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LAKE SHAMINEAU HIGH WATER OUTLET PROJECT ENGINEERING FEASIBILITY REPORT

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Lake Shamineau Lake Improvement District



Houston Engineering, Inc.
1401 21st Ave. N
Fargo, ND 58102
Phone # 701.237.5065

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

A handwritten signature in blue ink, appearing to read 'Michael M. Opat', is written over a horizontal line.

Michael M. Opat
Registration No. 45806

5-12-2023

Date

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1 INTRODUCTION

1.1 PURPOSE

The purpose of this engineering feasibility report for the Lake Shamineau High Water Outlet Project is to address the requirements set forth in Chapter 429 of the Minnesota Statutes pertaining to special assessments for public improvements. The Lake Shamineau High Water Outlet Project is being developed by the Lake Shamineau Lake Improvement District (LSLID), a Minnesota political subdivision with the legal authority to develop the project and levy special assessments to fund it. The feasibility report will show that the project, as proposed, is feasible, necessary, and cost effective, and will provide the LSLID with necessary information and documentation to proceed with the process outlined in Chapter 429.

1.2 BACKGROUND

Lake Shamineau is located in Scandia Valley Township within Morrison County, approximately five miles south of Motley, Minnesota. The lake is approximately 1,434 acres in size. Lake Shamineau is in a closed basin watershed and it has been subject to rising water during the recent wet hydrologic cycle due to the lack of a natural outlet. The increase in lake levels has negatively affected properties around the lake, with more than 40 homes and cabins inundated by rising waters. The high water levels are also causing shoreline erosion, destruction of wildlife habitat, reduced public access to the lake, and other adverse impacts.

The LSLID has been seeking a permanent solution to the rising lake water since 2017. Analyses of the problem and potential alternatives to address it have been documented in a series of engineering reports commissioned by the LSLID. The Engineer's Feasibility Report dated January 23, 2018, by Houston Engineering, Inc. (HEI) documented four possible alternatives, including:

1. Do Nothing
2. Northeast Bound Outlet
3. Southwest Bound Outlet
4. Property Buyout

Alternative 3 (the Southwest Bound Outlet) was determined to be the most feasible engineering solution; however, the LSLID encountered challenges with right of way acquisition and permitting that led them to consider other options. The Preliminary Engineering Report dated June 3, 2019, by Widseth Smith Nolting & Associates (Widseth) documented an alternative involved pumping water out of the northeast corner of the lake and into an infiltration basin that would transfer the water away from the lake via groundwater flows. This alternative also encountered opposition from regulatory agencies and landowners and the LSLID chose to forgo further development of that option.

With the high water issues continuing to get worse in 2020, the LSLID hired HEI to reconsider all of the previously considered options and identify alternatives that would address the problem on Lake Shamineau while also mitigating the known concerns of the regulatory agencies and landowners involved. The Engineer's Conceptual Summary Report dated August 7, 2020, by HEI documented a solution involving a "West Bound Outlet" that addressed the issues previously encountered with the Southwest Bound Outlet from the 2018 study. Since August of 2020, the LSLID has been developing the West Bound Outlet, while also considering other solutions that could be more cost-effective, including other routes for the force main. The project described in this feasibility report has been found to be the most feasible and cost effective alternative.



1.2.1 NECESSITY

The project is necessary to lower and maintain water levels in Lake Shamineau in order to address the following objectives:

1. Significantly reduce the frequency of high lake stages exceeding the Ordinary High Water (OHW) elevation of Lake Shamineau causing damages to adjacent property owners.
 - a. Construct an artificial outlet for Lake Shamineau capable of being operated year around.
 - b. Reduce lake bounce duration and magnitude.
 - c. Return water levels in Lake Shamineau to the OHW within three years.
2. Improve lake shore land management.
3. Reduce lake shore erosion and improve water quality.
4. Improve public access to Lake Shamineau.
5. Improve access to public and private property around Lake Shamineau by reducing flooding of roads and driveways.
6. Restore property values for riparian properties around the lake.

The project has been voted on by the membership of the Lake Shamineau Improvement District, the same property owners that would be assessed for at least a portion of the project, and each time the membership has voted overwhelmingly to proceed with the project due to ongoing need for a solution.

