



Date: May 24, 2016
To: Water Utility Board
From: Pete Holmgren, PE
Re: **Recommendations of Water Tower Design and Site Configuration**
Project: **Blackhawk Tower**

Overview and Summary of Recommendations

Madison Water Utility (MWU) is seeking the board's approval to proceed with developing plans and specifications for their recommended water tower design and location for the Blackhawk Tower project.

After researching several viable options, MWU is recommending the following:

- Composite water tower style.
- Approximate site location 1, 2, or 3, per the attached site map.
- Two-toned paint scheme – upper portion “sky blue”, lower portion darker blue.
- Varying the standard concrete form liner.

Recommendations are based off of design analysis, cost comparisons, and public feedback.

Background

Following the board's review and approval in April to proceed with a water tower at the designated property, MWU and Baxter & Woodman conducted additional analyses of three possible water tower styles. All three styles would equally meet the functional needs of the project.

A new topographic survey of the property was also completed in order to accurately evaluate all viable water tower locations and potential site configurations. Ultimately, three areas on the property were identified for additional discussion and analysis.

Aesthetic options (aside from tower style) focused mostly on paint schemes that are consistent with other water towers in the City of Madison. To this end, options included one and two-tone schemes with shades of blue or white. Composite water towers also have a concrete base with aesthetic possibilities that were evaluated.

MWU has presented information to solicit public input through several means:

- Email list notifications
- Postcard notices in the mail

- Website updates
- Online design survey (open until May 18th)
- Design public meeting on May 5th, 2016

The notes from the public meeting, survey results, and all other related correspondence will be submitted to the board with this memo.

Analyses

Water Tower Design:

Three water tower styles were evaluated for this project: Composite, Hydropillar, and Spheroid (see Attachment A). All three styles can capably hold 1 million gallons of water and are functionally equal, though a Composite tower also allows for the possibility of storage space in the base of structure. Costs were then evaluated for the towers both in terms of initial construction and long-term maintenance, yielding the following breakdown:

- Composite - \$2.7M construction / lowest lifetime maintenance costs
- Hydropillar - \$3.1M construction / highest lifetime maintenance costs
- Spheroid - \$3.3M construction

In this evaluation, maintenance costs considered re-coating of the tanks; likelihood and cost of material repairs; and overall life cycle. Cost projections vary, but the difference between the most expensive and least expensive maintenance through the life of a tower is expected to be over \$300,000.

Availability was another consideration looked at for these tower styles. There are a limited number of water tower manufacturers and contractors, however MWU would expect to receive competitive bids on Composite and Spheroid styles. The Hydropillar style may be less competitive in bidding because at least one contractor is currently not in compliance with labor requirements in the City of Madison.

Water Tower Site Location and Layout

The MWU-owned property was examined to determine the most favorable placement of the water tower. Considerations included land elevations; water tower site configurations; and potential views from the surrounding area.

A topographical survey was completed which allowed for an assessment of the elevations throughout the property. MWU targeted the highest areas as potential sites for the water tower because they would minimize the tower height. Three potential sites emerged as the most favorable (see Attachment B).

Sites 1 and 2 are near the highest areas of the property. Site 3 is a couple of feet lower in elevation than the other two and would allow for an additional 100-foot (estimated) space from

the property to the south. The distance from Old Sauk Road would also be reduced on site 3, resulting in a shorter access road length and shorter piping from the future roadway water main.

Cellular equipment was another consideration for the site layout. It is recommended that a fenced enclosure be placed south of the tower to further conceal it from views along Old Sauk Road.

Water Tower Paint and Aesthetics

In reviewing tank painting options, MWU sought consistency with other existing City of Madison water towers, and considered the following colors and schemes:

- Colors:
 - Light blue (“sky blue”)
 - Dark blue
 - White
- Schemes:
 - One-tone
 - Two-tone (upper portion and lower portion)

Additional colors were also considered but would create a more significant contrast with the sky during daylight hours. The blue tones were also the most favorable based on the design survey that was made available to the public. More elaborate painting schemes were also looked at, however in addition to lacking the aforementioned consistency, extra cost and maintenance projections made these schemes unfavorable.

A two-tone option, with the lower portion being darker, also serves to mask the appearance of mildew that forms on the lower portion of the water tower’s tank.

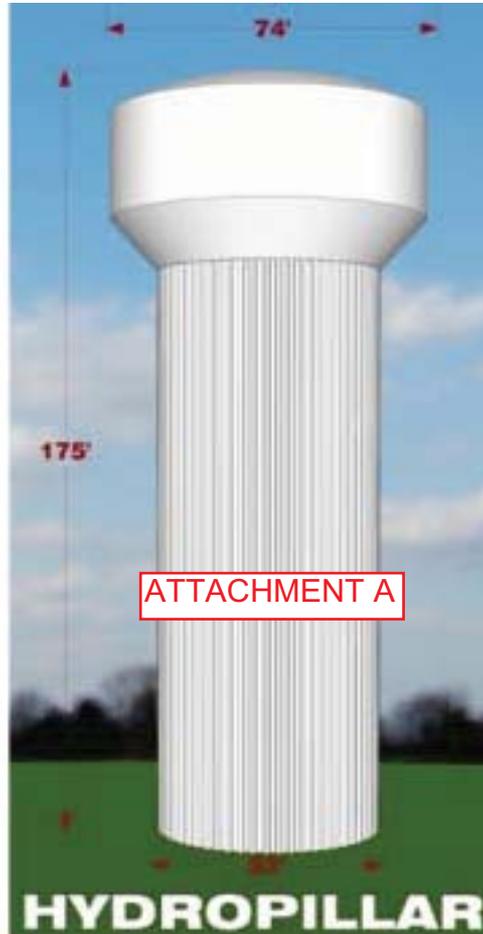
A Composite tower also has aesthetic options available for the concrete base, including:

