



Title: Permit 23-367: Forest Lake Hydraulic Dredging

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Recommendation:

Approval of MCWD permit application on the following conditions:

Conditions for permit issuance:

1. Payment of MCWD fees for cost of permit application, public notice mailing, and engineering and legal review.
2. Identification of spoil site conforming to rule.
3. Providing a copy of a Minnesota Pollution Control Agency spoils disposal permit.
4. Submission of Financial Assurance for Dredging equal to the cost of the project.

Permit stipulation:

The permittee will conform to standards and procedures listed in Attachment B.

Summary and Background:

Location:

Owners of the six properties listed below and their contractor (Co-Applicants) have jointly applied for a Minnehaha Creek Watershed District (MCWD) permit to dredge an existing channel adjacent to their properties (Project). The Project is located in the northern section of Forest Lake, northwest of West Arm, Lake Minnetonka, in the City of Orono. The Project is in the Lake Minnetonka subwatershed.

Applicants:

The Co-Applicants for this project are six property owners riparian to the channel and their hired contractor. A map of the properties in relation to the channel can be found in Attachment A.

- Corey & Annette Olson (975 Wildhurst Trail)
- Brad Pfaff (993 Wildhurst Trail)
- Thomas & Laurie Fleck (995 Wildhurst Trail)
- Brian & Ann Turbeville (997 Wildhurst Trail)
- Tony & Alison Stinar (999 Wildhurst Trail)
- Matthew and Susanne Johnson (1003 Wildhurst Trail)
- Twin Cities Outdoor Services (Contractor) (TCOS)

The Hennepin County property map indicates parcel boundaries that extend into Forest Lake. In addition to the six Co-Applicants, a seventh riparian owner, the Feldmanns at 805 Forest Arms Lane, is indicated as owning lakebed within the dredging footprint. The Feldmanns are not Co-Applicants, but have submitted written concurrence in the application.

For practical purposes of permit administration, the MCWD would intend to accept the financial assurance in the name of the contractor, and look to the contractor, in the first instance, for permit compliance and proper performance of the work. However, the other Co-Applicants will remain responsible for permit compliance as well. For convenience, this report will refer to TCOS as the "Applicant."

Proposed Project and Rule Triggers:

The Applicant proposes to dredge the bed of Forest Lake, a public water, to maintain navigational access and therefore triggers the MCWD's Dredging rule. The Applicant proposes to use the method of hydraulic dredging. The Applicant requests an exception, pursuant to the MCWD [Variances and Exceptions rule](#), with respect to [Dredging rule](#) section 5(a), which requires projects using hydraulic dredging to construct an earthen dike for spoil containment. Rather than use an

earthen dike, the Applicant proposes to use a geotextile container (Envirotubes) which serve the same purpose to filter saturated dredge spoils.

Dredging Methodology:

The Applicant proposes to use hydraulic dredging, a method of removing sediment through the use of suction rather than traditional dredging methods which rely on mechanical tools to physically excavate sediment. The Applicant proposes to use a DINO Six (Dredging Method Section of Attachment B), a lightweight hydraulic dredging machine which works from within the water. The machine uses a cutter head to excavate the sediment which is then moved to the inlet of a submersible pump and pumped into the spoil containment system. The spoil containment system consists of two geotextile bags, one placed on the northwest end of the channel and one on the southeast end of the channel (Appendix A of Attachment B). The bags dewater through the fabric of the bag, keeping the sediment contained and returning the water to the lake. The Applicant will place a polyethylene plastic liner underneath each bag so that water removed from the lake returns to the lake without oversaturating existing vegetation or entraining sediment from the lawn. The Applicant estimates that active dredging will take about 1 to 2 weeks, with the entire process, including dewatering, expected to last 2 to 6 weeks.

After the saturated sediment has dewatered, it becomes a solid cake. The bag is cut, and the material is removed from the bags and hauled off site.

MCWD Rule Analysis:

Dredging Rule:

The Project proposes to dredge approximately 1,500 cubic yards of accumulated sediment from the bed of a channel in Forest Lake. Forest Lake is defined as a public water, and the proposed work therefore triggers the MCWD's Dredging rule. Because the Applicant proposes the method of hydraulic dredging, section 5 of the Dredging rule is applicable.

Historic aerial imagery indicates that the channel was first dredged for navigation between 1957 and 1964 (Attachment C). The DNR issued a dredging permit in 1989, and an application was submitted for an MCWD permit (Appendix D of Attachment B), but there is no evidence that an MCWD permit was issued or that dredging occurred at that time (Project Background Section of Attachment B). Over time, lakebed material and/or sediment has moved into the originally dredged area, impeding navigational access and prompting the Applicant's proposal for the Project.

The Dredging rule (3(a) 1-2) permits private navigational dredging for two purposes:

- To maintain an existing public or private channel to dimensions the District previously has approved; or
- To implement or maintain a legal right of navigational access.

The application does not meet criteria under paragraph 3(a)(1) as there is no documentation of an earlier MCWD dredging approval. However, the Applicant may propose dredging under paragraph 3(a)(2) on behalf of the riparian Co-Applicants, on the basis of the legal right of navigational access that the Co-Applicants possess by virtue of their riparian right to navigational use of Forest Lake.

The channel is approximately 60 feet wide and 500 feet long. The Applicant proposes to dredge the channel over about 50 feet of its width, resulting in a 15-foot wide section with a bed elevation of 923.6 ft, sloping up to a bed elevation of 924.6 ft where there are boat parking structures. The northern side of the channel would have a 3:1 slope, while the southern side would have a more gradual incline. The existing depth of the bottom of the channel ranges from 924.61 ft to 926.78 ft (Appendix A of Attachment B).

Pursuant to section 3(c), staff has evaluated the setting to determine the scope of the riparian right, the scale of navigation that is reasonable for the setting, and whether the proposed dredging is necessary to accommodate that navigation:

1. The ecological sensitivity of the affected waterbody or wetland:

The navigational channel was created prior to the MCWD's existence and appears to have remained in use since that time for boat storage and travel to and from Forest Lake and Lake Minnetonka. In the setting, it is likely that over time, lakebed material has moved to fill in the originally dredged area, and that navigational use in recent years has involved

prop dredging that suspends and redistributes the material incrementally during regular channel use. Staff and the MCWD engineer do not observe any indication of a notable source of sediment external to the channel.

The channel is bordered by a Preserve wetland to the north. The southern shoreline consists of a combination of riprap and natural areas with emergent vegetation. The Applicant illustrates the proposed dredging footprint in Appendix A of Attachment B and has confirmed no cattails will be disturbed. MCWD staff and engineer have reviewed the proposed dredging footprint and cross section and are satisfied that the extent of dredging will not impact the northern wetland. An additional aspect is that ongoing prop dredging — using a vessel's propulsion system to dredge or otherwise alter a channel — may adversely affect benthic habitat by continually resuspending lakebed material and sediments. Measured against this potential impact, periodic maintenance dredging is preferred from an ecological standpoint. The proposed extent of dredging is consistent with maintenance dredging.

2. The size, draft, speed, motorized status and other characteristics of watercraft historically used or proposed to be used in the area to be dredged:

The property owners applying for the permit currently store a variety of watercraft in the channel, including a houseboat, a deck boat, a pontoon, a wakeboard boat, and multiple runabout boats. These watercraft are generally 20 feet long and have drafts about 3 feet. The watercraft that are stored and used on Forest Lake are very similar to those stored and used in the main bays of Lake Minnetonka, and watercraft have substantial traffic moving between Forest Lake and West Arm on Lake Minnetonka. The proposed scope of dredging is appropriate for these boats.

3. The size and restrictiveness of existing channels and bridge openings that may affect navigation:

The existing channel is approximately 60 feet wide and maintains a relatively consistent width along its entire length. The Applicant does not propose to widen the entire channel but proposes to dredge a 15-foot section in the center, which will be at a depth of 923.6 feet.

As indicated, the watercraft to be accommodated by the scope of dredging are of a size that typically navigates in Forest Lake and through the channel to the West Arm of Lake Minnetonka. The channel has historically been maintained with a consistent width of about 44 feet and passes under County Road 19 with a low chord elevation offering a clearance of 11'3" feet from the ordinary high water level of Lake Minnetonka. This geometry accommodates boats of the size and draft typically used on Lake Minnetonka, and so supports the proposed extent of dredging.

4. The availability of other means to gain access, such as extending docks; purchasing, renting, or leasing shore moorings; or anchoring watercraft away from shore moorings:

The Co-Applicants currently have docks in the channel, and dock extensions would likely reduce navigational capacity for other users within the channel.

The proposal has also been assessed by MCWD staff against the rule 3(d) and has found it to conform.

Staff, with the advice of the MCWD engineer, further assessed the proposal against the criteria of section 4 of the Dredging rule. The assessment is summarized here:

4(a) The application must show that the proposed dredging is the means to resolve Co-Applicants' need with least impact:

Based on MCWD analysis of historic aerials, the channel was first dredged between 1957 and 1964 (Attachment C). There is no evidence that the channel has been dredged since then, other than prop dredging (Project Background Section of Attachment B). Over time, the channel has accumulated sediment, impeding navigational access and prompting the Applicant's proposal for the Project.

Previously dredged channels naturally accumulate sediment through resuspension and settlement of existing sediment as well as the accumulation of new sediment and organic material. When this occurs, if routine dredging isn't implemented, prop dredging will occur when boat traffic disturbs the shallow sediment.

As mentioned above in the 3(c)(4) criteria evaluation, there are no other locations or reasonable means for the riparian Co-Applicants to provide docking. The Applicant has compared the proposed hydraulic dredging method with traditional dredging, including proposed use of a geotextile bag rather than an earthen dike. It notes that traditional dredging can lead to resuspension and disturbance of adjacent sediment; the spoil removal process also can cause sediment to fall back into the water. In addition, the effluent from traditional dredging is not always monitored for water quality standards, whereas the Applicant will provide a monitoring regime to avoid discharging spoil effluent that exceeds the state standard for turbidity or suspended solids. The Applicant also compared the use of a geotextile bag to the required earthen dike, noting that earthen dikes typically require a larger area of upland disturbance and can be more prone to erosion while the geotextile bag requires no fill or excavation. MCWD staff and the MCWD engineer find that the proposed method, conducted per the protocol in the submittal, will have the least impact.

