



FEASIBILITY REPORT

2024 / 2025 STREET RECONSTRUCTION AND MUNICIPAL SEWER AND WATER EXTENSION PROJECT COLONIAL WOODS

CITY OF LINO LAKES | ANOKA COUNTY | MINNESOTA

June 10, 2024

Prepared for:

City of Lino Lakes
600 Town Center Parkway
Lino Lakes, MN 55014

WSB PROJECT NO. 023620-000



June 10, 2024

Honorable Mayor and City Council
City of Lino Lakes
600 Town Center Parkway
Lino Lakes, MN 55014

Re: 2024 / 2025 Street Reconstruction and Municipal Sewer and Water Extension Project
Colonial Woods
Feasibility Report
City of Lino Lakes, MN
WSB Project No. 023620-000

Dear Honorable Mayor and City Council Members:

The City of Lino Lakes is evaluating the extension of municipal sewer and water to the Colonial Woods neighborhood which is located off 62nd Street and Red Maple Lane. Transmitted herewith for your review is the Feasibility Study.

Please feel free to contact me with any questions at 651-982-2430 or dhankee@linolakes.us.

Sincerely,

WSB

A handwritten signature in black ink that reads "Diane Hankee". The signature is written in a cursive, flowing style.

Diane Hankee, PE
City Engineer

Attachments

cc: Veronica Kubicek, WSB

kkp



Table of Contents

Letter of Introduction

Table of Contents

Certification

1.	Executive Summary	1
2.	Introduction	2
2.1	Authorization	2
2.2	Scope	2
2.3	Data Available	2
3.	Existing Conditions	3
3.1.	Streets	3
3.2.	Drainage	3
3.3.	Utilities	4
3.3.1.	Sanitary Sewer	4
3.3.2.	Watermain	4
4.	Proposed Improvements	5
4.1	Streets	5
4.2	Drainage	5
4.3	Utilities	5
4.3.1	Sanitary Sewer	5
4.3.2	Water Service	5
5.	Financing	6
5.1	Opinion of Probable Cost	6
5.2	Funding	6
6.	Project Schedule	8
7.	Feasibility and Recommendation	8

Appendix A

Figures

- Project Location Map
- Colonial Woods Proposed Sanitary Sewer and Watermain Extension
- Colonial Woods Proposed Storm Sewer and Pond Location
- Colonial Woods Street Typical Section



Appendix B

Colonial Woods Opinion of Probable Cost

Appendix C

Preliminary Assessment Map

Preliminary Assessment Roll

Appendix D

Municipal Utility Unit Cost Estimates

Appendix E

Design Phase Geotechnical Evaluation (November 2023)



Certification Sheet

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.

Veronica Kubicek, PE

Date: June 10, 2024 Lic. No. 57270

Quality Control Review Completed By:

Diane Hanke, PE

Date: Date: June 10, 2024 Lic. No. 43338



1. Executive Summary

The City's 2024-2027 Street Reconstruction Plan incorporates multiple roadway improvements, some of which include the Colonial Woods neighborhood. The Colonial Woods neighborhood for the purpose of this study includes Red Maple Lane and 62nd Street (east of West Shadow Lake Drive). The street reconstruction and drainage improvements are planned to be funded through Street Reconstruction Bonds. There are no proposed assessments associated with the roadway and drainage improvements. The City's pavement management plan identifies these roadways to be in poor condition and recommends reconstruction. The estimated cost of the street and drainage improvements in the Colonial Woods neighborhood is \$2,580,649. An exhibit illustrating the Colonial Woods project location is shown in **Appendix A**.

Considering the age of the neighborhood, platted in 1977, and the need for street reconstruction, the City is evaluating the extension of municipal water and sanitary sewer to serve the area. Currently this neighborhood is served by onsite septic systems and private wells. Funding for sanitary sewer and water extension to serve the neighborhood would be through assessments to the benefitting properties, and Area & Unit Trunk Funds. The estimated cost of sanitary sewer and water system improvements is \$1,443,560.

The cost opinion includes a 10% construction contingency and 20% for indirect costs. The project is proposed to be constructed in either 2024 or 2025 pending permitting timelines. This project is feasible, necessary, and cost effective from an engineering standpoint and should be constructed as proposed herein.



2. Introduction

The City of Lino Lakes is completing this Feasibility Study for the extension of municipal sewer and water to the Colonial Woods neighborhood which is located off 62nd Street and Red Maple Lane.

2.1 Authorization

On August 28, 2023, the City Council of Lino Lakes approved Resolution 23-89 authorizing the preparation of an engineering feasibility study for the extension of sanitary sewer and water systems to the Colonial Woods neighborhood which includes Red Maple Lane and 62nd Street (east of West Shadow Lake Drive).

2.2 Scope

The City of Lino Lakes plans to reconstruct Red Maple Lane and 62nd Street (east of West Shadow Lake Drive) as part of a larger roadway improvement project, the project location map can be found in **Appendix A**. The most cost-effective time to consider extending municipal utilities is in coordination with roadway reconstruction. Thus, the City is evaluating the feasibility of extending municipal sanitary sewer and water systems to the Colonial Woods neighborhood. This includes the property located at 707 62nd Street in addition to those with Red Maple Lane addresses as included in the 1996 Colonial Woods plat, 29 properties in total.

2.3 Data Available

Information and materials used in preparation of this report include the following:

- City of Lino Lakes Record Drawings
- City of Lino Lakes Property Files
- City of Lino Lakes Charter, updated January 13, 2014
- Design Phase Geotechnical Evaluations, dated November 4, 2023
- Rice Creek Watershed District Rules
- Anoka County Property Data
- Minnesota Department of Natural Resources Well Index Records
- Field Observations of the Area and Discussions with City Staff
- Public Input and Participation



3. Existing Conditions

3.1. Streets

The roadway condition of Red Maple Lane includes various severities of distress including delamination and potholes, minor alligator, block, transverse, and longitudinal cracking, along with a few localized drainage issues. The roadway is approximately 45 years old is generally 28 feet wide and has rolled bituminous curb that has diminished over time. Red Maple Lane is within a 60-foot wide right of way.

62nd Street east of West Shadow Lake Drive is 30 feet wide and the concrete curb and gutter ends 60 feet east of West Shadow Lake Drive. 62nd Street is within a 50 to 70 foot wide right of way. The total length of roadway improvements, Red Maple Lane and 62nd Street, included with this project is approximately 0.64 miles.

There is an existing trail between 6273 and 6283 Red Maple Lane that connects to the street called Fox Circle to the north.

2024 Street Reconstruction Project Existing Conditions				
Street Segment	From	To	Length	Existing Width
62 nd Street	W Shadow Lake Drive	Red Maple Lane	415'	30'
Red Maple Lane	62 nd Street	62 nd Street	3075'	28'

3.2. Drainage

There are 3 main drainage areas in the Colonial Woods neighborhood and the project encompasses 40 acres of land. Street runoff flows along the sides of the pavement and into the grass and low areas or is collected by the existing storm sewer drains at the southeast corner of Red Maple Lane. There is a existing 20 foot wide drainage and utility easement between 6339 and 6331 Red Maple Lane. Within the easement is a storm system structure. There is also a drainage and utility easement along the east and northerly property line of address 707 62nd Street.

On the southerly end of the project area, there are also storm sewer drains at the intersection of Red Maple Lane and 62nd Street north side. These drains lead to a ditch system that runs through 6347 and 6339 Red Maple Lane. The intersection of West Shadow Lake Drive and 62nd Street is drained by storm sewer that outlets to the south between properties 690 62nd Street and 760 62nd Street. There are multiple wetlands and stormwater basins within and adjacent to the project.



3.3. Utilities

3.3.1. Sanitary Sewer

The properties along Red Maple Lane and 62nd Street east of West Shadow Lake Drive are served by onsite septic systems. Some of the septic systems are drain fields while others are mound systems. There is an existing 8-inch diameter PVC sanitary sewer mainline near the intersection of 62nd Street and West Shadow Lake Drive, with the as-built dated 2004. Existing septic systems have an average age of 35 years. There are 4 of the 29 systems that have been replaced within the last 10 years. The majority of septic systems appear to be installed at the same time the home was constructed. Septic systems installed around this time typically have a 35 to 40 year lifespan.

3.3.2. Watermain

The Red Maple Lane and 62nd Street properties east of West Shadow Lake Drive are served by private wells. There is an existing 12-inch diameter DIP watermain near the intersection of 62nd Street and West Shadow Lake Drive, with the as-built dated 2004. Existing wells are typically between 91 to 142 feet deep. Wells were installed at the time these houses were built. Wells have an average life span of 50 years.



4. Proposed Improvements

4.1 Streets

The City will reconstruct the roadway back to the existing width of 28 feet (back of curb to back of curb) and install concrete curb and gutter. Once curb and gutter is installed the roadway will seem narrower, which will provide a level of traffic calming. The road section will consist of 4 ½ inches of bituminous on top of 8 inches of class 5 aggregate base. The subgrade will be evaluated through the design process. The City may incorporate reclamation into the project. Surmountable curb and gutter is proposed for the entire Colonial Woods neighborhood, and will be lowered at the driveways. A proposed typical section can be found in Appendix A.

4.2 Drainage

The City has completed a preliminary stormwater management design that will replace and expand the existing drainage systems. The design is in conformance with the City's Stormwater Management Ordinance and Rice Creek Watershed District (RCWD) Rules. The area planned for a new stormwater management facility is within the 62nd Street right of way as it extends undeveloped to the east. The City will be required to obtain a permit from Rice Creek Watershed District and the Minnesota Pollution Control Agency (MPCA).

