Stantec

Memo

To:	Minnetonka Beach Minnetonka Beach City Hall	From:	Ryan Capelle Minneapolis
File:	Revised - Water Supply Alternatives Update	Date:	May 21, 2021

Reference: Update Memo – Minnetonka Beach Water Supply Alternatives

Introduction

The purpose of this memo is to provide the Minnetonka Beach stakeholders with the information needed to make critical decisions regarding the future of treatment for the water supply. More specifically included herein is an update of the improvements that have been completed to date, high- level material and construction costs for previously identified improvements, an update identifying next improvements, and a comparison of alternatives based up common criteria. The three designated alternatives were defined in the scope of services as follows:

1) **Maintenance Plan** – This scenario involves maintenance and replacing existing components as planned or as needed due to failure, critical condition assessment, Minnesota Department of Health (MDH) recommendations, health and safety issues and/or compliance with Ten State Standards (TSS). With this item we will identify the next $100,000 +/- worth of most critical needs for the WTP to provide the City with infrastructure having an estimated useful life of 20 years. This option lays out a plan that extends the life of the plant to the year 2041.
2) **Demolish Existing WTP And Replace With Entirely New Treatment Facility** – This scenarioupdate is to include demolition and replacement of the existing WTP to provide the City with a new WTP and associated infrastructure that provides an estimated useful life greater than 50- 100 years.
3) **Orono Water Supply –** This option will revisit and summarize this topic with Orono city staff to update costs associated with buying water from Orono and decommissioning Minnetonka Beach's current water treatment plant. The costs will include water costs and infrastructure costs associated with metering and conveying water to Minnetonka Beach.

Status of Proposed Projects identified in Condition Assessment

Since the Condition Assessment Report was written in December 2019 several task/improvement items that were identified have been completed. The items completed were mainly focused on addressing immediate health and safety requirements and from recommendations communicated by Minnesota Department of Health (MDH)necessary for meeting current codes and/or Ten States Standards (TSS).

More specifically, the recent Chemical Feed Improvements Project that was completed at the end of 2020 successfully separated the fluoride feed system from the Chlorine Storage Room into its own room (repurposed Storage Room). The estimated project cost for the year 2020 was $175,000 the actual project cost for year 2020 was $85,320 which is $89,680 lower than the estimate. The overall updated estimate for the 20-year plan decreased from $2,963,000 to **$2,134,840** which represents a decrease of **$828,160** (see bottom of Updated Table 1.1R). The decrease is due mainly to updated perspective regarding the useful life of the existing WTP structure and the resulting removal of a key capital investment into replacement filters. The updated estimates also include revisions for materials costs, inclusion of a 20% premium to account for

Reference: **Update Memo – Minnetonka Beach Water Supply Alternatives**

near-term supply chain disruptions and/or emergency procurement due to failure and requirements or strong recommendations identified by MDH in the recently received Sanitary Survey (valued at $93,000).

The culmination of the completed items that have been completed are reflected in **the Updated Table 1.1R from the 2019 Condition Assessment Report in Appendix A.**

The updated Table 1.1R illustrates the progress made on proposed projects and shows the updated estimate for proposed tasks for years 2-5. To further refine these projects, we have prepared an estimate for the next proposed project to be conducted in 2021-2022. The estimated cost for this next project (including requirements and strong recommendations from MDH is **$349,690**. Given the age of existing equipment we also estimated the at-risk equipment for the coming year to be and additional $257,150 to represent a worst-case scenario for the coming year.

The updated table 1.2 showing the $349,690 project can be viewed in Appendix B.

Update on Cost Estimate Contingencies

The estimate allocations for contingency, engineering, legal and admin for maintaining the existing WTP are the same as those that were used for the 2019 Condition Assessment report. An additional premium contingency of 20% was applied for mobilization to account for the risk of premium charge for replacing failed equipment on short notice and the recent increase in construction materials observed in recent bids. The duration of impacts on cost due to COVID-19 and stimulus funding are not known, therefore we did not apply a separate premium for COVID-19 across all time period categories.

The cost for operation and maintenance is not identified separately for each of the scenarios given that these costs should be part of the respective water rates for each scenario. The costs for operating and maintaining water purchased from Orono is assumed to be part of the water rate structure charged by Orono.

Comparison of Alternatives

The three selected scenarios were compared based upon the following common set of criteria: cost, ease of operation, effective treatment, useful life/longevity, health and safety/compliance with MDH/TSS, risk of failure and autonomy. The following section summarizes the basis for these common criteria under each scenario.

Scenario 1 – Maintenance of Existing WTP

The scenario to maintain the existing WTP primarily involves continuing to operate the existing plant while following the planned improvements categorized in the 2019 Condition Assessment Report and the recently received Sanitary Survey Report received from MDH on 4-6-21. The culmination of significant items from both sources are reflected in the updated Table 1.1 which can be referenced in Appendix A. It should be noted that the plan reflected in Table 1.1R is an estimated progression of work based up on estimated useful life, and implied requirements from MDH, the exact order of projects is subject to change based on actual occurrence of deficiencies or further requirements received from MDH.

Cost: The estimated cost for maintaining the existing WTP through year 2041 is summarized in Updated Table 1.1. The 20-year cost is estimated to be **$2,134,840**. This value includes 30% contingency for construction, 30% for engineering, legal and administration, 7% for mobilization, plus a 20% mobilization

Reference: **Update Memo – Minnetonka Beach Water Supply Alternatives**

premium over 2019 prices for emergency on-call and near-term materials prices. A continued need for significant on-going maintenance or plant replacement at or near the end of the 20-year plan is expected.

