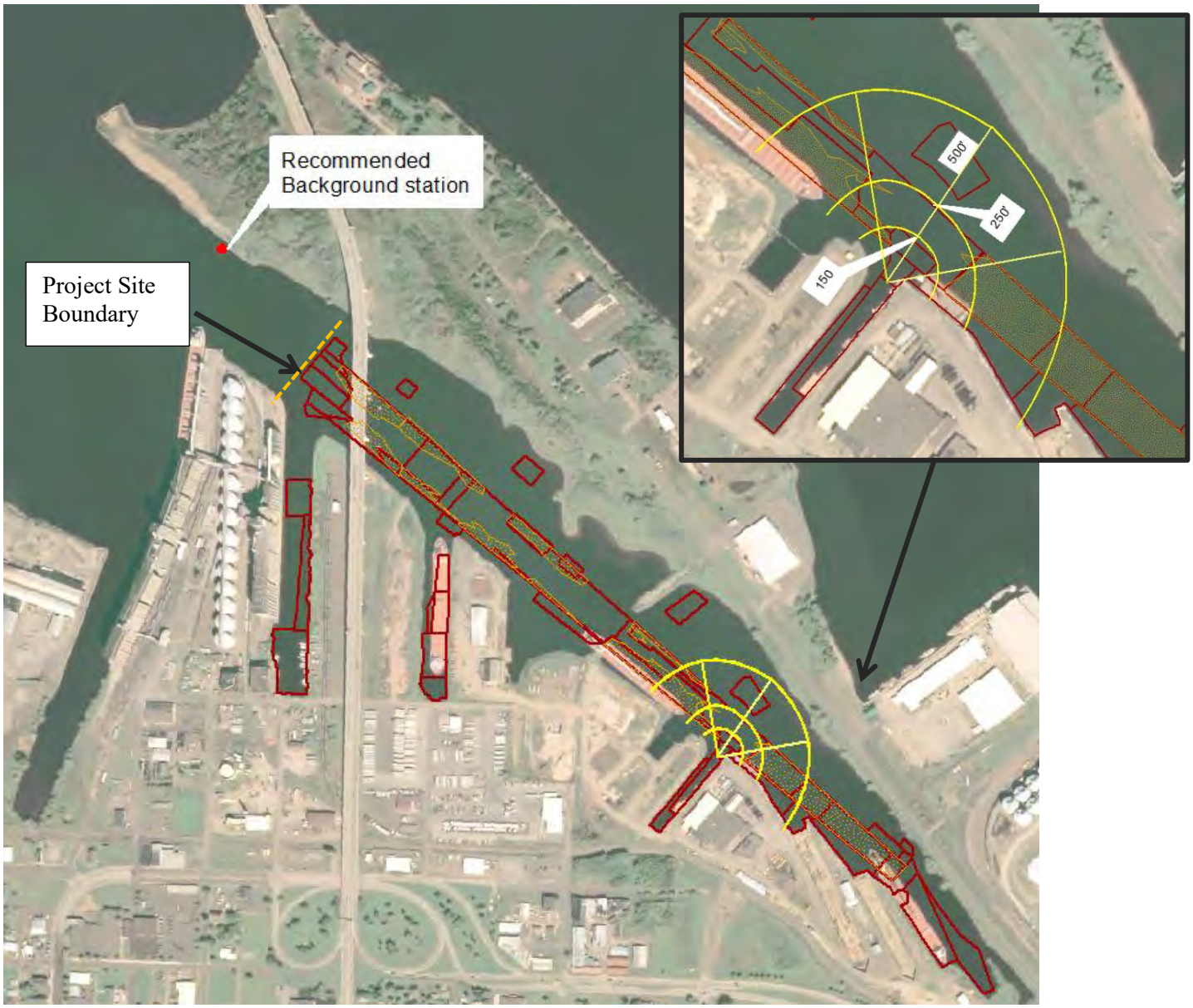

Figure 1: Proposed background monitoring station and illustration of approximate distance of performance monitoring station relative to active dredging location (readings at 150' used for warning and cease of operation, respectively. Also, the additional radius lines are drawn as reference to support the decision why place monitoring stations at 150' away from dredging or sand placement activities is recommended. For instance, if excess amount of sediment is detected at monitoring station approximately 250' or 500' outside of the slip, there is a high potential of sediment already having settled in the navigation channel or even spread across the channel).

