COTTAGE GROVE PLANNING COMMISSION February 23, 2026

12800 RAVINE PARKWAY SOUTH
COTTAGE GROVE, MN 55016

COUNCIL CHAMBER - 7:00 PM

1 Call to Order

2 Roll Call

3 Approval of the Agenda

4 Open Forum

5 Chair's Explanation of the Hearing Process

6 Public Hearing and Applications

A **New Life Church Addition - Case SP2026-004**
Discussion: Station 19 Architects, on behalf of New Life Church, has submitted an application for a Site Plan Review to construct a 5,814 square foot building addition to the existing church building located at 11245 Point Douglas Drive South. The addition will consist of lobby space, restrooms, and five new classrooms for youth religious education.

B **Panera - Cases SP2026-007 & CUP2026-007**
Discussion: CA Commercial Development has applied for a Site Plan Review of a proposed Panera restaurant and a Conditional Use Permit to allow a drive-through to be located at 7162 East Point Douglas Road South.

C **Ravara Trails – Cases ZA2026-003, PUD2026-003, PP2026-003, MS2026-003**
Discussion: Twin Cities Land Development has submitted an application for a Zoning Amendment, Planned Unit Development (PUD), Preliminary Plat, and Minor Subdivision for a subdivision consisting of 575 residential lots including 306 townhome lots and 269 single-family lots on property is located east of Keats Avenue (CSAH 19) at 77th Street and south of 70th Street.

D **Talcott Glen – Cases ZA2026-005 & PP2026-005**
Discussion: US Home, LLC, dba Lennar, has applied for a Zoning Amendment and Preliminary Plat for a subdivision to be called Talcott Glen that will be located west of 95th Street and Mississippi Dunes Boulevard, with the primary access via an extension of 95th Street. The Zoning Amendment will rezone the property from AG-2, Agricultural, to R-4, Transitional Residential. The proposed single-family community will consist of 177 homes with a mix of 50- and 65-foot wide lots.

E **McHattie Landing – Case PP2026-006**
Discussion: M/I Homes of Minneapolis/St. Paul, LLC has applied for a Preliminary Plat and Planned Unit Development (PUD) for a proposed subdivision to be known as McHattie Landing, that will be located at 9119 and 9165 Military Road, which will consist of 85 single-family homes on approximately 34.3 acres. The property is currently zoned R-4, Transitional Residential.

7 Approval of Minutes

A December 15, 2025, Planning Commission Minutes

8 Reports

A Recap of January and February 2026, City Council Meetings

B Response to Planning Commission Inquiries

C Planning Commission Requests

9 Adjournment

STAFF REPORT CASE: SP2026-004

ITEM: 6.1

PUBLIC MEETING DATE: 2/23/26 **TENTATIVE COUNCIL REVIEW DATE: 3/4/26**

APPLICATION

APPLICANT: Station 19 Architects on behalf of New Life Evangelical Free Church

REQUEST: A Site Plan Review for a 5,814 square foot building addition onto the existing church building. The addition will contain new classrooms, restrooms, and lobby space.

SITE DATA

LOCATION: 11245 Point Douglas Drive South

ZONING: R-2, Residential Estate

GUIDED LAND USE: Public/Semi-Public

LAND USE OF ADJACENT PROPERTIES:

	CURRENT	GUIDED
NORTH:	Residential Estate	Public/Semi-Public
EAST:	Agricultural Preservation	Agricultural
SOUTH:	Residential Estate	Rural Residential
WEST:	Residential Estate	Golf Course

SIZE: 10.13 Acres

DENSITY: N/A

RECOMMENDATION

Approval, subject to the conditions stipulated in this staff report.

COTTAGE GROVE PLANNING DIVISION

Planning Staff Contact: Kelly Becker, Associate Planner; 651-458-2834; kbecker@cottagegrovemn.gov

Application Accepted: 1/28/2026 60-Day Review Deadline: 3/29/2026

Planning Staff Report
New Life Church
Planning Case No. SP2026-004
February 23, 2026

Proposal

Station 19 Architects (Applicant) on behalf of New Life Church has submitted a Site Plan Review application to construct a 5,814 square foot building addition to the existing church building located at 11245 Point Douglas Drive South. The addition will consist of lobby space, restrooms, and five new classrooms for youth religious education. The primary days of operation will remain as Sundays and Wednesday.



Project Location

Review Schedule

Application Received: January 26, 2026
Application Accepted: Janurary 28, 2026
Planning Commission Meeting: February 23, 2026
Tentative City Council Meeting: March 4, 2026
60-Day Review Deadline: March 29, 2026

Background

New Life Community Church received a Conditional Use Permit approval (Resolution No. 81-139) in 1981 for construction of the church and gravel parking lot on the property. Later in 1990, the Church received additional Conditional Use Permit approval (Resolution No. 90-89) for a building addition and classroom use. The addition included a 36-foot by 56-foot Gelco building attached to the main assembly hall of the church with an enclosed breezeway. That addition was constructed as approved and the Church has been operating with classroom space since then. This proposal would allow additional classroom space to be used primarily on Sundays and Wednesdays.

Planning Considerations

Zoning and Comprehensive Plan

The parcel is approximately 10.13 acres and is zoned R-2, Residential Estate. Places of worship/ religious institutions and private education facilities are permitted with a Conditional Use Permit in the Residential Estate zoning district. The parcel already has existing Conditional Use Permit approvals for both uses; therefore, additional approvals for the current and proposed use are not required. The City's 2040 Comprehensive Plan guides this parcel as public/semi-public given the religious institution use; the proposed expansion aligns with the City's future land use guidance.



Zoning Map

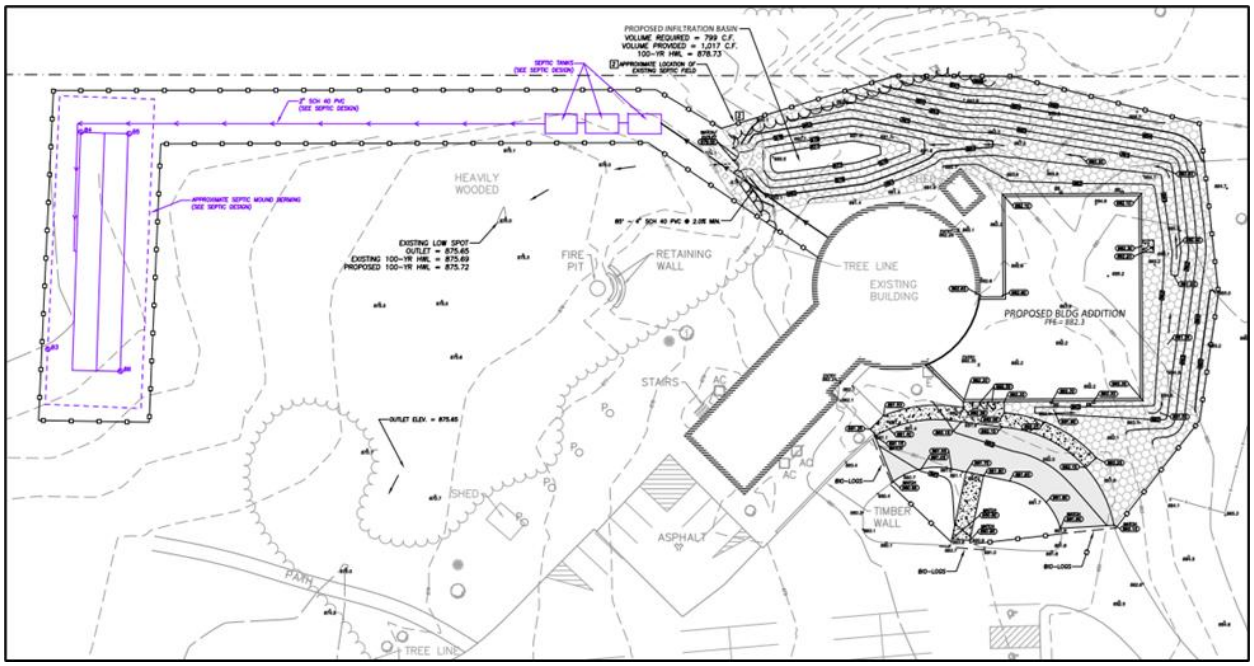
Mississippi River Corridor Critical Area (MRCCA) Overlay District

The subject property is located within the Mississippi River Corridor Critical Area (MRCCA) District, specifically within the Separated from River (SR) Overlay District. The MRCCA ordinance is intended to protect existing bluffs, islands, floodplains, and wetlands and to be enforced by local jurisdictions. The Separated from River overlay district is characterized by its physical and visual

distance from the Mississippi River. The district includes land separated from the river by distance, topography, development, or a transportation corridor. The land in this district is not readily visible from the Mississippi River. The property does not contain any wetlands or bluff, and the proposal meets the criteria for the requirements in the SR Overlay District.

Project Site Plan

The proposed building addition will be located on the east side of the existing dome-shaped structure and will connect to the main worship hall. The addition will provide a new main entry and lobby space in the building, as well as five new classrooms and new restrooms, with a total area of 5,814 square feet. The permitted maximum structure height in the R-2 Residential Estate Zoning District is 35 feet, and the peak of the existing dome is 26 feet. The new addition will be approximately 17 feet. To accommodate the new entry to the building, the project will also involve removing and replacing the bituminous circular driveway approach and concrete walkways at the front of the building. Grading and tree removal will occur onsite for replacement of the existing septic system and new onsite stormwater treatment practices.



Proposed Improvements

Setbacks

The setbacks in the R-2, Residential Estate district, are listed below. When the church received the Conditional Use Permit for the building addition in 1990, a condition was added that no building shall be located within 50 feet of the any lot line, which is more restrictive than current code standards. The proposed addition will meet all setbacks in the code and in the previous conditions of approval.

Applicable Building Setback	Required	Proposed
Side yard (north)	25’	50’
Side yard (south)	25’	197’
Front yard	30’	148’
Rear yard	50’	>750’

Access

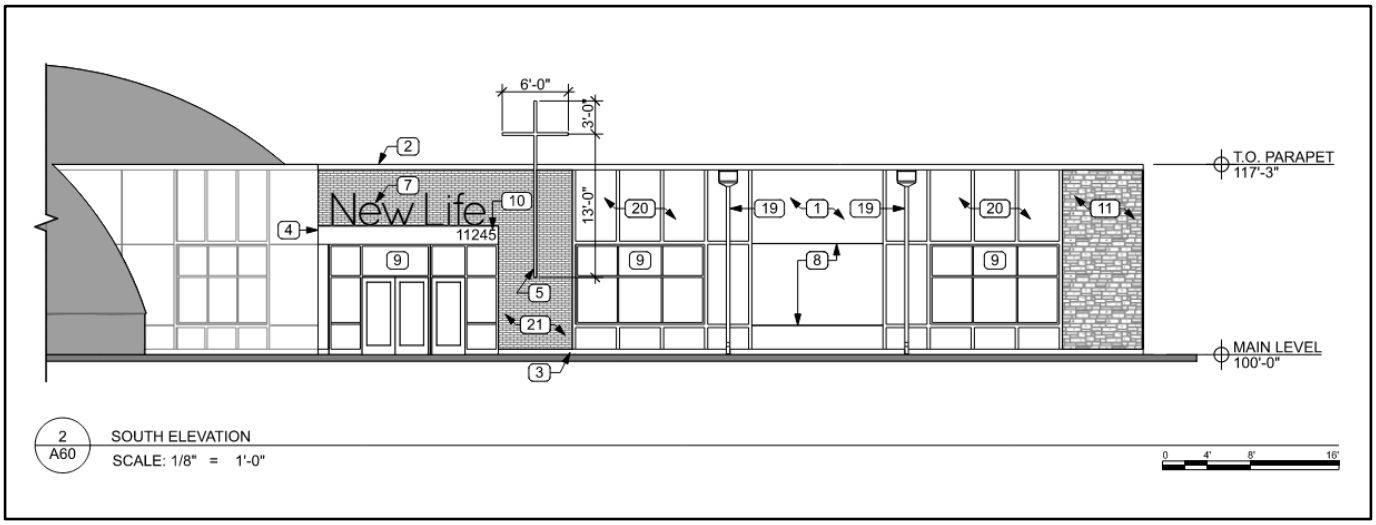
The property currently utilizes a shared driveway entrance with the property to the south branching off US 61. The Minnesota Department of Transportation (MnDOT) reviewed the existing access and proposed expansion. MnDOT included a comment in their review response indicating that at-grade intersections along US 61 are being phased out and converted to J-turns as this corridor approaches capacity for traditional intersections. In the future, upon advanced notice, the median at this location may be closed, allowing only right-in/right-out access. Left turns would then be made using a median U-turn. No changes to the access are being proposed or required at this time, and MnDOT is not requesting any additional right of way.

Architecture

Title 11-3-11 requires that nonresidential or mixed-use buildings in a residential zoning district must use at least three different Class 1 materials and be composed of at least 65 percent Class 1 or 2 materials and not more than 10 percent of Class 4 materials. The Applicant has proposed a combination of brick, manufactured stone, glass (Class 1 materials) and stucco (Class 2), totaling 67 percent of the new addition. The remainder of the addition will be composed of Class 3 materials, including metal flashing and engineered wood siding. No Class 4 materials are proposed. Final rooftop mechanical location and colors of the exterior materials have not yet been selected but shall be reviewed and approved by City staff prior to the issuance of a building permit.



Proposed Addition Rendering



Proposed Entry of Addition

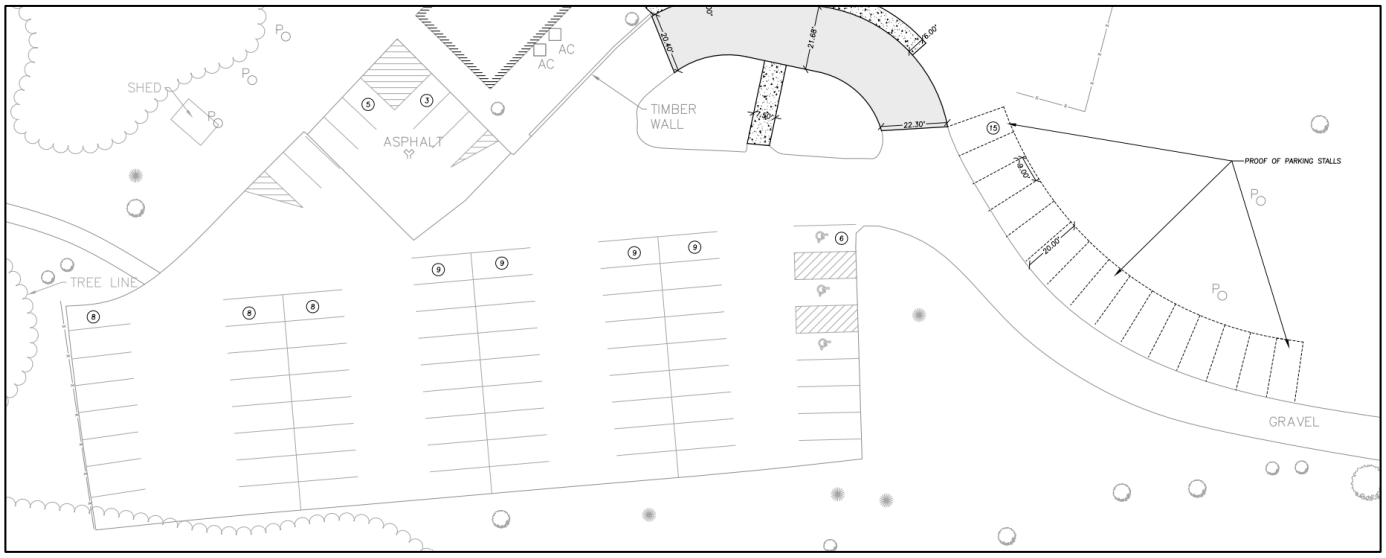
Parking

The existing parking lot was a gravel surface until 2023, when the church received a permit to pave the lot in its existing approved footprint. Title 11-3-4 requires places of worship to have one

parking space for every four seats, based on the design capacity of the main assembly hall. Submitted plans indicate that the main assembly hall capacity is 299 persons, which would require 75 parking spaces. There are currently 74 spaces onsite, including 3 handicap accessible parking spaces; therefore, the site currently lacks one required parking space.

Title 11-3-4 also requires schools to have 1 space for each classroom, plus 1 additional space for each 100-student capacity. With the five new classrooms and six existing classrooms, there will be 11 classrooms in total in the building, requiring 11 parking spaces. The Applicant has indicated that the student capacity will be 184, which requires 2 additional parking spaces. Based on the school use and the current deficit of one parking space for the worship hall parking calculation, 14 additional parking spaces are required.

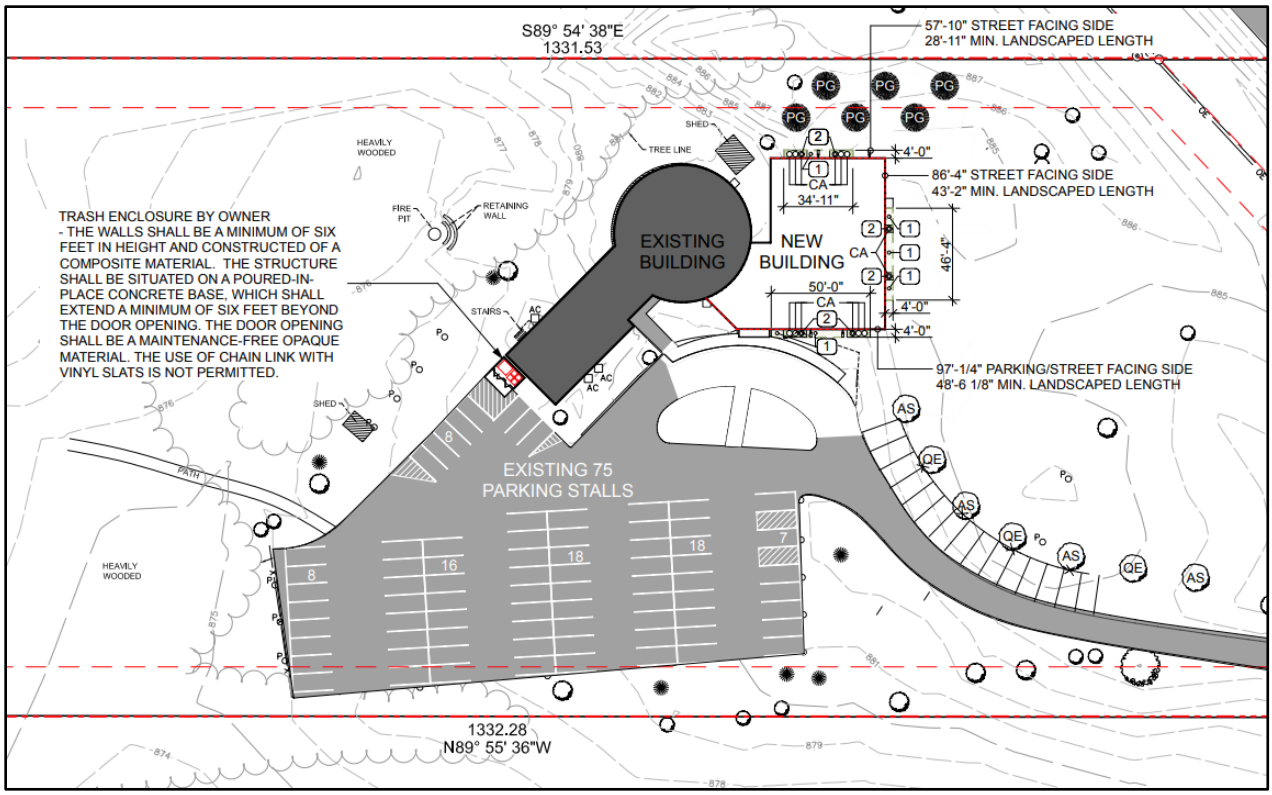
The Applicant has indicated that the 14 additional parking spaces would be excessive to meet their current needs. Title 11-3-4 permits the City to consider a proof of parking plan when a business can demonstrate a proposed use will not require the minimum number of spaces as otherwise required. When parking is reduced, the City may require that area to be reserved in open space for future parking needs. Therefore, the Applicant has shown 14 proof of parking spaces reserved on the site plan should staff verify the need arises for additional parking onsite in the future.



Parking Lot Design

Landscaping and Tree Mitigation

Title 11-3-12 requires the sides of a building that face a public street be landscaped for a length equal to one-half of the building dimension, with the landscaped region having an average depth of four feet. The Applicant has proposed a combination of sod, mulch, and shrubs to landscape the addition facing the highway in compliance with the code. Based on the total area of site disturbance and the coefficients found in the code, 7 overstory deciduous trees, 6 coniferous trees, and 14 shrubs are required and have been identified on the site plans. Non-residential uses on residential zoned property are required to maintain a minimum of 30 percent open space. After all proposed improvements, the site will maintain approximately 85 percent open space.

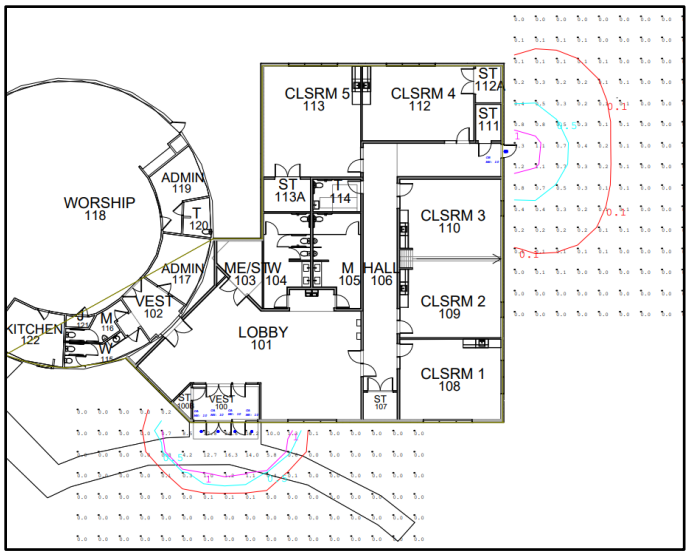


Landscaping Plan

The property contains areas onsite which are heavily wooded and meet the code definition of a large woodland tract. A large woodland tract is defined as a wooded area greater than or equal to 7,500 square feet of contiguous or nearly contiguous canopy cover. Title 11-3-13 permits up to 40 percent of qualifying trees to be removed before tree mitigation is required. The Applicant has not provided a tree inventory at this time due to the relatively small area of site disturbance and tree removal compared to the overall size and tree cover on the property; however, a condition has been added to complete a tree inventory per code requirements prior to the issuance of a building permit.

Lighting

The Applicant has proposed new lighting at the exit door on the new addition facing US 61. Additional new lighting is proposed at the new entryway on the addition. Title 11-3-10 requires light to be deflected from residential property lines or public streets. Additionally, reflected glare of spill light shall not exceed 0.5 foot-candle as measured on the property line when abutting any residential parcel. All proposed lighting will be downward directed. A photometric plan was completed, and zero footcandles are measured at the residential property line to the south and at the right of way line facing US 61.



Photometric Plan

Signage

The Applicant has included renderings of a building wall sign above the new entryway on the proposed building addition. A sign permit shall be required prior to approval of the design of the sign, per Title 12, Sign Regulations.

Utilities

City utilities are not available to this site; therefore, the site is served by private well and septic systems. To meet the needs of the proposed addition, the property owner is proposing a new septic system. The new system has been designed by a licensed professional and a sanitary sewer permit from Washington County has been issued. The mound system and tanks are proposed on the west side of the building. The existing well is currently located where the proposed addition will be. The property owner will need to verify the location of the new well and obtain approval for a new well prior to the issuance of a building permit.



Proposed New Sanitary Sewer Location

Grading and Storm Water Management

The Applicant is proposing grading onsite to account for the building addition, stormwater treatment area, and new septic system. A detailed stormwater management plan was submitted, and the Applicant shall comply with all comments included in the City Engineer Review Memo

dated 2/3/2026. The site currently does not have any stormwater management infrastructure; however, the Applicant is now proposing new infrastructure to meet current code standards including a new infiltration basin north of the existing building. A Stormwater Maintenance Agreement will be required to be executed prior to issuance of a building permit.

Public Hearing Notices
The public hearing notice for the February 23, 2026, Planning Commission meeting was published in the St Paul Pioneer Press and mailed on February 11, 2026, to 10 property owners that are within 500 feet of the proposed project. Staff have not received any comments at the time of writing this report.

Recommendation

That the Planning Commission recommend that the City Council approve the Site Plan for a 5,814 square foot building addition to the existing New Life Church building located at 11245 Point Douglas Drive South, subject to the following conditions:

1. The project shall be completed in accordance with the plans submitted by the conditions of approval. Any significant changes to the plans, as determined by planning staff, shall require review and approval by the Planning Commission and City Council.

2. Prior to the issuance of a building permit, the Applicant shall incorporate the recommendations, requirements, and evaluations noted in the comment letter dated 2/3/2026, and subject to modifications that are agreed to by the Applicant and City Engineer. All comments shall be adopted herein by reference.

3. All applicable permits (i.e., building, demo, electrical, grading, right-of-way and mechanical) and a commercial plan review packet must be completed, submitted, and approved by the City prior to the commencement of any construction activities. Detailed construction plans must be reviewed and approved by the Building Official, City Engineer, and Fire Marshal.

4. Installation of landscaping shall occur in a timely fashion and be consistent with an approved plan. Prior to the issuance of a building permit, a letter of credit in the amount of 150 percent of the landscape estimate shall be submitted to the City as required by City ordinance. The financial guarantee shall be held until all required plantings are installed. At such time of installation, the Planning Department shall conduct an inspection to verify compliance with the landscape plan. If the inspection is approved, 50 percent of the financial guarantee shall be released. One year from the date of initial inspection, a follow-up inspection shall be conducted to verify survivability. If the follow-up inspection is approved, the remainder of the financial guarantee shall be released.

5. The grading and erosion control plan for the site must comply with NPDES II permit requirements. Erosion control devices must be installed prior to commencement of any grading activity. Erosion control must be performed in accordance with the recommended practices of the Minnesota Stormwater Manual and the conditions stipulated in Title 9-7-1, Erosion Control During Construction, of the City's Subdivision Ordinance. The Applicant shall be responsible for the costs for the City to inspect the site in relation to erosion control conformance.

6. The Applicant must provide the City with an as-built survey of grading.

7. The Applicant is responsible for removing debris from all adjacent public and private roadways during their grading and construction process. The adjacent streets shall be swept clean daily or as needed.

8. All areas of the site, where practical, shall be established and maintained per the approved final landscaping plan.

9. The Applicant shall provide a plan for ensuring establishment and survivability of the proposed seeding and landscape items. Sod shall be established along the building perimeter as shown on the landscape plans.

10. Signage is not approved as part of this application. Any proposed signage shall meet the requirements of the sign ordinance and require a separate permit.

11. A Stormwater maintenance agreement shall be recorded prior to the issuance of a building permit.

12. A grading LOC is required prior to the issuance of a grading permit.

13. Should additional parking be needed, the property owner shall pave and stripe the proposed proof of parking area.

14. The property owner shall obtain approval for a new well from the State prior to the issuance of a building permit.

15. The well sealing report shall be sent to the City once the existing well is sealed.

Prepared by
Kelly Becker
Associate Planner

Attachments
Project Narrative
Civil Plan Set
Site Survey
Septic Design
Septic Approval
Wetland Letter
Stormwater Management Report
MnDOT Review Letter
Setback Sheet
Letter of Concurrence
Lighting Spec Sheet
Engineering Review Memo

STATION 19
ARCHITECTS

4181 W. BROADWAY AVE | MPLS, MN 55422 | 612.623.1800

28 January 2026

Re: Project Narrative – Project #4538
Project: New Life EFree Church – Cottage Grove, MN

The project consists of a 5,814 square foot addition to an existing church building. The intention of the project is to provide a lobby, restrooms and five classrooms to be used for children religious education as accessory to places of religious worship. The existing building includes seating for 299 at the main worship / assembly hall, restrooms, administrative rooms and seven classrooms used for adult religious education.

The project includes site grading as required for the new addition and a new well and septic system. The exterior of the building addition will be a mix of stucco, engineered wood siding, aluminum storefront/windows, manufactured stone and thin brick.