Ease of operation: The existing WTP utilizes pressure filters which have been operating with a relatively low level of operational requirements with the exception of when certain elements fail to operate properly such as valves or pumps. Pressurized systems require more surveillance to make sure that over-pressurizing of certain process elements does not occur.

Effective Treatment: A handful of recent tests at the existing WTP indicate that the effluent iron ranges from 0.13 To 0.43 mg/l, the latter is higher than the secondary standards for drinking water established by MDH at 0.3 mg/l for iron. Recent manganese concentrations ranged from 0.036 to 0.053 mg/l; the secondary standard for manganese is 0.05 mg/l. It is possible that water quality would improve with the replacement of filter media, however it can not be counted on unconditionally given the age of the equipment and potential for other contributing deficiencies. The Minnetonka Beach water plant is currently meeting all primary water health and safety standards. Secondary standards are not set strictly for health and safety reasons, but more for aesthetic water quality goals such as taste, odor, staining of fixtures etc.

Useful Life/Longevity: The useful life of the existing WTP is directly dependent upon the condition of the building envelope as well as the components within it. The building envelope for the existing WTP and several of the electrical, mechanical and process equipment items have exceeded their useful life and, therefore are subject to failure at any time until or unless they are replaced. Once replaced, a reset of useful life is provided for specific components only. The reliability of the overall system may be improved, but the degree to which the longevity of the comprehensive water treatment system is improved may have varying significance due to interdependencies (weakest link relationships between systems). As always, mechanical equipment, pumps, and electronics will continue to carry an elevated risk of failure.

After further consideration of useful life, the existing WTP structure is not expected to be suitable for the intended purpose of housing treatment equipment during the time period ranging from 20-40 years from present without major reconstruction of structural walls at or around year 20.

For this reason, additional investment into a new skid mounted filtration system during years 16-20 is no longer advised. The maintenance of existing WTP scenario has been updated to reflect the reduction of capital cost in the amount of $717,000 plus associated contingencies, (totaling $828,160) represented by the filter equipment line item previously assigned to years 16-20. This approach more accurately reflects the expenditures that would be pursued without major reconstruction of the building envelope. With the revised approach, it is assumed that a new WTP project will be required in approximately 20 years if Minnetonka Beach continues to treat and sell water to its residents.

Health and Safety/compliance: The MDH recently conducted its periodic survey of conditions at the WTP results have not been obtained as of this writing. The condition assessment conducted in early 2021 identified the list of tasks to be addressed for health and safety compliance and these items are identified in the updated Table 1.1. Over the course of time if the elements identified in the condition assessment are addressed along with any new items from MDH the existing WTP can achieve compliance with health and safety requirements.

Risk of Failure: The risk of failure for used or existing systems and components is generally higher than the risk of failure for new systems. It should be noted that some items within the existing WTP are operating beyond their useful life and could fail at any time. A few items include: two of three high service pumps,

dehumidification system and unit heaters. Items that have been replaced should provide a diminished risk of failure for the new component only. Interdependency between electrical, process and mechanical systems can result in one system failing as the result of one component failing in another. That said, as items are replaced the risk of system wide failure diminishes to some extent.

Autonomy: The decision to maintain the existing WTP would result from a high-level decision to continue in the business of supplying and treating the water supply in Minnetonka Beach. Maintaining and operating the production of treated water results in greater autonomy and control over the cost of water for Minnetonka Beach residents.

Scenario 2 – Demolish Existing WTP and Construct New WTP

The alternative to demolish the WTP and construct a new facility for treatment the water supply effectively pushes the reset button for the community of Minnetonka Beach for a time frame of 50-100 years. This estimate assumes the new WTP will be constructed of cast-in-place concrete with gravity filters and will be designed for functionality, low maintenance and modest exterior finishes.

Cost: A high level cost estimate for a new WTP facility using recent bid prices for materials from a project bid in Cold spring, MN in November of 2020 results in an overall project cost of $4.84 M. This value includes 10% contingency, 20% engineering, legal and administration. The contingency for new design and engineering is less than rehabilitation/maintenance because the design elements are known and there is economy of scale with size of project compared to piece meal projects.

Ease of operation: A new design WTP will incorporate ease of operation primarily through implementation of gravity filters vs. pressure filters that are utilized at the existing WTP. Gravity filters are typically constructed as open top concrete boxes with filter media that allow raw water to trickle through them using gravity. This allows for visual verification and reliability and low maintenance compared to enclosed vessels constructed of painted steel.

Effective Treatment: A new WTP will be designed to consistently meet secondary standards established by MDH for iron and manganese. Secondary standards are 0.3 mg/l for iron and 0.05 mg/l for manganese.

Useful Life/Longevity: The useful life of a concrete gravity WTP falls within the range of 50-100 years. It must be recognized that certain mechanical elements within the facility such as the various pumps, electronic devices, controls, chemical feed systems and filter media will need to be replaced periodically over time similar to the existing WTP. New equipment should have an initial useful life greater than 20 years, with replacements needed thereafter on a typical 20-year cycle.

Health and Safety/compliance: A new WTP facility will be designed to meet applicable health safety requirements enforced by MDH. MDH will require plan review as part of the permitting process to ensure that the project complies with TSS enforced by MDH.