4(b) If dredging is to remove sediment that was transported into the waterbody, and if the sediment source is readily identifiable and within the Applicant's control, the plan must remedy the cause of sediment transport:

Staff does not find there to be an external source of sediment other than ordinary runoff that contributes low levels of sediment over time. The cause of sedimentation into the channel is resuspension and redistribution of bed material. This source is not within the Applicant's control to prevent.

4(c) Dredging is limited to the minimum dimensions necessary to achieve the purpose, but not below 923.6 in Lake Minnetonka (this incorporates the standard stated in the 1993 Joint Policy Statement among the MCWD, the Department of Natural Resources and the Lake Minnetonka Conservation District) or, in other lakes, four feet below the ordinary high-water elevation:

The Applicant proposes to dredge to an elevation of 923.6 feet. Forest Lake is hydraulically connected to Lake Minnetonka, and shares the Lake Minnetonka OHWL of 929.4 feet. For the purpose of applying this criterion, staff finds it appropriate to evaluate the dredging depth against the Lake Minnetonka criterion. The proposed dredging depth meets this criterion and is appropriate for the draft of the boats to be accommodated. The current sediment levels in the areas of the channel which will have the greatest change are 926.78 ft and the Applicant proposes to dredge to a depth of 923.6 ft.

4(d) Side slopes within dredged areas are to be 3:1:

The Applicant proposes a 3:1 slope on the northern side of the channel, with a more gradual slope on the southern side. MCWD staff and engineer find the more gradual slope to be of no concern, as the southern edge will likely be less susceptible to sediment sluffing as a result.

4(e) Dredging may not occur between April 1st and June 30th:

The Applicant proposes the dredging to occur in the fall of 2024.

4(f) The application must identify a spoil disposal site:

While the Applicant has not finalized the disposal site location for the dried and compacted spoils, indicating the final spoil disposal location would be a condition for permit issuance and the site must not be below the OHW of a public water or wetland, in a floodplain absent flood storage replacement, or within 50 feet of any drinking water well. The Applicant proposes the following locations as possible spoil site locations if no hazardous material is present:

1. 2705 Hwy 55, Medina – TCOS Property
2. 4275 Creek View Circle, Minnetrista - Specialized Environmental Tech
3. 1003 Wildhurst Trail, Orono

If hazardous material is present, the Applicant proposes the following spoil disposal sites:

1. 3230 W 130th St, Shakopee (outside of MCWD jurisdictional boundary) – Dem-Con
2. 2650 Cliff Rd W, Burnsville (outside of MCWD jurisdictional boundary) – Waste Management

MCWD staff must review and approve the spoil site, if it falls within the District's jurisdictional boundary, before issuing the permit.

The additional standards for hydraulic dredging projects were evaluated as well:

5(a) Dikes must be of compacted earth. If the spoil containment has no outlet, it must have four times the calculated volume of solid material to be removed:

The Applicant seeks an exception to this section of the rule, as outlined in the “Exception Request” section below.

5(b) The applicant must provide a copy of the MPCA spoils disposal permit or notification and any sediment analysis performed:

The Applicant has not provided this at this time and conformance to this section of the rule is recommended as a condition for permit issuance.

5(c) The Applicant must submit a restoration plan that shows how it will retain sediments on site during operations, and how it will restore and revegetate the site. The plan must show final grades:

If vegetation below the geotextile bags/plastic liner does not survive, along with any other disturbed areas, the Applicant plans to restore areas through seeding. There will be no difference in pre- and post-project grades.

5(d) Discharge from spoil containment must meet MPCA turbidity and total suspended solids (TSS) standards applicable to the receiving water. The Applicant must monitor at least weekly and promptly forward results to the MCWD:

The MPCA exempts dredging projects where the effluent is returning to its original source from Turbidity and TSS standards. However, the Applicant has submitted a monitoring plan in which the effluent will be measured daily for the first 1-2 weeks of dredging, and weekly thereafter, during the dewatering process, to ensure compliance with the standards. More information regarding the water quality monitoring plan is described in the Exception Analysis section below.

Because the Applicant proposes that the geotextile bags be placed within the floodplain during the Project, MCWD staff and the MCWD Engineer evaluated this proposal for how this fill may impact the floodplain of Forest Lake (noting that it shares the Lake Minnetonka floodplain). Staff has determined that it would result in a temporary loss of floodplain storage that is less than a 0.001 ft (Appendix E of Attachment A) and therefore not a reason for concern.

Exception Request:

The Applicant seeks an exception to section 5(a) of the Dredging rule, which requires an earthen dike be constructed for hydraulic dredging projects. The Applicant instead proposes the use of a geotextile bag. As noted in the Variances and Exceptions rule, the Board of Managers may grant an exception from a particular water resource standard, specification or management method in the MCWD rules, if it determines that an alternative approach proposed by the applicant would achieve water resource outcomes of the type that the Board intends the standard, specification or method to achieve, and would do so to at least the same degree.

Geotextile Bag Proposal:

The Applicant proposes the use of geotextile bags, with the name “Envirotubes”, instead of an earthen dike. When the dredging spoils are removed from the channel via suction, they are then pumped directly into the geotextile bag for dewatering through the bag where the sediment is contained and the water returns to the lake. The Applicant proposes this method as an alternative to constructing an earthen dike due to its reported ability to provide equivalent or better water quality performance and pose minimal risk to rupture when used correctly.

While the Envirotube’s primary use is for dewatering, such as the use in the proposed Project, the product is also designed for structural use in projects such as levies, spoil-containment structures, and breakwaters and is advertised to be able to remain in place for years. These products have been used for this purpose for over 20 years.

Exception Analysis:

The Applicant’s exception proposal has been reviewed by staff and the MCWD Engineer to assess whether the proposed geotextile bag will achieve equal or greater water resource outcomes as compared to an earthen dike. The proposal’s spoil containment plan, risk of spoil leak, and water quality testing procedures are explained below, and would be a necessary condition within the permit.

Spoil Containment:

The Applicant proposes a method of hydraulic dredging in which the spoils are transported directly from the lakebed, through a pump, and into a geotextile bag. This method reduces the risk of resuspension that can occur when manually lifting sediment or during transport, by keeping the spoils contained throughout the entire process. Once the sediment is in the geotextile bag, it dewateres until enough water has been removed and the sediment turns into a solid, stiff structure. After sufficient dewatering, the solidified material can be removed and transported to the designated spoil disposal site. In contrast, traditional dredging methods do not contain spoils until the sediment is deposited in the spoil containment location.

Risk of Spoil Leak:

The Envirotube has been tested for two metrics regarding the risk of rupture: a puncture test and breaking pressure test. The puncture test indicates a puncture force of 280 lbs with an 8mm rod is needed for rupture. The breaking pressure test reports a breaking pressure of 1,200 psi would result in rupture. The Applicant noted the puncture force needed to rupture the bag would need to be a large amount of intentional force. The Application also listed the following as typical pressures placed on the bag:

1. A worker weighing 300 lbs on 1 foot: ~15 psi
2. Discharge pressure of the sediment slurry into the bag: 15-60 psi
3. Sediment pressure inside the bag: <6 psi

The bags are designed with the expectation that they can be walked upon by workers to distribute the sediment slurry if necessary. The likelihood that the bag tears is minimal as no heavy machinery is to be operated near the bag until dewatering has finished and the spoils are being removed. However, as a secondary precaution, the Applicant will maintain two rows of silt fence downgradient of the geotextile bags. If all noted precautions fail, while the water returning to the lake would be turbid, it would be returning to its original source and not introducing additional nutrients or sediment to the system. Staff and the MCWD Engineer have reviewed the geotextile bags for durability and concur that the Applicant's proposal is reasonable, and the product is well-suited for its intended purpose.

Water Quality:

In accordance with Minnesota State Rule 7053.0225 Sub. 3, and in consultation with the Minnesota Pollution Control Agency, water quality standards for Total Phosphorus (TP) and Total Suspended Solids (TSS) in the spoil effluent are exempt from regulation if the receiving waterbody is the same waterbody as where the spoils were removed. However, the Applicant still plans to monitor the effluent water quality to meet the TSS water quality standard of 32 mg/L for Lake Minnetonka, a Class 2b water, as outlined in Minnesota Rule 7050.0222, which would apply without the MPCA exemption.

Monitoring of the effluent will involve taking a sample of water as it leaves the geotextile bag and using a handheld device to measure turbidity, which can be correlated to TSS concentrations. These data points will be sent to MCWD to verify that the water quality levels do not exceed 32 mg/L TSS. Monitoring and subsequent data reporting will occur daily for the first 1-2 weeks of dredging and will decrease to once a week once dredging is complete and the bags are dewatering.

If at any point the effluent exceeds the 32 mg/L TSS standard, pumping will stop, and the plastic sheet beneath the bags will be raised to prevent further dewatering.

In consultation with the MCWD Engineer, in the judgment of staff, the geotextile bag as described by the Applicant will provide at least equivalent water resources outcomes as an earthen dike.

Summary:

The Applicant has applied for a Minnehaha Creek Watershed District permit under the Dredging rule, and an Exception to providing an earthen dike as outlined in section 5(a) of the rule.

The construction of an earthen dike requires earthwork adjacent to the waterbody, which can pose its own erosion risks, disturb the landscape, and require hauling fill materials to and from the site for the construction and decommission of the dike.

Staff and the MCWD Engineer have evaluated the exception of the earthen dike in regard to spoil containment, risk, and water quality standards, and find that the Applicant has provided sufficient evidence that the proposed project will achieve water resource outcomes at least equivalent to an earthen dike, within the meaning of section 5(a) of the Dredging rule.

Therefore, staff recommends approval of the requested exception, and the permit application, with the conditions listed at the beginning of this report.