2 PROJECT DESCRIPTION

2.1 PROJECT DESCRIPTION

Due to the absence of a natural outlet, an artificial outlet is necessary to draw down and maintain Lake Shamineau at a lower elevation. After reviewing numerous alternatives, a west bound outlet has been found to be the most feasible and cost-effective alternative. This alternative includes a pump station and forcemain that will draw water out of the west side of the lake and transfer it to Fish Trap Creek and Todd County Drain No. 41 (TCD 41). The Project is set to follow the route shown on the map in Figure 1. The proposed pump station is located near the bend in Aztec Road and the force main would be constructed along Aztec Road and then extend south along the east side of U.S. Highway 10 to the south side of County Road 203 before crossing under U.S. Highway 10. On the west side of U.S. Highway 10 the force main will discharge into an existing drainage ditch and the water will continue westerly toward Atlantic Road. At that point, flows from the Project will be diverted out of the existing drainage ditch into a bypass channel that will convey the water along the east side of Atlantic Road and the south side of Pulaski Road before discharging into a tributary that drains into Fish Trap Creek and TCD 41. At the point of diversion, only the flow equivalent to the discharge from the pumping system will be diverted while the pump(s) is running, and the natural flows will continue to flow downstream along the natural watercourse.

The outlet system will include a MNDNR-approved filter that will prevent the transfer of aquatic invasive species (AIS) that exist in Lake Shamineau, including Eurasian watermilfoil which is known to exist in the lake. Following an analysis of average annual inflows to the lake and expected losses due to evaporation and groundwater flows, the LSLID selected a pump discharge rate of 10 cubic feet per second (cfs). At this rate, it is estimated that the lake would be drawn down 2.8 feet (based on June 2020 recorded water levels) to the ordinary high water (OHW) level, as defined by the DNR, in approximately three years. Refer to the 2020 HEI report for more information. When considering the design discharge rate, the LSLID sought to strike a balance between addressing the damages being caused by high water levels around the lake and the ability of downstream watercourses to handle the water being conveyed downstream without flooding. After the initial three year discharge period, pumping would only be required when water levels reach levels above the OHW, in accordance with the operating plan.



