CITY OF NAPERVILLE

BID NUMBER: REQ-22-114 WORK ORDER #4

ENGINEERING SERVICES FOR CENTRAL ELEVATED WATER TANK RELOCATION

MANDATORY PRE-BID MEETING

Monday, February 27, 2023 at 1:00 pm.
CENTRAL ELEVATED WATER TANK at,
418 E 5TH AVENUE

ELECTRONIC BID DUE DATE/TIME:

Friday, March 17, 2023 at 2:00 p.m.

Jason Xi
Engineering Manager, Department of Public Utilities-Water/Wastewater
630 420-6702
xij@naperville.il.us

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GENERAL INFORMATION

The City of Naperville is seeking to retain the quotation from qualified consultant to perform design engineering, permitting, bid and construction phase engineering services for the Central Elevated Water Tank Relocation.

In Fiscal Year (CY) 2022, the City of Naperville completed a Request for Qualifications (RFQ 22-114) for Engineering Services for Water Supply and Sanitary Lift Stations. Four consultants were short-listed as a result of this process. The selected consultants may be retained for similar projects in CY 2022, 2023, and up to five one-year options to extend.

These consultants are:

Baxter & Woodman, Inc.
CDM Smith, Inc.
Ciorba Group, Inc.
Fehr-Gram & Associates, LLC

The quotation of the work is requested from above four shortlisted consultants refer to RFQ22-114 WO#4 – Engineering Services of Central Elevated Water Tank Relocation. If additional phases of work are required specific to this project, the City may, at its discretion, elect to use the services of the consultant selected with work order.

BACKGROUND

The Central Elevated Water Tank (CET) is located at ENG, Naperville, east of Naperville train station. CET was originally built in 1937, with an estimated height from ground to low water level of 100 feet. The tank storage capacity is 500,000 gallons. The approximate site elevation is 720 feet, and the approximate high-water level is 840 feet.

The current tank is aged and in poor condition; per the inspection report completed by Dixon Engineering, Inc. the total repair cost is approximately $950,000. (Report in Appendix B)

Since CET is approaching the end of its useful service life, requires significant, costly repair to continue operating, and its current location creates difficulties for future site development, the City intends to build a new elevated water Tank in a different location and demolish the existing central elevated water Tank. The City has conducted a concept study for water Tank relocation and recommends relocating the water Tank on the same property. The new elevated water Tank will be located at the southeast corner of the existing site. (The new layout and concept study related slides are included in Appendix C).

MINIMUM SCOPE OF SERVICES

General Description:
The City of Naperville is looking to engage the services of a competent and experienced consultant to carry out the design engineering, permitting, bidding, and construction phase services for the relocation of the Central Elevated Water Tank. Should the consultant choose to utilize subconsultants or collaborate with other companies for the structural design of the elevated water tank, it is mandatory that the subconsultant (or partner firm) have successfully completed a minimum of five projects of similar size or larger in the past five years. The subconsultant or partner firm's relevant experience and at least three references for similar design projects must be included in the proposal.

The scope of this project will include but not limited to the following tasks:

- Meet with City staffs onsite to understand the existing elevated water tank's function, mechanical piping/valves and existing electrical, control and communication systems. Understand which equipment need to be relocated and which equipment needs to be salvaged. Develop a detailed design task list for City to review and approve.
- Review the proposed location of new water elevated tank provided by City.
- Perform site plat and topography survey for design usage; Determine the final site layout with new elevated water tank.
- The soil investigation includes obtaining up to 8 soil borings at the locations determined by the consultants and directed by the City staffs. The depth of each boring shall be 70 feet to 100 feet and sufficient for elevated water tank design.
- Civil work, includes but not limited to existing pavement removal, site grading, pavement design, retaining wall design, water main installation, storm water line extension, retaining wall reconstruction and portion of parking reconstruction. Consultant shall attend pre-bid meeting and conduct site visit to develop the hours needed for Civil design.
- Demolition-The existing elevated water tank will be demolished.
- New water elevated tank structural, mechanical, electrical and control design.

APPROACHES

The engineering services include following approaches:

Task 1. Data Collection:

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- Review existing study information, including but not limited to: Central Elevated Water Tank inspection report (Appendix B), city concept study summary, Concept Site layout (Appendix C) and WaterGems model (Will be provided to the awarded consultant).
- Collect additional data including but not limited to: existing elevated water tank minimum and maximum water level, water usage data, controls, GIS and other information needed.
- Coordinate with the City's GIS staff to obtain all available aerial contour mapping and utility data(Water main, Storm Sewer, Sanitary Sewer,) for the project and surrounding site. This data is only intended to supplement the detailed field topographical surveys.
- Public Utility Coordination to obtain existing utility data from Nicor, ComEd, AT&T, Comcast, etc. and evaluate potential conflicts. If pothole or other methods are needed to locate utilities, the cost shall be included in the proposed scope with no additional compensation from City.
- Plat Survey to determine lot boundaries (property pins) and the existence of any easements.
- Existing topographic and utility survey of the entire project work site and extending a minimum of 50- feet, or longer as necessary, beyond the limits of the proposed work, including the alignment of proposed watermain work.
- Coordinate with Burlington Northern and Santa FE Railway Company (BNSF) for proposed development.

Task 2. Conceptual Design (30%):

- Provide locations of Geotechnical Investigation (Borings); City will use its own contractor to complete soil boring and reports. The selected consultant will be provided with a geotechnical report completed by the city's contractor.
- From above information, develop a conceptual report, including but not limited to the following tasks:

1. Provide water elevated tank relocation site layout including new location, dimensions, roadway, entrance, pavements, sanitary sewer, storm sewer, watermain and other site improvements. This should consider the tank bowl overhang, future maintenance, access for painting, snow removal etc.

2. Provide new elevated water tank elevations, dimensions, storage capacity and materials. including minimum one plan view and one section view. The proposed CET will be a Pedosphere Elevated Storage Tank (PED).

3. Conceptual level construction cost estimates.

4. City has been using Advanced Automation and Controls, Inc (AAC) as City water system SCADA designer and programmer. Please include AAC in the team for SCADA programing and design built through all the phases to insure the new Elevated Water Tank can be integrated into City Water Control System.

5. Value engineering of proposed project concept plan to determine if any costs saving measures are available.

- Develop a final study report which includes above items 1-5 for City's review.
- Coordinate railway for initial permit coordination.
- Attend up to 2 project review meetings with City staffs.
- Address City's review comments.

Task 3. 60% Design:

Upon completion of conceptual study, with City's authorization, the consultant shall perform 60% design. The 60% design will include but not limited to following tasks:

1. Comprehensive 60% engineer plan set includes, but not limited to Title Sheet, General notes, existing elevated tank demolition plan, Civil Site Plans, Site utility plan, Watermain plan view and Profile, Cross sections, Tree removal & Preservation Plan, Soil Erosion Control Plan, SWPPP, Restoration/Landscape Plan, elevated water tank structural plan, sections, electrical plan, control plan (including one line diagram and wire diagrams.); SCADA I/O; and detail sheets;

2. Provide elevated water tank structural design and related specifications.

3. Prepare bid specification including project general descriptions, related demolition work, site civil work, water utility work, mechanical, electrical controls, finishes and other related specifications.

4. Provide detailed quantities and 60% engineering construction cost estimates.

5. Submit permit application includes but not limited to IEPA construction permit, BNSF Permit (if needed) and City building permit.

Submit above engineering plan, specification and construction cost estimates for City's review; Facilitate value engineering discussions and options for discussion with city staff. Facilitate a meeting with city staff to discuss and document value engineering decisions.

Attend up to 2 City's review meetings and address any comments to the Plan, specification, cost estimates and refined construction schedule.

Initial and manage public information meetings with impacted property owners as needed. (up to 2 meetings)

Task 4: Final Design Plans

This task includes the development of final engineering plans and specifications for one bid package to be advertised for bids and constructed by one prime contractor.

Coordination with the city's SCADA integrator shall occur during this stage and any comments from them incorporated into the final bid documents. The SCADA bid allowance amount shall also be determined.

Prepare front end bidding and contract documents and complete the final bid package.

Conduct a 90% review workshop with the city and incorporate any comments in the final contract documents. Document any proposed changes to the final construction drawings and specifications. Prepare final contract documents for bidding.

Address permit application review comments and obtain all necessary permits.

Final design documents shall be complete and ready for bid not later than November 15, 2023

TENTATIVE SCHEDULE

02/13/2023	RFQ issued to vendors.
2/27/2023	Mandatory Pre-Proposal Meeting will be held at 1:00 p.m. local time on site. 418 E 5th Avenue
3/10/2023	Last day to ask questions. All questions must be received via email to xij@naperville.il.us by 12:00 p.m.
3/17//2023	Proposals should be submitted to the City by 2:00 p.m. The contents of the response are listed under Technical Proposal Elements.
March 2023	Firm selected for award will be notified.
April 2023	City Council award.

PROPOSAL CONTENTS

- Include personal's Resume who will be involved in this project and their roles.
- List all the subconsultants (partners), their experiences and references.
- Include a milestone schedule of completion each submittal of this project.
- Any suggestions consultant might have to improve this project. (No need to repeat items that are already listed above)

- Include fee schedule as below:
  1. Consultant's engineering service lump sum fee for design.
  2. City Integrator's allowance: $35,000 (T&M), no administration fee from consultant can be applied.
  3. 400 hours construction services (T&M).

Please provide a detailed fee schedule including above items 1 to 3. The schedule should list all the break down tasks, hours, hourly rates and estimated total hours. It should also list any assumptions and exclusions consultant used to develop the fee schedule.

- Include this document in the submittal, fill the fee calculated above in the last page of this document and provide the signature

Proposals shall not be accepted after the designated response due date and time. It is the responsibility of proposers to submit proposals on or before the response due date and time.

