FEASIBILITY STUDY

FOR

DOWNTOWN RECONSTRUCTION, PHASE 4 PROJECT

CITY OF WACONIA, MN

AUGUST 2025

PREPARED BY:
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August 12, 2025

City of Waconia
Attn: Shane Fineran
201 South Vine Street
Waconia, MN 55387

RE: Downtown Reconstruction, Phase 4 Project

Honorable Mayor and City Council Members:

Pursuant to your request we have prepared a Feasibility Study for project components to be included in the Downtown Reconstruction, Phase 4 Project. The project location and the various proposed project components include the following:

- Street and utility reconstruction of 1st Street from Olive Street to Spruce Street, Elm Street from 1st Street to 2nd Street, and 2nd Street from Elm Street to Pine Street consisting of the following items:
  - Complete street reconstruction
  - Storm sewer replacement/expansion
  - Sidewalk replacement/widening
  - Sanitary sewer replacement
  - Water system replacement/upsizing and addition of cathodic protection
  - Irrigation system expansion
- Vacation of Pine Street from 1st Street to 2nd Street.
- Parking lot improvement in the public and private parking areas south of 1st Street and west of Elm Street (across the alley from the proposed apartment building project).
- Lighting improvements in City Square Park.

This report includes maps and drawings indicating the proposed improvements and a proposed method of financing and funding. I am available to discuss this report and this proposed project at your convenience.

Respectfully Submitted,
Bolton & Menk, Inc.

Jake S. Saulsbury

Jake S. Saulsbury, P.E.

Cc: Jon Haukaas, Public Services Director

Enclosure

FEASIBILITY STUDY

FOR

DOWNTOWN RECONSTRUCTION, PHASE 4 PROJECT

CITY OF WACONIA, MINNESOTA

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Jake S. Saulsbury, P.E.

Date: August 12, 2025 Registration No. 42713

TABLE OF CONTENTS

FIGURES & TABLES

SUMMARY & CONCLUSIONS

A. STUDY SCOPE

The proposed infrastructure improvements aim to establish a sustainable system of roads, utilities, and pedestrian facilities, enhancing the City with improved water quality, greater connectivity among residents, safer travel for both vehicles and pedestrians, and an overall healthier quality of life. This Feasibility Study evaluates the viability of the proposed improvements, provides associated project cost estimates, and recommends an approach for financing and funding the project. The project area, outlined in Figure 1.1 in Appendix A, includes the reconstruction of 1st Street (from Olive Street to Spruce Street), Elm Street (from 1st Street to 2nd Street), and 2nd Street (from Elm Street to Pine Street), as well as the removal of Pine Street (from 1st Street to 2nd Street). Individual project components are described below:

1. Removal and reconstruction of the 66-foot road right-of-way of 1st Street, Elm Street, and 2nd Street including streets, curb and gutter, and sidewalks.
2. Reconstruction of 1st Street and Elm Street to match the City's truck route street section.
3. Reconstruction of 2nd Street to match the City's residential street section.
4. Removal and vacation of Pine Street (between 1st and 2nd Street) and associated road right-of-way, including the removal of the sidewalk on the west side of the street from 1st Street for approximately 180 linear feet, and the entire sidewalk on the east side of the street.
5. Construction of curb and gutter, and sidewalks as they relate to the vacation of Pine Street.
6. Replacement of the sanitary sewer system, including service laterals.
7. Replacement and upsizing of the water system, including replacement of hydrants, gate valves, and services.
8. Expansion of the irrigation system.
9. Replacement and expansion of the existing storm sewer system.
10. Replacement of street lighting along 1st Street, Elm Street, 2nd Street, and within City Square Park.
11. Improvements to off-street parking west of Elm Street.

The contents of this Feasibility Study and the widths of the roadway, parking areas, and sidewalks contained herein reflect the direction of City staff.

B. Estimated Costs, Funding, and Financing

Estimated project costs for each of the project components are provided in Appendix B. The project costs are summarized as follows:

1.) Street Reconstruction	$4,879,160
2.) Parking Lot Reconstruction	$308,050
3.) Utility Reconstruction	$1,691,120
Total Project Cost -	**$6,878,330**

The proposed financing for the Downtown Reconstruction, Phase 4 Project is recommended to be achieved through the sale of a combined bond, which includes a Chapter 429 General Obligation Bond, a Chapter 115 Sanitary Sewer Revenue Bond, and a Chapter 444 Water and Stormwater Revenue Bond. The Chapter 429 Bond will fund street and storm sewer reconstruction, while the Chapter 115 Bond will cover sanitary sewer improvements. The Chapter 444 Bond will support watermain reconstruction and various drainage improvements. Additionally, PIR Capital Improvement funds will be allocated for sidewalk upgrades. This financing approach will be further reviewed in consultation with the Finance Director and the City's Financial Consultant.

C. Overall Feasibility and Cost Effectiveness

All improvements outlined in this report are technically feasible. This study examines deficiencies in existing infrastructure, including deteriorating street pavement, storm sewers, watermains, sanitary sewers, irrigation systems, sidewalks, parking, and lighting. These upgrades are essential to ensuring safe and reliable infrastructure and represent cost-effective solutions for addressing these needs. Comprehensive cost estimates for all project components have been prepared and can be found in Appendix B.

SECTION 1 - INTRODUCTION

A. IMPETUS

This report is prepared in response to a request from the City of Waconia to assess the feasibility of planned infrastructure improvements for the coming year. The proposed project location for the Downtown Reconstruction, Phase 4 Project is illustrated in Figure 1.1 in Appendix A.

B. REPORT ORGANIZATION

This report is structured to provide a clear and organized approach to addressing the various projects by categorizing the pertinent information into the following four sections:

- Section 1 - Introduction
- Section 2 - Street and Utility Reconstruction
- Section 3 - Parking Lot Improvements
- Section 4 - Financing and Funding

SECTION 2 - STREET AND UTILITY RECONSTRUCTION

A. STREET IMPROVEMENTS

Figure 2.1 presents the street layout option for 1st Street between Olive Street and Spruce Street and the proposed improvements on Elm Street and 2nd Street. The project involves removing the existing road sections on each of the highlighted streets and reconstructing them to meet current City standards, including replacing existing curb and gutter, and sidewalk sections. The City has requested a review of the options outlined below:

1. 1st Street (Olive Street to Pine Street)

   The current street section for 1st Street from Olive Street to Pine Street is very difficult to maneuver, particularly for trucks. To accommodate larger vehicles, increasing the lane widths is recommended. One potential approach involves adjusting the angled parking from approximately 60 degrees to 45 degrees. However, this adjustment would eliminate approximately 13 parking spaces. Given the City's strong preference for preserving parking, this option is not pursued further within this Feasibility Study. Instead, this report explores maintaining the existing 60-degree angled parking while widening the lane widths as much as possible. The proposed revised street section between Olive Street and Pine Street includes a 51.5-foot-wide street with curb and gutter, and sidewalks ranging from 7.5 to 9 feet (sidewalk widths will be maximized, though may be narrower in some areas due to the existing building face locations within the right-of-way). The through lanes along 1st Street are proposed at 12.5 feet wide. Figure 2.1A shows the recommended street and parking dimensions between Olive Street and Elm Street, and Figure 2.1B shows the recommended street and parking dimensions between Elm Street and Pine Street. (Note: The proposed revision to the street section would result in a street center line that has an approximate 2-foot offset across Olive Street, as compared to the recently constructed street section to the west, and a 2.5-foot offset to the street section through Elm Street; this offset through Elm Street is due to the varying sidewalk limits and building faces that we will be matching.)

   ADA accessible parking stall locations will be further evaluated during final design after receiving public input. It is assumed the stall locations will approximately match the current condition. Additionally, the mid-block pedestrian crossing

connecting the church to the school will be evaluated during final design to determine the best location and to possibly modify it to a 90-degree crossing.

2. 1st Street (Pine Street to Spruce Street)

   The proposed street section for 1st Street between Pine Street and Spruce Street features a 48-foot-wide street with curb and gutter. This street width closely matches the existing street section and accommodates parallel parking on both the north and south sides of 1st Street. The existing concrete sidewalk on the north side – adjacent to City Square Park – is wider than necessary. It is recommended that the sidewalk along the park be redesigned to include a 6-foot sidewalk and a 5-foot boulevard with street trees. This configuration would be mirrored on the south side of the street. Introducing boulevards on both sides will create a more cohesive streetscape while also reducing impervious areas. Figure 2.1C shows the recommended street and parking dimensions between Pine Street and Spruce Street. (Note: The proposed revision to the street section results in an 8-foot offset through the Pine Street intersection, which exists currently but is less apparent due to the lack of striping in the existing roadway. This offset will be de-emphasized with the proposed roadway by the addition of curb and gutter on the south side due to the removal of Pine Street. The curb and gutter will help guide vehicles through the intersection with the taper.)

3. Elm Street (1st Street to 2nd Street)

   The proposed street section for Elm Street from 1st Street to 2nd Street consists of a 48-foot-wide street with curb and gutter. While this design narrows the existing roadway by approximately 3 feet, it allows for wider sidewalks on both sides and travel lane widths remain more than adequate at approximately 14.5 feet. Wider sidewalks are needed along this block due to the desire to include lighting and maintain sidewalks that are ADA compliant. The sidewalks would be expanded to 9 feet in width – an increase of roughly 2 feet on each side. Parallel parking would be maintained along both sides of the street.

4. 2nd Street (Elm Street to Pine Street)

   The proposed street section for 2nd Street features a 42-foot-wide street with curb and gutter, increasing the existing street width by approximately 2 feet. This width matches the block to the west that was part of the Phase 3 project. Parallel parking

would be maintained on both sides of the street, with 12-foot-wide travel lanes. An 8-foot sidewalk is proposed along the north side of the street and will remain 1 foot off the property line. This design is consistent with the downtown standard of a wider sidewalk without a grass boulevard. On the south side, the design includes a 6-foot sidewalk accompanied by a 5-foot boulevard, keeping consistent with the proposed section on First Street between Pine Street and Spruce Street.

5. Pine Street Removal (1st Street to 2nd Street)

   Pine Street is being proposed to be completely removed, including all curb and gutter due to an agreement in place with St. Joseph Church. The street has already been vacated and is frequently closed off during school hours and for special events. The need for additional vacation work pertaining to Pine Street and the adjacent alley to the west will be reviewed during final design. The existing sidewalks will be removed from 1st Street to the intersecting sidewalk at the school on the west side, and completely on the east side. This will allow accessibility and access for the school to continue. It is intended to keep the school's parking lot curb and gutter in place during the sidewalk removal on the west side so there are no impacts to the parking lot. At 1st Street, the curb and gutter and sidewalk will continue along the south side of 1st Street to create a 3-way stop intersection. Consideration should be given to removing the stop signs on 1st Street and giving east-west traffic the right- of-way. At 2nd Street, the curb and gutter will continue along the north side, creating a 3-way stop intersection. Similarly to 1st Street, consideration should be given to removing the stop signs on 2nd Street. The sidewalk along 2nd Street will stop on the west side of Pine Street. A pedestrian crossing will be provided on the south side of the intersection to provide an east/west pedestrian crossing, and on the west side of the intersection to provide a north/south pedestrian crossing. There will no longer be a pedestrian crossing to the east, on the north side of 2nd Street, due to the removal of the existing sidewalk on the east side of Pine Street.

6. Typical Street Sections

   Truck Route Section - Construction of a standard truck route section includes three lifts of bituminous pavement (6.5"), aggregate base (12.0"), and select granular borrow (12.0") underlain by geotextile fabric. The standard truck route street section will be constructed on top of a compacted subgrade and contain drain tile behind the curb. The typical section for the City standard truck route is shown in

Figure 2.2. Additional materials above the residential street section are considered extra section items and are therefore not considered to be assessable.

Residential Street Section - Construction of a residential street section includes two lifts of bituminous pavement (4.5”), aggregate base (8.0”), and select granular borrow (12.0”) underlain by geotextile fabric. The standard residential street section will be constructed on top of a compacted subgrade and contain drain tile behind the curb. The typical section for the City standard residential street is also shown in Figure 2.2.

Soils Report - The results of the soils investigation indicate poor soils could be encountered on 1st Street from Olive Street to Pine Street. To provide a suitable subgrade, a layer of stabilizing aggregate will likely be needed in these areas. Additionally, silty soils that cannot be compacted to project requirements may need to be removed and replaced with suitable compacted engineered fill.

7. Construction Staging

The staging for construction will generally fall into three construction stages. The first stage of construction includes all three blocks of 1st Street (between Olive Street and Spruce Street) with a temporary access connection to Pine Street from the southeast corner of the school parking lot. The second stage includes Elm Street from 1st Street to 2nd Street, 2nd Street from Elm Street to Pine Street, and the reconstruction of the off-street parking. The third stage includes the removal of Pine Street. Staging is subject to change based on findings during final design and/or after the project is bid and coordination occurs with the selected contractor. Construction staging may also need adjusting to provide adequate parking, pedestrian access, and uninterrupted business access. The stages will continually change as the work progresses from utilities to street construction and will be adjusted as necessary. Figure 2.3 depicts the recommended construction staging for the Phase 4 project.

B. SIDEWALK IMPROVEMENTS

The proposed sidewalk reconstruction locations are shown on Figure 2.1. The proposed sidewalk on the north and south sides of 1st Street between Olive Street and Pine Street will approximately match the existing sidewalk widths of 7.5 to 9 feet (widths vary based on

building locations). At the existing intersection of 1st Street and Pine Street, the pedestrian ramps will be removed on the side of the intersection where Pine Street will be removed, and a proposed sidewalk will be carried across the intersection to provide a pedestrian friendly condition following street removal. The proposed sidewalk on 1st Street between Pine Street and Spruce Street will be 6 feet with a 5-foot boulevard on both sides of the street. The sidewalk adjacent to City Square Park encroaches into the right-of-way by 4.5 feet. However, this matches the existing condition. Elm Street sidewalks will be constructed to a width of 9 feet on both sides of the road which increases the width by approximately 2 feet. The sidewalk on the north side of 2nd Street will be reconstructed to a width of 8 feet and will remain approximately 1 foot off the property line. The sidewalk on the south side of 2nd Street will be reconstructed to a width of 6 feet with a 5-foot boulevard, this results in an increase of approximately 2 feet in width. All existing and proposed pedestrian ramps will be constructed to Americans with Disabilities Act (ADA) standards to provide adequate access to all users.

The total estimated cost of the sidewalk improvements is **$572,410** which is not considered an assessable cost. It should be noted that the City has received an estimated $41,500 from the developer of the apartment complex on the corner of 2nd Street and Elm Street for the proposed sidewalk adjacent to the building on Elm Street. This cost offset along with financing and funding for the entire project is discussed in Section 4.

C. STREET AND PARK LIGHTING

Street lighting improvements are recommended for all streets within this project phase (except for Pine Street). The City prefers to locate streetlights behind the sidewalk if possible. Often, light poles located behind the sidewalk require easements due to being located outside of the right-of-way. Light poles that are assumed to require an easement are shown on Figure 2.4 in red for easy identification. Figure 2.4 depicts the locations of the recommended street lighting as well as proposed banner pole locations. The style of lighting fixtures and the layout of the lighting will approximately match the previous three phases of the Downtown Reconstruction project. Street lighting is not proposed along 1st Street adjacent to City Square Park. Instead, the City prefers to upgrade all the lighting within the park which would negate the need for additional street lighting. Street lighting is a non-assessable cost.

The lighting within City Square Park is in need of an upgrade. It is recommended that a

photometric study be performed to help determine how effective the existing pole locations are at lighting the park. For the purposes of this Feasibility Study, costs are included for replacing all the existing lights/poles at or near their current locations with City standard lighting. New wiring was installed within the park in 2024 and can be utilized to provide electrical service to all new light poles in the park. A lump sum estimate for City Square Park lighting replacements has been included in the cost estimate as a non-assessable cost. However, quantities and costs may change based on the recommendations of a photometric study.

D. STORM SEWER IMPROVEMENTS

The existing storm sewer systems on 1st Street, Elm Street, and 2nd Street will be removed and reconstructed as shown on Figure 2.5. A weir structure will be installed on Elm Street to divert stormwater runoff on Elm Street into the underground treatment system, constructed during Phase 3, resulting in the Elm Street storm main experiencing a decrease in pipe surcharging. The existing drainage patterns will primarily be maintained. Existing storm structures are anticipated to experience surcharging during 5-yr rainfall events.

A reduction of impervious area is proposed with this phase of construction with the removal of Pine Street and associated sidewalk and removing some impervious areas along City Square Park. Per Carver County Watershed Management Organization, a project's stormwater treatment requirement can be waived with a cumulative decrease in impervious area of 10% or more. The percentage impervious area proposed for removal within Phase 4 is 10.1**%.**

Municipal projects are also required to comply with the Minnesota Pollution Control Agency's (MPCA) Stormwater requirements. The MPCA Municipal stormwater permit (MS4 General Permit) requires that the water quality volume from new and fully reconstructed impervious surfaces be treated where "the water quality volume is calculated as the larger of one (1) inch times the new impervious surface or one-half (0.5) inch times the sum of the new and fully reconstructed impervious surface". The permit states that if there is not adequate area for treatment within the site (and reasonable attempts have been made to obtain additional space and/or permission to treat the stormwater with no success), then owners of the construction activity must maximize the treatment of the water quality volume as much as possible. The Phase 4 reconstruction project will maximize the treatment of the water quality volume as much as possible by diverting a portion of the stormwater flow to the underground treatment structure that was installed in Phase 3. This structure is

located just west of Elm Street, between 1st Street and 2nd Street. Additionally, it should be noted that the Phase 4 reconstruction project is located at a topographical high point and much of the stormwater runoff is already captured and treated prior to discharging into the lake. For these reasons, additional stormwater treatment is not proposed as part of this Feasibility Study.

The total estimated cost for the proposed street and storm sewer reconstruction improvements (not including sidewalk and off-street parking lot costs) is **$4,306,750**. Of this amount **$641,560** is considered assessable. Itemized cost estimates are provided in Appendix B of this report. Financing and funding for the entire project is discussed in Section 4.

E. SANITARY SEWER IMPROVEMENTS

The sanitary sewer improvements consist of reconstruction of sewer main, manholes, and sewer services on 1st Street and 2nd Street as shown on Figure 2.6. The sewer reconstruction consists of replacing the old and deteriorated, clay sewer system with an 8-inch PVC sewer main with sewer services from the main to the property line. Sanitary manholes will be reconstructed, and new sewer will be connected to existing pipes. Sewer services will be added for properties 18 and 27B/28 (refer to Figure 4.1 for the location of these properties) for possible future redevelopment.

The total estimated cost for all sanitary sewer improvements is **$451,450**. Of this amount, **$141,420** is considered assessable. Itemized cost estimates are provided in Appendix B. Financing and funding are discussed in Section 4.

F. WATERMAIN IMPROVEMENTS

Figure 2.7 indicates the proposed watermain improvements. The existing watermain consists of 6-inch mains on 1st Street and 2nd Street, and an 8-inch main on Elm Street. There is a parallel 8-inch existing water main that connects an old pump station (located within City Square Park) with the old water treatment plant (located in the alley off Elm Street). These facilities have been abandoned, and it is recommended that the associated watermain be removed during construction to prevent any accidental connections to the abandoned pipe in the future.

The existing system is aging and is susceptible to breakages and leaks. Breakages and leaks result in high maintenance and repair costs, service disruptions, and saturation of the street subgrade. Therefore, the proposed improvements include removing and replacing the entire

watermain system within the street right-of-way and upsizing it to a 10-inch main on 1st Street and an 8-inch main on 2nd Street. The 8-inch main on Elm Street will be replaced with the same size main. Replacement includes the mainline, gate valves, hydrants, and services. The new watermain will be stubbed out to the east of the intersections included in Phase 4 improvements (both 1st Street and Spruce Street and 2nd Street and Pine Street) and connected to the existing pipes so the intersections will not need to be reconstructed again with future adjacent projects.

Water services will be constructed into buildings that are adjacent to the road. This will involve connecting inside the buildings and extra work to bore through the foundation walls and make any necessary adjustments to interior connections. Curb stops will be constructed within the City right-of-way for future operation and maintenance needs as standard practice. Water services will be added for properties 18 and 27B/28 (refer to Figure 4.1 for the location of these properties) for possible future redevelopment.

The proposed pipe material is polyvinyl chloride pipe (PVC). This pipe is more resistant to corrosion from the in-place clay soils. Previous geotechnical evaluations on adjacent projects included soil resistivity testing to determine how corrosive the in-place soils are. These tests resulted in resistivity values showing the in-place soil to be moderately corrosive. To protect the watermain against corrosion, the following steps will be taken during construction:

- All hydrants and gate valves will be manufactured and secured utilizing stainless steel bolts.
- All fittings will be coated with fusion bonded epoxy.
- All ductile iron pipe, fittings, valves, valve boxes, and hydrant risers will be wrapped in polyethylene encasement material and provided with cathodic protection.

The total estimated cost for all the watermain improvements is **$1,239,670**. Of this amount, **$249,490** is considered assessable. Itemized cost estimates are provided in Appendix B. Financing and funding are discussed in Section 4.

G. IRRIGATION SYSTEM IMPROVEMENTS

Figure 2.8 indicates the proposed irrigation system improvements. The irrigation system improvements will include installing 1-inch mains along both sides of 1st Street (from Olive Street to the east side of Spruce Street) and Elm Street and installing a 1-inch main on the north side of 2nd Street. The 1-inch mains will be used to water plantings hanging from the light poles. The irrigation system is planned to be switched over to a stormwater reuse system

when the stormwater treatment system is constructed. The irrigation system improvements are considered a non-assessable cost and are included in the watermain improvements cost estimate.

SECTION 3 – PARKING LOT IMPROVEMENTS

Off-street parking lot improvements were considered as part of this Feasibility Study. Figure 3.1 illustrates the recommended layout for additional parking located on the west side of Elm Street between 1st Street and 2nd Streets. This site would require coordination with the property owners and reservation of parking stalls for tenants. With the preliminary layout shown in Figure 3.1, the proposed parking lot would create a paved and striped lot with up to 35 parking stalls in the downtown area. The parking lot would be constructed with a typical section of 2 lifts of bituminous pavement totaling 4.5-inches, an aggregate base depth of 9-inches, and geotextile fabric. The total estimated cost for the proposed offsite parking lot improvements is **$308,050** and is considered a non-assessable cost.

An itemized cost estimate is provided in Appendix B. Financing and funding are discussed in Section 4.

SECTION 4 - FINANCING / FUNDING

A. FINANCING

The proposed method of financing for the Downtown Reconstruction, Phase 4 Project is through the sale of a combined bond consisting of a Chapter 429 General Obligation Bond, a Chapter 115 Sanitary Sewer Revenue Bond, and a Chapter 444 Water and Stormwater Revenue Bond. The Chapter 429 Bond would be used for the street/storm sewer reconstruction. The Chapter 115 Bond would be used for the sanitary sewer reconstruction. The Chapter 444 Bond would be used for the watermain reconstruction and miscellaneous drainage improvements. PIR Capital Improvement cash would be used for the sidewalk improvements.

It is recommended that the City discuss financing options in more detail with their Financial Consultant. Combining the financing of this project with other possible planned improvements or planned equipment purchases should also be evaluated and discussed.

The total estimated project cost is **$6,878,330**. The detailed cost estimates for individual project components are in Appendix B. The estimates consist of the estimated construction cost based on recent construction bid prices, a 10% allowance for contingencies, and a 30% allowance for bidding, surveying, engineering, property owner coordination, building inspections, construction staking, construction administration, and inspection costs.

B. FUNDING

The different funding sources proposed to be used to service the bond debt include the following:

- Special assessments
- New special debt levy
- Stormwater funds
- Sewer funds
- Water funds
- PIR funds

The City has funds available in the various fund accounts to service the debt. And if necessary, the City also has funds available in the general fund to service the debt.

The following sections provide a cost apportionment and funding source summary for the various project components.

C. STREET / STORM / SIDEWALK RECONSTRUCTION

The total project costs are apportioned as follows:

Item	Cost / FF	City Cost or Assessment	Recommended Funding Source
Sidewalk Construction Cost			
Sidewalk Construction Cost	$572,410	City	
Total Sidewalk Construction Cost:	***$572,410***		
Street / Storm Reconstruction Calculations			
Extra Section Depth / Width Cost / Parking Lot	$3,182,520	City	
Street / Storm Reconstruction Cost	$1,432,280	Assessment	
Total Street / Storm Reconstruction Cost:	***$4,614,800***		
Assessment Calculations			
Standard Street Section Cost	$1,432,280		
City Contribution (50%)	$716,140	City	New Special Debt Levy
Assessable Eligible Portion (50%)	$716,140		
Total Front Footage (Feet)	3355.5		
Corner Lot Front Footage (Feet)	868.5		
Assessment Basis Front Footage (Feet)	2487.0		
Assessable Cost Per Front Foot	$287.95		
Non-Assessable Front Footage (Feet)	259.0		
Non-Assessable Cost	$74,580	City	New Special Debt Levy
City Front Footage (Feet)	243.5		
City Front Footage Cost	$70,120		
Assessment Front Footage (Feet)	2228.0		
Total Assessed Amount	$641,560	Assessment	Special Assessments
Total City Cost:	***$4,545,650***		
Total Assessed Amount:	***$641,560***		
Total Project Cost:	***$5,187,210***		

D. SANITARY SEWER

The sanitary sewer proposed for reconstruction services commercial and residential properties. Commercial and multi-family properties are converted to equivalent residential units (ERUs) based on water usage. Three properties exceed the normal water usage for a typical single-family home. These properties and their ERU calculations are as follows:

Property Owner	Property Address	*Water Usage (gal)	Daily Water Usage (gal)	Daily Usage / ERU (gal)	**ERUs
MADSEN HOLDINGS LLC	16 1ST ST W	925,000	1,214	275	4.0
LIFT MANAGEMENT SERVICES	37 1ST ST W	380,000	499	275	1.5
BURR OAKS LLC	9 1ST ST W	440,000	577	275	2.0

*Water usage is from approximately 2 years of consumption data.

**ERUs are rounded down to the nearest 0.5 units with a minimum of 1.0 unit.

On previous projects the portion of the sanitary sewer cost that was assessed consisted of 50 percent of the typical project sanitary sewer cost. Costs related to looping, soil corrections, bypass pumping, and vibration monitoring are isolated as City costs and not included in the assessment calculations.

Also, the unique project area should be considered by including non-assessable units. To remain fair and equitable it is recommended to include 10 non-assessable units to account for the large amount of frontage of the Church of St. Joseph parcels and the City Park parcel that do not contain sewer and water services. With the addition of these non-assessable units, this project contains 34.5 sewer units, 24.5 of which are assessable.

The total project costs for the sanitary sewer component of the proposed project are apportioned as follows:

Item	Cost / FF	City Cost or Assessment	Recommended Funding Source
Total Sanitary Sewer Project Costs			
Typical Sanitary Sewer Project Cost	$398,270	Assessment	
City Contribution - Non Assessable Cost	$53,180	City	Sewer Fund
Total Project Cost:	***$451,450***		
Assessment Calculations			
Assessment Eligible Portion	$398,270		
City Contribution (50%)	$199,135	City	Sewer Fund
Assessable Eligible Portion (50%)	$199,135		
Total Sanitary Sewer Units	34.5		
Assessment Per Unit	$5,772		
Assessable Units	24.5		
Non-Assessable Units	10.0		
Non-Assessable Cost (City Cost)	$57,720	City	Sewer Fund
Total Assessed Amount	$141,420	Assessment	Special Assessments
Total City Cost:	***$310,030***		
Total Assessed Amount:	***$141,420***		
Total Project Cost:	***$451,450***		

E. WATERMAIN

The watermain proposed for reconstruction services commercial and residential properties. Same as with the sanitary sewer, commercial and multi-family properties are converted to equivalent residential units (ERUs) based on water usage. Three properties exceed the normal water usage for a typical single-family home. These properties and their ERU calculations are as follows:

Property Owner	Property Address	*Water Usage (gal)	Daily Water Usage (gal)	Daily Usage / ERU (gal)	**ERUs
MADSEN HOLDINGS LLC	16 1ST ST W	925,000	1,214	275	4.0
LIFT MANAGEMENT SERVICES	37 1ST ST W	380,000	499	275	1.5
BURR OAKS LLC	9 1ST ST W	440,000	577	275	2.0

*Water usage is from approximately 2 years of consumption data.

**ERUs are rounded down to the nearest 0.5 units with a minimum of 1.0 unit.

On previous projects, the portion of the watermain cost that was assessed consisted of 50 percent of the standard water system cost. Costs related to looping, soil corrections, vibration monitoring, boring, and cathodic protection are isolated as City costs and not included in the assessment calculations.

Similar to the sanitary sewer methodology, 10 non-assessable units are recommended to be added to account for the unique project area. With the addition of these non-assessable units, this project contains 34.5 water units, 24.5 of which are assessable.

The total project costs for the watermain component of the proposed project are apportioned as follows:

Item	Cost / FF	City Cost or Assessment	Recommended Funding Source
Total Watermain Project Costs			
Typical Water System Project Cost	$702,620	Assessment	
City Contribution - Non Assessable Cost	$537,050	City	Water Fund
Total Project Cost:	***$1,239,670***		
Assessment Calculations			
Assessment Eligible Portion	$702,620		
City Contribution (50%)	$351,310	City	Water Fund
Assessable Eligible Portion (50%)	$351,310		
Watermain Units	34.5		
Assessment Per Unit	$10,183		
Assessable Units	24.5		
Non-Assessable Units	10		
Non-Assessable Cost (City Cost)	$101,830	City	Water Fund
Total Assessed Amount	$249,490	Assessment	Special Assessments
Total City Cost:	***$990,180***		
Total Assessed Amount:	***$249,490***		
Total Project Cost:	***$1,239,670***		

F. OVERALL COST SUMMARY

In summary, a portion of the street and utility reconstruction work will be assessed to benefit property owners and the remaining work is recommended to be paid by the City. The overall costs for all project components are summed as follows:

Item	Cost	Recommended Funding Source
Assessed Amount (Per Policy)	$1,032,470	Special Assessments
Developer Cost Sharing	* $41,500	Developer Costs
Street & Utility Reconstruction (City Cost)	$5,804,360	Combined Bond Funds & PIR Capital Improvement Funds
Total Overall Project Cost:	**$6,878,330**	

* This is the amount the City has received from the developer of the apartment complex on the corner of 2nd Street and Elm Street for the proposed sidewalk adjacent to the building on Elm Street.