The use of the building will remain the same with the primary days of operation will be Sundays and Wednesdays.

Respectfully Submitted,

Daniel E Torgerson, ALA, NCARB **01/28/26**
Principal

NEW LIFE EFREE CHURCH

COTTAGE GROVE, MN

CITY SUBMITTAL

PROJECT TEAM

ARCHITECT
Station 19 Architects, Inc.
4181 West Broadway Ave.
Minneapolis MN 55422
612.623.1800

STRUCTURAL ENGINEER
Innovative Structural Solutions
5279 Kyler Avenue NE
Albertville, MN 55301
763.425.9960

CIVIL ENGINEER
Rehder & Associates
3440 Federal Drive
Suite 100, Eagan, MN 55122
651.452.5051

LOCATION MAP



MATERIAL SYMBOLS

- CONCRETE
- CONCRETE MASONRY UNIT
- EARTH
- GYPSUM BOARD/PLASTER
- INSULATION - BATT
- INSULATION - RIGID
- MASONRY
- METAL
- PLYWOOD
- WOOD, FINISH
- WOOD, OSB

SHEET INDEX

T00 TITLE SHEET

CIVIL
C0 COVER SHEET
C1 SITE DEMOLITION PLAN
C2 SITE DIMENSION PLAN
C3 GRADING, DRAINAGE, EROSION CONTROL & UTILITY PLAN
C4 DETAILS & SPECIFICATIONS

ARCHITECTURAL
A01 LANDSCAPE PLAN
A11 MAIN LEVEL CODE PLAN
A20 DEMOLITION PLAN
A30 FLOOR & ROOF PLAN
A60 EXTERIOR ELEVATIONS & BUILDING SECTIONS

SITE PHOTOMETRIC PLAN

STATION 19 ARCHITECTS
4181 W BROADWAY AVE, MINNEAPOLIS, MN 55422
612.623.1800 ■ STATION19.COM

NOT FOR CONSTRUCTION

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 Architect under the laws of the state of MN.

SIGNATURE:

REGISTRATION #:

DATE: 01.28.2026

NEW LIFE EFREE CHURCH

11245 POINT DOUGLAS DR S
COTTAGE GROVE MN 55033

PROJECT NO: 4638

DRAWN BY: GT,

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NO	DATE	DESCRIPTION

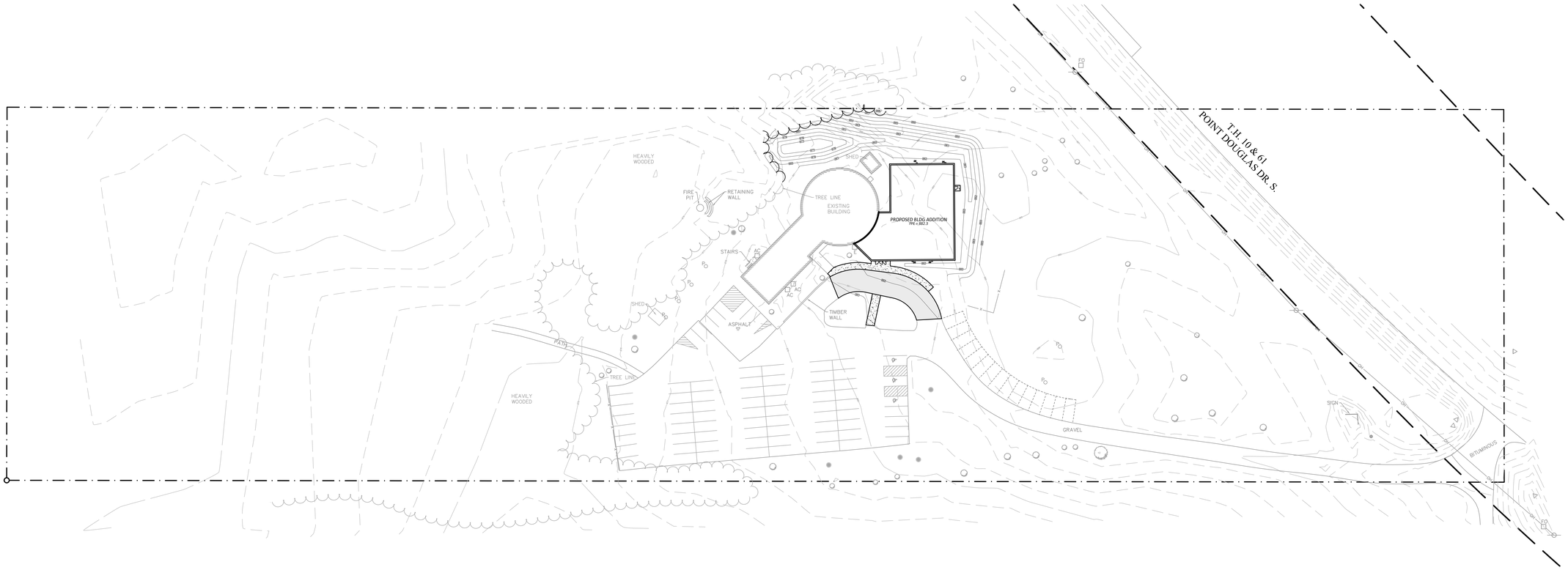
CITY SUBMITTAL

TITLE SHEET

T00

NEW LIFE EFREE CHURCH

11245 POINT DOUGLAS DRIVE SOUTH
COTTAGE GROVE, MN 55033



GOPHER STATE ONE CALL

CALL 48 HOURS BEFORE YOU DIG
TWIN CITY AREA 651-454-0002
MN. TOLL FREE 1-800-252-1166

Boundary topographical & utility information was prepared by M&P Associates. This information has not been verified as to its accuracy or completeness by Rehder & Associates, Inc.

CODE COMPLIANCE:

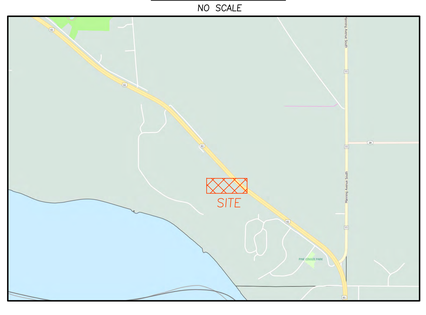
1. WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LAWS, CODES & REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION.
2. NOTIFY THE OWNER'S ENGINEER OF DISCREPANCIES BETWEEN THE WORK AND APPLICABLE CODES. DO NOT WORK IN AN AFFECTED AREA UNTIL THE DISCREPANCY HAS BEEN RESOLVED.
3. VERIFY CODES IN EFFECT AT THE TIME OF THE NOTICE TO PROCEED AND STAY CURRENT WITH CODE CHANGES WHICH AFFECT THE WORK UNTIL SUBSTANTIAL COMPLETION.

PROJECT CONTACTS:

Nick Adam, P.E.
Civil Engineer
651-337-6729
nadam@rehder.com

TBD
General Contractor
XXX-XXX-XXX
XXXXXXXXXXX

VICINITY MAP
NO SCALE



SHEET INDEX

TITLE	SHEET NO.
COVER SHEET	C0
SITE DEMOLITION PLAN	C1
SITE DIMENSION PLAN	C2
GRADING, DRAINAGE, EROSION CONTROL & UTILITY PLAN	C3
DETAILS & SPECIFICATIONS	C4

N

0 20 40 80 120
Scale in Feet

REHDER & ASSOCIATES, INC.
Civil Engineers & Land Surveyors
3440 Federal Drive, Suite 110
Eagan, MN 55122
Telephone 651-452-5051
www.rehder.com

PROJECT NO.: 251-2393.058 DRAWING FILE: 2393058.DWG

I, hereby certify that this plan 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.

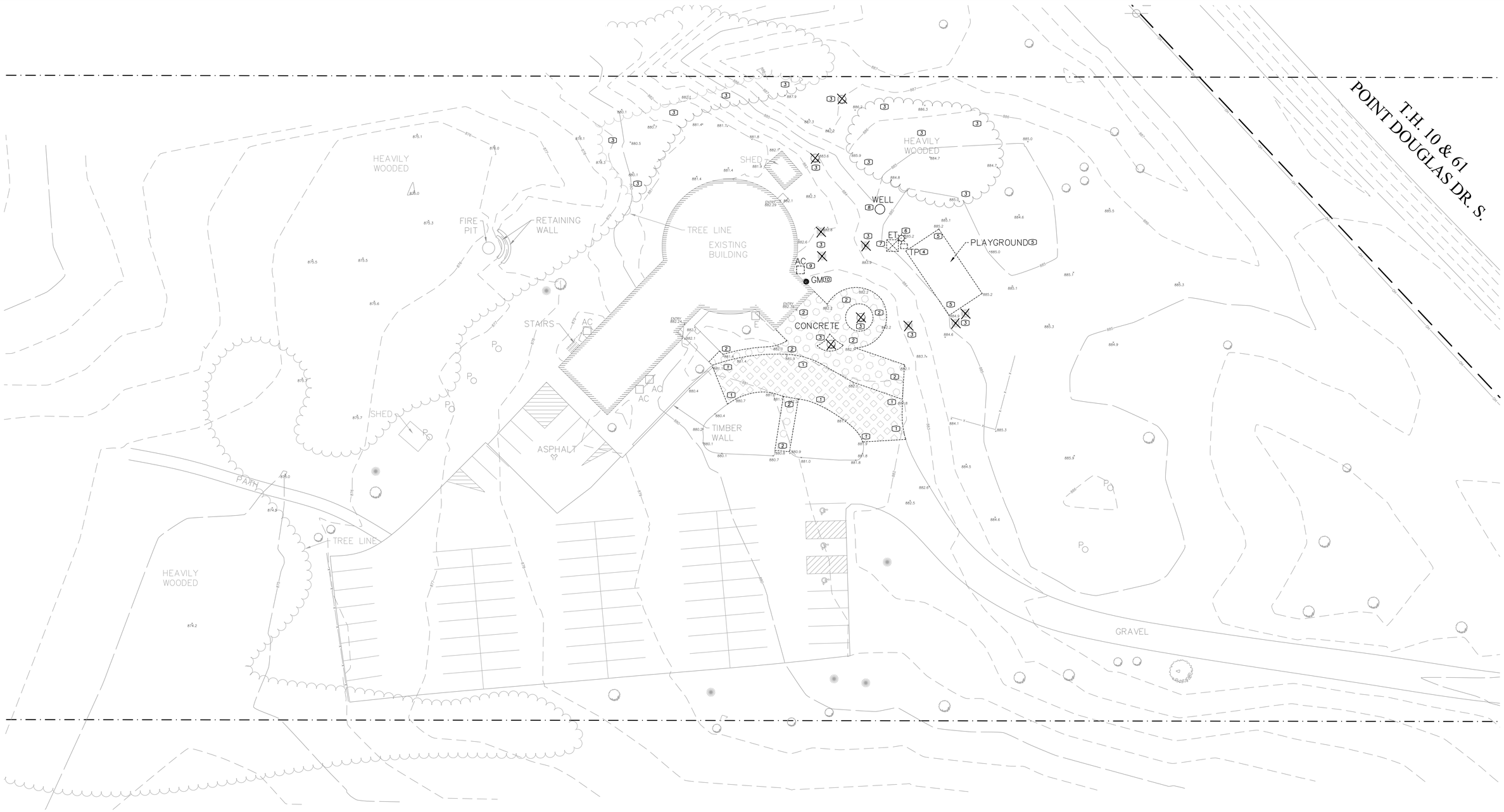
PRELIMINARY

Name _____ Date _____
Reg. No. _____

Issued
CITY SUBMITTAL 1-28-26

COVER SHEET
NEW LIFE EFREE CHURCH
CITY OF COTTAGE GROVE

SHEET NUMBER
C0



DEMOLITION NOTES

1. – Remove bituminous pavement
2. – Remove concrete pavement
3. – Remove tree(s)
4. – Remove communication pedestal
5. – Remove & salvage playground
6. – Remove light pole
7. – Remove transformer
8. – Remove well
9. – Remove air conditioner
10. – Remove gas meter

LEGEND

- EXISTING BITUMINOUS TO BE REMOVED
- EXISTING CONCRETE TO BE REMOVED
- BOUNDARY/ROW/BLOCK LINE
- EASEMENT
- BUILDING/PARKING SETBACK LINE
- 980 EXISTING CONTOUR
- × 995.50 EXISTING ELEVATION

N

0 10 20 40 60
Scale in Feet

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PROJECT NO.: 251-2393.058 DRAWING FILE: 2393058.DWG

I hereby certify that this plan 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.

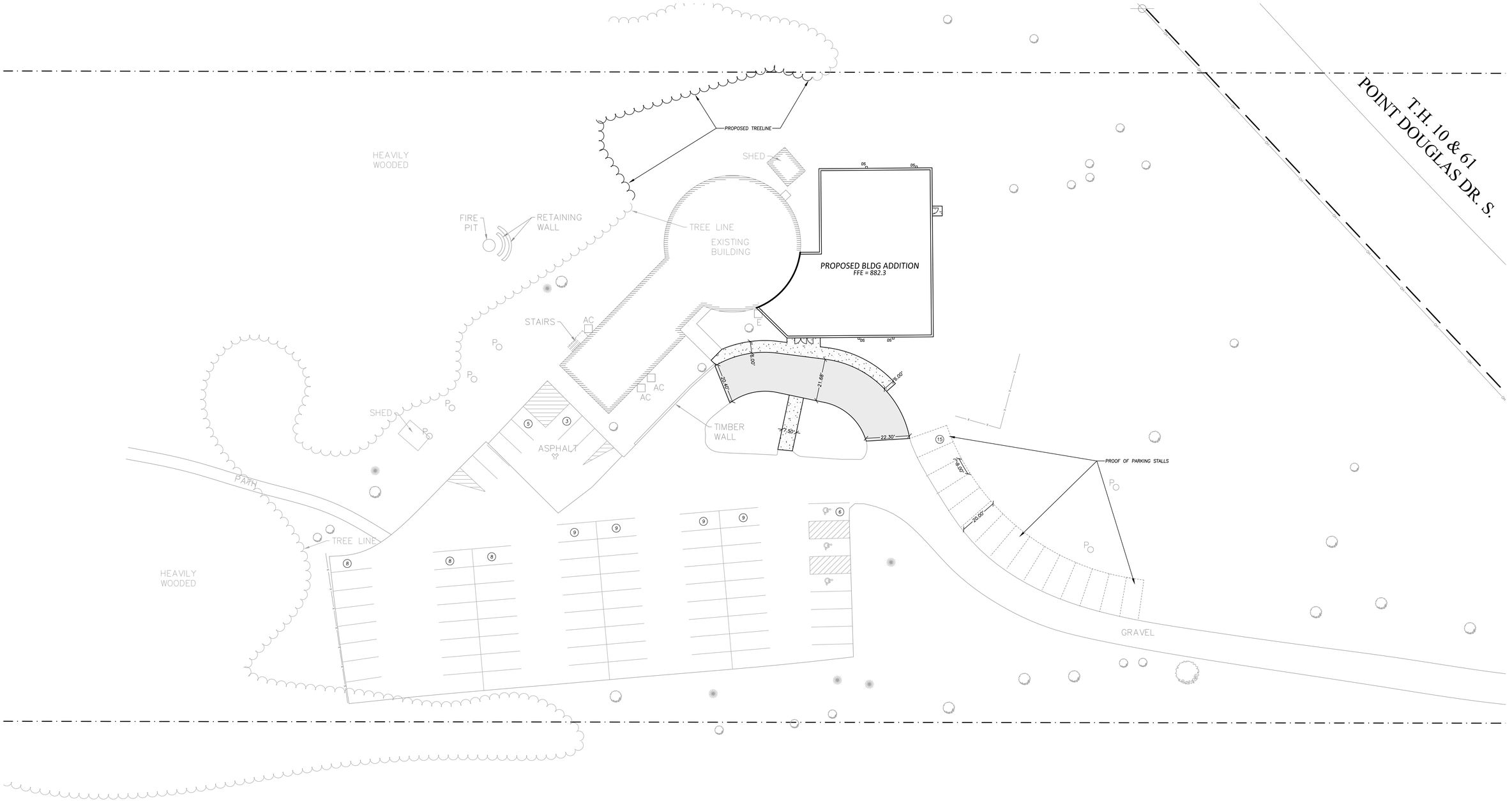
PRELIMINARY

Name _____ Reg. No. _____ Date _____

Issued
CITY SUBMITTAL 1-28-26

SITE DEMOLITION PLAN
NEW LIFE EFREE CHURCH
CITY OF COTTAGE GROVE

SHEET NUMBER
C1



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SITE SUMMARY

SITE AREA = 8.68 ACRES
DISTURBED AREA = 0.58 ACRES
EXISTING IMPERVIOUS AREA = 1.24 ACRES (14.3%)
POST CONSTRUCTION IMPERVIOUS AREA = 1.33 ACRES (15.3%)
OPEN SPACE = 100% - 15.3% = 84.7%
NEW IMPERVIOUS AREA = 1.33 - 1.24 = 0.09 ACRES
RECONSTRUCTED IMPERVIOUS AREA = 0.11 ACRES

PARKING STALLS REQUIRED

ASSEMBLY = 299 SEATS @ 1 STALL/4 SEATS =	= 75 STALLS
CHILD CLASSROOM = 11 CLASSROOMS @ 1 STALL/CLASSROOM	= 11 STALLS
CHILD CLASSROOM = 184 STUDENTS @ 1 STALL/100 STUDENTS	= 2 STALLS
TOTAL	= 88 STALLS

PARKING STALLS PROVIDED

STANDARD STALLS	= 71 STALLS
ACCESSIBLE STALLS	= 3 STALLS
PROOF OF PARKING STALLS	= 15 STALLS
TOTAL	= 88 STALLS

LEGEND

- BOUNDARY/ROW/BLOCK LINE
- EASEMENT
- BUILDING/PARKING SETBACK LINE
- PROPOSED CONCRETE
- PROPOSED BITUMINOUS

N

0 10 20 40 60
Scale in Feet

REHDER & ASSOCIATES, INC.
Civil Engineers & Land Surveyors
3440 Federal Drive, Suite 110
Eagan, MN 55122
Telephone 651-452-5051
www.rehder.com

PROJECT NO.: 251-2393.058 DRAWING FILE: 2393058.DWG

I hereby certify that this plan 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.

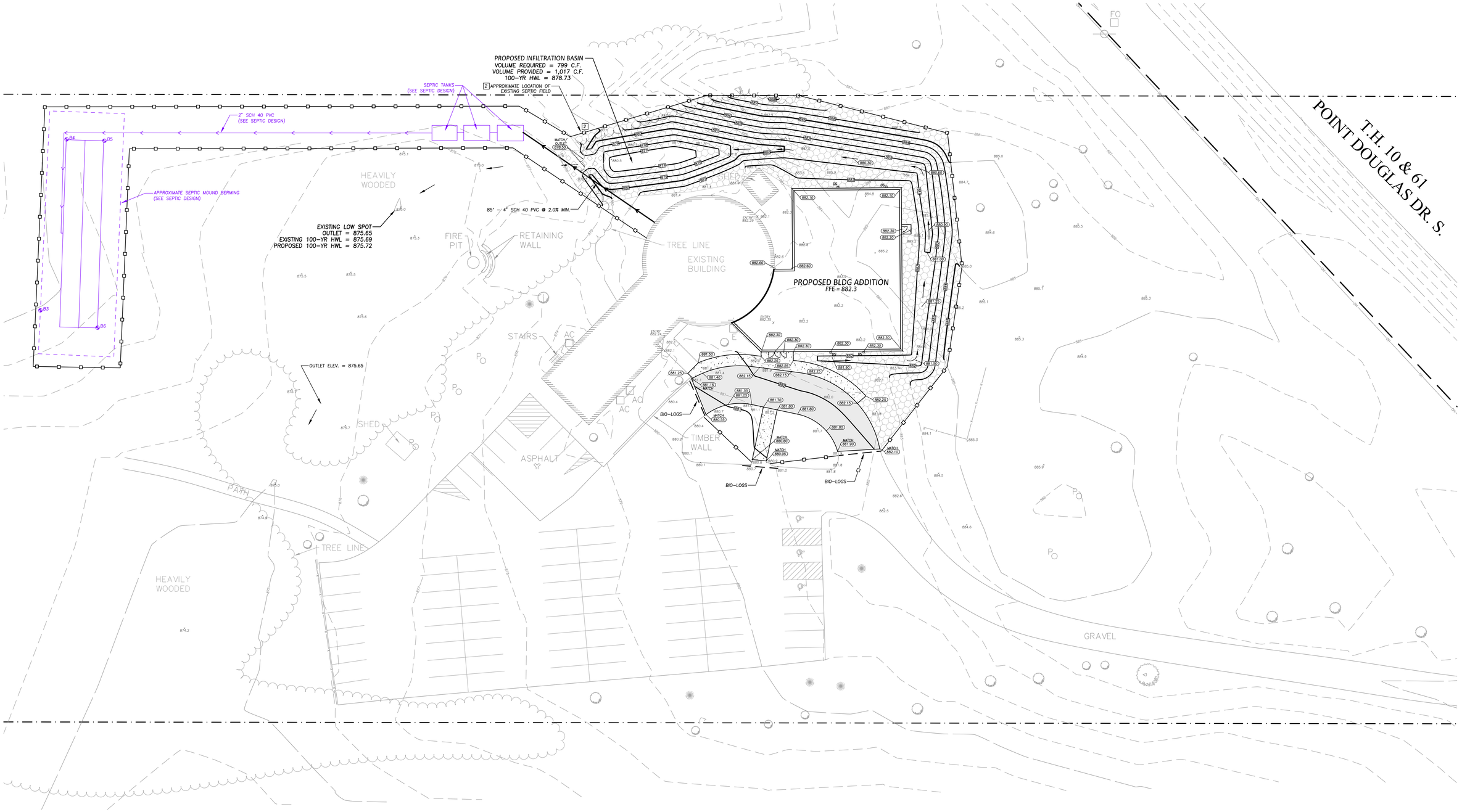
PRELIMINARY

Name _____ Date _____ Reg. No. _____

Issued
CITY SUBMITAL 1-28-26

SITE DIMENSION PLAN
NEW LIFE EFREE CHURCH
CITY OF COTTAGE GROVE

SHEET NUMBER
C2



GRADING NOTES

1 – *All elevations shown are to final surfaces.*

2 – *Contractor to field verify location of the existing septic drain field. Notify the Engineer of results found in the field.*

EROSION CONTROL NOTES

1 – *All erosion control measures shown shall be installed prior to grading operations and maintained until all areas disturbed have been restored.*

2 – *Sweep paved public streets as necessary where construction sediment has been deposited.*

3 – *Each area disturbed by construction shall be restored per the specifications within 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.*

4 – *Temporary soil stockpiles must have silt fence around them and cannot be placed in surface waters, including storm water conveyances such as curb and gutter systems, or conduits and ditches.*

5 – *The normal wetted perimeter of any temporary or permanent drainage ditch or swale that drains water from any portion of the construction site, or diverts water around the site, must be stabilized within 200 lineal feet from the property edge, or from the point of discharge into any surface water. Stabilization of the last 200 lineal feet must be completed within 24 hours after connecting to a surface water.*

6 – *Excess concrete/water from concrete trucks shall be disposed of in portable washout concrete basin or disposed of in a contained area.*

NOTE: CONTRACTOR RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF WELL AND SEPTIC SYSTEM.

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED CONCRETE
- PROPOSED BITUMINOUS
- 1050 PROPOSED CONTOUR
- 1023.54 PROPOSED ELEVATION
- SILT FENCE
- BIO-LOGS
- INLET PROTECTION DEVICE
- PROPOSED EC BLANKET CATEGORY 20 (MNDOT 3885)
- PROPOSED EC TRM CATEGORY 72 (MNDOT 3885)
- BOUNDARY/ROW/BLOCK LINE
- EASEMENT
- BUILDING/PARKING SETBACK LINE
- DRAINAGE ARROW
- 980 EXISTING CONTOUR
- × 995.50 EXISTING ELEVATION

N

0 10 20 40 60

Scale in Feet

CODE COMPLIANCE:

1. WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LAWS, CODES & REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION.
2. NOTIFY THE OWNER'S ENGINEER OF DISCREPANCIES BETWEEN THE WORK AND APPLICABLE CODES. DO NOT WORK IN AN AFFECTED AREA UNTIL THE DISCREPANCY HAS BEEN RESOLVED.
3. VERIFY CODES IN EFFECT AT THE TIME OF THE NOTICE TO PROCEED AND STAY CURRENT WITH CODE CHANGES WHICH AFFECT THE WORK UNTIL SUBSTANTIAL COMPLETION.

Boundary topographical & utility information was prepared by M&P Associates. This information has not been verified as to its accuracy or completeness by Rehder & Associates, Inc.

GOPHER STATE ONE CALL

CALL 48 HOURS BEFORE YOU DIG
TWIN CITY AREA 651-454-0002
MN. TOLL FREE 1-800-252-1166

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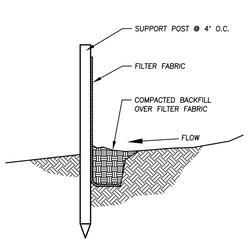
Name _____ Date _____ Reg. No. _____

PRELIMINARY

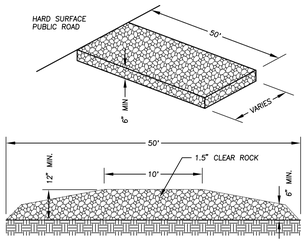
Issued
CITY SUBMITTAL 1-28-26

GRADING, DRAINAGE, EROSION CONTROL & UTILITY PLAN
NEW LIFE EFREE CHURCH
CITY OF COTTAGE GROVE

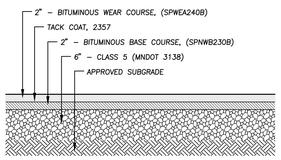
SHEET NUMBER
C3



1 C4 SILT FENCE
NO SCALE

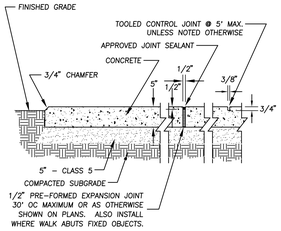


2 C4 ROCK CONSTRUCTION ENTRANCE
NO SCALE

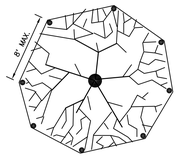


NOTE: PAVEMENT RECOMMENDATION PROVIDED BY INDEPENDENT TESTING TECHNOLOGIES, PROJECT 23-235

3 C4 PAVEMENT SECTION
NO SCALE

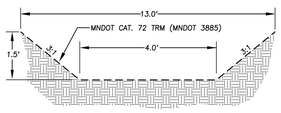


4 C4 CONCRETE SIDEWALK
NO SCALE

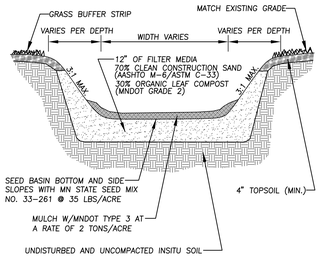


4' SNOW FENCE WITH POST 8' ON CENTER TO BE PLACED AROUND TREE AT THE DRIP LINE OF THE OUTER MOST BRANCHES.