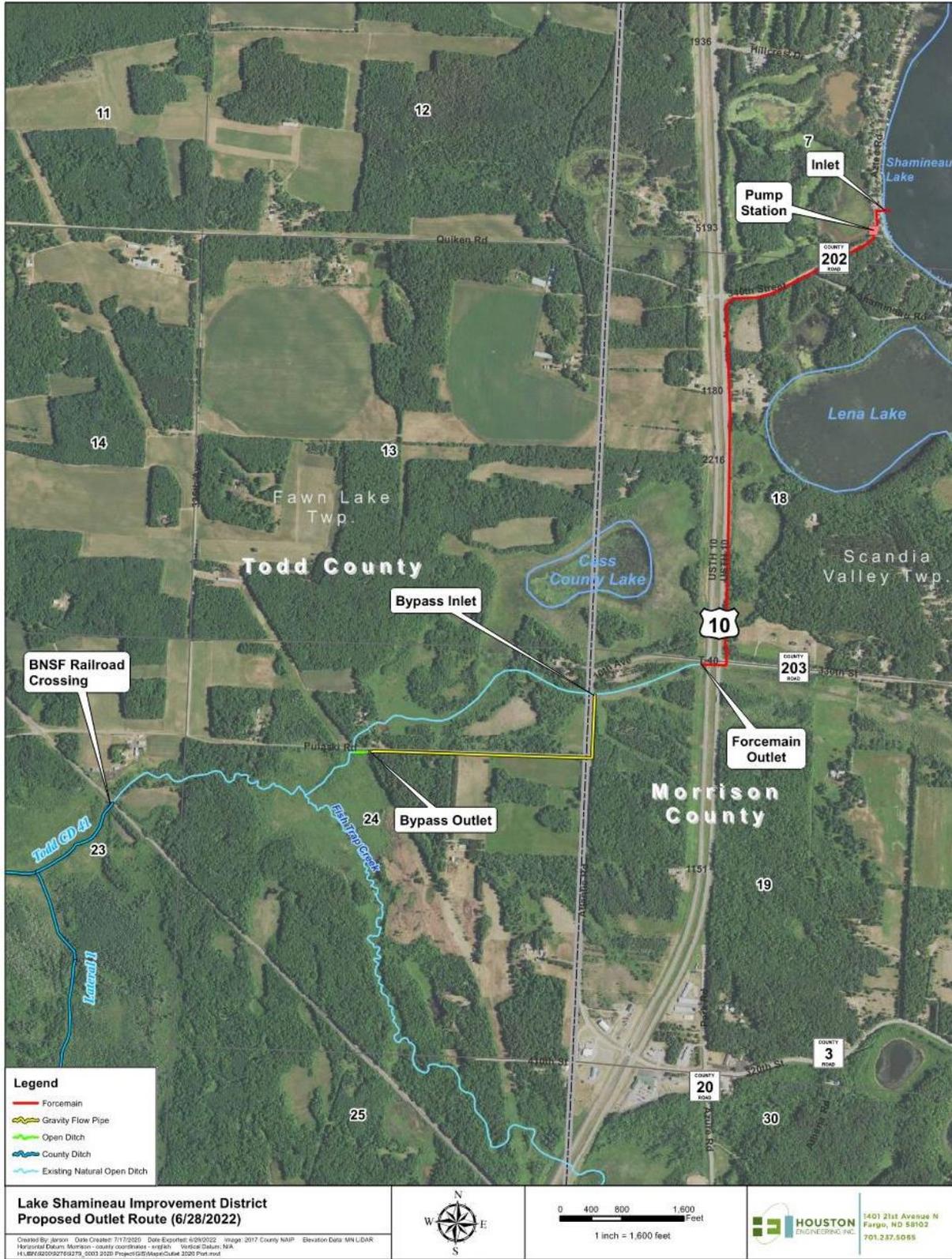


Figure 1 – Project Route & Features

The project will also include monitoring systems that will aid the LSLID in operating the project in accordance with the operating plan that was developed to address specific requirements in the permit issued by the Minnesota Department of Natural Resources and in the order issued by Todd County that allows the LSLID to utilize TCD 41 as an outlet.

2.1.1 FEASIBILITY

The feasibility of the project is based on the previous reports referenced in **Section 1.2 Background**, and subsequent analysis of the proposed project and other potential alternatives. As of the date of this report, construction plans for the project are 90% complete, the LSLID has secured agreements for all necessary right of way for the project, and all required permits have either been acquired or are pending with approvals anticipated. The LSLID has also obtained necessary permissions to utilize Todd County Ditch No. 41 as an outlet. There are no foreseeable issues that would impact the feasibility of the project from an engineering perspective. Additionally, the LSLID has already received direction from its membership to proceed with the project through a vote conducted as required by the LSLID's bylaws.

2.1.2 OPINION OF PROBABLE COST

A preliminary opinion of probable cost has been developed from estimated costs for construction and other project costs. The LSLID has elected not to include pre-construction costs (including right of way/land rights and pre-construction engineering) as part of the costs that will be specially assessed to property owners through the Chapter 429 process, so those costs have not been included in the preliminary opinion of probable cost. The estimated costs reflect best available data derived from recent construction bids, pricing from potential suppliers and contractors, and reasonable assumptions for current and future market conditions. The preliminary opinion of probable cost also includes a contingency to help mitigate any unforeseen costs that may arise. The detailed preliminary opinion of probable cost is shown in Figure 3 and summarized below:

Construction	\$4,400,000
Construction Engineering	\$300,000
Utilities	\$40,000
Permitting	\$20,000
Administrative, Legal & Misc.	\$50,000
Financing	\$300,000
Contingency	\$440,000
Total Estimated Project Cost	\$5,550,000

3 PROPOSED PROJECT FUNDING

Through a vote of the membership of the Lake Shamineau Improvement District conducted in August of 2022, the Lake Shamineau Improvement District's Board of Directors received authorization to proceed with the construction of an outlet project with a maximum local cost of \$5,550,000. In an effort to offset the local share of the project cost, the LSLID has been pursuing funding in the form of a grant from the state of Minnesota. As of the date of this report, the LSLID has not been awarded a state grant from the construction phase of the project, but the legislative session is ongoing and the LSLID is actively pursuing legislative financial support. The local share of the project, up to the maximum authorized amount of \$5.55 million, will be funded through a financial bonding instrument that will be paid back with charges and special assessments levied by the LSLID on benefitting properties within the lake improvement district.