Risk of Failure: The risk of failure diminishes with construction of new facilities An overall reset of useful life is provided with installation of a new facility with new equipment at the same time. A design that harnesses gravity inherently reduces risk of failures caused by pressurization. Mechanical aspects such as pumps, electronics will continue to carry risk of failure. A warranty period of 2 years is typical for new construction.

Reference: **Update Memo – Minnetonka Beach Water Supply Alternatives**

Autonomy: The decision to construct a new WTP represents a high-level decision to invest in the business of supplying and treating the water supply for Minnetonka Beach. Maintaining and operating the production of treated water results in greater autonomy and control over the cost of water for Minnetonka Beach residents.

Scenario 3 – Orono Water Supply

This scenario involves purchasing treated water from Orono and includes evaluation of the common criteria with specific input on items that impact Minnetonka Beach.

Cost: The cost for purchasing water from Orono for the period of 20 years is estimated to be $6.30 M. Details are available in Appendix D. This cost estimate is based on our current understanding of water supply discussions with Orono City Staff which includes:

1. There are improvements within Orono that need to be made to improve water supply to Minnetonka Beach. These improvements would be a shared cost at 50/50 split. Our current estimate is $150,000 to increase watermain size within Orono.
2. Water system improvements/requirements in Minnetonka Beach are 100% Minnetonka Beach's cost and include:
    a. Installing meters on the watermains at the MB/Orono boarder for approximately $150,000
    b. Water plant demo/repurposing for approximately $100,000
    c. Well abandonment for $50,000
3. Water would be sold at a wholesale rate based on city boarder water meters (not the sum of household meters) coinciding with Orono's lowest tier residential water utility rate. Based on Orono's October 2020 rate study, Minnetonka Beach could assume the following rates:
    a. 2022 - $8.01
    b. 2023 - $8.26
    c. 2024 - $8.50
    d. 2025 - $8.76
    e. 2026 - $9.02
    f. +3% in future years
4. Minnetonka Beach would be responsible for:
    a. Ownership of the Minnetonka Beach water system within Minnetonka Beach
    b. Demolition/decommissioning/abandonment of the existing water treatment plant and wells
    c. All maintenance and replacement within Minnetonka Beach
    d. All billing and collection of water fees from Minnetonka Beach residents
    e. Providing Orono required Dept of Health and DNR water use and reporting information.

Ease of operation: By purchasing water from Orono, the operation of supplying and treating water would no longer be part of Minnetonka Beach Public Works daily duties. Operating and maintaining the water storage tank and distribution system will be remain as is. Additional coordination with Orono Public Works will be required, but will be less than the time allocated to operating the existing WTP.

Effective Treatment: Orono employs water treatment facilities to treat their water to below secondary standards established by MDH. As long as Orono maintains their water treatment facilities, effective water treatment should be achieved.

Useful Life/Longevity: The useful life of the treatment plant in Minnetonka Beach would no longer be part of Minnetonka Beach concern. Public Works would focus attention on the useful life of the distribution system

Reference: **Update Memo – Minnetonka Beach Water Supply Alternatives**

and soon to be completed elevated water storage tower. Determination of the useful life of Orono's water treatment systems are considered to be the responsibility of Orono and are not within the scope of this update.

Health and Safety/compliance: Compliance with health and safety requirements for the water supply would be limited to the distribution and storage tanks. Elements for compliance with drinking water quality standards would be trusted to the licensed operators in Orono and are not part of this update.

Risk of Failure: The risk of failure for treatment systems would be directly tied to the reliability of systems providing water from Orono. The risk of failure for Orono's water treatment systems are considered to be the responsibility of Orono and are not within the scope of this update.

Autonomy: The decision to purchase water from Orono would result from a high-level decision to delegate responsibility and operations of treatment of water supply to Orono which provides less autonomy over water rates for Minnetonka Beach.

Summary

The following table summarizes the costs estimated for each of the selected scenarios along with and their expected design lives.

Scenario	Cost	Estimated Design Life
1) Maintain Existing Plant	$2.13M	20 years
2) Build New WTP	$4.84M	50-100 years
3) Orono Supply	$6.30M	20-year cost shown

Reference: **Update Memo – Minnetonka Beach Water Supply Alternatives**

Closing

The content within this memo provides information needed to make critical decisions for the future of Minnetonka Beach water supply and treatment. After you have had a moment to review the various estimates and content, we are happy to respond to any questions you may have. As always, thank you for the opportunity to be of service to your community.

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Attachment:
Appendix A – Updated Table 1.1R
Appendix B – Updated Table 1.2
Appendix C – Revised - WTP Cost Summary with Useful Life Estimates
Appendix D – Orono Supply Cost Details
Appendix E – MDH 2021 WTP Report