5 C4 TREE PROTECTION
NO SCALE



6 C4 BASIN OVERFLOW OUTLET
NO SCALE



7 C4 INFILTRATION BASIN X-SECTION
NO SCALE

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PRELIMINARY

Name _____ Reg. No. _____ Date _____

Issued

CITY SUBMITTAL	1-28-26

DETAILS & SPECIFICATIONS
NEW LIFE EFREE CHURCH
CITY OF COTTAGE GROVE

SHEET NUMBER
C4

LANDSCAPE MATERIALS	
KEY	CONTENT
1	TURF GRASS SOD (KENTUCKY BLUEGRASS)
2	MULCH W/ STEEL EDGING

PLANT SCHEDULE					
#	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT
SHRUBS					
14	CA	CALAMAGROSTIS ACUTIFLORA	KARL FOERSTER	#2	CONT.
OVERSTORY DECIDUOUS					
4	AS	ACER SACCHARUM MARSHALL	SUGAR MAPLE	2.5" CAL.	B&B
3	QE	QUERCUS ELLIPSOIDALIS	NORTHERN PIN OAK	2.5" CAL.	B&B
CONIFEROUS					
6	PG	PICEA GLAUCA VAR. DENSATA	BLACK HILLS SPRUCE	6' HEIGHT	B&B

§ 11-3-12: B.1.b.(1) MIN. LANDSCAPING REQ.
The sides of a building that face a public street or parking lot shall be landscaped for a length equal to one-half (1/2) of the building dimension, with the landscaped region having an average depth of four feet (4')
239'-2"x 1/2 = **MIN. 119'-7" LONG x 4'-0" DEEP**

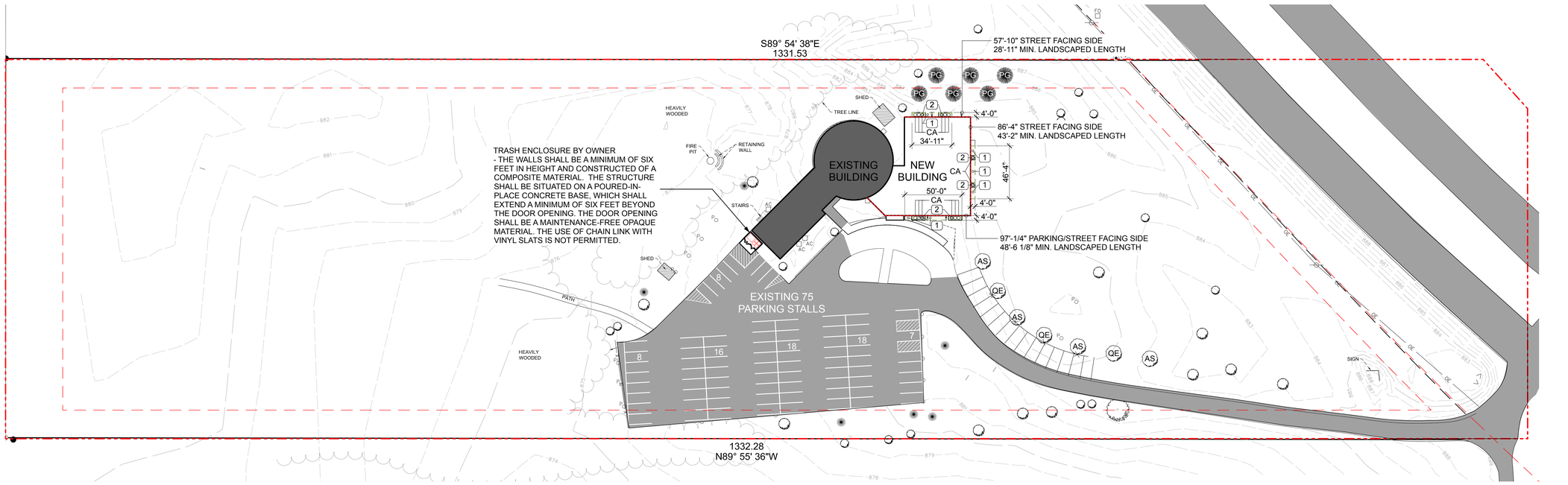
§ 11-3-12: C.1. LANDSCAPING MATERIALS
Three (3) or more
- a. **Sod**;
- b. **Mulch**;
- c. **Shrubs**;
- d. Coniferous trees;
- e. Ornamental trees;
- f. Overstory trees;
- g. Decorative rock;
- h. Decorative site amenities;
- i. Any other decorative landscape treatment; and/or
- j. Berms.

§ 11-3-12: C.2. MIN. SIZE REQ'D FOR VEGETATION

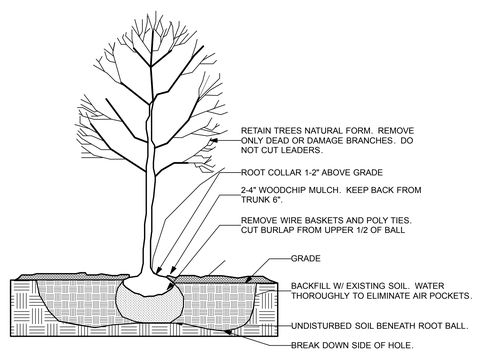
§ 11-3-12: E.3. TREE & SHRUB CALCULATIONS

22,215 Sq Ft Disturbed

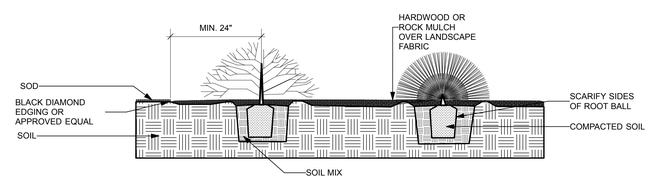
	Overstory Deciduous	Coniferous	Shrubs
Ratio	0.0002786	0.00026	0.0006
	7 trees (6.18)	**6 trees** (5.77)	**14 shrubs** (13.33)



1 A01 LANDSCAPE PLAN
SCALE: 1" = 40'



TREE PLANTING DETAIL - NOT TO SCALE



SHRUB PLANTING DETAIL - NOT TO SCALE

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4181 W BROADWAY AVE. MINNEAPOLIS, MN 55422
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SIGNATURE:

REGISTRATION #:

DATE: 01.28.2026

NEW LIFE EFREE CHURCH

11245 POINT DOUGLAS DR S
COTTAGE GROVE MN 55033

PROJECT NO: 4638

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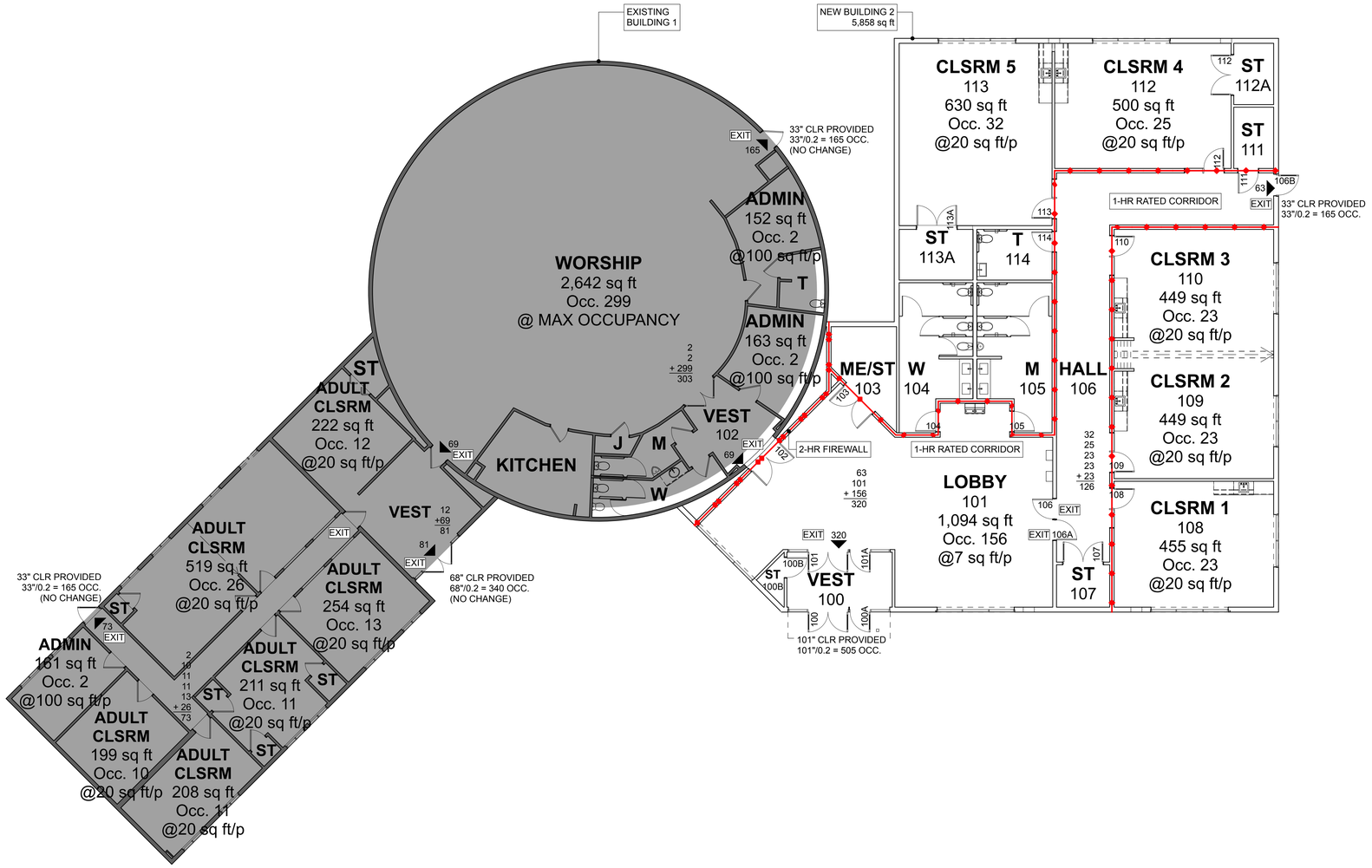
NO	DATE	DESCRIPTION

CITY SUBMITTAL

LANDSCAPE PLAN

A01



1 A11 CODE PLAN

SCALE: 1/8" = 1'-0"

N

0 4' 8' 16'

GENERAL CODE NOTES

A. ALTERATIONS TO BE DONE IN A MANNER THAT MAINTAINS THE LEVEL OF FIRE PROTECTION PROTECTION PROVIDED.
B. AREAS SHOWN GREY ARE EXISTING TO REMAIN.
C. EXTEND AND MODIFY EXISTING FIRE ALARM SYSTEMS FOR NEW WORK.
D. BUILDING TO BE UNSPRINKLED

CODE REVIEW SUMMARY

MN BUILDING CODE 2020

CH. 3 **DESCRIPTION OF OCCUPANCY:**
A-3
(S508) ACCESSORY OCCUPANCIES OF STORAGE & ADMINISTRATION DO NOT EXCEED 10%
(S305.1) EDUCATIONAL ROOMS AS ACCESSORY TO PLACES OF RELIGIOUS WORSHIP AND HAVE OCCUPANT LOADS LESS THAN 100 PEOPLE PER ROOM SHALL BE CLASSIFIED AS A-3

CH. 6 **TYPE OF CONSTRUCTION:**
TYPE VB, *UNSPRINKLERED*

T601	**FIRE RESISTANCE RATING REQUIREMENTS**	**REQUIRED**	**PROVIDED**
	STRUCTURAL FRAME (COLUMNS, GIRDERS, TRUSSES)	0 HR	0 HR
	BEARING WALLS - EXTERIOR	0 HR	0 HR
	BEARING WALLS - INTERIOR	0 HR	0 HR
	NONBEARING WALLS - EXTERIOR	0 HR	0 HR
	NONBEARING WALLS - INTERIOR	0 HR	0 HR
	FLOOR CONSTRUCTION (INCLUDING SUPPORTING BEAMS & JOISTS	0 HR	0 HR
	ROOF CONSTRUCTION (INCLUDING SUPPORTING BEAMS & JOISTS	0 HR	0 HR

T602 **FIRE RESISTANCE RATING REQ. FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE**
FIRE SEPARATION DISTANCE: >30' REQUIRED SEPARATION: 0 HR

ALLOWABLE HEIGHT AND BUILDING AREAS

S504	ALLOWABLE HEIGHT		1 STORY, 40 FT
	PROPOSED/EXISTING HEIGHT		**26 FT NO CHANGE**
S506	ALLOWABLE AREA PER FLOOR (Aa = At+(NSxIf))= 6,000+(6,000 x If))		
	ALLOWABLE AREA FOR BUILDING 1		8,968 SF
	ALLOWABLE AREA FOR BUILDING 2		**9,078 SF**
	BASE ALLOWABLE AREA (At): NS = 6,000		
	FRONTAGE INCREASE (If): (If = (F/P-0.25)W/30)	BLDG 1	**BLDG 2**
	BUILDING PERIMETER WHICH FRONTS A PUBLIC WAY (F)	283 FT	**251 FT**
	PERIMETER OF ENTIRE BUILDING (P)	380 FT	**329 FT**
	WIDTH OF PUBLIC WAY OR OPEN SPACE (W)	>30 FT	>30 FT
	PROPOSED/EXISTING AREA		
	EXISTING BUILDING - BUILDING 1		NO INCREASE - OK
	NEW BUILDING - BUILDING 2		5,858 SF NEW - OK

PLUMBING REVIEW SUMMARY

MN BUILDING CODE 2020 SECTION 2902

MINIMUM NUMBER OF PLUMBING FIXTURES
TOTAL OCCUPANCY: 425 OCC.
425 OCC./2 = 213 MEN AND 213 WOMEN

	REQUIRED	PROVIDED
MENS WATER CLOSETS (213/150)	2	2
MENS LAVATORIES (213/200)	2	3
WOMENS WATER CLOSETS (213/75)	3	5
WOMENS LAVATORIES (213/200)	2	3
ADULT CHANGING TABLE (MAC SEC. 1109.2.4.1) WHERE AN AGGREGATE OF 6 OR MORE WATER CLOSETS ARE REQ'D	0	NA
UNISEX RESTROOMS	1	2
DRINKING FOUNTAIN (1:1000) EACH FOUNTAIN TO BE HI-LO	1	1
SERVICE SINK	1	1

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DATE: 01.28.2026

NEW LIFE EFREE CHURCH

11245 POINT DOUGLAS DR S
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NO	DATE	DESCRIPTION

CITY SUBMITTAL

MAIN LEVEL CODE PLAN

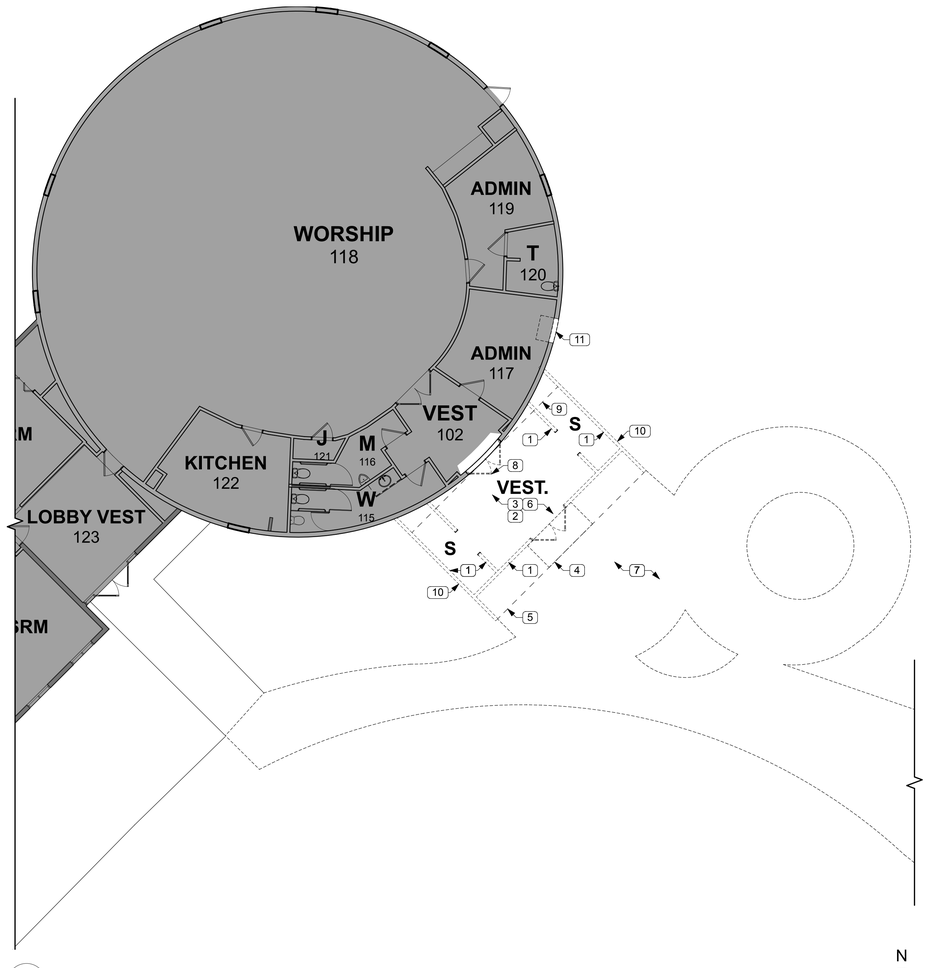
A11

GENERAL DEMO NOTES

A. CONTRACTOR TO REMOVE ALL ITEMS DESIGNATED UNDER SPECIFIC DEMO NOTES. ITEMS TO BE REMOVED ARE SHOWN DASHED.
B. FIELD VERIFY ALL DEMOLITION REQUIREMENTS. VERIFY ANY DISCREPANCIES WITH ARCHITECT PRIOR TO REMOVAL.
C. REFERENCE SITE DEMO PLANS, FLOOR PLANS, AND DETAILS FOR ADDITIONAL DEMOLITION NOTES. VERIFY ANY DISCREPANCIES WITH ARCHITECT PRIOR TO REMOVAL.
D. DEMO CONTRACTOR RESPONSIBLE FOR ALL TEMPORARY SHORING OR SUPPORT OF EXISTING STRUCTURAL ELEMENTS DURING CONSTRUCTION.
E. PROTECT ALL EXISTING WORK TO PREVENT DAMAGE FROM THE ELEMENTS DURING DEMOLITION AND UNTIL NEW WORK IS IN PLACE.
F. WHERE ENTIRE WALLS ARE INDICATED TO BE REMOVED, REMOVE ENTIRE WALL INCLUDING ALL INTEGRAL DOORS, WINDOWS, FRAMES, MECHANICAL DUCTING AND PIPING, ELECTRICAL CONDUIT, EQUIPMENT, OR OTHER MISCELLANEOUS ITEMS.
G. WHERE FLOORS ARE SHOWN TO BE REMOVED, REMOVE OR PATCH AS REQUIRED AND PREPARE FOR NEW FLOOR FINISH.
H. PROVIDE ALL MISCELLANEOUS DEMOLITION.
I. REMOVE ALL FINISHES FOR ALL MINOR DEMOLITION REQUIRED TO PROVIDE A CLEAN SUITABLE SURFACE FOR INSTALLATION OF NEW FINISHES AND CONSTRUCTION.
J. PATCH HOLES IN FLOORS, WALLS, CEILINGS, ETC. WHERE WINDOWS, DOORS, OR EQUIPMENT WILL BE PROVIDED.
K. OWNER TO REMOVE ALL FURNISHING AND MOVEABLE EQUIPMENT.
L. ALL OTHER EQUIPMENT REMOVAL TO BE THE RESPONSIBILITY OF THE DEMOLITION CONTRACTOR UNLESS NOTED OTHERWISE.
M. ALL OTHER MATERIALS AND ITEMS OF DEBRIS OF DEMOLITION SHALL BE DISPOSED OF OFF SITE BY THE DEMOLITION CONTRACTOR TO PROVIDE A CLEAN SUITABLE SURFACE FOR THE INSTALLATION OF NEW WORK.
N. COORDINATE POWER, WATER SUPPLY, AND OTHER SERVICE INTERRUPTIONS WITH OWNER.
O. AREAS SHOWN GRAY ARE EXISTING TO REMAIN.

SPECIFIC DEMO NOTES

1. STUD WALL & ALL INTEGRAL COMPONENTS INCLUDING ANY DOORS & WINDOWS
2. ACT CEILINGS INCLUDING GRID, LIGHTS, & ALL ACCESSORIES
3. FLOORING & BASE
4. CONCRETE STOOP AS REQUIRED FOR NEW CONSTRUCTION
5. EXTERIOR ROOF OVERHANG/CANOPY
6. LIGHTING
7. SEE CIVIL PLANS FOR EXTENT OF SITE DEMO
8. DOOR & FRAME
9. ROOF & ARCH TO REMAIN
10. RELOCATE UTILITY CONNECTION
11. DORMER & WINDOW



1 / A20 MAIN LEVEL DEMO PLAN
SCALE: 1/8" = 1'-0"

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NO	DATE	DESCRIPTION

CITY SUBMITTAL

DEMOLITION PLAN

A20

GENERAL PLAN NOTES

A. ALL WALLS TO BE MTL STUDS, INSULATED AND RUN TO BOTTOM OF DECK OR STRUCTURE UNLESS OTHERWISE NOTED.
B. ALL EXTERIOR WINDOWS TO BE ALUMINUM STOREFRONT.
C. ALL INTERIOR DOORS & WINDOWS TO BE HOLLOW METAL FRAMES WITH WOOD DOORS UNLESS NOTED OTHERWISE.
D. ALL CEILINGS TO BE 2'x2' ACT W/ LED DIRECT/INDIRECT LIGHTS UNLESS NOTED OTHERWISE.
E. SEE SITE PLAN FOR PAVING, SIDEWALKS, PARKING, ETC.
F. AREAS SHOWN GREY ARE EXISTING TO REMAIN.

SPECIFIC PLAN NOTES

1. CONCRETE STOOP WITH FROST FOOTINGS
2. POLISHED CONCRETE FLOOR & VINYL BASE
3. H.C. PUSH PADS
4. CANOPY ABOVE SHOWN DASHED
5. 2-HR RATED FIRE WALL
6. 1-HR RATED FIRE PARTITION
7. ALUMINUM STOREFRONT DOORS/WINDOWS
8. WOOD VENEER BASE CABINET W/ SOLID SURFACE COUNTER & SINK AS OCCURS - ADD ALT #1
9. ADA FLOOR MOUNTED W.C. W/ FLUSH VALVE, GRAB BARS, AND WALL MOUNTED SINK WITH WALL SCONCES EACH SIDE OF MIRROR AND LED PENDANT CAN LIGHTS.
10. CARPET TILE & VINYL BASE
11. WALK-OFF MAT & VINYL BASE
12. CERAMIC TILE FLOOR & WALLS - FULL HEIGHT CERAMIC TILE ALL WALLS
13. 12'-0" ACT CEILING WITH RECESSED 2X2 DIRECT/INDIRECT LED TROFFERS
14. OPERABLE PARTITION WALL SYSTEM - ADD ALT #1
15. HI-LO DRINKING FOUNTAIN W/ BOTTLE FILLER
16. WOOD VENEER TALL STORAGE CABINETS - ADD ALT #1
17. SOLID SURFACE CHECK-IN KIOSKS - PROVIDE ELECTRICAL - ADD ALT #1
18. 12'-0" ACT CEILING WITH RECESSED CAN LED FIXTURES - 1 HOUR FIRE RATING - PROVIDE (2) LAYERS 5/8" GYP AT UNDERSIDE OF ROOF STRUCTURE
19. SOLID SURFACE VANITY W/ INTEGRAL BOWLS & 18" X 36" FRAMED MIRRORS
20. ADA FLOOR MOUNTED W.C. W/ FLUSH VALVE, GRAB BARS, & MTL TOILET PARTITIONS
21. URINALS W/ FLUSH VALVES
22. ADA FLOOR-MOUNTED W.C. & GRAB BARS FOR AMBULATORY STALL
23. FLOOR-MOUNTED ADA HEIGHT W.C.

SPECIFIC PLAN NOTES CONT.

24. 2-HR RATED H.M. FRAME & SOLID CORE WD DOOR W/ PANIC HARDWARE & MAG. HOLD OPENS - PROVIDE POWER
25. H.M. FRAME, SOLID CORE WD DOOR W/ FULL GLASS, PANIC HARDWARE & PUSH TO HOLD OPEN CLOSER
26. 1-HR RATED H.M. FRAME & SOLID CORE WOOD DOOR W/ CLASSROOM FUNCTION HARDWARE & CLOSER
27. 1-HR RATED H.M. FRAME & SOLID CORE WOOD DOOR W/ OCCUPANCY INDICATOR & CLOSER
28. 1-HR RATED H.M. FRAME W/ SIDE LITE & SOLID CORE WOOD DOOR W/ CLASSROOM FUNCTION HARDWARE & CLOSER
29. H.M. FRAME & SOLID CORE WD DOOR W/ CLASSROOM FUNCTION HARDWARE
30. ALUMINUM DOOR W/ PANIC HARDWARE AND CLOSER
31. ALUMINUM DOOR W/ PUSH/PULL HARDWARE AND CLOSER
32. ALUMINUM DOOR W/ PANIC HARDWARE, CLOSER, & H.C. ACTUATOR
33. ALUMINUM DOOR W/ PUSH/PULL HARDWARE, CLOSER. & H.C. ACTUATOR
34. TYP. EXTERIOR WALL - STUCCO O/ WEATHER BARRIER, SELF-FURRING METAL LATH, 2" CONT. INSUL. W/ DRAINAGE CHANNELS, SHEATHING, 2x6 WD STUD WALLS @ 16" O.C., R-21 BATT INSULATION, VAPOR BARRIER, & 5/8" TYPE 'X' GWB
35. 10'-0" 5/8" GWB ON 2x10 FRAMING W/ RECESSED CAN LED FIXTURES
36. (2) LAYERS 5/8" TYPE 'X' GWB ON EXISTING FOR 1-HR PROTECTION
37. INFILL & PATCH DORMER OPENING TO MATCH EXISTING CONSTRUCTION
38. 12'-0" ACT CEILING WITH RECESSED CAN LED FIXTURES
39. MANUFACTURED STONE O/ 1" CONTINUOUS INSULATION O/ (2) LAYERS WEATHER BARRIER, 5/8" PLYWD SHEATHING, 2x6 WD STUD WALLS @ 16" O.C., R-21 BATT INSULATION, VAPOR BARRIER, & 5/8" TYPE 'X' GWB
40. PROVIDE POWER FOR CANOPY MOUNTED SIGNAGE
41. PROVIDE EXTERIOR POWER

GENERAL ROOF NOTES

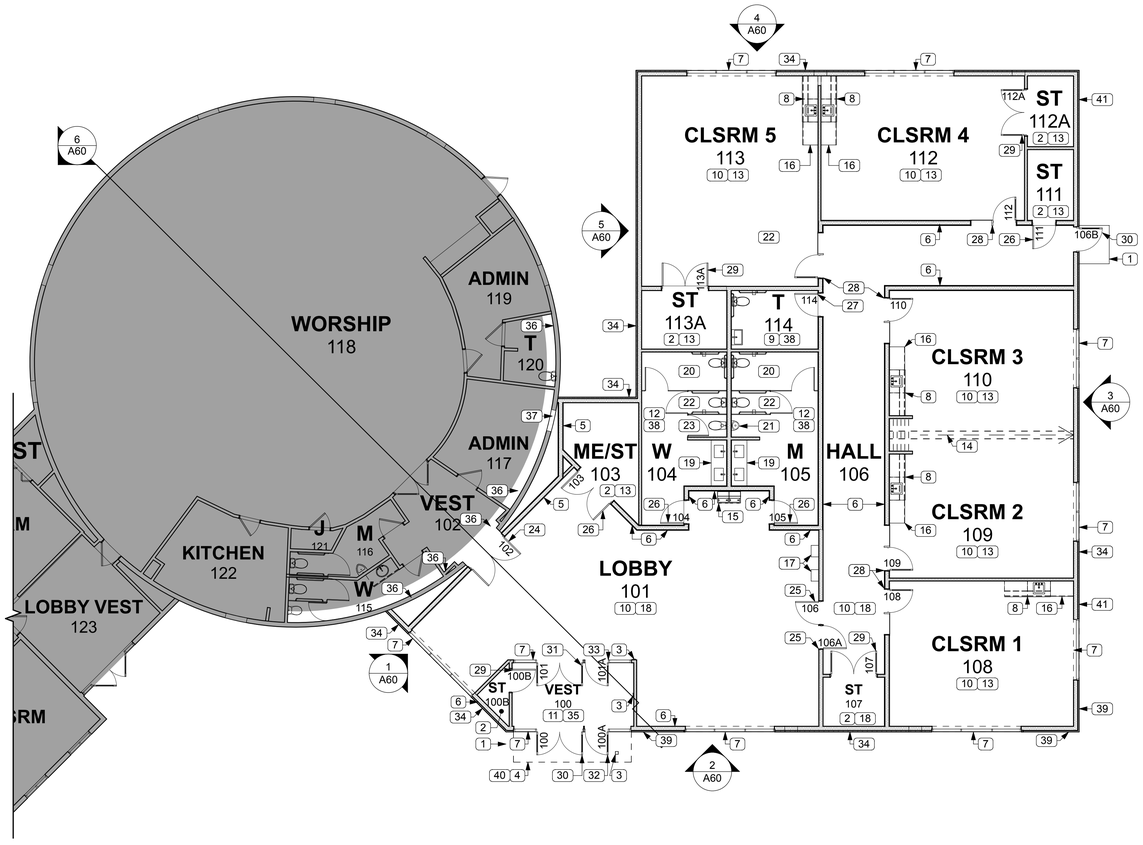
A. ALL PARAPET CAPS, SCUPPERS & DOWN SPOUTS TO BE PREFINISHED METAL.
B. PROVIDE 3' RAIN WATER LEADERS & CONCRETE SPLASH BLOCKS AT THE BASE OF ALL DOWNSPOUTS.
C. PROVIDE INSULATION CRICKETS AT MECHANICAL UNITS AS NEEDED FOR POSITIVE DRAINAGE.
D. PROVIDE MEMBRANE FLASHING AT ALL ROOF PENETRATIONS & CURBS.
E. "TI" IS ABBREVIATION FOR TAPERED INSULATION.
F. SEE MECH. FOR ROOF DRAINS & ADDITIONAL EQUIPMENT.
G. MEP TO BE DESIGN BUILD BY CONTRACTOR. RTU LOCATIONS & NUMBER SHOWN FOR DESIGN INTENT ONLY. CONTRACTOR TO PROVIDE CODE COMPLIANT INSTALLATION AND TO COORDINATE & REVIEW LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION. VERIFY CLEARANCE REQUIREMENTS FOR RTU SCREENING.
H. AREAS SHOWN GREY ARE EXISTING TO REMAIN.