The preliminary storm sewer design is proposed to consist of typically 12 inch to 18 inch diameter Reinforced Concrete Pipe (RCP). At the time of this report, the storm system is planned to convey water to the pond on the easterly end of 62nd Street and outlet to the easterly wetland. The preliminary storm pipe locations and pond outline can be seen in **Appendix A**.

4.3 Utilities

4.3.1 Sanitary Sewer

An 8-inch diameter PVC sanitary sewer will be extended east along 62nd Street to Red Maple Lane. The sanitary sewer along 62nd Street is trunk sanitary sewer and will serve additional properties in the future.

An 8-inch diameter PVC sanitary sewer will be extended north along Red Maple Lane and extend around Red Maple Lane in both the east and west directions to serve the Colonial Woods neighborhood, as shown in **Appendix A**. Four-inch diameter PVC services would be extended from the 8-inch PVC mainline sewer to the property lines.

4.3.2 Water Service

Twelve-inch diameter DIP watermain will be extended east along 62nd Street to Red Maple Lane. The watermain along 62nd Street is trunk watermain and will serve additional properties in the future.

An 8-inch diameter DIP municipal water will be extended north along Red Maple Lane and loop around Red Maple Lane in both the east and west directions to serve the Colonial Woods neighborhood, as shown in **Appendix A**. The City will loop the system to an existing 8 inch stub that extends down from Fox Circle. Fire hydrants will be installed per City specifications. One inch diameter copper services would be extended to the property lines.



5. Financing

5.1 Opinion of Probable Cost

A detailed opinion of probable cost is included in **Appendix B** of this report. The opinion of probable cost is based on projected construction costs for 2024 through 2025 and includes a 10% construction contingency and 20% indirect costs. The indirect costs include engineering, legal, and administrative costs associated with the project. The project costs are summarized as follows:

2024 / 2025 Street and Utility Improvement Project Opinion of Probable Cost	
Breakout	Probable Cost
Street and Storm	\$2,580,649
Sanitary Sewer	\$701,903
Watermain	\$741,657
Total Project	\$4,024,209

5.2 Funding

The street and storm water infrastructure improvements are proposed to be funded by the issuance of Street Reconstruction Bonds, repaid by a property tax levy. There are no proposed assessments associated with the roadway and drainage improvements.

Funding of the extension of municipal watermain and sanitary sewer improvements is proposed to be provided by the City's Area & Unit Trunk Fund and special assessments.

2024 / 2025 Street and Utility Improvement Project Funding Overview				
Breakout	Street Reconstruction Bond	Area & Unit Trunk Fund	Assessment	Total
Street and Storm	\$2,580,649			\$2,580,649
Sanitary Sewer		\$440,903	\$261,000	\$701,903
Watermain		\$480,657	\$261,000	\$741,657
Totals	\$2,580,649	\$921,560	\$522,000	\$4,024,209

In the table above, the total sewer and water infrastructure cost is \$1,443,560 of which \$247,455 is attributable to trunk oversizing. Generally, oversizing is calculated by the difference in cost between a regular main and an oversized main. There are other factors considered such as additional depth and difference in materials.

The remaining amount to be funded through special assessments is \$1,196,105. This equates to \$41,245 per unit/lot. The City consulted with an independent appraiser to conduct a special benefit analysis of the proposed sewer and water extensions. The analysis supported an assessment amount of \$18,000 per unit/lot. This would total \$522,000 from special assessments to benefiting properties. A Preliminary Assessment Role and corresponding map is include in **Appendix C**.



This would result in a funding gap of \$23,245 per unit/lot which totals \$674,351. The City could consider funding the gap through the Area & Unit Trunk Fund. The Area & Unit Trunk Fund would be reimbursed through a special project specific trunk connection fee.

All properties when connecting to municipal sewer and water services pay a standard trunk connection fee in the amount of \$7,429 per unit/lot (adjusted annually). The funding gap of \$23,245 per unit/lot minus the standard trunk connection fee in the amount of \$7,429 per unit/lot equals \$15,816 per unit/lot. A special project fee would be established to include the base fee plus 50% of the funding gap on a per lot basis. Based on this scenario property owners would pay an additional connection fee of \$7,908 upon hook up for a total connection fee of \$15,337. The City's Area & Unit Trunk Fund would fund the balance of the funding gap as outlined below:

2024 / 2025 Street and Utility Improvement Project Proposed Detailed Funding					
	Area & Unit Trunk Fund				Total
	City Funds		Property Owner Connection Fees		
	Oversizing	Additional Match Costs	Additional Match Connection	Standard Connection Fee	
Sanitary Sewer	\$111,376	\$116,000	\$116,000	\$97,527	\$440,903
Watermain	\$136,079	\$113,332	\$113,332	\$117,914	\$480,657
Total	\$247,455	\$229,332	\$229,332	\$215,441	\$921,560

Preliminary assessments are calculated on a per unit basis for benefitting parcels along the streets within the project area. Benefitting parcels would be assessed over a period of 15 years, collected with property taxes, at an interest rate set at 2% above the City's borrowing rate. Last year's interest rate was 5%. At a 5% rate over 15 years, the assessments would be \$1,735/year or \$145 per month.

The City also provides for the trunk connections fees to be specially assessed at the time of connection.

A compilation of connection cost and assessments per property is outlined in **Appendix D**.



6. Project Schedule

The proposed schedule for this improvement is as follows:

Task Number	Task Description	Completion Date
1	Accept Feasibility and Order Public Hearing	June 10, 2024
2	Public Hearing	July 8, 2024
3	60 days of no action of the City Council Ends	September 6, 2024
4	Authorize Preparation of the Plans and Specifications	September 23, 2024
5	Authorize the Ad for Bid	December 9, 2024
6	Award a Construction Contract	March / April 2025
7	Start Construction	Spring 2025
8	Complete Construction	Fall 2025

7. Feasibility and Recommendation

The 2024 / 2025 Street Reconstruction and Municipal Sewer and Water Extension Project includes roadway, drainage, sanitary sewer and water system improvements and appurtenant work. The total project costs are estimated to be \$4,024,209.

Based on our analysis and data presented, the proposed project is feasible, necessary, and cost effective from an engineering standpoint. We recommend reconstruction/construction of the proposed improvements as detailed in this report and as determined financially feasible by the City Council.