3.1 FINANCING

In order for the LSLID to finance the project, it must issue a bond (which is much like a loan). Pursuant to Chapter 429 of the Minnesota Statutes, a percentage of the bond must be repaid through the levy of special assessments. The other portion of the bond can be paid through charges or a tax levy. The issuance of a bond will allow the LID to secure lower tax exempt interest rates that will ultimately save money for the LSLID and its members.

3.2 CHARGES

The LSLID currently funds its normal operations through a charge paid by all riparian property owners comprising the membership of the lake improvement district, including private residences, associations, and commercial properties, based on a formula adopted by the LSLID. The LSLID Board of Directors is proposing to fund a minimum of 60% (\$3,330,000) of the local share of the project through charges to the membership in accordance with its established charging practice.

3.3 SPECIAL ASSESSMENTS

After the charges described in **Section 3.2 Charges** are applied, the remaining local share of the project will be funded through special assessments levied under Chapter 429 of the Minnesota Statutes. The LSLID Board of Directors is proposing to fund a maximum of 40% (\$2,220,000) of the local share of the project through special assessments.

3.3.1 ASSESSMENT METHODOLOGY

The LSLID Board of Directors appointed a committee to develop a process for determining and levying special assessments in accordance with Chapter 429 of the Minnesota Statutes. The committee worked with HEI and the LSLID's legal counsel to develop an assessment methodology that is consistent with generally accepted assessment procedures, is not arbitrary or capricious, and would stand up to any objections or appeals made to the assessments. The methodology developed by the committee and adopted by the LSLID Board of Directors is largely based on methodologies used by other lake improvement districts to levy special assessments for similar lake outlet projects in other parts of the state, with modifications made to account for specific features of the project and conditions unique to Lake Shamineau.

The adopted assessment methodology breaks the assessments into three tiers, with one tier accounting for direct benefits to each parcel, one tier associated with indirect drainage benefits to each parcel, and the third tier tied to the overall benefit of the project. Within these tiers, considerations for lot frontage widths, building elevations, and average parcel elevations are factored into the overall assessment for each parcel. HEI utilized the best available data, including LIDAR-derived topographic data and parcel data provided by Morrison County, to determine the lot frontage widths and elevations used in the assessment calculations. Members of the committee also conducted field reviews of certain parcels to verify the existence of structures and other site conditions, and their findings were incorporated into the calculations.

3.3.2 ASSESSMENT CALCULATIONS

Utilizing the tax roll information provided by the Morrison County Auditor's Office on May 1, 2023, the LSLID is proposing to assess approximately 340 properties, including 319 riparian properties, 14 association properties, and 7 commercial properties. Based on this tax roll information and the assumed assessment amount of \$2,220,000 (40% of the local share), the LSLID's assessment methodology would result in a maximum

assessment on any parcel of approximately \$11,000, while the average assessment is approximately \$6,550 and the minimum assessment is approximately \$2,500. These special assessments would be in addition to the charges discussed in **Section 3.2 Charges**. Assessed property owners can pay their assessments in full, and the LSLID can consider allowing the assessments to be paid over a period of time, with considerations for interest charges and administration expenses.

4 FINDINGS

The Lake Shamineau High Water Outlet Project, as described in this feasibility report, is feasible from engineering and construction standpoints. The project is necessary to lower and maintain water levels in the lake, reduce property damages, protect property values, reduce shoreline erosion, improve water quality, and to improve access to the lake and to adjacent riparian properties. The project is cost effective when compared to other alternatives.

The project, as proposed, is feasible, necessary, and cost effective.