SPECIFIC ROOF PLAN NOTES

1. R-30 MIN. INSULATION STRUCTURALLY SLOPED
2. BALLASTED EPDM ROOFING
3. 1/2"/1'-0" TAPERED INSULATION
4. EPDM EXPANSION JOINT
5. THRU-WALL SCUPPER W/ INTEGRAL OVERFLOW, PREFINISHED MTL DOWNSPOUT & CONCRETE SPLASH BLOCK
6. FULLY ADHERED EPDM MEMBRANE W/ SLOPED INSULATION
7. NO ROOF PENETRATIONS WITHIN 4'-0" OF FIRE WALL
8. PATCH/REPAIR ASPHALT SHINGLES AS REQ'D AT ROOF TIE-IN

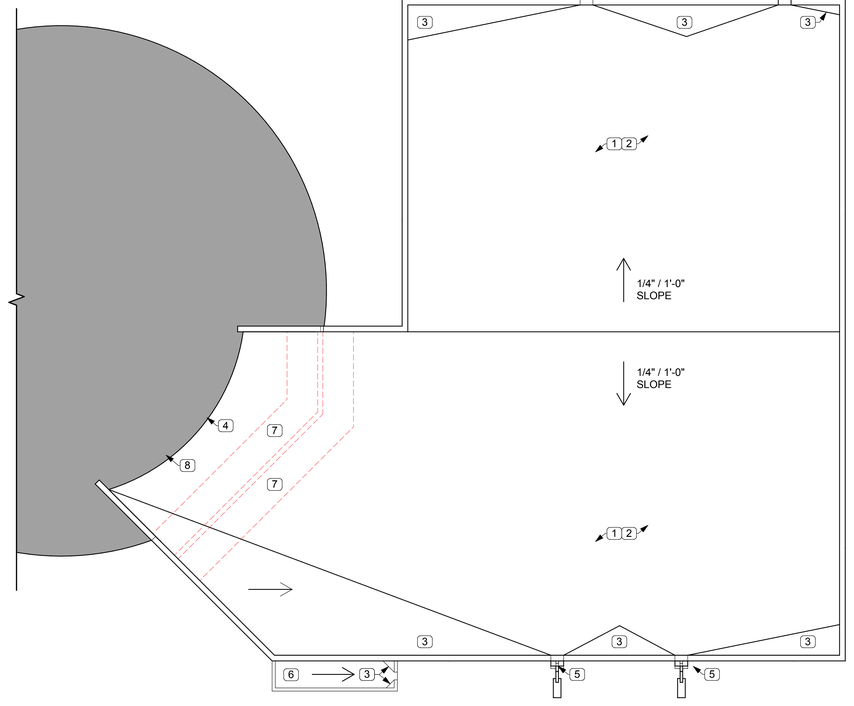
ROOFTOP MECHANICAL EQUIPMENT AS VIEWED FROM THE CENTERLINE OF ALL ADJACENT RIGHTS OF WAYS AND FROM PROPERTY LINES ADJACENT TO RESIDENTIAL PROPERTIES MUST BE SCREENED. THE SCREENING IS TO BE PROVIDED BY THE MECHANICAL CONTRACTOR.

GROUND MOUNTED MECHANICAL EQUIPMENT ACCESSORY TO THE PRINCIPAL STRUCTURE THIRTY INCHES OR GREATER THAN TWELVE CUBIC FEET SHALL BE SCREENED FROM PUBLIC VIEWS WITH LANDSCAPING, BERMING OR SCREEN WALL.



1 A30 MAIN LEVEL FLOOR PLAN
SCALE: 1/8" = 1'-0"

N
0 4' 8' 16'



2 A30 ROOF PLAN
SCALE: 1/8" = 1'-0"

N
0 4' 8' 16'

STATION 19
ARCHITECTS
4181 W BROADWAY AVE, MINNEAPOLIS, MN 55422
612.623.1800 ■ STATION19.COM

NOT FOR CONSTRUCTION

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 Architect under the laws of the state of MN.

SIGNATURE:

REGISTRATION #:

DATE: 01.28.2026

NEW LIFE EFREE CHURCH

11245 POINT DOUGLAS DR S
COTTAGE GROVE MN 55033

PROJECT NO: 4638
DRAWN BY: GT,
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NO	DATE	DESCRIPTION

CITY SUBMITTAL

FLOOR & ROOF PLAN

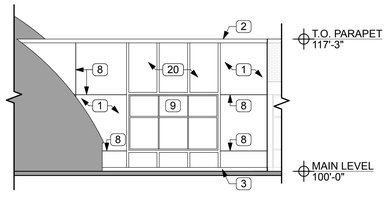
A30

ELEVATION & SECTION NOTES

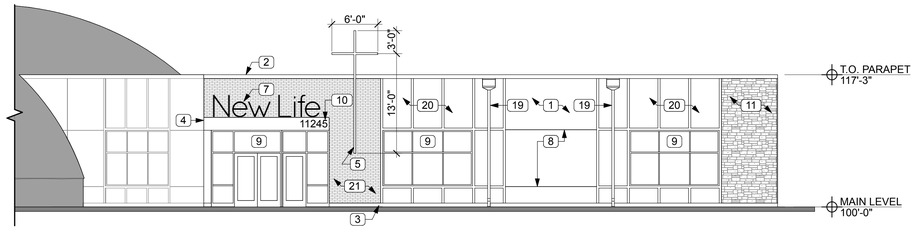
1. STUCCO
2. PREFINISHED METAL PARAPET CAP
3. PREFINISHED METAL GRADE FLASHING - EXTEND 6" BELOW GRADE O/ 2" RIGID INSUL. & DAMP PROOFING
4. CANOPY W/ PREFINISHED METAL ROOF EDGE & GUTTER. METAL SOFFIT PANELS AND RECESSED LED CAN LIGHTING
5. 4" X 4" GALVANIZED TUBE STEEL CROSS WITH HIGH PERFORMANCE PAINT
6. JAMB RETURN WHERE BUILDINGS MEET
7. INTERNALLY ILLUMINATED SIGNAGE - PROVIDE POWER
8. STUCCO REVEAL JOINT
9. STOREFRONT DOOR OR WINDOW
10. PIN MOUNTED LETTERS
11. MANUFACTURED STONE
12. 4'-0" DEEP FROST FOOTING - SEE STRUCT.
13. 4'-0" DEEP FROST FOOTING BEYOND AT STOOP - SEE STRUCT.
14. EXISTING FOOTING
15. SUSPENDED ACOUSTIC CEILING
16. NEW ROOF & STRUCTURE TO TIE INTO EXISTING - PROVIDE EPDM EXPANSION JOINT
17. ARCH & ROOF TO REMAIN
18. 2-HR FIRE WALL
19. ROOF SCUPPER W/ PREFINISHED METAL CONDUCTOR HEAD & DOWNSPOUT
20. ENGINEERED WOOD SIDING & TRIM
21. THIN BRICK
22. LED LIGHT FIXTURE

TOTAL BUILDING ELEVATIONS 5,179 SF

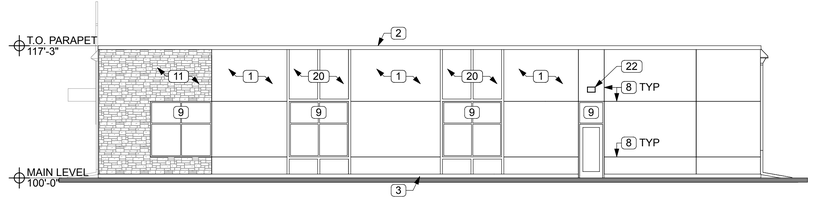
CLASS 1 MATERIAL 25%	
BRICK	193 SF
MANUFACTURED STONE	301 SF
GLASS	793 SF
CLASS 2 MATERIAL 42%	
STUCCO	2,158 SF
CLASS 3 MATERIAL 33%	
METAL FLASHING	333 SF
ENGINEERED WD SIDING	1,401 SF



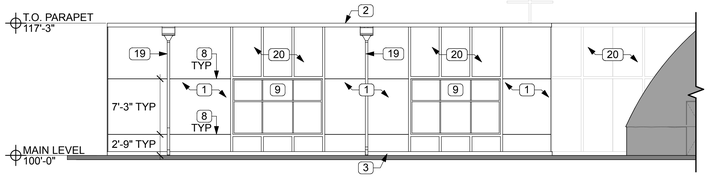
1 A60 SOUTHWEST ELEVATION
SCALE: 1/8" = 1'-0"



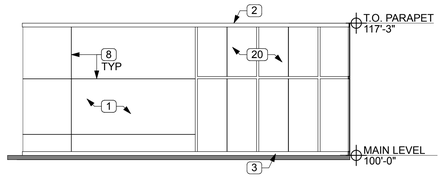
2 A60 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



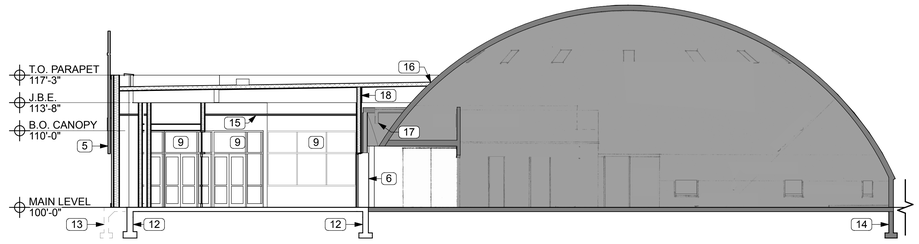
3 A60 EAST ELEVATION
SCALE: 1/8" = 1'-0"



4 A60 NORTH ELEVATION
SCALE: 1/8" = 1'-0"



5 A60 WEST ELEVATION
SCALE: 1/8" = 1'-0"



6 A60 DOME SECTION
SCALE: 1/8" = 1'-0"



7 A60 SOUTHEAST PERSPECTIVE - FINAL COLORS TBD
NOT TO SCALE

STATION 19
ARCHITECTS
4181 W BROADWAY AVE, MINNEAPOLIS, MN 55422
612.623.1800 ■ STATION19.COM

NOT FOR CONSTRUCTION

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 Architect under the laws of the state of MN.

SIGNATURE:

REGISTRATION #:

DATE: 01.28.2026

NEW LIFE EFREE CHURCH

11245 POINT DOUGLAS DR S
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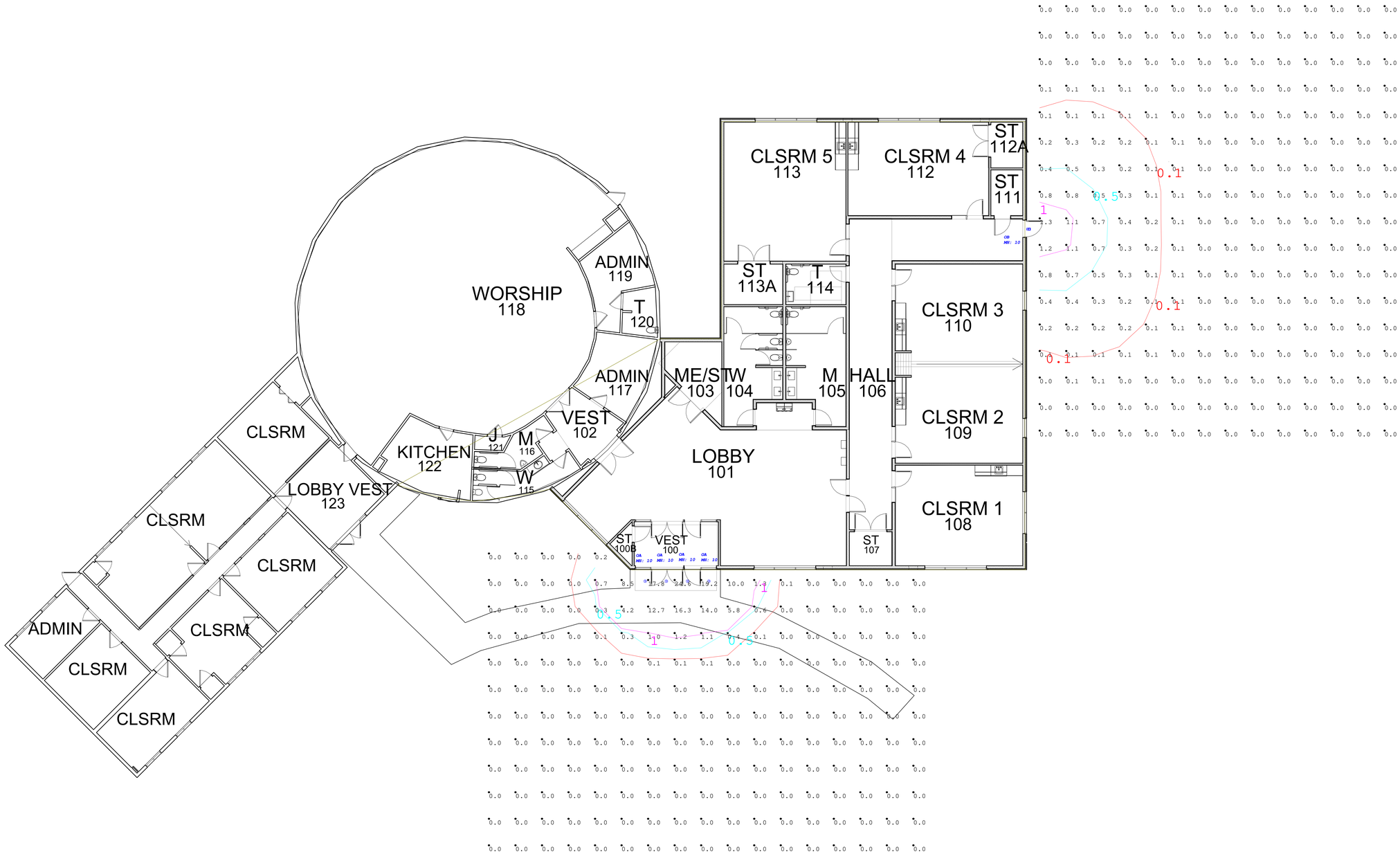
NO	DATE	DESCRIPTION

CITY SUBMITTAL

EXTERIOR ELEVATIONS & BUILDING SECTIONS

A60



1. Standard Reflectance of 80/50/20 unless noted otherwise
2. Not a Construction Document, for Design purposes only
3. Standard indoor calc points @ 30" A.F.F. unless noted otherwise
4. Standard outdoor calc points @ Grade unless noted otherwise
5. Egress calc points @ 0" A.F.F.
6. Mlazgar Associates assumes no responsibility for installed light levels due to field conditions, etc.

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPt EAST	Illuminance	Fc	0.08	1.3	0.0	N.A.	N.A.
CalcPts_1	Illuminance	Fc	0.73	24.6	0.0	N.A.	N.A.

Luminaire Schedule								
Symbol	Qty	Label	Manufacturer	Description	Arrangement	Lum. Lumens	Lum. Watts	LLF
	4	OA		HC610D010-HM60525840-61WDC	Single	1320	9.9	0.900
	1	OB		GKO-PB1A-740-U-T4W	Single	745	4.8	0.900

MLAZGAR ASSOCIATES
10340 VIKING DR.
SUITE 150
EDEN PRAIRIE, MN 55344
(p) 952-943-8080
(f) 952-943-8088
www.mlazgar.com

#	Date	Comments
Revisions		

RLMA Project #: 181871
Drawn By: BS
Date: 1/6/2026

Scale: 1" = 8'

PHOTOMETRIC

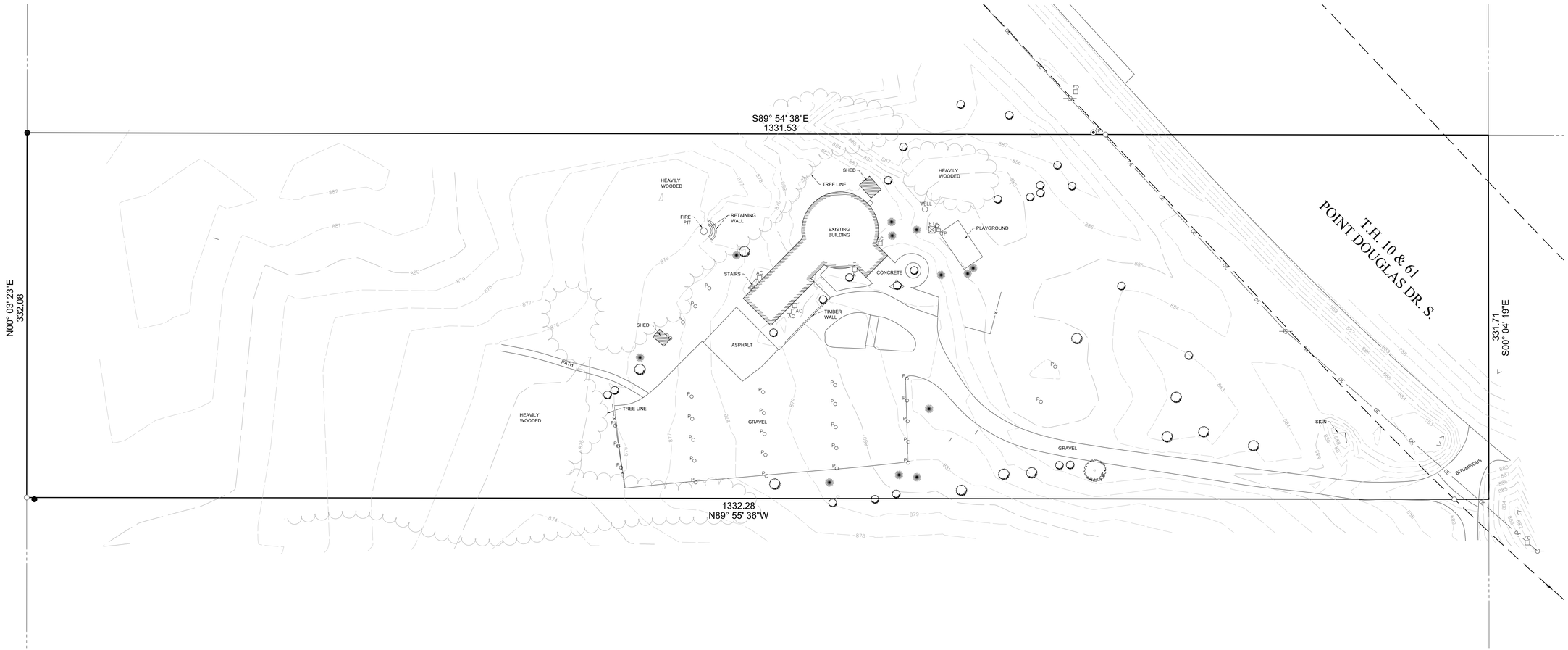
NEW LIFE EFREE CHURCH
HASTINGS, MN

EXISTING CONDITIONS SURVEY FOR:

New Life Comm. Church

DESCRIPTION:

The N1/2 of the N1/2 of the SW1/4 of the NW1/4, subject to highway easement, Sec. 36 T.27 R.21, Washington County, Minnesota.



- Iron Monument Found
- Iron Monument Set RLS 21292
- AC Air Conditioner
- ET Transformer
- TP Telephone Box
- E Electric Box
- P Post
- Light Pole
- WELL Catch Basin
- Power Pole
- FO Sanitary Manhole
- FES/Culvert
- Trees

N

50 0 25 50 100

Scale: 1 Inch = 50 Feet

M&P associates
civil engineering · land surveying · site planning
1440 Arcade St. Suite 250
Saint Paul, MN 55106
Phone: 651-768-0112
Fax: 651-776-0206
E-mail: info@mpasso.com

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

DATE 9/21/21 LIC. NO. 21292

REVISIONS

DATE

OWNER

New Life Comm. Church
11256 POINT DOUGLAS DR. S.
COTTAGE GROVE, MN 55033

EXISTING CONDITIONS

NEW LIFE COMM. CHURCH
COTTAGE GROVE, MN 55033

DRAWN	CHECKED
KGD	ACS

PROJECT # 5291.001

DATE 9/21/21

SHEET # C1

Ten Thirty Environmental Solutions

Ten Thirty Environmental Solutions, SBC
1684 132nd Ave NE
Blaine, MN 55448

Regarding Septic Design For Property Located At New Life Evangelical Free Church

November 11, 2025

Please find the enclosed design for the septic system for the property at 11245 Point Douglas Drive South (New Life Evangelical Free Church) in Cottage Grove, Minnesota. This design was completed on November 11, 2025 to be in compliance with local and state requirements. This design does not offer a guarantee that it will be permitted by the local permitting authority, however the design was completed using all the applicable resources and knowledge available at the time of the design that would make it in compliance with local and state rules.

An overview of the septic design for a type I mound is shown below with more details in the enclosed design documents.

- Permit design flow of 2,460 gallons per day (gpd) for a church with up to 600 attenders and 4 FTE on Sundays, 200 attenders and 4 FTE on Wednesdays, 100 attenders and 4 FTE on Thursdays and 15 attenders and 4 FTE Tuesday, Friday and Saturday while being closed on Mondays. With flow EQ average daily design flow is 591 gpd.
    - BOD loading is 0.01 lbs per attender and 0.04 lbs per employee, this equates to 6.2 lbs on Sunday, 2.16 lbs on Wednesday, 1.16 lbs on Thursday, and 0.31 lbs on Tuesday/Friday/Saturday for an average BOD loading of 1.49 lbs per day.
- Flow from the church will be collected in a new 4,200 gallon septic tank followed by another new 4,200 gallon septic tank.
    - The second 4,200 gallon septic tank will have a Polylok 525 effluent filter with an alarm installed on the outlet.
- Flow from the second 4,200 gallon septic tank will then flow into a new 4,200-gallon pump/EQ tank.
- The 4,200-gallon pump tank will **time dose** and center feed a 100’ x 10’ rockbed mound with a 12 inch sand lift (three - 1.5” laterals with 3/16 inch perforations).
    - There will be two pumps in the pump tank and they will alternate doses.
        - An SJE Rhombus C-Level Sensor with EZ Insite control panel is recommended if available for ease of setting and troubleshooting as well as ongoing flow monitoring.
    - The absorption area for the mound will be 100’ x 20’.
    - The pumps will have an elapsed time meter, event counter and alarm installed on them (alarm on a separate circuit than the pump).
- 1.5” laterals are called for to be center fed to keep dose volume down and protect the mounds.
    - **NO** TIMER OVERRIDE MAY BE INSTALLED AS THAT WILL OVERLOAD THE MOUND.
- To protect the mound trees within 10’ of absorption area should be cut down.

- Please read the Site/Soil Narrative on the Elevations Page in the attached design documents for a detailed description of the site and proposed system.
- The well serving the church will be moved as part of the expansion.
- Secondary protection within the manholes are required.
- A hatch is recommended for the pump tank, this must be secured with a padlock to prevent access by children.
- Low flow fixtures are STRONGLY encouraged within the church. Aerators on faucets of 0.5 - 1.0 gpm are recommended. Low flow toilets are also recommended. Examples of these can be found in the last few pages of the design.
- It is recommended to mow the mound at least once per year to help prevent any trees or woody shrubs from growing on it.
- The tanks should be evaluated every 24 months to determine whether or not they need to be pumped.

Please protect the soil treatment area from all vehicle traffic as such traffic may damage the area and require a system redesign.

This design does not guarantee the performance of the system, the design is based on available information at the time of the design. In addition in the event the system is not operated in accordance with the management plan the design is not guaranteed.

In order for the system to be installed it must first be permitted by the local regulatory authority. If there are any questions or concerns with the design please do not hesitate to call or email.

Sincerely,

Alex Pepin, Professional Engineer (Lic# 58962) and Advanced Designer (Lic# 4082)
612-248-4281
alex.pepin@tenthirtyenvironmental.com.