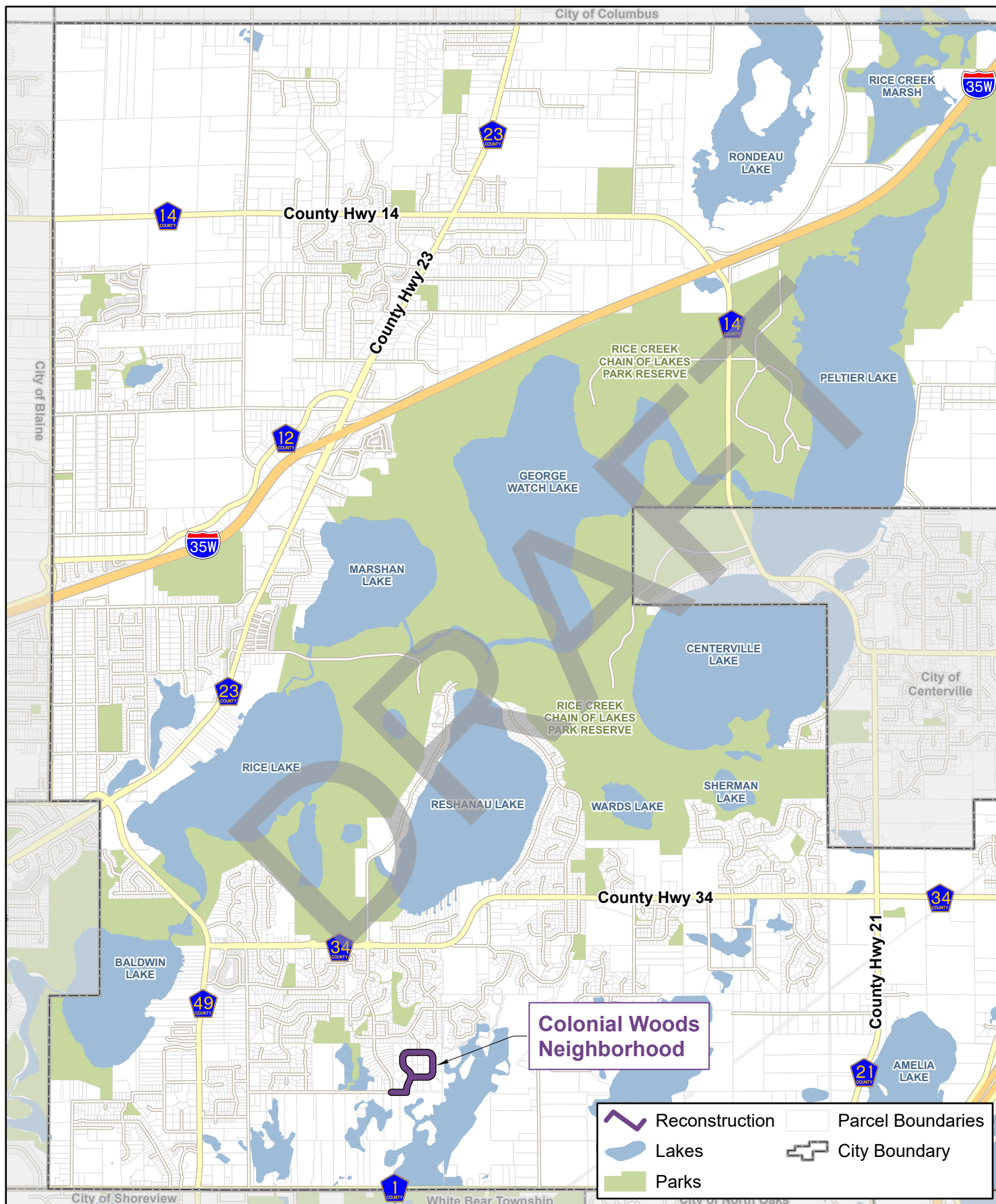
Appendix A

Colonial Woods Project Location

Colonial Woods Proposed Sanitary Sewer and Watermain Extension

Colonial Woods Proposed Storm Sewer and Pond Location

Colonial Woods Street Typical Section



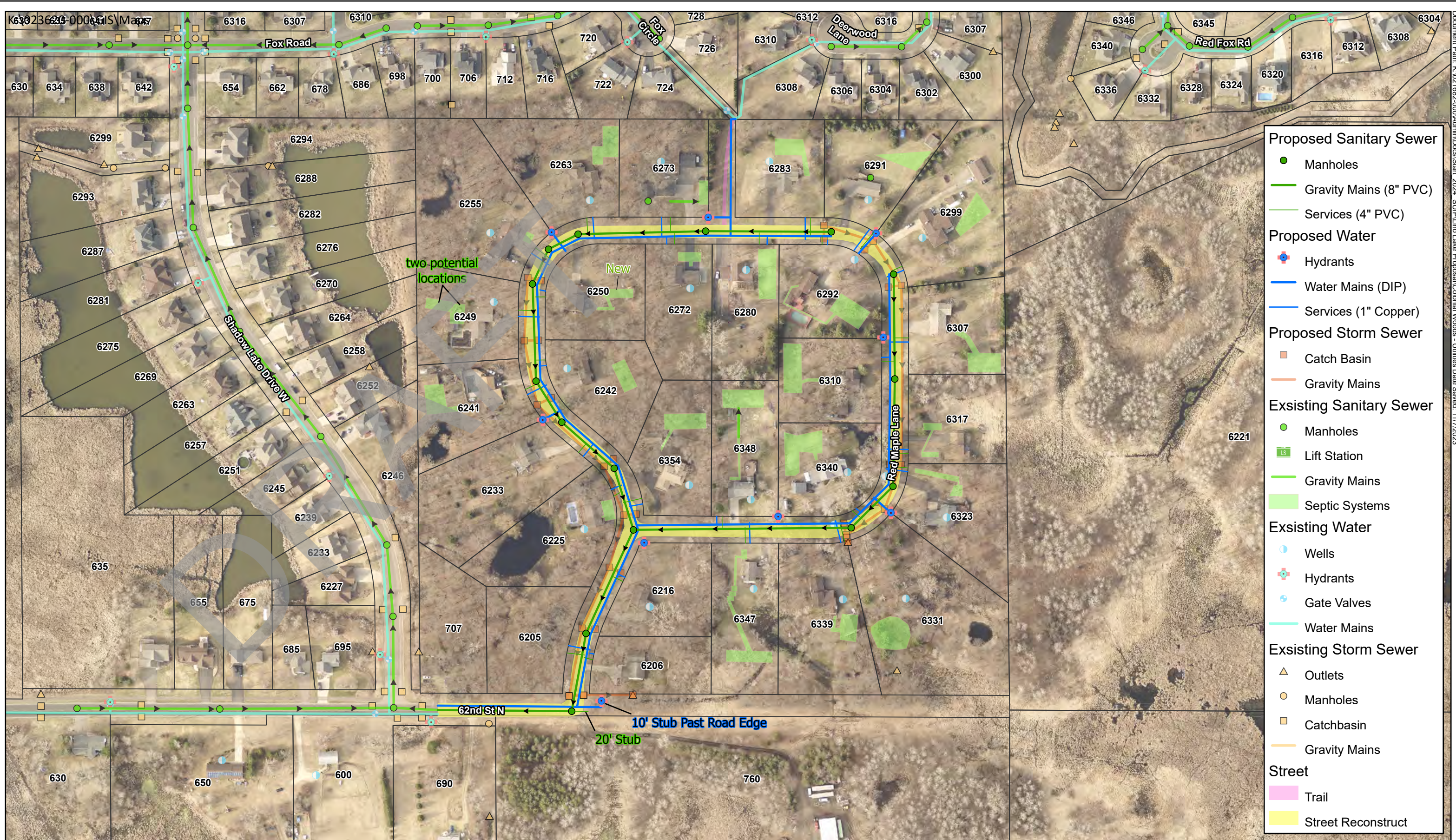
Project Location Map

City of Lino Lakes, Minnesota



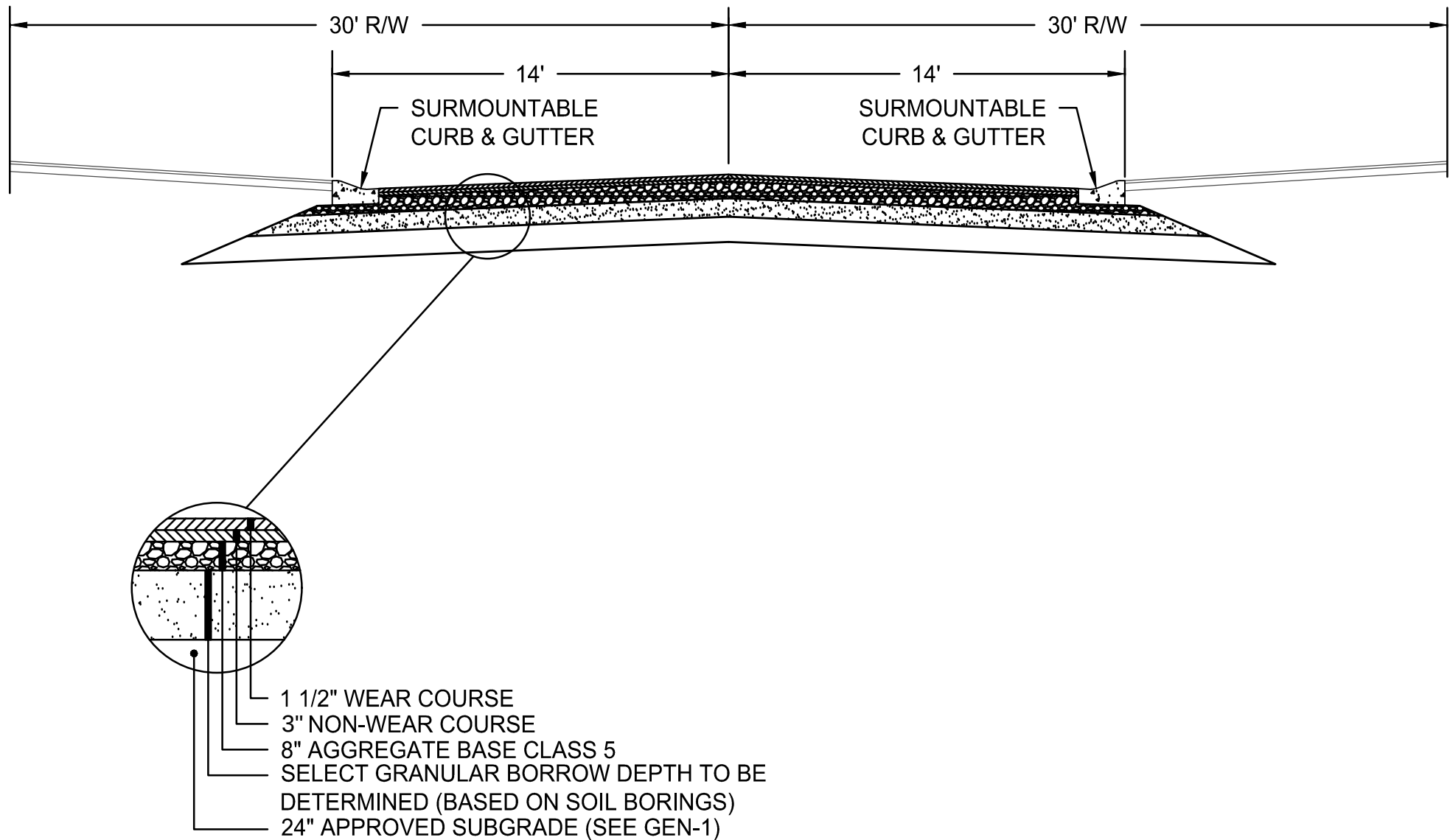
0 3,500
Feet
1 inch = 3,500 feet







K:\023620-000\Cad\Exhibits\TYPICAL SECTION.dwg 11/9/2023 8:39:27 AM



WSB PROJECT NO.:
023620-000
NOVEMBER 2023

2024 STREET RECONSTRUCTION PROJECT
TYPICAL SECTION
COLONIAL WOODS NEIGHBORHOOD
CITY OF LINO LAKES

APPENDIX A



Appendix B

Colonial Woods Opinion of Probable Cost

OPINION OF PROBABLE COST							Design By: EKM Checked By: VCK Date: 5/31/2024					
WSB Project: 2024 STREET IMPROVEMENT PROJECT Project Location: LINO LAKES, MN WSB Project No: 023620-000							PAVEMENT MANAGEMENT FUND		TRUNK WATER FUND		TRUNK SEWER FUND	
							FUNDING SOURCE		FUNDING SOURCE		FUNDING SOURCE	
Item No.	MnDOT Specification No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost	ESTIMATED QUANTITY	ESTIMATED COST	ESTIMATED QUANTITY	ESTIMATED COST	ESTIMATED QUANTITY	ESTIMATED COST
A. SURFACE IMPROVEMENTS												
1	2021.501	MOBILIZATION	LS	1	\$ 93,097.00	\$ 93,097.00	1.0	\$ 93,097.00		\$ -		\$ -
2	2101.501	CLEARING & GRUBBING	LS	1	\$ 25,000.00	\$ 25,000.00	1.0	\$ 25,000.00		\$ -		\$ -
3	2104.502	REMOVE SIGN	EACH	3	\$ 150.00	\$ 450.00	3.0	\$ 450.00		\$ -		\$ -
4	2104.502	REMOVE MAIL BOX SUPPORT	EACH	29	\$ 100.00	\$ 2,900.00	29.0	\$ 2,900.00		\$ -		\$ -
5	2104.503	SAWING CONCRETE PAVEMENT (FULL DEPTH)	L F	200	\$ 10.00	\$ 2,000.00	200.0	\$ 2,000.00		\$ -		\$ -
6	2104.503	SAWING BIT PAVEMENT (FULL DEPTH)	L F	1000	\$ 8.00	\$ 8,000.00	1000.0	\$ 8,000.00		\$ -		\$ -
7	2104.503	REMOVE CURB & GUTTER	L F	20	\$ 12.00	\$ 240.00	20.0	\$ 240.00		\$ -		\$ -
8	2104.503	SALVAGE FENCE	L F	200	\$ 150.00	\$ 30,000.00	200.0	\$ 30,000.00		\$ -		\$ -
9	2104.504	REMOVE CONCRETE DRIVEWAY PAVEMENT	S Y	180	\$ 11.00	\$ 1,980.00	180.0	\$ 1,980.00		\$ -		\$ -
10	2104.504	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	S Y	1070	\$ 9.00	\$ 9,630.00	1070.0	\$ 9,630.00		\$ -		\$ -
11	2104.504	REMOVE BITUMINOUS PAVEMENT	S Y	10460	\$ 9.00	\$ 94,140.00	10460.0	\$ 94,140.00		\$ -		\$ -
12	2104.601	SALVAGE AND REINSTALL LANDSCAPE STRUCTURES	LS	1	\$ 5,000.00	\$ 5,000.00	1.0	\$ 5,000.00		\$ -		\$ -
13	2105.504	GEOTEXTILE FABRIC TYPE 5	S Y	12920	\$ 3.00	\$ 38,760.00	12920.0	\$ 38,760.00		\$ -		\$ -
14	2105.601	DEWATERING	LS	1	\$ 10,000.00	\$ 10,000.00	1.0	\$ 10,000.00		\$ -		\$ -
15	2105.601	SITE GRADING	LS	1	\$ 7,500.00	\$ 7,500.00	1.0	\$ 7,500.00		\$ -		\$ -
16	2106.507	EXCAVATION - COMMON	C Y	3590	\$ 15.00	\$ 53,850.00	3590.0	\$ 53,850.00		\$ -		\$ -
17	2106.507	EXCAVATION - SUBGRADE	C Y	7180	\$ 24.00	\$ 172,320.00	7180.0	\$ 172,320.00		\$ -		\$ -
18	2106.507	EXCAVATION - CHANNEL AND POND	C Y	2130	\$ 45.00	\$ 95,850.00	2130.0	\$ 95,850.00		\$ -		\$ -
19	2106.507	SELECT GRANULAR EMBANKMENT (CV)	C Y	7180	\$ 24.00	\$ 172,320.00	7180.0	\$ 172,320.00		\$ -		\$ -
20	2106.507	COMMON EMBANKMENT (CV)	C Y	360	\$ 22.00	\$ 7,920.00	360.0	\$ 7,920.00		\$ -		\$ -
21	2112.519	SUBGRADE PREPARATION	RDST	30	\$ 250.00	\$ 7,500.00	30.0	\$ 7,500.00		\$ -		\$ -
22	2123.610	STREET SWEEPER (WITH PICKUP BROOM)	HOURL	25	\$ 150.00	\$ 3,750.00	25.0	\$ 3,750.00		\$ -		\$ -
23	2130.523	WATER	MGAL	50	\$ 100.00	\$ 5,000.00	50.0	\$ 5,000.00		\$ -		\$ -
24	2123.61	UTILITY CREW	HOURL	10	\$ 750.00	\$ 7,500.00	10.0	\$ 7,500.00		\$ -		\$ -
25	2211.507	AGGREGATE BASE (CV) CLASS 5	C Y	3250	\$ 32.00	\$ 104,000.00	3250.0	\$ 104,000.00		\$ -		\$ -
26	2331.603	JOINT ADHESIVE	L F	6460	\$ 1.00	\$ 6,460.00	6460.0	\$ 6,460.00		\$ -		\$ -
27	2357.506	BITUMINOUS MATERIAL FOR TACK COAT	GAL	500	\$ 3.50	\$ 1,750.00	500.0	\$ 1,750.00		\$ -		\$ -