5 NEXT STEPS

5.1 CHAPTER 429 SPECIAL ASSESSMENT PROCESS

5.1.1 IMPROVEMENT HEARING

Pursuant to Chapter 429 of the Minnesota Statutes, the LSLID must hold a public hearing on the proposed improvement project before awarding a construction contract or assessing any portion of the cost of the project. A Notice of Public Hearing on Improvement must be published in the LSLID's official newspaper and mailed to the owners of each parcel proposed to be assessed, in accordance with the requirements stipulated in Chapter 429. The Notice will state the date, time, and place of the Hearing, along with the general nature of the improvement, the estimated cost, and the area proposed to be assessed. The purpose of the Improvement Hearing is for the engineer to present the Engineering Feasibility report and for the LSLID Board of Directors to gather public comments before ordering the project to be done. A reasonable estimate of the total amount to be assessed, and a description of the methodology used to calculate individual assessments for affected parcels, must be available at the hearing.

5.1.2 ORDERING THE IMPROVEMENT

Following the Improvement Hearing, the LSLID Board of Directors can consider adopting a resolution ordering the improvement. The resolution ordering the improvement may be adopted at any time within six months after the date of the Improvement Hearing by vote of the Board, pursuant to relevant requirements of Chapter 429 of the Minnesota Statutes. The resolution may reduce, but not increase, the extent of the improvement as stated in the Notice of Public Hearing on Improvement. Upon adoption of the resolution, the LSLID Board of Directors can direct the engineer to proceed with the preparation of final plans and authorize the project to be advertised for bids.



5.1.3 ASSESSMENT HEARING

Before the special assessments are finalized and certified to the tax rolls, an Assessment Hearing will be held. The purpose of the Assessment Hearing is for the LSLID Board of Directors to hear and consider all objections to the proposed assessments, whether presented orally or in writing. Before adopting the final assessments, the LSLID Board of Directors may change, or amend, the proposed assessment on any parcel. A Notice of Assessment Hearing will be published in the LSLID's official newspaper and mailed to the owners of each parcel proposed to be assessed, in accordance with the requirements stipulated in Chapter 429. The Notice will state the date, time, and place of the Hearing, along with the general nature of the improvement, the estimated cost, and the area proposed to be assessed. The Notice will also inform the property owner of the amount to be assessed against their parcel and provide information regarding the property owner's rights under Chapter 429 of the Minnesota Statutes.

Pursuant to Chapter 429 of the Minnesota Statutes, the LSLID Board of Directors can proceed with the Assessment Hearing at any time after ordering the improvement. In this case, the Board may wish to wait until the project is completed, or nearly completed, before formally proceeding with the Assessment Hearing. This will allow for the Board to have a more complete picture of the costs and funding associated with the project before calculating the total amount to be assessed and the corresponding assessment on each parcel.

The LSLID should consult with legal counsel for guidance on the entire Chapter 429 process, including the steps described above and further considerations for spreading assessments, charging interest, issuing Notice of Payment, deferring assessments, and certifying the assessments.

5.2 BIDDING

After ordering the improvement, as discussed in **Section 5.1.2**, the LSLID Board of Directors can direct the engineer to prepare final plans and advertise the project for bids. The LSLID can divide the project into multiple construction contracts if it so desires. The bidding process is governed by Chapter 429, and other relevant chapters, of the Minnesota Statutes. Specifically, the LSLID must advertise the project in the LSLID's official newspaper as well as other specified publications for a minimum of 21 days. After opening the bids, the LSLID must either award the contract to the responsible bidder (with rare exceptions) or reject all bids. Additionally, the LSLID will have no more than 30 days (unless otherwise specified or agreed to) to take action on the bids before the bidders will be allowed to withdraw their bids without penalty. The LSLID's engineer and legal counsel will assist the LSLID with the development of the bidding documents and the bidding process.

After awarding the contract(s), the contractor(s) and the LSLID will proceed with completing and signing the construction agreements, including providing bonds, proof of insurance, and other documentation. Once all of the paperwork is in order, the LSLID can authorize the contractor(s) to proceed with construction.

