

MEMORANDUM

Date: September 20, 2022

To: Water Utility Board

From: Kelly Miess, Design Engineer
Joe Grande, Water Quality Manager
Pete Holmgren, Chief Engineer

Subject: Unit Well 19 Treatment System, Preliminary Design Recommendation

Recommendation

Staff recommends UW19 Treatment System Preliminary Design Option 2 for approval by the Water Utility Board (Board) to move forward to final design.

Background

Unit Well 19 is located at 2526 Lake Mendota Drive on an easement on UW-Madison property between the Eagle Heights student housing complex and Picnic Point, and within the Lakeshore Nature Preserve. The well is a critical supply point for the University of Wisconsin, the Utility's largest customer, as well as the near west side of Madison. It is a major contributor to the Zone 6-West water supply.

The well, built in the early 1970's, suffers from poor water quality. This project will remove three contaminants of concern, iron, manganese and radium with a pyrolusite filtration system. The upgrade of original equipment is also included the project scope.

In 2021 the project was ranked as the most critical of several pending projects and the Utility decided to move forward with the project.

- On November 23, 2021, the Board approved advertising for qualified engineering design consultants for the project
- On February 22, 2022, the Board approved the hiring of Short, Elliot, Hendrickson, Inc. (SEH) to provide design engineering services

Design Options

Preliminary design phase activities included surveys, soil borings and other site investigations. After extensive deliberations among the Utility staff, SEH team, City Planning and Zoning Departments, University staff, as well as receiving inputs at the public information meeting in July 2022, the Utility design team has developed two design options.

Option 1:

- A 16-filter vessel treatment system housed within the existing building on a platform approximately two feet below the main floor level and suspended above the basement level where the three booster pumps are located.

Option 2:

- A 16-filter vessel treatment system housed within an approximately 25' x 55' building addition to the northeast corner of the existing building; the addition is approximately two feet taller than the existing building at its tallest point.

Both options include the following features:

- A semi-buried approximately 25' x 40' backwash tank north of the existing building
- The driveway shifted north to accommodate the backwash tank and provide better large-vehicle access (chemical delivery, cranes for well maintenance)
- A reinforced-turf access path off the main driveway to the MGE-owned generator
- Building upgrades to current regulatory standards
- Replacement of the original booster pumps and electronic control equipment
- Native landscape plantings along the west property line between Lake Mendota Drive and the generator access path
- Native landscape plantings along the north property line between Lakeshore Nature Preserve paths and the main driveway

Evaluation of Environmental and Social Impacts

The Utility evaluates projects using a triple bottom line analysis, considering environmental, social and financial impacts. The environmental and social impacts of each option are summarized in Table – 1.

Table – 1 Environmental and Social Impacts		
	Option – 1	Option – 2
Post-construction impacts to long-term maintenance	Significant	Negligible
Construction impacts to well operation and water supply	Significant	Negligible
Impacts on the viewsheds from Eagle Heights and the Lakeshore Nature Preserve	Negligible	Moderate
Increased impervious area	Moderate	Moderate
Site disturbance during construction	Moderate	Moderate

From an environmental and social impact perspective, *Option 2 is the preferable option.*

Evaluation of Cost Impacts

The estimated cost impacts for each of the options are shown in Table – 2.

Table – 2 Estimated Cost Comparison		
	Option – 1	Option – 2
Construction Cost	\$6.8M	\$6.8M
Annual O&M Costs	\$36K	\$44K
Net Present Value of 50-Year O&M Costs	\$1.8M	\$2.2M
Net Present Value of 50-Year Equipment Replacement & Repairs	\$3.8M	\$3.8M
50-Year Lifecycle Cost	\$12.4M	\$12.8M

Recommendation

Option 2 is more desirable from a social and environmental impact perspective, as evidenced from Table 1. From a purely financial perspective, Option 1 is slightly more desirable, with Option 1 costing \$8,000 less in annual operation and maintenance costs and \$400,000 less in 50-Year life cycle cost. However, Utility staff recommends proceeding with Option 2 since we believe the minimal additional cost more than compensates for the greater social and environmental benefits of Option 2.

Attachments:

- A. Design Option 1 Exhibit
- B. Design Option 2 Exhibit