28	2360.504	TYPE SP 9.5 WEAR CRS MIX(2,C)3.0" THICK	S Y	1070	\$ 37.00	\$ 39,590.00	1070.0	\$ 39,590.00		\$ -		\$ -
29	2360.509	TYPE SP 9.5 WEARING COURSE MIX (2,C)	TON	890	\$ 82.00	\$ 72,980.00	890.0	\$ 72,980.00		\$ -		\$ -
30	2360.509	TYPE SP 12.5 NON WEAR COURSE MIX (2,C)	TON	1740	\$ 85.00	\$ 147,900.00	1740.0	\$ 147,900.00		\$ -		\$ -
31	2501.502	24" RC PIPE APRON	EACH	2	\$ 2,100.00	\$ 4,200.00	2.0	\$ 4,200.00		\$ -		\$ -
32	2503.503	15" RC PIPE SEWER DES 3006 CL V	L F	810	\$ 75.00	\$ 60,750.00	810.0	\$ 60,750.00		\$ -		\$ -
33	2503.503	18" RC PIPE SEWER DES 3006 CL V	L F	930	\$ 88.00	\$ 81,840.00	930.0	\$ 81,840.00		\$ -		\$ -
34	2503.503	21" RC PIPE SEWER DES 3006 CL III	L F	590	\$ 92.00	\$ 54,280.00	590.0	\$ 54,280.00		\$ -		\$ -
35	2503.503	24" RC PIPE SEWER DES 3006 CL III	L F	230	\$ 100.00	\$ 23,000.00	230.0	\$ 23,000.00		\$ -		\$ -
36	2504.602	IRRIGATION SYSTEM REPAIR	EACH	10	\$ 500.00	\$ 5,000.00	10.0	\$ 5,000.00		\$ -		\$ -
37	2505.601	UTILITY COORDINATION	LS	1	\$ 2,500.00	\$ 2,500.00	1.0	\$ 2,500.00		\$ -		\$ -
38	2506.502	CONST DRAINAGE STRUCTURE DESIGN SPECIAL	EACH	12	\$ 2,100.00	\$ 25,200.00	12.0	\$ 25,200.00		\$ -		\$ -
39	2506.502	CONST DRAINAGE STRUCTURE DES 48-4020	EACH	9	\$ 2,100.00	\$ 18,900.00	9.0	\$ 18,900.00		\$ -		\$ -
40	2506.502	CONST DRAINAGE STRUCTURE DES 60-4020	EACH	4	\$ 2,500.00	\$ 10,000.00	4.0	\$ 10,000.00		\$ -		\$ -
41	2511.507	RANDOM RIPRAP CLASS III	C Y	50	\$ 80.00	\$ 4,000.00	50.0	\$ 4,000.00		\$ -		\$ -
42	2531.503	CONCRETE CURB & GUTTER DESIGN B618	L F	6460	\$ 28.00	\$ 180,880.00	6460.0	\$ 180,880.00		\$ -		\$ -
43	2531.504	6" CONCRETE DRIVEWAY PAVEMENT	S Y	180	\$ 90.00	\$ 16,200.00	180.0	\$ 16,200.00		\$ -		\$ -
44	2540.602	MAIL BOX	EACH	29	\$ 100.00	\$ 2,900.00	29.0	\$ 2,900.00		\$ -		\$ -
45	2540.602	MAIL BOX SUPPORT	EACH	29	\$ 150.00	\$ 4,350.00	29.0	\$ 4,350.00		\$ -		\$ -
46	2540.602	TEMPORARY MAIL BOX	EACH	29	\$ 150.00	\$ 4,350.00	29.0	\$ 4,350.00		\$ -		\$ -
47	2557.602	REPAIR DOG FENCE	EACH	10	\$ 500.00	\$ 5,000.00	10.0	\$ 5,000.00		\$ -		\$ -
48	2557.603	INSTALL FENCE	L F	200	\$ 150.00	\$ 30,000.00	200.0	\$ 30,000.00		\$ -		\$ -
49	2563.601	TRAFFIC CONTROL	LS	1	\$ 12,000.00	\$ 12,000.00	1.0	\$ 12,000.00		\$ -		\$ -
50	2564.602	INSTALL SIGN	EACH	3	\$ 150.00	\$ 450.00	3.0	\$ 450.00		\$ -		\$ -
51	2573.501	STABILIZED CONSTRUCTION EXIT	LS	1	\$ 1,500.00	\$ 1,500.00	1.0	\$ 1,500.00		\$ -		\$ -
52	2573.502	STORM DRAIN INLET PROTECTION	EACH	2	\$ 150.00	\$ 300.00	2.0	\$ 300.00		\$ -		\$ -
53	2573.503	SILT FENCE, TYPE MS	L F	1620	\$ 4.00	\$ 6,480.00	1620.0	\$ 6,480.00		\$ -		\$ -
54	2573.503	SEDIMENT CONTROL LOG TYPE WOOD FIBER	L F	1620	\$ 3.00	\$ 4,860.00	1620.0	\$ 4,860.00		\$ -		\$ -
55	2574.507	COMMON TOPSOIL BORROW	C Y	960	\$ 38.00	\$ 36,480.00	960.0	\$ 36,480.00		\$ -		\$ -
56	2574.508	FERTILIZER TYPE 3	L B	240	\$ 4.00	\$ 960.00	240.0	\$ 960.00		\$ -		\$ -
57	2574.508	FERTILIZER TYPE 4	L B	270	\$ 4.00	\$ 1,080.00	270.0	\$ 1,080.00		\$ -		\$ -
58	2575.504	SODDING TYPE LAWN	S Y	5740	\$ 10.00	\$ 57,400.00	5740.0	\$ 57,400.00		\$ -		\$ -
59	2575.504	ROLLED EROSION PREVENTION CATEGORY 25	S Y	10890	\$ 3.00	\$ 32,670.00	10890.0	\$ 32,670.00		\$ -		\$ -
60	2575.505	SEEDING	ACRE	2	\$ 2,000.00	\$ 4,400.00	2.2	\$ 4,400.00		\$ -		\$ -
61	2575.508	SEED MIXTURE 33-261	L B	80	\$ 25.00	\$ 2,000.00	80.0	\$ 2,000.00		\$ -		\$ -
62	2575.508	HYDRAULIC MULCH MATRIX	L B	5620	\$ 6.00	\$ 33,720.00	5620.0	\$ 33,720.00		\$ -		\$ -
						CONSTRUCTION TOTAL	\$ 1,955,037.00	\$ 1,955,037.00		\$ -		\$ -
						CONTINGENCY TOTAL (10%)	\$ 195,504.00	\$ 195,504.00		\$ -		\$ -
						SUBTOTAL	\$ 2,150,541.00	\$ 2,150,541.00		\$ -		\$ -
						INDIRECT COST TOTAL (20%)	\$ 430,108.00	\$ 430,108.00		\$ -		\$ -
						TOTAL SURFACE COST	\$ 2,580,649.00	\$ 2,580,649.00		\$ -		\$ -