G. ASSESSMENTS

The assessable portion of the street and utility reconstruction work is proposed to be assessed to the benefiting properties in accordance with current City policy as follows:

- Street Reconstruction - 50% Assessed on a Front Footage Basis of Standard City Residential Street
- Storm Sewer Reconstruction - 50% Assessed on a Front Footage Basis
- Sanitary Sewer Reconstruction - 50% Assessed on a Unit Basis
- Watermain Reconstruction - 50% Assessed on a Unit Basis

Some of the project components would not be assessed. These project components include the following:

- Extra Depth and Width of Street Reconstruction
- Parking Lot Reconstruction
- Sidewalk Reconstruction
- Sanitary Sewer & Watermain Non-Standard Construction Items
- Irrigation

The current estimated assessable percentage of the street and utility reconstruction project is **15.0%**. The minimum required assessable percentage for a Chapter 429 bond is 20.0%. Consistent with City policy and previous assessment projects, a benefit evaluation will be conducted to determine the special benefit amounts. The assessments will be capped at these amounts as determined by this benefit evaluation process. This process is anticipated to lower the assessments and reduce the assessable percentage of the project. Therefore, as discussed in the previous section, a combined bond approach is recommended in order meet all statutory requirements.

A copy of the current City assessment policy is included in Appendix C of this report for reference. Located in Appendix A is an assessment area map (Figure 4.1). To follow is the preliminary assessment roll (Table 4.1) for the street and utility reconstruction project area and debt service and proposed funding sources (Table 4.2).

TABLE 4.1 - PRELIMINARY ASSESSMENT ROLL
DOWNTOWN RECONSTRUCTION, PHASE 4 PROJECT
8/12/2025

PROP. NO.	P.I.D.	OWNER	PROPERTY ADDRESS	OWNER ADDRESS		F/F	*STREET ASSESSMENT	WATERMAIN UNITS	WATERMAIN ASSESSMENT	SANITARY SEWER UNITS	SANITARY SEWER ASSESSMENT	TOTAL ASSESSMENT	**ANNUAL ASSESSMENT PAYMENT
1	750502700	44W FIRST ST LLC	44 1ST ST W	40 E LAKE ST	WACONIA MN 55387	27.50	$7,918.72	0.0	$0.00	0.0	$0.00	$7,918.72	$1,050.56
2	750502690	WILLE FAMILY TRUST	36 1ST ST W	8411 KEATS AVE SW	HOWARD LAKE, MN 55349	30.00	$8,638.60	1.0	$10,182.90	1.0	$5,772.03	$24,593.53	$3,262.77
3	750502680	INDEPENDENT PROPERTIES LLC	32 1ST ST W	2037 WOODSTONE DR	VICTORIA MN 55386	25.00	$7,198.83	1.0	$10,182.90	1.0	$5,772.03	$23,153.76	$3,071.76
4	750502670	WACONIA LODGE NUMBER 326 AF AND AM INC	24 1ST ST W	24 W 1ST ST	WACONIA MN 55387	36.50	$10,510.30	1.0	$10,182.90	1.0	$5,772.03	$26,465.23	$3,511.08
5 - 6	750502660/750502650	MADSEN HOLDINGS LLC	16 1ST ST W	2906 BUTTERNUT DR	CHASKA, MN 55318	73.50	$21,164.57	4.0	$40,731.59	4.0	$23,088.12	$84,984.28	$11,274.68
7	750502620	LAKETOWN CREAMERY LLC	8 1ST ST W	9451 GANDER LN	MINNETRISTA, MN 55375	16.50	$4,751.23	1.0	$10,182.90	1.0	$5,772.03	$20,706.16	$2,747.04
8	750502610	EMBARQ CORP	NA	931 14TH ST	DENVER, CO 80202	15.50	$4,463.28	1.0	$10,182.90	1.0	$5,772.03	$20,418.20	$2,708.84
9	750502640	EMBARQ CORP	40 ELM ST S	931 14TH ST	DENVER, CO 80202	39.00	$11,230.18	1.0	$10,182.90	1.0	$5,772.03	$27,185.11	$3,606.59
10	750502550	CHURCH OF ST JOSEPH	32 1ST ST E	41 1ST ST E	WACONIA MN 55387	165.00	$47,512.30	1.0	$10,182.90	1.0	$5,772.03	$63,467.23	$8,420.06
11	750502540	WACONIA CITY	101 MAIN ST E	201 VINE ST S	WACONIA MN 55387	165.00	$47,512.30	1.0	$10,182.90	1.0	$5,772.03	$63,467.23	$8,420.06
12	750501520	JANE M EVESLAGE TRUST	41 1ST ST W	281 LAKEVIEW TERR BLVD	WACONIA MN 55387	0.00	$0.00	0.0	$0.00	0.0	$0.00	$0.00	$0.00
13	750501550	LIFT MANAGEMENT SERVICES	37 1ST ST W	820- PINE ST S	WACONIA MN 55387	29.00	$8,350.65	1.5	$15,274.35	1.5	$8,658.04	$32,283.04	$4,282.92
14	750501570	YETZER PROPERTIES I LLC	33 1ST ST W	PO BOX 51	WACONIA MN 55387	53.50	$15,405.50	1.0	$10,182.90	1.0	$5,772.03	$31,360.43	$4,160.52
15	750501580	DENNIS D GEZEL	25 1ST ST W	1817 TIMBER TRL	CHIPPEWA FALLS, WI 54729	27.50	$7,918.72	1.0	$10,182.90	1.0	$5,772.03	$23,873.64	$3,167.26
16	750501590	17 WEST RENTAL LLC	17 1ST ST W	PO BOX 721	LONG LAKE, MN 55356	77.50	$22,316.39	1.0	$10,182.90	1.0	$5,772.03	$38,271.31	$5,077.37
17	750501611	BURR OAKS LLC	9 1ST ST W	PO BOX 12	WACONIA MN 55387	60.00	$17,277.20	2.0	$20,365.80	2.0	$11,544.06	$49,187.06	$6,525.54
18	750501630	WACONIA CITY	NA	201 VINE ST S	WACONIA MN 55387	78.50	$22,604.34	0.0	$0.00	0.0	$0.00	$22,604.34	$2,998.87
19	750501620	BURR OAKS LLC	NA	PO BOX 12	WACONIA MN 55387	55.00	$15,837.43	0.0	$0.00	0.0	$0.00	$15,837.43	$2,101.12
20	753320010	OLIVE AND SECOND HOLDING, LLC	135 OLIVE ST	332 W 4TH ST	WACONIA MN 55387	78.50	$22,604.34	0.0	$0.00	0.0	$0.00	$22,604.34	$2,998.87
21 - 22	750501680/750501690	WROLSON HOLDINGS LLC	109 ELM ST S	109 ELM ST S	WACONIA MN 55387	137.50	$39,593.59	1.0	$10,182.90	1.0	$5,772.03	$55,548.51	$7,369.50
23	750501700	CHURCH OF ST JOSEPH	41 1ST ST E	41 1ST ST E	WACONIA MN 55387	253.00	$72,852.20	0.0	$0.00	0.0	$0.00	$72,852.20	$9,665.14
24 - 27A	750501670/750501660 / 750501650/750501770	CHURCH OF ST JOSEPH	141 ELM ST S / 8 2ND ST E / 16 2ND ST E	41 1ST ST E	WACONIA MN 55387	264.00	$76,019.69	1.0	$10,182.90	1.0	$5,772.03	$91,974.61	$12,202.07
27B	750501770	CHURCH OF ST JOSEPH	NA	41 1ST ST E	WACONIA MN 55387	143.00	$41,177.33	0.0	$0.00	0.0	$0.00	$41,177.33	$5,462.90
28	750501780	CHURCH OF ST JOSEPH	117 1ST ST E	41 1ST ST E	WACONIA MN 55387	47.50	$13,677.78	0.0	$0.00	0.0	$0.00	$13,677.78	$1,814.60
29	750501790	SARA CARLSON EARLEY	125 1ST ST E	125 1ST ST E	WACONIA MN 55387	47.50	$13,677.78	1.0	$10,182.90	1.0	$5,772.03	$29,632.71	$3,931.31
30	750501800	TODD JOHNSON PROPERTIES LLC	141 1ST ST E	141 1ST ST E	WACONIA MN 55387	62.50	$17,997.08	1.0	$10,182.90	1.0	$5,772.03	$33,952.01	$4,504.34
31	750500510	JOSEPH PAUL BRAUNSHAUSEN	209 ELM ST S	209 ELM ST S	WACONIA MN 55387	55.00	$15,837.43	0.0	$0.00	0.0	$0.00	$15,837.43	$2,101.12
32	750500520	GREGG ALAN MALSBARY	17 2ND ST E	17 2ND ST E	WACONIA MN 55387	55.00	$15,837.43	1.0	$10,182.90	1.0	$5,772.03	$31,792.36	$4,217.82
33	750500530	SPRING MARIE PEDEN	25 2ND ST E	25 2ND ST E	WACONIA MN 55387	55.00	$15,837.43	1.0	$10,182.90	1.0	$5,772.03	$31,792.36	$4,217.82
34	750500550	JARED G BUESGENS	33 2ND ST E	33 2ND ST E	WACONIA MN 55387	55.00	$15,837.43	0.0	$0.00	0.0	$0.00	$15,837.43	$2,101.12
						2,228.00							
					Totals:		$641,560.08	24.5	$249,481.01	24.5	$141,414.71	$1,032,455.81	$136,973.61

*Cost per FF = $287.95 (Original Calculation)

**Based on a 5.50% Interest Rate and a 10 Year Term.

TOTAL FRONT FOOTAGE:	3,355.50
CORNER LOT CREDIT:	868.50
ASSESSMENT BASIS FRONT FOOTAGE:	2,487.00
NON-ASSESSABLE FRONT FOOTAGE:	259.00
ASSESSMENT FRONT FOOTAGE:	2,228.00

TABLE 4.2
DEBT SERVICE & PROPOSED FUNDING SOURCES
FOR
DOWNTOWN RECONSTRUCTION, PHASE 4 PROJECT

8/12/2025

	TOTALS				DEBT SERVICE / FUNDING SOURCE						
PROPOSED PROJECTS	TOTAL PROJECT COST	TOTAL ASSESS. AMOUNT	TOTAL CITY COST	TOTAL ASSESS. %	TOTAL DEBT SERVICE	DEBT SVC ASSMT REVENUE	DEBT SVC GENERAL/ PIR FUND	DEBT SVC SEWER FUND	DEBT SVC WATER FUND	TOTAL REVENUE	RECOMMENDED FINANCING OPTION
STREET & UTILITY RECONSTRUCTION	$6,878,330	$1,032,470	$5,845,860	15.0%	$869,275	$130,482	$574,475	$39,181	$125,138	$869,275	$6,900,000 Combined Bond
TOTALS:	**$6,878,330**	**$1,032,470**	**$5,845,860**	**15.0%**	**$869,275**	**$130,482**	**$574,475**	**$39,181**	**$125,138**	**$869,275**	

Notes:

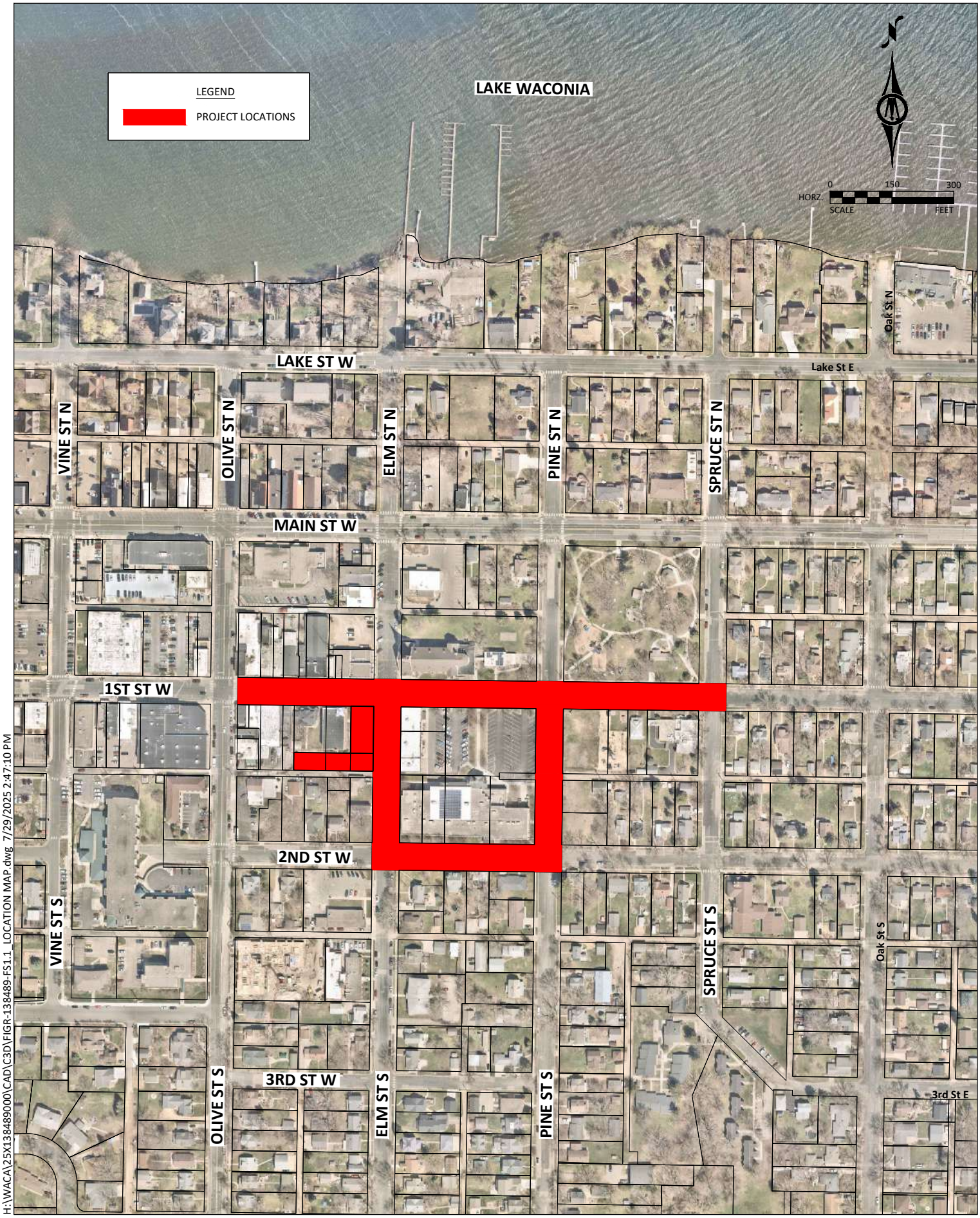
1.) All Debt Service Projections are Based on a 10-Year Bond At 4.5%.

2.) Actual Assessment Revenue Debt Service Will Be Based On Interest Rate 1.0% Above Bonding Cost (=4.5% + 1.0% = 5.5%) With a 10-Year Term.

3.) Amounts Shown Do Not Include Any Grant Funds Which May Reduce the Required Payment Amounts.

APPENDIX A

FIGURES



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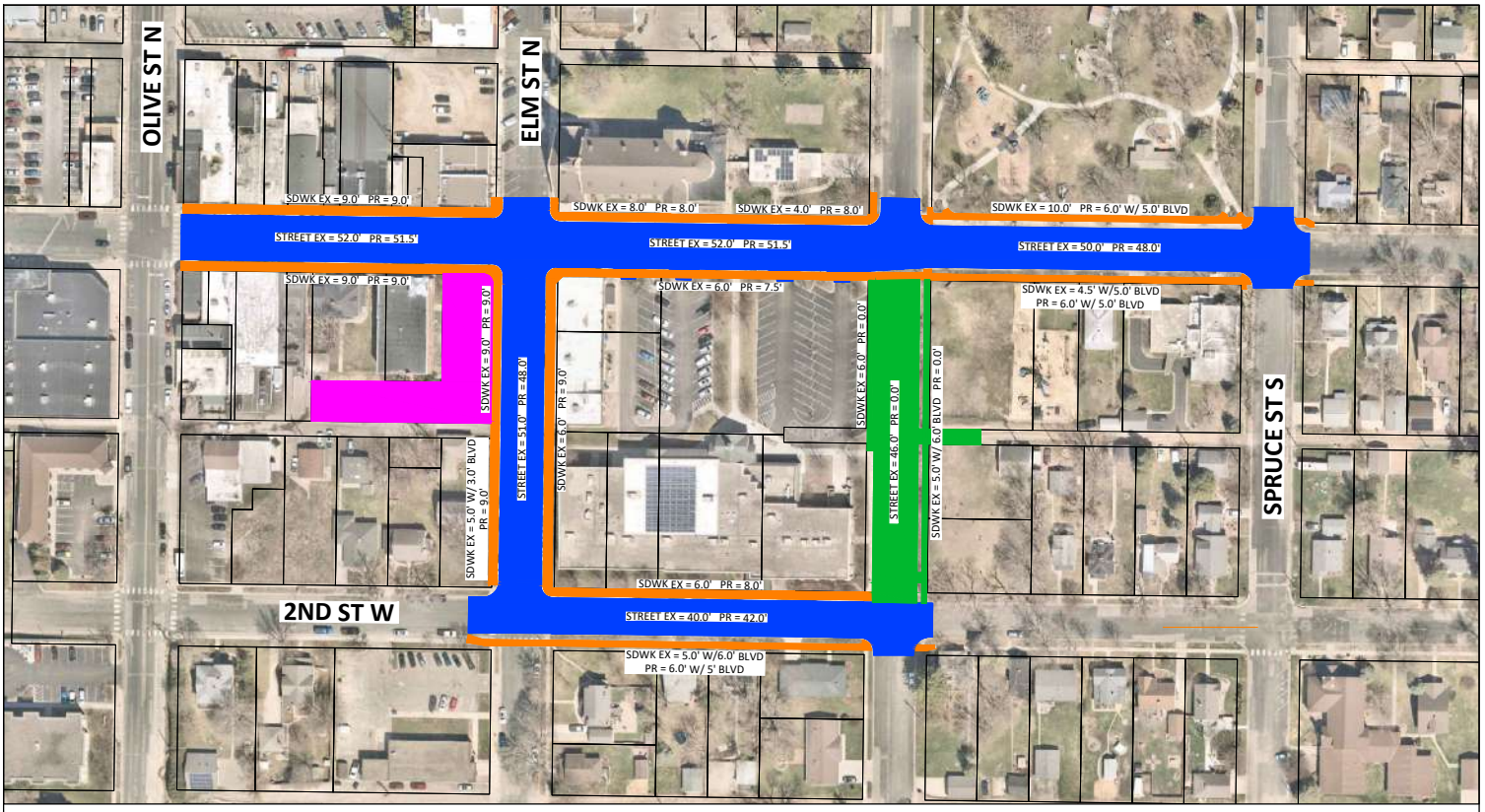


LEGEND

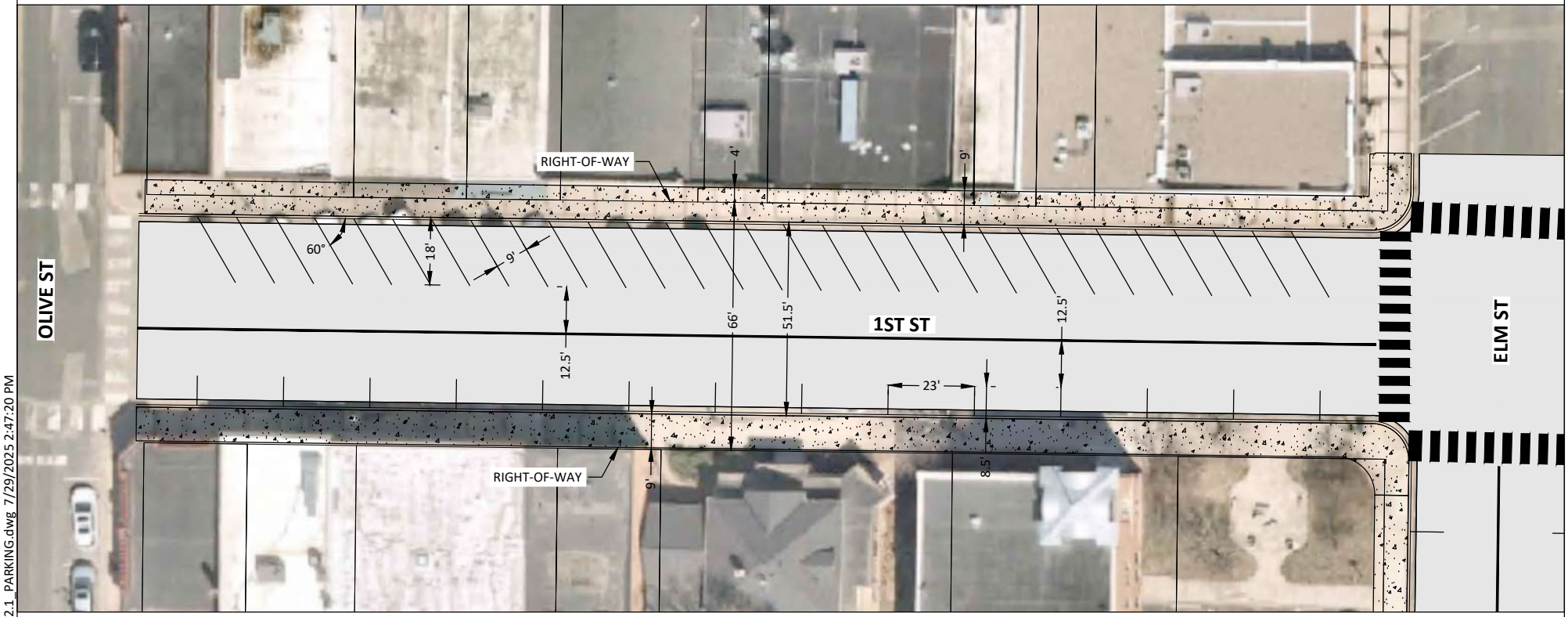
- PROPOSED STREET RECONSTRUCTION
- PROPOSED PARKING LOT IMPROVEMENTS
- PROPOSED SIDEWALK RECONSTRUCTION
- PROPOSED STREET & SIDEWALK REMOVAL

N

HORZ. SCALE 0 100 200 FEET

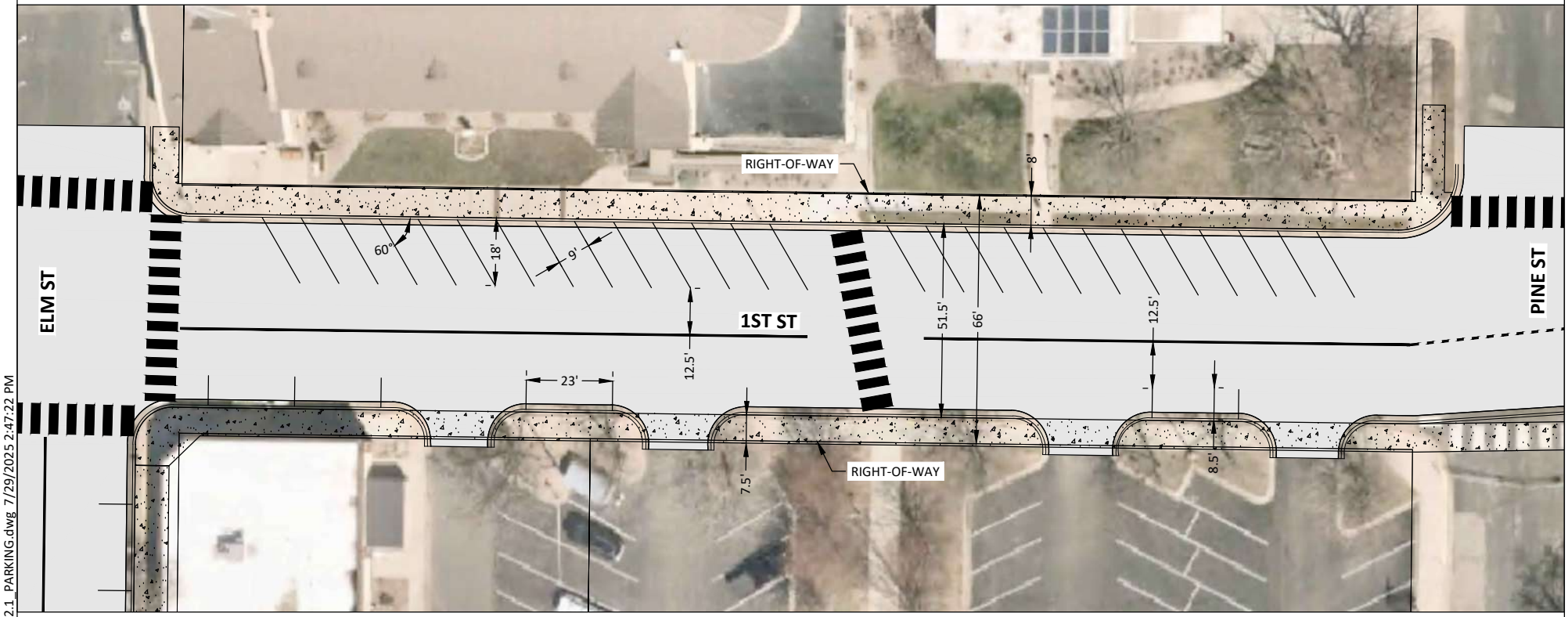
H:\WACA\25X138489000\CAD\C3D\FIGR-138489-FS2.1_STREET.dwg 7/29/2025 2:47:40 PM

Figure 2.1A: Parking Layout - 1st Street (Olive St to Elm St)



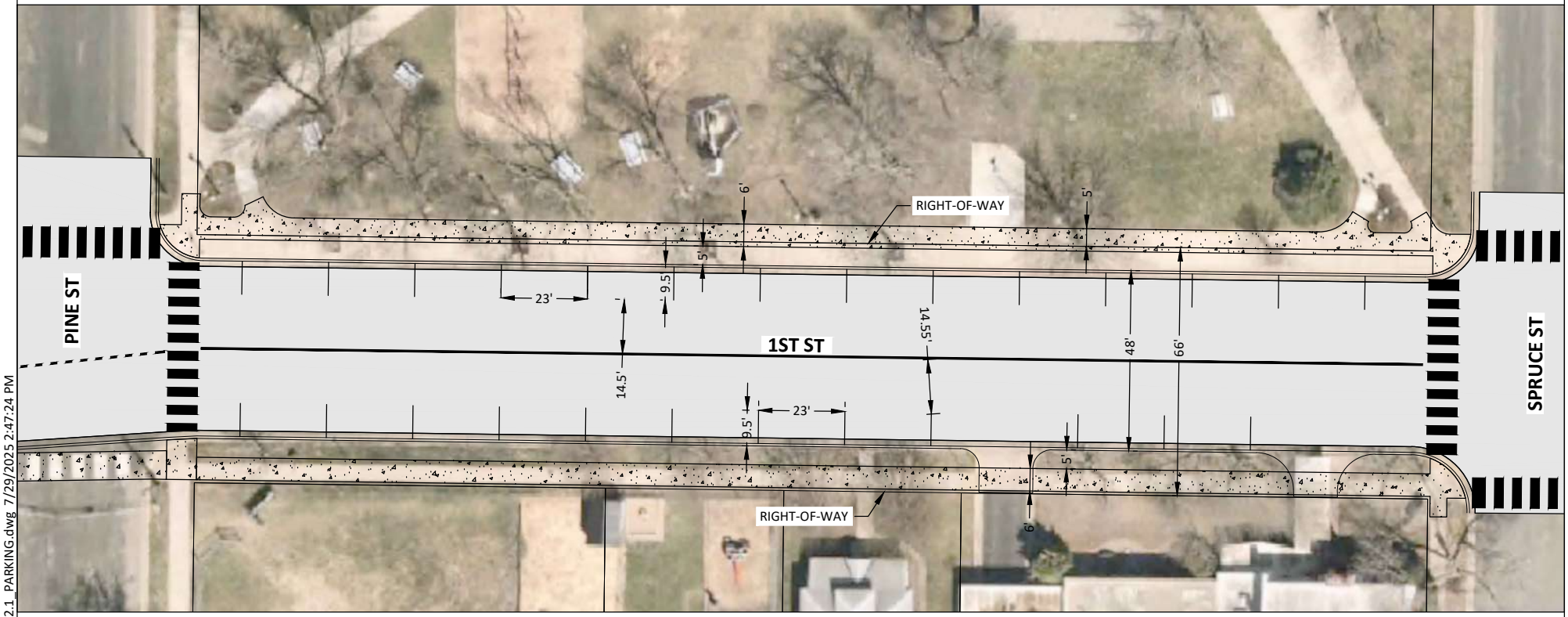
HORZ. SCALE 0 20 40 FEET

Figure 2.1B: Parking Layout - 1st Street (Elm St to Pine St)