Table 1: Turbidity Monitoring Frequency, Warning, Action, Not to Exceed Levels and Minimum Response Actions

Activity	Frequency	Level	Turbidity Level (NTU)	Trigger	Actions	Resume Condition
Continuous Background Measurements	Continuous, 10-minute intervals, calculating 0.5-hour average	Background	-	None – 0.5-hour average of measurements determine background turbidity levels to evaluate trigger levels below	NA	No work stoppage
Hand held measurements taken at 150 feet from dredging/cover placement activities and at the project site boundary	Twice per day, in middle of each shift with active dredging or cover placement AND every 0.5 hours where trigger level is exceeded.	Warning	65	Turbidity levels 65 to 87 NTU above average 0.5- hour background	1. Increase hand held monitoring frequency to every 0.5-hours to confirm Warning level exceedance 2. Inspect & repair BMPs 3. If two consecutive 0.5-hour measurements exceed the warning level but are less than the Action Level, the cause of the exceedance must be investigated 4. Notify oversight	No work stoppage
		Action	87	Turbidity levels more than 87 NTU above 0.5- hour average background	1. Increase hand held monitoring frequency to every 0.5-hours to confirm Action level exceedance. 2. Inspect & repair BMPs 3. Evaluate potential causes and make operational changes as appropriate. 4. Notify oversight	No work stoppage Operational changes made, as appropriate Oversight concurs
		Not to Exceed	110	Turbidity levels more than 110 NTU above 0.5-hour average background	1. Stop in-water activities until levels are corrected. 2. Increase hand held monitoring frequency to every 0.5-hours to confirm NTE level exceedance. 3. Identify causes, repair BMPs and make operational changes as appropriate. 4. Notify oversight, EPA, and WDNR	Operational changes made Levels drop below NTE level (or other WDNR approved level) for 30 minutes and EPA and DNR has been notified. Oversight concurs

CORRESPONDENCE/MEMORANDUM

DATE: March 27, 2017 FILE REF: Howards Bay

TO: Howards Bay Project Design Team

FROM: Joe Graham, WDNR

SUBJECT: Recommendations for the Sand to be used for Residual Cover and Enhanced Natural Recovery in Howards Bay, Superior, Wisconsin

The purpose of this memorandum is to provide Wisconsin DNR's recommendations for the physical, chemical, and biological characteristics for the material to be placed in-water as cover for management of dredging residuals and Enhanced Natural Recovery (ENR) in Howards Bay.

The preferred cover material is clean, medium to coarse grained, sand with little to no fines (SW or SP). Clean for this purpose means imported materials that are free from debris or other deleterious substances, foreign objects such as frozen material, wood, hay, burlap, paper, plastics, tree roots, pieces of concrete or pavement or contaminants (chemical and/or biological) from a pure (virgin) source such as a nonmetallic mining operation or dredged material form the federal navigation channel confirmed by testing to meet the quality requirements below.

The department may prohibit using aggregates from any source, plant, pit, quarry, or deposit if the character of the material or method of operation makes it unlikely to furnish aggregates conforming to specified requirements; or from deposits or formations known to produce unsound materials.

Sample Frequency:
Commercial/quarry sources a minimum of one sample per 1,000 cubic yards of material prior to delivery. Federal channel dredged material or other noncommercial sources a minimum of one sample per 500 cubic yards prior to delivery.

Specific Gravity: Minimum of 2.6

Gradation: See tables below for residuals cover and enhanced natural recovery, adapted from ASTM C33 and/or WisDOT 501.2.5 for fine aggregate. Sieve analysis ASTM D2487 or equivalent.

Residuals Cover

Sieve Size	*% Passing*
3/8 – inch	100
#4	90 - 100
#8	n/a
#16	45 - 85
#30	n/a
#50	5 - 30
#100	0 - 10
#200	0 – 1

Enhanced Natural Recovery

Sieve Size	*% Passing*
3/8 – inch	100
#4	95 – 100
#8	80 - 100
#16	50 - 85
#30	25 - 60
#50	10 – 30
#100	2 - 10
#200	0 – 3.5

Chemical Quality: Metals analyzed using methods SW846 6010 or 7471 and PAHs analyzed using GC/MS (SIM) meeting the quality limits below.

Analyte Group	*Parameter*	*Limit[1] (mg/kg)*
RCRA Metals	Arsenic	10
	Cadmium	1
	Chromium	43
	Copper	32
	Lead	36
	Nickel	23
	Mercury	0.2
	Zinc	120
PAHs[2]	Acenapthene	0.0067
	Acenaphthylene	0.0059
	Anthracene	0.0572
	Fluorene	0.0774
	Naphthalene	0.176
	Phenanthrene	0.204
	Benz(a)anthracene	0.108
	Benzo(a)pyrene	0.15
	Benzo(b)fluoranthene	0.24
	Benzo(k)fluoranthene	0.24
	Benzo(g,h,i)perylene	0.17
	Chrysene	0.166
	Dibenz(a,h)anthracene	0.033
	Fluoranthene	0.423
	Indeno(1,2,3-cd)pyrene	0.2
	Pyrene	0.195
	Total PAHs[2]	**1.61**

1 - Threshold Effects Concentration (TEC) for aquatic macroinvertebrates (WDNR 2003)

2 - Limit applied as Total or sum of the16 PAH compounds in table above