ArcGIS Web Map

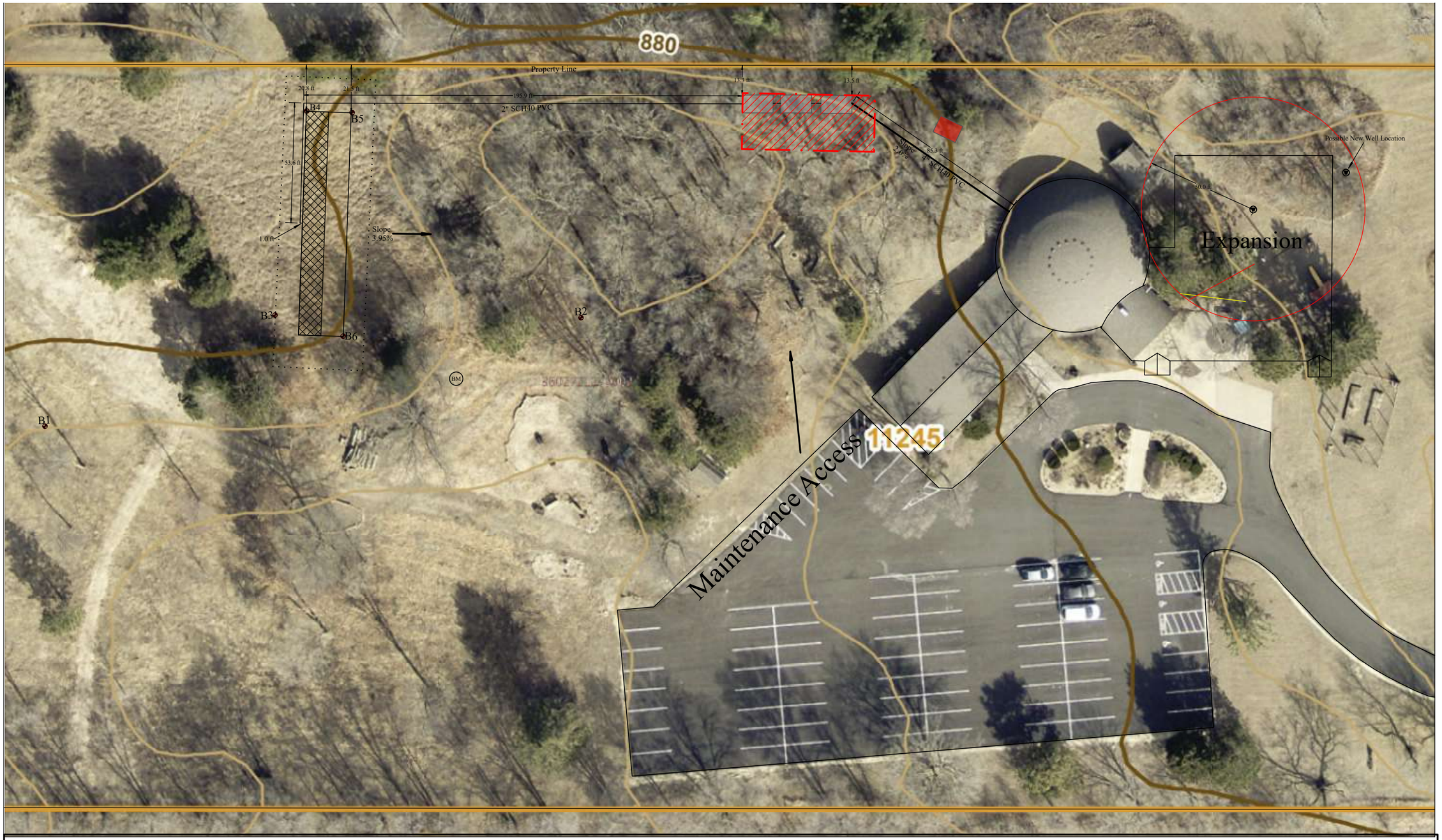


11/5/2025, 4:23:17 PM

1:1,500

0 65 130 260 ft

0 20 40 80 m



11245 Point Douglas Drive South - Cottage Grove
New Life Evangelical Free Church
Max Daily Flow - (2,460 gpd)
Average Daily Flow - (591 gpd)
Average Daily BOD - 1.49 lbs/day
(Not A Survey)
Design By: Ten Thirty Environmental Solutions

50.0 ft

Legend

- Soil Observation
- Well
- Benchmark
- Approximate Mound Berming
- Absorption Area
- Rockbed
- New Tank
- Old Tank
- Drainfield
- Electric Line
- Gas Line

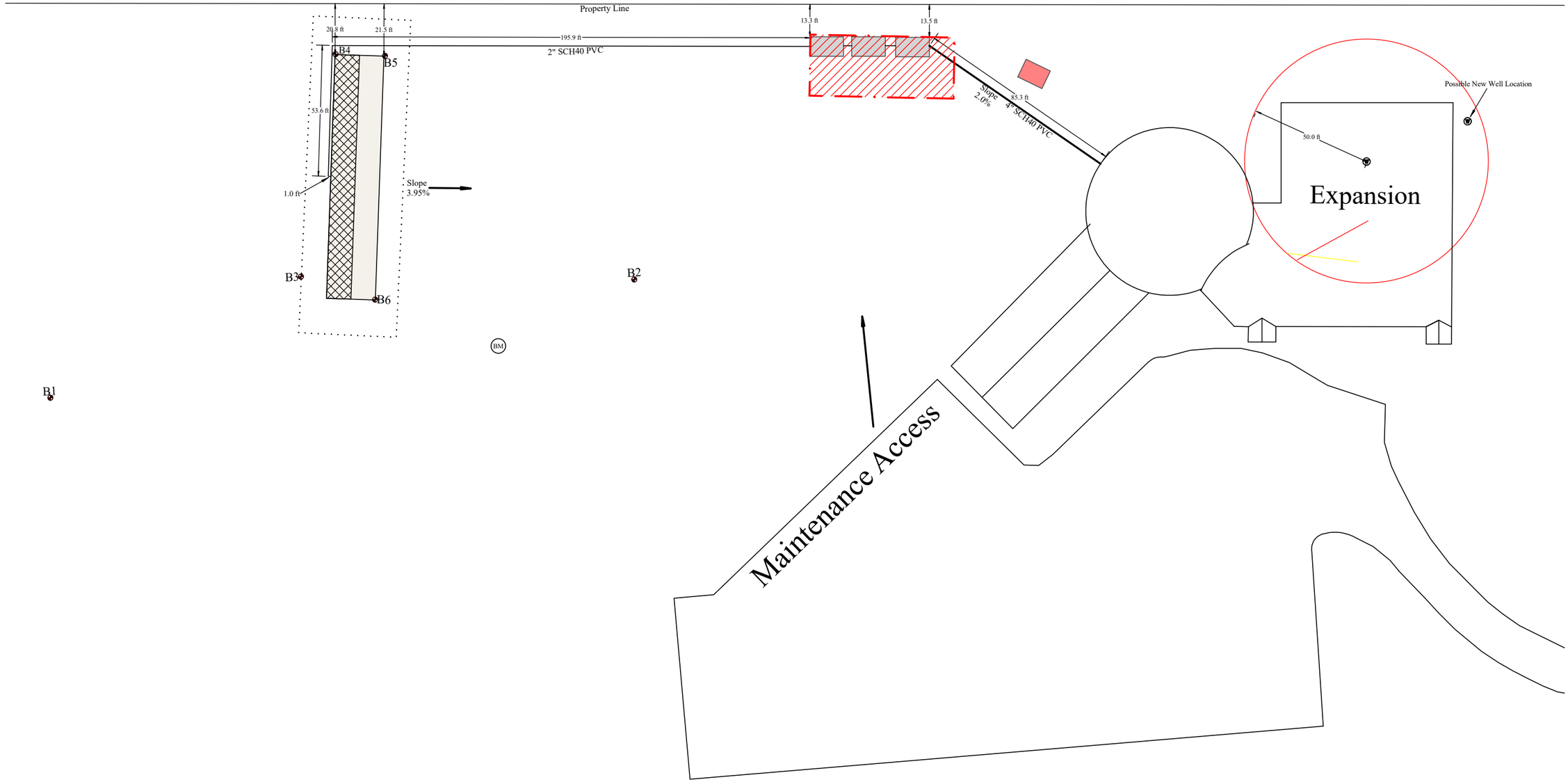
Mound Information:
Bottom of Rock - 881.22'
10' x 100' rockbed
20' x 100' absorption area
3.95% Slope
12" Sandlift

Tank Information:
New 4,200 gal septic tank - Inlet - 872.62'
New 4,200 gal septic tank - Inlet - 871.01'
New 4,200 gal pump tank - Inlet - 869.39'

Current first tank inlet - 876.61'

Benchmark - 877.69'

N



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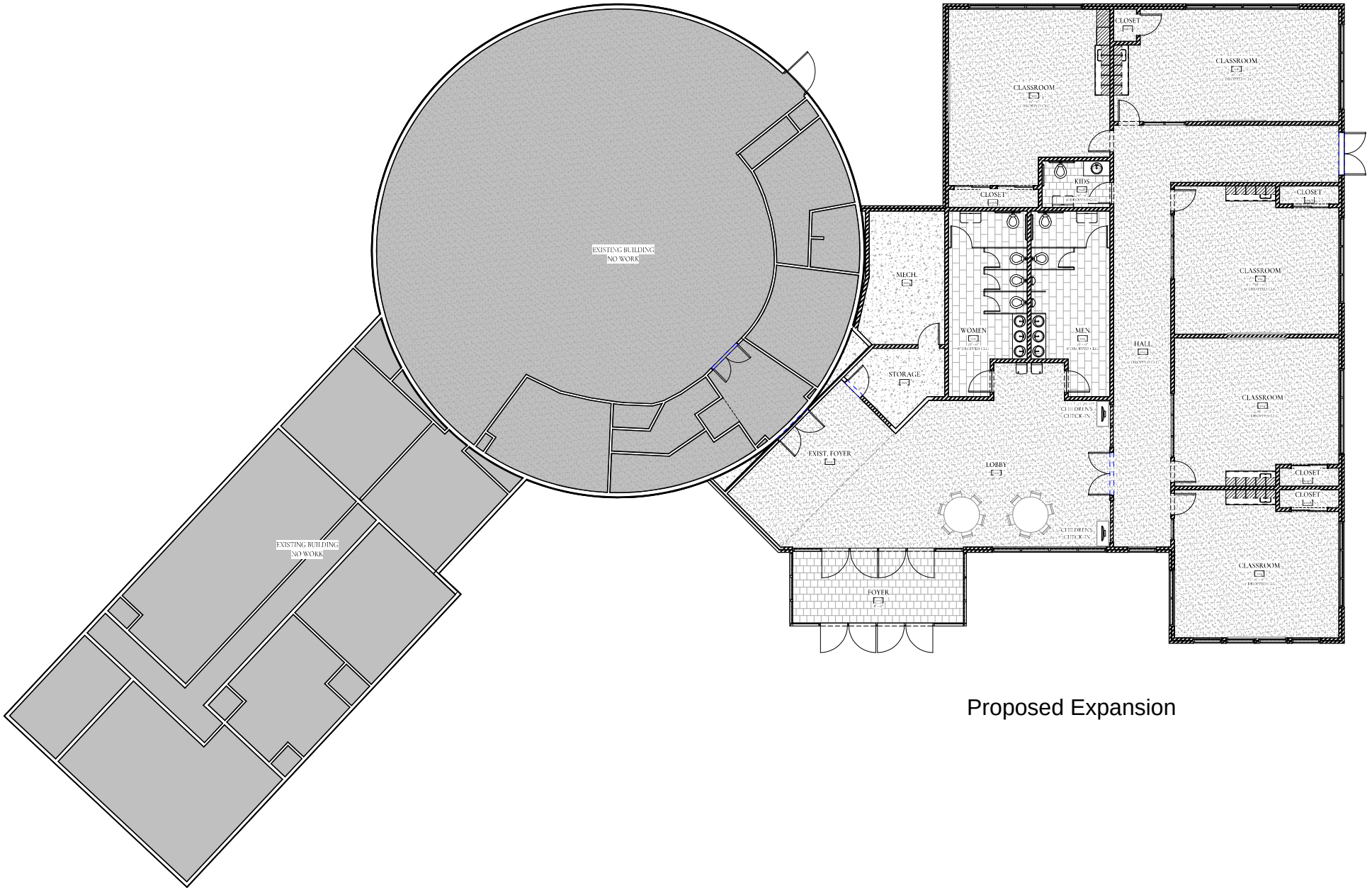
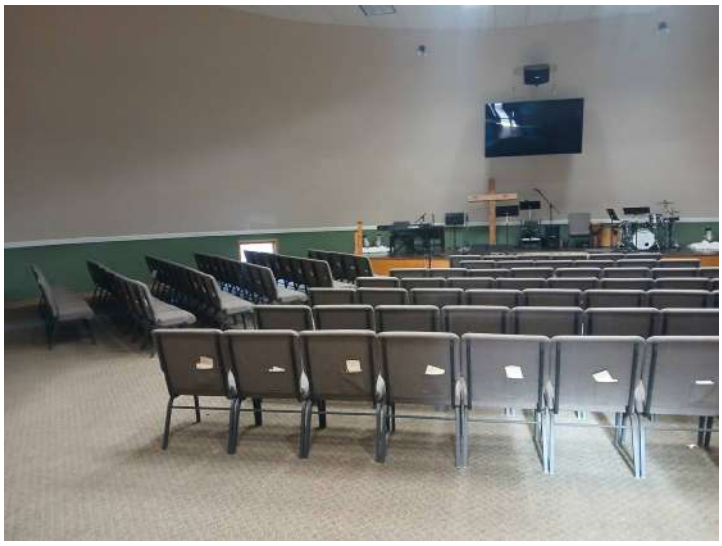
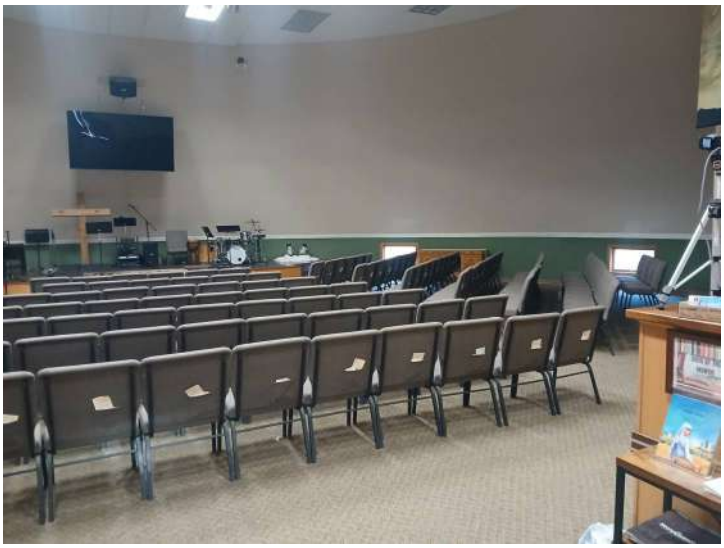


Proposed Expansion





Current sanctuary above (not changing) and kitchen below (not changing)
Kitchen for pot lucks only and staff.




Existing Tank
First Tank Inlet


Existing Tank
Pump Tank Outlet


B4
B5


B5
B4


Benchmark
B6
SW Rockbed Corner


B3
SW Rockbed Corner
B6

Elevations Worksheet Ten Thirty Environmental Solutions

Address 11245 Point Douglas Dr S

Location	Elevation	Restriction depth (in)	Restriction Elevation	Separation as Designed	Comments
Grade at B1	877.55	22	**875.71**	-	Exploratory boring to SW
Grade at B2	875.09	36	**872.09**	-	Exploratory boring in low area closer to tanks
Grade at B3	880.15	30	**877.65**	3.57	Near SW rockbed corner
Grade at B4	880.22	41	**876.81**	4.42	NW rockbed corner
Grade at B5	879.13	36	**876.13**	5.09	NE absorption corner
Grade at B6	879.39	31	**876.81**	4.41	SE absorption corner
Grade at SW rockbed corner	879.88				SW rockbed corner
Grade at current septic tank	878.86				
Inlet at current septic tank	876.61				
Grade at first new septic tank	877.37				All tanks 37.5" to top of tank.
Inlet at first new septic tank	872.62				No buoyancy issues at depth designed.
Grade at new second septic tank	875.76				Duplex alternating pumps in pump tank. Hatch recommended for ease of maintenance and access.
Inlet at new second septic tank	871.01				
Grade at proposed new pump tank/EQ tank	874.14				
Inlet at new pump tank/EQ tank	869.39				Static Head
Top of Pump (For 12" pump + 2" pad)	864.89				16.83

Benchmark	Elevation
Top of footing for elevated playhouse (NW corner)	877.69

Soil Treatment Area Type	Max Grade	Bottom of Rock
Mound	**880.22**	***881.22***

Overall Separation As Designed

3.57

Measured Slope

0.34%	3.95%
Slope N to S (top of rock)	**Avg Slope W to E**



Soil/Site Narrative

Soil observations completed using a shovel/post hole digger pit down to ~2' and borings after that if necessary. All observations conducted in a manner that allows for the evaluation of soil structures.

Church is expanding to add some additional Sunday school classrooms and bathrooms. Currently 200 seats in sanctuary, will add 5 new classrooms (total square footage of classrooms = 2986 square feet) with allowable 1 child per 35 square feet for daycare rules this works out to a max of 85 children in this space. Rounding up we will say up to 300 people each service for a total of 600 per Sunday (currently 100-150 per service with about 100 kids, so tripling size). For youth group on Wednesdays say 200 people (currently about 60). Also allow for another day for people to use the classrooms for something, say 100 people. The other three days will have up to 10 visitors per day. Six days per week (Sun, Tu, Wed, Th, Fr, Sat) there will be 4 FTE. For churches design guidance says 4 gal/seat or person and 0.01 lbs of BOD per person. Design guidance also says 15 gpd per employee and 0.04 lbs of BOD per employee. This works out the following flow and waste strength profile. Sun - 2,460 gpd, 6.2 lbs BOD; Mon - closed, Tu - 120 gpd, 0.31 lbs BOD; Wed - 860 gpd, 2.16 lbs BOD; Th - 460 gpd, 1.16 lbs BOD, Fri - 120 gpd, 0.31 lbs BOD; Sat - 120 gpd, 0.31 lbs BOD. Using flow equalization this works out to an average flow of 591 gpd and 1.49 lbs of BOD per day. Organic loading is the limiting factor (1.49/0.0017 = 874.8 required square feet in sand). Upsizing 15% this works out to 1,000 square feet required. With a mound called for this works out to a 100' x 10' mound rockbed. There is a small pot luck kitchen in the church (see pictures) this is only for potlucks and will not be used to make meals for the church only to heat up food and put things together prepared elsewhere. Commercial kitchens require additional things the church does not desire to undertake. It should also be noted that above 299 seats fire suppression would be required, so they will always stay under that number.

The soils are fine sand consistently over the entire site with redox seen from 22" to 41". As a result the area proposed is the best area for a mound and is also straightforward for pumping from the tanks.

The entire site had darker soils down to around 30" in many borings (10YR3/3) with B3 being the exception, however the 4/4 colored soils were encountered in B5 down deeper as well so the soils consistently fine sand with roots down to about 3' (10YR6/3). As a result of redox seen where it is a mound with a 12" sand lift is called for.

The mound is not exactly the same elevation across the rockbed, there is a 0.34% slope from N to S, however this is well under the required 1% to be on contour. It should be noted in estimating material costs that some additional material will be needed as the NW corner is the highest and as a result there will be more than 12" of sand at the SW corner under the rock.

Preliminary Evaluation Worksheet

1. Contact Information

v 04.07.2025

Property Owner/Client:	New Life Community Church	Date Completed:	11/11/2025
Site Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033	Project ID:	11245PO
Email:	bcmyre@hotmail.com (Ben Myre)	Phone:	651-558-6433
Mailing Address:		Alt Phone:	
Legal Description:			
Parcel ID:	3602721230002	SEC:	
TWP:		RNG:	

2. Flow and General System Information

A. Client-Provided Information

Project Type: ☐ New Construction ☐ Replacement ☐ Expansion ☐ Repair

Project Use: ☐ Residential ☒ Other Establishment: Church

Residential use: # Bedrooms: | Dwelling sq.ft.: | Unfinished sq.ft.:

Adults: | # Children: | # Teenagers:

In-home business (Y/N): | If yes, describe:

Water-using devices: *(check all that apply)*

- ☐ Garbage Disposal/Grinder
- ☐ Dishwasher
- ☐ Hot Tub*
- ☐ Sewage pump in basement
- ☐ Water Softener*
- ☐ Sump Pump*
- ☐ Large Bathtub >40 gallons
- ☐ Iron Filter*
- ☐ Self-Cleaning Humidifier*
- ☐ Clothes Washing Machine
- ☒ High Eff. Furnace*
- ☐ Other:

* Clear water source - should not go into system

Additional current or future uses: Max capacity is 299 b4 fire suppression required (so no)

Anticipated non-domestic waste: None - If add iron filter must divert reject water out of septic

The above is complete & accurate: *Client signature & date*

B. Designer-determined Flow and Anticipated Waste Strength Information

Attach additional information as necessary.

Design Flow: 591 GPD Anticipated Waste Type: Other Est. - At-Risk

Maximum Concentration BOD: 247 mg/L TSS <60 mg/L Oil & Grease <25 mg/L

3. Preliminary Site Information

A. Water Supply Wells

#	Description	Mn. ID#	Well Depth (ft.)	Casing Depth (ft.)	Confining Layer	STA Setback	Source
1	Unknown well	none	?	?		>100'	
2							
3							
4							

Additional Well Information:

Preliminary Evaluation Worksheet

Site within 200' of noncommunity transient well (Y/N)	No	Yes, source:	
Site within a drinking water supply management area (Y/N)	No	Yes, source:	
Site in Well Head Protection inner wellhead management zone (Y/N)	No	Yes, source:	
Buried water supply pipes within 50 ft of proposed system (Y/N)	No		

Water Supply Pipe Comments:

B. Site located in a shoreland district/area? No — Yes, name: N/A

Elevation of ordinary high water level: N/A ft — Source: N/A

Classification: N/A — Tank Setback: N/A ft. — STA Setback: N/A ft.

C. Site located in a floodplain? No — Yes, Type(s): N/A

Floodplain designation/elevation (10 Year): N/A ft — Source: N/A

Floodplain designation/elevation (100 Year): N/A ft — Source: N/A

D. Property Line Id / Source: ☐ Owner ☐ Survey ☒ County GIS ☐ Plat Map ☐ Other

E. ID distance of relevant setbacks on map: ☐ Water ☐ Easements ☐ Well(s) ☒ Building(s) ☒ Property Lines ☐ OHWL ☐ Other:

4. Preliminary Soil Profile Information From Web Soil Survey (attach map & description)

Map Units: 8B - Sparta Loamy Sand — Slope Range: 2-6 %

List landforms: See enclosed map unit description

Landform position(s):

Parent materials:

Depth to Bedrock/Restrictive Feature: in — Depth to Watertable: in

Map Unit Ratings

Septic Tank Absorption Field- At-grade:

Septic Tank Absorption Field- Mound:

Septic Tank Absorption Field- Trench:

5. Local Government Unit Information

Name of LGU: Washington County

LGU Contact:

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:

Field Evaluation Worksheet

ONSITE SEWAGE TREATMENT PROGRAM

MINNESOTA POLLUTION CONTROL AGENCY

1. Project Information

v 04.07.2025

Property Owner/Client:	New Life Community Church	Project ID:	11245PO
Site Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033	Date Completed:	11/11/2025

2. Utility and Structure Information

Utility Locations Identified ☒ Gopher State One Call # see site plan ☐ Any Private Utilities:

Locate and Verify (*see Site Evaluation map*) ☒ Existing Buildings ☒ Improvements ☐ Easements ☐ Setbacks

3. Site Information

Vegetation type(s):	Grass			Landscape position:	Back/ Side Slope
Percent slope:	4.0 %	Slope shape:	Linear, Convex	Slope direction:	East

Describe the flooding or run-on potential of site: None

Describe the need for Type III or Type IV system: N/A

Note:

Proposed soil treatment area protected? (Y/N): Yes If yes, describe: Staked out

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): No

If yes, describe:

Soil observations were conducted in the proposed system location (Y/N): Yes

A soil observation in the most limiting area of the proposed system (Y/N): Yes

Number of soil observations: 6 Soil observation logs attached (Y/N): Yes

Percolation tests performed & attached (Y/N):

5. Phase I. Reporting Information

	Depth		Elevation		
Limiting Condition*:	30	in	**877.65**	ft	**Most Restrictive Depth Identified from List Below*
Periodically saturated soil:	30	in	877.65	ft	Soil Texture: Fine Sand
Standing water:	-	in		ft	Percolation Rate: min/inch
Bedrock:	-	in		ft	Soil Hyd Loading Rate: 0.60 gpd/sq.ft

Benchmark Elevation: 877.7 ft Elevations and Benchmark on map? (Y/N): Yes

Benchmark Elevation Location: Footing for NW corner of raised play house

Differences between soil survey and field evaluation: fine sand vs medium sand

Site evaluation issues / comments: None

Anticipated construction issues: Big tank holes for large tanks in sandy soils.

Soil Observation Log

Project ID: 11245PO v 04.07.2025

Client:	New Life Community Church	Location / Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033

Soil parent material(s): (Check all that apply) ☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	4.0	Slope shape:	Linear, Linear	Flooding/Run-On potential:	No
Vegetation:	Grass	Soil survey map units:	8B - Sparta Loamy Sand			Surface Elevation-Relative to benchmark:	877.55
Date/Time of Day/Weather Conditions:		11/11/2025	10:00AM	Sunny		Limiting Layer Elevation:	875.71
Observation #/Type/Location:		B1	See site map	Shovel and auger		Depth to Standing Water-inches:	-

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)		Mottle Color(s)		Redox Kind(s)	Indicator(s)	I-------- Structure----------I		
									Shape	Grade	Consistence
0-17	Loamy fine sand	<5%	10YR	3/2					Single grain	Structureless	Loose
17-22	Fine sandy loam	<5%	10YR	3/2					Granular	Weak	Friable
22-30	Fine sandy loam	<5%	10YR	3/3	10YR	5/3	Depletions	S2	Blocky	Weak	Friable
30-33	Fine sandy loam	<5%	10YR	3/4	10YR	4/4	Concentrations	S2	Blocky	Weak	Friable
					10YR	5/3	Depletions				

Comments: Root channels to about 2' (10YR6/3, not redox). Redox at 22".

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer/Inspector)	(Signature)	(License #)	(Date)

Soil Observation Log

Project ID: 11245PO v 04.07.2025

Client:	New Life Community Church	Location / Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033

Soil parent material(s): (Check all that apply) ☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	1.0	Slope shape:	Linear, Linear	Flooding/Run-On potential:	No
Vegetation:	Forest	Soil survey map units:	8B - Sparta Loamy Sand			Surface Elevation-Relative to benchmark:	875.09
Date/Time of Day/Weather Conditions:		11/11/2025	10:00AM	Sunny		Limiting Layer Elevation:	872.09
Observation #/Type/Location:		B2	See site map	Shovel and auger		Depth to Standing Water-inches:	-

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure Shape	Structure Grade	Structure Consistence
0-17	Fine Sand	<5%	10YR 3/2				Single grain	Structureless	Loose
17-32	Fine Sand	<5%	10YR 3/3				Single grain	Structureless	Loose
32-36	Fine Sand	<5%	10YR 4/3				Single grain	Structureless	Loose
36-42	Fine Sand	<5%	10YR 4/3	10YR 4/6	Concentrations	S2	Single grain	Structureless	Loose
				10YR 6/3	Depletions				

Comments: Root channels to about 3' (10YR6/3, not redox). Redox at 36".

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer/Inspector)	(Signature)	(License #)	(Date)

Soil Observation Log

Project ID: 11245PO v 04.07.2025

Client:	New Life Community Church	Location / Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033

Soil parent material(s): (Check all that apply) ☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	4.0	Slope shape:	Linear, Linear	Flooding/Run-On potential:	No
Vegetation:	Grass	Soil survey map units:	8B - Sparta Loamy Sand			Surface Elevation-Relative to benchmark:	880.15
Date/Time of Day/Weather Conditions:		11/11/2025	11:00AM	Sunny		Limiting Layer Elevation:	877.65
Observation #/Type/Location:		B3	See site map	Shovel and auger		Depth to Standing Water-inches:	-

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)		Mottle Color(s)		Redox Kind(s)	Indicator(s)	I-------- Structure----------I		
									Shape	Grade	Consistence
0-12	Fine Sand	<5%	10YR	3/3					Single grain	Structureless	Loose
12-30	Fine Sand	<5%	10YR	4/3					Single grain	Structureless	Loose
30-36	Fine Sand	<5%	10YR	4/4	10YR	4/6	Concentrations	S2	Single grain	Structureless	Loose
					10YR	6/3	Depletions				

Comments: Root channels to about 3' (10YR6/3, not redox). Redox at 30".

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer/Inspector)	(Signature)	(License #)	(Date)





B3 - redox at 30” (right)

Soil Observation Log

Project ID: 11245PO v 04.07.2025

Client:	New Life Community Church	Location / Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033

Soil parent material(s): (Check all that apply) ☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	4.0	Slope shape:	Linear, Linear
Flooding/Run-On potential:	No				
Vegetation:	Grass	Soil survey map units:	8B - Sparta Loamy Sand	Surface Elevation-Relative to benchmark:	880.22
Date/Time of Day/Weather Conditions:	11/11/2025	11:30AM	Sunny	Limiting Layer Elevation:	876.81
Observation #/Type/Location:	B4	See site map	Shovel and auger	Depth to Standing Water-inches:	-

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	I-------- Structure----------I Shape	Grade	Consistence
0-12	Fine Sand	<5%	10YR 3/2				Single grain	Structureless	Loose
12-35	Fine Sand	<5%	10YR 3/3				Single grain	Structureless	Loose
35-41	Fine Sand	<5%	10YR 4/3				Single grain	Structureless	Loose
41-47	Fine Sand	<5%	10YR 4/3	10YR 4/6 10YR 6/3	Concentrations Depletions	S2	Single grain	Structureless	Loose

Comments: Root channels to about 3' (10YR6/3, not redox). Redox at 41".

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer/Inspector)	(Signature)	(License #)	(Date)





B4 - redox at 41” (right).

Soil Observation Log

Project ID: 11245PO v 04.07.2025

Client:	New Life Community Church	Location / Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033

Soil parent material(s): (Check all that apply) ☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	4.0	Slope shape:	Linear, Linear	Flooding/Run-On potential:	No
Vegetation:	Grass	Soil survey map units:	8B - Sparta Loamy Sand			Surface Elevation-Relative to benchmark:	879.13
Date/Time of Day/Weather Conditions:		11/11/2025	12:00PM	Sunny		Limiting Layer Elevation:	876.13
Observation #/Type/Location:		B5	See site map	Shovel and auger		Depth to Standing Water-inches:	-

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure Shape	Structure Grade	Structure Consistence
0-6	Fine Sand	<5%	10YR 3/2				Single grain	Structureless	Loose
6-28	Fine Sand	<5%	10YR 3/3				Single grain	Structureless	Loose
28-36	Fine Sand	<5%	10YR 4/3				Single grain	Structureless	Loose
36-42	Fine Sand	<5%	10YR 4/4	10YR 4/6	Concentrations	S2	Single grain	Structureless	Loose
				10YR 6/3	Depletions				

Comments: Root channels to about 3' (10YR6/3, not redox). Redox at 36".