Attachments:

- A. Property Map of Applicants
- B. Permit Application Submittal
 - Appendix A – Site Plan
 - Appendix B – Envirotubes Water Quality Case Study
 - Appendix C – Envirotubes Structural Data Sheet
 - Appendix D – Historical Aerials and 1989 Dredging Permit
 - Appendix E – Flood Storage Loss Calculation
 - Appendix F – Orono City Engineer Email Regarding Envirotubes
 - Appendix G – Homeowner Permissions
- C. Hennepin County Historic Aerials

Attachment A: Property Map of Applicants



1003

999

997

995

993

975

Wildhurst Trl

Forest Lake

Attachment B: Permit Application Submittal



TECHNICAL MEMORANDUM

To: Trey Jonas
Permitting Technician

Veronica Sannes
Permitting Technician

From: Justin Klabo, PE
Senior Water Resources Engineer

Luke LaMoore
Water Resources EIT

Re: **Wildhurst Trail Dredging Submittal**

Date: September 9, 2024

EXCEPTION REQUEST

The purpose of this memorandum is to document the dredging process Twin Cities Outdoor Services (TCOS) is proposing for this project, which uses an alternative method (Envirotubes / geotextile bags) for spoil containment not stated in the MCWD's Dredging Rule. AE2S and TCOS request that MCWD review this memorandum for exception approval because the Envirotubes provide equivalent or better water quality performance and pose minimal risk to bursting when used correctly.

PROJECT BACKGROUND

Six properties along Wildhurst Trail in Orono, MN share a shallow channel for access to Lake Minnetonka (See **Figure 1** in **Appendix A**). These properties use this channel to access the rest of the lake with their boats, pontoons, and other watercraft. This shallow channel has silted in over time, reducing the channel depth and making access difficult. There is no known past dredging done in this channel. Historical imagery dating back to 1991 was used for this determination, applying aerial time increments about every 10 years. When looking at channel width, the aerials from 1991 and 2002 look reasonably similar to present conditions given the quality of the resolution/frame shifting, and from a channel depth perspective it is near impossible to identify a difference based on these aerials. A dredging permit was issued in 1989 by the DNR, but again that impact does not appear to be noticeable from the aerials. See **Appendix D** for the historical aerials and 1989 dredging permit.

TCOS developed a dredging plan that is shown in **Appendix A**, which would include lowering the middle of the channel to approximately 923.6 for a navigation width of 15 feet. Based on survey completed by TCOS, this would involve lowering the middle of the channel from about 1

to 3 feet, with shallower dredging depths to blend the channel into the existing channel bottom beyond the 15-foot width. The volume of this operation is estimated to be 1,500 cubic yards of dry spoil material.

TCOS has partnered with AE2S to complete the dredging permit process for this location. The project is proposing to use hydraulic dredging and Envirotubes for spoil containment. See **Appendix A** for the site plan.

DREDGING METHOD – HYDRAULIC DREDGING

The dredging work will be done using hydraulic dredging methods. Based on information provided by TCOS, they will use a DINO Six, a lightweight sediment removal system designed to access confined water bodies. Effectively a pontoon, the DINO Six needs only a few feet of water depth to make navigation possible, and since it works from the water there is no damage to shoreline or land tracks. Sediment is excavated by a cutter head and moved to the inlet of the submersible pump, which pumps the slurry to the spoil containment system. The cutter head is controlled by hydraulics, once the operator has positioned the cutter head, the cutter head cannot move unless the DINO Six itself moves. This provides excellent dredging precision as the only way for the cutter head to move off its current elevation would be if wave action rocked the DINO Six, which is unlikely given the project location is a sheltered channel. Operation of the cutter head and submersible pump is done aboard the DINO Six. The DINO Six itself is moved using guy-wires set to anchor points along the shoreline. When the DINO Six completes sediment removal in the current area these anchor points (thus the DINO Six) are repositioned to the next area. The operator on the DINO Six controls its movement along the guy-wires.

SPOIL CONTAINMENT SYSTEM – SEDIMENT CONTAINMENT BAGS

Envirotubes, which are geotextile sediment containment bags, will be used as the spoil containment system and is a commonly used technique for dewatering sediment-water slurry that is generated from the hydraulic dredging operations. The operation of the containment bag involves the following steps:

1. **Filling:** Slurry (a mixture of water and sediment) is pumped into the containment bag through multiple fill ports. As the bag fills, the sediment particles are retained within the bag while the water passes through the filtration fabric.
2. **Sediment Cake Formation:** Over time, a sediment cake forms on the inside of the containment bag, restricting the flow of water.
3. **Cake Disruption and Dewatering:** To maintain efficient water flow, the sediment cake must be disrupted. This can be achieved by physically manipulating the bag, such as

walking on it or striking it. This action causes the sediment cake to settle, allowing water to drain more freely.

4. **Port Rotation:** To prevent excessive sediment cake buildup in any one area of the bag, the fill ports are rotated. This ensures that the entire bag contributes to the dewatering process.

Appendix B contains a previous project example using Envirotubes, and **Appendix C** contains a product data sheet for the geotextile fabric used in Envirotubes.

Figure 1 shows the approximate location of where the Envirotubes will be staged. Polyethylene plastic liners will be placed underneath the bags, creating a barrier between the bags and the underlying lawn. The liner ensures all water that came from the lake goes back into the lake and prevents oversaturation/drowning of existing vegetation. The liner also ensures the monitoring is only measuring load from the Envirotube and not also picking up trace sediment from the underlying lawn. Discharge water from the tubes will travel back to the access channel where the dredging is occurring via overland flow over the liner. This method of spoil containment removes the need for earthwork and has minimal impact on surrounding landscape. Additional detail on water quality effluent is described in the **Effluent Water Quality** section on the following page.

Once the sediment sufficiently dewateres, all sediment will be removed and hauled off. Additional detail on material disposal is described later in this memorandum in the **Material Disposal** section.

As shown in **Figure 1 (Appendix A)**, both Envirotube locations are within the 100-year floodplain; however, the location of the sediment / Envirotubes is temporary, and all dredging material will be removed from the floodplain once the sediment is dewatered. Placing the Envirotube near the shore also reduces the potential that discharge water will produce any negative impacts on the lake outside the dredging area or on adjacent property owners. Further, in the highly unlikely event that a major flood does occur in the short time that the Envirotubes are still dewatering, another benefit of the Envirotubes over an earthen dike is that the Envirotubes entirely contain the sediment and the bag will not wash out during a flood event. In the event flood water does reach the bag, flood water may enter the bag due its semi-permeability, but any solids leaving the bag are only what might remain after settling and flocculation (i.e. the standard process of the Envirotube). The only effect flood water has on the bags is the potential for additional water to enter the bag and will not affect the sediment treatment. See the **Safety/Risk of Failure** section for additional information.

Finally, the loss in storage volume in the floodplain due to bag location is inconsequential, less than 0.001 ft. See Appendix E for calculation details and assumptions.

CONSIDERATIONS

Effluent Water Quality

The water quality of the effluent shall conform to the 32 mg/L TSS standard as seen in Minn. R. 7050.0222 and BWSR's Public Drainage Manual (Appendix 9). This 32 mg/L of TSS is for Use Classification 2b, matching the classification of Lake Minnetonka. Monitoring of the effluent shall be conducted, much like with other projects that have used Envirotubes.

Multiple projects in Minnesota and other geographies have used Envirotubes. One such project was the city of Archie, Missouri found in **Appendix B**. Using hydraulic dredging and Envirotubes for spoil containment, data from the receiving water where the Envirotubes discharged to dropped in turbidity from 15 NTU prior to dredging to less than 10 NTU after dredging, suggesting that the discharge effluent from the Envirotubes will be sufficiently clean to meet water quality standards.

One of the other advantages to Envirotubes is their ability to provide adequate discharge effluent water quality in space-constrained areas, which is the case on this project. Earthen dikes often require much larger footprints and are extremely prone to resuspension from wind and localized flow patterns.

Monitoring Plan

To verify the quality of the effluent, monitoring by TCOS will be conducted. The monitoring device is a handheld instrument that operated by TCOS staff, where results can be recorded and proven using a photo. Results will be sent to MCWD via email for comparison with applicable water quality standards. Timeline for results will vary, monitoring and results will be conducted every day for the first 1-2 weeks of active dredging, decreasing in frequency to once a week when dredging is complete and the Envirotubes are dewatering.

Effluent Contingency Plan

Should the project at any point exceed the water quality standard. The following steps shall be taken:

- Pumping into the bags is ceased
- The polyethylene plastic sheet underneath the bags will be raised over the bag, creating an impermeable container (same as an earthen embankment)
- The system will further settle sediment now with no outlet
- Once monitoring reflects an acceptable water quality reading, the plastic sheet can be lowered to allow discharge
- Additional erosion control BMPs shall be placed to slow down the discharge if needed

Safety/Risk of Failure of the Sediment Containment Bag

For safety of the Envirotube, the technical specification is seen in **Appendix C**. The two notable metrics are the ASTM D-4833 puncture test, which reports a puncture force of 280 lbs, and the ASTM D-3786 Mullen Burst test, which reports a breaking pressure of 1200 psi. For context, the puncture test is done with an 8mm diameter rod, as in 280 lbs of force on an 8mm diameter rod broke the material. For the Mullen Burst test, the fabric is locked in place between two plates. One of the plates has a hole in the center. Glycerin is pumped through this hole against the fabric with increasing pressure until the fabric breaks and the pressure is recorded.

Typical forces seen on the bags are: weight of a worker on the bag, the pressure that the slurry is pumped into the bag, and the weight of the slurry itself inside the bag. A conservative estimate of pressure from the weight of a man on the bag as 300 lbs and all their weight on one foot (20 square inches) which the resultant is 15 psi. The discharge pressure of the slurry is typically also 15 psi during operation but may go as high as 60 psi. The max pressure of the slurry itself inside the bag is less than 6 psi (assuming a unit weight of slurry roughly equivalent to unit weight of soil which is 120 pounds per cubic foot, and a max depth of material of 6 feet which is the approximate bag dimension to be used onsite). With this in mind it is unlikely typical forces seen onsite will be able to break the bag unless done intentionally (like when dewatering is complete and the bag needs to be cut for sediment to be removed).