Appendix A - Updated Table 1.1R Including Items from MDH 2021 Sanitary Survey

Component[1]	2019 Estimated Expenditure (0-1 years)		Estimated Expenditure (2-5 years)	Estimated Expenditure (6-10 years)	Estimated Expenditure (11-15 years)	Estimated Expenditure (16-20 years)
Architectural						
Interior walls	$36,000	item moves to right >	$36,000			
Prefinished metal fascia	$3,000	item moves to right >	$3,000			
Roof shingles			$18,000			
Service doors			$3,000			
Exterior masonry walls			$12,000			
Cedar shakes			$2,000			
Electrical						
Service entrance						$25,000
Phase monitor[2]			$6,000			
Generator connection[2]			$46,000			
Motor control center						$36,000
PLC and operator interface			$29,000			
Well level monitors[2]				$11,000		
Lighting			$8,000			
Receptacles			$6,000			
Conduit and wiring	$11,000	item moves to right >	$11,000			
Mechanical						
Chlorine room exhaust fan						$7,000
Chlorine room inlet louver & damper[2]	$6,000	$6,000				
Gas fired unit heater			$8,000			
Electric unit heater	$3,000	$5,000				
Dehumidifier	$10,000	item moves to right >	$10,000			
Water closet	$1,000	item moves to right >	$10,000			
Sink	$2,000	item moves to right >	$2,000			

Process	
Filter media	$20,000
Chlorine & chemical room	$17,000
Chlorine & chemical room separation	$20,000
Chlorination cylinders & diffusers	$8,000
Chlorination equipment[2]	$15,000
Chemical totes	$13,000
Chemical metering pump & diffusers	$14,000
Chemical transfer pump	$13,000
Piping	$16,000
Valves (operable, quantity 18)	$49,000
Valves (operable, quantity 1)	$3,000
Valves (operable, quanitity 7)	$19,000
Valves (inoperable, quantity 6)	$16,000
Pressure relief valve	$1,000
Filters	$0
Elevated storage (separate budget)	
Backwash waste storage	$20,000
Well 1[3]	$172,000
Well 2[3]	$172,000
Well pump 1	$37,000
Well pump 2	$37,000
High service pump 1	$27,000
High service pumps 2 & 3	$47,000
Air compressor	$10,000
Ground storage	$5,000
Selective demolition	$15,000
MDH 2021 Survey Key Items	

Investigate plumbing connections			$2,500			
Seal toilet and associated drains			$5,000			
Seal manhole in WTP			$4,500			
Provide water meter for Well 1			$8,500			
Well #1 pump to Waste			$14,000			
Paint all interior piping			$25,000			
Secure chlorine cylinders to wall			$1,000			
Investigate and repair filter legs			$10,000			
Provide backwash air gap			$500			
Install air/vac relaese on filters			$3,000			
Test Fe and Mn regularly			$500			
Provide full empty signs			$500			
Vacuum breaker on Hose bib			$500			
Install Warning Sign			$500			
Replace South Door to Facility			$4,000			
Remove old Softener drain pit			$3,000			
Seal outlet pipe to San. Sewer			$10,000			
Construction Subtotal	$104,000	$63,000	$451,000	$138,000	$362,000	$145,000
Mobilization (7%) + Premium (20%)	$7,000		$121,770	$37,260	$97,740	$39,150
Contingency (30%) / Change Order	$32,000	$820	$135,300	$41,400	$108,600	$43,500
Engineering, Admin, Finance (30%)	$32,000	$21,500	$135,300	$41,400	$108,600	$43,500
UPDATED Total		**$85,320**	**$843,370**	**$258,060**	**$676,940**	**$271,150**
Original Estimate from 2019 Report	**$175,000**	--	**$511,000**	**$232,000**	**$605,000**	**$1,440,000**
DIFFERENCE between estimate and actual		**$89,680**	**$332,370**	**$26,060**	**$71,940**	**-$1,168,850**
Total 20-year Updated Estimated Expenditure……						**$2,134,840**
					2019 Estimate	**$ 2,963,000**
					Total Difference	**-$828,160**

Completed in 2020

Appendix B - Updated Table 1.2 for Next Year Project

Updated Table 1.2 Next Project for 2021-2022

	Estimated Expenditure (2-5 years)	Year 1 (2021-2022) Estimated Project		(2021-2022) Estimated At Risk Equipment
Architectural				
Interior walls	$36,000	$36,000		
Prefinished metal fascia	$3,000	$3,000		
Roof shingles	$18,000	after 2022		
Service doors	$3,000	$3,000		
Exterior masonry walls	$12,000	$0		
Cedar shakes	$2,000	after 2022		
Electrical				
Service entrance				
Phase monitor[2]	$6,000	$6,000		
Generator connection[2]	$46,000	$46,000		
Motor control center				
PLC and operator interface	$29,000	after 2022	>	$29,000
Well level monitors[2]				
Lighting	$8,000	$0		
Receptacles	$6,000	$6,000		
Conduit and wiring	$11,000	$11,000		
Mechanical				
Chlorine room exhaust fan	completed			
Chlor. Rm inlet louver & damper[2]	completed			

Gas fired unit heater	$8,000	after 2022	>	$8,000
Electric unit heater				
Dehumidifier	$10,000	after 2022	>	$10,000
Water closet	$10,000	$10,000		
Sink	$2,000	$2,000		
Process				
Filter media	$20,000	after 2022		
Chlorine & chemical room				
Chlorine & chemical room separation	completed			
Chlorination cylinders & diffusers				
Chlorination equipment[2]				
Chemical totes				
Chemical metering pump & diffusers				
Chemical transfer pump				
Piping				
Valves (operable, quantity 18)				
Valves (operable, quantity 1)				
Valves (operable, quanitity 7)				
Valves (inoperable, quantity 6)	$16,000	$8,000	>	8000
Pressure relief valve	$1,000	$1,000		
Filters				
Elevated storage (sep. budget)				
Backwash waste storage				
Well 1[3]				
Well 2[3]				