HORZ. SCALE 0 20 40 FEET

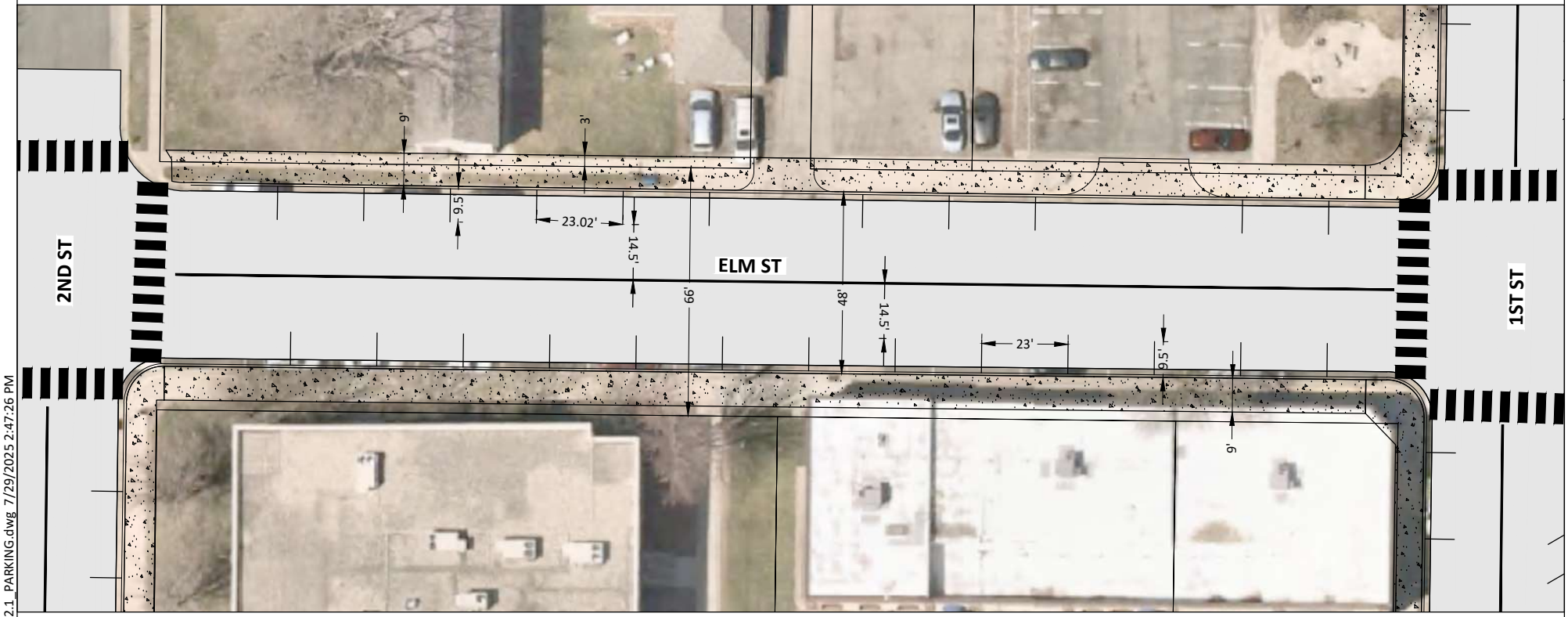
Figure 2.1C: Parking Layout - 1st Street (Pine St to Spruce St)



HORZ. SCALE 0 20 40 FEET

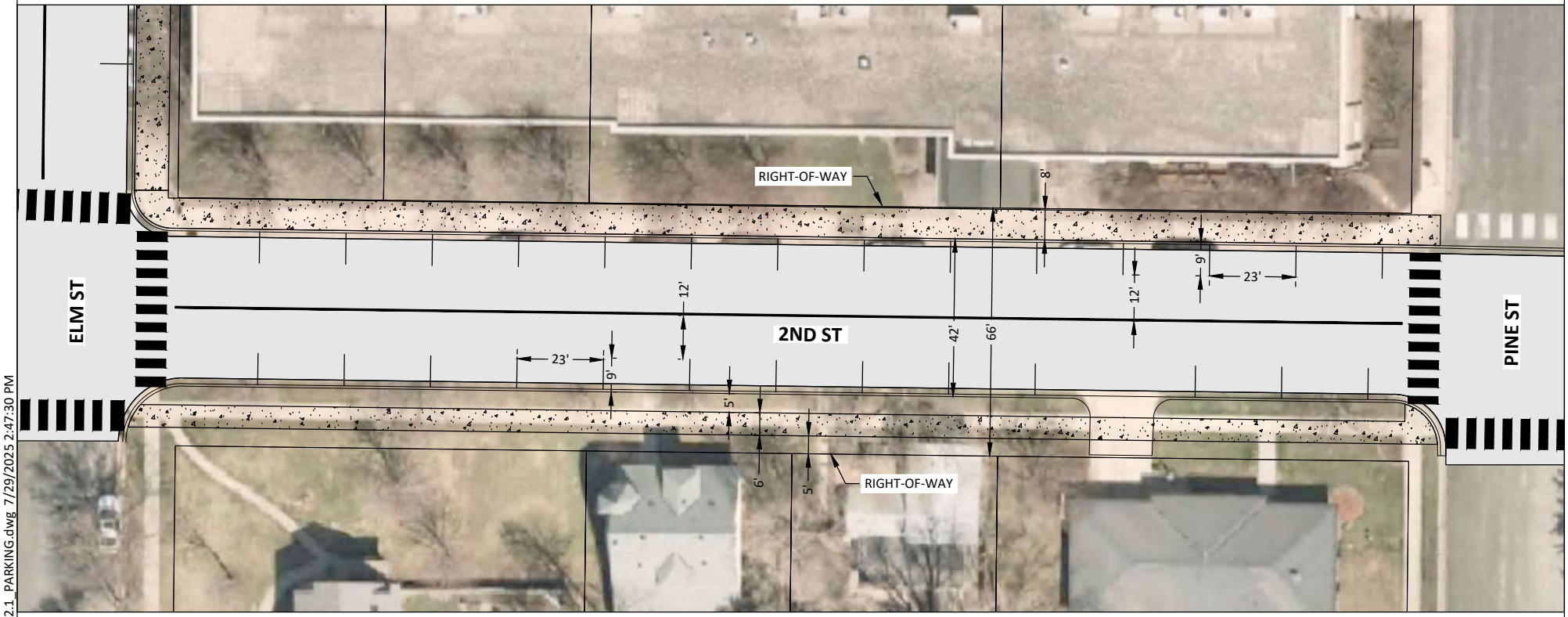
H:\WACA\25X138489000\CAD\C3D\FIGR-138489-FS2.1_PARKING.dwg 7/29/2025 2:47:24 PM

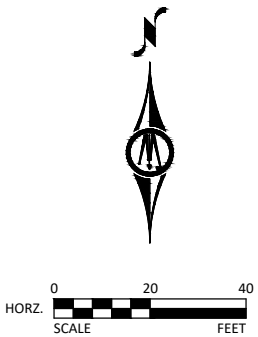
Figure 2.1D: Parking Layout - Elm St (1st St to 2nd St)



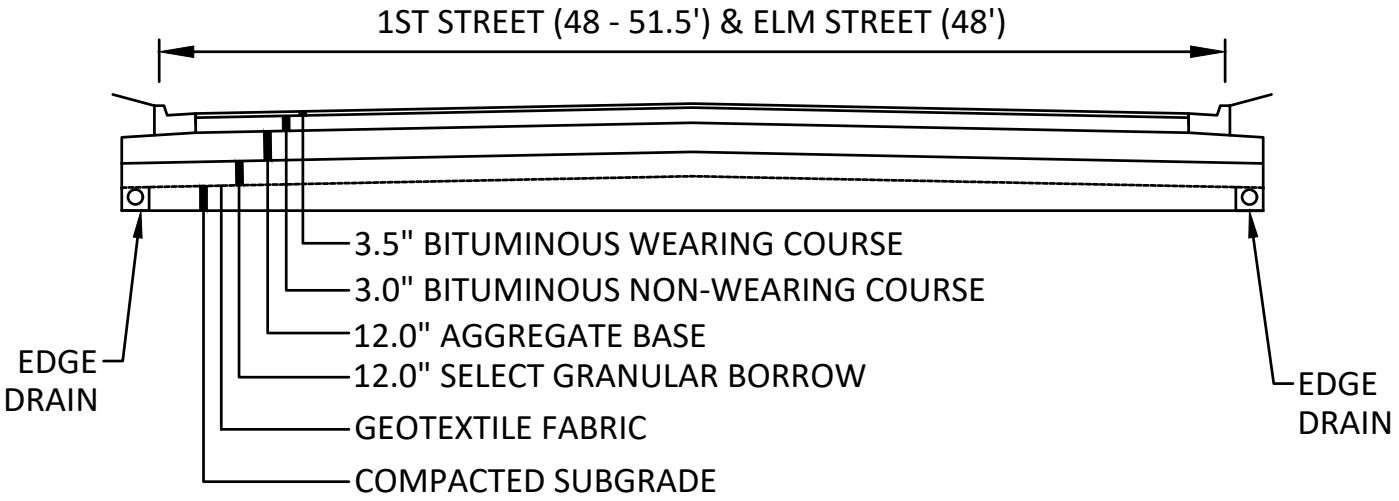
HORZ. SCALE 0 20 40 FEET

Figure 2.1E: Parking Layout - 2nd Street (Elm St to Pine St)

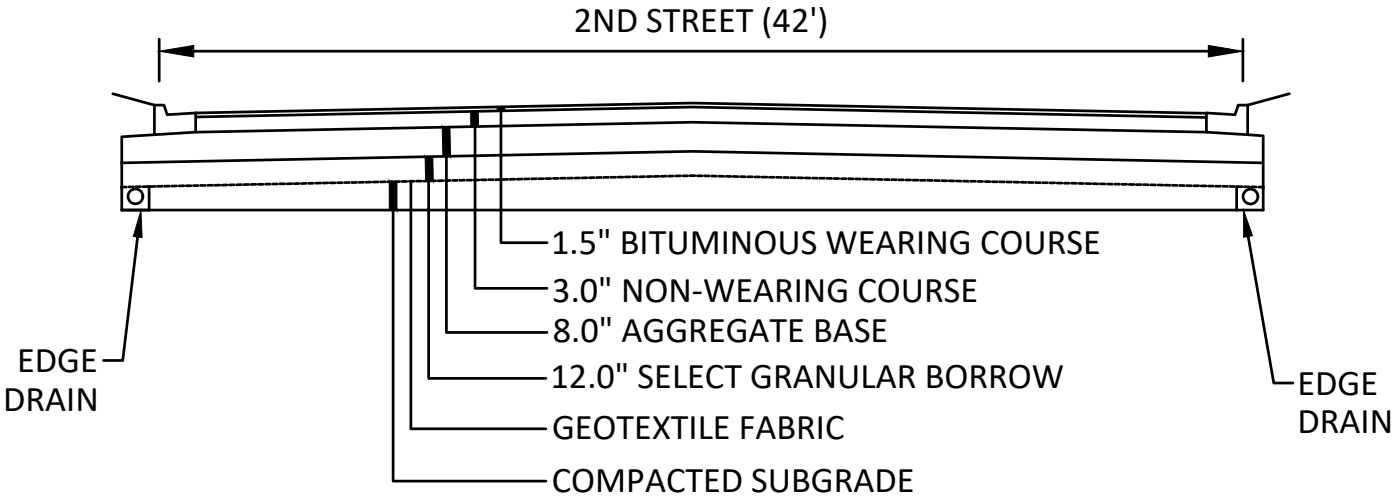


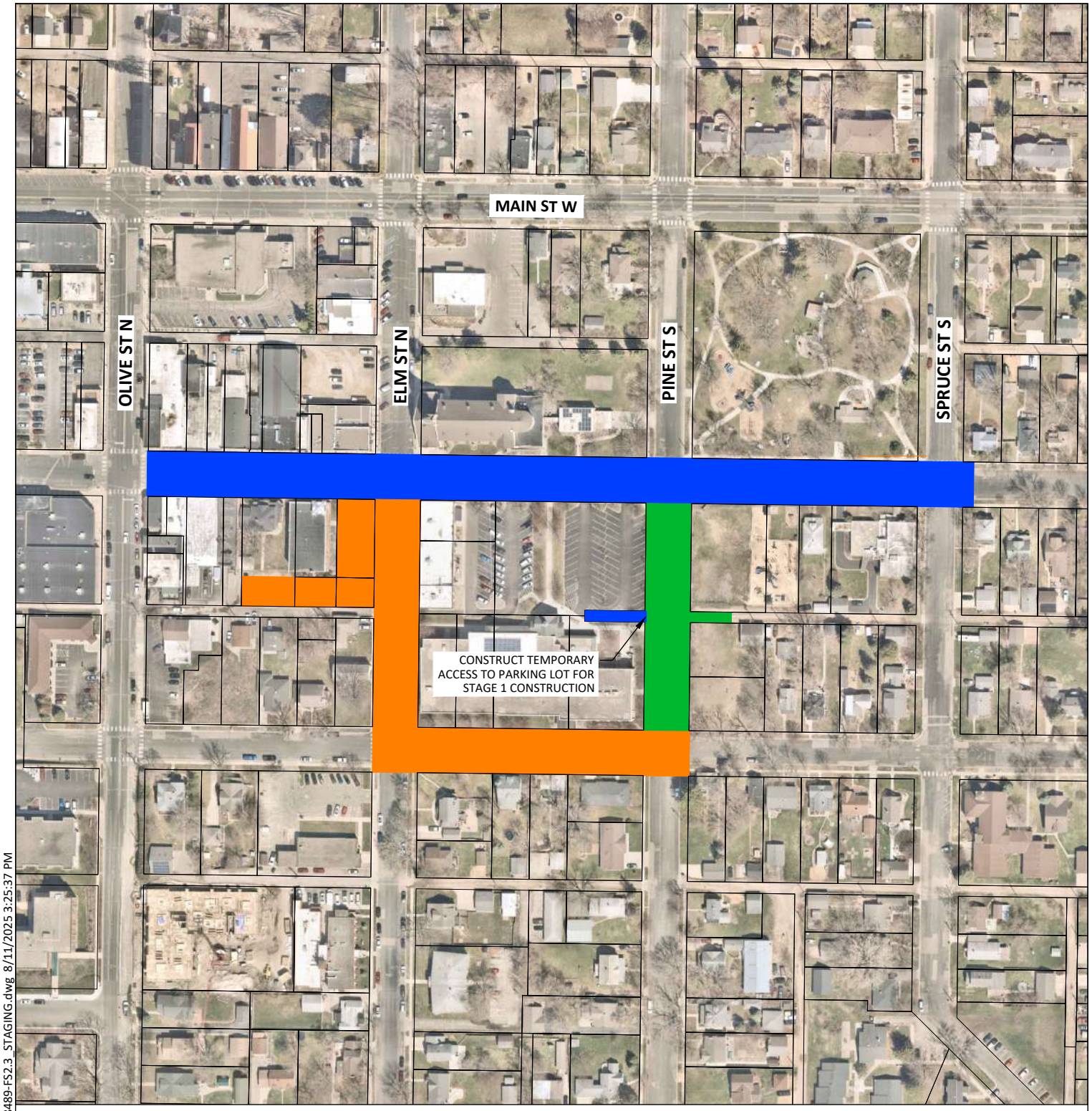


STREET SECTION (TRUCK SECTION)
NOT TO SCALE



STREET SECTION (RESIDENTIAL SECTION)
NOT TO SCALE





LEGEND
- STAGE 1
- STAGE 2
- STAGE 3

N

HORZ. SCALE 0 100 200 FEET

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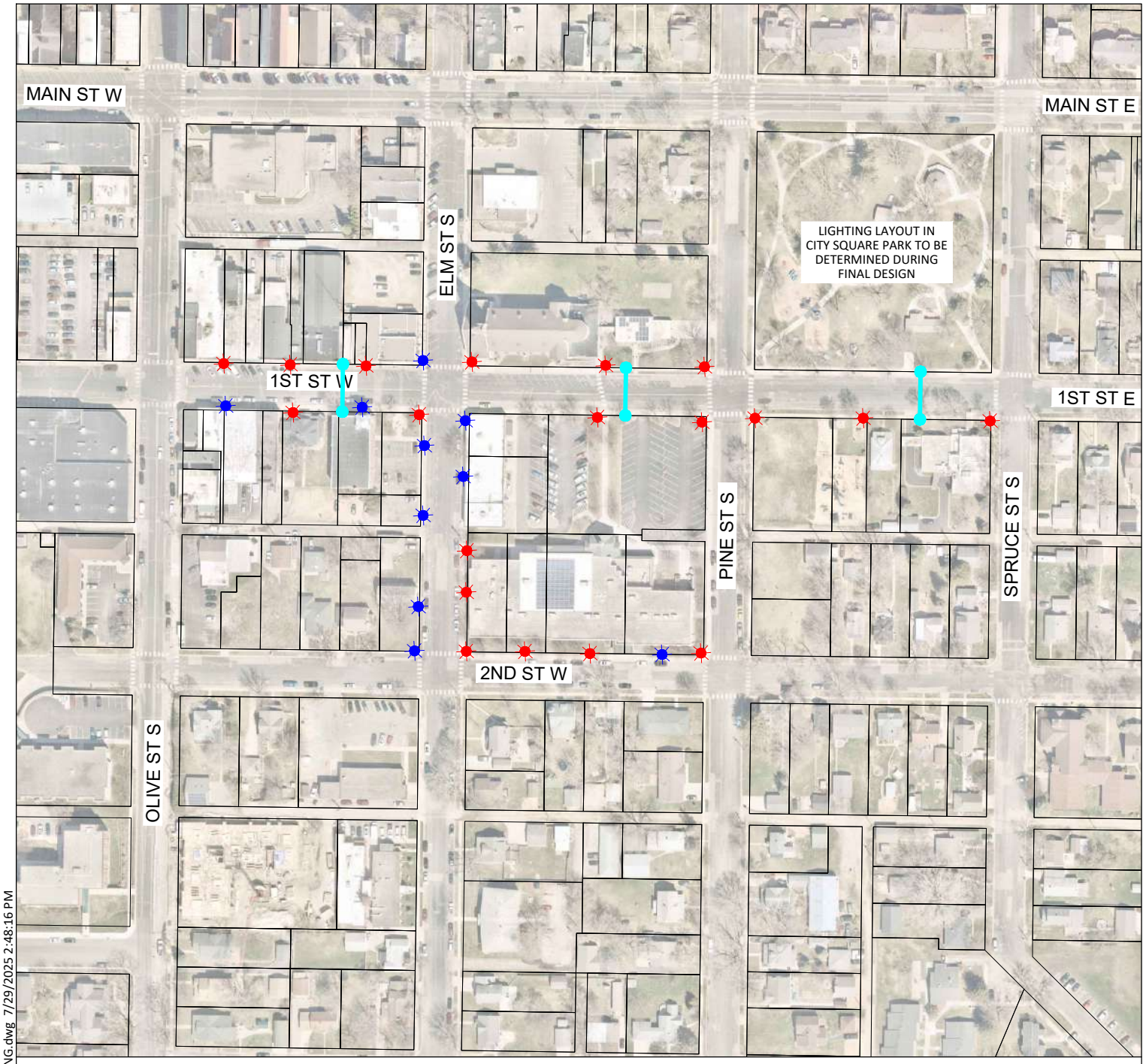
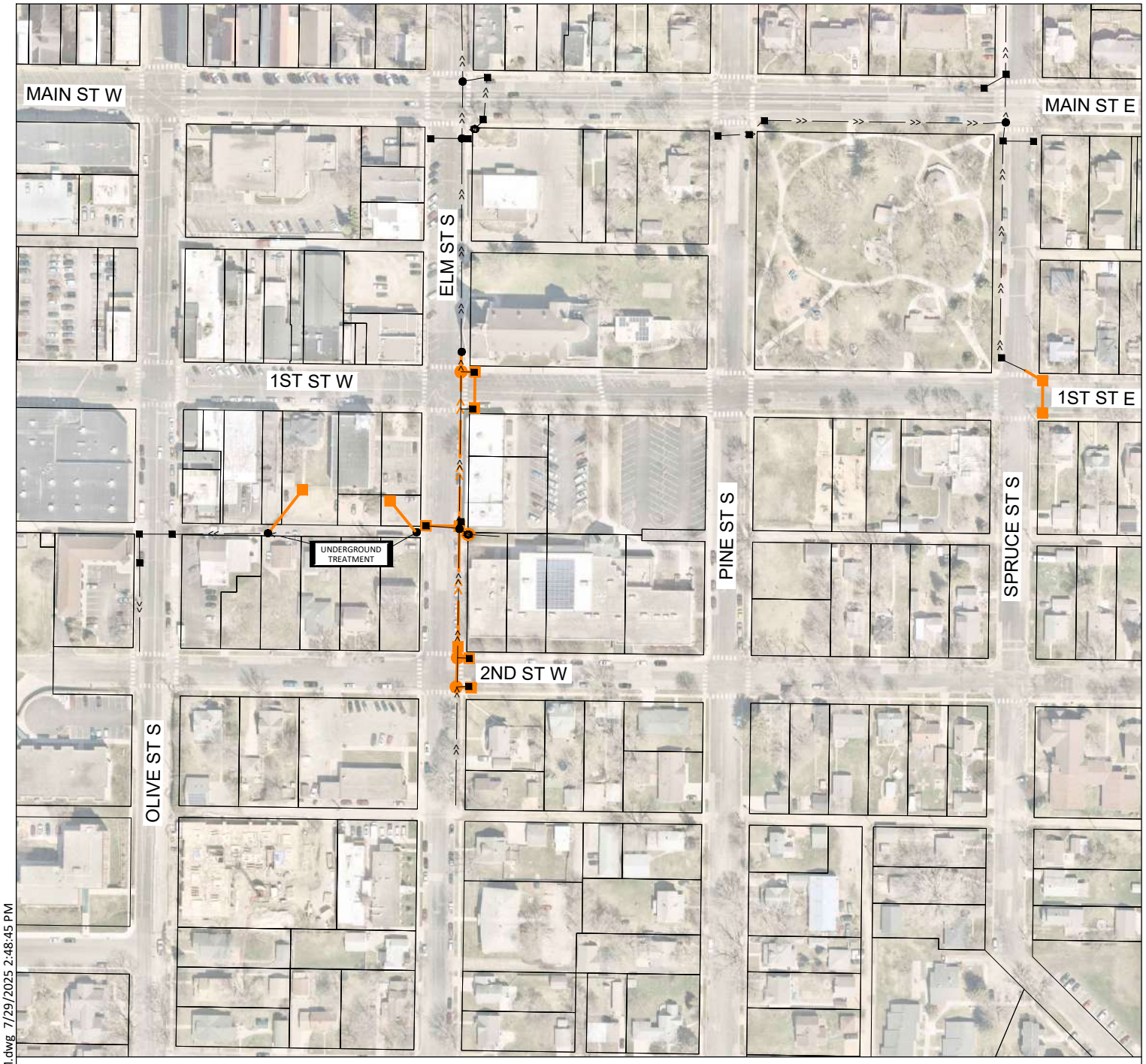


LEGEND

- PROPOSED LIGHT POLE
- PROPOSED LIGHT POLE (EASEMENT NEEDED)
- BANNER POLES

HORZ. SCALE 0 100 200 FEET



LEGEND

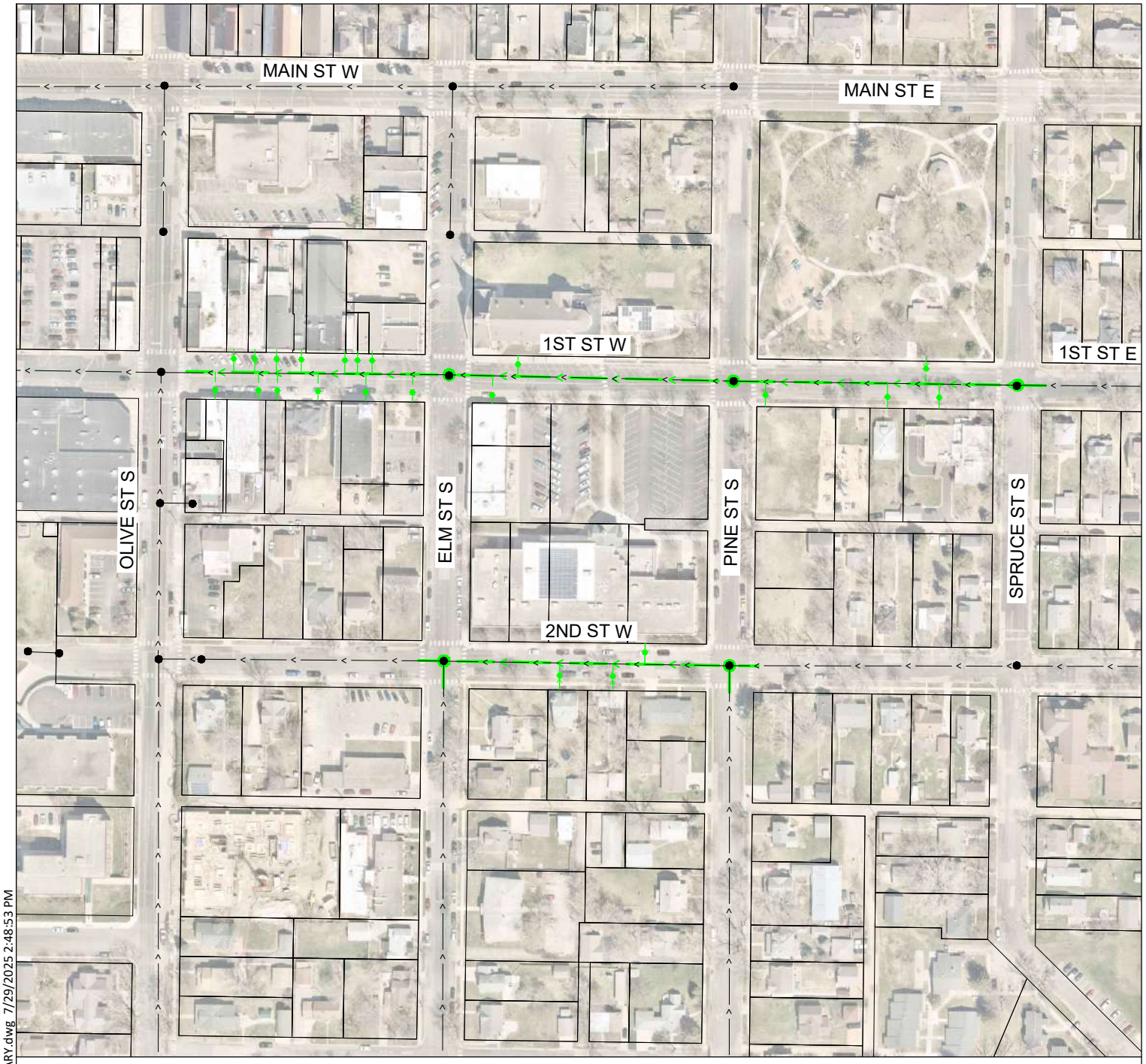
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURES
- PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED CATCH BASIN

N

HORZ. SCALE 0 100 200 FEET

H:\WACA\25X138489000\CAD\C3D\FIGR-138489-FS2.5_STORM.dwg 7/29/2025 2:48:45 PM

Figure 2.6: Sanitary Sewer Reconstruction

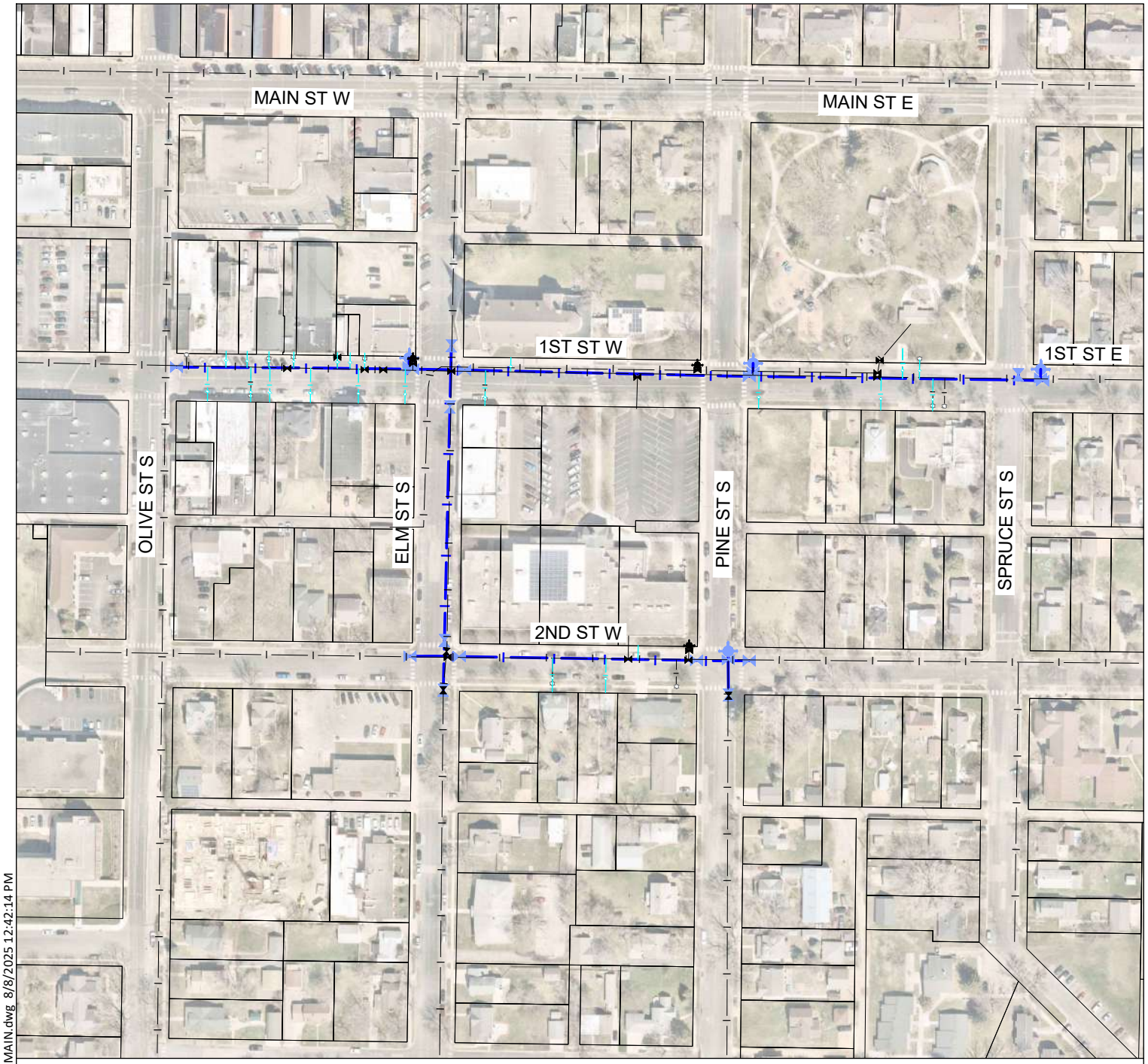


LEGEND

- EXISTING SANITARY SEWER
- EXISTING SANITARY STRUCTURE
- REPLACE SANITARY SEWER
- REPLACE SANITARY SEWER SERVICE
- REPLACE MANHOLE