The bags are designed to be walked on to promote even distribution of slurry into the bag, which further supports the conclusion that the bags have sufficient strength as well as provides a built-in means for TCOS to routinely inspect the bag and discharge effluent.

As redundancy, a secondary protection method will be installed. In this case, two rows of silt fence will be placed downstream of the Envirotube. These serve to both capture any sediment that may still be in the water leaving the bag and mitigate erosion by slowing down the water leaving the bag. The plastic sheet will be shingled with this silt fence to minimize the chance of water flowing over underlying soil.

In event of a bag rupture, additional erosion control BMPs (biologs or similar) will be deployed at the rupture location, in addition to the two rows of silt fence, to slow down the water before it reaches the lake, promoting as much settling as possible. Meanwhile, the rest of the operation will follow the Effluent Contingency Plan described above, where pumping is ceased and the plastic sheet is raised to promote settling of sediment within the bags.

OPERATIONS ALTERNATIVES

Other alternatives have been briefly explored regarding the purpose of the project: making the channel navigable by motorized watercraft. With the channel only approximately 3 feet deep at its deepest and 80 feet wide, any dock extension would be ineffective, as the docks would have

to be so deep into the channel they would block actual boat paths. There is insufficient plant growth in the middle of the channel to be the primary cause of troublesome watercraft passage, as the middle of the channel is clear of vegetation based on aerial imagery. Given the channel itself of the only means of passage for these residents and the above points, the channel must be dredged in order to improve navigability.

With dredging being the chosen alternative, the last considerations are what type of dredging operation is to be done. And as explained in multiple sections above. Hydraulic dredging and sediment containment bags (the chosen operation) provides the least amount of impact. Hydraulic dredging disturbs less surrounding bed sediment than mechanical dredging and does not impact residential docks or lawns as compared to an excavator (it is reasonably infeasible for an excavator to access the channel via barge therefore it'd operate onshore) and the sediment containment bags again disturb less residential land vs an earthen embankment. The embankment requires both excavation to create the containment site and significant restoration once the operation is complete, whereas the sediment containment bags do not require excavation and will lay on top of residential property which may need to be restored due to loss of light and water, not due to mechanical removal of vegetation.

MATERIAL DISPOSAL

Over the course of 2-6 weeks the slurry will lose its water and become a much stiffer and drier cake (see photographs below). The dewatered sediment will then be removed and hauled off by cutting the bag open and using conventional earthwork equipment to load the material into dump trucks. Disposal location may vary depending on soil testing as per the MPCA Dredging Notification procedure. If no hazardous material exists, which is likely, most or all of the material will be disposed by TCOS on TCOS property (2705 Hwy 55, Medina) for a screening berm. An alternative disposal plan will be to haul to Specialized Environmental Tech for the material to be used as part of the compost soil blends (4275 Creek View Circle, Minnetrista). Otherwise (or if the material contains hazardous waste) the material will be landfilled at either Dem-Con (3230 West 130th St, Shakopee) or Waste Management (2650 Cliff Rd West, Burnsville). Lastly, the owner of 1003 Wildhurst gives permission for dredged material (pending soil test results) to be spread in the woods of their property. As the woods are outside of the 100-year floodplain, there is no long-term impacts to floodplains or the lake. Disposal location is to be determined once the soil results are reported.



RESTORATION

Given the minimal disturbance of hydraulic dredging and the Envirotubes, restoration of the project area should be minimal. All sediment containment bags will be removed from the site. The DINO Six, pumping pipes, silt fence, and other project apparatus will be removed upon project completion. Where the bags/plastic liner rest and where silt fence installed, seeding and stabilization will be conducted as needed if the underlying vegetation does not survive, along with any other areas disturbed during mobilization.

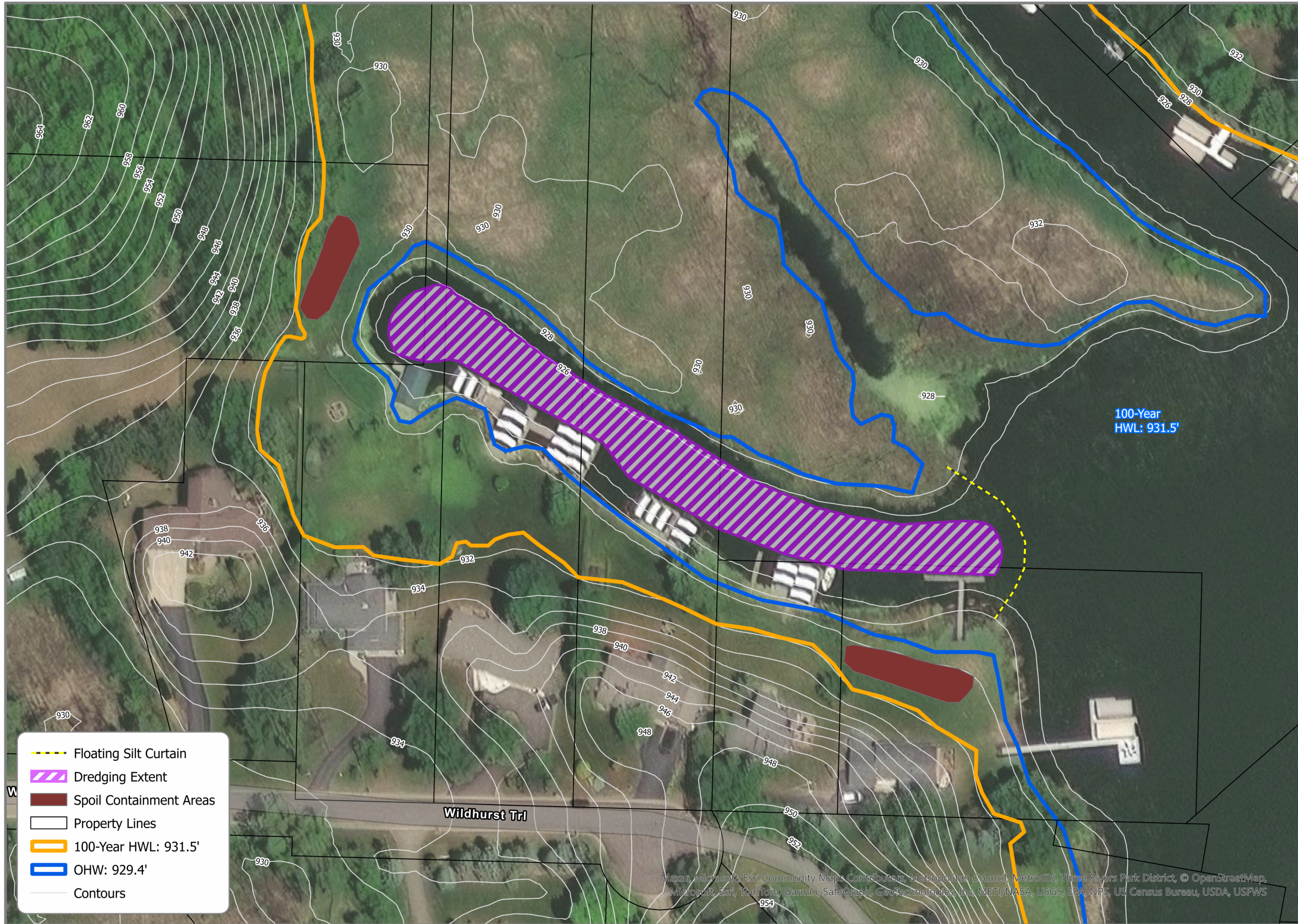
CONCLUSIONS AND SUMMARY








The Envirotubes are capable of providing equivalent or better water quality performance through demonstrated success on similar projects and based on information from TCOS, they have minimal risk of safety issues. The City of Orono has used this product in the past, and the City Engineer confirmed they have no issues with using this product for spoil containment (See **Appendix F**). Therefore, the Envirotubes meet the intent of the earthen dikes specified in the MCWD Dredging Rule and are eligible for an exception.

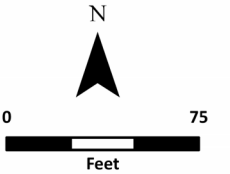
LIST OF APPENDICES

- Appendix A – Site Plan
- Appendix B – Envirotubes Water Quality Case Study: Archie, Missouri
- Appendix C – Envirotubes Structural Data Sheet
- Appendix D – Historical Aerials and 1989 Dredging Permit
- Appendix E – Flood Storage Loss Calculation
- Appendix F – Orono City Engineer Email Regarding Envirotubes
- Appendix G – Homeowner Permissions

APPENDIX A – SITE PLAN



-  Floating Silt Curtain
-  Dredging Extent
-  Spoil Containment Areas
-  Property Lines
-  100-Year HWL: 931.5'
-  OHW: 929.4'
-  Contours