Well pump 1	$37,000	$0	>	$37,000
Well pump 2				
High service pump 1 per MDH	$27,000	$27,000		
High service pumps 2 & 3	$47,000	$0	>	$47,000
MDH 2021 Survey Key Items				
Investigate plumbing connections	$2,500	$2,500		
Seal toilet and associated drains	$5,000	$5,000		
Seal manhole in WTP	$4,500	after 2022		
Provide water meter for Well 1	$8,500	after 2022		
Well #1 pump to Waste	$14,000	after 2022		
Paint all interior piping	$25,000	after 2022		
Secure chlorine cylinders to wall	$1,000	$1,000		
Investigate and repair filter legs	$10,000	$10,000		
Provide backwash air gap	$500	$500		
Install air/vac relaese on filters	$3,000	$3,000		
Test Fe and Mn regularly	$500	$500		
Provide full empty signs	$500	$500		
Vacuum breaker on Hose bib	$500	$500		
Install Warning Sign	$500	$500		
Replace South Door to Facility	$4,000	$4,000		
Remove old Softener drain pit	$3,000	after 2022		
Seal outlet pipe to San. Sewer	$10,000	after 2023		
Construction Subtotal	$451,000	$187,000		$139,000
Mobilization (7%) (20%)	$121,770	$50,490		$34,750
Contingency (30%)	$135,300	$56,100		$41,700
Engineering, Admin, Finance (30%)	$135,300	$56,100		$41,700
Total	**$843,370**	**$349,690**		**$257,150**

Appendix C- New WTP Cost Estimate Summary *With Estimated Useful Life*

Minnetonka Beach - Proposed 0.5 MGD Water Treatment Facility

05/21/21

Construction Cost Summary

A	B	C	D	E	F	G	H	I	J	K	L	M
		Equip. &	Percent	10%	18.0%	2%						
Division	Description	Installation	of Total Cost	Contingency	Engineering	Legal / Admin	Total w/o Eng.	Total w/ Columns CEFG	Estimated Useful Life	First replacement 25 years	Second Replacement 50 years	3rd Replacement 75 years
1	General Requirements	$ 225,000	6.12%	$ 22,500	$ 44,550	$ 4,500	$ 252,000	$ 296,550	75	$ -	$ -	$ 225,000
2	Site Construction	$ 531,128	14.45%	$ 53,113	$ 105,163	$ 10,623	$ 594,863	$ 700,026	75	$ -	$ -	$ -
3	Concrete	$ 801,390	21.81%	$ 80,139	$ 158,675	$ 16,028	$ 897,557	$ 1,056,232	75	$ -	$ -	$ -
4	Masonry	$ 29,518	0.80%	$ 2,952	$ 5,844	$ 590	$ 33,060	$ 38,904	75	$ -	$ -	$ -
5	Metals	$ 45,850	1.25%	$ 4,585	$ 9,078	$ 917	$ 51,352	$ 60,430	75	$ -	$ -	$ -
6	Wood and Plastics	$ 33,860	0.92%	$ 3,386	$ 6,704	$ 677	$ 37,923	$ 44,627	75	$ -	$ -	$ -
7	Thermal and Moisture Protection	$ 44,157	1.20%	$ 4,416	$ 8,743	$ 883	$ 49,456	$ 58,199	25	$ 53,784	$ 44,157	$ 44,157
8	Doors and Windows	$ 81,000	2.20%	$ 8,100	$ 16,038	$ 1,620	$ 90,720	$ 106,758	30	$ -	$ 81,000	$ -
9	Finishes	$ 69,086	1.88%	$ 6,909	$ 13,679	$ 1,382	$ 77,376	$ 91,055	20	$ 84,147	$ 69,086	$ 69,086
10	Specialties	$ 7,216	0.20%	$ 722	$ 1,429	$ 144	$ 8,082	$ 9,511	20	$ 7,216	$ 7,216	$ 7,216
11	Equipment	$ 746,571	20.32%	$ 74,657	$ 147,821	$ 14,931	$ 836,159	$ 983,980	20	$ 746,571	$ 746,571	$ 746,571
12	Furniture	$ 14,000	0.38%	$ 1,400	$ 2,772	$ 280	$ 15,680	$ 18,452	40	$ -	$ 14,000	$ -
13	Special Construction	$ 33,750	0.92%	$ 3,375	$ 6,683	$ 675	$ 37,800	$ 44,483	25	$ 33,750	$ 33,750	$ 33,750
14	Conveying Systems	$ -	0.00%	$ -	$ -	$ -	$ -	$ -	25	$ -	$ -	$ -
15	Mechanical	$ 554,479	15.09%	$ 55,448	$ 109,787	$ 11,090	$ 621,017	$ 730,804	25	$ 554,479	$ 554,479	$ 554,479
16	Electrical	$ 457,875	12.46%	$ 45,788	$ 90,659	$ 9,158	$ 512,820	$ 603,479	50	$ -	$ 457,875	$ -
Totals		**$ 3,674,880**	**100.00%**	**$ 367,488**	**$ 727,626**	**$ 73,498**	**$ 4,115,866**	**$ 4,843,492**	45.625	**$ 1,479,947**	**$ 2,008,135**	**$ 1,680,260**