HORZ. SCALE 0 100 200 FEET

H:\WACA\25X138489000\CAD\C3D\FIGR-138489-FS2.6_SANITARY.dwg 7/29/2025 2:48:53 PM

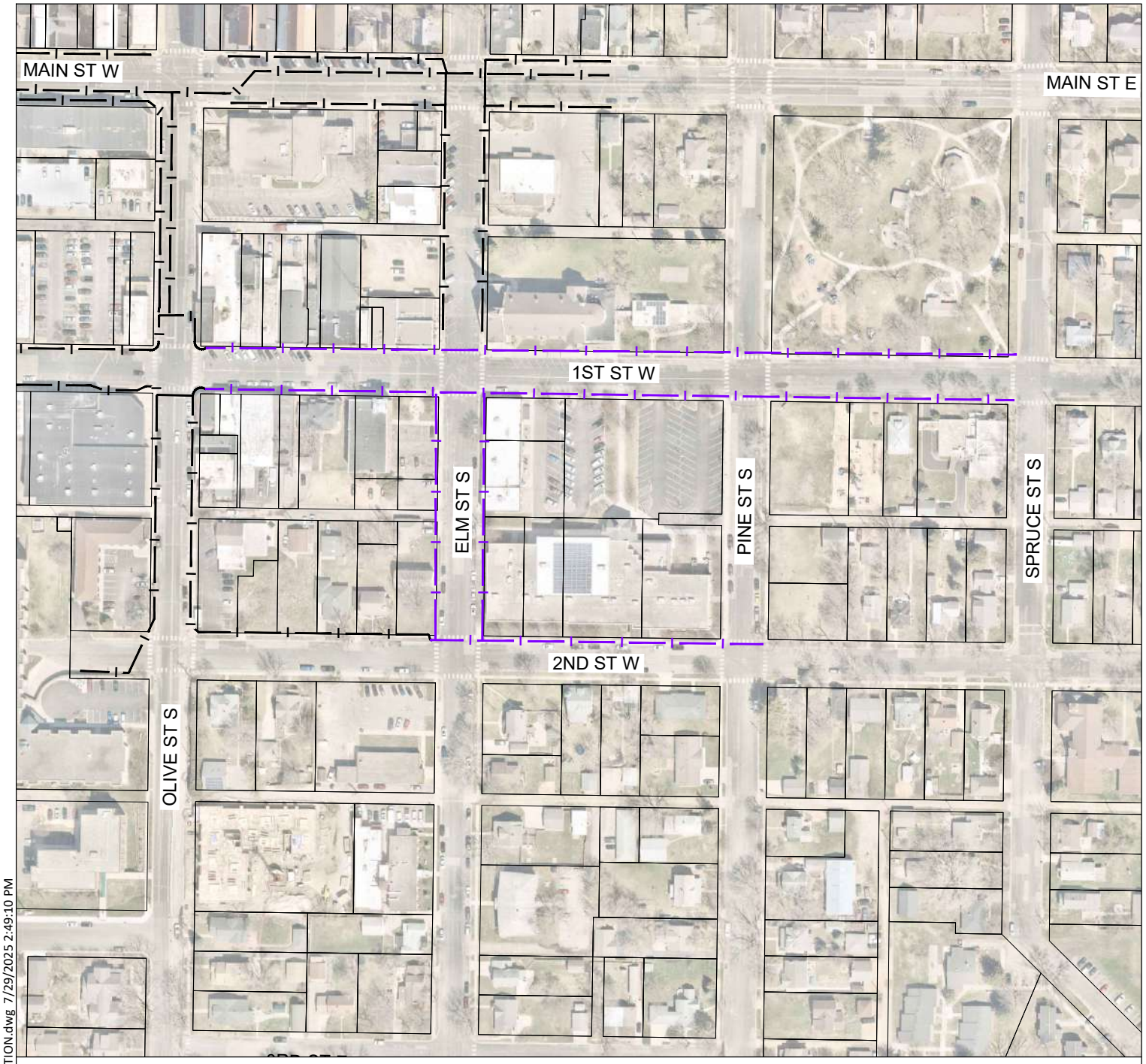


LEGEND

- EXISTING WATERMAIN
- EXISTING WATER SERVICE
- EXISTING WATER STRUCTURES
- REPLACE WATERMAIN
- REPLACE WATER SERVICE
- HYDRANTS AND VALVES

HORZ. SCALE 0 100 200 FEET

H:\WACA\25X138489000\CAD\C3D\FIGR-138489-FS2.7_WATERMAIN.dwg 8/8/2025 12:42:14 PM



LEGEND

EXISTING IRRIGATION SYSTEM

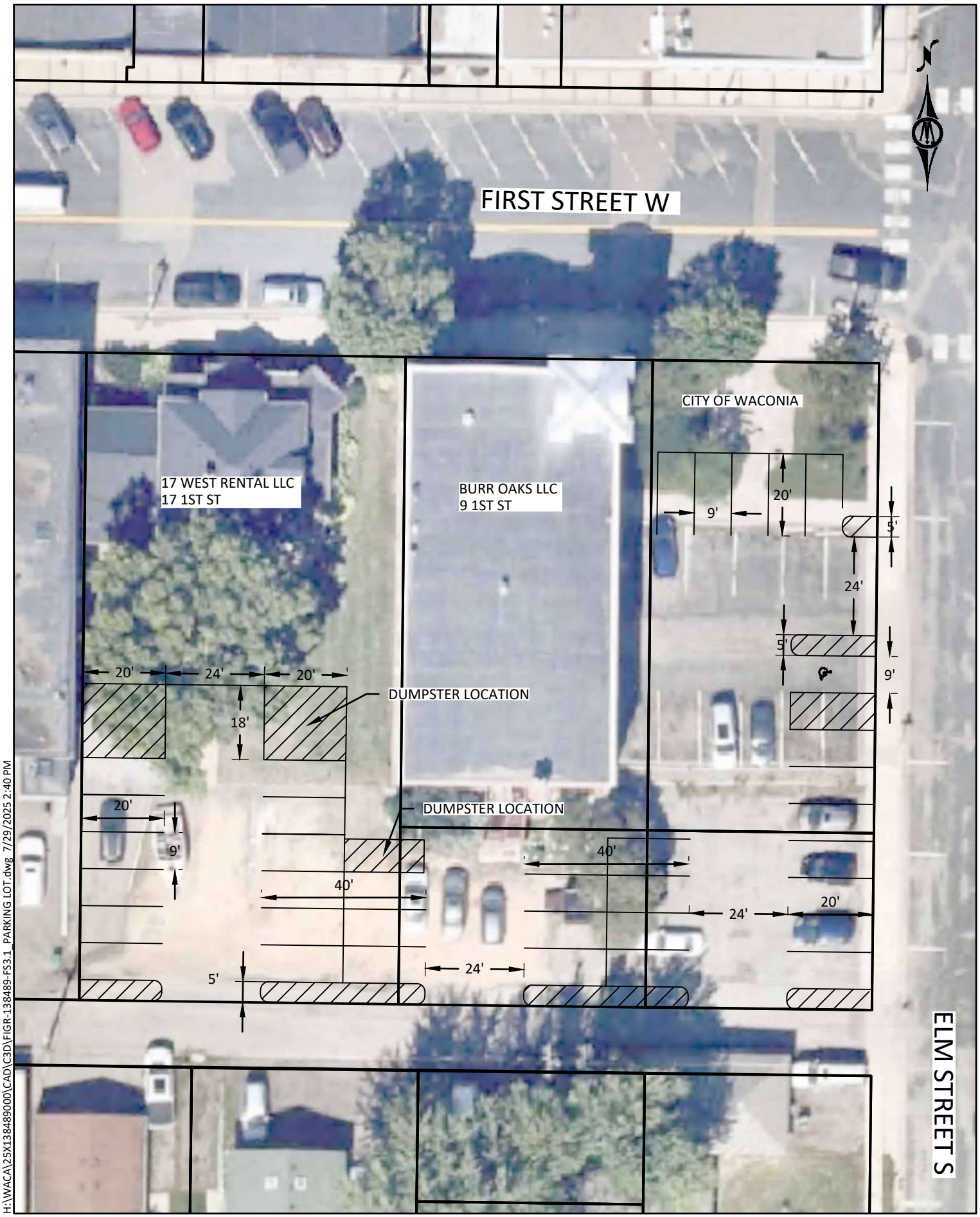
1" IRRIGATION PIPE

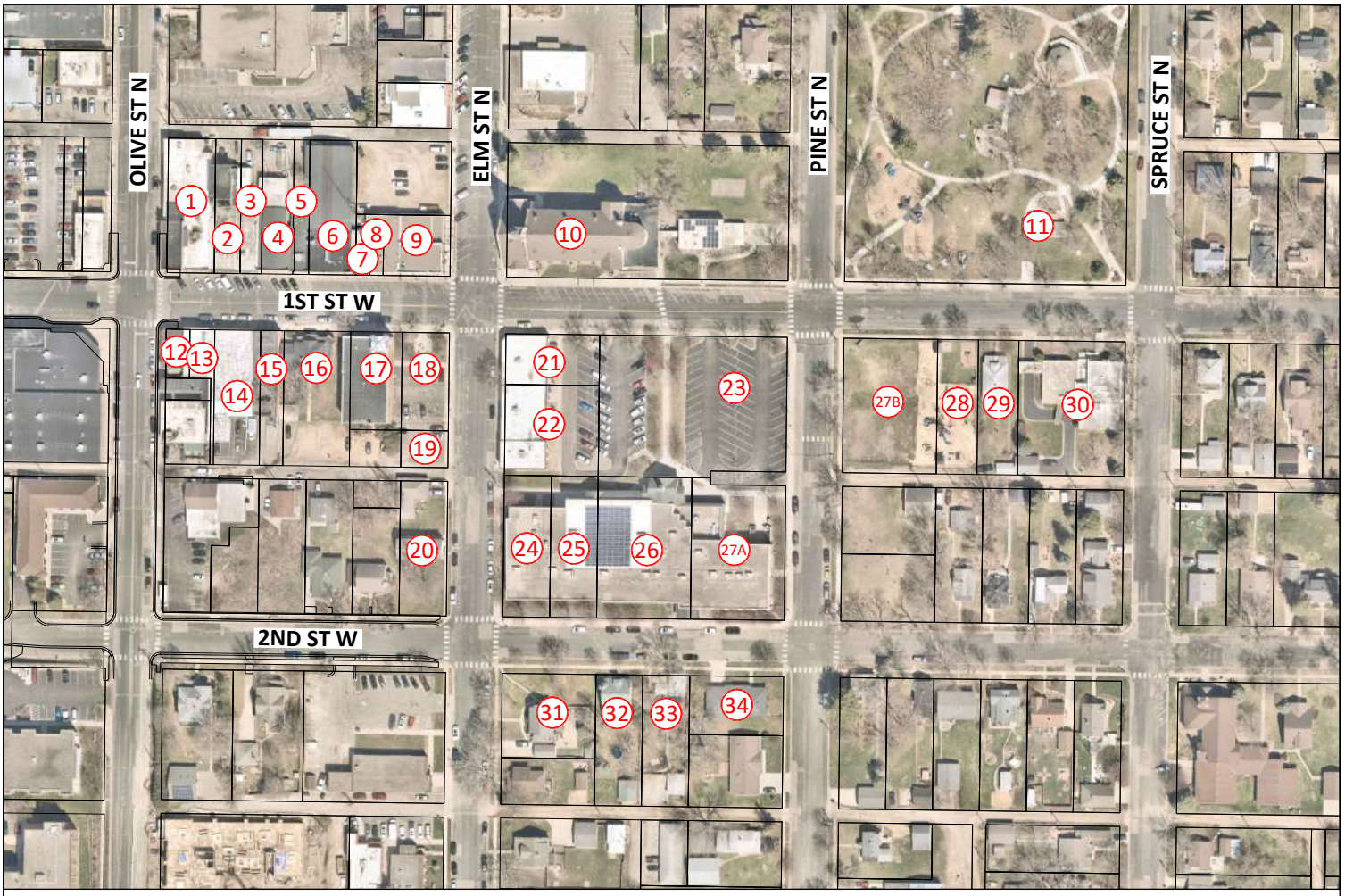
HORZ. SCALE 0 100 200 FEET

Figure 3.1: Parking Lot Improvements

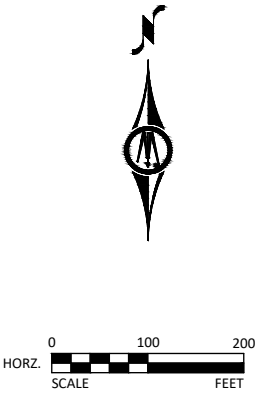
August 2025

HORZ. SCALE 0 15 30 FEET





PROP. NO.	P.I.D.	OWNER	PROPERTY ADDRESS
1	750502700	44W FIRST ST LLC	44 1ST ST W
2	750502690	WILLE FAMILY TRUST	36 1ST ST W
3	750502680	INDEPENDENT PROPERTIES LLC	32 1ST ST W
4	750502670	WACONIA LODGE NUMBER 326 AF AND AM INC	24 1ST ST W
5 - 6	750502660/750502650	MADSEN HOLDINGS LLC	16 1ST ST W
7	750502620	LAKETOWN CREAMERY LLC	8 1ST ST W
8	750502610	EMBARQ CORP	NA
9	750502640	EMBARQ CORP	40 ELM ST S
10	750502550	CHURCH OF ST JOSEPH	32 1ST ST E
11	750502540	WACONIA CITY	101 MAIN ST E
12	750501520	JANE M EVESLAGE TRUST	41 1ST ST W
13	750501550	LIFT MANAGEMENT SERVICES	37 1ST ST W
14	750501570	YETZER PROPERTIES I LLC	33 1ST ST W
15	750501580	DENNIS D GEZEL	25 1ST ST W
16	750501590	17 WEST RENTAL LLC	17 1ST ST W
17	750501611	BURR OAKS LLC	9 1ST ST W
18	750501630	WACONIA CITY	NA
19	750501620	BURR OAKS LLC	NA
20	753320010	OLIVE AND SECOND HOLDING, LLC	135 OLIVE ST
21 - 22	750501680/750501690	WROLSON HOLDINGS LLC	109 ELM ST S
23	750501700	CHURCH OF ST JOSEPH	41 1ST ST E
24 - 27A	750501670/750501660 / 750501650/750501770	CHURCH OF ST JOSEPH	141 ELM ST S / 8 2ND ST E / 16 2ND ST E
27B	750501770	CHURCH OF ST JOSEPH	NA
28	750501780	CHURCH OF ST JOSEPH	117 1ST ST E
29	750501790	SARA CARLSON EARLEY	125 1ST ST E
30	750501800	TODD JOHNSON PROPERTIES LLC	141 1ST ST E
31	750500510	JOSEPH PAUL BRAUNSHAUSEN	209 ELM ST S
32	750500520	GREGG ALAN MALSBARY	17 2ND ST E
33	750500530	SPRING MARIE PEDEN	25 2ND ST E
34	750500550	JARED G BUESGENS	33 2ND ST E



APPENDIX B

ITEMIZED COST ESTIMATES

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

STREET RECONSTRUCTION (ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$48,000.00	$48,000.00
2	REMOVE CONCRETE CURB & GUTTER	LIN FT	4,405	$6.30	$27,751.50
3	REMOVE BITUMINOUS PAVEMENT	SQ YD	7,725	$6.83	$52,723.13
4	REMOVE CONCRETE DRIVEWAY PAVEMENT	SQ FT	2,700	$3.15	$8,505.00
5	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	SQ FT	165	$1.31	$216.56
6	REMOVE DRAINAGE STRUCTURE	EACH	8	$388.50	$3,108.00
7	REMOVE DRAINAGE PIPE	LIN FT	590	$16.80	$9,912.00
8	COMMON EXCAVATION (EV)	CU YD	4,500	$31.50	$141,750.00
9	GEOTEXTILE FABRIC	SQ YD	8,100	$1.79	$14,458.50
10	AGGREGATE BASE CLASS 5 (CV) - 8" DEPTH	TON	4,095	$48.30	$197,788.50
11	CONCRETE CURB & GUTTER (B618)	LIN FT	3,815	$23.10	$88,126.50
12	BITUMINOUS NON-WEAR COURSE - 3.0" DEPTH	TON	1,450	$89.25	$129,412.50
13	BITUMINOUS WEAR COURSE - 1.5" DEPTH	TON	725	$103.95	$75,363.75
14	3" BITUMINOUS DRIVEWAY	SQ FT	165	$5.62	$926.89
15	6" CONCRETE DRIVEWAY	SQ FT	2,200	$11.81	$25,987.50
16	CONSTRUCT DRAINAGE STRUC. DES 2'X3'	EACH	4	$2,100.00	$8,400.00
17	CONSTRUCT DRAINAGE STRUC. DES 4020-48	EACH	7	$7,350.00	$51,450.00
18	CONSTRUCT DRAINAGE STRUC. DES 4022-48	EACH	1	$7,350.00	$7,350.00
19	15" RC PIPE SEWER DES 3006 CL V	LIN FT	300	$73.50	$22,050.00
20	18" RC PIPE SEWER DES 3006 CL V	LIN FT	400	$74.55	$29,820.00
21	21" RC PIPE SEWER DES 3006 CL V	LIN FT	100	$94.50	$9,450.00
22	CASTING ASSEMBLY (STORM)	EACH	12	$1,155.00	$13,860.00
23	ADJUST CASTING (STORM)	EACH	13	$714.00	$9,282.00
24	CONNECT TO EXISTING STORM SEWER	EACH	4	$2,100.00	$8,400.00
25	LANDSCAPING	ALLOWANCE	1	$10,000.00	$10,000.00
26	IRRIGATION & DOG FENCE REPAIR	ALLOWANCE	1	$7,500.00	$7,500.00

SUBTOTAL:	*$1,001,592.33*
CONTINGENCIES (10%):	*$100,159.23*
ESTIMATED CONSTRUCTION COST:	*$1,101,751.56*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$330,525.47*
TOTAL ESTIMATED PROJECT COST:	***$1,432,277.02***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

STREET RECONSTRUCTION (EXTRA SECTION - NON-ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$94,000.00	$94,000.00
2	TRAFFIC CONTROL	LUMP SUM	1	$56,000.00	$56,000.00
3	CLEAR & GRUB TREE	EACH	22	$945.00	$20,790.00
4	REMOVE BITUMINOUS PAVEMENT	SQ YD	4,620	$6.83	$31,531.50
5	REMOVE SIGN	EACH	39	$409.50	$15,970.50
6	COMMON EXCAVATION (EV)	CU YD	3,265	$31.50	$102,847.50
7	SUBGRADE EXCAVATION (EV)	CU YD	405	$21.00	$8,505.00
8	GEOTEXTILE FABRIC	SQ YD	3,990	$1.79	$7,122.15
9	AGGREGATE BASE CLASS 5 (CV) - 12" DEPTH	TON	2,515	$50.72	$127,548.23
10	AGGREGATE BASE CLASS 5 (CV) - 8" DEPTH	TON	345	$50.72	$17,496.68
11	AGGREGATE BASE CLASS 5 (CV) - 4" DEPTH	TON	840	$50.72	$42,600.60
12	STABILIZING AGGREGATE (CV)	CU YD	405	$32.55	$13,182.75
13	SELECT GRANULAR BORROW (CV) - 12" DEPTH	CU YD	4,030	$35.00	$141,050.00
14	BITUMINOUS NON-WEAR COURSE - 3.0" DEPTH	TON	585	$89.25	$52,211.25
15	BITUMINOUS WEAR COURSE - 1.5" DEPTH	TON	40	$103.95	$4,158.00
16	BITUMINOUS WEAR COURSE - 2.0" DEPTH	TON	735	$101.85	$74,859.75
17	BITUMINOUS WEAR COURSE - 3.5" DEPTH	TON	600	$103.95	$62,370.00
18	4" SOLID DOUBLE YELLOW LINE	LIN FT	3,250	$1.95	$6,347.25
19	4" SOLID LINE WHITE	LIN FT	5,325	$1.31	$6,989.06
20	PAVEMENT MARKINGS	EACH	3	$288.75	$866.25
21	SUMP PUMP SERVICE CONNECTION	EACH	5	$330.75	$1,653.75
22	CONSTRUCT WEIR STRUCTURE	EACH	1	$12,600.00	$12,600.00
23	CASTING ASSEMBLY (STORM)	EACH	1	$1,155.00	$1,155.00
24	4" PERFORATED EDGE DRAIN	LIN FT	3,815	$17.96	$68,498.33
25	4" HDPE DRAIN TILE CLEANOUT	EACH	16	$315.00	$5,040.00
26	ROCK CONSTRUCTION ENTRANCE	EACH	5	$2,100.00	$10,500.00
27	SOD TYPE LAWN	SQ YD	4,500	$14.49	$65,205.00
28	TOPSOIL BORROW (LV)	CU YD	500	$66.15	$33,075.00
29	FURNISH & INSTALL SIGN	EACH	38	$577.50	$21,945.00
30	BUSINESS SIGNAGE	ALLOWANCE	1	$15,000.00	$15,000.00
31	REPAIR EXTERIOR BUILDING FAÇADE	ALLOWANCE	1	$20,000.00	$20,000.00
32	STREET LIGHTING & BANNER POLES	LUMP SUM	1	$550,000.00	$550,000.00
33	CITY PARK LIGHTING	LUMP SUM	1	$270,000.00	$270,000.00
34	WAYFINDING SIGNAGE	LUMP SUM	1	$25,000.00	$25,000.00
35	CONSTRUCTION TRAILER MOBILIZATION & SETUP	LUMP SUM	1	$4,000.00	$4,000.00
36	TEMPORARY PARKING LOT ACCESS	LUMP SUM	1	$10,000.00	$10,000.00
37	LANDSCAPING	ALLOWANCE	1	$10,000.00	$10,000.00

SUBTOTAL:	*$2,010,118.54*
CONTINGENCIES (10%):	*$201,011.85*
ESTIMATED CONSTRUCTION COST:	*$2,211,130.39*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$663,339.12*
TOTAL ESTIMATED PROJECT COST:	***$2,874,469.51***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

PARKING LOT RECONSTRUCTION (NON-ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$11,000.00	$11,000.00
2	TRAFFIC CONTROL	LUMP SUM	1	$2,000.00	$2,000.00
3	ROCK CONSTRUCTION ENTRANCE	EACH	1	$2,100.00	$2,100.00
4	REMOVE CONCRETE CURB & GUTTER	LIN FT	123	$6.30	$774.90
5	CLEAR & GRUB TREE	EACH	4	$945.00	$3,780.00
6	REMOVE BITUMINOUS PAVEMENT	SQ YD	1,313	$6.83	$8,961.23
7	REMOVE CONCRETE DRIVEWAY PAVEMENT	SQ FT	1,927	$3.15	$6,070.05
8	COMMON EXCAVATION (EV)	CU YD	867	$31.50	$27,310.50
9	SUBGRADE EXCAVATION (EV)	CU YD	73	$21.00	$1,533.00
10	GEOTEXTILE FABRIC	SQ YD	2,198	$1.79	$3,923.43
11	AGGREGATE BASE CLASS 5 (CV) - 9" DEPTH	TON	877	$50.72	$44,477.06
12	STABILIZING AGGREGATE (CV)	CU YD	73	$32.55	$2,376.15
13	BITUMINOUS NON-WEAR COURSE - 3.0" DEPTH	TON	391	$89.25	$34,896.75
14	BITUMINOUS WEAR COURSE - 1.5" DEPTH	TON	197	$103.95	$20,478.15
15	CONSTRUCT DRAINAGE STRUC. DES G	EACH	1	$2,100.00	$2,100.00
16	CONSTRUCT DRAINAGE STRUC. DES 2'X3'	EACH	1	$3,937.50	$3,937.50
17	15" RC PIPE SEWER DES 3006 CL V	LIN FT	150	$73.50	$11,025.00
18	CASTING ASSEMBLY (STORM)	EACH	3	$1,155.00	$3,465.00
19	CONNECT TO EXISTING ROOF DRAIN	EACH	2	$1,000.00	$2,000.00
20	STORM DRAIN INLET PROTECTION	EACH	8	$178.50	$1,428.00
21	BIOROLL	LIN FT	330	$3.94	$1,299.38
22	6" CONCRETE DRIVEWAY	SQ FT	163	$11.81	$1,925.44
23	4" SOLID LINE WHITE	LIN FT	3,589	$1.31	$4,710.56
24	PAVEMENT MARKINGS	EACH	3	$288.75	$866.25
25	SOD TYPE LAWN	SQ YD	128	$14.49	$1,854.72
26	TOPSOIL BORROW (LV)	CU YD	17	$66.15	$1,124.55
27	REPAIR EXTERIOR BUILDING FAÇADE	ALLOWANCE	1	$5,000.00	$5,000.00
28	LANDSCAPING	ALLOWANCE	1	$5,000.00	$5,000.00

SUBTOTAL:	*$215,417.61*
CONTINGENCIES (10%):	*$21,541.76*
ESTIMATED CONSTRUCTION COST:	*$236,959.37*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$71,087.81*
TOTAL ESTIMATED PROJECT COST:	***$308,047.18***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

SIDEWALK (NON-ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	REMOVE CONCRETE WALK	SQ FT	27,710	$1.94	$53,826.68
2	4" CONCRETE WALK (w/ AGG. CL 5 BASE)	SQ FT	30,215	$7.88	$237,943.13
3	BUSINESS ENTRANCE MODIFICATIONS	ALLOWANCE	1	$7,500.00	$7,500.00
4	PEDESTRIAN RAMP	EACH	25	$3,675.00	$91,875.00
5	CROSSWALK EXPOXY	SQ FT	2,900	$3.15	$9,135.00

SUBTOTAL:	*$400,279.80*
CONTINGENCIES (10%):	*$40,027.98*
ESTIMATED CONSTRUCTION COST:	*$440,307.78*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$132,092.33*
TOTAL ESTIMATED PROJECT COST:	***$572,400.11***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

SANITARY SEWER RECONSTRUCTION (ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$14,000.00	$14,000.00
2	REMOVE SANITARY MANHOLE	EACH	5	$840.00	$4,200.00
3	REMOVE SANITARY PIPE	LIN FT	1,735	$7.35	$12,752.25
4	REMOVE SANITARY SERVICE PIPE	LIN FT	1,035	$5.25	$5,433.75
5	EXTERNAL CHIMNEY SEAL	EACH	5	$315.00	$1,575.00
6	8" PVC PIPE SEWER SDR 35	LIN FT	1,740	$60.17	$104,687.10
7	6" PVC PIPE SEWER SERVICE SDR 26	LIN FT	1,135	$46.20	$52,437.00
8	8" X 6" SERVICE WYE	EACH	22	$735.00	$16,170.00
9	CONSTRUCT SANITARY MANHOLE (48")	LIN FT	70	$540.75	$37,852.50
10	CASTING ASSEMBLY (SANITARY)	EACH	5	$1,470.00	$7,350.00
11	CONNECT TO EXISTING SANITARY SEWER PIPE	EACH	5	$1,680.00	$8,400.00
12	CONNECT TO EXISTING SANITARY SERVICE	EACH	20	$682.50	$13,650.00

SUBTOTAL:	*$278,507.60*
CONTINGENCIES (10%)	*$27,850.76*
ESTIMATED CONSTRUCTION COST:	*$306,358.36*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$91,907.51*
TOTAL ESTIMATED PROJECT COST:	***$398,265.87***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

SANITARY SEWER RECONSTRUCTION (NON-ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$2,000.00	$2,000.00
2	BYPASS PUMPING	LUMP SUM	2	$8,400.00	$16,800.00
3	VIBRATION MONITORING	LUMP SUM	1	$18,385.00	$18,385.00

SUBTOTAL:	*$37,185.00*
CONTINGENCIES (10%):	*$3,718.50*
ESTIMATED CONSTRUCTION COST:	*$40,903.50*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$12,271.05*
TOTAL ESTIMATED PROJECT COST:	***$53,174.55***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

WATERMAIN RECONSTRUCTION (ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$24,000.00	$24,000.00
2	REMOVE WATERMAIN	LIN FT	2,395	$6.83	$16,345.88
3	REMOVE WATERMAIN SERVICE	LIN FT	930	$2.63	$2,441.25
4	REMOVE GATE VALVE & BOX	EACH	11	$357.00	$3,927.00
5	REMOVE HYDRANT	EACH	3	$288.75	$866.25
6	6" DIP WATERMAIN	LIN FT	115	$73.50	$8,452.50
7	8" PVC WATERMAIN	LIN FT	410	$78.75	$32,287.50
8	10" PVC WATERMAIIN	LIN FT	1,200	$88.20	$105,840.00
9	3 LB ANODE	EACH	9	$210.00	$1,890.00
10	9 LB ANODE	EACH	4	$304.50	$1,218.00
11	WATERMAIN FITTINGS	POUND	2,310	$17.85	$41,233.50
12	6" GATE VALVE & BOX	EACH	7	$2,730.00	$19,110.00
13	8" GATE VALVE & BOX	EACH	5	$3,780.00	$18,900.00
14	10" GATE VALVE & BOX	EACH	4	$5,355.00	$21,420.00
15	1" CORPORATION STOP	EACH	21	$1,260.00	$26,460.00
16	1" CURB STOP & BOX	EACH	21	$651.00	$13,671.00
17	1" SERVICE PIPE (OPEN CUT)	LIN FT	800	$32.55	$26,040.00
18	1" SERVICE PIPE (PULLED)	LIN FT	200	$139.65	$27,930.00
19	HYDRANT	EACH	3	$8,400.00	$25,200.00
20	WATER SERVICE CASTING ASSEMBLY	EACH	21	$399.00	$8,379.00
21	TRACER WIRE ACCESS BOX	EACH	21	$336.00	$7,056.00
22	TEMPORARY WATER SYSTEM	LUMP SUM	1	$31,500.00	$31,500.00
23	CONNECT TO EXISTING WATER SERVICE	EACH	19	$546.00	$10,374.00
24	CONNECT TO EXISTING WATERMAIN	EACH	5	$3,360.00	$16,800.00

SUBTOTAL:	*$491,341.88*
CONTINGENCIES (10%):	*$49,134.19*
ESTIMATED CONSTRUCTION COST:	*$540,476.06*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$162,142.82*
TOTAL ESTIMATED PROJECT COST:	***$702,618.88***

ESTIMATED PROJECT COST
FOR
Downtown Reconstruction Phase 4
8/12/2025

WATERMAIN RECONSTRUCTION (NON-ASSESSABLE)

ITEM NO.	BID ITEM	UNIT	EST QTY	UNIT PRICE	TOTAL
1	MOBILIZATION	LUMP SUM	1	$14,000.00	$14,000.00
2	REMOVE WATERMAIN	LIN FT	840	$6.83	$5,733.00
3	REMOVE GATE VALVE & BOX	EACH	4	$358.00	$1,432.00
4	6" DIP WATERMAIN	LIN FT	60	$73.50	$4,410.00
5	8" PVC WATERMAIN	LIN FT	550	$78.75	$43,312.50
6	3 LB ANODE	EACH	6	$210.00	$1,260.00
7	9 LB ANODE	EACH	1	$304.50	$304.50
8	WATERMAIN FITTINGS	POUND	205	$17.85	$3,659.25
9	6" GATE VALVE & BOX	EACH	2	$2,730.00	$5,460.00
10	8" GATE VALVE & BOX	EACH	4	$3,780.00	$15,120.00
11	HYDRANT	EACH	1	$8,400.00	$8,400.00
12	CONNECT TO EXISTING WATERMAIN	EACH	3	$3,360.00	$10,080.00
13	BORE FOUNDATION WALL/REMOVE & REPLACE FLOOR	EACH	19	$546.00	$10,374.00
14	RESET WATER METER & ADJUST PIPING	EACH	19	$546.00	$10,374.00
15	MOVE ELECTRICAL GROUND FROM WATER SERVICE	EACH	19	$441.00	$8,379.00
16	HAND EXCAVATION TO CONNECT WATER SERVICE (IN CRAWL SPACE)	EACH	19	$567.00	$10,773.00
17	CATHODIC PROTECTION TEST STATION	EACH	19	$2,100.00	$39,900.00
18	VIBRATION MONITORING	LUMP SUM	1	$18,375.00	$18,375.00
19	1" IRRIGATION MAIN HDD	LIN FT	3,405	$12.00	$40,860.00
20	CONNECT TO EXISTING IRRIGATION PIPE	EACH	3	$1,500.00	$4,500.00
21	IRRIGATION BLOWOFF STRUCTURE CASTING	EACH	7	$1,250.00	$8,750.00
22	IRRIG. CONNECTOR IN PRECAST CONC. HANDHOLE	EACH	32	$1,800.00	$57,600.00
23	BLOWOFF IN PRECAST CONCRETE HANDHOLE (60")	EACH	7	$7,500.00	$52,500.00

SUBTOTAL:	*$375,556.25*
CONTINGENCIES (10%):	*$37,555.63*
ESTIMATED CONSTRUCTION COST:	*$413,111.88*
ADMINISTRATION, ENGINEERING, SURVEYING, INSPECTION (30%):	*$123,933.56*
TOTAL ESTIMATED PROJECT COST:	***$537,045.44***

APPENDIX C

CITY ASSESSMENT POLICY

Section Extracted from City of Waconia Financial Policy & Guidelines
Last Amended June 19, 2017

Special Assessments

The financing for reconstruction projects is through the sale of General Obligation 429 Improvement Bonds. Minnesota State Statute requires a minimum assessed percentage of 20% for projects financed with 429 bonds.

