



**Date:** December 10, 2018

**To:** Mayor and City Council

**From:** Chad A. Millner PE, Director of Engineering,

**Subject:** Water Treatment Plant 5: Dublin Amendment to Preliminary Design Report

## **Executive Summary:**

Staff recommends locating a 4,000 gallon per minute (gpm) water treatment plant at the Dublin Reservoir Site to take advantage of overlapping infrastructure needs such as improving water age, improving the E-W distribution system, better utilization of the Dublin site, and allow the Southdale site to remain available for future development. If council agrees with staff recommendation at the Dublin site, staff would develop a public participation plan and a request for purchase for professional services for consideration at a future city council meeting.

## **Information / Background:**

The Comprehensive Plan update and specifically the Water Supply Plan informed staff that there may be an alternative site for a water treatment plant. The location is at the Dublin reservoir. While the Southdale site was the preferred site based on the Water Distribution System Analysis (August 2002) and the initial feasibility study for WTP #5, the previously unevaluated Dublin site has shown to have overlapping infrastructure needs. Either site is feasible with each having its own advantages and disadvantages.

Treatment plants serve to remove contaminants from groundwater by a variety of physical and chemical processes. Unfiltered water results in water clarity complaints. A primary treatment goal of this plant is the reduction of iron and manganese to improve water taste, clarity, and reduce staining and sediment.

When complete WTP 5 will; Increase filtered capacity of the City of Edina water system to be able to provide filtered water during nearly all typical summer demands, add flexibility and resilience to the filtered supply, and end the seasonal unfiltered water pulse that affects water clarity in southeast Edina.

## **Water Supply Plan:**

The Water Supply Plan is a new document that updates and replaces the Water Distribution System Analysis (August 2002), and Water Emergency and Conservation Plans (2007/8), and meets the requirements from the Minnesota DNR and Metropolitan Council for 2016-2018 Minnesota Water Supply

Planning. Along with Stormwater and Sanitary Sewer plans, the Water Supply Plan serves as a basis for the water resources chapter of the 2018 City of Edina Comprehensive Plan.

The Water Supply Plan is used as a tool to identify, plan for, and address utility trends and issues in water supply, treatment, distribution, and growth that affect the utility over a planning period extending to the year 2040.

Edina's water system supply, treatment, storage, and distribution is in good condition and provides its core services reasonably well for its age and era of construction, while minimizing cost and risk. Key findings and future needs include;

- System has capacity to serve growth contemplated in Comprehensive Plan drafts.
- Average water demand is stable with counter trends of conservation and growth.
- Indoor water demand shows a strong passive conservation trend.
- Outdoor and peak day demand varies widely with climate.
  - Current system can meet 2040 peak demands for a variety of growth scenarios.
- System modernization needs include:
  - Trunk capacity improvements in northeast quadrant and Grandview district
  - Trunk capacity improvements to east-west flow capacity
  - Tapping available storage at Dublin reservoir to support water age and emergency supply
  - Water age improvements in western portions of northwest and southwest quadrants
  - Additional 0.5 million gallons of storage

### **Water Distribution Strategy:**

The system modernization needs listed above provided an opportunity to think about how water is distributed in the system. The initial strategy for WTP #5 was focused on addressing water clarity complaints at the Southdale location that was primarily served by wells 5 and 18. An alternative strategy was realized based on water age concerns in the western portion of Edina, the need for east-west transmission improvements, and under-utilized storage at Dublin. The alternative strategy is to filter and pump the water in the west and transmit it to the Southdale area where it is needed. This improves water age in the western portion of Edina while addressing other infrastructure needs listed.

In the appendix is a series of three graphics depicting the water age during three operational scenarios of the Dublin Reservoir labeled “Water Treatment Plant No. 5: Water Age Scenario Graphics”. SCENARIO EX-ON depicts water age with existing operations on at the Dublin Reservoir. Notice the amount of red dots that show an average water age greater than 6 days. SCENARIO EX-OFF depicts water age with the existing Dublin Reservoir out of service. Again, notice the number of red dots. SCENARIO 5A depicts water age with a water treatment plant on the Dublin Reservoir site. Notice the large reduction in water age greater than 6 days.

Also attached and labeled “Water Supply Plan Figure 8-1: Proposed Water System Improvements” shows suggested improvements to the water distribution system by 2040 with or without a water treatment plant at the Dublin Reservoir site. Notice Trunk D and Trunk G improvements in the SW quadrant. These improvements provide better E-W transmission of water.

As part of the water model update, we confirmed what our operators already understood about the Dublin Reservoir. It has 4 million gallons of capacity but it effectively has 2.8 million gallons of service. The limiting

factor is the ability to fill the storage. If it is filled too fast, pressure drops so low to surrounding customers that water is not available for use. The network surrounding the reservoir creates a situation where entire storage capacity cannot be fully utilized. This water treatment plant would repurpose a portion of reservoir as a clear well to support water treatment operations. The Water Supply Plan identified a need for 0.5 million gallons of additional storage by 2040. By repurposing a portion of the Dublin reservoir, the storage needs of the system may increase to 1.5 million gallons. True storage needs will be based on future use and growth. Staff tried to understand where this storage may occur. One idea is to increase the amount of storage or size of the water tower at the Community Center site when that piece of infrastructure is due for replacement.