Summary 0.5 MGD Estimated Project Costs

Construction Cost	From Column C above		**$ 3,674,880**
Contingency	From Column E above (10%)		**$ 367,488**
Legal/Admin	From Column G above (2%)		**$ 73,498**
Engineering/other Budget Est.	From Column F above	**18.0%**	**$ 727,626**
Total Estimated 0.5 MGD WTP	**Project Cost**		**$4,843,492**

Appendix D

Orono Water Supply Information

Year	MB Annual Use in gallons	
2016	27,336,100	
2017	26,687,698	
2018	24,927,700	
2019	20,879,700	meter issues and omitted from average
2020	26,755,801	
Average	26,400,000	

Year		Assume Use (gal)	Unit cost per 1000 gal	Annual Cost
2023		26,400,000	8.26	$218,064
2024		26,400,000	8.50	$224,400
2025		26,400,000	8.76	$231,264
2026		26,400,000	9.02	$238,128
2027		26,400,000	9.29	$245,272
2028		26,400,000	9.57	$252,630
2029		26,400,000	9.86	$260,209
2030		26,400,000	10.15	$268,015
2031		26,400,000	10.46	$276,056
2032		26,400,000	10.77	$284,337
2033		26,400,000	11.09	$292,867
2034		26,400,000	11.43	$301,653
2035		26,400,000	11.77	$310,703
2036		26,400,000	12.12	$320,024
2037		26,400,000	12.49	$329,625
2038		26,400,000	12.86	$339,514
2039		26,400,000	13.25	$349,699
2040		26,400,000	13.64	$360,190
2041		26,400,000	14.05	$370,996
2042		26,400,000	14.47	$382,126
	Subtotal			$5,855,771
2023	Meter/watermain		LS	$300,000
2023	Plant demo/repurpose		LS	$100,000
2023	Well abandonment		LS	$50,000
	Subtotal			$450,000
	Total			$6,305,771

MINNESOTA DEPARTMENT OF HEALTH
Section of Drinking Water Protection
Sanitary Survey Report

System Name: **Minnetonka Beach**
PWSID: **1270034**
System Contact: **Jason Hilgers**

Survey Date: **02/16/2021**
Surveyor: **Brian A. Noma, P.E.**
PWS Type: **Community**

Requirements and Recommendations

Water Source

All potential sources of contamination must be located at least 50 feet from a community water supply well. The well inside the water treatment builiding is located less than 50 feet from the toilet along the south wall of the building. The toilet shall be removed if it has not already been done, and the opening capped and permanently sealed in accordance with the Minnesota Plumbing Code, Minn. Rules Chapter 4714.

Based on the item above, an investigation as to what type and how many sewers are connected to the drainage piping, floor drains, sinks and other fixtures in the water treatment building. Although the wells appear to be constructed in 1958 (before the Minnesota Well Code was in effect), it is recommended that the wells meet the current setback distances as listed in Minnesota Rules Chapter 4725. There are several drain lines that are located at distances less than the current required minimum distances specified in Minnesota Rules Chapter 4725.

As a reminder, it is required that a well for a community public water supply be located according to distances specified in Minn.Rules 4725.4450, including not less than 50 feet from a source of contamination including buried sewers (except as specified in Minn. Rules 4725.5850).

It is recommended that each well be provided with a water meter that measures the flow rates, and the total number of gallons that each well is pumping when it is in operation.

Pumps/Pump Facilities and Controls

It is required that all of the high service pumps be operational. The third high service pump was still not operational at the time of the inspection. This pump was not operational at the MDH inspection on March 28, 2018. The third high service pump shall be repaired or replaced.

It is recommended that a means of pumping well #1 to waste be provided.

It is recommended that all piping and appurtenances be scraped clean and repainted. It is recommended that the color scheme outlined in the 2018 edition of the Great Lakes Upper Mississippi Board Recommended Standards, Part 2.14 be used.

It is recommended that the water seal glands on the high service pumps be repaired or replaced. The packing gland on the middle pump was still leaking at the time of inspection.

Treatment

All gas chlorine cylinders must be secured to the wall to prevent the cylinders from tipping over. A chain or similar restraint shall be provided for each cylinder.

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Survey Date: **02/16/2021**
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PWS Type: **Community**

Requirements and Recommendations

Treatment

It was observed during the survey that the feet on the pressure filters and water softeners are showing signs of advanced corrosion (see photos). It is strongly recommended that they be inspected by a qualified engineer to determine their structural integrity to avoid potential collapse and failure of the treatment process.

The filter backwash pipe shall dishcharge through an air gap to the backwash tank. An air gap of at least 2 times the diameter of the discharge pipe shall be provided.

The open end of the vacuum/air release valve pipes on the filters shall be screened with a corrosion resistant 24-mesh screen.

It is recommended that the iron concentration in the filter effluent be tested at least once per backwashing cycle to assure adequate iron removals.

It is recommended that the interior walls of the water treatment plant be finished with a material that is smooth, water resistant and easily cleanable. The exterior walls are currently covered with exposed polystyrene insulation material which may pose a fire and smoke hazard.

It is recommended that signage be provided for the "full" and "empty" gas chorine cylinders.