The cost of all equipment and labor to complete the work as identified shall no exceed:

$ _____

Quote Provided by: _____
Signature Printed

Company and Address: _____

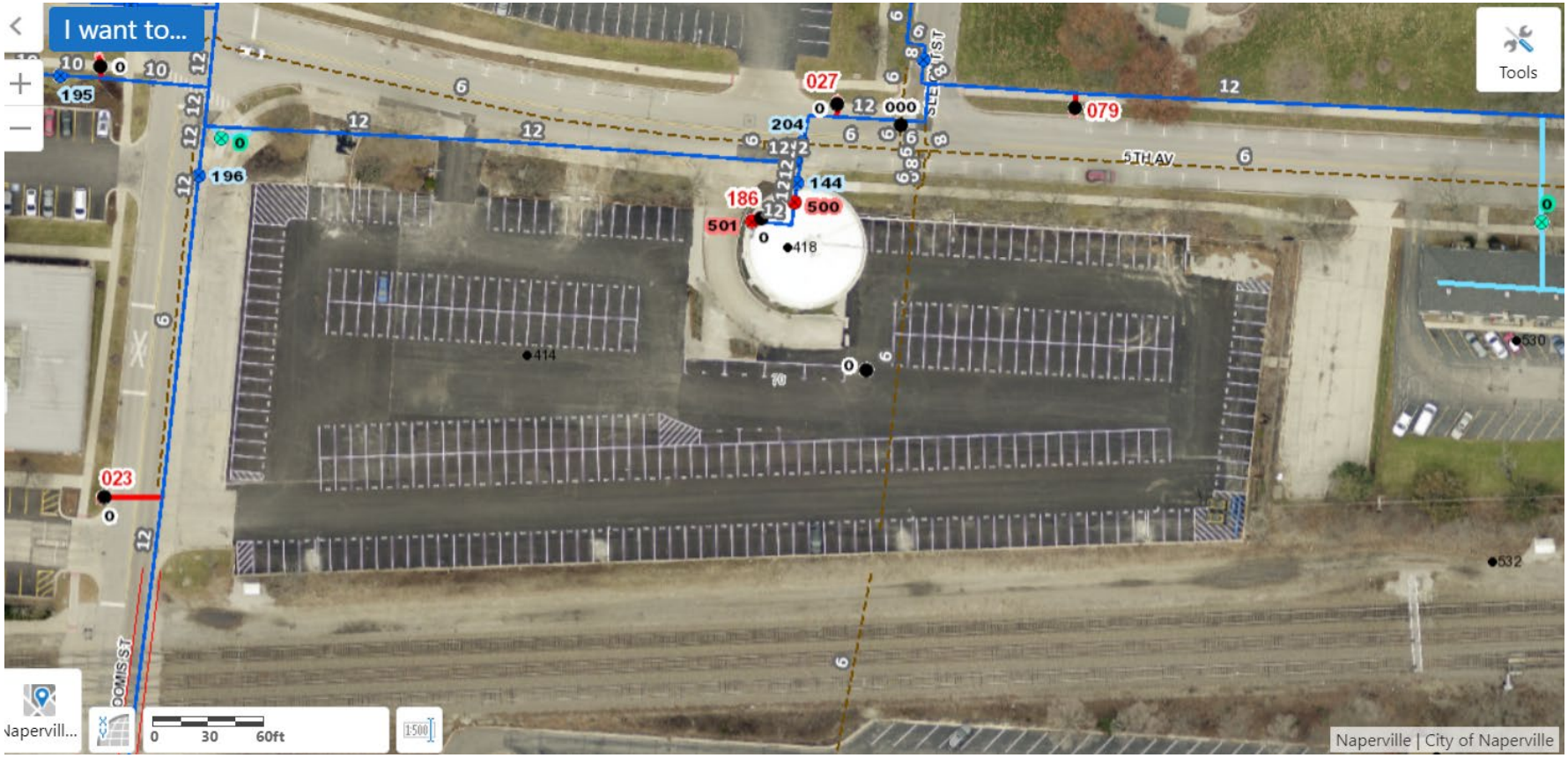
_____

_____

QUOTES ARE DUE NO LATER THAN 2:00 P.M. STANDARD CENTRAL TIME ON FRIDAY, March 17, 2023. QUOTES TO BE SUBMITTED BY EMAIL TO JASON XI AT xij@naperville.il.us. ANY QUESTIONS SHOULD BE EMAILED TO JASON XI AT xij@naperville.il.us. THE CITY OF NAPERVILLE IS TAX EXEMPT.

APPENDIX A – LOCATION MAP

EXHIBIT A. EXISITNG CENTRAL ELEVATED WATER TANK LOCATION MAP



APPENDIX B – CENTRAL ELEVATED WATER TANK INSPECTION REPORT

Dixon Engineering, Inc.

Maintenance Inspection

500,000 Gallon Radial Arm (Central Tank)

Naperville, Illinois

Inspection Performed: July 23, 2021
Reviewed by Joseph T. Hoban P.E.: August 27, 2021

Phone (414) 529-1859
Fax (414) 282-7830
http://www.dixonengineering.net
Wisconsin@dixonengineering.net

Dixon Engineering, Inc.
4811 S. 76th St. Ste. 109, Greenfield, WI 53220

CONCLUSIONS:

1. The exterior coating is an acrylic overcoat system. The coating is in fair condition overall. Coating deterioration includes spot failures to the substrate with rust undercutting, rust bleedthrough, micro-cracking, and erosion. There are numerous coating failures throughout.

2. The wet interior coating is an unknown system. The coating is in poor condition overall. Below the high-water level coating deterioration includes spot failures to the substrate on the sidewall and bowl. There are coating failures throughout the roof and stiffeners above the high-water level.

RECOMMENDATIONS (IMMEDIATE WORK):

The Illinois EPA may allow some of the required changes to be delayed until the next paint project. These items are listed as immediate work since they are currently out of compliance.

1. Install a handrail on the roof to meet current Illinois EPA recommendations. Install a painter's railing on the roof around the new handrail. The estimated cost is $15,000.

2. Modify the overflow pipe discharge so the air gap is between 12 - 24 inches to bring it into compliance with current Illinois EPA requirements. Install a flap gate or duck bill check valve at the new discharge. The estimated cost is $4,000.

RECOMMENDATIONS (WITH THE NEXT PAINT PROJECT):

Annually inspect the roof vent, hatches, and any other health or security items on the structure. The work could be performed by in-house personnel or contracted as part of a regular maintenance program.

Complete the recommended work in one to two years. The repairs and upgrades should be completed during the next major tank rehabilitation project when coating repairs are made.

1. Abrasive blast clean the exterior inside a dust tight containment system and repaint with a urethane system. The estimated cost is $420,000 plus $100,000 for containment.

2. Abrasive blast clean the entire wet interior and repaint with an epoxy system. The estimated cost is $210,000.

3. Caulk the roof lap seams after the wet interior is repainted. The estimated cost is $3,000.

4. Weld plates over the cathodic lift holes in the roof and remove the remaining wires from the abandoned system. The estimated cost is $6,000.

5. Continue to maintain the operating submerged cathodic protection system. The cost would be dependent on your contract with your cathodic vendor.

6. Temporarily relocate or protect the power lines that would interfere with containment needed for exterior work. The work would need to be performed by the electric company.

7. Recoat the foundations to help prevent deterioration. The cost would be incidental to exterior painting.

8. Replace the deteriorated anchor bolt nuts. The cost would be incidental to the next paint project.

9. Drill drainage holes in the balcony walkway. The cost would be incidental to exterior painting.

10. Install rigging couplings on the roof for temporary fall prevention of workers in the wet interior. The cost would be incidental to the next painting project.

11. Relocate all roof antennas to the new roof handrail and remove the existing mounts. The cost would be incidental to roof handrail installation.

12. Install rigging couplings on the bowl. The cost would be incidental to the next painting project.

13. Replace the wet interior roof hatch with a 30 inch diameter hatch. The estimated cost is $4,000.

14. Install a handhold at the wet interior roof hatch. The handhold would assist the climber while entering and exiting the opening. The cost would be incidental to the next painting project.

15. Install a handrail where one is missing at the step-off platform under the bowl. The estimated cost is $2,000.

16. Replace the sidewall/roof ladder with a vertical ladder and a step-off platform. The estimated cost is $15,000.

17. Install a wet interior ladder from the roof to the bowl that is equipped with a fall prevention device. The estimated cost is $10,000.

18. Remove the damaged wet interior ladder from the sidewall to the bowl. The cost would be incidental to the next painting project.

19. Remove the inoperable drain line valve in the riser and weld plates over the openings. The estimated cost is $1,000.

20. Install a handrail around the top of the riser in the wet interior. The estimated cost is $7,000.

21. Remove the damaged painter's railing from the tank bottom. The cost would be incidental to wet interior repainting.

A DISCUSSION ON RESCUE AND RETRIEVAL OPERATIONS FROM ELEVATED STORAGE TANKS

Working on elevated water storage tanks is inherently dangerous. OSHA regulations give guidelines for the climbing on elevated structures. Contractors and Engineers/Consultants are responsible for their own employees, but even with safety training and proper equipment, accidents can occur. Most rescue squads are local or neighboring fire departments, with some departments having more experience than others. Water storage tanks are designed to store water and are not suited for rescue or retrieval convenience. We recommend that you meet with your local rescue personnel and draft a rescue plan. A copy of the plan should be kept at the tank and with the rescue crew.

OSHA does not require 30 inch manways or hatches but for rescue purposes 30 inch openings would allow enough room for a rescue basket with an injured person on it to pass through. Smaller openings may not be sufficient for retrieval.

Rescue personnel would gain access to the injured person using the existing ladders while attached to fall prevention devices. If possible, the basket would be lowered through the riser and out the opening in the bottom. If needed, the rescue crew would work from the roof inside a handrail. A tripod would be used to attach a winch to the basket. If the basket cannot fit through the riser then it would need to be raised to the roof.

From the roof it is possible to lower the basket over the side to ground level, but that would require a very large winch and increased loading on the attachment point. On a rainy, windy, or snowy day, the objective would be to get rescue personnel off the roof as soon as possible, so lowering through the dry interior is preferred. A helicopter rescue would need to be performed if it is not possible to lower the rescue basket down the dry interior.

Upgrades intended to make a rescue easier are included in this report. Dixon recommends 30 inch manways or hatches where possible and fall prevention devices on all ladders.

COST SUMMARY:

Exterior repaint with containment	$520,000
Wet interior repaint	210,000
Caulk roof lap seams	3,000
Weld cathodic covers	6,000
Roof handrail and painter's railing	15,000
Overflow discharge modification	4,000
30 inch wet interior roof hatch	4,000
Step-off platform handrail	2,000
Roof platform and sidewall ladder	15,000
Wet interior ladder	10,000
Drain line valve removal	1,000
Handrail around the top of the riser	7,000
Sub Total	$797,000
Engineering and Contingencies	153,000
Total	$950,000

Notes: Exterior coating is primarily for aesthetics and can be delayed as long as desired since the next paint job cannot be an overcoat. While the appearance will deteriorate the structural integrity should not be impacted.

Exterior repainting will require temporary removal and relocation of the antennas and cables. This cost is not included in these estimates and is assumed to be the responsibility of the antenna owners. Cost is also not included for coordinating with the antenna carriers or for any redesign work needed for antenna mounting or cable routing.

Safety improvements are optional and can be delayed. Best price for safety improvements would be obtained by including them with the next painting project.

INSPECTION:

On July 23, 2021, Dixon Engineering Inc. performed a preliminary maintenance inspection on the 500,000 gallon radial arm (Central Tank) elevated water storage tank owned by the City of Naperville, Illinois. Purposes of the inspection were to evaluate the interior and exterior coating's performance and life expectancy, assess the condition of metal surfaces and appurtenances, review safety and health aspects, and make budgetary recommendations for continued maintenance of the tank. All recommendations with budgeting estimates for repairs are incorporated in this report.

The inspection was performed by Josh Grover, Engineering Technician. The inspector was assisted by Lane Tremblay, ROV Operator, and Jesse Darnell, Staff Technician.