							PROPERTY OWNER CONTRIBUTION FUNDING SOURCE		TRUNK WATER FUND FUNDING SOURCE		TRUNK SEWER FUND FUNDING SOURCE	
Item No.	MnDOT Specification No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost	ESTIMATED QUANTITY	ESTIMATED COST	ESTIMATED QUANTITY	ESTIMATED COST	ESTIMATED QUANTITY	ESTIMATED COST
C. WATERMAIN IMPROVEMENTS												
59	2123.610	UTILITY CREW	HOURL	20	\$ 750.00	\$ 15,000.00		\$ -	20.0	\$ 15,000.00		\$ -
60	2504.602	CONNECT TO EXISTING WATER MAIN	EACH	2	\$ 2,500.00	\$ 5,000.00		\$ -	2.0	\$ 5,000.00		\$ -
61	2504.602	HYDRANT ASSEMBLY	EACH	9	\$ 10,000.00	\$ 90,000.00	7.0	\$ 70,000.00	2.0	\$ 20,000.00		\$ -
62	2504.602	1" CORPORATION STOP	EACH	29	\$ 250.00	\$ 7,250.00	29.0	\$ 7,250.00		\$ -		\$ -
63	2504.602	8" GATE VALVE & BOX	EACH	4	\$ 2,250.00	\$ 9,000.00	4.0	\$ 9,000.00		\$ -		\$ -
64	2504.602	12" GATE VALVE & BOX**	EACH	1	\$ 5,750.00	\$ 5,750.00		\$ -	1.0	\$ 5,750.00		\$ -
65	2504.602	1" CURB STOP & BOX	EACH	29	\$ 360.00	\$ 10,440.00	29.0	\$ 10,440.00		\$ -		\$ -
66	2504.603	1" TYPE K COPPER PIPE	L F	870	\$ 50.00	\$ 43,500.00	870.0	\$ 43,500.00		\$ -		\$ -
67	2504.603	8" WATERMAIN DUCTILE IRON CL 52	L F	3610	\$ 95.00	\$ 342,950.00	3210.0	\$ 304,950.00	400.0	\$ 38,000.00		\$ -
68	2504.603	12" WATERMAIN DUCTILE IRON CL 52**	L F	320	\$ 50.00	\$ 16,000.00		\$ -	320.0	\$ 16,000.00		\$ -
69	2504.603	ANODE BAGS	EACH	9	\$ 120.00	\$ 1,080.00	7.0	\$ 840.00	2.0	\$ 240.00		\$ -
70	2504.604	4" POLYSTYRENE INSULATION	S Y	30	\$ 50.00	\$ 1,500.00	20.0	\$ 1,000.00	10.0	\$ 500.00		\$ -
71	2504.608	DUCTILE IRON FITTINGS	LB	720	\$ 20.00	\$ 14,400.00	590.0	\$ 11,800.00	130.0	\$ 2,600.00		\$ -
CONSTRUCTION TOTAL								\$ 458,780.00		\$ 103,090.00		\$ -
CONTINGENCY TOTAL (10%)								\$ 45,878.00		\$ 10,309.00		\$ -
SUBTOTAL								\$ 504,658.00		\$ 113,399.00		\$ -
INDIRECT COST TOTAL (20%)								\$ 100,932.00		\$ 22,680.00		\$ -
TOTAL WATERMAIN COST								\$ 605,590.00		\$ 136,079.00		\$ -

							PROPERTY OWNER CONTRIBUTION FUNDING SOURCE		TRUNK WATER FUND FUNDING SOURCE		TRUNK SEWER FUND FUNDING SOURCE	
Item No.	MnDOT Specification No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost	ESTIMATED QUANTITY	ESTIMATED COST	ESTIMATED QUANTITY	ESTIMATED COST	ESTIMATED QUANTITY	ESTIMATED COST
B. SANITARY SEWER IMPROVEMENTS												
72	2106.601	DEWATERING	LS	1	\$ 45,000.00	\$ 45,000.00	0.3	\$ 13,500.00		\$ -	0.7	\$ 31,500.00
73	2123.610	UTILITY CREW	HOURL	20	\$ 850.00	\$ 17,000.00		\$ -		\$ -	20.0	\$ 17,000.00
74	2503.602	CONNECT TO EXISTING SANITARY SEWER	EACH	1	\$ 2,500.00	\$ 2,500.00		\$ -		\$ -	1.0	\$ 2,500.00
75	2503.602	CONNECT TO EXISTING MANHOLES (SAN)	EACH	1	\$ 1,250.00	\$ 1,250.00		\$ -		\$ -	1.0	\$ 1,250.00
76	2503.602	8"x4" PVC WYE	EACH	29	\$ 250.00	\$ 7,250.00	29.0	\$ 7,250.00		\$ -		\$ -
77	2503.603	8" PVC PIPE SEWER SDR 26	L F	3550	\$ 75.00	\$ 266,250.00	3250.0	\$ 243,750.00		\$ -	300.0	\$ 22,500.00
78	2503.603	4" PVC SANITARY SERVICE PIPE	L F	870	\$ 55.00	\$ 47,850.00	870.0	\$ 47,850.00		\$ -		\$ -
79	2506.602	CHIMNEY SEAL	EACH	19	\$ 275.00	\$ 5,225.00	18.0	\$ 4,950.00		\$ -	1.0	\$ 275.00
80	2506.502	CASTING ASSEMBLY (SANITARY SEWER)	EACH	19	\$ 850.00	\$ 16,150.00	18.0	\$ 15,300.00		\$ -	1.0	\$ 850.00
81	2506.603	CONSTRUCT 48" DIA SANITARY MANHOLE	L F	290	\$ 425.00	\$ 123,250.00	270.0	\$ 114,750.00		\$ -	20.0	\$ 8,500.00
CONSTRUCTION TOTAL								\$ 447,350.00		\$ -		\$ 84,375.00
CONTINGENCY TOTAL (10%)								\$ 44,735.00		\$ -		\$ 8,438.00
SUBTOTAL								\$ 492,085.00		\$ -		\$ 92,813.00
INDIRECT COST TOTAL (20%)								\$ 98,417.00		\$ -		\$ 18,563.00
TOTAL SANITARY SEWER COST								\$ 590,502.00		\$ -		\$ 111,376.00
COLONIAL WOODS PROJECT TOTAL COST								\$ 4,024,209.00				



Appendix C

Preliminary Assessment Map

Preliminary Assessment Roll



Document Path: K:\021682-000\Admin\Doc\Stat 2024 - SUP\Lino Lake Proposal\Colonial Woods - Assessment Map Date Saved: 11/13/2023