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer/Inspector)	(Signature)	(License #)	(Date)





B5 - redox at 36” (right).

Soil Observation Log

Project ID: 11245PO v 04.07.2025

Client:	New Life Community Church	Location / Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033

Soil parent material(s): (Check all that apply) ☑ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter ☐ Disturbed/Fill

Landscape Position:	Back/Side Slope	Slope %:	4.0	Slope shape:	Linear, Linear
Flooding/Run-On potential:	No				
Vegetation:	Grass	Soil survey map units:	8B - Sparta Loamy Sand	Surface Elevation-Relative to benchmark:	879.39
Date/Time of Day/Weather Conditions:	11/11/2025	12:30PM	Sunny	Limiting Layer Elevation:	876.81
Observation #/Type/Location:	B6	See site map	Shovel and auger	Depth to Standing Water-inches:	-

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	I-------- Structure----------I Shape	Grade	Consistence
0-7	Fine Sand	<5%	10YR 3/2				Single grain	Structureless	Loose
7-16	Fine Sand	<5%	10YR 3/3				Single grain	Structureless	Loose
16-31	Fine Sand	<5%	10YR 4/3				Single grain	Structureless	Loose
31-37	Fine Sand	<5%	10YR 4/3	10YR 4/6 10YR 6/3	Concentrations Depletions	S2	Single grain	Structureless	Loose

Comments: Root channels to about 3' (10YR6/3, not redox). Redox at 31".

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer/Inspector)	(Signature)	(License #)	(Date)





B6 - redox at 31” (right)

Textures:	
C	Clay
SiC	Silty Clay
SC	Sandy Clay
CL	Clay Loam
SiCL	Silty Clay Loam
SCL	Sandy Clay Loam
Si	Silt
SiL	Silt Loam
L	Loam
SL	Sandy Loam*
LS	Loamy Sand*
S	Sand*

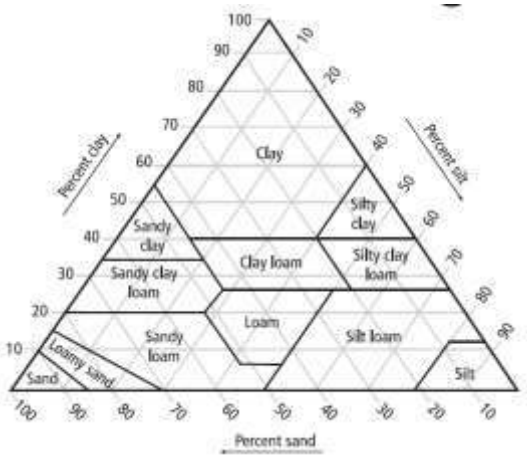
*Sand Modifiers:	
Co	Coarse
M	Medium
F	Fine
VF	Very Fine

Topsoil Indicator(s) of Saturation:

T1. Wetland Vegetation
T2. Depressional Landscape
T3. Organic texture or organic modifiers
T4. N 2.5/ 0 color
T5. Redox features in topsoil
T6. Hydric indicators

Subsoil Indicator(s) of Saturation:

S1. Depleted matrix (value >/=4 and chroma </=2)
S2. Distinct gray or red redox features (any Matrix Hue)
S3. Matrix Hue of 5Y with a chroma </= 3
S4. Matrix Hue of 7.5 YR or redder with faint redox concentrations or redox depletions



Shape:

Granular	The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots when soil is turned over.
Platy	The peds are flat and plate like. They are oriented horizontally and are usually overlapping. Platy structure is commonly found in forested areas just below the leaf litter or shallow topsoil.
Blocky	The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are castings of the faces of surrounding peds. Blocky structure is commonly found in the lower topsoil and subsoil.
Prismatic	Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically casts or molds of adjoining peds. Prismatic structure is commonly found in the lower subsoil.
Single Grain	The structure found in a sandy soil. The individual particles are not held together.

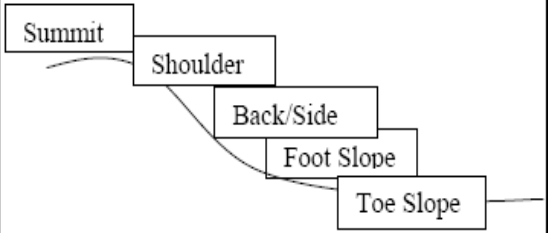
Grade:

Loose	No peds, sandy soil
Weak	Poorly formed, indistinct peds, barely observable in place
Moderate	Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed soil
Strong	Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed
Massive	No observable aggregates, or no orderly arrangement of natural lines of weakness

Consistence:

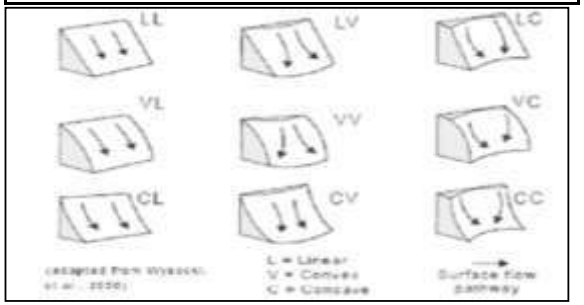
Loose	Intact specimen not available
Friable	Slight force between fingers
Firm	Moderate force between fingers
Extremely Firm	Moderate force between hands or slight foot pressure
Rigid	Foot pressure

Landscape Position:



Slope Shape:

Slope shape is described in two directions:
up and down slope (perpendicular to the contour),
and across slope (along the horizontal contour);
e.g. Linear, Convex or LV'.



ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

1. PROJECT INFORMATION

v 04.07.2025

Property Owner/Client:	New Life Community Church	Project ID:	11245PO
Site Address:	11245 Point Douglas Drive S, Cottage Grove, MN 55033	Date:	11/11/25
Email Address:	bcmyre@hotmail.com (Ben Myre)	Phone:	651-558-6433

2. DESIGN FLOW & WASTE STRENGTH

Design Flow: 591 GPD Anticipated Waste Type: Other Est. - At-Risk

BOD: 247 mg/L TSS: <60 mg/L Oil & Grease: <25 mg/L

Treatment Level: C ***Select Treatment Level C for residential septic tank effluent***

3. HOLDING TANK SIZING

Holding Tank Sizing: see 7080.2290

Code Minimum **Holding Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

Recommended **Holding Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

The holding tank(s) will be: _____ *Existing tank reuse requires a tank integrity assessment*

Type of High Level Alarm: _____

(Alarm Set @ 75% tank capacity measured from inlet to bottom)

Comments: _____

4. SEPTIC TANK SIZING

Sizing: See 7080.1930

A. Residential dwellings:

Number of Bedrooms (Residential): _____

Code Minimum **Septic Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

Recommended **Septic Tank** Capacity: _____ Gallons with _____ Tanks or Compartments

The septic tank(s) will be: _____ *Existing tank reuse requires a tank integrity assessment*

Comments: _____

Effluent Screen & Alarm (Y/N): _____ Model/Type: _____

B. Other Establishments:

Waste received by: Gravity 2460 GPD x 3 Days Hyd. Retention Time

7080 Minimum **Septic Tank** Capacity: 7380 Gallons with 1 Tanks or Compartments

Designed **Septic Tank** Capacity: 8400 Gallons with 2 Tanks or Compartments

The septic tank(s) will be: All New *Existing tank reuse requires a tank integrity assessment*

Comments: _____

Effluent Screen & Alarm (Y/N): Yes Model/Type: Polylok 525 (10,000 gpd rated)

*** Other Establishments Require Department of Labor and Industry Approval and Inspection for Building Sewer ***

ONSITE SEWAGE TREATMENT PROGRAM

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

5. PUMP TANK SIZING *Sizing: see 7080.2100*

Soil Treatment Dosing Tank				Other Component Dosing Tank:			
Pump Tank Capacity (7080 Minimum):	4200	Gal		Pump Tank Capacity (7080 Minimum):		Gal	
Pump Tank Capacity (Designed):	4200	Gal		Pump Tank Capacity (Designed):		Gal	
Pump Req:	59.0	GPM	Total Head: 48.7 ft	Pump Req:		GPM	Total Head: ft
Supply Pipe Dia.	2.00	in	Dose Vol: 135.0 gal	Supply Pipe Dia.		in	Dose Vol: Gal

*** Flow measurement device must be incorporated for any system with a pump ***

6. SYSTEM AND DISTRIBUTION TYPE

Project ID: 11245PO

Soil Treatment Type:	Mound	Distribution Type:	Pressure Distribution-Level
Elevation Benchmark:	877.69 ft	Benchmark Location:	Footing for NW corner of raised p
MPCA System Type:	Type I	Distribution Media:	Rock
Type III/IV/V Details:			

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (yes/no) No If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note:

	Depth		Depth		Elevation		
Limiting Condition:	30.0	inches	2.50	ft	877.65	ft	***Elevations are critical for system compliance.***
Minimum Req'd Separation:	36	inches	3.00	ft			Mound Minimum Sand Depth: 12 inches

Designed Distribution Media Bottom Elevation*: 881.22 ft Designed Separation: 42.8 inches

*This is the minimum elevation of the bottom of the distribution media for required separation related to the established benchmark

A. Soil Texture:	Fine Sand		
B. Soil Hyd. Loading Rate:	0.60 GPD/ft^2	C: Percolation Rate:	MPI
D. Contour Loading Rate:	10.0	Note:	
E. Measured Land Slope:	4.0 %	Note:	
Comments:			

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	sq.ft	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Minimum Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	sq.ft	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Design Summary Page

Project ID: 11245PO

Mound:

Dispersal Area	1000.0	sq.ft	Media Length	100.0	ft	Media Width	10.0	ft
Absorption Width	20.0	ft	Clean Sand Lift	1.0	ft	Berm Width (0-1%)		ft
Upslope Berm Width	9.8	ft	Downslope Berm	15.4	ft	Endslope Berm Width	12.9	ft
Total System Length	125.8	ft	System Width	35.1	ft	Contour Loading Rate	10.0	gal/ft

At-Grade:

Dispersal Area		sq.ft	Bed Length		ft	Bed Width		ft
Upslope Berm		ft	Downslope Berm		ft	Finished Height		ft
System Length		ft	Endslope Berm		ft	System Width		ft

Level & Equal Pressure Distribution Soil Treatment Area

No. of Laterals	3		Lateral Diameter	1.50	in	Lateral Spacing	3.0	ft
Perforation Spacing	3.0	ft	Perforation Diameter	3/16	in	Drainback Volume	42.5	gal
Min Dose Volume	129.4	gal	Max Dose Volume	147.8	gal	Total Dosing Volume	177.5	gal

Non-Level and Unequal Pressure Distribution Soil Treatment Area

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perf Size (in)	Spacing (ft)	Spacing (in)
Lateral 1							
Lateral 2							
Lateral 3							
Lateral 4							
Lateral 5							
Lateral 6							

Minimum Dose Volume: gal

Maximum Dose Volume: gal

Total Dosing Volume: gal

9. Organic Loading and Additional Info for HSW or Type IV/V Design - See Organic Loading tab

Organic Loading to Soil Treatment (Based on Waste Strength Data and Organic Loading Design)

A. Organic Loading Based on: BOD **B.** Minimum required area 875.0 sq.ft

Technology Strength Reduction (Treatment Level or HSW)

A. Starting Waste Strength: Treatment designed to meet:

Pretreatment Technology: *Must Meet or Exceed Target Level

Model: Units:

Disinfection Technology: *Required for Levels A & B

Model: Units:

10. Comments/Special Design Considerations:

Please read site/soil narrative for detailed discussion of site and proposed system. Dual alternating pumps center feeding a 100' x 10' rockbed mound with 12" sand lift and 1.5" laterals with 3/16" perfs. Must center feed.

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Alex Pepin		4082	11/11/2025
(Designer)	(Signature)	(License #)	(Date)

Mound Design Worksheet
≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: 11245PO v 04.07.2025

A. Design Flow:	591	GPD
B. Soil Loading Rate:	0.60	GPD/sqft
C. Depth to Limiting Condition	2.5	ft
D. Percent Land Slope:	4.0	%
E. Media (Sand) Loading Rate:	1.0	GPD/sqft
F. Mound Absorption Ratio:	2.00	

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio		Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

TABLE IXa
LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C: Absorption Area Loading Rate (gpd/ft²)	Treatment Level C: Mound Absorption Ratio	Treatment Level A, A-2, B: Absorption Area Loading Rate (gpd/ft²)	Treatment Level A, A-2, B: Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Hydraulic Absorption Required Bottom Area: Design Flow (1A) ÷ Design Media Loading Rate(1E)

591 GPD ÷ 1.00 GPD/sqft = 591.0 sq.ft

Optional Upsizing of Dispersal Media Area

B. Larger Area Size or Organic Sizing of Area (see organic loading sheet - 2G) 1000.0 sq.ft

C. Designed Dispersal Media Area: 1000.0 sq.ft *Larger of 2A or 2B*

D. Enter Dispersal Bed Width: 10.0 ft *Can not exceed 10 feet*

E. Calculate Contour Loading Rate: Bed Width(2D) X Design Media Loading Rate(1E)

10.0 ft X 1.0 GPD/sqft = 10.0 gal/ft *Can not exceed Table 1*

F. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area(2C) ÷ Bed Width(2D)

1000 sqft ÷ 10.0 ft = 100.0 ft

If a longer dispersal media is desired, enter Length(ft): ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width(2D) X Mound Absorption Ratio(1F)

10.0 ft X 2.0 = 20.0 ft

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

Calculate Downslope Absorption Width: Absorption Width(3A) - Bed Width(2D)

20.0 ft - 10.0 ft = 10.0 ft

4. DISTRIBUTION MEDIA:

Project ID: 11245PO

Select Dispersal Media: Rock *Enter Either 4A or 4B*

A. Rock Depth Below Distribution Pipe

6 in

B. Registered Media

Registered Media Depth in

Check registered product information for specific application details and design

Specific Media Comments:

5. MOUND SIZING

Project ID: 11245PO

A. Clean Sand Lift: Required Separation - Depth to Limiting Condition = Clean Sand Lift (1 ft minimum)

3.00 ft - 2.50 ft = 1.00 ft Design Sand Lift (optional): ft

B. Upslope Height = Clean Sand Lift(5A) + Depth of Media(4AorB) + Depth to Cover Pipe(0.33ft) + Depth of Cover (1 ft)

1.00 ft + 0.50 ft + 0.33 ft + 1.00 ft = 2.83 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio	3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
	4:1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70

C. Select Upslope Berm Multiplier (based on land slope): 3.45

D. Calculate Upslope Berm Width: Multiplier (5C) X Upslope Mound Height (5B)

3.45 X 2.83 ft = 9.76 ft

E. Calculate Drop in Elevation Under Bed: Bed Width(2D) X Land Slope(1D) ÷ 100 = Drop (ft)

10.00 ft X 4.0 % ÷ 100 = 0.40 ft

F. Calculate Downslope Mound Height: Upslope Height(5B) + Drop in Elevation(5E)

2.83 ft + 0.40 ft = 3.23 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio	3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
	4:1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69

G. Select Downslope Berm Multiplier (based on land slope): 4.76

H. Calculate Downslope Berm Width: Downslope Multiplier(5G) X Downslope Height (5F)

4.76 x 3.23 ft = 15.35 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width(3B) + 4 feet

10.00 ft + 4.00 ft = 14.00 ft

J. Design Downslope Berm = greater of 5H and 5I: 15.35 ft

K. Select Endslope Berm Multiplier: 4.0 *(usually 3.0 or 4.0)*

L. Calculate Endslope Berm Width = Endslope Berm Multiplier(5K) X Downslope Mound Height(5F)

4.00 X 3.2 ft = 12.90 ft

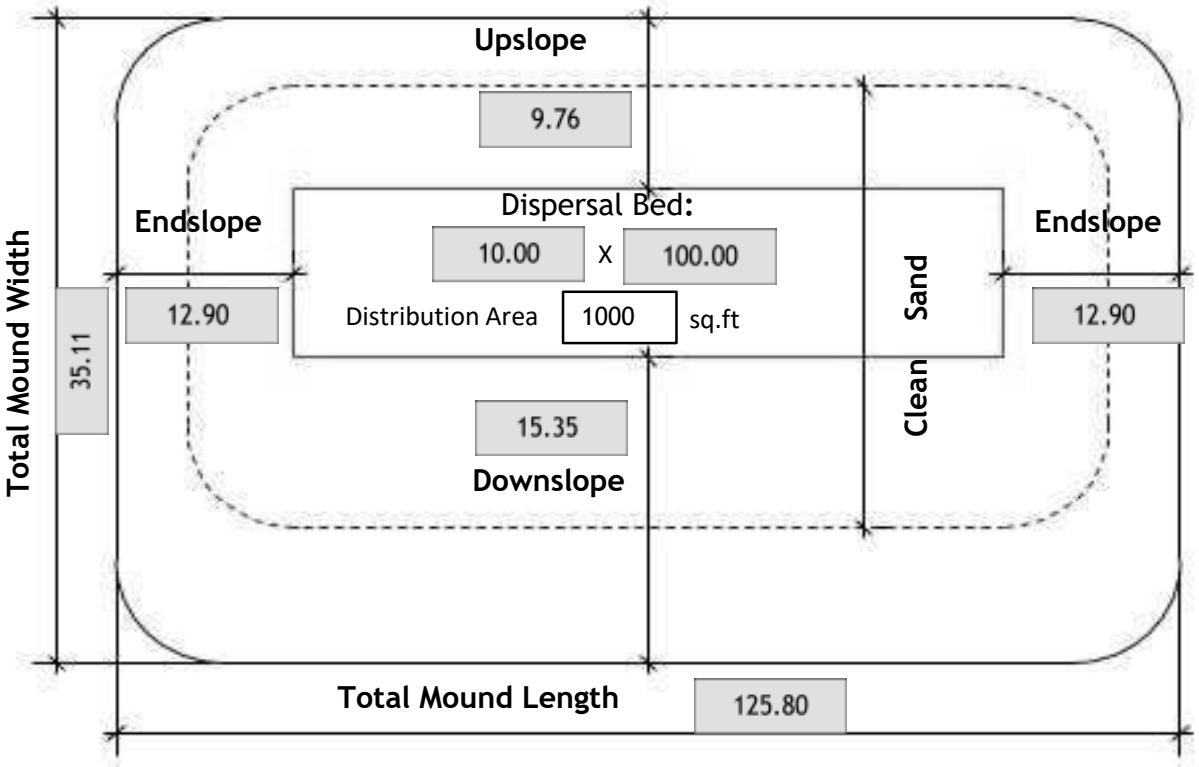
M. Calculate Mound Width: Upslope Berm Width(5D) + Bed Width(2D) + Downslope Berm Width(5J)

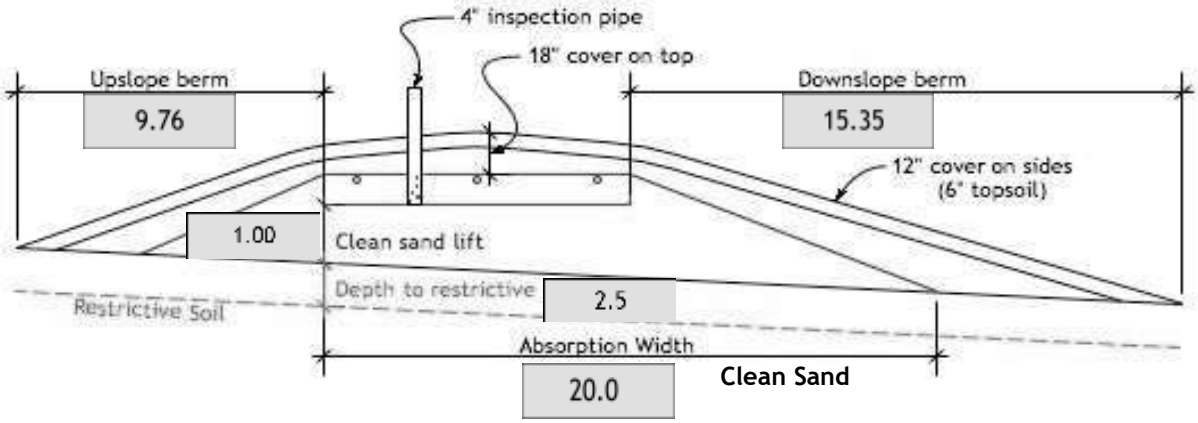
9.76 ft + 10.00 ft + 15.35 ft = 35.11 ft

N. Calculate Mound Length: Endslope Berm Width (5L) + Bed Length(2F) + Endslope Berm Width(5L)

12.90 ft + 100.00 ft + 12.90 ft = 125.80 ft

6. MOUND DIMENSIONS (Feet) Project ID: 11245PO





Elevation to Benchmark

Required Separation: 36.0 (in) Elevation Limiting Layer: 877.65 ft

Distribution Media: Rock Elevation required Separation: 880.65 ft

Media Depth *Below Pipe* 6 (in) Elevation Distribution Media Bottom: 881.22 ft

Manifold Connection: Center Lateral Pipe Diameter: 1.50 (in)

Perforation Size: 3/16 (in) Perforation Spacing: 36.0 (in)

If Split and Non-Level Pressure Distribution Used: See Non-Level Pressure Distribution Form

Comments:

Installer to verify material volumes on the following page

Estimated Mound Materials Worksheet

Mound to be constructed to dimensions in design. This is an estimate of materials needed.
Individual construction practices may vary quantities.

Project ID: 11245PO v 04.07.2025

A. Rock *Volume*: (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch)*) X *Bed Length* X *Bed Width* = *Volume*

(6 in + 5.0 in) ÷ 12 X 100.0 ft X 10.0 ft = 916.7 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 916.7 cu.ft ÷ 27 = 34.0 cu.yd

Add 30% for constructability: 34.0 cu.yd X 1.3 = 44.1 cu.yd

B. Calculate *Clean Sand Volume:*

Volume Under Rock bed: *Average Sand Depth* x *Media Width* x *Media Length* = cubic feet

1.2 ft X 10.0 ft X 100 ft = 1198 cu.ft

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

ft - 1) X X ft =

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

ft - 1) X X ft =

Total Clean Sand Volume: *Volume from Length + Volume from Width + Volume Under Media*

cu.ft + cu.ft + cu.ft = cu.ft

For a Mound on a slope greater than 1%

Upslope Volume: ((*Upslope Mound Height - 1*) x 3 x *Bed Length*) ÷ 2 = cubic feet

((2.8 ft - 1) X 3.0 ft X 100.0) ÷ 2 = 274.5 cu.ft

Downslope Volume: ((*Downslope Height - 1)* x Downslope Absorption Width x *Media Length*) ÷ 2 = cubic feet

((3.2 ft - 1) X 10.0 ft X 100.0) ÷ 2 = 1112.5 cu.ft

Endslope Volume: (*Downslope Mound Height - 1)* x 3 x *Media Width* = cubic feet

(3.2 ft - 1) X 3.0 ft X 10.0 ft = 66.8 cu.ft

Total Clean Sand Volume: *Upslope Volume + Downslope Volume + Endslope Volume + Volume Under Media*

274.5 cu.ft + 1112.5 cu.ft + 66.8 cu.ft + 1197.5 cu.ft = 2651.3 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 2651.3 cu.ft ÷ 27 = 98.2 cu.yd

Add 30% for constructability: 98.2 cu.yd X 1.3 = 127.7 cu.yd

C. Calculate *Sandy Berm Volume:*

Total Berm Volume (approx.): ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2

(3.0 - 0.5)ft X 35.1 ft X 125.8) ÷ 2 = 5582.5 cu.ft

Total Mound Volume - Clean Sand volume -Rock Volume = cubic feet

5582.5 cu.ft - 2651.3 cu.ft - 916.7 cu.ft = 2014.6 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 2014.6 cu.ft ÷ 27 = 74.6 cu.yd

Add 30% for constructability: 74.6 yd^3 x 1.3 = 97.0 cu.yd

D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

35.1 ft X 125.8 ft X 0.5 ft = 2208.7 cu.ft

Divide cu.ft by 27 cu.ft/cu.yd to calculate cubic yards: 2208.7 cu.ft ÷ 27 = 81.8 cu.yd

Add 30% for constructability: 81.8 cu.yd X 1.3 = 106.3 cu.yd

ONSITE SEWAGE TREATMENT PROGRAM

Pressure Distribution Design Worksheet

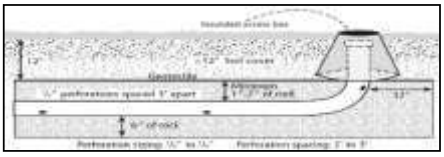
MINNESOTA POLLUTION CONTROL AGENCY

Project ID: 11245PO v 04.07.2025

1. Media Bed Width: 10.0 ft
2. Media Bed Length: 100.0 ft
3. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width(1.) - 4) ÷ 3] + 1.

   [(10 - 4) ÷ 3] + 1 = 3 laterals *Does not apply to at-grades*
4. Designer Selected *Number of Laterals*: 3 laterals

   Cannot be less than line 2 (Except in at-grades)



5. Lateral spacing in Bed; *Must be greater than 1 foot and no more than 3 feet*: 3.00 ft
6. *Length of Laterals* = Media Bed Length(2.) - 2 Feet.

   100.0 - 2ft = 98.0 ft *Perforation can not be closer then 1 foot from edge.*
7. Select *Perforation Spacing*: 3.0 ft
8. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals(6.)* by the *Perforation Spacing* (7.) and round down to the nearest whole number.

   Number of Perforation Spaces = 98.0 ft ÷ 3.0 ft = 32 Spaces
9. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces(8.)*. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

   Perforations Per Lateral = 32 Spaces + 1 = 33 Perfs. Per Lateral
10. Select *Perforation Diameter Size:* 3/16 in 0.1875
11. *Select Lateral Diameter (See Table)*: 1.50 in
12. Select *Manifold Connection* (End or Center): Center

If Center Manifold Connection the max number of perfs per lateral in the table can be doubled.

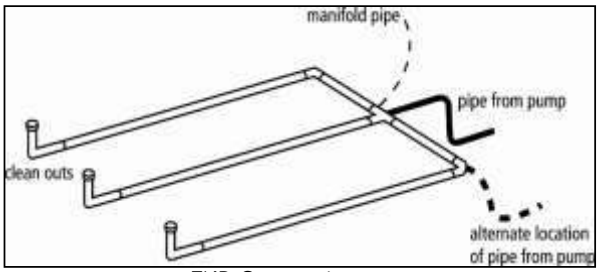
Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

¼ Inch Perforations						7/32 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3		1	1¼	1½	2	3
2	10	13	18	30	60	2	11	16	21	34	68
2½	8	12	16	28	54	2½	10	14	20	32	64
3	8	12	16	25	52	3	9	14	19	30	60
3/16 Inch Perforations						1/8 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3		1	1¼	1½	2	3
2	12	18	26	46	87	2	21	33	44	74	149
2½	12	17	24	40	80	2½	20	30	41	69	135
3	12	16	22	37	75	3	20	29	38	64	128

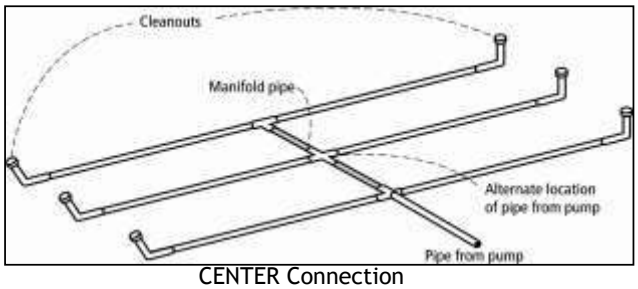
Pressure Distribution Design Worksheet

ONSITE SEWAGE TREATMENT PROGRAM

MINNESOTA POLLUTION CONTROL AGENCY



END Connection



CENTER Connection

Perf Per Lateral: 33

Perf Per Lateral Equal Split: 17 | 16

OPTIONAL Perf Per Lateral Non-Equal Split*: ____ | ____

* must not exceed maximum number perfs per lateral in table

End Feed Lateral Min Diameter: ____

Center Feed Lateral Min Diameter: ____

13. *Total Number of Perforations* equals the *Number of Perforations per Lateral (9.)* multiplied by the *Number of Perforated Laterals.(4.)*

33 Perf. Per Lat. X 3 Number of Perf. Lat. = 99 Total Number of Perf.

14. Calculate the *Square Feet per Perforation.*

Recommended value is 4-11 ft2 per perforation, Does not apply to At-Grades

a. *Bed Area* = Bed Width (ft)(1.) X Bed Length (ft)(2.)