The wet interior inspection was completed with a remotely operated vehicle (ROV). Video of the inspection and still photos are included with this report. No cleaning was performed in the wet interior during the ROV inspection.

GENERAL INFORMATION:

The tank was built with an estimated height to low-water level of 100 feet. The original construction date is unknown. The owner stated the tank is believed to have been built in 1937.

CONDITIONS AND RECOMMENDATIONS:

EXTERIOR COATING CONDITIONS:

Information provided by the Owner indicates that the exterior was last painted in 1996. The exterior was pressure washed and spot power tool cleaned to SSPC-SP11 condition. The coating applied was an elastomeric acrylic (noxyde) system.

The riser and leg coating is in fair condition with numerous failures. Primary methods of deterioration are spot failures to the substrate with rust undercutting, rust bleedthrough, and micro-cracking.

The bowl coating is in fair condition with several failures. Primary methods of deterioration are spot failures to the substrate with rust undercutting. The bowl is covered with light to moderate mildew growth.

Coating on the top of the balcony is in poor condition with numerous failures. Primary methods of deterioration are spot failures to the substrate with rust undercutting, rust bleedthrough, delaminated topcoat, and erosion.

The sidewall coating is in fair to poor condition with numerous failures on the sidewall. Primary method of deterioration is micro-cracking. There is lettering that states "NAPERVILLE" on the sidewall in one location. There is a city logo on the sidewall in one location.

The roof coating is in poor condition with numerous failures. Primary methods of deterioration are spot failures to the substrate with rust undercutting, delaminated topcoat, erosion, and micro-cracking.

EXTERIOR COATING RECOMMENDATIONS:

Budget for total exterior coating removal and repainting in approximately one to two years or when aesthetics dictate. Fading will continue and more rust spots will occur decreasing the tank's aesthetic appearance.

Remove the existing coating by dry abrasive blast cleaning the steel to a commercial (SSPC-SP6) condition and apply a urethane system. All blast work would be performed inside a dust tight containment system using negative air pressure.

Total removal is recommended because the coating failures are extensive, and it is not practical to attempt to spot repair all failed areas. The exterior has likely been overcoated multiple times and cannot support additional coats.

The coating system would consist of a full prime coat on the bare metal, a full coat of epoxy, followed by two full coats of urethane. The urethane system offers excellent abrasion resistance with high gloss and sheen retention. The expected life of this system is fifteen years. The system can be overcoated in fifteen years, and a second time approximately fifteen years after the first overcoat, extending the total life of the coating to approximately forty-five years before total removal would be necessary. The tank would be removed from service during the coating project. This is necessary to reduce condensation on the tank's surface. Urethane coatings have a minimum temperature requirement for application and are sensitive to moisture during the curing process. If moisture is present during the curing process, the appearance will become cloudy with little or no gloss. The estimated cost is $420,000 plus $100,000 for containment.

WET INTERIOR COATING CONDITIONS:

The coating is an unknown system. Determining exact coating type is not essential because spot repair is not typically recommended and overcoating is the wet interior is never recommended.

The roof coating is in poor condition with numerous failures. Primary methods of deterioration are spot failures to the substrate with rust undercutting. There are coating failures throughout the roof and roof stiffeners. Corrosion on the roof stiffeners is typical but should be corrected before structural loss of steel occurs.

The sidewall coating is in poor condition with numerous failures. Primary method of deterioration is spot failures to the substrate.

The coating on the bowl is in fair condition with numerous failures. Primary method of deterioration is spot failures to the substrate. The bowl was covered with approximately ¼ inch of sediment that limited the amount of surface visible with the ROV.

The riser was not inspected because the ROV cannot maneuver well in the tight space.

The surfaces below the normal operating water level are covered with mineral staining which does not affect the integrity of the coating system.

Coating samples were taken during a previous inspection and tested for heavy metals. The coating tested at 24 percent (240,000 ppm) lead by weight, 0.0057 percent (57 ppm) chromium by weight, and 0.026 percent (260 ppm) cadmium by weight. Special considerations will be needed during maintenance to avoid contamination of workers and prevent generation of a hazardous waste.

WET INTERIOR COATING RECOMMENDATIONS:

Budget to repaint the wet interior in one to two years. Abrasive blast clean the entire wet interior to a near-white metal (SSPC-SP10) condition. Wet interior coating systems must be approved for potable water storage tanks contingent upon meeting requirements of NSF/ANSI 61.

Apply a three-coat epoxy system to the prepared surfaces. Epoxy coating systems are recommended in most applications because they have good adhesion and abrasion resistant qualities. The estimated cost is $210,000.

Caulk the roof lap seams after the wet interior is repainted. The caulk will fill the open seams and help prevent corrosion. The estimated cost is $3,000.

CATHODIC PROTECTION CONDITIONS:

There are bolted covers on the roof over the access holes for the abandoned roof mounted cathodic protection system. These covers are kept in place with a single bolt. These covers tend to shift creating an opening in the roof. All of the covers were found to be in alignment during the inspection.

The tank has a suspended impressed current ice-free cathodic protection system that appears to be in fair condition. Surfaces below the high-water level are protected by the submerged system that is suspended from the bowl with a section through the riser. Some of the ropes for the ring are loose. The system appeared to be working properly. This was evident by the presence of deposits of cathodic byproducts on exposed steel surfaces and the lack of steel loss at the bare metal.

CATHODIC PROTECTION RECOMMENDATIONS:

Weld plates over the cathodic lift holes in the roof and remove the remaining wires from the abandoned system. The estimated cost is $6,000.

Continue to maintain the cathodic protection system. The cost would be dependent on your contract with your cathodic vendor.

SITE CONDITIONS:

The tank is located on a small fenced site. There is a car parking lot close to the tank and extra precautions will need to be taken to keep from getting coating or debris on the neighboring property.

There are two antenna buildings under the tank. The antenna buildings may interfere with a containment system.

Power lines are located approximately 5 feet away from the tank and could interfere with a containment system.

SITE RECOMMENDATIONS:

The tank site is small and there may be an issue trying to fit the contractor's equipment during the next painting project. Some of the contractor's equipment may need to be on the road or on the neighboring property. The property lines should be verified and a staging area determined before the next painting project.

Temporarily relocate or protect the power lines that would interfere with containment needed for exterior work. The work would need to be performed by the electric company.

FOUNDATION AND ANCHOR BOLT CONDITIONS:

The exposed concrete foundations are in good condition with no significant deterioration. The exposed foundations are coated. The coating is in poor condition with erosion and delamination throughout.

There are anchor bolts on each leg. There is minor steel loss from corrosion on some of the nuts.

FOUNDATION AND ANCHOR BOLT RECOMMENDATIONS:

Recoat the exposed concrete with an epoxy coating system to help prevent deterioration. The cost would be incidental to exterior painting.

Replaced the deteriorated anchor bolt nuts. The cost would be incidental to the next paint project.

GROUT CONDITIONS:

The grout between the baseplate and the foundation is in good condition on the riser and in good condition on the legs with none damaged or missing.

BALCONY CONDITIONS:

The exterior balcony is a walkway with a railing that surrounds the sidewall. The balcony is in good condition overall. The balcony is 27 inches wide with a 42 inch high handrail. The handrail consists of a midrail and a kick plate at the balcony floor.

The balcony does not contain enough drainage holes and water is ponding on the walkway.

BALCONY RECOMMENDATIONS:

Drill holes in the balcony to drain water and prevent water from ponding on the top of the balcony. The cost would be incidental to exterior painting.

ROOF HANDRAIL, PAINTER'S RAILING, AND ROOF RIGGING CONDITIONS:

The tank does not have a roof handrail or a painter's railing.

There are no roof rigging couplings for safety and staging lines during wet interior coating work.

ROOF HANDRAIL, PAINTER'S RAILING, AND ROOF RIGGING RECOMMENDATIONS:

Install an OSHA compliant railing on the roof to meet current Illinois EPA requirements. The railing would allow tie off locations during routine vent screen inspections, aviation light inspections, and would provide a safe work area for retrieval personnel performing a roof extraction. Install a painter's railing outside the railing. The estimated cost is $15,000.

Install rigging couplings on the roof under the new painter's railing for fall prevention of workers in the wet interior. The couplings would allow a contractor working in the wet interior to be tied off to a fall prevention device at all times. The cost would be incidental to the next painting project.

LIGHTING CONDITIONS:

The tank has a double aviation light on the roof that appears to be in good condition. The light is operating properly.

ANTENNA CONDITIONS:

There are four roof antennas and miscellaneous antenna equipment attached to a tripod frame and free-standing mounting pole. The antenna cable routing is in good condition and does not interfere with climbing or tank operations.

ANTENNA RECOMMENDATIONS:

Relocate all roof antennas to the new roof handrail and remove the existing mounts. The cost would be incidental to roof handrail installation.

SWAY ROD/BOWL SAFETY CONDITIONS:

There are sway rods and struts that connect between the legs. The rods are intended to keep the legs in alignment and are equipped with turnbuckles for adjusting tension. The sway rods and struts are in good condition. Because of the inaccessibility of the upper sway rods the tension could not be determined at every bay. However, based on the accessible bay at ground level it appears that the rods are in proper tension as designed.

There are riser tie rods that extend from each leg to the riser. The rods are bolted to an angle and to welded lugs on the riser. The rods help keep the legs and riser in alignment. The riser tie rods are in good condition.

There are no rigging couplings under the bowl for safety line attachments during exterior coating.

SWAY ROD/BOWL SAFETY RECOMMENDATIONS:

Install rigging couplings on the bowl halfway between each leg and the riser. The couplings would be used by contractors for rigging safety lines. Currently the contractor does not have a separate independent tie off location for safety lines. Without additional attachment points the rigging and safety lines would be tied to the same location. The cost would be incidental to the next painting project.

OVERFLOW PIPE CONDITIONS:

The overflow pipe exits the upper sidewall, extends along the sidewall, through the balcony, and down along a leg to ground. The discharge end of the overflow pipe is screened. The screen is in fair condition. The pipe discharges to a catch basin with a drain. The air gap does not meet the required 12-24 inches. The discharge area is in fair condition.

OVERFLOW PIPE RECOMMENDATIONS:

Modify the overflow pipe discharge so the air gap is between 12 and 24 inches to bring it into compliance with current Illinois EPA requirements. Install a flap gate or duck bill check valve at the new discharge. The flap gate would allow water to discharge even if the screen becomes covered with debris or frosted over. The flap gate is designed to stay closed to prevent rodents or birds from entering the pipe. The duck bill check valve would allow water out but prevent debris from clogging the discharge. The estimated cost is $4,000.

HATCH AND MANWAY CONDITIONS:

There is a 24 inch diameter roof hatch to the wet interior that is in good condition. The hinged cover is in good condition. There is no handhold next to the hatch to aid the climber while entering and exiting the opening. The hatch was secured with a bolt. The hatch neck curb height meets the minimum height requirement of 4 inches. The hatch cover lip meets the minimum height requirement of 2 inches. A gasket was installed on the roof hatch curb by the inspection crew

There is an 18 x 24 inch elliptical manway in the riser to the wet interior that is in good condition. There is also a 30 inch diameter manway in the riser that is in good condition. The manway gaskets showed no signs of leakage and the bolts are in good condition.