With each reconstruction project, a feasibility study is completed and approved by the City Council. Once a draft of the feasibility study is complete, City staff will share the information with a qualified appraiser to determine the special benefit to each property in the reconstruction area. The City Council will use this appraisal information as a basis for finalizing the special assessments due by property owners for reconstruction projects.

Assessment Policy Summary:

- The portion of the project costs assessed to the abutting property owner shall be based on a linear front footage basis of the parcel or unit basis.
- The City pays 50% of the total project cost of a standard local street section and 100% of the cost of extra width and extra depth above the city standard local street section.
- Storm sewer costs are to be included in the total project cost of a city standard local street, assessed 50% (and City pays 50%), in accordance with the Street Assessment Policy.
- All or some of the following improvements may be incorporated in a reconstruction project. Costs for these improvements will be included in the overall project cost, with a contribution from the City: storm water ponding, street lights, relocation of overhead power lines, street signs, sidewalks and trails, and boulevard trees.
- Corner lots and parcels with multiple frontages shall be assessed 50% of the front footage on each side.
- A minimum assessment shall be levied to parcels identified within the project area having neither direct primary nor non-primary access to affected streets. The assessment shall be equal to 75% of the typical front footage identified within the project area. Parcels abutting county roads are exempt from this provision.
- Assessments will not be levied for seal coat and overlay operations.
- Assessments may be pre-paid to the City by benefiting properties
- Assessments will be billed to the benefiting property owner by the City; typically over a ten (10) year period, at an interest rate of one percent (1%) over the bond interest rate. Other terms of the assessment receivable may be available to the benefiting property owners.
    - For any project, where all the benefitting property owner(s) are governmental entities (school district, county, state, etc.), the City will assess the benefiting property owner(s) the actual bond interest rate, typically over a ten (10) year period.
- In the case where a benefiting property owner is delinquent in their assessment payment, assessments may be certified to real estate taxes over a ten (10) year period, at an interest rate one percent (1%) over the bond interest rate.
- Partial pre-payments for assessments exceeding $100,000.00 may be accepted by the City.

Infrastructure Improvement Cost Breakdown & Methodology

Improvement	Type of Construction	Method
Curb & Gutter	New Development	100% of the cost assessed to abutting property owner on linear front footage OR unit basis.
	Reconstruction (Complete)	The portion of the project costs assessed to the abutting property owner shall be based on a linear front footage basis of the parcel.
	Reconstruction (Spot repair)	100% of cost to be included in overall cost of project prior to assessment apportionment in accordance with policy.
Local Street	New Development	100% of the cost assessed to abutting property owner on linear front footage OR per unit basis.
	Reconstruction	50% of the cost to be assessed to abutting property owner on linear front footage OR per unit basis. 50% of the cost to be paid by City.
	Maintenance (Seat coat & overlay)	100% Paid with City funds.
Collector Street as defined by the City's Transportation Plan	New Development	100% of the construction cost of a city standard local street assessed to abutting property owner based on linear front footage OR per unit basis.
	Reconstruction	The portion of the project costs assessed to the abutting property owner shall be based on a linear front footage OR per unit basis. City pays 50% of the cost of the construction of city standard local street and 100% of the cost of construction above a city standard local street.
	Maintenance (Seat coat & overlay)	100% Paid with City funds.
Intersection	New Development	100% of the cost to be included as part of street project and apportioned according to appropriate street construction category.
	Reconstruction	100% of cost to be included in overall cost of project prior to assessment apportionment in accordance with policy.
Multiple Fronted Parcels - Corner Lot - Double Fronted Lot - Large Parcels - Etc.	Reconstruction	Front footage to be used in assessment methods described herein shall be calculated as follows: - 50% of the front footage on all sides of the parcel. 50% of the cost to be paid with City funds.

Table continues on next page

Improvement	Type of Construction	Method
Parcels with no driveway access to primary and non-primary streets.	Reconstruction	A minimum assessment shall be levied to parcels identified within the project area having no direct driveway access to neither primary nor non-primary streets, i.e. alley access. The assessment shall be equal to 75% of the typical front footage identified within the project area. Parcels abutting county roads are exempt from this provision.
Alley	New Development	100% of the cost assessed to abutting property owner on linear front footage OR per unit basis.
	Reconstruction	50% of the cost to be assessed to abutting property owner on linear front footage OR per unit basis. 50% of the cost to be paid with City funds.
Sanitary Sewer Trunk/Lateral	New Development	100% of the cost assessed to benefited area on unit basis.
	Reconstruction	50% of the cost assessed to benefited area on unit basis. 50% of the cost to be paid with City funds.
	Maintenance	100% of the cost to be paid with City funds.
Sanitary Sewer Service	New Development	100% of cost assessed to property owner.
	Reconstruction (Including main)	50% of the cost assessed to benefited area on a unit basis. 50% of the cost to be paid with City funds.
	Reconstruction (Stand alone service replacement)	100% of cost assessed to property owner.
Sanitary Sewer Oversizing	New Development	100% paid with City funds. (Materials cost above 8-inch pipe plus 20% for handling and installation.)
	Reconstruction	100% paid with City funds. (Materials cost above 8-inch pipe plus 20% for handling and installation.)
Lift Station	New Development	100% of the cost assessed to benefited area on a per unit basis.
Water Trunk/Lateral	New Development	100% of the cost assessed to benefited area on unit basis.
	Reconstruction	50% of the cost assessed to benefited area on unit basis. 50% of cost to be paid with City funds.
	Maintenance	100% of the cost to be paid with City funds.
Water Service	New Development	100% of cost assessed to property owner.
	Reconstruction (Including main)	50% of the cost assessed to benefited area on a unit basis. 50% of the cost to be paid with City funds.
	Reconstruction (Stand alone service replacement)	100% of cost assessed to property owner.
Water Oversizing	New Development	100% paid with City funds. (Materials cost above 8-inch pipe plus 20% for handling and installation.)
	Reconstruction	100% paid with City funds. (Materials cost above 8-inch pipe plus 20% for handling and installation.)
Storm Sewer Trunk/Lateral	New Development	100% of the cost assessed to benefited area on unit basis.
	Reconstruction	50% of the cost to be assessed to abutting property owner on linear front footage OR per unit basis. 50% of the cost to be paid with City funds.
	Maintenance	100% of the cost to be paid with City funds.
Storm Water Ponding	New Development	100% assessed to development.
	Reconstruction	Cost to be included in overall cost of project prior to assessment apportionment in accordance with policy. City makes contribution to the project.
	Maintenance	100% of the cost to be paid with City funds.

Table continues on next page

Improvement	Type of Construction	Method
Overhead Power Lines	Relocation	Cost to be included in overall cost of project prior to assessment apportionment in accordance with policy. City makes contribution to the project.
Street Lights	New Development	100% of material and installation cost on a unit basis paid by developer.
	Reconstruction	Cost to be included in overall cost of project prior to assessment apportionment in accordance with policy. City makes contribution to the project.
	Maintenance	100% of the cost to be paid with City funds.
Street Signs	New Development	100% of material and installation cost on a unit basis paid by developer.
	Reconstruction	Cost to be included in overall cost of project prior to assessment apportionment in accordance with policy. City makes contribution to the project.
	Maintenance	100% of the cost to be paid with City funds.
Sidewalks & Trails	New Development	100% of cost assessed on a unit basis to development.
	Reconstruction	Cost to be included in overall cost of project prior to assessment apportionment in accordance with policy. City makes contribution to the project.
	Maintenance	100% of the cost to be paid with City funds.
Boulevard Trees	New Development	100% of cost paid by developer.
	Reconstruction	Cost to be included in overall cost of project prior to assessment apportionment in accordance with policy. City makes contribution to the project.
	Maintenance	100% of the cost to be paid with City funds.

Deferred Special Assessments
Hardship Assessment Deferral for Senior Citizens, People with Disabilities, or Members of the National Guard or other Reserves Ordered to Active Military Service.

Pursuant to the authority for deferring special assessments as provided in Minnesota State Statute Section 435.193 through 435.195, the City Council may, in its discretion, defer the payment of special assessments for any homestead property owned by a person 65 years of age or older, one retired by virtue of a permanent and total disability, or a member of the National Guard or other reserves ordered to active military service for whom it would be a hardship to make the payments.

Eligibility
Any person 65 years of age or older, permanently and totally disabled (as determined by the Social Security Administrator), or a member of the National Guard or other reserve ordered to active military service may request deferment of special assessments levied against real property for public improvements if the following conditions are met.

1. Ownership. The applicant must be the fee simple owner of the property or must be a contract vendee for fee simple ownership. An applicant must provide either a recorded deed or contract for deed with the application to establish a qualified ownership interest as required here.

2. Homestead. The property must be the applicant's principal place of domicile and classified on the City's and County's real estate tax rolls as the applicant's homestead.

3. Income. The income threshold for eligibility of those applicants 65 years of age and older or disabled be established by the most recent U.S. Census Bureau Poverty Threshold compilations. Income eligibility would be determined by the submittal of the most recent federal tax filing form.

Interest on Deferred Assessment
Interest on the deferred assessment shall be forgiven until December 31st of the year before the first installment is payable.

Deferment Period
The deferment shall be granted for as long a period of time as the hardship exists and the conditions aforementioned have been met. However, it shall be the duty of the applicant to notify the City Administrator of any change in status that would affect eligibility or deferment.

The entire amount of deferred special assessments shall be due within sixty (60) days after loss of eligibility by the applicant. If the special assessment is not paid within the sixty (60) days, the City Administrator shall add thereto interest at a per annum interest rate of one percent (1%) above the bond interest rate and the total amount of principal and interest shall be certified to the County Auditor for collection with taxes the following year. Should the applicant demonstrate to the satisfaction of the City Council that full repayment of the deferred special assessment would cause the applicant particular undue financial hardship, the Council may order that the applicant pay within sixty (60) days a sum equal to the number of installments of deferred special assessments outstanding and unpaid to date, including principal and interest, with the balance thereafter paid according to the terms and conditions of the original special assessments.

Termination of Deferral Status
The option to defer the payment of special assessment shall terminate and all amounts accumulated plus applicable interest shall become due upon the occurrence of any one of the following events:

1. Sale of Property. The subject is sold, transferred, or subdivided in whole or in part.

2. Death of Owner. The death of the fee owner qualified for deferral status unless a surviving joint tenant, tenant in common, or contract vendee is eligible for the deferral benefit provided hereunder.

3. Nonhomestead Property. The subject property loses its homestead status for any reason.

4. No Hardship. The City Council determines that there would be no hardship to require an immediate or partial payment of the deferred special assessment.

Filling for Federal Status/Fee
An eligible applicant must file an application not later than thirty (30) days after the assessment is adopted by the City Council.

All deferral applications must be made on forms approved by the City and submitted to the City Administrator. The applicant will be charged an administrative filing fee, based on the current fee schedule.

Nothing herein shall be construed to prohibit the determination of hardship on the basis of exceptional and unusual circumstances not covered by the above noted requirements where the determination is made in a nondiscriminatory manner and does not give the applicant an unreasonable preference or advantage over other applicants.

Deferred Assessment Procedures

- Deferred Assessment Application form is provided to applicant/property owner by the City Administrator's Office.

- Applicant fills out the application form and provides the relevant information to document qualification for deferred assessment. Applicant then returns form to City Administrator's Office.

- City Administrator forwards the application to the Finance Director for review of qualifications. Finance Director makes recommendation to City Council to approve or deny the application.

- An approved application may be forwarded to the Carver County Recorder's office for recording and to the Carver County Taxpayer Services Division.

- The deferral information is entered into the City's property records data base.

- At such time the property no longer qualifies for the deferred assessment (upon a transfer of the property, loss of homestead status, or death, no hardship as determined by the Council), the County Auditor/Recorder's office will notify the City of the termination of the deferral status, and direct the party to the City Administrator's office to pay balance on the outstanding deferred assessment amount.

CITY OF WACONIA
APPLICATION AND AUTHORIZATION FOR DEFERRED PAYMENT ON SPECIAL ASSESSMENTS FOR SENIOR CITIZEN/PERMANENTLY DISABLED HOMESTEAD/ NATIONAL GUARD OR OTHER RESERVES ORDERED TO ACTIVE MILITARY SERVICE MINNESOTA STATUTES 435.193 TO 435.195

STATE OF MINNESOTA)
)
COUNTY OF CARVER)

Date: _____, 20____

To: City Clerk, City of Waconia, Minnesota
201 South Vine Street
Waconia, MN 55387

I, the undersigned, declare under penalties of perjury:

1. That I reside at _____

   a. That I am not less than 65 years of age and that the date of my birth is _____

   b. That I am permanently and totally disabled as is used for social security purposes, which aid is at least 90 percent of the total income of such disabled person from all sources. YES_____ NO_____

   c. That I am a member of the National Guard or other reserves ordered to active military service

2. That I am the owner of the property legally described as _____
   _____

3. That my interest in the ownership of the above property was acquired on _____
   and is as follows: 1. Sole ownership YES_____ NO_____
   2. Joint tenancy, held with _____
   3. Other undivided interest (Specify) _____

4. That the total gross annual household income does not exceed $_____. (Established by the most recent U.S. Census Bureau Poverty Threshold compilation.)

A COPY OF YOUR MOST CURRENT MINNESOTA HOMEOWNER PROPERTY TAX REFUND RETURN FORM #M1PR MUST ACCOMPANY THIS APPLICATION IF APPLICABLE.

Kinds of Income Received	Husband	Wife	Other Family Members
Salaries & Wages	$	$	$
Social Security			
Veteran's Benefits			
Other Retirement			
Money from Rents			
Unemployment Insurance			
Workmen's Compensation			
Disability Benefits			
Stock Dividends/Interest			
All Other			

10/2/2008

7. That my social security number is ______-______-__________ Spouse ______-______-______

8. That on January 2, 20____ or December 1, 20____ I owned and occupied the above property as my homestead and such occupancy began on ______________________.

9. That the payments for improvements on the special assessments duly adopted by the City of Waconia as of ______________________ which have been allocated against the subject property would create undue personal hardship on my behalf and I respectfully request that payment be delayed and that such payments be so deferred for the years 20______ to 20______.

____
Owner Signature

____
Owner Signature

= =

I, ______________________________, City Clerk of the City of Waconia, Carver County, State of Minnesota, do hereby certify that the application of ____, above named, has been duly reviewed and that in accordance with the minutes of official record was duly
______**APPROVED** ______**DENIED** as of ____________________, 20______.

That in accordance with approval granted, that the payment for special assessments on the applicant's subject property in the amount of $__________ for the year (s) __________ should be so deferred with interest at the annual rate of __%, until such time as it is deemed the applicant no longer qualifies or the property loses its eligibility.

Dated____________________ 20 ______

____
City Clerk

10/2/2008

APPENDIX D

GEOTECHNICAL REPORT

HAUGO GEOTECHNICAL SERVICES

July 23, 2024 Project Number: 21-0538

Mr. Colton Lee, P.E.
Bolton & Menk, Inc
2638 Shadow Lane, Suite 200
Chaska, MN 55318

RE: Geotechnical Exploration Report, City of Waconia Downtown Reconstruction Phase 3 and 4, Waconia, Minnesota

Dear Mr. Lee:

We have completed the geotechnical exploration report for the City of Waconia Downtown Reconstruction Phase 3 and 4 project. Very briefly; we advanced 9 soil borings along the various roadways to characterize subsurface soil and groundwater conditions. Below the pavement section the soil borings generally encountered varying thicknesses of Fill and/or buried topsoil underlain predominantly by clayey glacial till soils that extended to the termination depths of the borings. Portions of the Fill and the buried topsoil were organic in composition and are poor quality soils for utility and pavement support.

Groundwater was not encountered in the borings while drilling and sampling or after removing the augers from the boreholes. We generally do not anticipate groundwater will be encountered during utility installation and/or pavement construction.

Specific details regarding our procedures, results and recommendations follow in the attached geotechnical exploration report.

Thank you for the opportunity to assist you on this project. If you have any questions or need additional information, please contact Paul Gionfriddo at 612-729-2959.

Sincerely,

Haugo GeoTechnical Services

Lucas Mol
Project Manager

Paul Gionfriddo, P.E.
Senior Engineer

GEOTECHNICAL EXPLORATION REPORT

PROJECT:

City of Waconia
Downtown Reconstruction Phase 3 and 4
Waconia, Minnesota

PREPARED FOR:

Bolton & Menk, Inc
2638 Shadow Lane, Suite 200
Chaska, MN 55318

PREPARED BY:

Haugo GeoTechnical Services LLC
2825 Cedar Avenue South
Minneapolis, Minnesota 55407

Haugo GeoTechnical Services Project: 24-0344

July 23, 2024

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Paul Gionfriddo, P.E.
Senior Engineer
License Number: 23093

Table of Contents

1.0 INTRODUCTION

1.1 Project Description

Bolton & Menk, Inc. is preparing design and construction documents for the City of Waconia Downtown Reconstruction Phase 3 (2025) and 4 (2026) projects

To aid in their design, Bolton & Menk, Inc. solicited bids to complete a geotechnical exploration for the projects. Haugo GeoTechnical Services, LLC (HGTS), the successful bidder was retained to advance 9 soil borings along the streets slated for improvements to characterize subsurface soil and groundwater conditions.

1.2 Purpose

The purpose of this geotechnical exploration was to characterize subsurface soil and groundwater conditions and provide recommendations for utility and street construction or reconstruction.

1.3 Site Description

Nine (9) soil borings were completed for the project and were taken along downtown business and residential streets. Each street consisted of a 2-lane bituminous paved surface. The streets slated for reconstruction and the soil boring locations are shown on the Revised Soil Boring Map that was prepared and provided by Bolton and Menk. These streets are summarized in Table 1.

Table 1. Downtown Street Reconstruction

Phase 3 - 2025	
Street	**Between Streets**
1st Street W	Maple Street S to Olive Street S
Olive Street S	1st Street W to 2nd Street W
2nd Street W	Library to Elm Street S
Phase 4 - 2026	
1st Street W	Olive Street S to Spruce Street S
Elm Street S	1st Street W to 2nd Street W
Pine Street S	1st Street W to 2nd Street W
2nd Street W	Elm Street S to Pine Street S

1.4 Scope of Services

Our services were performed in accordance with the HGTS proposal 21-0538 dated May 27, 2021. Our scope of services was performed under the terms of our General Conditions and limited to the following tasks:

- Calling the Gopher State One Call system to locate existing underground public utilities.
- Completing one (1) standard penetration soil borings extending to a nominal depth of 10 feet.
- Completing six (6) standard penetration soil borings extending to a nominal depth of 20 feet.

- Completing two (2) standard penetration soil borings extending to a nominal depth of 25 feet.
- Sealing the borings in accordance with MDH Regulations, including bituminous patching.
- Obtaining GPS coordinates and ground surface elevations at the soil boring locations. Elevations were subsequently provided by Bolton & Menk.
- Visually classifying samples recovered from the soil borings.
- Performing up to ten moisture content tests and ten P-200 content tests on selected samples.
- Preparing soil boring logs describing the soil types/classifications, N-Value determinations and results of water level measurements.
- Preparing an engineering report summarizing soil and groundwater conditions and providing recommendations for utility and roadway construction.

1.5 Documents Provided

We were provided with a map titled; "Downtown Reconstruction – Soil Boring Map" that was prepared by Bolton & Menk and dated April 2024. The map showed the streets and proposed boring locations superimposed onto an aerial photograph of the area. The locations of soil borings completed for previous street improvement projects near this project were also shown on the map.

The April 2024 Soil Boring Map showed the locations of 10 borings. The number of borings was reduced to 9 and we were subsequently provided a Revised Soil Boring Mao that was dated May 2024.

Soil borings were completed in this general area of the city in 2013, 2014, 2020 and 2021 by HGTS and by American Engineering Testing (AET). Log of boring sheets and sketches showing the locations of those boring are included in the Appendix for informational purposes.

1.6 Locations and Elevations

The boring locations were selected and staked in the field by Bolton & Menk. The approximate locations of the soil borings are shown on Revised Soil Boring Map provided by Bolton and Menk.

Ground surface elevations at the boring locations were provided by Bolton & Menk.

2.0 FIELD PROCEDURES

The Standard Penetration Test (SPT) borings were advanced on June 6, 2024 by HGTS with a rotary drilling rig, using continuous flight augers to advance the boreholes. Representative samples were obtained from the borings, using the split-barrel sampling procedures in general accordance with ASTM Specification D-1586. In the split-barrel sampling procedure, a 2-inch O.D. split-barrel spoon is driven into the ground with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampling spoon the last 12 inches of an 18-inch penetration is recorded as the standard penetration resistance value, or "N" value. The results of the standard penetration tests are indicated on the boring log. The samples were sealed in containers and provided to the HGTS office for testing and soil classification.

A field log of each boring was prepared by the HGTS drill crew. The logs contained visual classifications of the soil materials encountered during drilling, as well as the driller's interpretation of the subsurface conditions between samples and water observation notes. The final boring logs included with this report represent an interpretation of the field logs and include modifications based on visual/manual method observation of the samples.

The soil boring logs, general terminology for soil description and identification, and classification of soils for engineering purposes are also included in the appendix. The soil boring logs identify and describe the materials encountered, the relative density or consistency based on the Standard Penetration resistance (N-value, "blows per foot") and groundwater observations.

The strata changes were inferred from the changes in the samples and auger cuttings. The depths shown as changes between strata are only approximate. The changes are likely transitions, variations can occur beyond the location of the boring.

3.0 RESULTS

3.1 Soil Conditions

The soil borings generally encountered 4 main stratigraphic units that included; 1) a pavement section, 2) Fill, 3) buried topsoil, and 4) native glacial till. A brief description of each stratigraphic unit is described below.

Pavement Section Each of the soil borings encountered a pavement section at the surface that consisted of varying thicknesses of bituminous pavement over varying thickness of aggregate base. The bituminous thickness ranged from about 2 ¼ to 7 inches thick with the aggregate base ranging from about 1 to 12 inches thick. The pavement section at boring SB-5 consisted of about 5 inches of bituminous over an approximate 2-inch layer of aggregate over an approximate 2-inch layer bituminous. The pavement section thickness at the boring locations is summarized in Table 2.

Table 2. Summary of Existing Roadway Section

Boring Number	Approximate Bituminous Thickness (inches)	Approximate Aggregate Base Thickness (inches)	Subgrade Soil Type (ASTM)
Phase 3 (2025)			
SB-1	7	8	Buried Topsoil
SB-2	6	6	Buried Topsoil
SB-6	6	12	Buried Topsoil
SB-7	2 ¼	1 ¾	Sandy Lean Clay (CL)
Phase 4 (2026)			
SB-3	6 ½	6	Buried Topsoil & Fill
SB-4	6 ½	1 ¼	Sandy Silt (ML)
SB-5	5	2 & 2 " bituminous	Sandy Lean Clay (CL)
SB-8	5	< 1	Sandy Lean Clay (CL)
SB-9	6	< 1	Fill (CL)

Buried Topsoil Soil borings SB-1, SB-2, SB-3 and SB-6 encountered buried topsoil below the pavement section. The buried topsoil was composed of sandy lean clay that was black to dark grey in color. Organic content tests of the buried topsoil indicated that it was slightly organic with organic contents ranging from about 3 ½ to 4 ½ percent. The buried topsoil extended to depth ranging from about 2 to 4 ½ feet below the pavement surface.

Fill Soil borings SB-3 and SB-9 encountered Fill below the pavement section of the buried topsoil. The Fill was composed of sandy lean clay that extended to depths ranging from about 2 to 4 ½ feet below the pavement surface. The Fill varied from brown to greyish brown to black in color.

The penetration resistance values (N-Values), shown as blows per foot (bpf) on the boring logs, within the clayey Fill soils was 5 bpf. Indicating the Fill had a rather soft consistency.

Glacial Till Below the pavements section, Fill, or buried topsoil the borings encountered glacial till deposits that were composed predominantly of sandy lean clay that extended to the termination depths of the borings.

The exceptions were soil borings SB-4 and SB-5. Soil boring SB-4 encountered sandy silt below the pavement that extend to a depth of about 4 ½ feet. Both boring SB-4 and SB-5 encountered relatively thin layer of sand (poorly graded sand with silt)at about 7 and 9 ½ feet, respectively. The sand layer was estimated to be less than a foot thick at boring SB-4 and was estimated to be about 2 feet thick at boring SB-5.

The N-Values within the native clayey glacial till soils ranged from 3 to 17 bpf. These values indicate the clayey glacial till had a soft to very stiff consistency but was mostly medium to rather stiff. N-Values within the sandy silt poorly graded sand with silt ranged from 9 to 32 bpf, indicating a loose to dense relative density.

3.2 Groundwater

Groundwater was not encountered in the soil borings while drilling and sampling or after removing the augers from the boreholes. Groundwater appears to be below the depths explored by our borings.

Water levels were measured on the dates as noted on the boring logs and the period of water level observations was relatively short. Given the cohesive nature of the soils encountered, it is possible that insufficient time was available for groundwater to seep into the borings and rise to its hydrostatic level. Groundwater monitoring wells or piezometers would be required to more accurately determine water levels. Seasonal and annual fluctuations in the groundwater levels should be expected.

3.3 Laboratory Testing

Laboratory moisture content, organic content, and grain size analyses (gradations) were performed on selected samples recovered from the soil borings. Table 3 summarizes the results of the laboratory moisture content and organic content tests along with the P-200 portion of the grain size analyses. These results are also shown on the boring logs adjacent to the sample tested. The full grain size analyses are included in the Appendix.