10.00 ft X 100.00 ft = 1000 sq.ft

b. *Square Foot per Perforation* = *Bed Area (14a)* ÷ by *Total Number of Perfs (13)*

1000 sqft ÷ 99 perf = 10 sq.ft/perf

15. Select *Minimum Average Head*: 2.0 ft

16. Select *Perforation Discharge* based on Table: 0.59 GPM per Perf

17. *Flow Rate = Total Number of Perfs(13.) X Perforation Discharge(16.)*

99 Perfs X 0.59 GPM per Perforation = 59.0 GPM

18. *Volume of Liquid Per Foot of Distribution Piping (Table II)*: 0.110 Gallons/ft

19. *Volume of Distribution Piping = Number of Perforated Laterals(4.) X Length of Laterals(6.) X Volume of Liquid Per Foot of Distribution Piping (18.)*

3 X 98.0 ft X 0.110 gal/ft = 32.3 Gallons

20. Minimum Delivered Volume = Volume of Distribution Piping (19.) X 4

32.3 gal X 4 = 129.4 Gallons

21. Maximum Delivered Volume = Design flow x 25%

591 gpd X 25% = 147.8 Gallons

22. Minimum Delivered vs Maximum Delivered evaluation: Volume ratio correct

Perforation Discharge (GPM)				
Head (ft)	Perforation Diameter			
	1/8	3/16	7/32	1/4
1.0[4]	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0[5]	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0[5]	0.41	0.93	1.26	1.65
1 foot	Dwellings with 3/16 inch to 1/4 inch perforations			
2 feet	Dwellings with 1/8 inch perforations			
	Other establishments and MSTS with 3/16 inch to 1/4 inch perforations			
5 feet	Other establishments and MSTS with 1/8 inch perforations			

Table II Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

Comments/Special Design Considerations:

Basic STA Pump Selection Design Worksheet

ONSITE SEWAGE TREATMENT PROGRAM

MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY Project ID: 11245PO v 04.07.2025

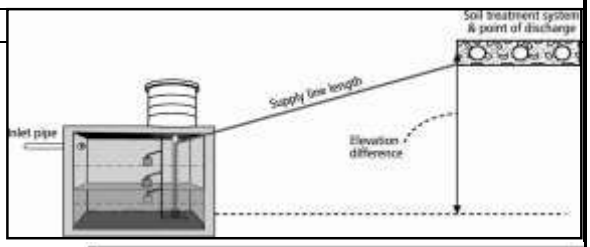
Pumping to Gravity or Pressure Distribution: Pressure

A. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*

B. If pumping to a pressurized distribution system: 59.0 GPM

C. Enter pump description: Equalization/Time Dosing

2. HEAD REQUIREMENTS



A. Elevation Difference between pump and point of discharge: 16.8 ft

B. Distribution Head Loss: 6 ft

C. Additional Head Loss*: _____ ft (due to special equipment, etc.)

*** Common additional head loss: gate valve = 1 ft each, globe valve = 1.5 ft each, splitter valve = see manufacturers details**

Distribution Head Loss	
Gravity Distribution = 0ft	
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:	
Minimum Average Head	**Distribution Head Loss**
1ft	5ft
2ft	6ft
5ft	10ft

Table I. Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 250 ft

E. **Friction Loss in Plastic Pipe per 100ft** from Table I:

Friction Loss = 8.3 ft per 100ft of pipe

F. Determine *Equivalent Pipe Length* from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss.
Supply Pipe Length X 1.25 = *Equivalent Pipe Length*

250 ft X 1.25 = 312.5 ft

G. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft(E.)* by the *Equivalent Pipe Length(F.)* and divide by 100.

Supply Friction Loss =

8.3 ft per 100ft X 312.5 ft ÷ 100 = 25.9 ft

H. *Total Head* requirement is the sum of the *Elevation Difference(2A)* + Distribution Head Loss(2B) + Additional Head Loss(2C) + Supply Friction Loss(2G)

17 ft + 6.0 ft + _____ ft + 25.9 ft = 48.7 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **59.0** GPM with at least **48.7** feet of total head.

Comments:

Goulds WE15H pump. Estimated operating point for time dosing 67 gpm.

STA Dosing Pump Tank Design Worksheet (Time Dose)

MINNESOTA POLLUTION CONTROL AGENCY

Project ID: 11245PO v 04.07.2025

DETERMINE TANK CAPACITY AND DIMENSIONS

1. A. Design Flow: 591 GPD B. Tank Use: **Dosing**

   C. Percentage of Design Flow 70 % 414 Gal Up to 75% design flow is normal for Design percentage

   D. Code minimum pump tank capacity: 4200 Gal E. Recommended capacity: 4200 Gal

2. A. Tank Manufacturer: Wieser B. Tank Model: W4200

   C. Capacity from manufacturer: 4200 Gallons

   D. Liquid depth of tank from manufacturer: 72.0 inches

   E. Gallons per inch: 58.9 Gallons per inch

Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.

DETERMINE DOSING VOLUME

3. *Volume to Cover Pump* (The inlet of pump should be 4 inches from the bottom of the tank & 2 inches covering the pump recommended)

   (Pump and block height + 2 inches) X *Gallons Per Inch* (2E)

   (16 in + 2 inches) X 58.9 Gallons Per Inch = 1059.3 Gallons

4. *Minimum Delivered Volume* = 4 X Volume of Distribution Piping:

   -Item 19 of the Pressure Distribution or Item 11 of Non-level 129.4 Gallons (minimum dose) 2.20 inches/dose

5. Calculate *Maximum Pumpout Volume* (25% of Design Flow)

   Design Flow: 591 GPD X 0.25 = 147.8 Gallons (maximum dose) 2.51 inches/dose

6. *Select a pumpout volume that meets both Minimum and Maximum:* 135.0 Gallons

7. Calculate *Doses Per Day* = Percentage Design Flow(1C) ÷ *Delivered Volume(6.)*

   414 gpd ÷ 135.0 gal = 3.1 *Doses*

8. Calculate Drainback:

   A. *Diameter of Supply Pipe* = 2 inches

   B. Length of Supply Pipe = 250 feet

   C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.170 Gallons/ft

   D. *Drainback = Length of Supply Pipe(8B)* X *Volume of Liquid Per Lineal Foot of Pipe(8C)*

   250 ft X 0.170 gal/ft = 42.5 Gallons

9. *Total Dosing Volume = Delivered Volume(6.) + Drainback(8D)*

   135.0 gal + 42.5 gal = 177.5 Gallons

10. Working Storage Volume = Tank Volume (2C) - Volume to Cover Pump(3.) - Reserve Capacity (22.)

    4200.0 gal - 1059.3 gal - 423.7 = 2717.0 Gallons

Volume of Liquid in Pipe	
Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

STA Dosing Pump Tank Design Worksheet (Time Dose)

ONSITE SEWAGE TREATMENT PROGRAM

MINNESOTA POLLUTION CONTROL AGENCY

11. Required *Flow Rate* :

A. From Pump Curve - **Must verify after Install**: 67 GPM*

B. Calculated GPM = Change in Depth (in) x Gallons Per Inch(2E) / Time Interval in Minutes

[ ] in X 58.9 gal/in ÷ [ ] min = [ ] GPM

Note: This value must be adjusted after installation based on pump calibration.

12. Select Flow Rate from 11 A or B: 67.0 GPM*

NORMAL OPERATION TIMER SETTINGS*

13. Calculate **TIMER ON** setting*:

Total Dosing Volume(9.) ÷ GPM(12.)

178 gal ÷ 67.0 gpm = 2.6 Minutes **ON*** | HR 0 | MIN 2.0 | SEC 38 | **ON Time**

14. Calculated **TIMER OFF** setting*:

Minutes Per Day (1440)/*Doses Per Day(7.)* - Minutes On(13.)

1440 min ÷ 3 doses/day - 2.6 min = 467.3 Minutes **OFF*** | HR 7 | MIN 47.0 | SEC 15 | **OFF Time**

OPTIONAL PEAK ENABLE DOSING* - *Designers option for peak flow operation*

15. Peak Percentage of Design Flow [ ] %

16. Peak Pump Volume that meets both Minimum and Maximum Volume [ ] gal + Drainback 42.5 gal

17. Peak Dose Volume [ ] gal

18. Peak TIMER ON [ ] gal ÷ [ ] gpm = [ ] min ON | HR [ ] MIN [ ] SEC [ ] Peak ON

**Note: This value must be adjusted after installation based on pump calibration.*

19. Peak TIMER OFF:1440 min ÷ [ ] doses/day - [ ] min On [ ] min Off | HR [ ] MIN [ ] SEC [ ] Peak OFF

FLOAT SETTINGS **Alarm and Pump are to be wired on separate circuits and inspected by the electrical inspector**

20. Pump Off Float - Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump(3.) ÷ Gallons Per Inch(2E):

1059 gal ÷ 58.9 gal/in = 18.0 inches

Alarm Depth 64.8 in

21. Alarm Float - Measuring from bottom of tank (90% recommended):

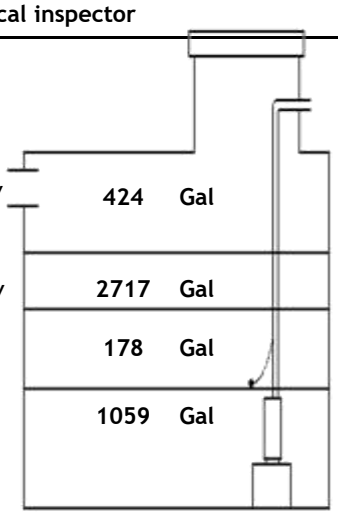
Distance to set Alarm Float = Tank Depth(2D) X % of Tank Depth (90% recommended)

72.0 in X 90 % = 64.8 inches

Pump Off 18.0 in

22. Reserve Capacity in gallons = Tank Depth(2D) - Alarm Depth(21.) X Gallons Per Inch(2E)

(72.0 in - 64.8 in) X 58.9 = 423.7 gallons



Tank Buoyancy Worksheet

1. Tank Specifications Project ID: 11245PO v 04.07.2025

A. Tank Manufacturer: Wieser Tank Model: W4200

B. Outside Tank Dimensions and Specifications: Tank Use:

Length: 164 in Width: 96 in Height: 98.5 in Diameter: in

Length: 13.7 ft Width: 8.0 ft Height: 8.2 ft Radius of Tank: in

2. Outside Volume of Tank

Rectangular Tank	Circular Tank
A. Area of Tank = Length (ft) X Width (ft)	A. Area of Tank = πr^2 = (3.14 X (Radius of Tank)^2)
13.7 ft X 8.0 ft = 109.3 sq.ft	3.14 X ( ) ft)^2 = sq.ft
B. Volume of Tank = Area of Tank (2.A) X Height (ft)	B. Volume of Tank = Area of Tank X Height (ft)
109.3 sq.ft X 8.2 ft = 897.4 cu.ft	sq.ft X ft = cu.ft

3. Force of Tank Weight (F_{TW})

Weight of Tank (provided by manufacturer) 26400 lbs

4. Force of Soil Weight Over Tank (F_{SW})

A. Depth of Cover Over Tank: 37.5 in 3.1 ft

B. Weight of Soil Per Cubic Foot: 120 lbs/cu.ft

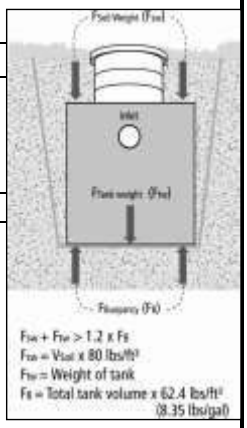
C. Volume of Soil Over Tank = Depth of Cover(4A) (ft) X Area of Tank(2A) (ft^2)

3.1 ft X 109.3 sq.ft = 341.7 cu.ft

D. Weight of Soil Over Tank = Volume of Soil Over Tank(4C) X Weight of Soil Per Cubic Foot

341.7 cu.ft X 120 lbs/cu.ft = 41,000.0 lbs *Note: Assumes saturation does not get over the lid of the tank*

Soil Type	Weight of Soil (lbs/ft^3)
Sandy	120
Loamy	100
Clay	90



5.Buoyant Force (F_B)

Buoyant Force (F_B) = Outside Volume of Tank(2B) X Weight of Water Per Cubic Foot (62.4 lbs/ft^3) X 1.2 (Safety Factor)

897 X 62.4 lbs/cu.ft X 1.2 = 67,200.6 lbs

6. Evaluation of Net Forces

A. Downward Force = Force of Tank Weight (F_{TW})(3.) + Force of Soil Weight of Soil (F_{SW})(4D.)

26400 lbs + 41000 lbs = 67,400.0 lbs

B. Net Difference = Downward Force(6A) - Buoyant Force Including Safety Factor (5.)

67400 lbs - 67201 lbs = 199.4 lbs

If the Net Difference is negative, counter measures will need to be taken to prevent the tank from floating out of the ground.

C. Feet of soil as counter measure = Net difference (6B)(if negative)(as absolute number) ÷ Weight of Soil ÷ Area of Tank (2A)

0 lbs ÷ 120 lbs/ft^3 ÷ 109.3 (ft^2) = 0.0 ft of Soil Needed (minimum)

Comments/Solution:

As designed all tanks over 37.5" to top of tank, no buoyancy issues. If shallower contact tank manufacturer for buoyancy countermeasures.

Organic Loading Considerations

Project ID: 11245PO v 04.07.2025

Property Address: New Life Community Church

Date Completed: 11/11/2025

1. DESIGN FLOW & WASTE STRENGTH SAMPLING

Attach waste strength sampling data/estimated strength for Other Establishments

A. Design Flow: 591 GPD B. Measured Flow: GPD or Anticipated Flow: 413.7 GPD

C. BOD 241 mg/L D. TSS 60 mg/L E. Oil & Grease 25 mg/L F. CBOD5 mg/L

G. SQ feet STA in Design: 1000.0 sq.ft Anticipated Waste Type: Other Est. - At-Risk

2. ORGANIC LOADING TO SOIL TREATMENT

A. Soil Texture: Medium Sand

B. Sustainable Organic Loading Rate : *See table 5.1 for organic loading values of soil /media interface*

BOD5 0.001191 lbs/sq.ft/day TSS 0.000420 lbs/sq.ft/day

FOG 0.000175 lbs/sq.ft/day CBOD5 lbs/sq.ft/day

C. BOD LOADING #### N/A *Enter measured or anticipated flow above for calculations*

1. BOD5 Loading = Flow (1A or B) gpm X 0.7 X BOD Concentration mg/L (1C) X 8.35 ÷ 1,000,000

414 gpd X 241 mg/L X 8.35 ÷ 1,000,000 = 0.83251 lbs. BOD/day (Organic Loading Design)

2. Organic Loading to Soil Treatment Area:

241 mg/L X 414 gpd X 0.7 X 8.35 ÷ 1,000,000 ÷ 1000.0 sq.ft = 0.000583 lbs./day/sqft

3. Organic Sized Absorption Bed Area = Organic Loading lbs BOD (2C1) ÷ Organic Soil Loading Rate (2B)

0.83251 lbs BOD ÷ 0.001191 lbs BOD/sq.ft = 699.0 sq.ft

D. TSS LOADING #### N/A

1. Starting TSS Concentration = Flow (1A or B) gpm X 0.7 X Starting TSS (1D) mg/L X 8.35 ÷ 1,000,000

414 gpd X 60 mg/L X 8.35 ÷ 1,000,000 = 0.20726 lbs. TSS/day (Organic Loading Design)

2. Organic Loading to Soil Treatment Area:

60 mg/L X 414 gpd X 0.7 X 8.35 ÷ 1,000,000 ÷ 1000.0 sq.ft = 0.000145 lbs./day/sqft

3. Organic Sized Absorption Bed Area = Organic Loading lbs TSS (2D1) ÷ Organic Soil Loading Rate (2B)

0.20726 lbs TSS ÷ 0.000420 lbs TSS/sq.ft = 493.5 sq.ft

E. FOG LOADING #### N/A

1. Starting FOG Concentration = Flow (1A or B) X 0.7 X Starting FOG (mg/L) X 8.34 ÷ 1,000,000

414 gpd X 25 mg/L X 8.35 ÷ 1,000,000 = 0.08636 lbs. FOG/day (Organic Loading Design)

2. Organic Loading to Soil Treatment Area:

25 mg/L X 414 gpd X 0.7 X 8.35 ÷ 1,000,000 ÷ 1000.0 sq.ft = 0.000060 lbs./day/sqft

3. Organic Sized Absorption Bed Area = Organic Loading lbs FOG (2E1) ÷ Organic Soil Loading Rate (2B)

0.08636 lbs FOG ÷ 0.000175 lbs FOG/sq.ft = 493.5 sq.ft

F. CBOD LOADING #### N/A

1. Starting CBOD5 Concentration =Flow (1A or B) X 0.7 X Starting CBOD (mg/L) X 8.34 ÷ 1,000,000

gpd X mg/L X 8.35 ÷ 1,000,000 = lbs. CBOD/day (Organic Loading Design)

2. Organic Loading to Soil Treatment Area:

mg/L X gpd X 0.7 X 8.35 ÷ 1,000,000 ÷ sq.ft = lbs./day/sqft

3. Organic Sized Absorption Bed Area = Organic Loading lbs CBOD (2F1) ÷ Organic Soil Loading Rate (2B)

lbs CBOD ÷ lbs CBOD/sq.ft = sq.ft

G. ORGANIC LOADING ABSORBTION BED AREA Largest Bed Absorption Area: BOD, TSS, FOG, CBOD 699.0 sq.ft

Flow Equalization Tank Worksheet To STA

Project ID: v 04.07.2025

1. Enter the peak 7 days measured or estimated flow:

#	Daily Flow Volume*(gal)	Time Dose Volume (gal)	Surge Volume (gal)
1	**2460**	591	1869
2	**860**	591	2137
3	**460**	591	2006
4	**120**	591	1534
5	**120**	591	1063
6	**120**	591	591
7	**0**	591	0

**Start with Highest daily flow value*

Total Weekly Flow: 4140 gal (Sum of Daily Flow 1-7)

Peak Daily Flow: 2460 gal (Max of Daily Flow 1-7)

Average Daily Value: 591 gal (Ave of Daily Flow 1-7)

Peak to Average Flow: 4.2

Maximum Surge Volume: 2137 gal (Max of Surge Vol 1-7)

Maximum Surge Volume + Average Daily Volume: 2729 gal

2. Choose peaking factor: 15 %

Surge + Peaking Factor: 3138 gal

3. Enter gallons to cover pump: 1059 gal (From Pump Tank STA Time)

Minimum flow equalization tank volume: 4197 gal

Minimum Design Flow for soil dispersal system: 845 gpd

Minimum Design flow based on 70% use from time dose volume

Comments:

ONSITE SEWAGE TREATMENT PROGRAM

Flow Estimation: Other Establishments

MINNESOTA POLLUTION CONTROL AGENCY

v 04.07.2025

Establishment	*7081* Specified Type of Establishment	Unit	# of Units	Design Flow per Unit (See Table I)	Total Avg Daily Flow
1	Church	Seat	600	4.00	2400
2	Employee	Person	4	15.00	60
3	Sunday				
4					
5					
				Total Flow 7081 Establishments (gpd)	2460

Establishment	*NON 7081* Specified Type of Establishment	Unit	# of Units	Design Flow per Unit	Total Avg Daily Flow
6	Church	Seat	200	4.00	800
7	Employee	Person	4	15.00	60
8	Wednesday				
9					
10					
				Total Flow Non-7081 Establishments (gpd)	860.00
				Safety Factor (gpd)	
				Total Flow 7081 and Non 7081 Establishments (gpd)	

ONSITE SEWAGE TREATMENT PROGRAM

Flow Estimation: Other Establishments

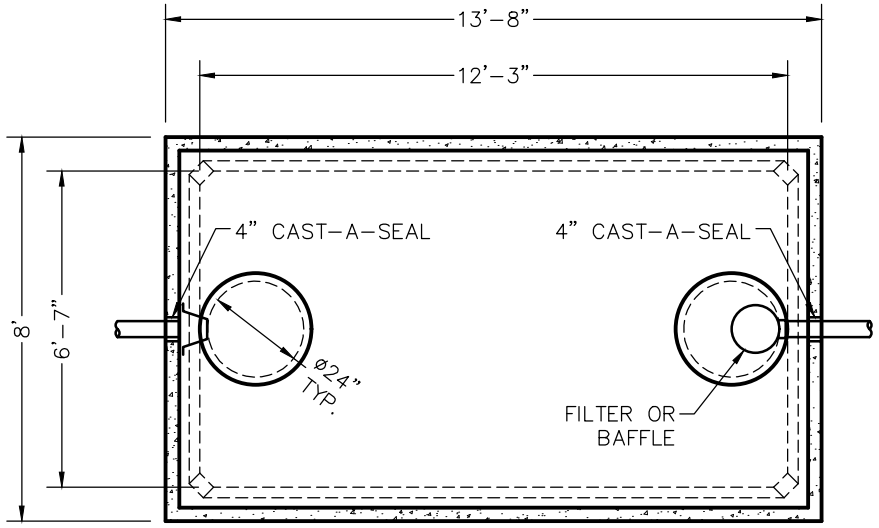
MINNESOTA POLLUTION CONTROL AGENCY

v 04.07.2025

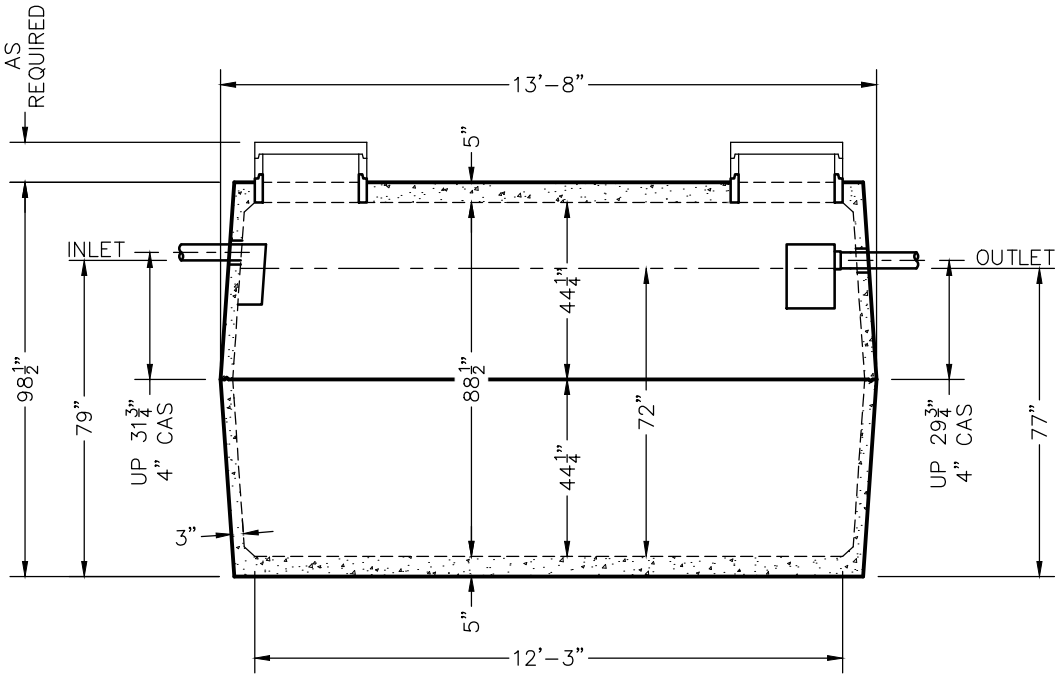
Establishment	*7081* Specified Type of Establishment	Unit	# of Units	Design Flow per Unit (See Table I)	Total Avg Daily Flow
1	Church	Seat	100	4.00	400
2	Employee	Person	4	15.00	60
3	Thursday				
4					
5					
				Total Flow 7081 Establishments (gpd)	460

Establishment	*NON 7081* Specified Type of Establishment	Unit	# of Units	Design Flow per Unit	Total Avg Daily Flow
6	Church	Seat	15	4.00	60
7	Employee	Person	4	15.00	60
8	Tues, Fri and Sat				
9					
10					
				Total Flow Non-7081 Establishments (gpd)	120.00
				Safety Factor (gpd)	
				Total Flow 7081 and Non 7081 Establishments (gpd)	

W4200
TANK SPECIFICATIONS



TOP VIEW



SIDE VIEW

DIMENSIONS:
- WALL: 3"
- BOTTOM: 5"
- COVER: 5"
- MANHOLE: 24" I.D. PRECAST CONCRETE RISER
- HEIGHT: 98 1/2"
- LENGTH: 13'-8"
- WIDTH: 8'-0"
- BELOW INLET: 79"
- LIQUID LEVEL: 72"
- WEIGHT: 13,200 LBS. PER SECTION

INLET AND OUTLET:
- 4" CAST-A-SEAL BOOT OR EQUAL GASKET

INLET AND OUTLET BAFFLE AND FILTER:
- WISCONSIN, SEE DETAIL #10
- (OTHER STATES SEE CHART)

LIQUID CAPACITY: 58.85 GAL/IN

HOLDING TANK:
- OUTLET HOLE PLUGGED
- ACTUAL CAPACITY: 4,355 GALLONS

LOADING DESIGN: 8'-0" UNSATURATED SOIL

TANK CAN BE USED AS:
- SEPTIC / HOLDING / PUMP OR SIPHON

TANK: MIX DESIGN #9 (SMALL FIBER)

CUSTOMIZED TANKS:
- FOR CUSTOM TANKS CONTACT WIESER CONCRETE

REVIEWED BY _____

REVIEW DATE _____

DRAWINGS SUBMITTED FOR APPROVAL

APPROVED BY: _____

APPROVAL DATE: _____

PRODUCTS NEEDED BY: _____

TANKS ARE MANUFACTURED TO MEET OR EXCEED ASTM C-1227 REQUIREMENTS

PRE-POUR: POST-POUR:

SCALE: 1/4" = 1'-0" | REV. | DATE:

DRAWN BY: WCP

DATE: 00/00/00

FILE: w4200

WIESER CONCRETE
W3716 US HWY 10, MAIDEN ROCK, WI 54750
800-325-8456

W4200
SEPTIC MANUAL

SHEET NO. 1 OF 1

Polylok Riser Installation Instructions

To ensure the desired safety and performance from the Polylok riser system, the riser and cover must be installed properly. Below is a list of instructions that must be followed to achieve a successful watertight installation. It is important to follow these instructions closely, as the failure to do so may result in serious personal injury or death. Should you have any questions about these instructions, please contact us at [https://www.polylok.com/contact] and/or hire a licensed contractor.

1. The most critical joint for water testing purposes is the joint where the riser is cast into the lid of the tank. Visual inspection is required to make sure there are no cracks or gaps between the riser and concrete. Should you find it necessary, seal any areas in question with sealant.

2. Gaskets are installed in all riser covers. Although they are held in place with adhesive, there is always a chance that a gasket could be dislodged or become damaged. These gaskets must be in place if a watertight installation is required. Before attempting an installation, inspect the gaskets in the riser cover. A riser cover with a damaged or missing gasket should not be installed. Should you find a gasket damaged, replace or repair by applying a bead of silicone or butyl mastic over the area in question before attempting an installation.

3. Risers do NOT come with factory installed gaskets. If you are attempting to create a watertight seal, you must install a gasket or butyl to the riser joint. The material you use must cover the full diameter of the riser and adhere completely to the riser. We offer 20" and 24" gaskets should you need a watertight connection. Part numbers are 3008-HR for the 24" gasket and 3009-HR for the 20" gasket.