There is an 18 x 24 inch elliptical manway in the sidewall to the wet interior that is in good condition. The manway gasket showed no signs of leakage and the bolts are in good condition.

HATCH AND MANWAY RECOMMENDATIONS:

Replace the wet interior roof access hatch with a new 30 inch hatch. Average rescue baskets will not pass through the existing hatch. The estimated cost is $4,000.

Install a handhold at the wet interior roof hatch. The handhold would assist the climber while entering and exiting the opening. The cost would be incidental to the next painting project.

VENT CONDITIONS:

The roof vent is a pressure vacuum design that is in good condition. The pressure vacuum plate was found to be properly aligned. There is a large external screen intended to keep birds out and a smaller mesh screen on the interior intended to keep insects out. The screens are in good condition. There is a rain shield over the outer screen.

LADDER CONDITIONS:

The exterior leg ladder starts approximately 17 feet above the ground and extends up to a small platform near the top of the leg column. There is a small section where there is no handrail at the step-off platform. There is a stairway and ladder that go from the platform to the balcony. The ladder meets OSHA size requirements. The leg ladder is equipped with a rail-type fall prevention device that is in good condition. There is a vandal guard on the leg ladder that is in good condition.

There is a fixed sidewall/roof ladder that follows the curve of the roof to the center near the vent. The ladder is in good condition. The ladder meets OSHA size requirements. The ladder is not equipped with a fall prevention device.

There is a wet interior ladder from the sidewall manway to the bowl that is in poor condition.

There is no ladder in the wet interior from the roof to the bowl.

LADDER RECOMMENDATIONS:

Install a handrail where one is missing at the step-off platform under the bowl. The estimated cost is $2,000.

Replace the roof and sidewall ladder with a vertical sidewall ladder that runs up to a step-off platform. The platform would have a handrail that would extend around the roof hatch. The step-off platform and railing will provide a safer working area at the roof hatch. The estimated cost is $15,000.

Install a ladder in the wet interior from the roof to the bowl that is equipped with a fall prevention device. The estimated cost is $10,000.

Remove the damaged ladder from the sidewall to the bowl. The cost would be incidental to wet interior repainting.

DRAIN VALVE CONDITIONS:

There is a drain valve located in the bottom of the riser to aid in removal of sediment during inspections and routine maintenance. The owner stated on a previous inspection that the valve is not operational.

DRAIN VALVE RECOMMENDATIONS:

Remove the inoperable drain line valve in the riser and weld plates over the openings. The estimated cost is $1,000.

WET INTERIOR SAFETY CONDITIONS:

There is no grate over or handrail around the riser opening.

WET INTERIOR SAFETY RECOMMENDATIONS:

Install a handrail around the top of the riser. The railing will prevent personnel from falling through the riser opening. The estimated cost is $7,000.

WET INTERIOR METAL CONDITIONS:

The steel structure is in good condition overall. No significant pitting was observed at the coating failures.

The interior roof is supported by radial stiffeners that are in good condition with minor corrosion in the crevices and at the edges. The connections at the sidewall are stitch welded and bolted and are in good condition.

There was a painter's railing located at the upper sidewall. The stiffener is in poor condition and is lying on the tank bottom.

WET INTERIOR METAL RECOMMENDATIONS:

Monitor the corrosion on the edges of the stiffeners. Repaint the roof before metal loss becomes significant.

Remove the damaged painter's railing from the tank bottom. The cost would be incidental to wet interior repainting.

DIXON ENGINEERING, INC.

STEEL TANK FIELD INSPECTION REPORT

LEGGED TANK

DATE: **July 23, 2021**

OWNER: **City of Naperville**
CLIENT CODE: **13-22-03-01**
TANK NAME: **Central Tank (CET)**
LOCATION: Address: **536 E. 5th Avenue**
City: **Naperville**
State: **Illinois**
TANK SIZE: Capacity: **500,000 gallons**
Bottom (LWL): **95 feet (from drawings)**
Head range: **25 feet (from drawings)**
CONSTRUCTION: **Welded, riveted**
Type: **Radial arm**
YEAR CONSTRUCTED: **1937**
MANUFACTURER: **Unknown**
CONTRACT NUMBER: **Unknown**
USE: **Potable water and fire protection**
Coating information below is from: **Owner personnel**

COATING HISTORY	EXTERIOR	WET INTERIOR
YEAR COATED	**1996**	**Unknown**
CONTRACTOR	**World Wide Waterproofing**	**Unknown**
SYSTEM	**Noxyde Elastomeric Acrylic**	**Unknown**
SURFACE PREPARATION	**SSPC-SP11**	**Unknown**
MANUFACTURER	**Advance Coating Technology**	**Unknown**
HEAVY METAL COATING SAMPLES	**No**	**No**
HEAVY METAL BEARING	**Unknown**	**Yes 24% lead 0.0057% chrome**

PERSONNEL: Lead inspector **Josh Grover**
Crew member **Ryan Szczepaniak**, ROV operator **Lane Tremblay**
METHOD OF INSPECTION: **ROV**

SITE CONDITIONS

Fenced: **Yes**
Site large enough for contractor's equipment: **No**
Control building: **No**
Antenna control site: **Yes**
Number: **2**
Type: **Building**
Location: **Under tank**
Would antenna sites interfere with containment: **No**
Power lines within 50 feet: **Yes (estimated distance 5 feet)**
Are power lines attached to the structure: **No**
Would power lines interfere with containment: **Yes**
Site drainage: **Away from tank**
Indications of underground leakage: **No**
Shrub, tree, etc. encroachment: **No**
Site comments: **There is a large parking lot adjacent to the tank**

EXPOSED PIPING

N/A

FOUNDATION

Riser:
Foundation exposed: **Yes**
Exposed height: **3-5 inches**
Exposed foundation condition: **Good**
Damage or deterioration: **No**
Foundation coated: **Yes**
Coating condition: **Poor**
Type of baseplate gap filler: **Grout**
Condition: **Good**
Amount missing: **0 feet**
Undermining of foundation: **No**
Riser foundation comments: **There is erosion of the coating**

FOUNDATION

Legs:

Foundations exposed: **Yes**
Exposed height: **0-13 inches**
Exposed foundation condition: **Good**
Damage or deterioration: **No**
Foundation coated: **Yes**
Coating condition: **Poor**
Type of baseplate gap filler: **Grout**
Condition: **Good**
Amount missing: **0 feet**
Undermining of foundation: **No**
Leg foundation comments: **There is erosion and delamination of the coating**

EXTERIOR COATING

Legs:

Number: **10**
Type: **I-beam**
Dimensions: **14 ½ x 14 inches**
Topcoat condition: **Fair**
Previous system condition: **Fair**
Describe coating: **Fading, spot coating failures to substrate, rust undercutting, micro-cracking**
Dry film thickness: **11-15 mils**
Adhesion: **4A**
Metal condition: **Good**
Leg comments: **Many small ½-¼ inch diameter spot coating failures with micro-cracking throughout**

Riser:

Type: **Wet**
Diameter: **6 feet**
Topcoat condition: **Fair**
Previous system condition: **Fair**
Describe coating: **Fading, spot coating failures to substrate, rust undercutting, micro-cracking**
Mildew growth: **Yes – light**
Dry film thickness: **11-14 mils**
Adhesion: **Not taken**
Reason not taken: **Wet**

EXTERIOR COATING

Metal condition: **Good**
Bottom shell steel thickness: **0.495 inches**
Riser comments: **There are a few spot coating failures and micro-cracking throughout**

Bowl:

Topcoat condition: **Fair**
Previous system condition: **Fair**
Describe coating: **Spot coating failures to substrate, rust undercutting, micro-cracking**
Mildew growth: **Yes – light to moderate**
Metal condition: **Good**
Bowl comments: **The spot coating failures are along the radial arms and micro-cracking throughout**

Sidewall:

Lettering: **Yes**
Number: **1**
Lettering content: **NAPERVILLE**
Logo: **Yes**
Number: **1**
Describe logo: **City logo**
Topcoat condition: **Fair to poor**
Previous system condition: **Fair**
Describe coating: **Fading, spot coating failures to substrate, micro-cracking**
Dry film thickness: **16-20 mils**
Adhesion: **4A**
Metal condition: **Good**
Sidewall comments: **There are several small spot coating failures and micro-cracking throughout**

Roof:

Topcoat condition: **Poor**
Previous system condition: **Fair**
Describe coating: **Fading, delaminating, spot coating failures to substrate, rust undercutting, erosion, micro-cracking**
Dry film thickness: **13-16 mils**
Adhesion: **2A**
Metal condition: **Good**

EXTERIOR COATING

Roof comments: **There are ten spot delamination failures 2 inch diameter or less, twenty 1 inch diameter or smaller spot coating failures, and erosion and micro-cracking throughout**

EXTERIOR APPURTENANCES

Riser Manway:

Size: **18 x 24 inches**
Cover attachment: **Bolts**
Metal condition: **Good**

Riser Manway:

Size: **30 inches**
Cover attachment: **Bolts, davit arm**
Metal condition: **Good**

Anchor Bolts:

Number of bolts per leg: **2**
Diameter: **1 ¾ inches**
Metal condition: **Good**
Number of riser bolts: **0**

Overflow Pipe:

Diameter: **6 inches**
Metal condition: **Good**
Discharge orientation: **Vertical**
Screen condition: **Fair**
Percent of screen open: **100**
Mesh size: **2**
Flap gate/duck bill check valve: **No**
Air gap: **Yes**
Lowest part of discharge to the ground distance: **3 inches**
Height to elbow: **32 inches**
Overflow discharges to: **Catch basin with drain**
Condition: **Good**
Overflow comments: **There is only a 3 inch air gap to top of the basin**

Mud Valve:

Number: **1**
Type: **Unknown**
Functioning properly: **No**

EXTERIOR APPURTENANCES

Metal condition: **Good**

Mud valve comments: **There is an old drain valve in the bottom of the riser. Owner stated it does not function**

Sample Tap:

N/A

Threaded Coupling (for chemical feed on the fill/draw pipe):

N/A

Leg Ladder:

Height to start of ladder: **17 feet**

Toe clearance: **7 inches or greater**

Width of rungs: **16+ inches**

Thickness of rungs: **¾ inch**

Shape of rungs: **Diamond**

Metal condition: **Good**

Fall prevention device: **Yes**

Type: **Rail**

Function properly: **Yes**

Cage: **No**

Vandal guard: **Yes**

Condition: **Good**

Step off platform: **Yes**

Dimensions: **36 x 4 inches**

Dimensions: **24 x 24 inches**

Ladder comments: **The step-off platform has two steps, there is a section on the platform with no handrail next to the stairs**