Water Storage

It is recommended that an overall water storage plan te developed for the city. The following items must be addressed as a part of the overall water storage plan:

a. The existing elevated water storage tower must be provided with an overflow pipe. The overflow pipe must be sized to waste water in excess of the filling rate. the overflow pipe must extend to withyh 12-24 inches of the ground or final grade, and discharge over a drainage structure or splash plate. The overflow must open downward and be screened with a corrosion resistant 24-mesh screen.

b. The average dailywater usage excees the guidelines of providing a minimum of one day water storage capacity. It is recommended that a study be conducted to determine the adequacy of the system and the need for increased water storage capacity [Recommended Standards for Water Works, Part 7.0.1].

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Survey Date: **02/16/2021**
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PWS Type: **Community**

Requirements and Recommendations

Distribution

It is recommended that dead ends in the distribution system be minimized by looping. If looping is not feasible, a fire hydrant, approved flushing hydrant or blow off for flushing purposes must be used at the dead ends to maintain water quality and/or chlorine residual. [Recommended Standards for Water Works 8.0]

Monitoring/Reporting Data Verification

The following applicable records are required to be maintained by the water supply system:
a. Coliform bacteria results - 5 years
b. Chlorine residual results - 5 years
c. Chemical results - 10 years
d. Sanitary survey reports - 10 years
e. All lead and copper materials - 12 years
f. Consumer confidence reports - 3 years
g. Public Notices - 3 years
h. Fluoride quarterly results and monthly reports - 1 year
i.Turbidity results - 3 years
[Minn. Rules 4720.0350]

Water System Management/Operation

The hose bibb in the chlorine room shall be equipped with an approved vacuum breaker.

It is recommended that signage stating "Warning Tampering with this Facility is a Federal Offense" be posted on all water facilities.

It is recommended that the door on the south wall be replaced to improve security of the water treatment facility. The existing south entry door appears to be at the end of its useful life. The door shall open outward, be equipped with panic hardware, and be lockable.

It is recommended that materials which are not essential to water works operation not be stored in the water facility. The old fluoride tank shall be removed as soon as possible from the old chemical feed room.

To ensure security, it is recommended that a daily check of critical system components be conducted, including confirmation that all doors and access hatches are locked.

As a reminder, engineering plans for new, modifications to, or additions to the water supply system, including watermains, are required to be properly submitted to the Minnesota Department of Health for review. All plans must be approved prior to the start of construction. [Minn. Rules 4720.0010]

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Survey Date: **02/16/2021**
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PWS Type: **Community**

Requirements and Recommendations

Operator Compliance with State Requirements

The certified operators are required to qualify themselves by attending waterworks operators training seminars offered throughout the state. Continuing education is valuable experience for anyone engaged in this field. The required contact hours in the previous 3 years for certification renewal are:
Class A 32 contact hours
Class B 24 contact hours
Class C 16 contact hours
Class D 8 contact hours
Class E 4 contact hours
[Minn. Rules 9400.1200]

Other

It is recommended that the existing sanitary sewer system that serves the water treatment building be evaluated for safety and compliance with the Minnesota Plumbing Code, Minn. Rules Chapter 4714. The following items should be included in the evaluation of the sewer systrem:

a. the sump drain pit where the old water softeners discharge to should be either eliminated, or provided with a fixture trap and venbt in accordance with the Minnesota Plumbing Code, Minn. Rules Chapter 4714.

b. The sewer manhole that receives the discharge from the old water softeber pit shoul be removed and replaced with a sewer pipe that meets the requirements of the Minnesota Plumbing Code, Minn. Rules Chapter 4714. At a minimum, the manhole should ahgave a sealed, airtight cover to prevent sewer gas from entering the water treatment building.

c. The existing sewer connection fro the toilet in the corner of the water treatment building should be plugged and sealed in accordance with the Minnesota Plumbing Code, Minn. Rules Chapter 4714.

d. The vent pipe that is located on the outside wall from the water scloseet shall also be either terminated in accordance with the plumbing code, or re-piped such that it meets the requirements for fixture vents in the plumbing code.

e. Any other fixtures that are not properly trapped and vented must be evaluted for compliance with the Minnesota Plumbing Code.

System Name: **Minnetonka Beach**
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Survey Date: **02/16/2021**
Surveyor: **Brian A. Noma, P.E.**
PWS Type: **Community**

Other

The outlet pipe for the sewer manhole that is located inside the water treatment building should be investigated to determine its termination point (sanitary sewer, storm sewer, or infiltration pond). Depending on the outcome of the investigation, it should be determined if the connection point meets all state and local requirements, and if the wastes generated inside the water treatment building are being properly treated.

MINNESOTA DEPARTMENT OF HEALTH
Section of Drinking Water Protection
Sanitary Survey Report

System Name: **Minnetonka Beach**
PWSID: **1270034**
System Contact: **Jason Hilgers**

Survey Date: **02/16/2021**
Surveyor: **Brian A. Noma, P.E.**
PWS Type: **Community**

Bacteriological Results and Chlorine Residuals

Date	Sampling Location	Chlorine Residual Free / Total	Coliform Bacteria	E.Coli
02/16/2021	PUBLIC WORKS	/ 1.28	Absent	
02/16/2021	WELL 1	/	Absent	
02/16/2021	CITY HALL	/ 0.55	Absent	

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
Public Water Supply Inventory Report

System Name: **Minnetonka Beach** | Survey Date: **02/16/2021**
PWSID: **1270034** | Surveyor: **Brian A. Noma, P.E.**
System Contact: **Jason Hilgers** | PWS Type: **Community**