5.3 CONSTRUCTION

Once the Notice to Proceed has been issued, the contractor(s) will schedule a pre-construction meeting with representatives of the LSLID and other project stakeholders. This meeting will involve a review of the anticipated project schedule, coordination with utility companies, and a review of specific project activities and potential impacts to adjacent properties and roadways. Commencement of actual construction activities will be up to the contractor(s) to determine, as they will only be obligated under their contract(s) to meet specified milestones and completion dates. The LSLID Board of Directors will set these milestone and completion dates. The Board will

need to balance the desire to complete the project as soon as possible with a schedule contractors will find reasonable so that they offer their most competitive bid to complete the work. It should be noted that the lead times on the pump, filter, pipe, and other materials can be as long as four to six months, and this can have a significant impact on the contractor's schedule.

Upon substantial completion of the project, a punch list will be created and the contractor(s) will conduct an initial start up of the system and troubleshoot any issues that may arise. At that point further calibration of the pumping system and downstream monitoring components will take place. Once the contractor has met all of their contractual requirements and all punch list items are addressed, the contractor can turn the project over to the LSLID. Provided downstream conditions fall within the parameters specified in the operating plan, the system can be operated by the LSLID.



6 POTENTIAL PROJECT SCHEDULE

Task	Description	Timeline (Estimated)
Permitting	<ul style="list-style-type: none"> Finalize Morrison County permits Complete wetland credit acquisition (July 2023) 	May 2023
Improvement Hearing	<ul style="list-style-type: none"> Review Engineering Feasibility Report Review proposed assessments Public comments 	June 2023
Order Improvement	<ul style="list-style-type: none"> Can be considered after Improvement Hearing Board adopts resolution ordering project Board directs engineer to prepare final plans and advertise for bids 	June 2023
Final Plans and Specifications	<ul style="list-style-type: none"> Engineer prepares final plans, specifications, and construction contract documents 	June 2023
Bidding Process	<ul style="list-style-type: none"> Advertisement for Bids (at least 21 days in newspaper) Bidder questions Open bids, tabulate bids, determine lowest responsible bidder(s) Award contract(s) 	June-July 2023
Initial Contract Administration	<ul style="list-style-type: none"> Obtain and review bonds, insurance, schedules, etc. Sign contracts (between LSLID and contractor(s)) Issue Notice to Proceed Hold preconstruction meeting 	August 2023
Construction	<ul style="list-style-type: none"> Contractor(s) orders materials and equipment Construction Contractor to determine their schedule to meet specified milestones and completion dates 	Begins Fall 2023
Final Completion and Closeout	<ul style="list-style-type: none"> Complete punch list items Turf establishment System start up Testing and calibration 	2024 (Month TBD)
Assessment Hearing	<ul style="list-style-type: none"> Calculate total amount to be assessed and assessments on each parcel. Conduct Assessment Hearing Finalize and certify assessments 	2024 (Month TBD)