Struts and Rods:

Number of bays: **5**

Sway rod metal condition: **Good**

Loose rods: **No**

Number of loose rods: **0**

Strut metal condition: **Good**

Riser tie rod metal condition: **Good**

Connection to riser: **Welded lugs and angle**

Bowl Rigging Couplings:

N/A

EXTERIOR APPURTENANCES

Balcony:

Balcony width: **27 inches**
Railing height: **42 inches**
Kickplate height: **7 inches**
Vertical post type: **Channel**
    Size: **2 x 6 inches**
Top rail type: **Angle**
    Size: **3 x 3 inches**
Midrail type (x3): **Angle**
    Size: **2 ½ x 2 ½ inches**
    Size: **2 ½ x 2 ½ inches**
    Size: **3 x 3 inches**
Opening for access: **Yes**
    Location: **Balcony floor**
    Size: **18 x 36 inches**
    Handhold at opening: **Yes**
    Opening security: **Cover**
Coating condition: **Poor**
Describe coating: **Fading, delaminating, spot coating failures to substrate, rust undercutting, erosion, rust bleedthrough, micro-cracking**
Metal condition: **Good**
Evidence of water ponding: **Yes**
Balcony comments: **There are extensive coating failures**

Sidewall Manway:

Size: **18 x 24 inches**
Cover attachment **Bolts**
Metal condition: **Good**

Antennas:

Roof number: **4**
    Attached to: **Tripod, free-standing pole**
Balcony number: **0**
Antenna or cable interference: **No**

Sidewall Ladder:

Design: **Fixed**
Metal condition: **Good**
Toe clearance: **Less than 7 inches**

EXTERIOR APPURTENANCES

Width of rungs: **Less than 16 inches**
Thickness of rungs: **¾ inch**
Shape of rungs: **Diamond**
Fall prevention device: **No**
Cage: **No**

Step-off Platform:

N/A

Roof Ladder:

Continuation of sidewall ladder

Roof Handrail:

N/A [Proposed diameter 20 feet]

Painter's Rail:

N/A

Roof Rigging Points:

N/A

Removable Cathodic Covers:

Number: **16**
Metal condition: **Good**
Aligned: **Yes**

Wet Interior Roof Hatch:

Neck size: **24 inches**
Distance from center of the tank (to outer edge): **17 feet**
Shape: **Round**
Handhold at opening: **No**
Curb height: **4 inches**
Cover overlap: **2 inches**
Gasket on neck curb: **Yes (installed by Dixon)**
Hatch security: **Bolt**
Metal condition: **Good**

Bolted Ventilation Hatch:

N/A

EXTERIOR APPURTENANCES

Roof Vent:

Number: **1**
Distance from center of the tank (to outer edge): **0 feet**
Type: **Pressure-vacuum**
Neck diameter: **18 inches**
Flange opening diameter: **24 inches**
Vertical expanded metal condition: **Good**
Interior screen condition: **Good**
    Mesh size: **24**
Rain shield: **Yes**
Pressure plate condition **Good**
    Plate free to move: **Yes**
    Plate screened: **No**
Height of the lowest screen above the roof: **15 inches**
Metal condition: **Good**

Aviation Lights:

Design: **Double red**
Location: **Free-standing mount**
Functioning: **Yes**
Globe condition: **Good**
Photoelectric cell: **No**
Aviation light comments: **Both lights were on during the inspection**

Electrical Components:

Electrical conduit condition: **Good**
Exposed wiring: **No**

WET INTERIOR COATING

Roof:

Topcoat condition: **Poor**
Primer coating condition: **Poor**
Describe coating: **Delaminating, spot coating failures to substrate, rust undercutting**
Metal condition: **Good**
Lap seams: **Open**
    Condition of lap seams: **Fair**
Roof comments: **There are extensive coating failures throughout**

WET INTERIOR COATING

Sidewall:

Topcoat condition: **Poor**
Primer coating condition: **Poor**
Describe coating: **Spot coating failures to substrate**
Mineral deposits: **Moderate**
Metal condition: **Good**
Active pitting: **No**
Previous pitting: **No**
Sidewall comments: **There are extensive coating failures throughout**

Tank Bottom:

Partially covered in sediment, not completely inspected with the ROV
Type: **Flat**
Topcoat condition: **Fair**
Primer coating condition: **Fair**
Describe coating: **Spot coating failures to substrate**
Mineral deposits: **Moderate**
Metal condition: **Good**
Active pitting: **No**
Previous pitting: **No**
Sediment depth: **¼ inch**

Riser:

Could not inspect with ROV

WET INTERIOR APPURTENANCES

Ladder:

N/A

Ladder:

Location: **Sidewall manway to bowl**
Metal condition: **Poor**
Fall prevention device: **No**
Ladder comments: **Only one rung remaining**

Cathodic Protection:

N/A
Clips: **Yes**
Pressure fitting: **Yes**
Location of clips: **Bowl**

WET INTERIOR APPURTENANCES

Type: **Ring**
Ropes/arms damaged: **No**
Wires damaged: **No**

Roof Stiffeners:

Radial:
- Number: **25**
- Dimensions: **3 x 4 inches**
- Shape: **Angle**
- Connections: **Bolted, welded, stitched**

Ring Stiffener:
- Number: **1**
- Shape: **Angle**
- Connections: **Welded**

Coating condition: **Poor**
Metal condition: **Good**

Sidewall Stiffeners:

Metal condition: **Poor**
Sidewall stiffener comments: **Broken off and lying on bowl**

Overflow Pipe Inlet:

Type: **Weir box**
Metal condition: **Good**

Fill Pipe (could not inspect with ROV)

Mixer:

N/A

Riser Safety:

N/A

Siphon:

N/A

Field Inspection Report is prepared from the contractor's viewpoint. It contains information the contractor needs to prepare his bid for any repair or recoating. The engineer uses it to prepare the engineering report. Cost estimates are more accurate if the contractor's problems can be anticipated. While prepared from the contractor's viewpoint, the only intended beneficiary is the owner. These reports are completed with diligence, but the accuracy is not guaranteed. The contractor is still advised to visit the site.

500,000 gallon radial arm (Central Tank) located in Naperville, Illinois.

1) The exposed riser foundation is in good condition overall. The coating is in poor condition.

2) Same.

3) The riser drain valve is not functional.

4) The elliptical riser manway is in good condition.

5) The bolted riser manway is in good condition.

6) The riser coating is in fair condition overall.

7) Same.

8) The riser tie rods are attached to welded lugs that are in good condition.

9) Riser tie rods near the bowl are attached to an angle.

10) Typical leg foundation that is in good condition. The coating is in poor condition overall.

11) Same.

12) Anchor bolt with minor steel loss from corrosion.

13) Same.

14) The overflow pipe discharges to a catch basin.

15) The overflow pipe screen is in good condition.

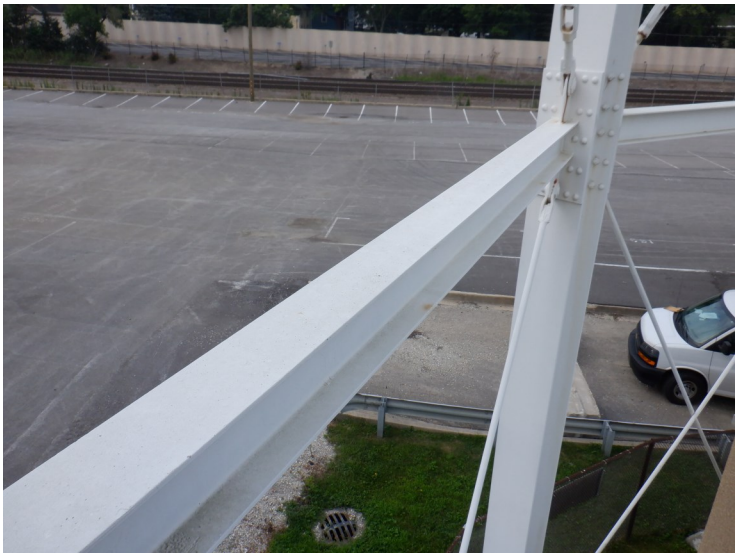
16) Coating failures with rust undercutting on a leg.

17) The leg coating is in fair condition overall.

18) Same.

19) The leg ladder is equipped with a vandal guard that is in good condition.

20) The ladder is in good condition. The ladder is equipped with a fall prevention device.



21) Typical strut section that is in good condition. The coating is in fair condition overall.

22) Spot coating failures and rust bleedthrough at a strut and leg connection.

23) Same.

24) The step-off platform under the bowl is in good condition. There are remains of a hawk nest on the platform.

25) The bowl coating is in fair condition overall. There is mildew growth on the bowl.

26) Same.

27) Spot coating failures on the radial arm bowl stiffeners.

28) The stairs and ladder to the balcony are in good condition.

29) The balcony ladder opening is in good condition. The opening cover is in good condition.

30) The balcony is in good condition. The coating is in poor condition.

31) Same.

32) The balcony handrail is in good condition.

33) Spot coating failures on the handrail.

34) The sidewall manway is in good condition.

35) The sidewall coating is in fair condition overall.

36) Same.

37) The sidewall ladder is in good condition. The ladder is not equipped with a fall prevention device.

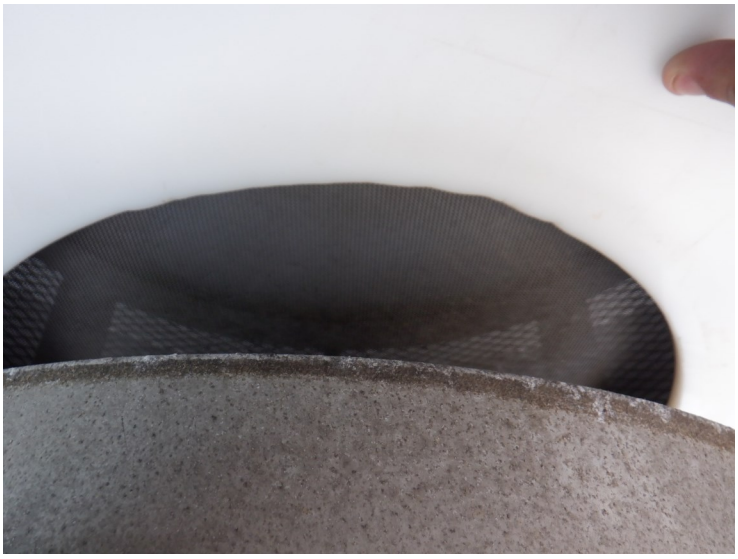
38) The ladder routes up the sidewall and along the roof.

39) Bolted cathodic cover on the roof that is in good condition.

40) The double red aviation light is in good condition.