1 inch equals 75 feet



Locator Map Not to Scale

Orono
Hennepin County, MN

Figure 1
**WILDHURST
DREDGING PROJECT
- SITE PLAN**

WILDHURST DREDGING
PROJECT/TCOS

Date: 9/9/2024



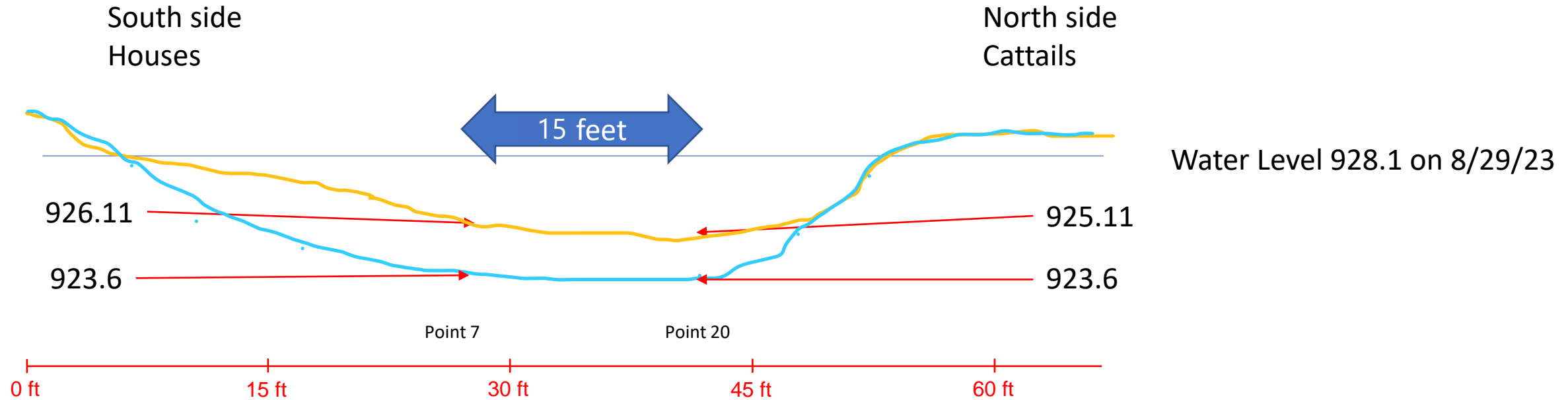
Maxar, Microsoft, Esri Community Maps Contributors, Metropolitan Council, MetroGIS, Three Rivers Park District, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS



point #	Water Depth Feet	Bottom Elevation	removal Depth Change	point #	Water Depth feet	Bottom Elevation	removal Depth Change
1	3.00	925.11	1.51	16	1.67	926.44	2.84
2	2.00	926.11	2.51	17	2.50	925.61	2.01
3	2.00	926.11	2.51	18	3.00	925.11	1.51
4	1.50	926.61	3.01	19	3.00	925.11	1.51
5	2.00	926.11	2.51	20	3.00	925.11	1.51
6	2.00	926.11	2.51	21	3.00	925.11	1.51
7	2.00	926.11	2.51	22	3.00	925.11	1.51
8	2.50	925.61	2.01	23	3.00	925.11	1.51
9	1.33	926.78	3.18	24	3.00	925.11	1.51
10	2.00	926.11	2.51	25	2.50	925.61	2.01
11	2.00	926.11	2.51	26	3.00	925.11	1.51
12	1.50	926.61	3.01	27	2.50	925.61	2.01
13	1.50	926.61	3.01	28	2.50	925.61	2.01
14	2.00	926.11	2.51	29	3.00	925.11	1.51
15	2.00	926.11	2.51	30	3.00	925.11	1.51
				31	3.50	924.61	1.01

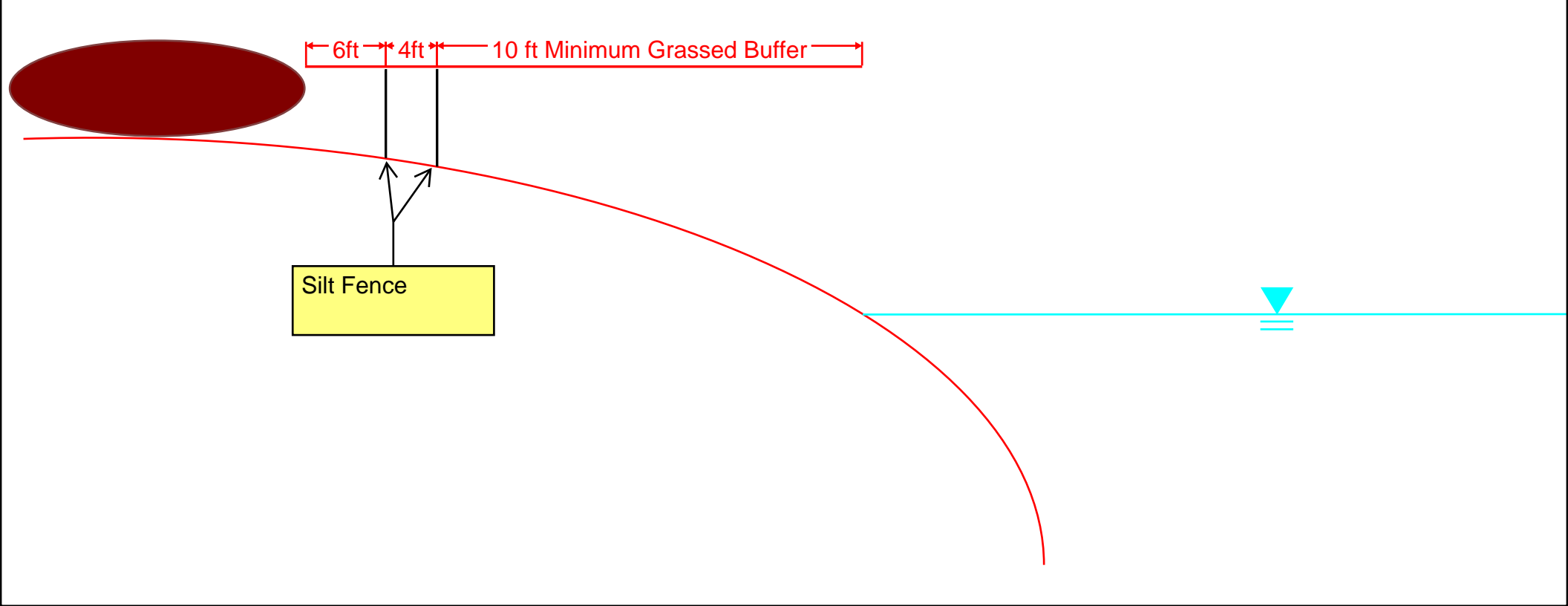
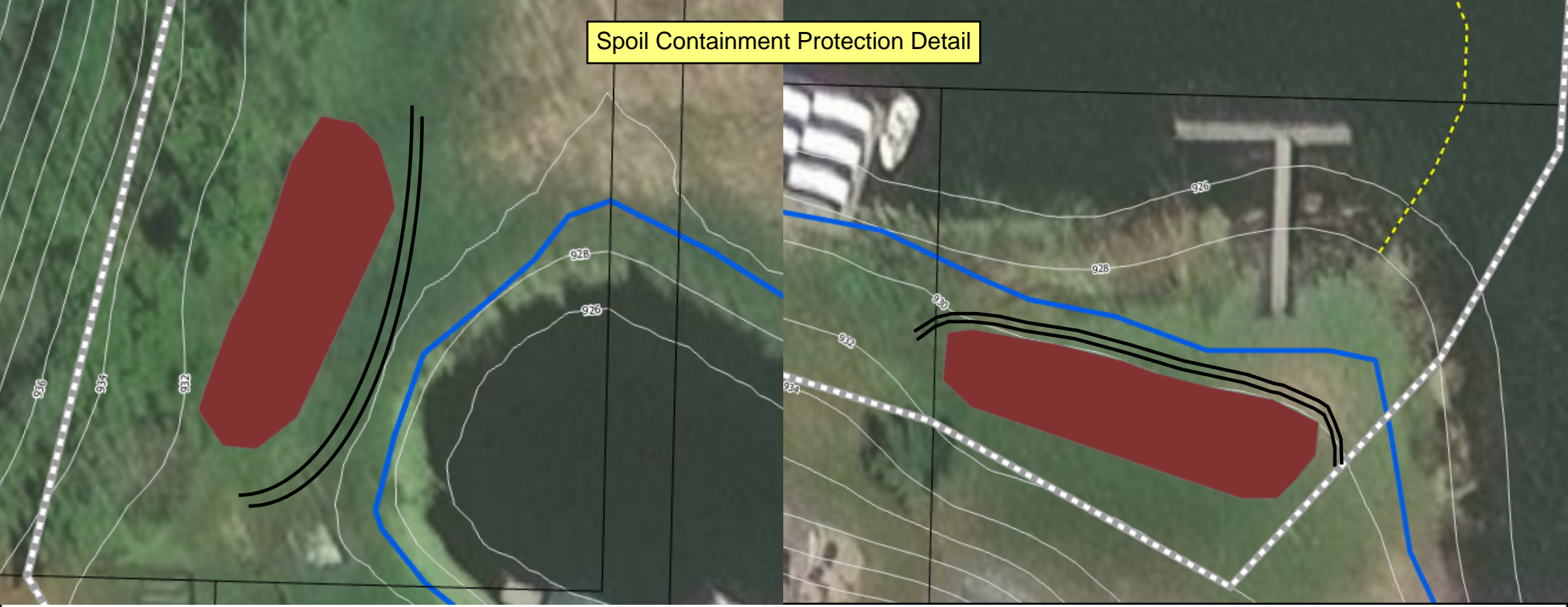


Cross Section of Channel - Wildhurst



Dredge out the water way to a depth of 923.6 feet leaving a 3:1 slope towards the cattails to the north and a less severe slope to the south towards the houses. With in boat parking structures sediment to be removed to 924.6 at the waterway side sloping up towards the shore gradually to allow boats access. Along outside of docks a depth of 924.6 slowing down to main channel, and up towards shore.

Spoil Containment Protection Detail



APPENDIX B – ENVRIOTUBES WATER QUALITY CASE STUDY: ARCHIE, MISSOURI

Sediment Removal from Potable Water Reservoir

The city of Archie, Missouri receives its potable water supply from a small river. The river water is pumped into a primary settling pond and flows by gravity into a secondary settling pond. The river water that was filling the ponds contained sediment which reduced the capacity of the ponds, deposited organic material, created algae growth and other organic chemical problems. Manganese deposits were forming on the equipment and plumbing in the plant. These problems were affecting the odor and taste of the water.

According to Rick Blundell, the Water Plant Superintendent for the City of Archie, copper sulfate had to be added to the ponds to retard growth. Carbon treatment had to be used to cleanse the water of taste and suspended undesirables. Even though the city was spending more time and money to treat the water, the taste and odor remained a problem. The settling ponds had to be cleaned.

The problems Blundell faced in choosing the method to clean the ponds are typical to this type of project. If he chose to drain the ponds and remove the sediment, the pond would be out of service, leaving water supply unavailable to the city. Also, the contractors that were contacted would not guarantee the dam against leaks. If he chose to dredge the ponds, he had no space available to place a spoil area for the dredge slurry.