Preliminary Assessment Map

Colonial Woods Neighborhood

81st St, Danube St, Elbe St, Lino Lakes, MN



0 200 Feet
1 inch = 200 feet



Preliminary Assessment Roll

WSB Project:	2024 / 2025 STREET RECONSTRUCTION AND MUNICIPAL SEWER AND WATER EXTENSION PROJECT (COLONIAL WOODS)					Residential per unit
Project Location:	City of Lino Lakes					cost
WSB Project No.:	023620-000					
Date:	6/10/2024					\$18,000.00
MapID	PIN	PROPERTY ADDRESS			OWNER	ASSESSMENT
1	323122140013	707 62ND ST	LINO LAKES	MN 55014	MUNSON DOUGLAS C & GALE A	\$18,000.00
2	323122140012	6205 RED MAPLE LN	LINO LAKES	MN 55014	FANUM MICHAEL J & JULIANNE	\$18,000.00
3	323122140014	6225 RED MAPLE LN	LINO LAKES	MN 55014	ENGST STEPHEN T & KAREN A	\$18,000.00
4	323122140015	6233 RED MAPLE LN	LINO LAKES	MN 55014	KORKOWSKI KENNETH J & G E	\$18,000.00
5	323122140016	6241 RED MAPLE LN	LINO LAKES	MN 55014	DICK TERRANCE J	\$18,000.00
6	323122140017	6249 RED MAPLE LN	LINO LAKES	MN 55014	LANGANKI TRUSTEE, CYNTHIA	\$18,000.00
7	323122140018	6255 RED MAPLE LN	LINO LAKES	MN 55014	CASURA, WAYNE A	\$18,000.00
8	323122140019	6263 RED MAPLE LN	LINO LAKES	MN 55014	BORDSEN JAMES D & KELLY L	\$18,000.00
9	323122140020	6273 RED MAPLE LN	LINO LAKES	MN 55014	MILLER, CARA DEANNE	\$18,000.00
10	323122140011	6283 RED MAPLE LN	LINO LAKES	MN 55014	SLATTEN, MONIKA E	\$18,000.00
11	323122140010	6291 RED MAPLE LN	LINO LAKES	MN 55014	O CONNOR MICHAEL E & LINDA J	\$18,000.00
12	323122140009	6299 RED MAPLE LN	LINO LAKES	MN 55014	KENNY JOHN P & DAWN M	\$18,000.00
13	323122140008	6307 RED MAPLE LN	LINO LAKES	MN 55014	SAGER, CHELSEA R	\$18,000.00
14	323122140007	6317 RED MAPLE LN	LINO LAKES	MN 55014	DROW THOMAS M & CHRISTINE J	\$18,000.00
15	323122140006	6323 RED MAPLE LN	LINO LAKES	MN 55014	DEDOMINES, ANNETTE M	\$18,000.00
16	323122140005	6331 RED MAPLE LN	LINO LAKES	MN 55014	O'NEILL, MAURA J	\$18,000.00
17	323122140004	6339 RED MAPLE LN	LINO LAKES	MN 55014	BUSHOR, STEPHEN R	\$18,000.00
18	323122140003	6347 RED MAPLE LN	LINO LAKES	MN 55014	KELLY JODI L & VANBERGEN BRIAN	\$18,000.00
19	323122140002	6216 RED MAPLE LN	LINO LAKES	MN 55014	KEMPLIN MARK STEVE	\$18,000.00
20	323122140001	6206 RED MAPLE LN	LINO LAKES	MN 55014	KELLER RICHARD A & REBECCA	\$18,000.00
INTENTIONALLY LEFT BLANK						
22	323122140028	6354 RED MAPLE LN	LINO LAKES	MN 55014	ANDERSON JOSHUA J	\$18,000.00
23	323122140027	6242 RED MAPLE LN	LINO LAKES	MN 55014	JAVORSKI STANLEY & DOLORES	\$18,000.00
24	323122140026	6250 RED MAPLE LN	LINO LAKES	MN 55014	ENGSTROM, CAESARE	\$18,000.00
25	323122140025	6272 RED MAPLE LN	LINO LAKES	MN 55014	BARTHEL TRUSTEE, JOSEPH L	\$18,000.00
26	323122140024	6280 RED MAPLE LN	LINO LAKES	MN 55014	DEWITT DAVID F & KAREN E	\$18,000.00
27	323122140023	6292 RED MAPLE LN	LINO LAKES	MN 55014	MEIS, CARRIE A	\$18,000.00
28	323122140022	6310 RED MAPLE LN	LINO LAKES	MN 55014	OMAN JONATHAN	\$18,000.00
29	323122140021	6340 RED MAPLE LN	LINO LAKES	MN 55014	FERNSTROM GEORGE R & LYNN K	\$18,000.00
30	323122140029	6348 RED MAPLE LN	LINO LAKES	MN 55014	LECLAIRE, BRIANNA R	\$18,000.00
					TOTAL:	\$522,000.00



APPENDIX D

Municipal Utility Unit Cost Estimates

Municipal utility extension would be funded by assessments to the benefitting properties and trunk utility funds. The proposed assessment amount is \$18,000 per unit/lot.

The City has established connection fees to pay for the trunk facilities on each utility. The trunk utility connection fees would be due at the time of connection. The 2024 connection fees for watermain and sanitary sewer are \$4,066 per unit/lot and \$3,363 per unit/lot respectively, which combined are \$7,429 per unit/lot. There would also be project specific additional trunk connection fees for watermain and sanitary sewer \$7,908 per unit/lot respectively.

A summary of the connection fees on a per unit basis:

Sanitary Sewer and Water Connection Fees per unit/lot	
Trunk sanitary sewer and SAC	\$3,363
Trunk watermain and WAC	\$4,066
Additional Trunk Connection Fee	\$7,908
MCES SAC	\$2,485
Total	\$17,822

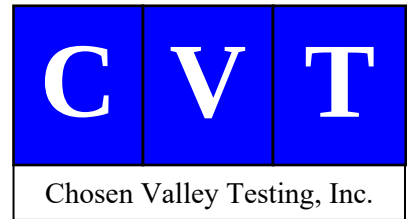
In addition to these costs, the individual property owners would need to hire a contractor to make the connection from the City's Right of Way to the house. The estimated cost of construction for installing both the sanitary sewer and watermain is \$10,000 per unit.

The City consulted with an independent appraiser to develop the proposed assessments. As part of the analysis, the appraiser determined a typical well replacement to cost typically \$15,000 - \$25,000 and a typical septic system replacement \$25,000 - \$30,000. The average overall full replacement well and septic is expected to cost \$40,000 - \$60,000 per unit.



APPENDIX E

Design Phase Geotechnical Evaluation (November 2023)



Design Phase Geotechnical Evaluation:

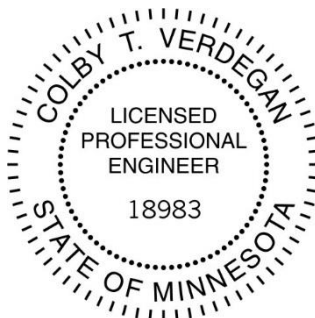
Proposed Red Maple Lane Infrastructure Improvement
Lino Lakes, Minnesota

Prepared for:

City of Lino Lakes
c/o: Michael Grochala

November 4, 2023
CVT Project: 22539.23.MNS

Certification:



I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly licensed engineer under the laws of the State of Minnesota.

A handwritten signature in black ink, appearing to read 'Colby Verdegan'.

Colby T. Verdegan, PE
Geotechnical Engineer
Registration Number 18983
Date: November 4, 2023

Chosen Valley Testing, Inc.

245 Roselawn Avenue East, Suite #29, St. Paul, MN 55117
Phone: 1-651-756-7384 Fax: 1-651-888-6121

City of Lino Lakes
c/o: Michael Grochala
600 Town Center Parkway
Lino Lakes, MN 55014
Email: Michael.Grochala@ci.lino-lakes.mn.us

November 4, 2023

cc. WSB
Veronica Abrams-Kubicek, PE
VKubicek@wsbeng.com

**Re: Design Phase Geotechnical Evaluation
Proposed Red Maple Lane Infrastructure Improvement
Lino Lakes, Minnesota
CVT Number: 22539.23.MNS**

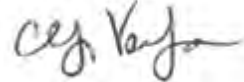
Dear Mr. Grochala,

As authorized, we have completed the geotechnical evaluation for the proposed infrastructure improvements of the subdivision in Lino Lakes, Minnesota. The attached report provides details of our findings and recommendations for the proposed project. CVT appreciates the opportunity to provide geotechnical services on this project. If you have any questions about our report, please feel free to contact us at (651) 756-7384.

Sincerely,
Chosen Valley Testing, Inc.



Hannah Fischer
Graduate Engineer



Colby T. Verdegan, PE
President/Chief Engineer

TABLE OF CONTENTS

A. INTRODUCTION	2
A.1. PURPOSE	2
A.2. SCOPE	2
A.3. BORING LOCATIONS AND ELEVATIONS.....	2
A.4. GEOLOGIC BACKGROUND	2
B. SUBSURFACE DATA	2
B.1. STRATA	3
B.2. PENETRATION TEST RESULTS	3
B.3. GROUNDWATER DATA	4
C. PROJECT DESIGN DATA	4
D. UTILITY RECOMMENDATIONS.....	4
D.1. GROUNDWATER/DE-WATERING	4
D.2. TRENCH SIDEWALLS	5
D.3. TRENCH BOTTOM STABILITY.....	5
D.4. FILL PLACEMENT AND COMPACTION	5
E. PAVEMENT RECOMMENDATIONS	5
E.1. STRIPPING AND GRADING	5
E.2. PRELIMINARY PAVEMENT DESIGN.....	6
F. CONSTRUCTION TESTING AND DOCUMENTATION	6
F.1. EXCAVATION	6
F.2. COMPACTION	6
F.3. COLD WEATHER	6
F.4. CONSTRUCTION PHASE TESTING AND DOCUMENTATION	6
G. LEVEL OF CARE.....	7
APPENDIX	8

BORING LOCATION SKETCH

LOG OF BORING # 1-4

LEGEND TO SOIL DESCRIPTION

**Design Phase Geotechnical Report
Red Maple Lane Infrastructure Improvements
Lino Lakes, Minnesota**

CVT Project Number: 22539.23.MNS

Date: November 4, 2023

A. Introduction

The intent of this report is to present our findings and describe the means used to collect the data. The data was collected for a specific purpose and may not be suitable for other purposes. We should be consulted before attempting to use the data for other uses. A complete and thorough review of the entire document, including its assumptions and its appendices, should be undertaken immediately upon receipt.

A.1. Purpose

This geotechnical report was prepared to assist planning for proposed infrastructure improvements of the subdivision of Red Maple Lane in Lino Lakes, Minnesota. Our services were authorized by Mr. Michael Grochala from The City of Lino Lakes.

A.2. Scope

To obtain data for analysis, a total of four (4) penetration test borings were performed. The borings were drilled to depths of about 9 ½ to 20 feet. Our engineering scope consisted of providing this report of our findings and including geotechnical recommendations for construction and design of potential utility replacements and paved areas.