**Process to Date:**

Recall 95% bidding documents were completed and solicitation of bids was close. Please recall previous City Council, Planning Commission and staff actions on this topic:

- Professional Services: On March 7, 2017 Council approved professional services for a preliminary report and pilot study of chemical treatment options for Water Treatment Plant 5 (WTP 5) and on September 6 Council approved change order #1 for evaluation of an additional site and to extend the pilot study.
- Preliminary Report: On October 3, 2017 Council reviewed preliminary design report and architectural concepts, discussed scope, schedule and budget and authorized design and construction services for the selected site.
- 95% Design: On February 14, 2018 Planning Commission approved a Front Yard Setback Variance
- 95% Design: On February 21, 2018 Council reviewed 95% design architectural, directed preparation of an enhanced architectural option and approved a setback variance.
- March 2018: Reviewed enhanced architectural option, not approved.
- April 2018: Hired Snow Kreilich to develop an enhanced architectural concept.
- October 2018: Approved professional services with AE2S to complete study of Dublin site.

An enhanced architectural option was created by Snow Kreilich Architects based on feedback from individual council members, members of the Southdale Area Working Group, AE2S and City Staff. Snow Kreilich considered 3 options to develop their concept;

1. Re-Skinning – using the 95% design pieces and changing the aesthetics.
2. Shifting – keeping the general locations of the 95% design but shifting elements to meet stakeholder's goals
3. Flipping – total move of structural and operational elements

They selected Option 2 to shift program elements to meet stakeholder goals. Shifting included a reduced main level footprint, office / lab & electrical room on second level, added elevator, transparency to France Avenue, and ramp incorporated into building mass. The concept did not address emergency egress access doors along France Avenue based on the building code, HVAC equipment on the roof, maintenance of the architectural glass and other concerns listed in the Southdale WTP – Enhanced Architectural Concepts Technical Memorandum. It also made tradeoffs that raise the burden to operators for maintenance and workability.

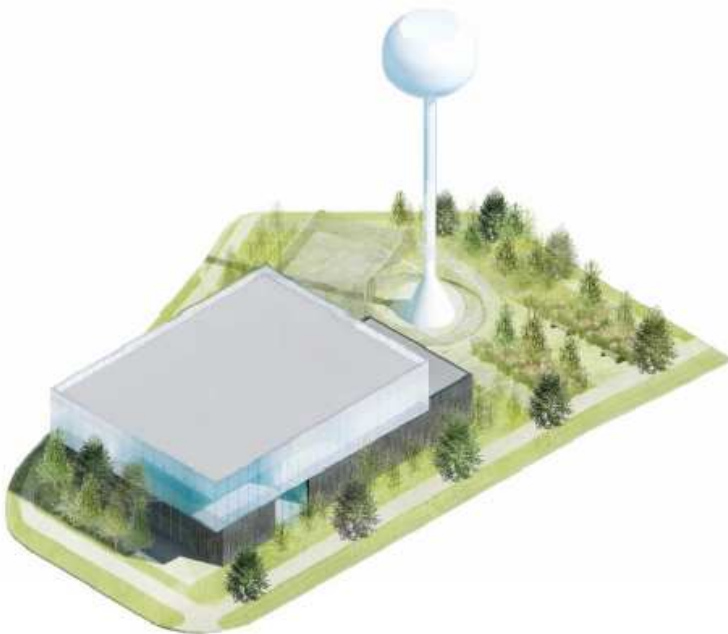
**Options:**

The WTP 5 Alternatives – Comparison of Opinions of Probable Cost Technical Memorandum lists 13 options for this facility. Staff is of the opinion 4 of those should be considered and discussed.

1. Option 1C – Southdale Site - 95% Plan: Continue with the architectural concept shown.



2. Option 1E - Southdale Site - Snow Kreilich Concept: Develop Bid Documents for architectural concept shown.



3. Option 5A – Dublin Site at 3,000 gpm: Develop Architectural Engagement Proposal and Create Bid Documents
4. Option 5C – Dublin Site at 4,000 gpm: Develop Architectural Engagement Proposal and Create Bid Documents