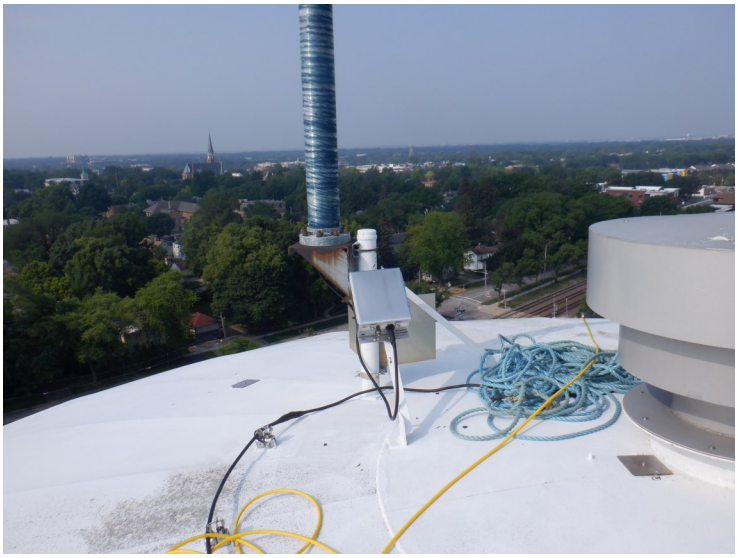
41) The outer vent screen is in good condition.

42) The vent pressure plate is in good condition and was found to be properly aligned during the inspection.



43) The inner vent screen is in good condition.

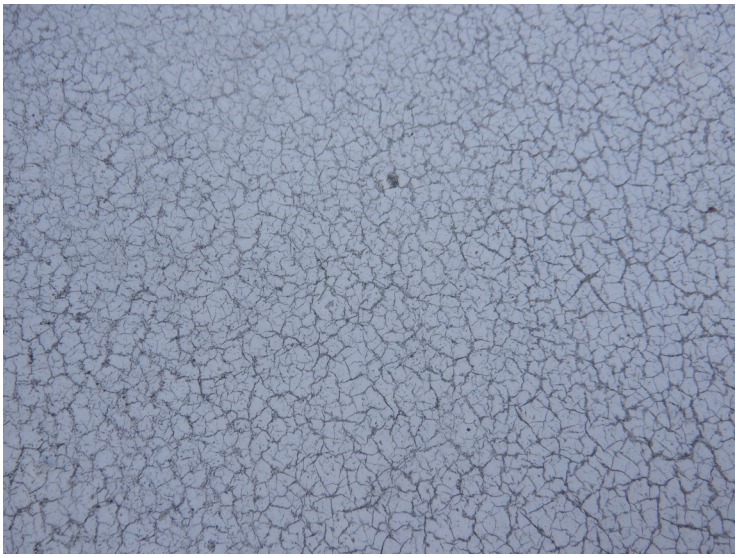
44) There are antennas on the roof.



45) Same.

46) The roof coating is in poor condition overall.

47) Micro-cracking on the exterior roof.



48) Spot coating failure on the roof.

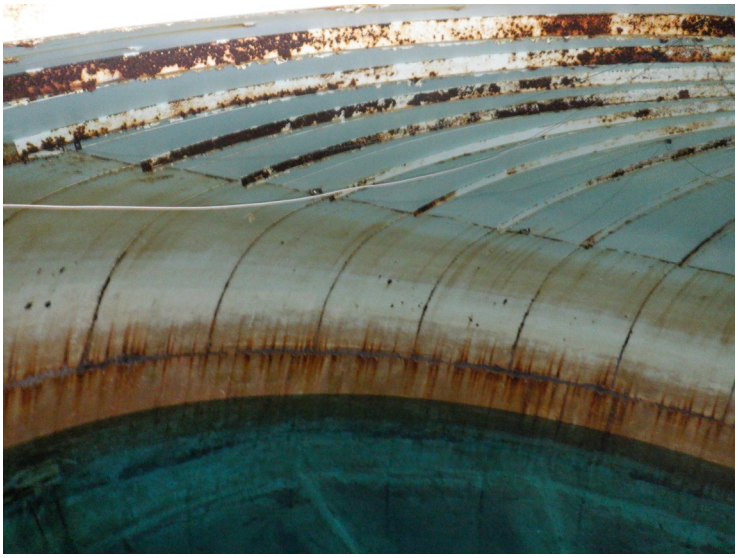
49) Same.

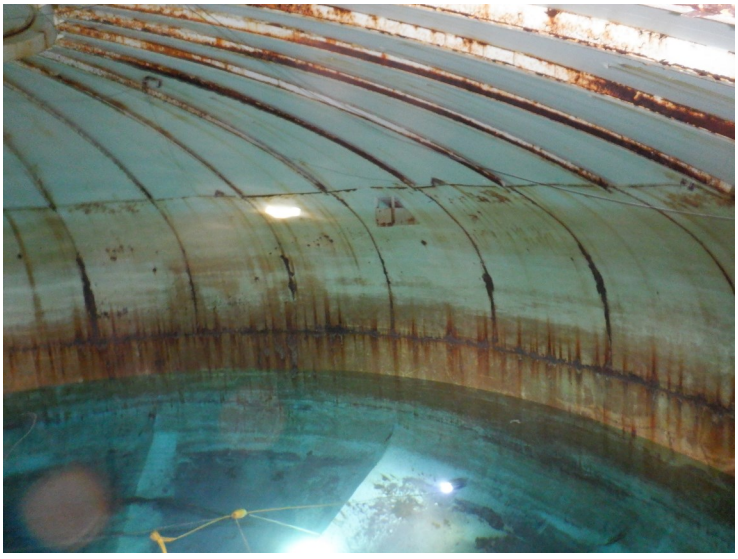
50) The wet interior roof hatch is in good condition. There are spot coating failures on the cover.

51) A gasket was installed on the wet interior hatch by Dixon during the inspection.

52) The wet interior roof coating is in poor condition overall.

53) Coating failures on the roof stiffeners.



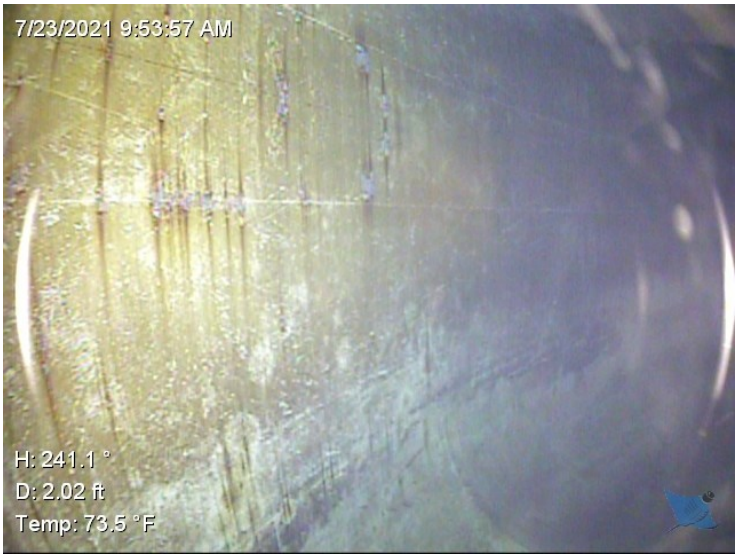


54) Same.

55) Spot coating failures on the wet interior sidewall.

56) Same.

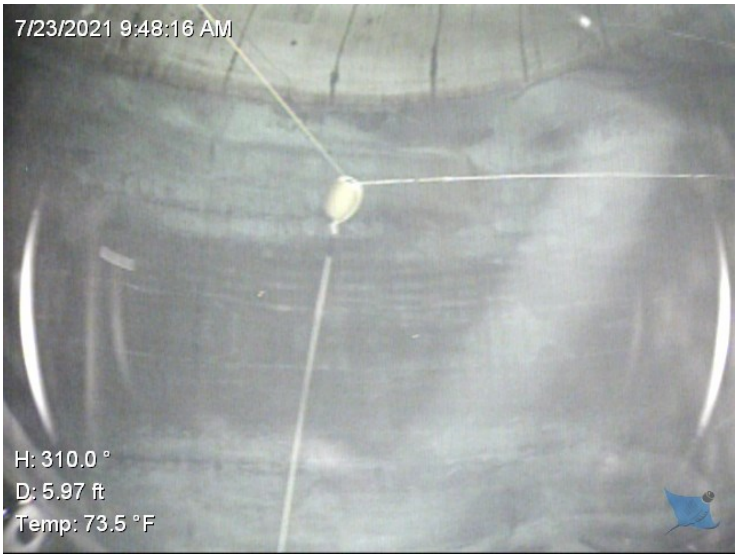
57) Same.



58) Spot coating failures on the sidewall below the water line.

59) Same.

60) The floating ring cathodic protection system appears to be in good condition.



61) Same.

62) The bowl coating is in fair condition overall.

63) Same.

64) The painter's railing has broken from the sidewall and is lying on the bowl.

65) Same.

66) There is no safety grate over or around handrail the riser.

APPENDIX C – Central Elevated Water Tank Study Information

Central Elevated Tank Relocation

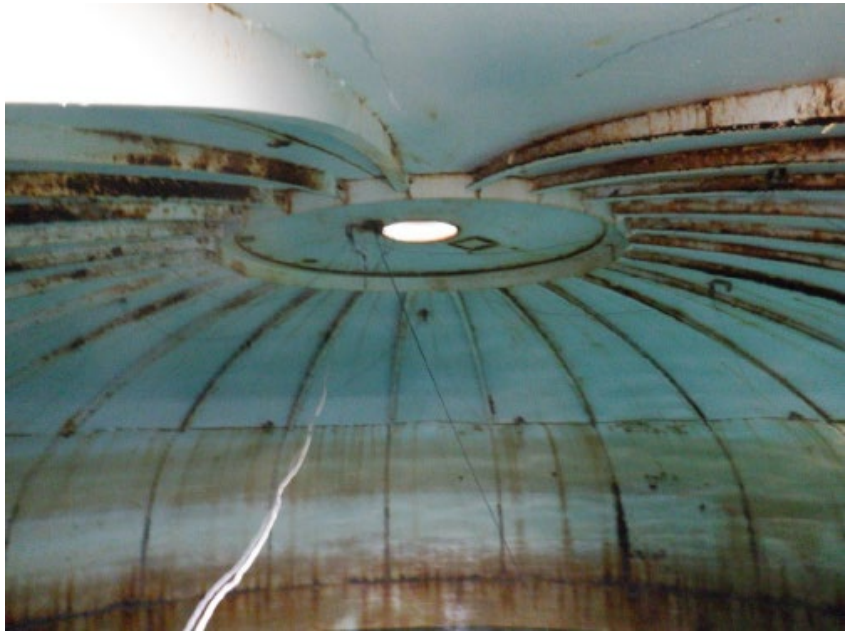
October 11, 2021

Outline

- Purpose and Need
- Discussion of site requirements
- Potential sites to be considered
- Conceptual Cost Estimates and Project Methods
- Time Frame
- Discussion and Questions