A.3. Boring Locations and Elevations

The preferred boring locations were indicated to Chosen Valley Testing (CVT) on a site plan provided by the city. The Boring Location Sketch in the Appendix shows the approximate locations as drilled on aerial imagery using Google Earth software. Ground surface elevations were estimated using MnTOPO software from the Minnesota DNR and are indicated on the Log of Boring sheets in the Appendix. The elevations should be considered approximate.

A.4. Geologic Background

A geotechnical report is based on subsurface data collected for the specific structure or problem. Available geologic data from the region can help interpretation of the data and is briefly summarized in this section.

Geologic maps indicate the soils in the area are dominated by glacial till deposits of sand to silty sand. Bedrock is commonly more than 50 feet below the surface and is not a consideration for this project.

B. Subsurface Data

The borings were performed using penetration test procedures (Method of Test D1586 of the American Society for Testing and Materials). This procedure allows for the extraction of intact soil specimen from deep in the ground. With this method, a hollow-stem auger is drilled to the desired sampling depth. A 2-inch OD sampling tube is then screwed onto the end of a sampling rod, inserted through the hole in the auger's tip,

and then driven into the soil with a 140-pound hammer dropped repeatedly from a height of 30 inches above the sampling rod. The sampler is driven 18 inches into the soil unless the material is too hard. The samples are generally taken at 2½ to 5-foot intervals. The core of soil obtained was classified and logged by our drilling personnel at the site and a representative portion was then sealed and delivered to our laboratory for further review.

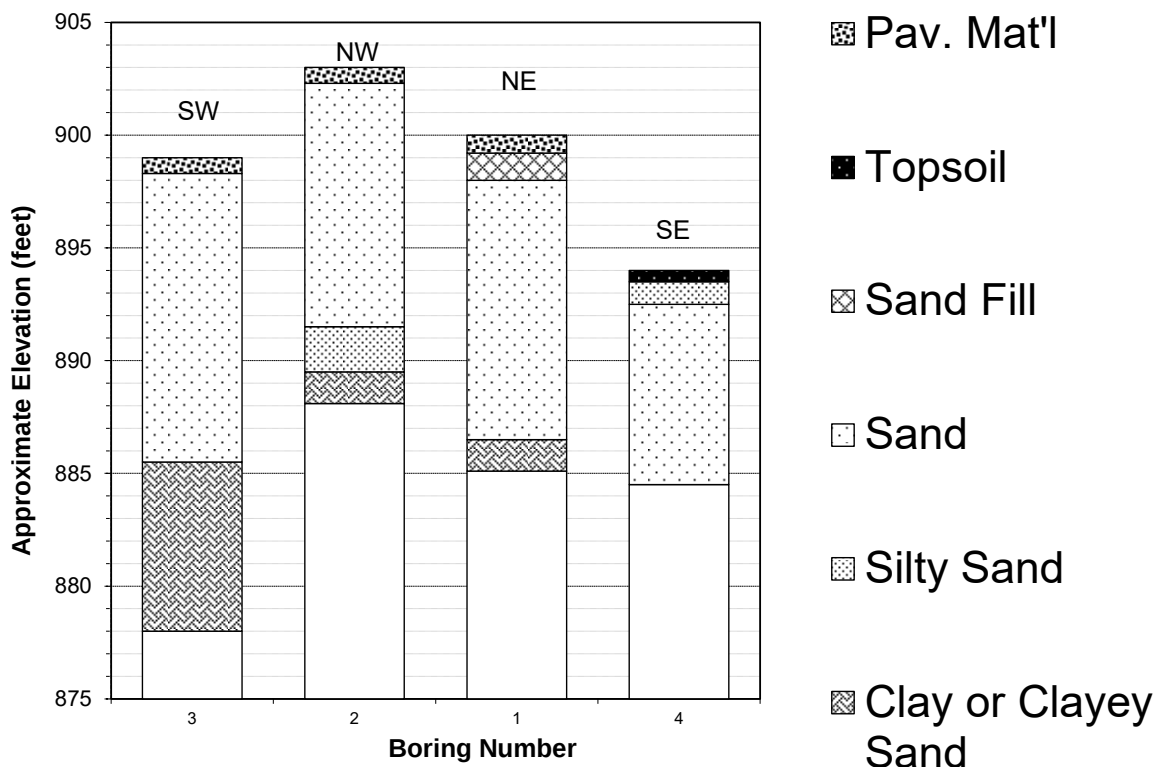
B.1. Strata

Three borings were drilled through existing pavement and encountered about 3 to 4 inches of asphalt over 6 inches of aggregate. The southeast boring was drilled in a green area and met about ½ foot of topsoil at the surface.

Below the surface materials, the northern east boring encountered possible fill consisting of poorly graded sand with silt to a depth of 2 feet.

Below the surface material, the borings were dominated by clean sands natural sands (poorly graded sand and poorly graded sand with silt) with lesser layers of silty sand. The green area boring terminated in these materials. The borings drilled through the pavements met clayey sand or sandy clay at about 13 ½ feet and terminated in these materials.

For the reader's convenience, we have summarized the soil boring data in the following cross-section. The reader is referred to the boring logs in the Appendix for more detailed information.



B.2. Penetration Test Results

Penetration Test Results: The number of blows needed for the hammer to advance the penetration test

sampler is an indicator of soil characteristics. The results tend to be more meaningful for natural mineral soils than for fill soils. In fill soils, density tests are more meaningful.

Penetration resistance values ("N" Value) of 5 to 11 blows per foot (BPF) were recorded in the sands indicating they were very loose to medium dense but mostly loose.

The clays returned blows of 7 BPF, indicating it was medium.

A key to descriptors used to qualify the relative density of soil (such as *soft*, *stiff*, *loose*, and *dense*) can be found on the Legend to Soil Description in the Appendix.

B.3. Groundwater Data

During drilling, the drillers may note the presence of moisture on the sampler, in the cuttings, or in the borehole itself. These findings are reported on the Log of Boring sheets. Because water levels vary with weather, time of year, and other factors, the presence or lack of water during exploration is subject to interpretation and is not always conclusive.

Water was observed in all boring at depths from 7 to 11 feet below the surface. These depth corresponds to elevations of about 892 to 893 in the borings were three borings which terminated in the clayey soils, but about 877 in the southeast boring which did not encounter the clayey layer. Groundwater levels at the site are expected to fluctuate seasonally similar to levels in the nearby lake, as well as with local weather patterns.

C. Project Design Data

Each structure has a different loading configuration and intensity, different grades, and different structural and performance tolerances. Therefore, the geotechnical exploration will be construed differently from one structure to another. If the initial structure should change design, we should be engaged to review these conditions with respect to the prevailing soil conditions. Without the opportunity to review any such changes, the recommendations may no longer be valid or appropriate.

The project consists of complete reconstruction of pavements and the installation of watermain, storm sewer and sanitary sewer in the subdivision. CVT assumes the pipes will be installed at depths between 5 and 10 feet using open cut excavations or direction drilling.

We have assumed final grades will be at or close to the existing grades. The new pavement is expected to consist of asphalt over aggregate base.

D. Utility Recommendations

D.1. Groundwater/De-watering

As mentioned earlier, water was observed in all the boring at a depth of 7 to 11 feet. Due to the high permeability of the dominated sand, well-points or dewatering wells will likely be required for excavations into the water table.

D.2. Trench Sidewalls

The contractor will be required to slope or shore the excavations as needed to meet OSHA requirements for safety. Most of the soils would be expected to classify as Type C soils as defined by OSHA. Trench boxes or other stabilization methods may be necessary if excavations encroach near existing utilities or structures.

D.3. Trench Bottom Stability

Depending upon location and depth, the utilities are expected to bear primarily on clean sands. These materials are considered generally suitable for support of pipes. If soft and unstable conditions are encountered, we recommend placing bedding of coarse sand or gravel at the base of the trenches to provide a more stable bottom for crews laying the pipes.

In order to reduce the potential for point loads on the pipes, we recommend removing any cobbles or boulders to a depth of at least 6 to 8 inches from around pipes and replacing those materials with clean sand or gravel that can more readily conform to the pipes.

D.4. Fill Placement and Compaction

Soils placed as backfill below paved areas should ideally be compacted to 100% of their maximum standard Proctor density (ASTM D 698) in the upper 3 feet, and to at least 95% below. In green areas, 90% compaction is normally adequate.

The dominated sands as well as the less dominant silty sands encountered are considered generally suitable for use as backfill above utilities, provided they can be adequately compacted. To reduce potential for differential frost action, fill placed in upper part of the trenches should ideally be placed in layers that align reasonably similar to the soil stratification on the trench side walls. In this case, the soils appear to be reasonably uniform, and layering does not appear to be necessary.

E. Pavement Recommendations

E.1. Stripping and Grading

We recommend removing the existing asphalt, aggregate base, from the below new paved areas, along with any topsoil or fine grained soils (silts or clay) is present within 3 feet of the proposed top of subgrade. It may be possible to reclaim and reuse the existing asphalt and aggregate for use as part of the new pavement's aggregate base, provided it meets MnDOT specifications.

After the removals, utility construction, and grading, the near-surface soils are expected to primarily consists of clean sands. We recommend scarifying and compacting all near-surface soils in order to even out any localized discontinuities in the subgrade materials and to provide a more gradational transition between differing materials. This action is intended to limit differential frost heave and provide more uniform pavement support.

Subgrades should be test rolled using a tandem axle truck. Any soft areas detected should be scarified,

dried, and recompact. If time constraints prohibit drying, soil corrections, extra aggregate base, breaker run, sand subbase, and/or geotextiles may be necessary for stabilization.

E.2. Preliminary Pavement Design

As mentioned earlier, subgrade soils are expected to consist primarily of clean sands. The effective Hveem-stabilometer R-values for dominant sands would be expected to range from 50 to 70. We recommend using a value of 50 for pavement design.