**Option Analysis:**

<b><u>Option</u></b>	<b><u>Advantages</u></b>	<b><u>Disadvantages</u></b>
Option 1C – Southdale Site - 95% Plan	<ol style="list-style-type: none"> <li>1. Raw WM available</li> <li>2. Distribution system available</li> <li>3. Lowest Cost</li> </ol>	<ol style="list-style-type: none"> <li>1. One additional well needed</li> <li>2. Architectural cost premium</li> <li>3. Constructability</li> </ol>
Option 1E - Southdale Site - Snow Kreilich Concept	<ol style="list-style-type: none"> <li>1. Raw WM available</li> <li>2. Distribution system available</li> <li>3. Largest Architectural Impact</li> </ol>	<ol style="list-style-type: none"> <li>1. One additional well needed</li> <li>2. Architectural cost premium</li> <li>3. Future maintenance and operations</li> <li>4. Constructability</li> <li>5. Highest Cost</li> </ol>
Option 5A – Dublin Site 3000 gpm  And  Option 5C – Dublin Site 4000 gpm	<ol style="list-style-type: none"> <li>1. Three wells immediately available</li> <li>2. Distribution system available</li> <li>3. Overlapping infrastructure needs               <ol style="list-style-type: none"> <li>a. Addresses water age issue</li> <li>b. Better utilization of storage volume</li> <li>c. Improves E-W distribution</li> </ol> </li> <li>4. Lesser architectural premium</li> <li>5. Simpler chemical process</li> <li>6. Coordinate piping needs with 2020 street reconstruction</li> </ol>	<ol style="list-style-type: none"> <li>1. Raw WM required</li> <li>2. Located in residential area</li> <li>3. Water storage need increases from 0.5 MG to 1.5 MG by 2040</li> </ol>

**Professional Services to Date:**

<b><u>Item</u></b>	<b><u>Date</u></b>	<b><u>Fees</u></b>
AE2S Preliminary Engineering Services	March 7, 2017	\$75,000
AE2S Change Order #1 – Additional Pilot Testing and Evaluation of Fred Richards Site	September 6, 2017	\$10,500
AE2S Design and Bidding Phase Services	October 3, 2017	\$911,000
Total AE2S Approved Services to Date		\$996,500
Snow Kreilich Approved Services to Date	April 17, 2018	\$19,600
AE2S Additional Professional Services <ul style="list-style-type: none"> <li>- Dublin Reservoir Site Evaluation</li> <li>- Option 1E: Snow Kreilich Concept Cost Estimate</li> </ul>	October 16, 2018	\$27,200
Total Professional Services to Date		\$1,043,300

**Total Estimated Project Costs:**

<b><u>Cost Item</u></b>	<b>Option 1C – Southdale Site - 95% Plan</b>	<b>Option 1E - Southdale Site - Snow Kreilich Concept</b>	<b>Option 5A – Dublin Site – 3,000 gpm</b>	<b>Option 5C – Dublin Site – 4,000 gpm</b>
Facility Capital Costs	\$9,467,000	\$11,276,000	\$8,407,000	\$9,103,000
Raw Watermain Piping to Date	\$400,000	\$400,000		
Minimum Raw Watermain Piping – Majority of Alignment on Edina School District Property			\$2,350,000	\$2,350,000
Additional Raw Watermain Piping – Premium for Alignment Entirely on City ROW			\$450,000	\$450,000
Facility Integration	\$400,000	\$400,000	\$335,000	\$335,000
Contingency	\$247,000	\$2,335,000	\$1,731,000	\$1,836,000
Future 3 <sup>rd</sup> Well	\$1,700,000	\$1,700,000	\$0	
Professional Services to Date	\$1,043,300	\$1,043,300	\$1,043,300	\$1,043,300
Additional Design Professional Services	\$50,000	\$1,401,000	\$1,327,000	\$1,407,000
Construction Professional Services	\$506,000	\$701,000	\$664,000	\$704,000
<b>ESTIMATED TOTAL PROJECT COST</b>	<b>\$13,813,300</b>	<b>\$19,256,300</b>	<b>\$15,857,300 - \$16,307,300</b>	<b>\$16,778,300 - \$17,228,300</b>
<b><u>Future Infrastructure Needs</u></b>				
Future 4 <sup>th</sup> Well or Use Well #8	NA	NA	NA	\$1,200,000
Water Storage Estimate	\$1,400,000	\$1,400,000	\$2,500,000	\$2,500,000

**Funding Sources:**

The 2019 – 2020 Capital Improvement Plan (CIP) has two projects related to this water treatment plant. At the time of the CIP, the water treatment plant and an additional well with related raw watermain piping was estimated at \$15.7 million. To fund the potential difference between the CIP and estimated project costs, staff will review other watermain related projects to determine if they can be moved to a later year and we will value engineer the plant during design.

**Schedule**

The following schedule is approximate.

December 2018	Review WTP#5 Options and Select Location
Summer/Fall 2019	Bid Opening / Award
Fall/Winter 2019/2020	Construction Start
Fall/Winter 2021/2022	Construction Complete

**Attachments / References:**

Water Treatment Plant No. 5 Feasibility Study for the Dublin Reservoir Site

Technical Memorandum - WTP No. 5 Alternatives – Comparison of Opinions of Probable Cost

Water Supply Plan Figure 8-1: Proposed Water System Improvements

October 3, 2017 Council Packet: Water Treatment Plant 5 Preliminary Design Report and Appendices  
<https://edina.novusagenda.com/agendaintranet/CoverSheet.aspx?ItemID=3629&MeetingID=464>