- Concrete painting
- Concrete dyeing
- Concrete patterning

Concrete painting and dyeing are options that again would significantly add to construction and maintenance costs, however the concrete patterning options present opportunities to add a more notable look to the overall tower. MWU recommends varying the standard form liner with a combination smooth/patterned look. Other façade accents may also be a consideration, provided they are used judiciously to control costs. With this in mind, MWU is requesting that the board approve the option to vary the standard form liner.



Est. construction cost:
\$2.7 million
Maintenance cost rank:
3 (lowest)



Est. construction cost:
\$3.1 million
Maintenance cost rank:
1 (highest)

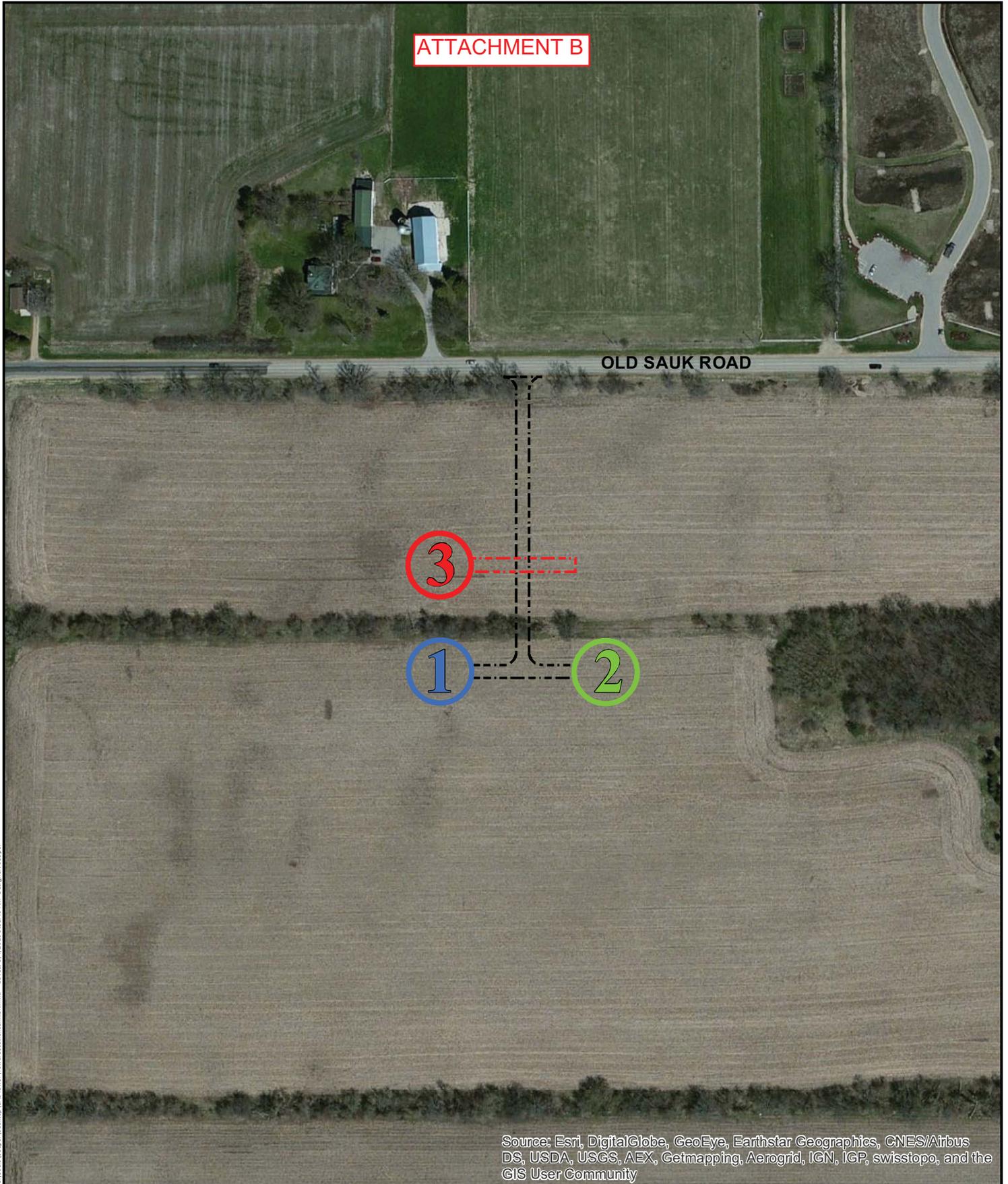


Est. construction cost:
\$3.4 million
Maintenance cost rank:
2 (middle)

ATTACHMENT A

PROPOSED TOWER LOCATIONS

Blackhawk Water Tower
MADISON WATER UTILITY, MADISON WI



C:\Users\j33pct\OneDrive\CAD\Drawings\TowerLocations\Exhibit.mxd, Saved: 5/1/2016 9:35:40 AM, Designer: j33pct

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



1" = 200'