CLEANING THE POND:

Archie Water Plant Superintendent Rick Blundell shows dewatered sediment removed from the pond.

THE SOLUTION

The final method researched by Rick was to use Envirotubes to contain and dewater the slurry, returning the water to the ponds. This solution would remedy the problems the project presented and would cost no more than the other methods. The job could be done easily with an economical number of tubes over a short period of time. The process would include pumping mud into the tubes and allowing them to decant clean water back into the pond. This was not a very large job and the procedure was simple enough that Rick decided the city would operate with their own personnel.

Industrial Fabrics, Inc. furnished the package for the job. This package included the dredging equipment and pipeline rental, Envirotubes constructed of 4x6 geotextile, polymer, training, and all parts so the city could do the project.



DREDGE AND DIRT:

The dredge is small enough to fit in most ponds.

Quick Quote

"This project could not have been done with hydraulic dredging, without the use of Envirotubes."

- City of Archie Missouri

THE RESULTS

The water quality improved as soon as the job began. The dam has remained secure and there is no more need for carbon treatment. There is no detectable manganese, the black coating is disappearing and the copper sulfate treatment of the pond is minimal. Intake water amounts, from the reservoir to the plant changed from 15NTU in 2001 to 5-8NTU in 2002. This project could not have been done with hydraulic dredging, without the use of the Envirotubes.



THE RESULTS:

Water is filtered out, leaving dried solid materials inside the Envirotubes.



COST-EFFECTIVE SOLUTION:

Fabricated from 4 x 6 reinforcement geotextile, Envirotubes offer the benefit of being less expensive than other cleaning methods.



Technical Memorandum
Re: Wildhurst Trail Dredging Submittal
September 9, 2024

APPENDIX C – ENVIROTUBES STRUCTURAL DATA SHEET



INDUSTRIAL FABRICS, INC.
Since 1981

HEADQUARTERS
510 O' Neal Lane
Baton Rouge, LA 70819

225-273-9600 (Phone)
225-273-0440 (Fax)
www.ind-fab.com (Web)

PRODUCT DATA SHEET

FAB 4x6

FAB 4x6 is manufactured using high tenacity polypropylene yarns that are woven to form a dimensionally stable network, which allows the yarns to maintain their relative position. **FAB 4x6** resists ultraviolet deterioration, rotting and biological degradation and is inert to commonly encountered soil chemicals.

PROPERTY	TEST METHOD	MARV ENGLISH	MARV METRIC
Tensile Strength (Grab)	ASTM D-4632	600 x 700 lbs	2670 x 3114 N
Elongation	ASTM D-4632	15 x 15%	15 x 15%
Wide Width Tensile	ASTM D-4595	4800 x 7200 lbs/ft	70 x 105 kN/m
Wide Width Elongation	ASTM D-4595	14 x 9%	14 x 9%
Wide Width Tensile Strength at 5% Strain	ASTM D-4595	1200 x 2640 lbs/ft	17.5 x 38.5 kN/m
Puncture	ASTM D-4833	280 lbs	1246 N
Mullen Burst	ASTM D-3786	1200 psi	8270 kPa
Trapezoidal Tear	ASTM D-4533	180 x 275 lbs	801 x 1223 N
UV Resistance (at 500 hrs)	ASTM D-4355	80%	80%
Apparent Opening Size (AOS)*	ASTM D-4751	40 US Std. Sieve	0.425 mm
Permittivity	ASTM D-4491	.26 sec ⁻¹	.26 sec ⁻¹
Water Flow Rate	ASTM D-4491	20 gpm/ft ²	810 l/min/m ²
Roll Sizes		15' x 300'	4.57 m x 91.5 m

*Maximum average roll value.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. Industrial Fabrics, Inc. assumes no liability in connection with the use of this information.

APPENDIX D – HISTORICAL AERIALS AND 1989 DREDGING PERMIT

Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

Map Length:	97.97	Feet
Ground Length:	98.00	
Heading:	6.75 degrees	

Mouse Navigation

Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

Map Length: 97.97 Feet

Ground Length: 98.00

Heading: 6.75 degrees

Mouse Navigation Save Clear

Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

Map Length:	97.97	Feet
Ground Length:	98.00	
Heading:	6.75	degrees

Mouse Navigation



Ruler

Line Path Polygon Circle 3D path 3D polygon

Measure the distance between two points on the ground

Map Length: 97.97 Feet

Ground Length: 98.00

Heading: 6.75 degrees

Mouse Navigation Save Clear

PERMIT APPLICATION



TO WORK IN PROTECTED WATERS OR WETLANDS
(INCLUDING DAM SAFETY)

OFFICE USE ONLY	
P.A. NO.	
-	
<input type="checkbox"/> SWCD	<input type="checkbox"/> C/C
<input type="checkbox"/> W.D.	<input type="checkbox"/> USCOE

Please read instructions before attempting to complete this application.

I. Applicant's Name (Last, First, M.I.) Dave & Cheryl Hawkins	Authorized Agent (if applicable) Marine Environmental Services	Telephone Number & area code (612) 472-4689
Address (Street, RFD, Box Number, City, State, Zip Code) 993 Wildhurst Trail Orono, MN 55364		

II. LOCATION OF PROPOSED PROJECT (BE SURE TO INCLUDE SKETCH SHOWING HOW TO GET TO THE SITE)					
Government Lot(s)	Quarter Section(s) NW 1/4 NE 1/4	Section(s) No. 7	Township(s) No. 117	Range(s) No. 23	Lot, Block, Subdivision
Fire No., Box No. or Project Address 993 Wildhurst Trail Orono			County Hennepin	Project will affect <input checked="" type="checkbox"/> Lake <input type="checkbox"/> Wetland or <input type="checkbox"/> Watercourse (name & number, if known)	

III. TYPE OF WORK PROPOSED (CHECK ONE)	IV. TYPE OF PROJECT (CHECK ONE)
<input checked="" type="checkbox"/> excavate <input type="checkbox"/> fill <input type="checkbox"/> drain <input type="checkbox"/> construct <input type="checkbox"/> install <input type="checkbox"/> repair <input type="checkbox"/> remove <input type="checkbox"/> abandon <input type="checkbox"/> other (specify)	<input type="checkbox"/> shoreline <input checked="" type="checkbox"/> channel <input type="checkbox"/> sand blanket <input type="checkbox"/> riprap <input type="checkbox"/> shore-protection <input type="checkbox"/> harbor <input type="checkbox"/> permanent dock <input type="checkbox"/> wharf <input type="checkbox"/> obstruction <input type="checkbox"/> bridge <input type="checkbox"/> culvert <input type="checkbox"/> dam <input type="checkbox"/> other (specify)

V. ESTIMATED PROJECT COST \$ 20,000.00	VI. LENGTH OF SHORELINE AFFECTED (IN FEET): 540'
--	--

VII. VOLUME OF MATERIAL FILLED OR EXCAVATED (IN CUBIC YARDS): 1500 cubic yards

VIII. BRIEF EXPLANATION OF PROJECT: (EXPLAIN WHAT PROJECT CONSISTS OF AND HOW WORK WILL BE DONE)
Channel with an area of 25' x 540' to be dredged down to 923.6' and area approximately 25' x 75' to be dredged down to same out into Forest Lake to provide navigable access into Forest Lake. Mud will be removed by mechanical means and hauled away by dump truck.

IX. PURPOSE OF PROJECT: (Explain why this project is needed)
Owner(s) presently do not have navigable access to the lake.

X. ENVIRONMENTAL IMPACT (Anticipated changes to the water and related land resources, including unavoidable but detrimental effects)
Anticipate no changes to the area. Low term turbidity due to dredging actions.

XI. ALTERNATIVES (Other alternatives to the action proposed)
None foreseen.

XII. I hereby make application pursuant to Minnesota Statutes Chapter 105.42 and all supporting rules for a permit to work in or affect the above named protected water(s) in accordance with all supporting maps, plans, and other information submitted with this application. The information submitted and statements made concerning this application are true and correct to the best of my knowledge.

STATE OF Minnesota

COUNTY OF Scott

Subscribed and sworn to before me this

1st day of JUNE 19 89

My commission expires 6-11-91

Signature of Owner or Authorized Agent <i>Cheryl Hawkins</i>	Date 6-1-89
Signature of Leasee <i>Cheryl Hawkins</i>	Date 6-1-89

Signature of Notary
Arnon Petersen

- Distribution:
- White: DNR
 - Blue: SWCD
 - Green: Watershed District
 - Goldenrod: City or County
 - Pink: Army Corps of Engineers
 - Canary: Applicant



PROTECTED WATERS PERMIT

P.A. Number 89-6470

Pursuant to Minnesota Statutes, Chapter 105, and on the basis of statements and information contained in the permit application, letters, maps and plans submitted by the applicant and others supporting data, all of which are made a part hereof by reference, PERMISSION IS HEREBY GRANTED to the applicant named below to change the course, current, or cross section of the following:

Protected Water <u>Lake Minnetonka (27-133) Forest Lake #18</u>	County <u>Hennepin</u>
Name of Applicant <u>Dave & Cheryl Hawkins</u>	Telephone Number (include Area Code) <u>(612)472-4689</u>
Address (No. & Street, RFD, Box No., City, State, Zip Code) <u>993 Wildhurst Trail, Orono, MN 55364</u>	
Authorized to: <p style="text-align: center;">mechanically remove approximately 1200 cubic yards of material from an existing channel to facilitate navigational access to Lake Minnetonka proper. Channel dimensions shall be approximately 600' in length, maximum bottom width of 15', and 3:1 sideslopes (horizontal:vertical) with a bottom elevation no lower than 923.6'. All work shall be in conformance with revised plans received October 30, 1989.</p>	
Purpose of Permit: <u>Navigational access</u>	Expiration Date of Permit <u>June 30, 1990</u>
Property Described as: <u>SE$\frac{1}{4}$ SE$\frac{1}{4}$ NW$\frac{1}{4}$ Section 7, Township 117 North, Range 23 West</u>	County <u>Hennepin</u>
As Indicated: (8) <u>Does not apply</u>	As Indicated: (11) <u>the ordinary high water elevation, 929.4' (NGVD, 1929)</u>