Purpose and Need

- Originally constructed in 1937.
- The current tank is in poor condition.
- Tank inspection completed July 23, 2021
  - Repair and recoat interior and exterior
  - Safety improvements to railings, ladders and hatches
  - Replace cathodic protection
  - Remediation of possible soil contamination
  - Existing coatings contain lead, cadmium and chromium
  - Metal loss that cannot be confirmed until coatings are removed
- Estimate cost is $960,000 - $1,000,000



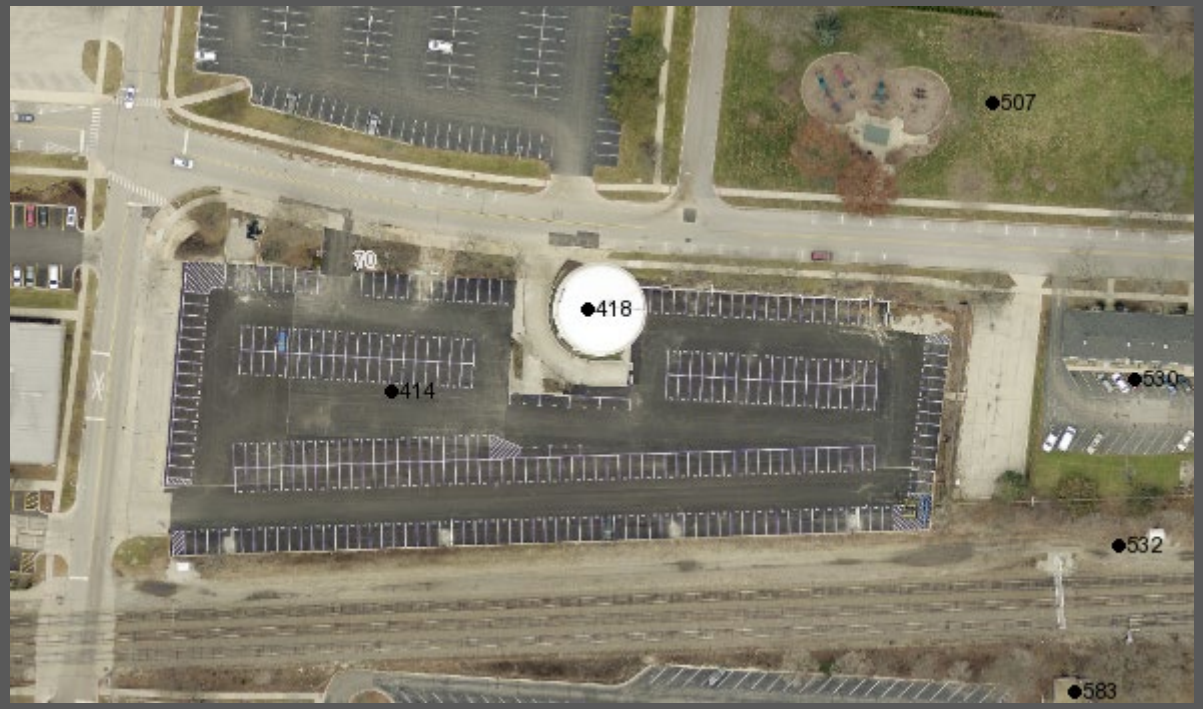
Purpose and Need

Three studies were performed to examine the continuing need for CET:

- 2008-CMT; 2017-Adam; 2021-Jason Xi
- Conclusion – CET can not be eliminated:
  a. CET is important to provide fire flow to adjacent areas.
  b. CET is important to provide stable pressure to adjacent areas.
  c. CET's function can not be replaced by only adjusting water system operation.

Purpose and Need

- Potential re-development of the 5th Avenue Site
  - Existing tank is in an awkward location on the site.
  - Site development opportunities could be improved if the tank were relocated from the middle of the site



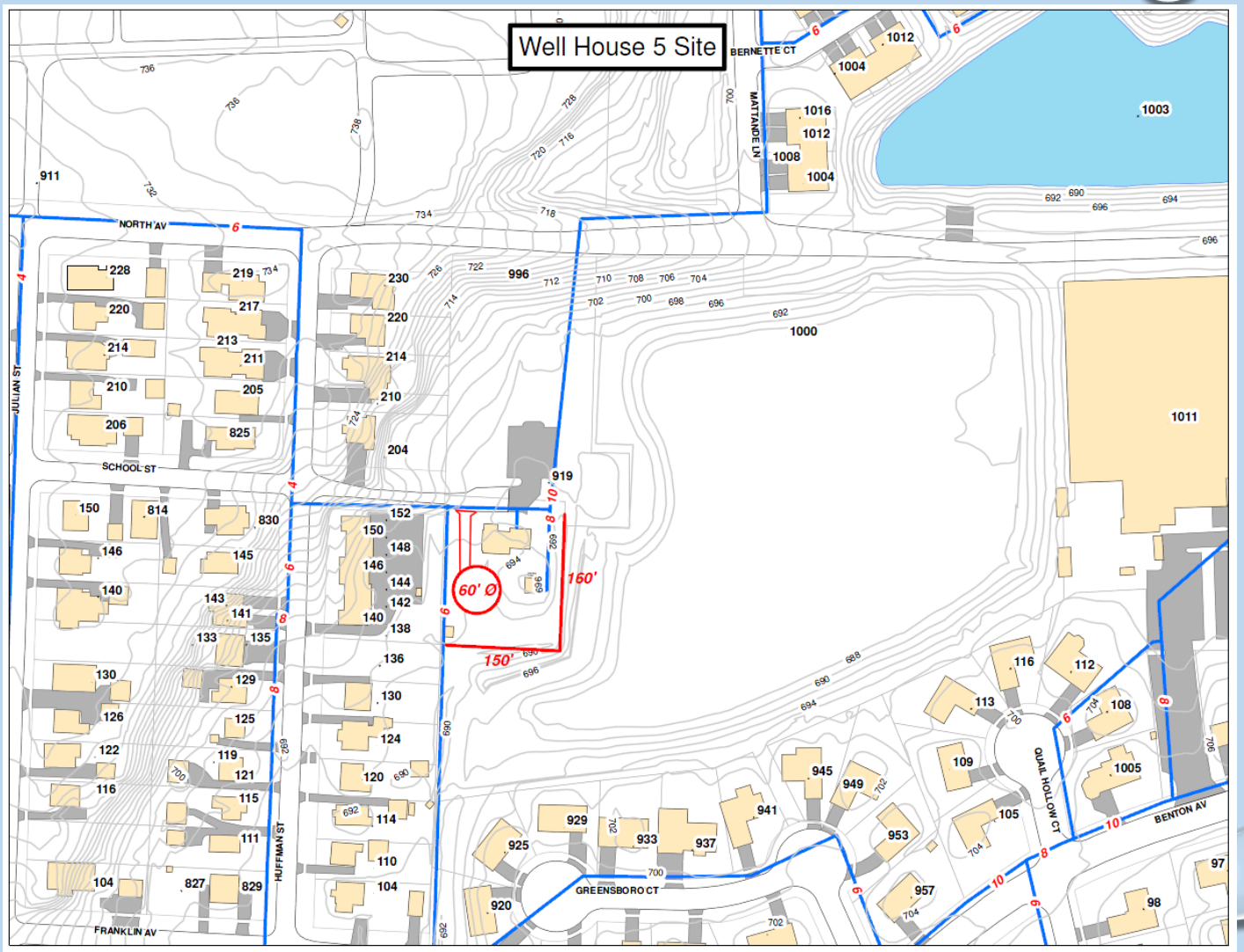
Site Requirements

- Location: Near existing Central Elevated Tank site
- Site Ownership
- High Water Level: 840-842 feet. (Current Ground 724 feet)
- Existing Tank Foot Print (Diameter) : 60 feet
- Height: Approximately 125 feet
- Site footprint: Approximately 120 feet x 120 feet
- Close to electrical power source
- Close to 12” watermain
- Have available storm sewer to empty the tank
- Have access road

POTENTIAL SITES CONSIDERED

Well House 5 site

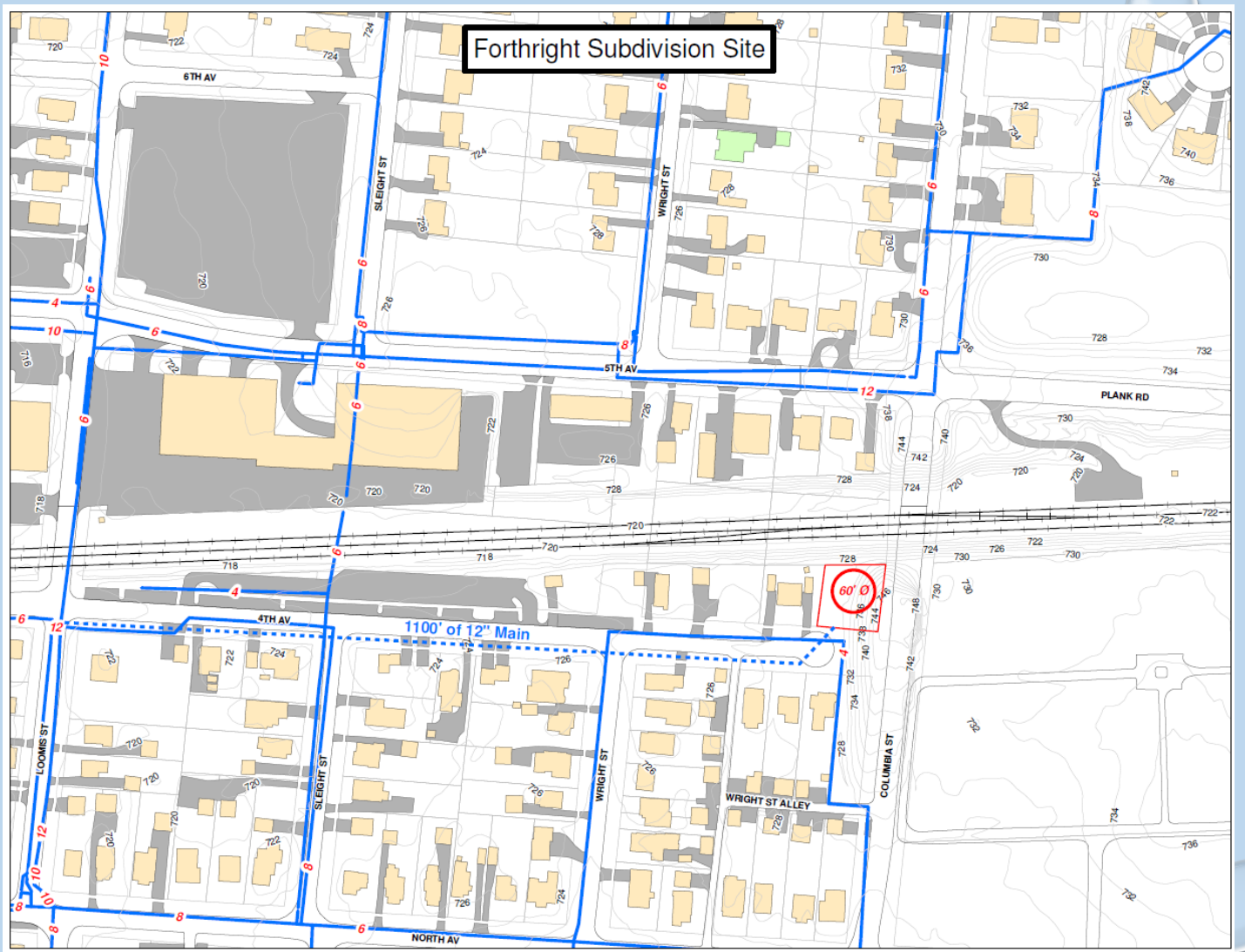
- Site owned by city
- Grade elevation = 694 feet (30 feet lower than Central tank)
- Electrical supply available
- Modeled results show location is not very effective during Max Day and Peak Hour scenarios unless North Ave is upgraded with 2600 feet of 12″ watermain
- The site is relatively at low elevation and needs to construct long watermain extension. Therefore, this site is not recommended.