Table 3. Summary of Laboratory Analysis

Boring Number	Sample	Depth (feet)	Moisture Content (%)*	P-200 Content (%) *	Organic Content (%) *
SB-1	AU-43	Agg Base	-	9	-
SB-1	SS-44	2 ½	27	-	3 ½
SB-1	SS-46	7 ½	20 ½	-	-
SB-2	AU-51	Agg Base	-	10 ½	-
SB-2	SS-52	2 ½	22	-	-
SB-2	SS-55	10	19	-	-
SB-3	AU-35	Agg Base	-	5	-
SB-3	SS-36	2 ½	25	-	-
SB-3	SS-38	7 ½	19 ½	-	-
SB-4	SS-28	2 ½	16	-	-
SB-4	SS-31	10	20 ½	-	-
SB-5	SS-65	2 ½	15 ½	-	-
SB-5	SS-68	10	7	-	-
SB-6	AU-59	Agg Base	-	11	-
SB-6	SS-60	2 ½	20	-	4 ½
SB-6	SS-61	5	19	-	-
SB-7	SS-21	5	30 ½	-	-
SB-7	SS-23	10	19 ½	-	-
SB-8	SS-11	2 ½	22 ½	-	-
SB-8	SS-13	7 ½	19	-	-
SB-9	SS-4	7 ½	19	-	-
SB-9	SS-7	15	19 ½	-	-

*Moisture content, P-200 and organic content tests were rounded to the nearest ½ percent.

3.4 OSHA Soil Classification

The soils encountered in the borings at the anticipated excavation depths consisted predominantly of sandy lean clay with lesser amounts of sandy silt and poorly graded sand with silt corresponding to the ASTM Classifications of CL, ML, and SP-SM, respectively. The clayey soils (CL) will generally be Type B soils under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines. The sandier soils (ML and SP-SM) will generally be a Type C soil under OSHA guidelines.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches." This document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Proposed Construction

We understand that street improvements will include removing and replacing underground watermain, storm sewer and sanitary sewer utilities and reconstructing the roadways.

Based on correspondence with Bolton & Menk we understand that the watermain and sanitary sewer will consist of non-corrosive pipe materials and the storm sewer will likely be reinforced concrete pipe. Sanitary sewer and watermain invert depths are anticipated to range from about 7 to 18 feet below the ground surface. Pipe burial depths for the storm sewer are anticipated to be within about 5 feet of the ground surface. We anticipate that site grading will consist of earthwork necessary for utility installations and roadway reconstruction and we do not anticipate any significant changes in the roadway alignment or roadway grades. Cuts or fills involving permanent grade change, if any, are assumed to be less than 2 feet.

Changes in the nature, design, or location of all or parts of this project may occur. If the proposed grades differ by more than 2 feet from the assumed values or if the design or location of the proposed improvements change, we should be informed. Additional analyses and revised recommendations may be necessary.

4.2 Discussion

General

The laboratory moisture contents of the clayey subgrade soils ranged from about 15 ½ to 30 ½ percent with most of the moisture contents between about 19 and 25 percent. These values indicate the soils were likely above their assumed optimum soil moisture content. Soil that will be reused as fill or backfill will likely require some drying to meet the recommended compaction levels. Summer months are typically more favorable for drying wet soils.

Buried Topsoil

Buried topsoil was encountered in borings SB-1, SB-2, SB-3 and SB-6. Laboratory tests indicated the buried topsoil was slightly organic. Organic soils or soils contain organic materials are generally compressible and are poor quality soils for utility and/or pavement support. We anticipate that these materials will be excavated incidental to utility installation and further anticipate that it will be desired to reuse the excavated materials to the greatest extent possible but given the organic nature of the materials we recommend they be replaced with suitable non-organic mineral soils.

Glacial Till

The sandy lean clay glacial till encountered in the borings, in our opinion, are suitable for roadway and pipe support. However, portions of the clay had a soft consistency and are not suitable for pipe support. Soft clays may need to be removed and replaced with suitable pipe bedding materials or excavated, dried and recompacted.

We anticipate that it will be desired to reuse the clayey soils as fill and backfill to the greatest extent possible. As noted above the clayey were likely above their assumed optimum soil moisture content. Soil that will be reused as fill or backfill will likely require some drying to meet the recommended compaction levels. Soils that cannot be dried and recompacted may need to be replaced with suitable compacted engineered fill.

Sandy silt (ML) was encountered in boring SB-4 that extended to about 4 ½ feet below the ground surface. The sandy silt is a moisture sensitive material and can easily become disturbed and loose strength due to construction activities, especially in the presence of excess moisture. These soils can also be difficult to compact. Silty soils that cannot be compacted to project requirements may need to be removed and replaced with suitable compacted engineered fill.

Groundwater Groundwater was not encountered in the soil borings while drilling and sampling or after removing the augers from the boreholes. We do not anticipate groundwater will be encountered during construction and do not anticipate that dewatering will be required.

4.3 Utility and Pavement Subgrade Preparation

Excavations We recommend that all pavements, organic soils, buried topsoil, Fill, and any soft or otherwise unsuitable soil materials, if encountered, be removed from below the proposed utilities, pavement and oversize areas. Table 4 summarizes the anticipated excavation depths to remove the pavements and buried topsoil. Excavation depths for pipe installation will likely be deeper. We anticipate that the utilities will be supported on the native glacial till soils which in our opinion are suitable for pipe support.

Table 4. Anticipated Excavation Depths

Boring Number	Measured Surface Elevation (feet)	Anticipated Excavation Depth (feet)*	Anticipated Excavation Elevation (feet)*	Anticipated Groundwater Elevation (feet)*
Phase 3 (2025)				
SB-1	1015.7	4 ½	1011	NE
SB-2	1024.6	2	1022 ½	NE
SB-6	1027.3	4 ½	1023	NE
SB-7	1028.9	½	1028 ½	NE
Phase 4 (2026)				
SB-3	1036.7	2	1034 ½	NE
SB-4	1043.5	½	1043	NE
SB-5	1049.5	1	1048 ½	NE
SB-8	1044.1	½	1043 ½	NE
SB-9	1045.9	2	1044	NE

* = Excavation elevations were rounded to nearest ½ foot. NE – Not Encountered

Oversizing In areas where the excavations extend below the proposed pavement or utility elevations, the excavation requires oversizing. We recommend the perimeter of the excavation be extended a foot outside the proposed footprint for every foot below finish grade (1H:1V oversizing). The purpose of the oversizing is to provide lateral support of the pavement or utility.

Backfilling We recommend bedding material be thoroughly compacted around the pipes. We recommend that engineered fill placed to establish pavement grades be compacted to a minimum of 95 percent of its standard Proctor density (ASTM D 698), the exception being within 3 feet of the proposed pavement subgrade, where 100 percent of standard Proctor density is required. In landscaped areas we recommend a minimum compaction of 90 percent.

Granular fill classified as SP or SP-SM should be placed within 65 percent to 105 percent of its optimum moisture content as determined by the standard Proctor. Other fill soils should be placed within 3 percentage points above and 1 percentage point below its optimum moisture content as determined by the standard Proctor. All fill should be placed in thin lifts and be compacted with a large self-propelled vibratory compactor operating in vibratory mode.

We anticipate that the soil removed for utility construction will be re-used as fill and backfill to the greatest extent possible. However, we do not recommend reusing the buried topsoil or other organic soils or other soils that are black in color as fill or backfill.

It is our opinion that glacial till soils excavated for utility installation are generally suitable for re-use as fill and backfill provided it is free of topsoil, organic soils or other unsuitable materials.

Moisture contents of the on-site soil materials ranged from about 15 ½ to 30 ½ percent with most of the moisture contents between 19 and 25 percent. These values indicate the soils were likely above their assumed optimum soil moisture content. Soil that will be reused as fill or backfill will likely require some drying to meet the recommended compaction levels. Summer months are typically more favorable for drying wet soils.

Additional backfill, if needed, to attain pavement subgrade elevation can consist of any mineral soil provided it is free of organic material or other deleterious materials.

Dewatering Groundwater was not encountered in the soil borings while drilling and sampling or after removing the augers from the boreholes. We do not anticipate groundwater will be encountered during construction and do not anticipate that dewatering will be required.

4.4 Pavement Recommendations

We anticipate the pavements will be designed in accordance with City of Waconia standard plates.

We were not provided any information regarding traffic volumes, such as Average Annual Daily Traffic (AADT) or vehicle distribution. Since the streets are generally located near "downtown" Waconia we anticipate that the streets will be used a variety of vehicles including; automobiles, light trucks, school buses, garbage trucks and delivery vans (FEDEX, UPS etc.). 1st Street, Olive Street and Elm Street are truck routs and may see some larger delivery vehicles. Based on the assumed traffic types we estimate the roadways will be subjected to Equivalent Single Axle Loads (ESAL's) ranging from about 50,000 to 75,000 over a 20-year design life. This does not account for any future growth.

We recommend the subgrade soil be backfilled and compacted as described in Section 4.3 above.

Prior to placing the aggregate base (Class 5) we recommend the subgrade be test rolled with a loaded tandem truck to identify soft, weak, loose or unstable areas that may require additional subcuts.

R-Values Laboratory tests to determine the soils Hveem Stabilometer R-Value (R-Value) was beyond the scope of this project. Based on the soil borings we anticipate we anticipate the pavement subgrade will consist of sandy lean clay meeting the ASTM classification CL. Information provided in the State of Minnesota Department of Transportation, Geotechnical & Pavement Manual, Part II, indicates that R-Values for sandy lean clay materials meeting the ASTM Classification CL can range from 6 to 18. Since the borings were spaced fairly far apart and to account for potential variations in subgrade soil conditions it is our opinion that an R-Value of 12 can be used for pavement design.

Pavement Section We understand that the pavements will be constructed to meet City of Waconia standard street sections. These city standard street sections are presented below. However, we understand that the City of Waconia and/or Bolton & Menk may evaluate alternate pavement section thicknesses and select an appropriate pavement section. Alternate pavement sections can be provided if requested.

Residential Street We recommend the pavement section consist of a minimum of 4 ½ inches of bituminous (2 inches of wear course and 2 ½ inches of base course) underlain by a minimum of 8 inches of aggregate base and a minimum of 12 inches of select granular subbase. We recommend placing a layer of geotextile separator fabric between the subgrade soils and select granular subbase. We recommend installing along with drain tile. Drain tile should be routed to the storm sewer system or ither suitable disposal area.

Truck Routes We recommend the pavement section consist of a minimum of 6 ½ inches of bituminous underlain by a minimum of 12 inches of aggregate base and a minimum of 12 inches of select granular subbase. We recommend placing a layer of geotextile separator fabric between the subgrade soils and select granular subbase. We recommend installing along with drain tile. Drain tile should be routed to the storm sewer system or ither suitable disposal area.

Geotextile Materials Geotextile fabric should meet MN/DOT Specification 3733. Based on 2020 MN/DOT specifications we recommend a Category 2, Type 9 geotextile, or equivalent.

Pavement Materials We recommend that the bituminous wear and base courses meet the requirement of Mn/DOT specification 2360. We recommend compacting the SPNW bituminous pavements to at least 93% of the maximum theoretical density and compacting SPWE bituminous pavements to at least 92% of the maximum theoretical density.

We recommend aggregate base meeting Mn/DOT specification 3138 for Class 5 aggregate base. We recommend the aggregate base be compacted to 100 percent of its maximum standard Proctor dry density.

The new pavement areas will likely include concrete curb and gutter. We recommend specifying concrete that has a minimum 28-day compressive strength of 3,900 psi. We recommend specifying 5 to 8 percent entrained air for exposed concrete to provide resistance to freeze-thaw deterioration. We recommend slump, air content and compressive strength tests of Portland cement concrete.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Excavation

The soils encountered in the borings at the anticipated excavation depths consisted predominantly of sandy lean clay with lesser amounts of sandy silt and poorly graded sand with silt corresponding to the ASTM Classifications of CL, ML, and SP-SM, respectively. The clayey soils (CL) will generally be Type B soils under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines. The sandier soils (ML and SP-SM) will generally be a Type C soil under OSHA guidelines.

Temporary excavations in Type B soils should be constructed at a minimum of 1 foot horizontal to every 1-foot vertical within excavations. Temporary excavations in Type C soils should be constructed at a minimum of 1 ½ foot horizontal to every 1-foot vertical within excavations. Slopes constructed in this manner may still exhibit surface sloughing. If site constraints do not allow the construction of slopes with these dimensions, temporary shoring may be required.

5.2 Observations

A geotechnical engineer or qualified engineering technician should observe the excavation subgrade to evaluate if the subgrade soils are similar to those encountered in the borings and adequate to support the proposed construction.

5.3 Backfill and Fills

Site soils that will be excavated and reused as backfill and fill appear to be above their assumed optimum moisture content. We anticipate it may be necessary to moisture condition (dry) portions of these soils to achieve the recommended compaction. We recommend that fill and backfill be placed in lifts not exceeding 4 to 12 inches, depending on the size of the compactor and materials used.

5.4 Testing

We recommend density tests of backfill and fills placed during utility and pavement construction. Samples of the proposed materials should be submitted to our laboratory prior to placement for evaluation of their suitability and to determine their optimum moisture content and maximum dry density (Standard Proctor).

5.5 Winter Construction

If site grading and construction is anticipated to proceed during cold weather, all snow and ice should be removed from cut and fill areas prior to additional grading and placement of fill. No fill should be placed on frozen soil and no frozen soil should be used as fill or backfill.

Concrete delivered to the site should meet the temperature requirements of ASTM and/or ACI. Concrete should not be placed on frozen soil. Concrete should be protected from freezing until the necessary strength is obtained.

6.0 PROCEDURES

6.1 Soil Classification

The drill crew chief visually and manually classified the soils encountered in the borings in general accordance with ASTM D 2488, "Description and Identification of Soils (Visual-Manual Procedure)". Soil terminology notes are included in the Appendix. The samples were returned to our laboratory for review of the field classification by a geotechnical engineer. Samples will be retained for a period of 30 days.

6.2 Groundwater Observations

Immediately after taking the final samples in the bottom of the borings, the hole was checked for the presence of groundwater. Again, at the end of the drilling day, the borings were re-checked for the presence of groundwater with the levels and time delay being noted on the boring logs.

7.0 GENERAL

7.1 Subsurface Variations

The analyses and recommendations presented in this report are based on data obtained from a limited number of soil borings. Variations can occur away from the borings, the nature of which may not become apparent until additional exploration work is completed or construction is conducted. A reevaluation of the recommendations in this report should be made after performing on-site observations during construction to note the characteristics of any variations. The variations may result in additional excavation costs and it is suggested that a contingency be provided for this purpose.

It is recommended that we be retained to perform the observation and testing program during construction to evaluate whether the design is as expected, if any design changes have affected the validity of our recommendations, and if our recommendations have been correctly interpreted and implemented in the designs, specifications and construction methods. This will allow correlation of the soil conditions encountered during construction to the soil borings and will provide continuity of professional responsibility.

7.2 Review of Design

This report is based on the design of the proposed structures as related to us for preparation of this report. It is recommended that we be retained to review the geotechnical aspects of the design and specifications. With the review we will evaluate whether any changes have affected the validity of the recommendations and whether our recommendations have been correctly interpreted and implemented in the design and specifications.

7.3 Groundwater Fluctuations

We made water level measurements in the borings at the times and under the conditions stated on the boring logs. The data was interpreted in the text of this report. The period of observation was relatively short and fluctuations in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw, drainage, and other seasonal and annual factors not evident at the time the observations were made. Design drawings and specifications and construction planning should recognize the possibility of fluctuations.

7.4 Use of Report

This report is for the exclusive use of Bolton & Menk and their design team to use to design the proposed structures and prepare construction documents. In the absence of our written approval, we make no representation and assume no responsibility to other parties regarding this report. The data, analysis and recommendations may not be appropriate for other structures or purposes. We recommend that parties contemplating other structures or purposes contact us.

7.5 Level of Care

Haugo GeoTechnical Services, LLC has used the degree of skill and care ordinarily exercised under similar circumstance by members of the profession currently practicing in this locality. No warranty expressed or implied is made.

APPENDIX

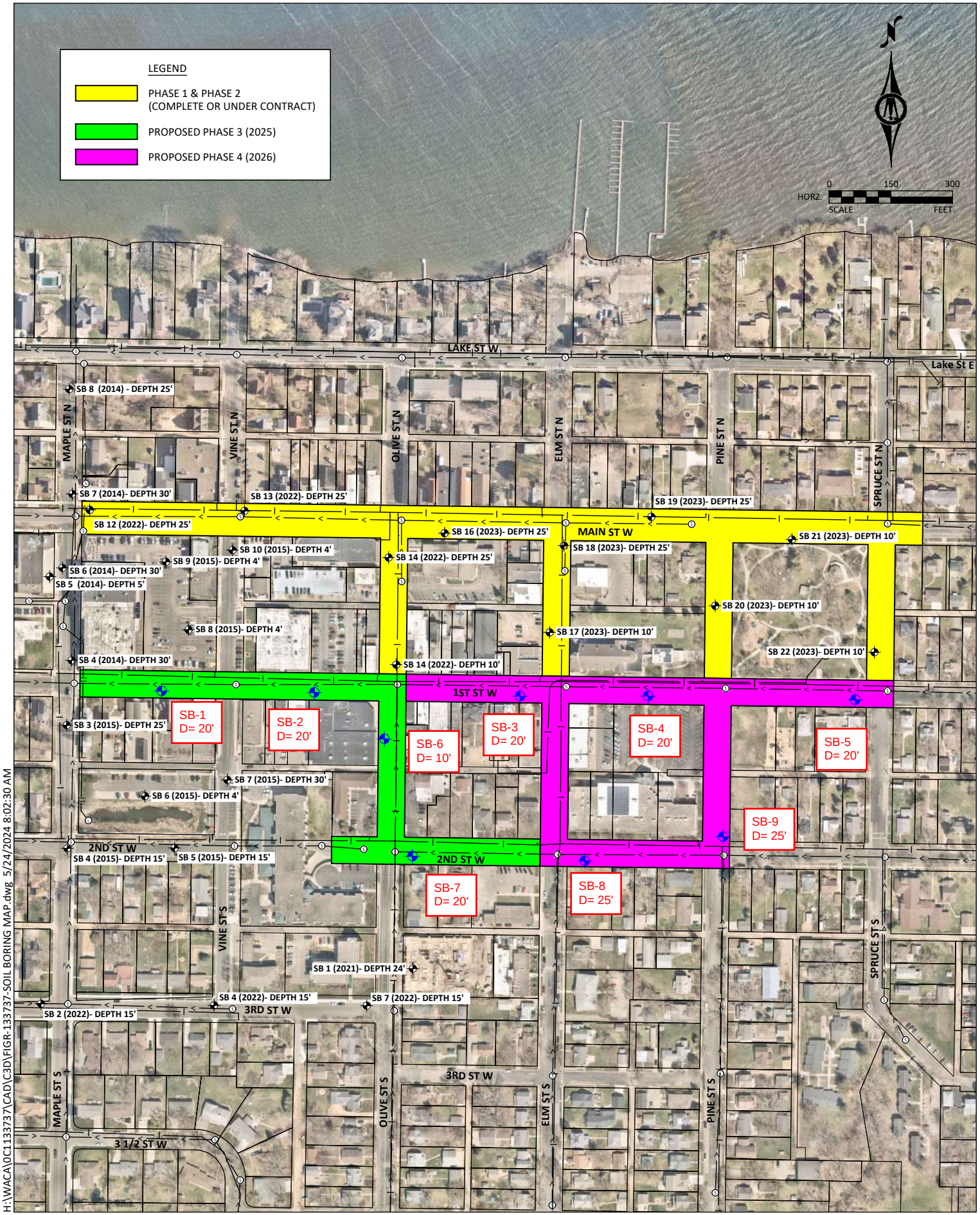
Downtown Reconstruction

City of Waconia

Revised Soil Boring Map

May 2024

BOLTON & MENK



H:\WACA\0C113737\CAD\C3D\FIGR-133737-SOIL BORING MAP.dwg 5/24/2024 8:02:30 AM

Haugo GeoTechnical Services
2825 Cedar Ave South
Minneapolis, MN, 55407
Telephone: 612-729-2959
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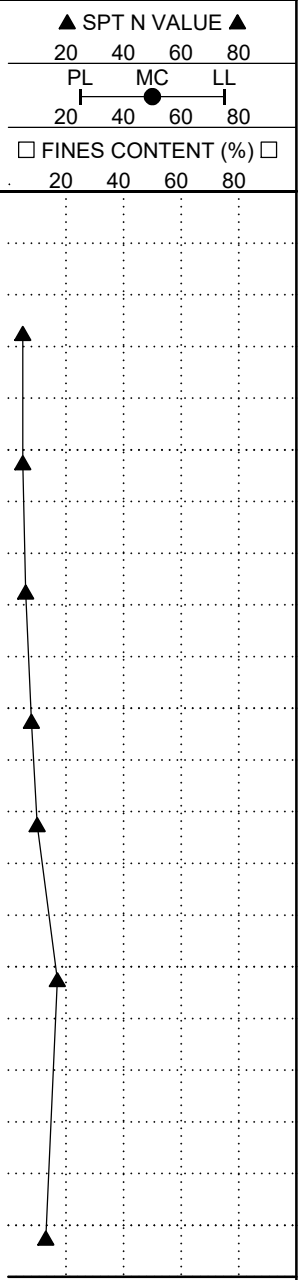
BORING NUMBER SB-1

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/6/24 **COMPLETED** 6/6/24
GROUND ELEVATION 1015.7 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 7 Inches of Bituminous	AU 43			
		Approximately 8 Inches of Aggregate P-200= 9.2%				
		Sandy Lean Clay, black to dark grey, moist to wet (Buried Topsoil)	SS 44		1-3-2 (5)	27
		Organic Content= 3.5%				
5		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, rather soft to very stiff (Glacial Till)	SS 45		1-2-3 (5)	
			SS 46		2-2-4 (6)	20.5
10			SS 47		3-3-5 (8)	
			SS 48		2-4-6 (10)	
15			SS 49		3-6-11 (17)	
20			SS 50		4-5-8 (13)	

Bottom of borehole at 21.0 feet.



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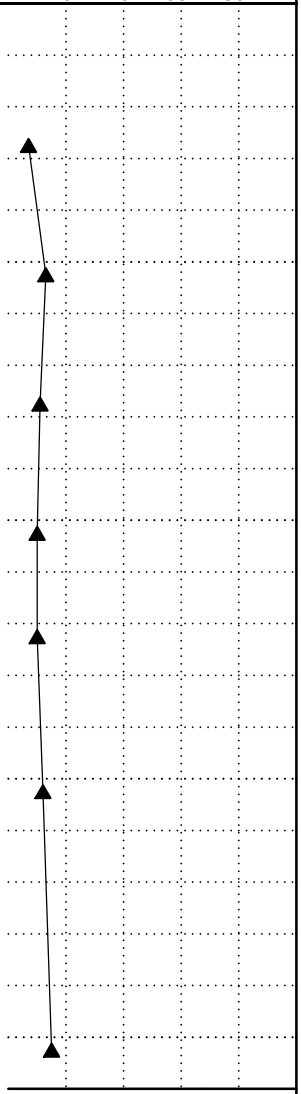
BORING NUMBER SB-2

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/6/24 **COMPLETED** 6/6/24
GROUND ELEVATION 1024.6 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 6 Inches of Bituminous	AU 51			
		Approximately 6 Inches of Aggregate Base P-200= 10.3%				
		Sandy Lean Clay, black, moist (Buried Topsoil)				
		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, medium to stiff (Glacial Till)	SS 52		2-3-4 (7)	22
5			SS 53		2-7-6 (13)	
			SS 54		4-5-6 (11)	
10			SS 55		4-4-6 (10)	19
			SS 56		2-4-6 (10)	
15			SS 57		4-5-7 (12)	
20			SS 58		4-7-8 (15)	

Bottom of borehole at 21.0 feet.

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



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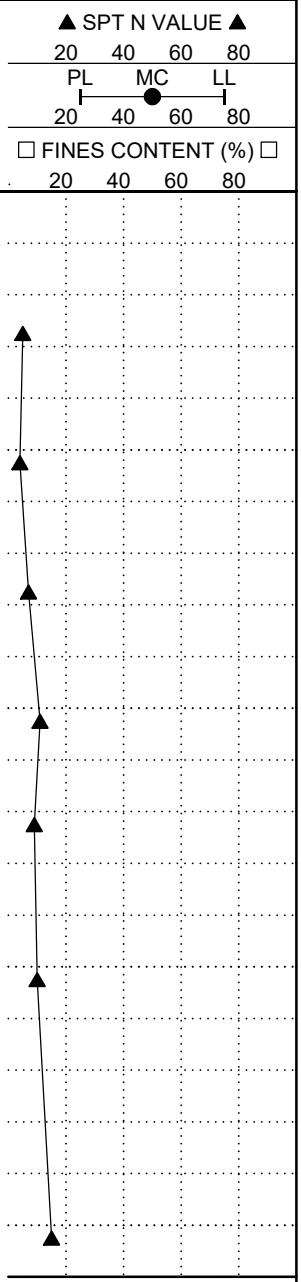
BORING NUMBER SB-3

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/6/24 **COMPLETED** 6/6/24
GROUND ELEVATION 1036.7 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 6.5 Inches of Bituminous	AU 35			
		Approximately 6 Inches of Aggregate Base P-200=4.9%				
		Sandy Lean Clay, trace Gravel, black, moist (Fill/Buried Topsoil)				
		Sandy Lean Clay, trace Gravel, brown, moist to wet, rather soft to stiff (Fill)	SS 36		2-2-3 (5)	25
5		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, rather soft to stiff (Glacial Till)	SS 37		2-2-2 (4)	
			SS 38		2-3-4 (7)	19.5
10			SS 39		3-5-6 (11)	
			SS 40		2-4-5 (9)	
15			SS 41		3-4-6 (10)	
20		(CL) Sandy Lean Clay, trace Gravel, grey, moist to wet, stiff (Glacial Till)	SS 42		4-6-9 (15)	

Bottom of borehole at 21.0 feet.



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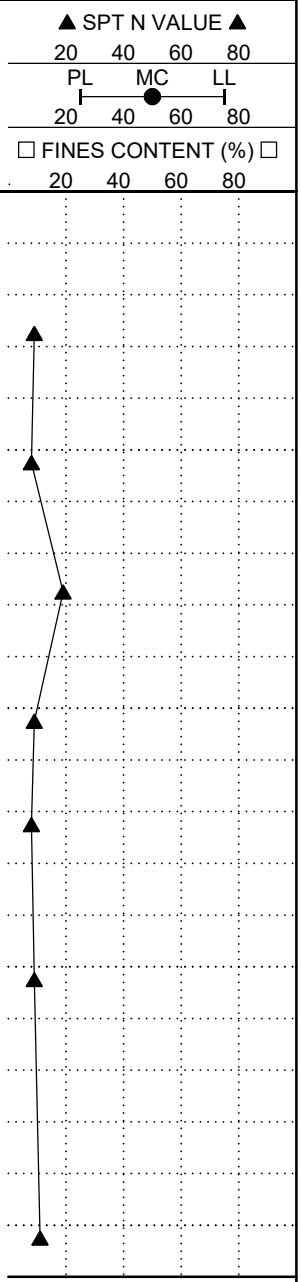
BORING NUMBER SB-4

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/6/24 **COMPLETED** 6/6/24
GROUND ELEVATION 1043.5 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 6.5 Inches of Bituminous	AU 27			
		Approximately 1.25 Inches of Bituminous				
		(ML) Sandy Silt, brown, moist, loose (Glacial Till)	SS 28		2-3-6 (9)	16
5		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, medium (Glacial Till)	SS 29		2-3-5 (8)	
		(SP-SM) Poorly Graded Sand with Silt, fine to medium grained, trace Gravel, brown, moist, medium dense (Glacial Till)	SS 30		6-10-9 (19)	
		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, medium to rather stiff (Glacial Till)				
10			SS 31		2-4-5 (9)	20.5
			SS 32		2-3-5 (8)	
15			SS 33		2-3-6 (9)	
20			SS 34		3-4-7 (11)	

Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-5

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/6/24 **COMPLETED** 6/6/24
GROUND ELEVATION 1049.5 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0	Approximately 5 Inches of Bituminous Approximately 2 Inches of Aggregate Base Approximately 2 Inches of Bituminous (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, medium to stiff (Glacial Till)	AU 64			
		SS 65		4-4-4 (8)	15.5
5		SS 66		3-4-6 (10)	
		SS 67		3-5-9 (14)	
10	(SP-SM) Poorly Graded Sand with Silt, fine to coarse grained, with Gravel, brown, moist, dense (Glacial Till)	SS 68		3-14-18 (32)	7
	(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, stiff to very stiff (Glacial Till)	SS 69		4-5-9 (14)	
15		SS 70		3-7-10 (17)	
20		SS 71		4-6-9 (15)	

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 21.0 feet.

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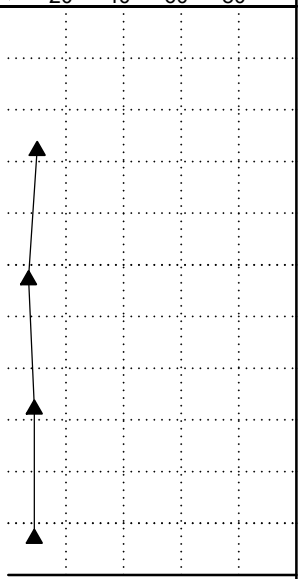
BORING NUMBER SB-6

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/6/24 **COMPLETED** 6/6/24
GROUND ELEVATION 1027.3 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 6 Inches of Bituminous	AU 59			
		Approximately 12 Inches of Aggregate Base P-200= 10.9%				
		Sandy Lean Clay, black to dark grey, moist (Buried Topsoil)	SS 60		6-4-6 (10)	20
		Organic Content= 4.5%				
5		(CL) Sandy Lean Clay, dark brown, moist to wet, medium (Glacial Till)	SS 61		2-3-4 (7)	19
		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, rather stiff (Glacial Till)	SS 62		2-4-5 (9)	
10			SS 63		4-4-5 (9)	

Bottom of borehole at 11.0 feet.