This permit is granted subject to the following GENERAL and SPECIAL PROVISIONS:

GENERAL PROVISIONS

1. This permit is permissive only and shall not release the permittee from any liability or obligation imposed by Minnesota Statutes, Federal Law or local ordinances relating thereto and shall remain in force subject to all conditions and limitations now or hereafter imposed by law.
2. This permit is not assignable except with the written consent of the Commissioner of Natural Resources.
3. The Regional Hydrologist shall be notified at least five days in advance of the commencement of the work authorized hereunder and shall be notified of its completion within five days thereafter. The notice of permit issued by the Commissioner shall be kept securely posted in a conspicuous place at the site of operations.
4. No change shall be made, without written permission previously obtained from the Commissioner of Natural Resources, in the dimensions, capacity or location of any items of work authorized hereunder.
5. The permittee shall grant access to the site at all reasonable times during and after construction to authorized representatives of the Commissioner of Natural Resources for inspection of the work authorized hereunder.
6. This Permit may be terminated by the Commissioner of Natural Resources at any time he deems it necessary for the conservation of water resources of the state, or in the interest of public health and welfare, or for violation of any of the provisions of this permit, unless otherwise provided in the Special Provisions.
7. Construction work authorized under this permit shall be completed on or before date specified above. Upon written request to the Commissioner by the Permittee, stating the reason therefore, an extension of time may be obtained.
8. The excavation of soil authorized herein shall not be construed to include the removal of organic matter (as indicated above) unless the area from which such organic matter is removed, is impervious, or is sealed by the application of bentonite after excavation.
9. In all cases where the doing by the permittee of anything authorized by this permit shall involve the taking, using, or damaging of any property rights or interests of any other person or persons, or of any publicly owned lands or improvements thereon or interests therein, the permittee, before proceeding therewith, shall obtain the written consent of all persons, agencies, or authorities concerned, and shall acquire all property, rights and interests necessary therefore.


10. This permit is permissive only. No liability shall be imposed upon or incurred by the State of Minnesota or any of its officers, agents or employees, officially or personally, on account of the granting hereof or on account of any damage to any person or property resulting from any act or omission of the permittee or any of its agents, employees, or contractors relating to any matter hereunder. This permit shall not be construed as estopping or limiting any legal claims or right of action of any person other than the state against the permittee, its agents, employees, or contractors, for any damage or injury resulting from any such act or omission, or as estopping or limiting any legal claim or right of action of the state against the permittee, its agents, employees, or contractors for violation of or failure to comply with the permit or applicable provisions of law.
11. No material excavated by authority of this permit nor material from any other source, except as specified herein, shall be placed on any portion of the bed of said waters which lies below (as indicated above).
12. Any extension of the surface of said waters resulting from work authorized by this permit shall become protected waters and left open and unobstructed for use by the public.
13. This permit does not obviate any requirement for federal assent from the U.S. Corps of Engineers, 1135 U.S. Post Office and Custom House, St. Paul, Minnesota 55101.

SPECIAL PROVISIONS

4. The permittee shall comply with all rules, regulations, requirements, or standards of the Minnesota Pollution Control Agency and other applicable federal, state, or local agencies.
5. Permittee shall ensure that the contractor has received and thoroughly understands all conditions of this permit.
6. Erosion control measures shall be adequately designed for the site characteristics. They may include staked haybales, diversion channels, sediment ponds, or sediment fences. They shall be installed prior to commencement and maintained throughout project. All exposed soil shall be restored (by seeding and mulching or sodding and staking) within 72 hours of completion of project. A floating silt curtain shall be installed at the mouth of the channel and shall remain in place for the duration of the project.
17. Future maintenance excavation of this project shall not exceed the dimensions herein authorized. Prior to commencing any maintenance excavation, permittee shall advise the Department of Natural Resources (DNR), in writing, of the volume of material to be removed, the manner of removal, and the spoil disposal site(s) proposed. Maintenance excavation shall not be commenced until permittee receives DNR approval.
18. Dredging is prohibited between April 1 and June 30 of each year to protect largemouth bass spawning.
19. Excavated materials shall not be deposited or stored alongside the protected water in a manner where the materials can be redeposited into the protected water by reasonably expected high water or storm runoff.
20. Dredging equipment shall be inspected for Eurasian watermilfoil following project completion, and every reasonable precaution shall be taken to prevent inoculation of other lakes/basins.

cc: USCOE
 City of Orono
 J. Parker, AWM
 J. Konrad, C.O.
 Lake Minnetonka (27-133) file #18

Hennepin SWCD
 Minnehaha Creek WSD
 B. Gilbertson, AFM
 J. Fax, St. Paul Waters

Authorized Signature	Title	Date
John Linc Stine 	Regional Hydrologist	8 Nov. 1989



**MINNEHAHA CREEK
WATERSHED DISTRICT**

P.O. Box 387
Wayzata, Minnesota 55391

(FOR OFFICE USE ONLY)

Permit Application No. _____
Date Received _____
Notice Sent _____
Agenda Date _____

APPLICATION FOR PERMIT

(See Reverse Side For Instructions)

(Do Not Write Above This Line)

1. Owner: Dave & Cheryl Hawkins
(Print or Type)
993 Wildhurst Tr. Orono, MN
(Address) (City)
612-472-4689 55364
(Telephone) (Zip)
[Signature]
(Owner Signature)

2. Owner's Representative JoLynn Mosher Bush
1919 Dupont Ave. S. #2B Mpls., MN
(Address) (City)
612-874-6386 55403
(Telephone) (Zip)

P.E. R.L.S. L.A. Other

3. Permit Requested For: (Check All Appropriate Boxes)

B. Stormwater Management Plan

- Commercial
- Industrial
- Institutional or Highway
- Residential

D. Wetland Alteration

E. Dredging

F. Shoreline/Bank Improvement

G. Stream/Lake Crossing

C. Floodplain Alteration

4. Project Location: Orono | Henn. | NW 1/4 NE 1/4 | 7 | 117 | 23
(City) (County) (1/4 Sec) (Sec) (Township) (Range)

5. Describe the Project: Remove mud from a channel approximately 25' x 540' and out into Forest Lake for 75' to provide navigable access to homeowners dock(s). Project will consist of approximately 1500' cubic yards of material removed.

6. If This Project Requires Municipal Approval or Review, Attach Documentation of Municipal Review.

7. Body of Water, Stream or Wetland Affected by Runoff From This Site: Forest Lake & Wildhurst Tr. Channel
Distance From Project: _____

8. Schedule For Construction, Implementation of Temporary Erosion Controls, Substantial Completion and Restoration: Spoils will be removed from the site by the contractor (Marine Environmental Services).

Please call (612) 473-4224 if assistance in completing this form is required. In submitting this form, the applicant acknowledges all requirements for permit approval as determined by the published Rules dated February 20, 1986.

LOCAL UNIT OF GOVERNMENT COMMENTS

PART B

Section I (To be completed by applicant)

Name of Applicant Dave & Cheryl Hawkins	Address (Street, RFD, Box No., City, State, Zip Code) 993 Wildhurst Trail Orono, MN 55364
--	--

PROJECT LOCATION	Quarter Section(s)	Section(s)	Township(s)	Range(s)	County(ies)
	NW $\frac{1}{4}$ NE $\frac{1}{4}$	7	117	23	Hennepin

Project will affect: (name and number of lake, wetland, or watercourse)
Wildhurst Trail Channel and Forest Lake

I hereby submit this application for permit to:
(mark proper box)

appropriate water work in protected waters

Signature of Applicant: *[Signature]* Date: 2-1-89

Section II (To be completed by local unit of government)

The following local unit of government comments and/or recommendations are submitted for consideration by the Department of Natural Resources in the disposition of the referenced permit application. **(YOUR RESPONSE MUST BE SUBMITTED TO THE DNR WITHIN 30 DAYS.)** Water Appropriation Permit Applications and Protected Waters Permit Applications are to be sent to the DNR Regional Office. **SEE REVERSE SIDE FOR CORRECT MAILING ADDRESSES.**

Was the proposed project field inspected by this local unit of government? NO YES (if Yes, give viewer's name)

Viewer's Name	Title			
Authorized Signature	Title	Date	Telephone No. (Area Code) () -	
Name of responding Soil and Water Conservation District, Watershed District, City or County				
Address (of the above named local unit of government)				

APPENDIX E – FLOOD STORAGE LOSS CALCULATION

Assumptions:

- All storage areas are simplified to vertical walls (volume is calculated as just area*depth)
- Forest Lake is hydraulically connected to the main body of Lake Minnetonka (proven based on aerial imagery)
- Envirotubes are perfectly level (proper install procedure)

Total footprint of Envirotubes: 13,500 square feet

Elevation of Envirotubes: 930.0 feet

Floodwater Depth around Envirotubes (100-year HWL – 931.5, source – MCWD): 1.5 feet

Volume Occupied by Envirotubes within Floodwater Zone = Total footprint of Envirotubes *
Floodwater Depth around Envirotubes = $13,500 * 1.5 = 20,250$ cubic feet

Total footprint of Lake Minnetonka: 14,500 acres (source – City of Orono/Wikipedia)

Ordinary high water level of Lake Minnetonka: 929.4 feet (source – LiDAR)

Floodwater Depth of Lake Minnetonka = $931.5 - 929.4 = 2.1$ feet

Floodwater volume of Lake Minnetonka = $2.1 \text{ feet} * 14,500 \text{ acres} (633,000,000 \text{ square feet}) =$
 $1,326,400,000$ cubic feet

Total Floodwater volume plus Envirotube displacement volume = $1.33 \text{ billion cubic feet} + 20,250$
cubic feet = $1,326,420,250$ cubic feet

New Floodwater depth of Lake Minnetonka = Total floodwater volume plus Envirotube
displacement volume - total footprint of Lake Minnetonka = $1,326,420,250 \text{ cubic feet} / 14,500$
acres = 2.10003 feet

Technical Memorandum
Re: Wildhurst Trail Dredging Submittal
September 9, 2024

APPENDIX F – ORONO CITY ENGINEER EMAIL REGARDING ENVIROTUBES

From: Corey Truebenbach <ctruebenbach@tcoscorp.com>
Sent: Tuesday, June 4, 2024 11:07 AM
To: Lucas LaMoore; Justin Klabo; Tim Vlach
Subject: FW: Dredging Permit Variance/exception letter - Wildhurst Trail
Attachments: [TCOS_DredgingSubmittal20240530.pdf](#)

One of the homeowners did forward this to the city of Orono. This was his response. Looks like we will need some stockpiling permits also from the city. But they are in support of this method.