POTENTIAL SITE CONSIDERED

Forthright subdivision

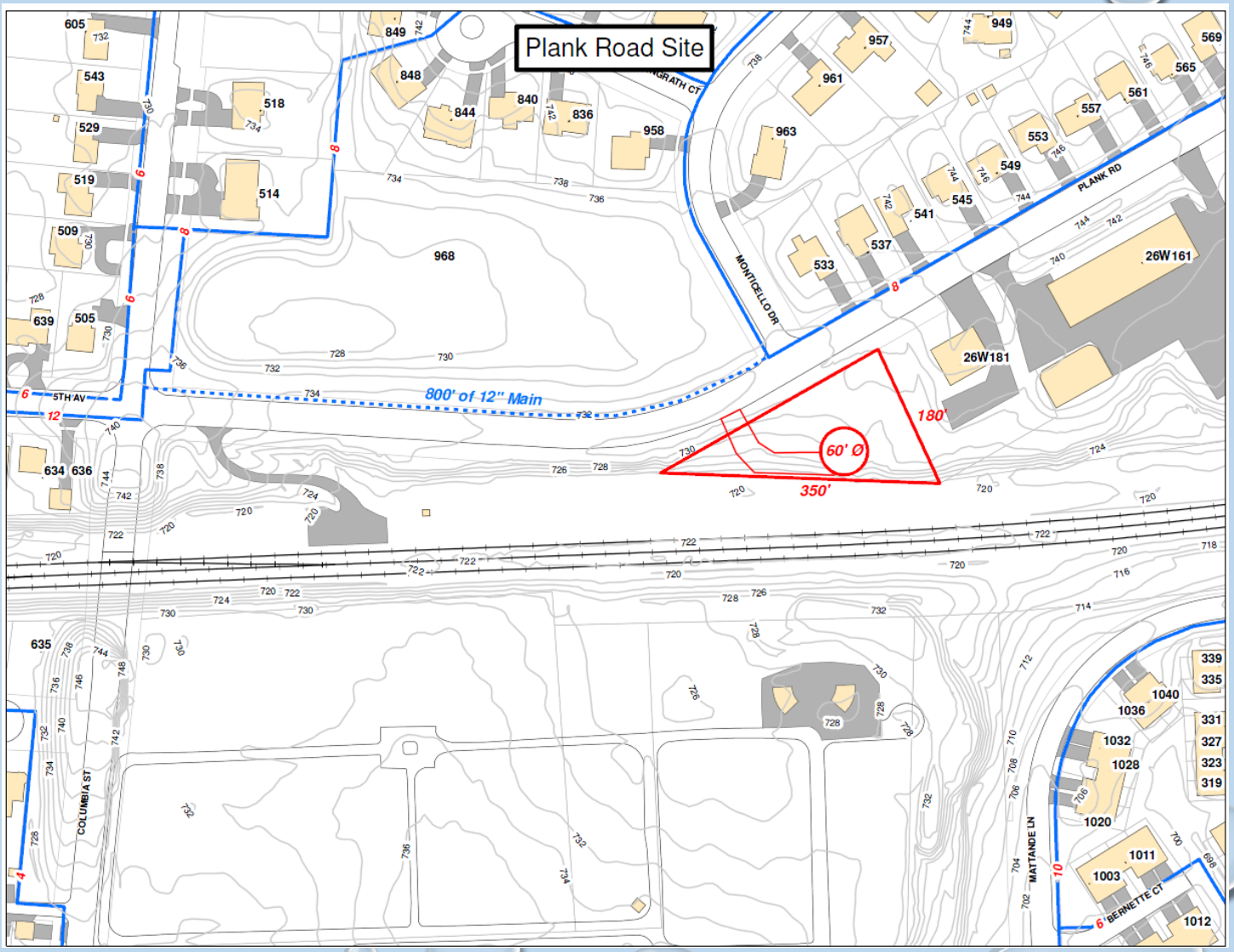
- Site was previously owned by city, but was sold to a private party several years ago
- Grade elevation = 730 feet (6 feet higher than Central tank)
- Electrical duct bank is located in the center of the site
- Modeled results show the site as a good alternative for Central Elevated Tank
- 1,100 feet of 12" watermain is required
- Compared to other options, more new WM is required, and the site is no longer owned by the city. Therefore, this site is not recommended.



POTENTIAL SITE CONSIDERED

Plank Road site

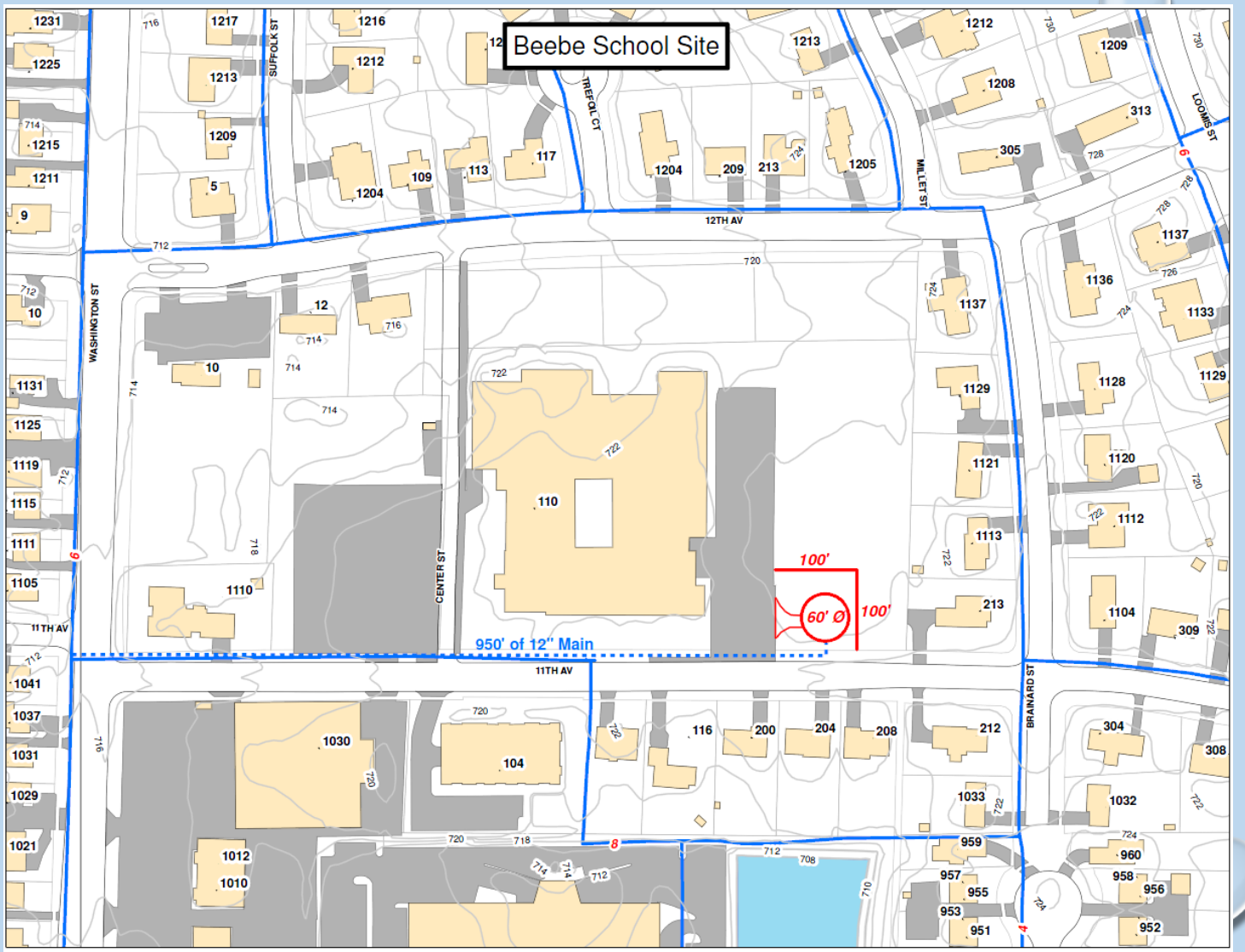
- Site owned by railroad
- Grade elevation = 730 feet (6 feet Higher than Central tank)
- Electrical supply is required
- Modeled results show location is a good alternative for Central elevated tank
- 800 feet of 12″ watermain is required
- Anticipated difficulty to get the property from railroad.



POTENTIAL SITE CONSIDERED

Beebe School

- Site owned by Naperville school District
- Grade elevation = 722 feet (2 feet lower than Central tank)
- Electrical supply is required
- Modeled results show location is effective providing fire flow and peak hour pressure for area north of downtown
- 950 feet of 12″ watermain is required
- Anticipated difficulty to get property from school district.



POTENTIAL SITE CONSIDERED

Relocate CET on the same site

- Relocate 0.5 MG Elevated tank on the same site
- 204 LF 12″ WM for connection
- Hydraulic performance will be the same as for existing tank
- The approximate site size 120′x120′ (measured from edge of existing pavement).
- Ground Elev.: 724 feet; 121 feet tall.

Conceptual Cost Estimates and Project Method

Conceptual Costs Estimates

ITEM	INITIAL COSTS	OPERATIONAL COSTS	OPERATIONAL COMPLEXITY	RELIABILITY	MAINTENANCE COSTS
BOOSTER STATION WITH RESERVOIR	$2,784,030	HIGH	HIGH	OK	HIGH
RELOCATE CET ONSITE	$2,679,058	LOW	LOW	HIGH	LOW
RELOCATE CET TO PLANK RD *	$3,064,308	LOW	LOW	HIGH	LOW

* Land acquisition costs are not included.

RECOMMENDATIONS

- Recommend to demolish existing central elevated water tower.
- Construct a same size of new water tower onsite.

Time Frame and Other Items

Time Frame

- Existing tank in poor condition
- Development of Existing Site?
- Tank replacement currently budgeted for 2023

Other Items

Questions & Discussion