Contact Information

Name	Address	Phone/Email	
Contact			
Jason Hilgers		Business Phone 1	612/618-3407, Ext. cell
		Business Phone 2	952/471-8878
		Email	Jhilgers@ci.minnetonka-beach.mn.us
Owner/Responsible Party			
Minnetonka Beach City Council	c/o M. Pat Melvin, Administrator Minnetonka Beach City Hall P.O. Box 146 Minnetonka Beach, MN 55361	Business Phone 1	952/471-8878
		Email	pmelvin@ci.minnetonka-beach.mn.us
Financial			
Minnetonka Beach City Council	c/o Heidi Honey, Clerk Minnetonka Beach City Hall P.O. Box 146 Minnetonka Beach, MN 55361	Business Phone 1	952/471-8878
		Email	hhoney@ci.minnetonka-beach.mn.us
Sample Bottles/General Correspondence			
Minnetonka Beach Water Superintendent	c/o Jason Hilgers 2945 Westwood Road P.O. Box 146 Minnetonka Beach, MN 55361	Business Phone 1	952/471-8878
		Business Phone 2	612/618-3407, Ext. cell
		Email	Jhilgers@ci.minnetonka-beach.mn.us
Emergency Workday			
Jason Hilgers		Business Phone 1	952/471-8878
		Cell Phone	612/618-3407
		Email	Jhilgers@ci.minnetonka-beach.mn.us
Emergency After-Hours			
Jason Hilgers		Cell Phone	612/618-3407
		Email	Jhilgers@ci.minnetonka-beach.mn.us
Consumer Confidence Report			
Heidi Honey		Business Phone 1	952/471-8878
		Email	hhoney@ci.minnetonka-beach.mn.us

Classification Information

Owner Type:	Municipal	Population:	502
System Class:	C	Service Connections:	214
Service Area Characteristics:	Municipal	Class Points:	33

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
Public Water Supply Inventory Report

System Name: **Minnetonka Beach** | Survey Date: **02/16/2021**
PWSID: **1270034** | Surveyor: **Brian A. Noma, P.E.**
System Contact: **Jason Hilgers** | PWS Type: **Community**

Certified Operators

Name	Class	Expiration Date	Name	Class	Expiration Date
Hilgers, Jason D.	C	04/30/2022			

Production Totals

Design Capacity: 500 Gallons per Minute
Average Daily: 73,303 Gallons
Highest Daily: 236,100 Gallons
Emergency Capacity:
Storage Capacity: 50,000 Gallons

Source Information

Well #1

Unique Well No.: 00208024
Type: Well
Status: Active
Availability: Primary
Year Constructed: 1958
Well Depth (ft): 406
Casing Depth (ft): 383
Casing Diameter (in): 10
Screen Length (ft): 14
Aquifer: Jordan

Source Type: Groundwater
Pump Capacity (gpm): 250
Pumping Rate (gpm): 250
Emergency Capacity:
Static Depth (ft):
Drawdown (ft):
Pump Type: Submersible
Vulnerable: Yes
Last Rehabilitated: 2006

Well #2

Unique Well No.: 00205624
Type: Well
Status: Active
Availability: Primary
Year Constructed: 1958
Well Depth (ft): 393
Casing Depth (ft): 358
Casing Diameter (in): 10
Screen Length (ft): 16
Aquifer: Jordan

Source Type: Groundwater
Pump Capacity (gpm): 250
Pumping Rate (gpm): 250
Emergency Capacity:
Static Depth (ft):
Drawdown (ft):
Pump Type: Submersible
Vulnerable: No
Last Rehabilitated: 2012

Interconnect 1 - Orono

Type: Consecutive Connection
Status: Active
Availability: Emergency

Purchases From: 1270041 Orono

Source Type: Purchased Groundwater
Design Capacity:
Emergency Capacity:
Pump: ☐

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
Public Water Supply Inventory Report

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PWSID: **1270034** | Surveyor: **Brian A. Noma, P.E.**
System Contact: **Jason Hilgers** | PWS Type: **Community**

Interconnect 2 - Orono

Type: Consecutive Connection | Source Type: Purchased Groundwater
Status: Active | Design Capacity:
Availability: Emergency | Emergency Capacity:
Pump: ☐
Purchases From: 1270041 Orono

Interconnect 3 - Orono

Type: Consecutive Connection | Source Type: Purchased Groundwater
Status: Active | Design Capacity:
Availability: Emergency | Emergency Capacity:
Pump: ☐
Purchases From: 1270041 Orono

Treatment Information

TREATMENT PLANT #1

Type: Treatment Plant | Source Water: Groundwater
Status: Active | Design Capacity: 500 Gallons per Minute
Availability: Primary | Emergency Capacity:

Treatment Objective	Treatment Process Mechanism
Disinfection	Chlorine/Gas
Fluoridation	Fluoridation/Hydrofluosilicic acid
Iron/Manganese Removal	Filtration (Pressure)/Multi media
	Oxidation - chemical/Chlorine

Storage Information

Elevated 50000 Gallon Tower

Type: Storage-Elevated | Capacity: 50,000 Gallons
Status: Active | Availability: Primary
Chlorination: ☐

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
Public Water Supply Inventory Report

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PWSID: **1270034**
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Survey Date: **02/16/2021**
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PWS Type: **Community**

Bacteriological Sample Site Plan

Distribution

Sample Site ID	Sample Location	Status	Notes
001	City Shop	Active	
002	City Hall	Active	