Thank you,
Corey Truebenbach
952-212-4151
Twin City Outdoor Services

----- Original message -----

From: Matt Johnson <matt@minnetonkamatt.com>
Date: 6/3/24 5:44 PM (GMT-06:00)
To: Corey Truebenbach <ctruebenbach@tcoscorp.com>
Subject: Fwd: Dredging Permit Variance/exception letter - Wildhurst Trail

See Below....

Matt Johnson
Minnetonka Matt Team
Compass - Lake Minnetonka
612-801-7580

Begin forwarded message:

From: Adam Edwards <aedwards@oronomn.gov>
Subject: RE: Dredging Permit Variance/exception letter - Wildhurst Trail
Date: June 3, 2024 at 10:13:50 AM CDT
To: Matt Johnson <matt@minnetonkamatt.com>
Cc: Melanie Curtis <MCurtis@oronomn.gov>, Laura Oakden <loakden@oronomn.gov>

Matt,

I have no concerns with the use of sediment containment bags as a method of dewatering. It is one of the methods we consider for city projects when we have to dredge storm ponds.

You will need stockpile permits from the city for the project for any of the parcels that are used for dewatering. Looks like two per the plans you provided. Per the plan it looks like the sediment will be hauled off site. If the sediment is used on site land alteration/ grading permits may be required. I've CC'd Melanie who can assist with those requirements.

Adam



Adam T. Edwards, P.E.
City Administrator / City Engineer
2750 Kelley Parkway | Orono, MN 55356
(952) 249-4600
aedwards@oronomn.gov
<http://www.ci.orono.mn.us>

From: Matt Johnson <matt@minnetonkamatt.com>
Sent: Friday, May 31, 2024 3:43 PM
To: Adam Edwards <aedwards@oronomn.gov>
Subject: Fwd: Dredging Permit Variance/exception letter - Wildhurst Trail

Matt Johnson
Minnetonka Matt Team
Compass - Lake Minnetonka
612-801-7580

Begin forwarded message:

From: Corey Truebenbach <ctruebenbach@tcoscorp.com>
Subject: Dredging Permit Variance/exception letter
Date: May 31, 2024 at 3:20:41 PM CDT
To: Matt Johnson <matt@minnetonkamatt.com>

APPENDIX G – HOMEOWNER PERMISSIONS

I, Joe Feldmann grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

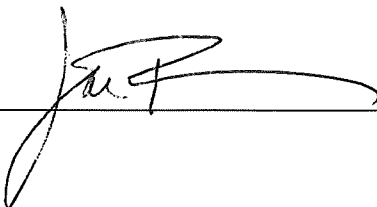
• 1003 Wildhurst Trail	• 995 Wildhurst Trail
• 999 Wildhurst Trail	• 993 Wildhurst Trail
• 997 Wildhurst Trail	• 975 Wildhurst Trail

This project will also Cross over land at 805 Forest Arm Lane.

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:	Joe Feldmann
Address:	805 Forest arms Ln
Email:	joefeld@feldmannimports.com

Sincerely,

Signed:  Date: 9/9/24

Address	Owners	E-Mail	Phone	6/7 Updated Sent	Permission Letter Received
1003 Wildhurst Trl	Matt Johnson	mjohnson@ci.orono.mn.us	Matt) 612-801-7580	x	x
999 Wildhurst Trl	Tony and Alison Stinar	Tonystinar@gmail.com , Alisonstinar@gmail.com	Tony) 763-355-4854	x	x
997 Wildhurst Trl	Brian and Ann Turbeville	Brian@wc-print.com	Ann) 612-875-1315 Ann) 612-875-1318	x	x
995 Wildhurst Trl	Tom and Laurie Fleck	TomFleck1@gmail.com	Tom) 612-618-8091 Laurie) 952-380-6332	x	x
993 Wildhurst Trl	Brad Pfaff	Brad@grnway.biz	612-419-5311	x	x
975 Wildhurst Trl	Corey and Annette Olson	lakeole@gmail.com	Corey) 507-208-2010	x	x

I, Brad PFAFF (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

- 903 Wildhurst Trail
- 999 Wildhurst Trail
- 997 Wildhurst Trail
- 995 Wildhurst Trail
- 993 Wildhurst Trail
- 975 Wildhurst Trail

Watercraft Description:

For 993 (address) Wildhurst Trail the watercraft currently docked in the space, include:

- houseboat Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- 19 Length
- 4' Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:

Brad PFAFF

Address:

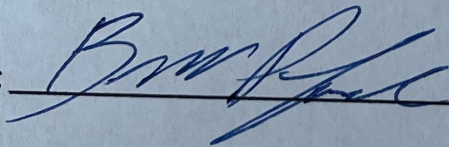
993 Wildhurst Trail

Email:

Brad@grnway.biz

Sincerely,

Signed:



Date:

6-12-2024

I, Tom Fleck (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

• 1003 Wildhurst Trail	• 995 Wildhurst Trail
• 999 Wildhurst Trail	• 993 Wildhurst Trail
• 997 Wildhurst Trail	• 975 Wildhurst Trail

Watercraft Description:

For 995 (address) Wildhurst Trail the watercraft currently docked in the space, include:

- Deck Boat Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- 22' 6" Length
- 2' 10" Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:	<u>Tom Fleck</u>
Address:	<u>995 WILDHURST TR. ORONO, MN 55364</u>
Email:	<u>TomFleck1@gmail.com</u>

Sincerely,

Signed:  Date: 7-1-2024

I, Brian Turbeville (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

• 1003 Wildhurst Trail	• 995 Wildhurst Trail
• 999 Wildhurst Trail	• 993 Wildhurst Trail
• 997 Wildhurst Trail	• 975 Wildhurst Trail

Watercraft Description:

For 997 (address) Wildhurst Trail the watercraft currently docked in the space, include:

- pontoon Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- 25' Length
- 20" Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:	<u>Brian Turbeville</u>
Address:	<u>997 Wildhurst Trail</u>
Email:	<u>Brian@WC-Print.com</u>

Sincerely,

Signed:  Date: 6/10/2024

I, Tony Stinar (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

• 1003 Wildhurst Trail	• 995 Wildhurst Trail
• 999 Wildhurst Trail	• 993 Wildhurst Trail
• 997 Wildhurst Trail	• 975 Wildhurst Trail

Watercraft Description:

For 999 (address) Wildhurst Trail the watercraft currently docked in the space, include:

- Wakeboard Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- 25 ft. Length
- 27 in. Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:	<u>Tony Stinar</u>
Address:	<u>999 Wildhurst Trl, Mound, MN 55364</u>
Email:	<u>tonystinar@gmail.com</u>

Sincerely,

Signed: 

Date: 6/17/24

I, MATT & SUSANNE JOHNSON (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

• 1003 Wildhurst Trail	• 995 Wildhurst Trail
• 999 Wildhurst Trail	• 993 Wildhurst Trail
• 997 Wildhurst Trail	• 975 Wildhurst Trail

Watercraft Description:

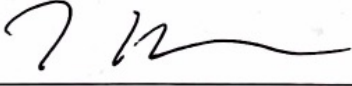
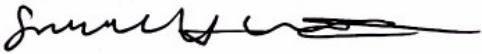
For 1003 (address) Wildhurst Trail the watercraft currently docked in the space, include:

- Run about (42) Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- 23' Length
- 4-5' Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:	MATT & SUSANNE JOHNSON
Address:	1003 WILDHURST TRAIL
Email:	MATT @ MINNETONKAMATT . COM

Sincerely,

Signed:  Date: 6/11/2024


I, Matt & Susanne Johnson (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

- 1003 Wildhurst Trail
- 999 Wildhurst Trail
- 997 Wildhurst Trail
- 995 Wildhurst Trail
- 993 Wildhurst Trail
- 975 Wildhurst Trail

Watercraft Description:


For 1003 (address) Wildhurst Trail the watercraft currently docked in the space, include:

- Runabout (x2) Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- 23' Length
- 4-5' Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name: Matt Johnson
Address: 1003 Wildhurst Trail
Email: Matt@MinnetonkaMatt.com

Sincerely,

Signed:  Date: 6/11/24

I, Corey Olson (name) grant permission to Twin City Outdoor Services to apply for a dredging permit with the Minnehaha Creek Watershed District.

The dredging permit is intended for sediment removal work to be conducted at the following properties in 2024 summer season:

• 1003 Wildhurst Trail	• 995 Wildhurst Trail
• 999 Wildhurst Trail	• 993 Wildhurst Trail
• 997 Wildhurst Trail	• 975 Wildhurst Trail

Watercraft Description:

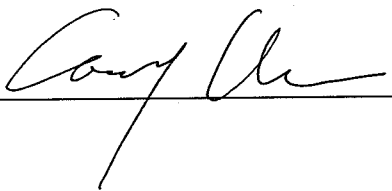
For ~~945~~ (address) Wildhurst Trail the watercraft currently docked in the space, include:

- N/A Type of watercraft (e.g., pontoon boat, houseboat, fishing boat)
- N/A Length
- N/A Draft (distance from waterline to lowest point of boat)

This information is requested by Minnehaha Creek Watershed District during the permitting process.

Name:	Corey Olson
Address:	975 Wildhurst Trail, Mound, MN 55364
Email:	lakeote@gmail.com

Sincerely,

Signed:  Date: 9-9-24

Attachment C: Hennepin County Historic Aerials



1957





1964





1969





1989





2000





2024