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



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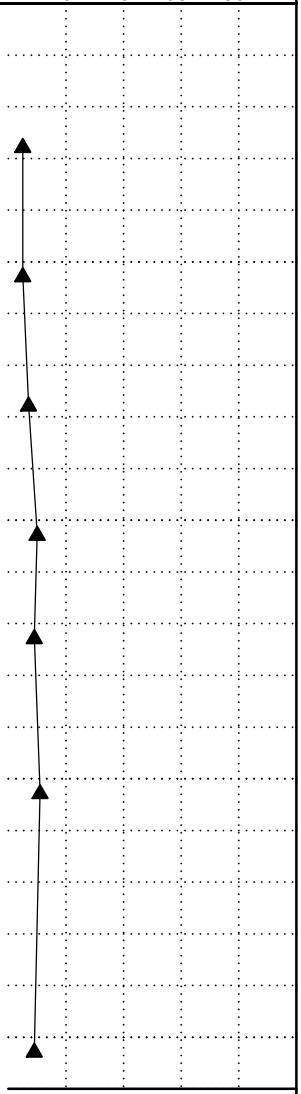
BORING NUMBER SB-7

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/5/24 **COMPLETED** 6/5/24
GROUND ELEVATION 1028.9 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0	Approximately 2.25 Inches of Bituminous Approximately 1.75 Inches of Aggregate Base (CL) Lean Clay, brown and light grey, moist to wet, rather soft (Glacial Till)	AU 19			
		SS 20		2-2-3 (5)	
5		SS 21		3-2-3 (5)	30.5
	(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, medium to rather stiff (Glacial Till)	SS 22		2-3-4 (7)	
10		SS 23		3-4-6 (10)	19.5
		SS 24		4-4-5 (9)	
15	(CL) Sandy Lean Clay, trace Gravel, grey, moist to wet, rather stiff (Glacial Till)	SS 25		4-4-7 (11)	
20		SS 26		1-4-5 (9)	

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



Bottom of borehole at 21.0 feet.

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BORING NUMBER SB-8

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/5/24 **COMPLETED** 6/5/24
GROUND ELEVATION 1044.1 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 5 Inches of Bituminous Less than 1 inch of Aggregate Base Poorly Graded Sand with Silt, fine to coarse grained, with Gravel, dark brown, moist (Fill)	AU 10			
		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, soft to rather stiff (Glacial Till)	SS 11		2-1-2 (3)	22.5
5			SS 12		2-2-3 (5)	
			SS 13		3-3-4 (7)	19
10			SS 14		3-4-5 (9)	
			SS 15		7-7-8 (15)	
15			SS 16		2-2-5 (7)	
20			SS 17		1-3-4 (7)	
25			SS 18		1-3-7 (10)	

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 26.0 feet.

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BORING NUMBER SB-9

CLIENT City of Waconia
PROJECT NAME Downtown Reconstruction Phase 3 & 4
PROJECT NUMBER 24-0344
PROJECT LOCATION Waconia, MN
DATE STARTED 6/5/24 **COMPLETED** 6/5/24
GROUND ELEVATION 1045.9 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS- 45
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY NC/MS **CHECKED BY** PG
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)
0		Approximately 6 Inches of Bituminous Less than 1 inch of Aggregate Base Sandy Lean Clay, greyish brown, black, moist (Fill)	AU 1			
		(CL) Sandy Lean Clay, trace Gravel, brown, moist to wet, rather soft to rather stiff (Glacial Till)	SS 2		2-1-3 (4)	
5			SS 3		3-3-5 (8)	
			SS 4		3-3-6 (9)	19
10			SS 5		2-4-7 (11)	
			SS 6		3-4-4 (8)	
15			SS 7		3-3-4 (7)	19.5
20			SS 8		5-6-7 (13)	
25		(CL) Sandy Lean Clay, trace Gravel, grey, moist to wet, rather stiff (Glacial Till)	SS 9		2-3-7 (10)	

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 26.0 feet.

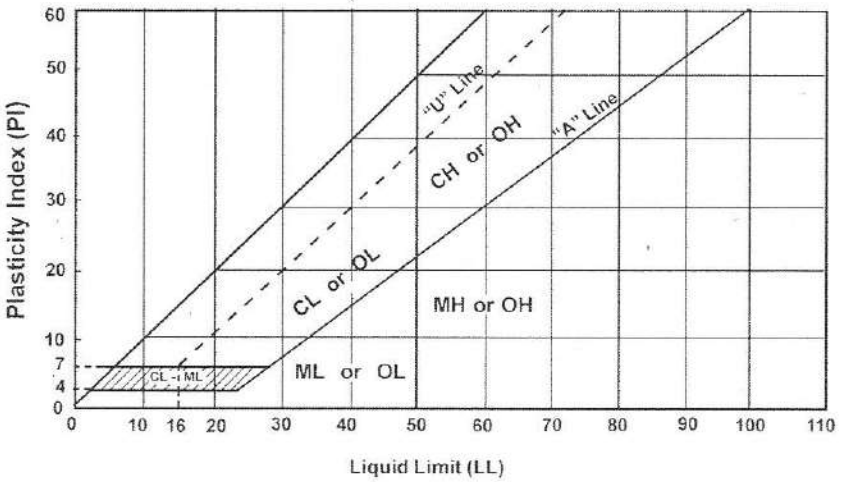
HAUGO GEOTECHNICAL SERVICES

Descriptive Terminology of Soil

Standard D 2487 - 00
Classification of Soils for Engineering Purposes
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [a]				Soils Classification	
				Group Symbol	Group Name [b]
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels 5% or less fines [e]	$C_u \geq 4$ and $1 \leq C_c \leq 3$ [c]	GW	Well-graded gravel [d]
			$C_u < 4$ and/or $1 > C_c > 3$ [c]	GP	Poorly graded gravel [d]
		Gravels with Fines More than 12% fines [e]	Fines classify as ML or MH	GM	Silty gravel [d f g]
			Fines classify as CL or CH	GC	Clayey gravel [d f g]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands 5% or less fines [i]	$C_u \geq 6$ and $1 \leq C_c \leq 3$ [c]	SW	Well-graded sand [h]
			$C_u < 6$ and/or $1 > C_c > 3$ [c]	SP	Poorly graded sand [h]
		Sands with Fines More than 12% [i]	Fines classify as ML or MH	SM	Silty sand [f g h]
			Fines classify as CL or CH	SC	Clayey sand [f g h]
Fine-grained Soils 50% or more passed the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line [j]	CL	Lean clay [k l m]
			PI < 4 or plots below "A" line [j]	ML	Silt [k l m]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [k l m n]
				OL	Organic silt [k l m o]
	Silts and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [k l m]
			PI plots below "A" line	MH	Elastic silt [k l m]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [k l m p]
				OH	Organic silt [k l m q]
Highly Organic Soils		Primarily organic matter, dark in color and organic odor		PT	Peat

a. Based on the material passing the 3-in (75mm) sieve.
b. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
c. $C_u = D_{60} / D_{10}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
d. If soil contains ≥15% sand, add "with sand" to group name.
e. Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
f. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
g. If fines are organic, add "with organic fines" to group name.
h. If soil contains ≥ 15% gravel, add "with gravel" to group name.
i. Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
j. If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
k. If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
l. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
m. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
n. PI ≥ 4 and plots on or above "A" line.
o. PI < 4 or plots below "A" line.
p. PI plots on or above "A" line.
q. PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	OC	Organic content, %
WD	Wet density, pcf	S	Percent of saturation, %
MC	Natural moisture content, %	SG	Specific gravity
LL	Liquid limit, %	C	Cohesion, psf
PL	Plastic limit, %	∅	Angle of internal friction
PI	Plasticity index, %	qu	Unconfined compressive strength, psf
P200	% passing 200 sieve	qp	Pocket penetrometer strength, tsf

Particle Size Identification

Boulders	over 12"
Cobbles	3" to 12"
Gravel	
Coarse	3/4" to 3"
Fine	No. 4 to 3/4"
Sand	
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Silt	< No. 200, PI < 4 or below "A" line
Clay	< No. 200, PI ≥ 4 and on or above "A" line

Relative Density of Cohesionless Soils

Very loose	0 to 4 BPF
Loose	5 to 10 BPF
Medium dense	11 to 30 BPF
Dense	31 to 50 BPF
Very dense	over 50 BPF

Consistency of Cohesive Soils

Very soft	0 to 1 BPF
Soft	2 to 3 BPF
Rather soft	4 to 5 BPF
Medium	6 to 8 BPF
Rather stiff	9 to 12 BPF
Stiff	13 to 16 BPF
Very stiff	17 to 30 BPF
Hard	over 30 BPF

Drilling Notes

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" ID hollow-stem augers unless noted otherwise. Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous-flight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the prefix "B."

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix "H."

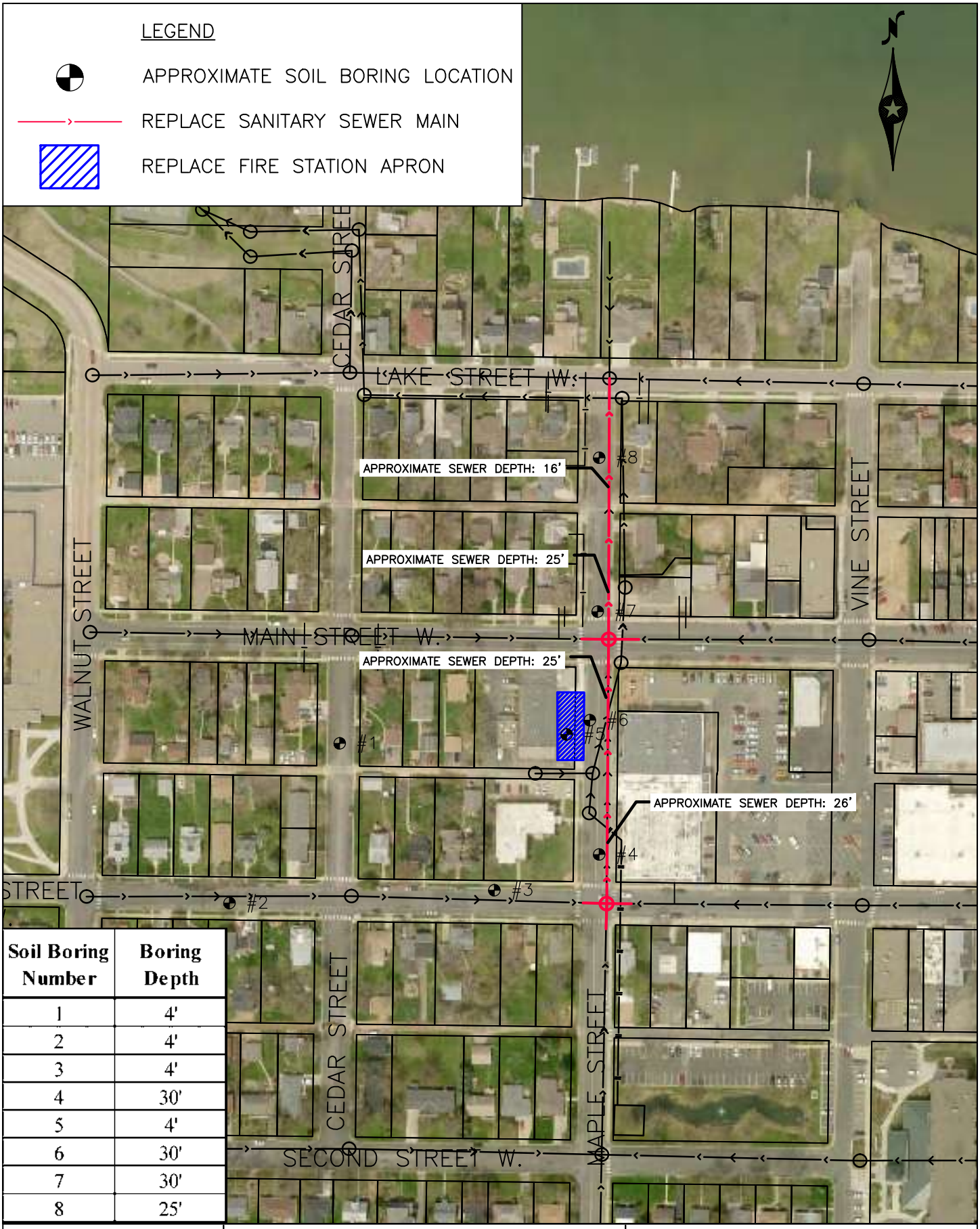
BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

TW indicates thin-walled (undisturbed) tube sample.

Note: All tests were run in general accordance with applicable ASTM standards.



Soil Boring Number	Boring Depth
1	4'
2	4'
3	4'
4	30'
5	4'
6	30'
7	30'
8	25'

0 100 200
SCALE FEET

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN
BURNSVILLE, MN WILLMAR, MN CHASKA, MN
RAMSEY, MN MAPLEWOOD, MN BRAINERD, MN AMES, IA

CITY OF WACONIA, MINNESOTA
2014 INFRASTRUCTURE IMPROVEMENTS
SOIL BORING LOCATIONS

10/28/2013 FIGURE NO. 1

H:\WACA\C12106944\C3D\106944_SOIL BORING.DWG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-4 (p. 1 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: ____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	R
0	4.5" Bituminous pavement	FILL		F							
	FILL, mostly gravelly silty sand,brown, frozen (A-1-b)			F							
1			50/.4	F	SS	8	18				
2	FILL, mostly sandy lean clay, a little gravel, ash/cinders, pieces of concrete, glass, ceramic, wood and bituminous, dark brown and gray, frozen to 3', a lens of gravelly sand at 4.5' to 6' (A-6)										
3			18	F	SS	16	21				
4											
5			9	M	SS	5	14				
6											
7											
8			3	M	SS	6	22				900
9											
10			4	M	SS	10	27				
11											
12											
13			4	M	SS	6	24				
14											
15			16	▼	SS	16	27				
16											
17	FILL, mostly lean clay with sand, a little gravel, brown, dark brown and light brown										
18			5	W	SS	16	28				
19											
20	FILL, mostly gravelly sandy lean clay, pieces of wood, dark brown and gray		4	W	SS	5	31				
21											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-29½' 3.25" HSA	**12/30/13**	**12:00**	**18.5**	**17.0**	**18.3**		**15.9**
	12/30/13	**12:10**	**18.5**	**17.0**	**18.3**		**15.7**
BORING COMPLETED: **12/30/13**	**12/30/13**	**12:30**	**31.0**	**29.5**	**31.0**		**27.7**
DR: **SS** LG: **MF** Rig: **1C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 1/13/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-4 (p. 2 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	R
23	FILL, mostly gravelly sandy lean clay, pieces of wood, dark brown and gray *(continued)*	FILL *(continued)*									
24	SANDY LEAN CLAY, a little gravel, gray, very stiff (CL) (A-6)	TILL									
25			27	M	SS	16	17				
26											
27											
28											
29											
30			18	M	SS	18	17				
31	**END OF BORING**										

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 1/13/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-5 (p. 1 of 1)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: ____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6.5" Concrete pavement	FILL		F							
1	FILL, mostly silty sand, a little gravel and clayey sand, brown, frozen to 18" (A-2-4)		50/.4	F	SS						
2											
3	FILL, mostly sandy lean clay, a little gravel, geotextile around 2', dark brown and brown (A-6)		26	M	SS	12	23				
4	FILL, mostly silty sand, a little gravel and lean clay, brown (A-2-4)										
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-26" FA	**12/20/13**	**12:48**	**4.0**	**2.0**	**4.0**		**None**	
BORING COMPLETED: **12/20/13**								
DR: **TK** LG: **SHS** Rig: **85C**								

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 1/13/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-6 (p. 1 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: ____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	R
	6.5" Bituminous pavement	FILL									
1	FILL, mostly gravelly silty sand, brown, frozen (A-1-b)						14				
2	FILL, mostly clayey sand, a little gravel, dark brown, frozen to 18" (A-2-6)										
3			14	F	SS	12	14				
4	FILL, mostly sandy lean clay, a little gravel and silty sand, ash/cinders, brown and dark brown (A-6)										
5			13	M	SS	12	14				
6											
7											
8			7	M	SS	10	13				2700
9											
10			14	M	SS	12	27				
11											
12											
13			8	M	SS	14	23				
14	FILL, mostly sandy lean clay, a little gravel, gray, dark brown and brown (A-6)										
15			8	M	SS	12	20				
16											
17											
18	SANDY LEAN CLAY, a little gravel, gray mottled, firm, laminations of silty sand (CL) (A-6)	TILL									
19											
20			6	M	SS	14	23				
21											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-29½' 3.25" HSA	**12/20/13**	**1:51**	**31.0**	**29.5**	**30.5**		**27.0**
BORING COMPLETED: **12/20/13**							
DR: **TK** LG: **SHS** Rig: **85C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 3/11/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-6 (p. 2 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	R
23	SANDY LEAN CLAY, a little gravel, gray mottled, firm, laminations of silty sand (CL) (A-6) *(continued)*	TILL *(continued)*									
24											
25			7	M	SS	16	25				
26											
27				▼							
28	SANDY LEAN CLAY, a little gravel, gray, stiff (CL) (A-6)										
29											
30			14	M	SS	14	19				
31	**END OF BORING**										

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 3/11/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-7 (p. 1 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	5" Bituminous pavement	FILL		F							
1	FILL, mostly silty sand, a little gravel, dark brown (A-2-4)			F			17				
			70	F/M	SS	18					
2	FILL, mostly lean clay with sand, a little gravel, brown and dark brown, frozen to 2.5' (A-6)		7	M	SS	10	24				
3											
4	FILL, mostly sandy lean clay, a little gravel and lean clay, dark brown and brown (A-6)										
5			6	M	SS	6	13				
6											
7											
8			6	M	SS	6	18				
9	LEAN CLAY, black, firm (CL) (A-6) (possible fill)	TOPSOIL OR FILL									
10			8	M	SS	6	27				
11											
12	SANDY LEAN CLAY, a little gravel, brown, a little light brown, very stiff, laminations of lean clay (CL) (A-6)	TILL									
13			15	M	SS	14	17				
14	SANDY LEAN CLAY, a little gravel, brown, a little dark brown and light gray, very stiff, laminations of sandy silt and silt (CL) (A-6)										
15			29	M	SS	18	17				
16											
17											
18	SANDY LEAN CLAY, a little gravel, possible cobbles around 20' and 22', gray, very stiff (CL) (A-6)			▼							
19											
20			17	M	SS	16	17				
21											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-29½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	12/26/13	**12:15**	**21.0**	**19.5**	**19.3**		**19.0**	
	12/26/13	**12:25**	**21.0**	**19.5**	**19.3**		**18.7**	
BORING COMPLETED: **12/26/13**	**12/26/13**	**12:40**	**31.0**	**29.5**	**29.8**		**29.1**	
DR: **SS** LG: **CD/MEg: 1C**								

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 1/13/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-7 (p. 2 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
23		TILL *(continued)*									
24	CLAYEY SAND, a little gravel, gray, very stiff, laminations of silty sand (SC) (A-6)										
25			16	M	SS	18	18				
26											
27											
28											
29											
30			18	M	SS	18	16				
31	**END OF BORING**										

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 1/13/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-8 (p. 1 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: ____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
0	2" Bituminous pavement	FILL									
1	FILL, mostly silty sand, a little gravel, brown, frozen (A-2-4)		50/.5	F	SS	3	.12				
2	FILL, mostly clayey sand, a little gravel, brown and dark brown, frozen (A-6)	TILL									
3	SANDY LEAN CLAY, a little gravel, brown, a little gray and light brown, frozen to 2.5', laminations of sandy silt and silt (CL) (A-6)		14	F/M	SS	14	18				
4											
5	SANDY LEAN CLAY, a little gravel, brown and brownish gray mottled to brown, stiff to very stiff, a lens of gravelly silty sand around 13' (CL) (A-6)		15	M	SS	16	17				
6											
7											
8			18	M	SS	18	18				
9											
10			17	M	SS	18	19				
11											
12											
13			26	M	SS	18	20				
14	SANDY LEAN CLAY, a little gravel, brown, a little dark brown, very stiff (CL) (A-6)										
15			28	M	SS	18	15				
16											
17											
18	SANDY LEAN CLAY, a little gravel, brown, hard (CL) (A-6)										
19											
20			42	M	SS	2	16				
21											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-24½' 3.25" HSA	**12/26/13**	**1:50**	**26.0**	**24.5**	**24.1**		**23.0**
	12/26/13	**1:55**	**26.0**	**24.5**	**24.1**		**22.5**
BORING COMPLETED: **12/26/13**							
DR: **SS** LG: **CD/MEg: 1C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **22-02671** LOG OF BORING NO. **B-8 (p. 2 of 2)**

PROJECT: **2014 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
23	SANDY LEAN CLAY, a little gravel, brown, hard (CL) (A-6) *(continued)*	TILL *(continued)*		▼							
24	SANDY LEAN CLAY, a little gravel, brownish gray, very stiff, laminations of sandy silt (CL) (A-6)										
25			28	M	SS	16	17				
26	**END OF BORING**										

AET_CORP 22-02671.GPJ AET+CPT+WELL.GDT 1/13/14

LEGEND

1 SOIL BORING LOCATION

RECONSTRUCTION AREA

SANITARY SEWER

BORING NO.	DEPTH
1	4'
2	4'
3	25'
4	15'
5	15'
6	4'
7	4'
8	4'
9	4'
10	4'
11	30'

HORIZ. 0 75 150
SCALE FEET

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN BURNSVILLE, MN
WILLMAR, MN CHASKA, MN RAMSEY, MN MAPLEWOOD, MN
BAXTER, MN ROCHESTER, MN AMES, IA SPENCER, IA

CITY OF WACONIA, MINNESOTA

2015 INFRASTRUCTURE IMPROVEMENTS

SOIL BORING LOCATIONS

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-3 (p. 1 of 2)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	7" Bituminous pavement	FILL			SU						
1	FILL, mostly sandy lean clay, a little gravel, brown and gray mottled, stiff (A-6)		12	M	SS	7	19				
2											
3	SANDY LEAN CLAY, a little gravel, brown and gray mottled, firm, laminations of silt (CL) (A-6)	WEATHERED TILL	7	M	SS	20	19				
4											
5	SANDY LEAN CLAY, a little gravel, brown and gray mottled to gray and brown mottled, stiff to very stiff, laminations of sandy silt (CL) (A-6)	TILL	13	M	SS	16	19				
6											
7											
8			12	M	SS	15	20				
9											
10			13	M	SS	17	20				
11											
12											
13			13	M	SS	18	20				
14											
15			25	M	SS	17	20				
16											
17											
18	SANDY LEAN CLAY, a little gravel, gray, very stiff, laminations of sand (CL) (A-6)										
19											
20			17	M	SS	16	17				
21											

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-24½' 3.25" HSA	**8/18/14**	**11:05**	**26.0**	**24.5**	**24.5**		**None**	
BORING COMPLETED: **8/18/14**								
DR: **SG** LG: **SB** Rig: **91C**								

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-3 (p. 2 of 2)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
23	SANDY LEAN CLAY, a little gravel, gray, very stiff, laminations of sand (CL) (A-6) *(continued)*										
24											
25			18	M/W	SS	16	17				
26	**END OF BORING**										

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-4 (p. 1 of 1)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	ohm-cm
	12.5" Bituminous pavement	FILL			SU						
1				M	SU						
	FILL, mostly lean clay, black and gray (A-7-6)		14	M	SS	8	21				
2											
	FILL, mostly clayey sand, a little gravel, gray, a little black (A-6)		9	M	SS	10	15				
3											
4											
	FILL, mostly organic clay, a little sand (A-8)		10	M	SS	8	42				
5											
6											
	FILL, mostly organic clay, a little sandy lean clay, black, a little gray (A-8)		4	M	SS	4	30				1100
7											
8											
9											
10							41				
	SANDY LEAN CLAY, a little gravel, brown and gray mottled, firm (CL) (A-6)	TILL	7	M	SS	14	22				
11											
12	CLAYEY SAND, a little gravel, gray, soft to firm (CL) (A-6)										
			4	M	SS	16	22				
13											
14											
15			6	M	SS	17	19				
16	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½' 3.25" HSA	**8/18/14**	**12:00**	**16.0**	**14.5**	**14.5**		**None**	
BORING COMPLETED: **8/18/14**								
DR: **SG** LG: **SB** Rig: **91C**								

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-5 (p. 1 of 2)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6" Bituminous pavement	FILL			SU						
1	18" Crushed limestone, light brown (A-1-b)		13	M	SS	10					
2											
3	FILL, mostly lean clay with sand, a little sand, black and gray (A-6)		7	M	SS	2	28				
4											
5	ORGANIC CLAY, black, soft to very soft (OH) (A-8)	SWAMP DEPOSIT	2	W/M	SS	6	140				
6											
7											
8			1½	M	SS	18	140				
9											
10	ORGANIC CLAY, trace shells and roots, black, very soft (OH) (A-8)		WH	M	SS	16	95				
11											
12											
13			WH	M	SS	18	164				
14											
15	ORGANIC CLAY, trace shells and roots, black, a little brown and light gray, very soft, lenses and laminations of hemic peat (OH) (A-8)		WH	M	SS	18	197				
16											
17	ORGANIC CLAY, trace roots, brown, very soft (OH) (A-8)										
18			WH	M	SS	10	240				
19											
20	CLAYEY SAND, a little gravel, gray, very soft to firm (SC) (A-6)	TILL	WH	W	SS	16	22				
21											

DEPTH:	DRILLING METHOD
0-24'	**3.25" HSA**
BORING COMPLETED:	**8/18/14**
DR: **SG**	LG: **SB** Rig: **91C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/18/14	**1:10**	**26.0**	**24.5**	**24.5**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-5 (p. 2 of 2)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
23	CLAYEY SAND, a little gravel, gray, very soft to firm (SC) (A-6) *(continued)*	TILL *(continued)*					24				
24											
25			6	M	SS	18	21				
26	**END OF BORING**										

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-6 (p. 1 of 1)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	3.75" Bituminous pavement	FILL			SU						
1	10.25" Crushed limestone base, light brown (A-1-b)		25	M	SS	16					
2	FILL, mostly sand with silt, a little gravel, geotextile at 14", brown (A-1-b)										
3	FILL, mostly sandy lean clay, gray and black (A-6)		5	M	SS	5	21				55
4	ORGANIC CLAY, black, soft (OH) (A-8)	SWAMP DEPOSIT									
5			4	M	SS	10	92				
6	ORGANIC CLAY, trace shells and roots, dark brown to black, soft to firm (OH) (A-8)										
7			2	M	SS	16	107				
8							113				
9	CLAYEY SAND, gray, firm (SC) (A-6)	TILL	5	M	SS	15	19				55
10	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-8' 3.25" HSA	**8/18/14**	**1:50**	**10.0**	**8.0**	**8.0**		**None**	
BORING COMPLETED: **8/18/14**								
DR: **SG** LG: **SB** Rig: **91C**								

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-7 (p. 1 of 1)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand with gravel, light brown (A-2-4)		33	M	SS	16					
2	FILL, mostly sand with silt, a little gravel, light brown (A-3)										
3	ORGANIC CLAY, black, stiff (OH) (A-8)	SWAMP DEPOSIT	9	M	SS	18	35				
4	SANDY LEAN CLAY, a little gravel, brown and gray mottled, soft to firm, laminations of sandy silt (CL) (A-6)	TILL									
5			4	M	SS	2	26				
6											
7											
8			7	M	SS	15	23				
9	CLAYEY SAND, a little gravel, gray and brown mottled, firm, laminations of sand (SC) (A-6)	TILL									
10			7	M	SS	18	22				
11	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-9½' 3.25" HSA	**8/18/14**	**9:05**	**11.0**	**9.5**	**9.5**		**None**	
BORING COMPLETED: **8/19/14**								
DR: **SG** LG: **SB** Rig: **91C**								

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-8 (p. 1 of 1)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	3" Bituminous pavement	FILL			SU						
	8" Crushed limestone base, light brown (A-1-b)				SU						
1	FILL, mostly sand with silt, a little gravel, brown (A-3)		6	M	SS	14	25				
2	LEAN CLAY, slightly organic, black, firm (CL) (A-7-6)	FINE ALLUVIUM / TILL									
3	SANDY LEAN CLAY, brown, a little gray mottled, firm (CL) (A-6)		6	M	SS	17	21				
4	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-2' 3.25" HSA	**8/19/14**	**9:19**	**4.0**	**2.0**	**4.0**		**None**	
BORING COMPLETED: **8/19/14**								
DR: **SG** LG: **SB** Rig: **91C**								

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-9 (p. 1 of 1)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	3" Bituminous pavement 5" Crushed limestone base, light brown (A-1-b) FILL, mostly sandy lean clay, gray (A-6)	FILL	9	M	SU SU SS	8	19				
2 3	SANDY LEAN CLAY, a little gravel, brown and gray mottled, firm, laminations of sandy silt (CL) (A-6)	TILL	9	M	SS	22	18				
4	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-2' 3.25" HSA	**8/19/14**	**9:34**	**4.0**	**2.0**	**4.0**		**None**	
BORING COMPLETED: **8/19/14**								
DR: **SG** LG: **SB** Rig: **91C**								

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **20-12298** LOG OF BORING NO. **SB-10 (p. 1 of 1)**

PROJECT: **2015 Infrastructure Improvements; Waconia, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	2" Bituminous pavement 14" Crushed limestone base, light brown (A-1-b)	FILL			SU SU						
2	FILL, mostly sandy lean clay with gravel, brown and gray		16	M	SS	11	15				
3	CLAYEY SAND, a little gravel, brown, stiff, lenses of sand with silt (SC) (A-6) (possible fill)	TILL OR FILL	13	M	SS	17	15				
4	**END OF BORING**										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-2'	**3.25" HSA**								
		8/19/14	**9:55**	**4.0**	**2.0**	**4.0**		**None**	
BORING COMPLETED: **8/19/14**									
DR: **SG** LG: **SB** Rig: **91C**									

AET_CORP 20-12298.GPJ AET+CPT+WELL.GDT 8/28/14

AMERICAN ENGINEERING TESTING	**Project:** Waconia Apartments Waconia, Minnesota		**AET Report No.:** P-0006217
	Subject: Approximate Soil Boring Locations		**Date:** 11/8/2021
	Scale: Shown	**Prepared By:** AS	**Checked By:** JS	**Figure 1**