In the absence of traffic loading, we recommend a pavement section consisting of at least 3 inches of asphalt and 6 inches of aggregate base. As noted before, the existing pavements could possibly be milled and then reused as base material provided the reclaimed material meets Mn/DOT Specification 3138 for Class 5 Aggregate Base.

F. Construction Testing and Documentation

F.1. Excavation

A variety of equipment is expected to be capable of performing earthwork and grading. An excavator or backhoe with a smooth-lipped bucket is recommended for completing any excavations. This is intended to limit disturbance to the supporting soils being left in place, while also producing a smooth working surface.

F.2. Compaction

Fill should be placed in lifts adjusted to the compactor being used and the material being compacted. We recommend limiting lifts to no more than 1 foot, assuming large, self-propelled or tow-behind compactors are used. Thinner lifts should be used for lighter compaction equipment.

F.3. Cold Weather

If the earthwork occurs during freezing temperatures, good winter construction practices should be used. No frozen fill should be used nor should structural filling take place on frozen ground.

F.4. Construction Phase Testing and Documentation

The bottom of all excavations, grading, and roadway subgrade should be evaluated and documented by geotechnical personnel after the unsuitable materials are removed and before placement of any fill or pavement. Samples of any fill materials and/or alternative gradations of materials proposed for use should be submitted for approval before use. The County may wish to have, or may be obligated to have tests performed regarding the other various paving components. Specification of such requirements is normally the responsibility of the City and their design consultant.

G. Level of Care

The services provided for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area, under similar budget and time constraints. This is our professional responsibility. No other warranty, expressed or implied, is made.

Appendix

Boring Location Sketch

Log of Boring # 1-4



Legend
○ Boring Locations

Boring Location Sketch

Red Maple Ln. Street Improvements

6354 Red Maple Ln.

Lino Lakes, Minnesota

CVT Project 22539.23.MNT



LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 22539.23.MNT Design Phase Geotechnical Evaluation Red Maple Lane Street Improvements 6354 Red Maple Ln. Lino Lakes, Minnesota				BORING: B-01		
				LOCATION: See attached sketch.		
				DATE: 10/3/2023		SCALE: 1" = 3'
Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
900.0	0.0					
899.7	0.3		4 INCHES BITUMINOUS			Elevations were estimated using MnDNR's program MNTPO and should be considered approximate. MC= 11.8%
899.2	0.8		6 INCHES AGGREGATE			
898.0	2.0		POSSIBLE FILL Poorly graded sand with silt, fine grained, dark brown, moist.			
		SP SM	POORLY GRADED SAND WITH SILT fine grained, brown, moist to 7 feet then water bearing, loose. (Glacial Outwash)	10		
				9		MC= 7.5%
				8	▽	MC= 19.7%
				7		MC= 20.3%
				10		MC= 21%
886.5	13.5	CL	SANDY LEAN CLAY grey, wet, medium stiffness.	7		
885.1	14.9		(Glacial Fluvium)			MC= 29%
			End of boring. Water was observed at 7 feet during drilling. Boring was sealed upon completion.			

CVT STANDARD 22539.23.MNT (LINO LAKES RED MAPLE LN).GPJ LOG A.GNIN06.GDT 10/24/23

LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 22539.23.MNT Design Phase Geotechnical Evaluation Red Maple Lane Street Improvements 6354 Red Maple Ln. Lino Lakes, Minnesota				BORING: B-02		
				LOCATION: See attached sketch.		
				DATE: 10/3/2023	SCALE: 1" = 3'	
Elev. 903.0	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
902.7	0.3		3 INCHES BITUMINOUS			
902.3	0.7		6 INCHES AGGREGATE			
		SP SM	POORLY GRADED SAND WITH SILT fine grained, brown, moist, loose. (Glacial Outwash)			
				9		MC= 7.6%
				8		MC= 5%
				7		MC= 6.5%
				7		No sample recovered due to gravel or cobble obstruction.
891.5	11.5	SM	SILTY SAND grey, wet, loose. (Glacial Fluvium)		▽	MC= 23.4%
889.5	13.5			8		
		CL	LEAN CLAY grey, wet, medium. (Glacial Fluvium)			
888.1	14.9			7		
			End of boring. Water was observed at 11 feet during drilling. Boring was sealed upon completion.			MC= 32.4%

CVT STANDARD 22539.23.MNT (LINO LAKES RED MAPLE LN).GPJ LOG A GNNIN06.GDT 10/24/23

LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 22539.23.MNT Design Phase Geotechnical Evaluation Red Maple Lane Street Improvements 6354 Red Maple Ln. Lino Lakes, Minnesota				BORING: B-03		
				LOCATION: See attached sketch.		
				DATE: 10/3/2023	SCALE: 1" = 3'	
Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
899.0	0.0					
898.7	0.3		3 INCHES BITUMINOUS			
898.3	0.7		6 INCHES AGGREGATE			
897.2	1.8	SP SM	POORLY GRADED SAND WITH SILT fine grained, trace Gravel, brown, moist. (Glacial Outwash)			
		SP SM	POORLY GRADED SAND WITH SILT fine grained, brown, moist to 7 feet then water bearing, loose to medium dense. (Glacial Outwash)	9		MC= 9.5%
				11		MC= 9.7%
				10	▽	MC= 17.4%
				7		MC= 23.6%
				10		MC= 31.5%
885.5	13.5	SC	CLAYEY SAND fine-to-medium grained, grey, wet, loose. (Glacial Fluvium)	5		MC= 16.7%
				7		MC= 14.9%
878.0	21.0		End of boring. Water was observed at 7 feet during drilling. Boring was sealed upon completion.			

CVT STANDARD 22539.23.MNT (LINO LAKES RED MAPLE LN) GPJ LOG A GNNIN06.GDT 10/24/23

LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 22539.23.MNT Design Phase Geotechnical Evaluation Red Maple Lane Street Improvements 6354 Red Maple Ln. Lino Lakes, Minnesota				BORING: B-04		
				LOCATION: See attached sketch.		
				DATE: 10/3/2023	SCALE: 1" = 3'	
Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
894.0	0.0					
893.5	0.5	OL	TOPSOIL , Silty Sand, fine grained, trace Roots, brown, moist.			
892.5	1.5	SM	SILTY SAND fine grained, grey, moist.			
		SP SM	POORLY GRADED SAND WITH SILT fine grained, brown, moist, loose. (Glacial Outwash)	9		MC= 13.6%
				7		MC= 17.8%
887.5	6.5	SP SM	POORLY GRADED SAND WITH SILT fine grained, grey, water bearing, medium dense. (Glacial Outwash)	11	▽	MC= 20.1%
				12		MC= 21.9%
884.5	9.5		End of boring. Water was observed at 7 feet during drilling. Boring was sealed upon completion.			

CVT STANDARD 22539.23.MNT (LINO LAKES RED MAPLE LN).GPJ LOG A.GNNIN06.GDT 10/24/23

UNIFIED SOIL CLASSIFICATION (ASTM D-2487/2488)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL	
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL	
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND	
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND	
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND	
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND	
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY	
			PI>4 AND PLOTS<"A" LINE	ML	SILT	
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT	
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY	
			PI PLOTS <"A" LINE	MH	ELASTIC SILT	
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT	
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT	

Relative Proportions of Sand and Gravel	
TERM	PERCENT
Trace	< 15
With	15 - 29
Modifier	> 30
Relative Proportions of Fines	
TERM	PERCENT
Trace	< 5
With	5 - 12
Modifier	> 12
Grain Size Terminology	
TERM	SIZE
Boulder	< 12 in.
Cobble	3 in. - 12 in.
Gravel	#4 sieve to 3 in.
Sand	#200 sieve to #4 sieve
Silt or Clay	Passing #200 sieve

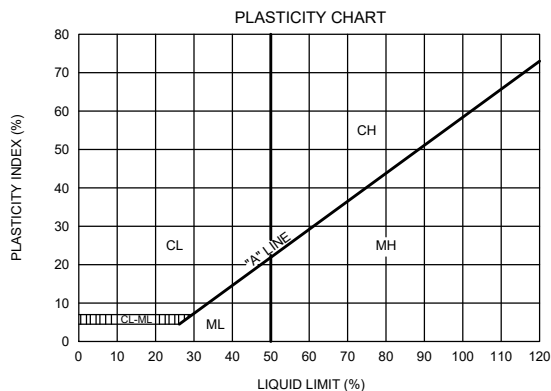
SAMPLE TYPES

- Hollow Stem
- Standard Penetration Test

TEST SYMBOLS

- | | |
|-----------------------------|--|
| MC - MOISTURE CONTENT | LL - LIQUID LIMIT |
| OC - ORGANIC CONTENT | PI - PLASTISITY INDEX |
| CN - CONSOLIDATION | SW - SWELL TEST |
| DD - DRY DENSITY | UU - Unconsolidated Undrained triaxial |
| PP - POCKET PENETROMETER | |
| RV - R-VALUE | |
| SA - SIEVE ANALYSIS | |
| P200 - % PASSING #200 SIEVE | |

- WATER LEVEL (WITH TIME OF MEASUREMENT)



PENETRATION RESISTANCE (RECORDED AS BLOWS / 0.5 FT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	COMPRESSIVE STRENGTH (TSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 1	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 3	0.25 - 0.50
MEDIUM DENSE	10 - 30	RATHER SOFT	4 - 5	0.50 - 1.0
DENSE	30 - 50	MEDIUM	6 - 8	
VERY DENSE	OVER 50	RATHER STIFF	9 - 12	1.0 - 2.0
		STIFF	13 - 16	
		VERY STIFF	17 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

Chosen Valley Testing

Job No. 16678.20.MNT

**LEGEND TO SOIL
DESCRIPTIONS**