Figure 2 – Potential Project Schedule

Figure 3 – Preliminary Opinion of Probable Cost

ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST					
LAKE SHAMINEAU HIGH WATER OUTLET PROJECT					
LAKE SHAMINEAU LAKE IMPROVEMENT DISTRICT					
May 12, 2023					
Item No.	Item Name	Unit	Quantity	Unit Price	Amount
1	Mobilization	LS	1	\$ 200,000.00	\$ 200,000
2	Traffic Control	LS	1	\$ 30,000.00	\$ 30,000
3	Flotation Silt Curtain	LF	370	\$ 25.00	\$ 9,250
4	Silt Fence	LF	800	\$ 2.50	\$ 2,000
5	Fiber Roll	LF	4,125	\$ 3.50	\$ 14,438
6	Ditch Check	EA	33	\$ 100.00	\$ 3,300
7	Turf Reinforcement Mat	SY	246	\$ 15.00	\$ 3,690
8	Excavation	CY	260	\$ 20.00	\$ 5,200
9	Embankment	CY	450	\$ 20.00	\$ 9,000
10	Seeding and Mulching	AC	6	\$ 2,200.00	\$ 13,200
11	Remove Tree	LS	1	\$ 110,000.00	\$ 110,000
12	Remove Fish Cleaning Shack	LS	1	\$ 10,000.00	\$ 10,000
13	Remove Asphalt Pavement	SY	1,502	\$ 15.00	\$ 22,530
14	Remove Gravel Surface	SY	341	\$ 6.00	\$ 2,046
15	Asphalt Pavement	TON	531	\$ 100.00	\$ 53,100
16	6" Concrete Pavement w/ 2" Gravel Base	SY	36	\$ 115.00	\$ 4,140
17	6" Gravel Surface	TON	144	\$ 20.00	\$ 2,880
18	6" Gravel Base	TON	470	\$ 25.00	\$ 11,750
19	Remove Culvert	LF	109	\$ 20.00	\$ 2,180
20	24" HDPE Pipe (Gravity Intake)	LF	428	\$ 310.00	\$ 132,680
21	3" HDPE (Backwash Pipe)	LF	458	\$ 50.00	\$ 22,900
22	16" DR25 C900 PVC Pipe (Forcemain)	LF	5,138	\$ 105.00	\$ 539,490
23	16" DR25 C900 PVC Pipe (Forcemain) - Install by HDD	LF	1,807	\$ 215.00	\$ 388,505
24	Type I Road Crossing w/ 16" DR25 C900 Restrained Joint PVC Pipe (Forcemain) w/ Casing Pipe	LF	310	\$ 950.00	\$ 294,500
25	12" CMP Culvert	LF	54	\$ 60.00	\$ 3,240
26	18" CMP Culvert	LF	34	\$ 70.00	\$ 2,380
27	24" CMP Culvert	LF	59	\$ 80.00	\$ 4,720
28	24" CMP Culvert Extension	LF	29	\$ 100.00	\$ 2,900
29	30" CMP Culvert	LF	39	\$ 115.00	\$ 4,485
30	24" HDPE Dual Wall Pipe	LF	3,662	\$ 105.00	\$ 384,510
31	12" Steel Apron	EA	4	\$ 500.00	\$ 2,000
32	18" Steel Apron	EA	2	\$ 550.00	\$ 1,100
33	24" Steel Apron	EA	5	\$ 650.00	\$ 3,250
34	30" Steel Apron	EA	2	\$ 750.00	\$ 1,500
35	4' AV/AR MH	EA	4	\$ 35,000.00	\$ 140,000
36	4' Dia Outlet Structure w/ Flap Gate	LS	1	\$ 15,000.00	\$ 15,000
37	4' Dia Bypass Inlet	EA	1	\$ 6,000.00	\$ 6,000
38	4' Dia MH	EA	11	\$ 5,500.00	\$ 60,500
39	5' Dia MH	EA	2	\$ 8,500.00	\$ 17,000
40	24" Slide Gate Manhole w/ Pedestal and Actuator	EA	1	\$ 27,000.00	\$ 27,000
41	Intake Structure with Fish Screen	LS	1	\$ 50,000.00	\$ 50,000
42	Dewatering & Sheet piling - Intake Pipe	LS	1	\$ 500,000.00	\$ 500,000
43	Dewatering Wells	LS	1	\$ 480,000.00	\$ 480,000
44	Pump Station	LS	1	\$ 672,000.00	\$ 672,000
45	Mechanical AIS Filter	LS	1	\$ 85,000.00	\$ 85,000
46	Pump Station SCADA System	LS	1	\$ 16,000.00	\$ 16,000
47	Bypass SCADA System	LS	1	\$ 21,000.00	\$ 21,000
48	Danger Buoy	EA	2	\$ 700.00	\$ 1,400
49	Sign	EA	1	\$ 150.00	\$ 150
50	Salvage and Re-install Signs	LS	1	\$ 2,000.00	\$ 2,000
51	Private Sewer Reconnections	LS	1	\$ 1,500.00	\$ 1,500
52	Water Surface Elevation Monitoring Gauge	EA	3	\$ 3,000.00	\$ 9,000
Construction Subtotal					\$ 4,400,000
Construction Phase Costs:					
	Construction				\$ 4,400,000
	Contingencies (10%)				\$ 440,000
	Construction Engineering, Staking, Material Testing				\$ 300,000
	Utility Relocations				\$ 20,000
	Electrical Service				\$ 20,000
	Permitting Fees & Wetland Credits				\$ 20,000
	Administrative, Legal & Misc.				\$ 50,000
	Finance Charges for Temporary Financing				\$ 300,000
Construction Phase Subtotal					\$ 5,550,000
OPINION OF TOTAL PROBABLE PROJECT COSTS					\$ 5,550,000