AMERICAN ENGINEERING TESTING

SUBSURFACE BORING LOG

AET JOB NO: **P-0006217** LOG OF BORING NO. **B-1 (p. 1 of 1)**

PROJECT: **Waconia Apartment Complex; Waconia, MN**

SURFACE ELEVATION: **1040.4** LATITUDE: **44.84753** LONGITUDE: **-93.7875**

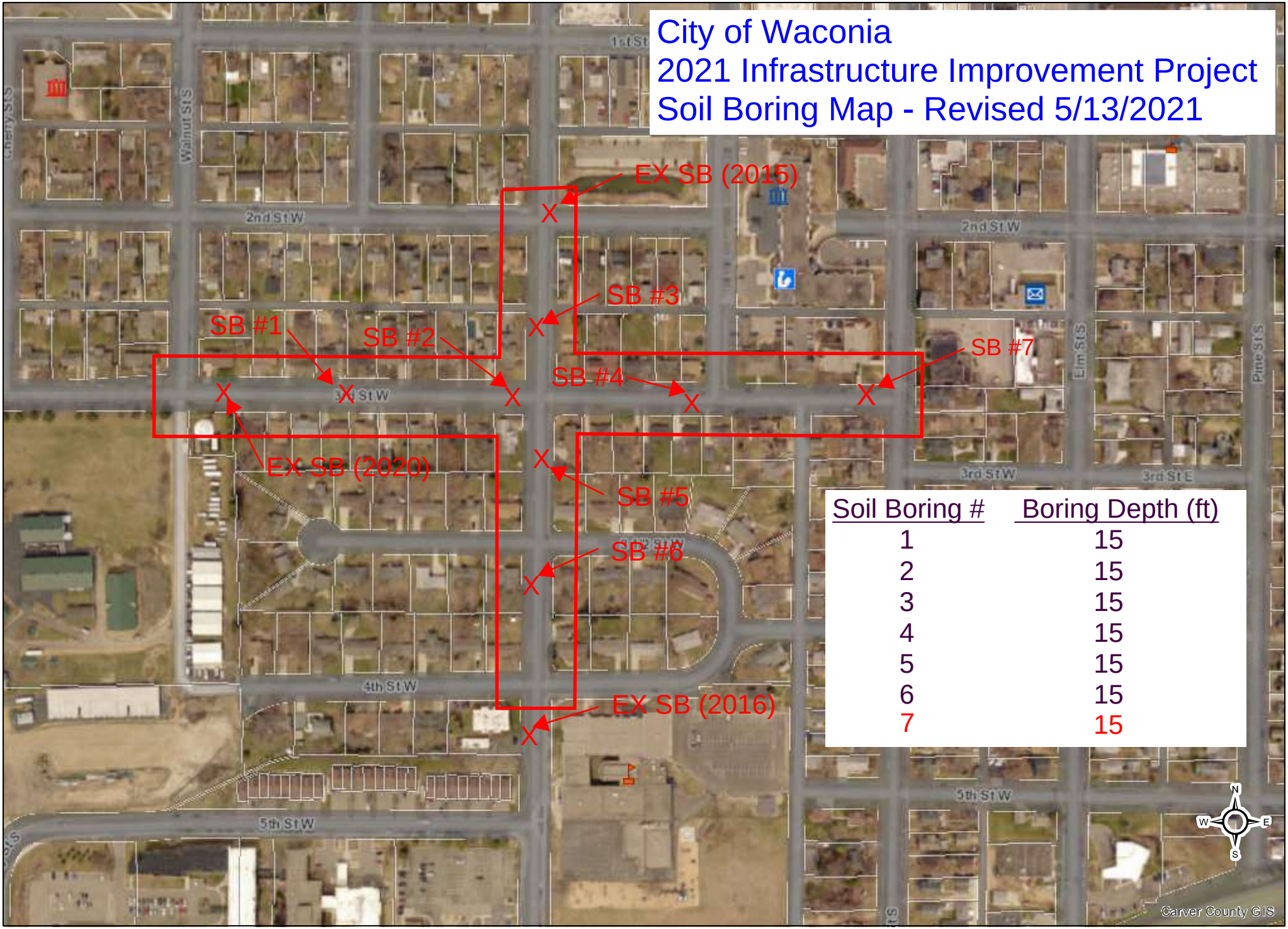
DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly clayey sand with organic fines, a little gravel, black (topsoil)	FILL	4	M	SS	10	18				
2											
3	FILL, mostly gravelly sand with silt, brown		15	M	SS	11					
4											
5	FILL, mixture of gravelly sand with silt and clayey sand, brown		14	M	SS	10					
6											
7	FILL, mostly gravelly sand with silt, brown										
8			10	M	SS	7					
9											
10			12	M	SS	12					
11											
12	SAND WITH SILT WITH GRAVEL, medium grained, dark brown, waterbearing, loose to medium dense (SP-SM)	COARSE ALLUVIUM		▼							
13			10	W	SS	15					
14											
15			13	W	SS	13					12
16											
17											
18											
19											
20			16	W	SS	12					
21											
22											
23											
24			17	W	SS	13					
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23' 3.25" HSA	**10/21/21**	**12:43**	**14.0**	**12.0**	**15.0**		**12.5**
	10/21/21	**12:59**	**24.5**	**23.0**	**24.0**		**12.9**
BORING COMPLETED: **10/21/21**							
DR: **GH** LG: **JJ** Rig: **91C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP W-LAT-LONG P-0006217.GPJ AET+CPT+WELL.GDT 11/15/21

City of Waconia
2021 Infrastructure Improvement Project
Soil Boring Map - Revised 5/13/2021



Soil Boring #	Boring Depth (ft)
1	15
2	15
3	15
4	15
5	15
6	15
7	15

Map Date: 4/28/2021

Haugo GeoTechnical Services
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959
Fax: 763-445-2238

BORING NUMBER SB-2

CLIENT Bolton & Menk
PROJECT NAME 2022 Waconia Infrastructure Improvements
PROJECT NUMBER 21-0538
PROJECT LOCATION Waconia, MN
DATE STARTED 6/29/21 **COMPLETED** 6/29/21
GROUND ELEVATION 1011.5 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS - 120
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY GD **CHECKED BY** PG
AT END OF DRILLING ---
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES
0.0		Approximately 3 Inches of Bituminous Asphalt					
		Approximately 4 Inches of Aggregate Base					
		(SC) Clayey Sand, fine to medium grained, trace Gravel, brown, medium. (Glacial Till)	AU 29				
2.5		P-200 = 43.5	SS 30		3-3-3 (6)	18.5	
5.0			SS 31		2-3-3 (6)		
7.5		(CL) Sandy Lean Clay, trace Gravel, wet, soft to rather stiff. (Glacial Till)	SS 32		1-2-2 (4)	22	
10.0			SS 33		3-5-6 (11)		
12.5		(CL) Sandy Lean Clay, trace Gravel, gray, wet, rather stiff. (Glacial Till)	SS 34		3-5-7 (12)		
			SS 35		6-6-6 (12)		

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 14.5 feet.

Haugo GeoTechnical Services
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959
Fax: 763-445-2238

BORING NUMBER SB-4

CLIENT Bolton & Menk
PROJECT NAME 2022 Waconia Infrastructure Improvements
PROJECT NUMBER 21-0538
PROJECT LOCATION Waconia, MN
DATE STARTED 6/29/21 **COMPLETED** 6/29/21
GROUND ELEVATION 1010.2 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS - 120
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
AT TIME OF DRILLING --- Not Encountered
LOGGED BY GD **CHECKED BY** PG
AT END OF DRILLING ---
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES
0.0	Approximately 3 Inches of Bituminous Asphalt Approximately 4 Inches of Aggregate Base P-200 = 7% Sandy Lean Clay, gray and black, wet. (Fill)	AU 36			4	
2.5	Organic Content = 4%	SS 37		2-2-3 (5)	20.5	
5.0	Sandy Lean Clay, black, wet. (Fill) Organic Content = 10.5%	SS 38		3-3-4 (7)	35	
7.5	(CL) Sandy Lean Clay, trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	SS 39		2-2-5 (7)		
10.0		SS 40		3-5-7 (12)		
12.5		SS 41		4-5-6 (11)		
	(CL) Sandy Lean Clay, trace Gravel, gray, wet, rather stiff. (Glacial Till)	SS 42		4-4-8 (12)		

Bottom of borehole at 14.5 feet.

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Haugo GeoTechnical Services
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959
Fax: 763-445-2238

BORING NUMBER SB-7

CLIENT Bolton & Menk
PROJECT NAME 2022 Waconia Infrastructure Improvements
PROJECT NUMBER 21-0538
PROJECT LOCATION Waconia, MN
DATE STARTED 6/29/21 **COMPLETED** 6/29/21
GROUND ELEVATION 1032.9 ft **HOLE SIZE** 3 1/4 inches
DRILLING CONTRACTOR HGTS - 120
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger/Split Spoon
▽ **AT TIME OF DRILLING** 12.50 ft / Elev 1020.40 ft
LOGGED BY GD **CHECKED BY** PG
AT END OF DRILLING ---
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES
0.0		Approximately 3 Inches of Bituminous Asphalt					
		Approximately 4 Inches of Aggregate Base					
		(CL-ML) Silty Clay, brown, moist, medium (Glacial Till)	AU 43				
2.5		P-200 = 64.5%	SS 44		3-4-4 (8)	23.5	
5.0		(ML) Sandy Silt, fine grained, brown and gray, moist, loose. (Glacial Till)	SS 45		3-4-5 (9)		
7.5			SS 46		3-4-3 (7)	30	
10.0		(SM) Silty Sand, fine to medium grained, brown, waterbearing, loose to medium dense. (Glacial Till)	SS 47		4-5-6 (11)		
12.5		▽	SS 48		2-4-6 (10)		
		(ML) Sandy Silty, fine grained, brown, waterbearing, loose. (Glacial Till)	SS 49		1-2-3 (5)		

Bottom of borehole at 14.5 feet.

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

2022 Infrastructure Improvements

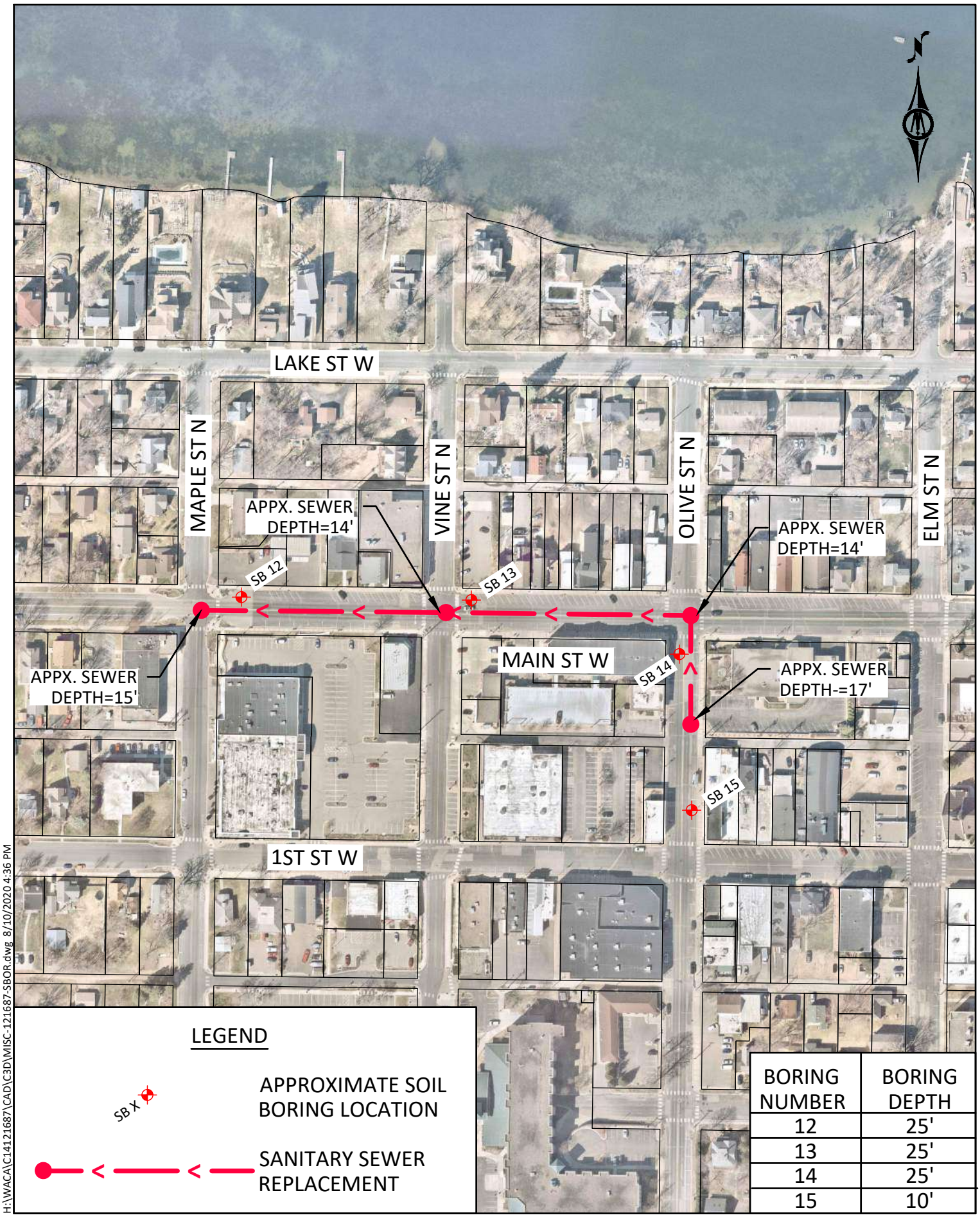
City of Waconia

Soil Boring Locations

August 2020

BOLTON & MENK

HORZ. SCALE 0 100 200 FEET



LEGEND

SB X — APPROXIMATE SOIL BORING LOCATION

SANITARY SEWER REPLACEMENT

BORING NUMBER	BORING DEPTH
12	25'
13	25'
14	25'
15	10'

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2023 Infrastructure Improvements

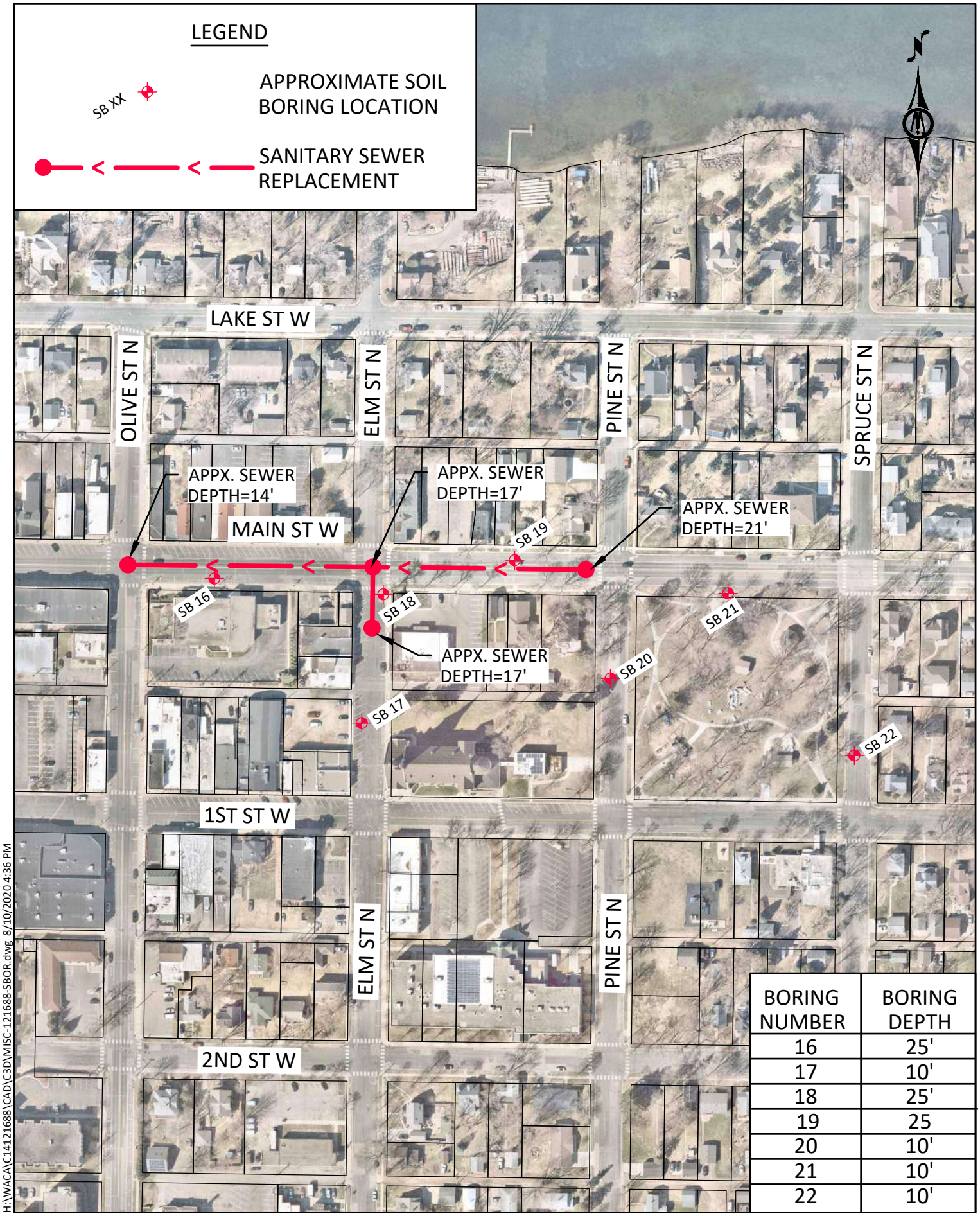
City of Waconia

Soil Boring Locations

August 2020

BOLTON & MENK

HORZ. SCALE 0 100 200 FEET



BORING NUMBER	BORING DEPTH
16	25'
17	10'
18	25'
19	25
20	10'
21	10'
22	10'

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AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-12 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

Surface Elevation 1011.5

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	7½" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand with gravel, pieces of concrete, geotextile, brown, A-1-b		75	M	SS	3					
2											
3	FILL, mostly silty sand with gravel, a little clayey sand and gravel, pieces of bituminous pavement, brown, A-1-b		28	M	SS	22					
4											
5	FILL, mostly sandy lean clay, a little gravel, brown and dark brown, A-6		11	M	SS	18	24				
6											
7											
8			2	M	SS	4	23				
9											
10			5	M	SS	10	21				
11											
12	ORGANIC CLAY, black, firm, A-8 (OL/OH)	SWAMP DEPOSIT									
13			8	M	SS	12	26				
14											
15	SANDY LEAN CLAY, slightly organic, dark brown, grayish brown, firm, A-6 (CL)	FINE ALLUVIUM	7	M	SS	22	24				
16											
17											
18	SANDY LEAN CLAY, a little gravel, brown and gray mottled, a little light gray, stiff, laminations of silt, A-6 (CL)	TILL	14	M	SS	15	14				
19											
20	CLAYEY SAND, a little gravel, brown and a little dark brown, very stiff, laminations of sandy silt, A-6 (SC)		22	M	SS	13	18				
21											
22	CLAYEY SAND, a little gravel, brown, very stiff, laminations of silty sand, A-6 (SC)										
23			24	M	SS	17	20				
24	**END OF BORING**										

DEPTH: DRILLING METHOD **0-22½' 3.25" HSA**

BORING COMPLETED: **10/6/20**

DR: **DS** LG: **SB** Rig: **1C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
10/6/20	**11:40**	**24.0**	**22.5**	**23.9**		**None**
10/6/20	**11:50**	**24.0**	**22.5**	**23.9**		**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-13 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1012.3 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6½" Bituminous pavement	FILL			SU						
1	8½" FILL, crushed limestone, light brown A-1-b		18	M	SS	17					
2	FILL, mostly silty sand, a little clayey sand and gravel, brown, A-2-4										
3			26	M	SS	19					
4											
5	FILL, mostly gravelly sand with silt, brown, A-1-b										
6			18	M	SS	10					
7											
8	SANDY LEAN CLAY, brown, a little gray, firm, laminations of sand and silt, A-6 (CL)	FINE ALLUVIUM	6	M	SS	18	29				
9											
10	SANDY LEAN CLAY, a little gravel, brown, firm, laminations of silty sand, A-6 (CL)	TILL									
11			5	M	SS	24	18				
12											
13	SANDY LEAN CLAY, a little gravel, gray, very stiff to stiff, A-6 (CL)		19	M	SS	24	17				
14											
15			14	M	SS	18	18				56
16											
17											
18	CLAYEY SAND, a little gravel, gray, a little brown, hard, laminations of silty sand, A-6 (SC)										
19											
20			47	M	SS	18	15				
21											
22	CLAYEY SAND, a little gravel, gray, a little light gray, hard, laminations of sand (SC)										
23			54	M	SS	6	15				
24	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-22½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	10/6/20	**10:10**	**24.0**	**22.5**	**23.8**		**None**	
	10/6/20	**10:20**	**24.0**	**22.5**	**23.8**		**None**	
BORING COMPLETED: **10/6/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-14 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

Surface Elevation 1017.4

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6¾" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand with gravel, brown, A-1-b		11	M	SS	15	11				
2	FILL, mostly clayey sand, a little silty sand and gravel, brown, A-6										
3			7	M	SS	7	11				
4											
5											
6			4	M	SS	4	14				
7											
8	FILL, mostly sandy lean clay, a little gravel, brown, A-6		1	M	SS	12	22				
9											
10	SANDY LEAN CLAY, a little gravel, brown to brown and dark brown mottled, firm to very stiff, A-6 (CL)	TILL									
11			7	M	SS	18	19				
12											
13			18	M ▼	SS	22	18				
14											
15	SANDY LEAN CLAY, a little gravel, grayish brown, stiff to very stiff, A-6 (CL)		15	M	SS	18	19				
16											
17											
18											
19											
20			18	M	SS	18	21				
21											
22											
23			16	M	SS	18	22				
24	**END OF BORING**										

DEPTH: DRILLING METHOD **0-22½' 3.25" HSA**

BORING COMPLETED: **10/6/20**

DR: **DS** LG: **SB** Rig: **1C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
10/6/20	**1:10**	**24.0**	**22.5**	**24.0**		**19.6**
10/6/20	**1:30**	**24.0**	**22.5**	**23.9**		**13.7**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-15 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1025.6 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	6½" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand with gravel, pieces of bituminous pavement at 3', brown and black, A-1-b		16	M	SS	14					
2											
3			20	M	SS	10					
4											
5	FILL, mostly sandy lean clay, a little silty sand and gravel (apparent boulder at 5'), brown, a little light tan, A-6		55/.6	M	SS	6	17				
6											
7											
8	SANDY LEAN CLAY, a little gravel, grayish brown and brown mottled, a little light gray, stiff, laminations of silt and sandy silt, stiff, A-6 (CL)	TILL									
9			12	M	SS	24	20				
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-7½' 3.25" HSA	**10/6/20**	**1:50**	**9.5**	**7.5**	**9.4**		**None**	
BORING COMPLETED: **10/6/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 1/29/21

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-16 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

Surface Elevation 1019.7

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	5¾" Bitiuminous pavement	FILL			SU						
1	FILL, mostly silty sand, a little gravel, brown, A-2-4		27	M	SS	17					
2											
3	FILL, mostly clayey sand, a little silty sand, gravel and bituminous pavement, brown, A-6		17	M	SS	18	15				
4											
5	SANDY LEAN CLAY, a little gravel, brown, a little gray mottled to brown, stiff to very stiff, A-6 (CL)	TILL	11	M	SS	22	19				
6											
7											
8			13	M	SS	24	20				
9											
10			15	M	SS	24	20				
11											
12											
13			17	M	SS	24	18				
14											
15			15	M	SS	24	19				54
16											
17											
18											
19											
20			16	M	SS	18	19				
21				▼							
22											
23	CLAYEY SAND, a little gravel, brown, hard, lens of silty sand, A-6 (SC)		39	M/W	SS	18	16				
24	**END OF BORING**										

DEPTH: DRILLING METHOD **0-22½;' 3.25" HSA**

BORING COMPLETED: **10/7/20**

DR: **DS** LG: **SB** Rig: **1C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
10/7/20	**9:40**	**24.0**	**22.5**	**24.0**		**23.0**
10/7/20	**9:50**	**24.0**	**22.5**	**24.0**		**21.4**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 1/29/21

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-17 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

Surface Elevation 1039.3

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	4¾" Bituminous pavement	FILL			SU						
1	FILL, mixture of crushed limestone and silty sand, brown, A-1-b		9	M	SS	10	21				
2	FILL, mostly clayey sand, a little gravel, brown, A-6	TILL									
3	CLAYEY SAND, a little gravel, brown, stiff, A-6 (SC)		10	M	SS	16	20				
4											
5											
6			11	M	SS	24	18				
7											
8											
9			12	M	SS	24	20				
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-7½' 3.25" HSA	**10/7/20**	**2:05**	**9.5**	**7.5**	**9.5**		**None**	
BORING COMPLETED: **10/7/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-18 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1032.1 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	5½" Bituminous pavement	FILL			SU						
1	FILL, mostly gravelly silty sand, brown, A-1-b		28	M	SS	15					
2											
3	FILL, mostly gravelly clayey sand, brown, A-2-6		6	M	SS	19	12				
4											
5	FILL, mostly clayey sand, a little gravel, brown, A-6		6	M	SS	8	18				
6											
7											
8	SANDY LEAN CLAY, a little gravel, brown, firm to very stiff, A-6 (CL)	TILL	7	M	SS	20	18				
9											
10			12	M	SS	24	20				
11											
12											
13			19	M	SS	24	19				
14											
15			20	M	SS	18	20				
16											
17											
18											
19											
20			15	M	SS	18	20				56
21											
22											
23											
24			15	M	SS	18	19				
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-23' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	10/7/20	**11:30**	**24.5**	**23.0**	**24.3**		**None**	
	10/7/20	**11:40**	**24.5**	**23.0**	**24.3**		**None**	
BORING COMPLETED: **10/7/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-19 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1039.6 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	7¼" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand, a little gravel, brown, A-2-4		19	M	SS	15					
2											
3	FILL, mixture of clayey sand and silty sand with cinders, a little gravel, brown and dark brown. A-2-4 and A-6		11	M	SS	19	15				
4											
5	SANDY LEAN CLAY, a little gravel, brown to brown with a little gray mottled, stiff, A-6 (CL)	TILL	13	M	SS	22	18				
6											
7											
8			14	M	SS	20	20				
9											
10			12	M	SS	24	21				
11											
12											
13			13	M	SS	24	22				
14											
15			13	M	SS	18	21				
16											
17											
18											
19											
20			15	M	SS	18	20				
21											
22											
23											
24			12	M	SS	18	21				57
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-23' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	10/7/20	**1:10**	**24.5**	**23.0**	**24.0**		**None**	
	10/7/20	**1:20**	**24.5**	**23.0**	**24.0**		**None**	
BORING COMPLETED: **10/7/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-20 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1047.1 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	2½" Bituminous pavement	FILL			SU		7				
1	FILL, mixture of clayey sand and silty sand, a little gravel, dark brown, A-2-6	TOPSOIL OR FILL	2	M	SS	6	28				
2	LEAN CLAY with sand, slightly organic, dark grayish brown, A-6 (possible fill) (CL)	TILL									
3	SANDY LEAN CLAY, a little gravel, brown, stiff, A-6 (CL)		12	M	SS	10	22				
4											
5	SANDY LEAN CLAY, a little gravel, brown, a little gray and light brown, stiff, laminations of sandy silt, A-6 (CL)										
6			11	M	SS	20	22				
7											
8	LEAN CLAY, brown, a little gray, stiff, laminations of silt, A-6 (CL)	FINE ALLUVIUM	11	M	SS	24	33				
9											
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-7½' 3.25" HSA	**10/8/20**	**10:50**	**9.5**	**7.5**	**9.5**		**None**	
BORING COMPLETED: **10/8/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-21 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1043.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	5" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand, a little gravel, brown, A-2-4		25	M	SS	17					
2	FILL, mostly silty sand with gravel, pieces of bituminous, dark brown, A-1-b										
3			11	M	SS	19					
4	SANDY LEAN CLAY, a little gravel, brown, stiff, A-6 (CL)	TILL					23				
5	SANDY LEAN CLAY, a little gravel, brown, a little light brown, stiff, laminations of sandy silt, A-6 (CL)										
6			11	M	SS	22	22				
7											
8	SANDY LEAN CLAY, a little gravel, brown mottled, very stiff, A-6 (CL)										
9			18	M	SS	18	19				
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-7½' 3.25" HSA	**10/8/20**	**9:35**	**9.5**	**7.5**	**9.5**		**None**	
BORING COMPLETED: **10/8/20**								
DR: **DS** LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-23155** Log of Boring No. **B-22 (p. 1 of 1)**

Project: **2022 and 2023 Infrastructure Improvement Projects; Waconia, MN**

DEPTH IN FEET	Surface Elevation 1047.8 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	2¼" Bituminous pavement	FILL			SU						
1	FILL, mostly silty sand with gravel, brown, A-1-b		15	M	SS	17	26				
2	FILL, mixutre of lean clay, slightly organic, and silty sand, a little gravel, pieces of bituminous, dark brown and black, A-6	FINE ALLUVIUM									
3			17	M	SS	14	30				
4	LEAN CLAY, brown, a little gray, very stiff, A-7-6										
5	SILTY SAND, a little gravel, brown, medium dense, laminations of clayey sand, A-2-4 (SM)	TILL	11	M	SS	20	10				
6	SANDY LEAN CLAY, a little gravel, brown and gray mottled, a little light brown, stiff to very stiff, laminations of sandy silt and silty sand, A-6 (CL)										
7											
8			23	M	SS	22	19				
9											
	END OF BORING										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-7½'	**3.25" HSA**	**10/8/20**	**10:20**	**9.5**	**7.5**	**9.5**		**None**	
BORING COMPLETED:	**10/8/20**								
DR: **DS**	LG: **SB** Rig: **1C**								

AET_CORP 20-23155.GPJ AET+CPT+WELL_20181012_JG.GDT 12/15/20