When adding additional riser sections, use #10 x 1.5" square drive stainless steel square drive screws to fasten the sections together. ALL screws must be installed in each riser section and cover to ensure a watertight connection. The structural integrity of the risers is dependent on all screws being installed properly. The maximum torque for #10 screws is 16 IN LBF (inch pounds of force) or 1.8 N-M (newton meters) Or handtight using a handheld screwdriver. Failure to do this could cause the riser sections to compromise the seals and possibly fail. **Note:** The maximum torque for # 12 screws is 20 IN LBF or 2.26 N-M.

4. Use an alternate screw tightening pattern to ensure even pressure on the risers and cover. Failure to do this could cause the riser sections to compromise the seals and possibly fail.

5. Should a riser boss (internal riser ribbing) crack when screwing riser sections together, use a new riser boss to screw the sections together.

6. Once the appropriate number of risers have been installed, install and screw down the cover before backfilling. Distribute the fill as evenly as possible around the riser as it is brought up to grade. Excessive lateral pressure on the riser column during installation can cause deformation or failure of the riser sections. Proper compaction is also important to minimize the shifting and undue stress on the riser column in the future.

7. Each riser section has a ring around the outside. In cold weather climates where frost heaves may occur, this ring needs to be removed. This should be done to each riser section before it is screwed in place. This can be done by running a knife between the ring and the riser. This will separate the two pieces so that the ring can be removed.

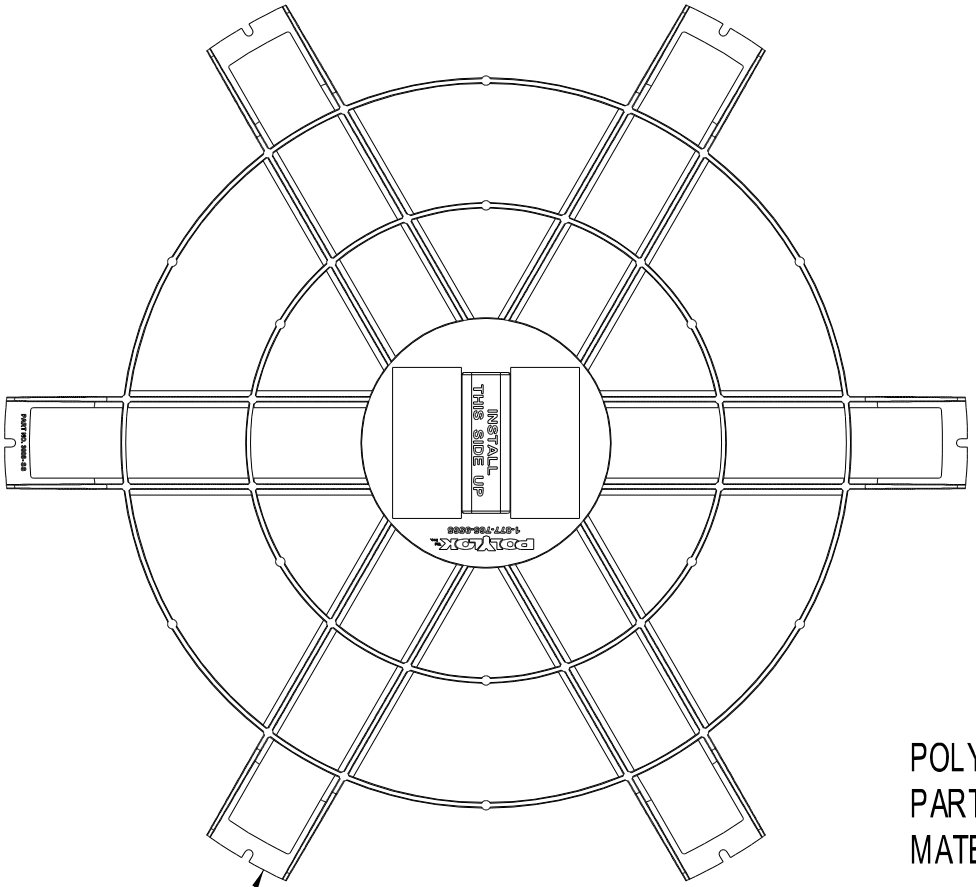
8. Although the Polylok risers and covers are very strong, it should be noted that they are not rated for H-20 loading. We have had risers tested to accept a uniform load of 6,000 lbs. and covers center load tested at 2,500 lbs. Risers should not be buried more than 3 feet below grade.

9. Polylok's Safety Screens should be used for installations near children and pets. Safety Screens act as a secondary layer of protection if the riser cover is damaged or removed. The screen fits in the upper most riser stack of our Polylok Risers and prevents entry into the septic tank. [https://www.youtube.com/watch?v=7hmR3-vOrWU]

THIS PRODUCT MUST BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE INSTALLATION CODE BY A PERSON FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF THE PRODUCT AND THE HAZARDS INVOLVED.

POLYLOK EXCLUDES AND DISCLAIMS ALL WARRANTIES FOR THIS PRODUCT, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

POLYLOK™ Inc.
Innovations in Precast, Drainage & Wastewater Products
Zabel® A Division of Polylok Inc.
3 Fairfield Boulevard, Wallingford, Connecticut 06492
Office: 1-877-765-9565 Fax: 203-284-8514
email: sales@polylok.com
Web site: www.polylok.com



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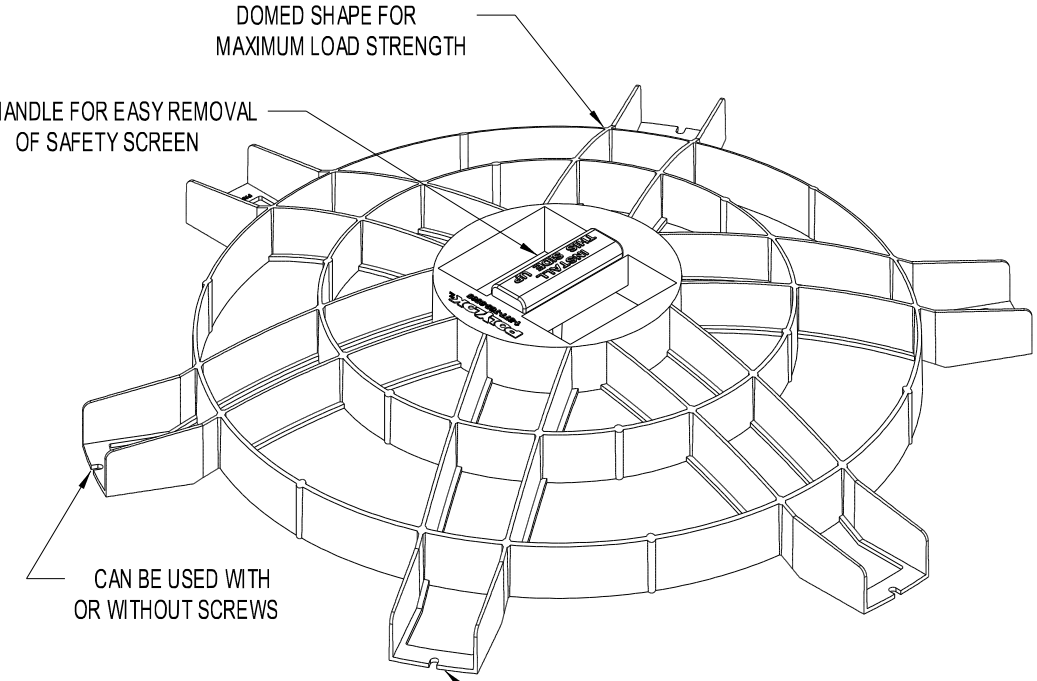
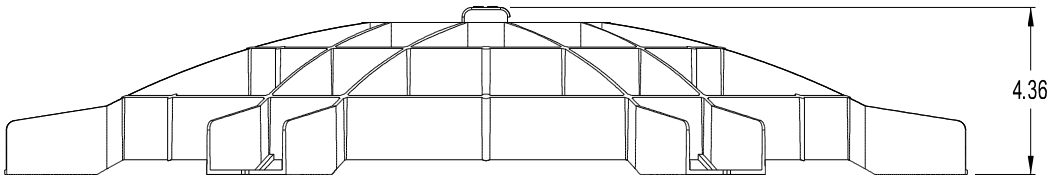
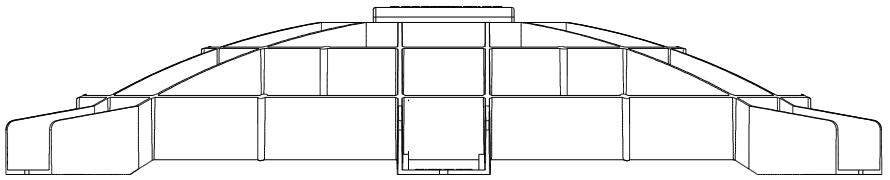


POLYLOK 24" SAFETY SCREEN
PART NO. - 3008-SS
MATERIAL - ABS





xylem
Let's Solve Water

TECHNICAL BROCHURE
B3885 R3



WE Series
Model 3885

SUBMERSIBLE EFFLUENT PUMPS

BUILT IN THE USA
ENGINEERED, ASSEMBLED & TESTED

GOULDS WATER TECHNOLOGY
a xylem brand

FEATURES

Impeller: Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

Casing: Cast iron volute type for maximum efficiency. 2" NPT discharge.

Mechanical Seal: Silicon Carbide vs. Silicon Carbide sealing faces. Stainless steel metal parts, BUNA-N elastomers.

Shaft: Corrosion-resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.

Fasteners: 300 series stainless steel.

Capable of running dry without damage to components.

Designed for continuous operation when fully submerged.

EXTENDED WARRANTY AVAILABLE FOR RESIDENTIAL APPLICATIONS.

APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

SPECIFICATIONS

Pump

- Solids handling capabilities: ¾" maximum
- Discharge size: 2" NPT
- Capacities: up to 140 GPM
- Total heads: up to 128 feet TDH
- Temperature: 104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

MOTORS

- Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- Class B insulation on ⅓ – 1½ HP models.
- Class F insulation on 2 HP models.

Single phase (60 Hz):

- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.
- SJTOW or STOW severe duty oil and water resistant power cords.
- ⅓ – 1 HP models have NEMA three prong grounding plugs.
- 1½ HP and larger units have bare lead cord ends.

Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

AGENCY LISTINGS

Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association File #LR38549

POLYLOK™ Inc.
Innovations in Precast, Drainage & Wastewater Products
Zabel® A Division of Polylok Inc.

PL-525 Effluent Filter

PL-525 Filter

The PL-525 Filter is rated for 10,000 GPD (gallons per day) making it one of the largest filters in its class. It has 525 linear feet of 1/16" filtration slots. Like the Polylok PL-122, the Polylok PL-525 has an automatic shut-off ball installed with every filter. When the filter is removed for cleaning, the ball will float up and temporarily shut off the system so the effluent won't leave the tank.

Features:

- Rated for 10,000 GPD (gallons per day).
- 525 linear feet of 1/16" filtration.
- Accepts 4'' and 6'' SCHD 40 pipe.
- Built in gas deflector.
- Automatic shut-off ball when filter is removed.
- Alarm accessibility.
- Accepts PVC extension handle.

PL-525 Installation:

Ideal for residential and commercial waste flows up to 10,000 gallons per day (GPD).

1. Locate the outlet of the septic tank.
2. Remove the tank cover and pump tank if necessary.
3. Glue the filter housing to the 4" or 6" outlet pipe. If the filter is not centered under the access opening use a Polylok Extend & Lok or piece of pipe to center filter.
4. Insert the PL-525 filter into its housing.
5. Replace and secure the septic tank cover.

PL-525 Maintenance:

The PL-525 Effluent Filters will operate efficiently for several years under normal conditions before requiring cleaning. It is recommended that the filter be cleaned every time the tank is pumped, or at least every three years. If the installed filter contains an optional alarm, the owner will be notified by an alarm when the filter needs servicing. Servicing should be done by a certified septic tank pumper or installer.

1. Locate the outlet of the septic tank.
2. Remove tank cover and pump tank if necessary.
3. Do not use plumbing when filter is removed.
4. Pull PL-525 cartridge out of the housing.
5. Hose off filter over the septic tank. Make sure all solids fall back into septic tank.
6. Insert the filter cartridge back into the housing making sure the filter is properly aligned and completely inserted.
7. Replace and secure septic tank cover.



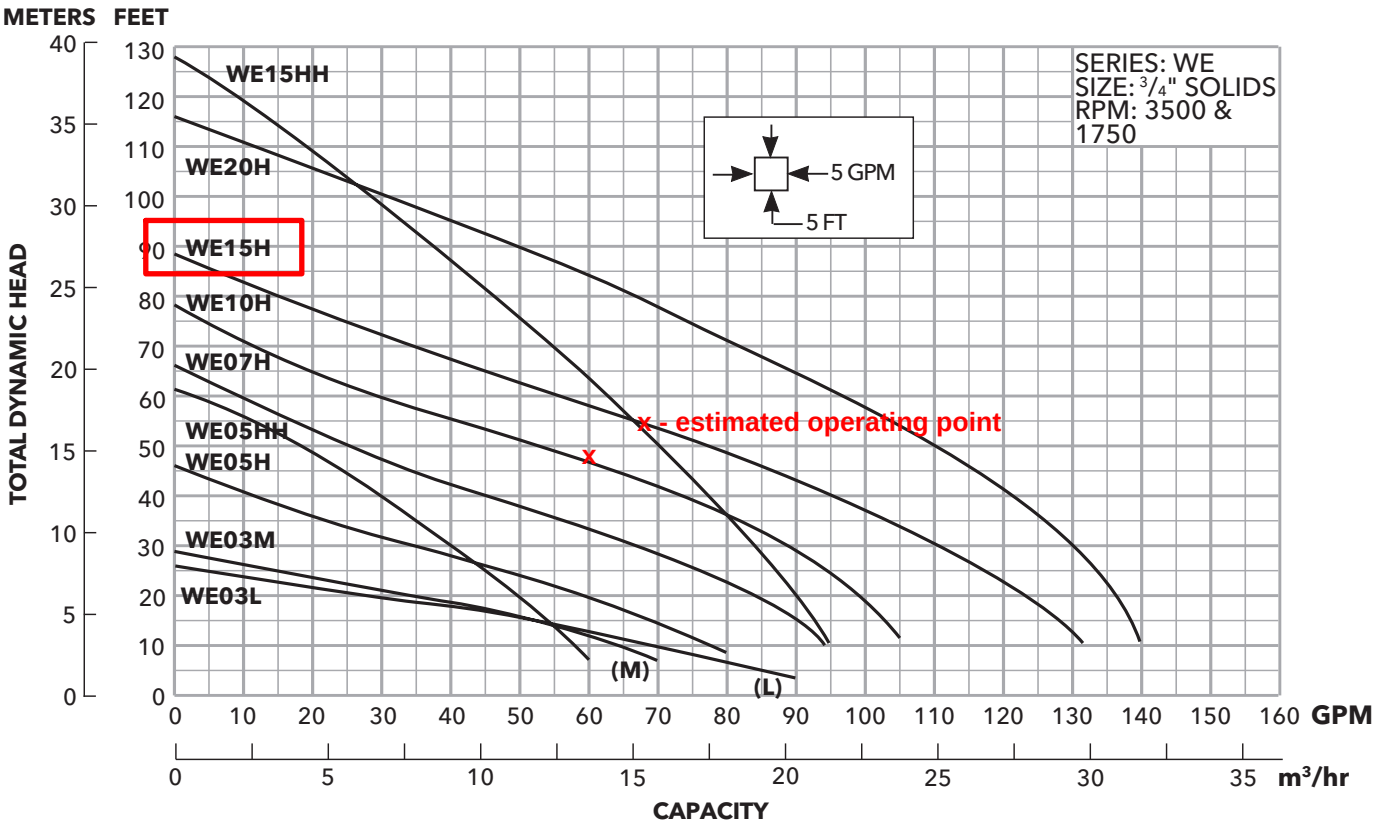


Outdoor SmartFilter® Alarm
Polylok, Zabel & Best filters accept the SmartFilter® switch and alarm.



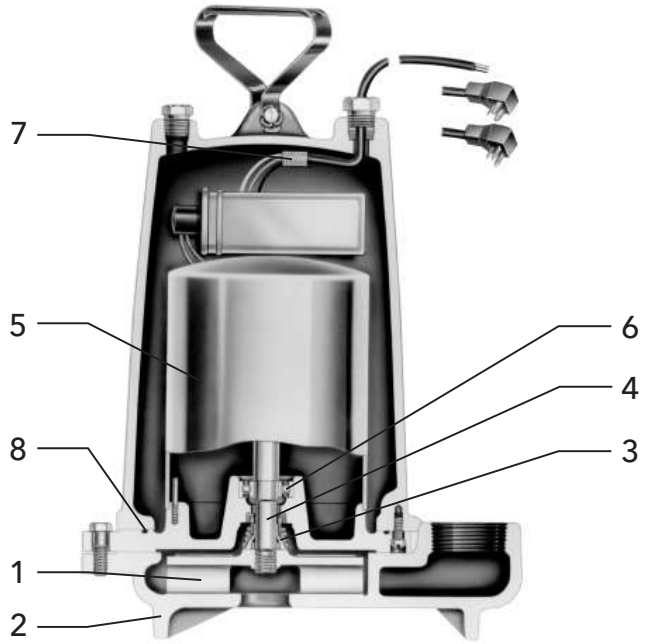
Extend & Lok™
Easily installs into existing tanks.

Polylok, Inc. 3 Fairfield Blvd. Wallingford, CT 06492 Toll Free: 877.765.9565 Fax: 203.284.8514 www.polylok.com



COMPONENTS

Item No.	Description
1	Impeller
2	Casing
3	Mechanical Seal
4	Motor Shaft
5	Motor
6	Ball Bearings
7	Power Cable
8	Casing O-Ring



MODELS

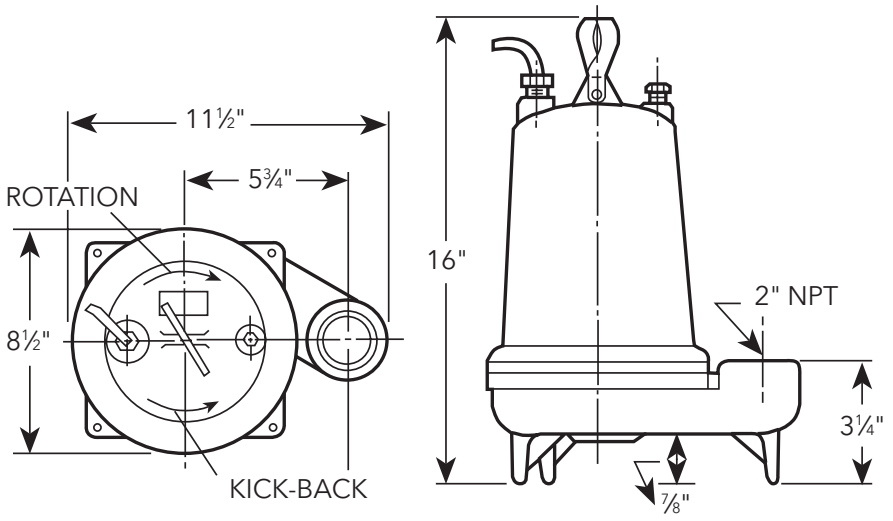
Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance		Power Cable Size	Weight (lbs.)
										Start	Line-Line		
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56
WE0318L			208			6.8	19.5	K	51	9.1	4.2		
WE0312L			230			4.9	14.1	L	53	14.5	8.0		
WE0311M			115			10.7	30.0	M	54	11.9	1.7		
WE0318M			208			6.8	19.5	K	51	9.1	4.2		
WE0312M			230			4.9	14.1	L	53	14.5	8.0		
WE0511H	0.5	1	115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3	
WE0512H			230			7.3	34.5	M	53	9.6	4.0		
WE0538H		3	200			4.9	22.6	R	68	NA	3.8	14/4	
WE0532H			230			3.3	18.8	R	70	NA	5.8		
WE0534H			460			1.7	9.4	R	70	NA	23.2		
WE0537H			575			1.4	7.5	R	62	NA	35.3		
WE0511HH		1	115		3.88	14.5	46.0	M	54	7.5	1.0	14/3	
WE0518HH			208			8.1	31.0	K	68	9.7	2.4	16/3	
WE0512HH			230			7.3	34.5	M	53	9.6	4.0		
WE0538HH		3	200			4.9	22.6	R	68	NA	3.8	14/4	
WE0532HH			230			3.6	18.8	R	70	NA	5.8		
WE0534HH			460			1.8	9.4	R	70	NA	23.2		
WE0537HH			575			1.5	7.5	R	62	NA	35.3		
WE0718H	0.75	1	208		4.06	11.0	31.0	K	68	9.7	2.4	14/3	70
WE0712H			230			10.0	27.5	J	65	12.2	2.7		
WE0738H		3	200			6.2	20.6	L	64	NA	5.7	14/4	
WE0732H			230			5.4	15.7	K	68	NA	8.6		
WE0734H			460			2.7	7.9	K	68	NA	34.2		
WE0737H			575			2.2	9.9	L	78	NA	26.5		
WE1018H	1	1	208		4.44	14.0	59.0	K	68	9.3	1.1	14/3	
WE1012H			230			12.5	36.2	J	69	10.3	2.1		
WE1038H		3	200			8.1	37.6	M	77	NA	2.7	14/4	
WE1032H			230			7.0	24.1	L	79	NA	4.1		
WE1034H			460			3.5	12.1	L	79	NA	16.2		
WE1037H			575			2.8	9.9	L	78	NA	26.5		
WE1518H	1.5	1	208		4.56	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512H			230			15.7	50.0	H	68	11.3	1.6		
WE1538H		3	200			10.6	40.6	K	79	NA	1.9	14/4	
WE1532H			230			9.2	31.7	K	78	NA	2.9		
WE1534H			460			4.6	15.9	K	78	NA	11.4		
WE1537H			575			3.7	13.1	K	75	NA	16.9		
WE1518HH		1	208		5.50	17.5	59.0	K	68	9.3	1.1	14/3	
WE1512HH			230			15.7	50.0	H	68	11.3	1.6		
WE1538HH		3	200			10.6	40.6	K	79	NA	1.9	14/4	
WE1532HH			230			9.2	31.7	K	78	NA	2.9		
WE1534HH			460			4.6	15.9	K	78	NA	11.4		
WE1537HH			575			3.7	13.1	K	75	NA	16.9		
WE2012H	2	1	230		5.38	18.0	49.6	F	78	3.2	1.2	14/3	83
WE2038H		3	200			12.0	42.4	K	78	NA	1.7	14/4	
WE2032H			230			11.6	42.4	K	78	NA	1.7		
WE2034H			460			5.8	21.2	K	78	NA	6.6		
WE2037H			575			4.7	16.3	L	78	NA	10.5		

PERFORMANCE RATINGS (gallons per minute)

Order No.		WE-03L	WE-03M	WE-05H	WE-07H	WE-10H	WE-15H	WE05HH	WE15HH	WE-20H
Total Head Feet of Water	**HP**	⅓	⅓	½	¾	1	1½	½	1½	2
	RPM	1750	1750	3500	3500	3500	3500	3500	3500	3500
	5	86	–	–	–	–	–	–	–	–
	10	70	63	78	94	–	–	58	95	–
	15	52	52	70	90	103	128	53	93	138
	20	27	35	60	83	98	123	49	90	136
	25	5	15	48	76	94	117	45	87	133
	30	–	–	35	67	88	110	40	83	130
	35	–	–	22	57	82	103	35	80	126
	40	–	–	–	45	74	95	30	77	121
	45	–	–	–	35	64	86	25	74	116
	50	–	–	–	25	53	77	–	70	110
	55	–	–	–	–	40	67	–	66	103
	60	–	–	–	–	30	56	–	63	96
	65	–	–	–	–	20	45	–	58	89
	70	–	–	–	–	–	35	–	55	81
	75	–	–	–	–	–	25	–	51	74
	80	–	–	–	–	–	–	–	47	66
	90	–	–	–	–	–	–	–	37	49
	100	–	–	–	–	–	–	–	28	30

DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)



STANDARD PANEL OPTIONS

Pump Order Number	K Series		Boulay Series	
	Simplex	Duplex	Simplex	Duplex
WE0311L	KS19020WF	KD19020WF	S10020	D10020
WE0318L	KS19020WF	KD19020WF	S10020	D10020
WE0312L	KS19020WF	KD19020WF	S10020	D10020
WE0311M	KS19020WF	KD19020WF	S10020	D10020
WE0318M	KS19020WF	KD19020WF	S10020	D10020
WE0312M	KS19020WF	KD19020WF	S10020	D10020
WE0511H	KS19020WF	KD19020WF	S10020	D10020
WE0518H	KS19020WF	KD19020WF	S10020	D10020
WE0512H	KS19020WF	KD19020WF	S10020	D10020
WE0538H	KS31255WF	KD31255WF	S34063	D34063
WE0532H	KS31255WF	KD31255WF	S32540	D32540
WE0534H	KS31255WF	KD31255WF	S31625	D31625
WE0537H	N/A	N/A	S31625	D31625
WE0511HH	KS19020WF	KD19020WF	S10020	D10020
WE0518HH	KS19020WF	KD19020WF	S10020	D10020
WE0512HH	KS19020WF	KD19020WF	S10020	D10020
WE0538HH	KS31255WF	KD31255WF	S34063	D34063
WE0532HH	KS31255WF	KD31255WF	S32540	D32540
WE0534HH	KS31255WF	KD31255WF	S31625	D31625
WE0537HH	N/A	N/A	S31625	D31625
WE0718H	KS19020WF	KD19020WF	S10020	D10020
WE0712H	KS19020WF	KD19020WF	S10020	D10020
WE0738H	KS34518WF	KD34518WF	S36310	D36310
WE0732H	KS34518WF	KD34518WF	S34063	D34063
WE0734H	KS31255WF	KD31255WF	S32540	D32540
WE0737H	N/A	N/A	S31625	D31625
WE1018H	KS19020WF	KD19020WF	S10020	D10020
WE1012H	KS19020WF	KD19020WF	S10020	D10020
WE1038H	KS34518WF	KD34518WF	S36310	D36310
WE1032H	KS34518WF	KD34518WF	S36310	D36310
WE1034H	KS34518WF	KD34518WF	S32540	D32540
WE1037H	N/A	N/A	S32540	D32540
WE1518H	KS19020WF	KD19020WF	S10020	D10020
WE1512H	KS19020WF	KD19020WF	S10020	D10020
WE1538H	KS34518WF	KD34518WF	S31016	D31016
WE1532H	KS34518WF	KD34518WF	S36310	D36310
WE1534H	KS34518WF	KD34518WF	S34063	D34063
WE1537H	N/A	N/A	S32540	D32540
WE1518HH	KS19020WF	KD19020WF	S10020	D10020
WE1512HH	KS19020WF	KD19020WF	S10020	D10020
WE1538HH	KS34518WF	KD34518WF	S31016	D31016
WE1532HH	KS34518WF	KD34518WF	S36310	D36310
WE1534HH	KS34518WF	KD34518WF	S34063	D34063
WE1537HH	N/A	N/A	S32540	D32540
WE2012H	KS19020WF	KD19020WF	S10020	D10020
WE2038H	KS34518WF	KD34518WF	S31016	D31016
WE2032H	KS34518WF	KD34518WF	S31016	D31016
WE2034H	KS34518WF	KD34518WF	S34063	D34063
WE2037H	N/A	N/A	S34063	D34063

Note: Boulay Series part numbers have additional available features, see page 7 for more information.

Note: K Series panel part numbers include floats, to order without float switches, remove the 'WF' suffix. Boulay Series panels do not include float switches.









K-SERIES

- NEMA 4X dead front outdoor rated enclosure
- Red LED alarm beacon
- HOA selector switch
- Field wiring terminal block
- Single phase models handle 120, 208 and 230V service
- Three phase models handle 200, 230 and 460V service
- Requires separate control/alarm power feed
- See brochure "BCPKSDPANELS" for additional information

BOULAY SERIES

- NEMA 4X outdoor rated enclosure
- Red alarm beacon
- HOA selector switch
- Through door pump run light(s)
- Through door alarm test and horn silence button
- Single phase models handle 120, 208 and 230V service
- Three phase models handle 200, 230, 460 and 575V service
- Accepts single or dual power feed
- See brochure "BCP3 R11" for additional information on simplex models
- See brochure "BCP4 R14" for additional information on duplex models

Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xyleminc.com

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2881 East Bayard Street Ext., Suite A
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Phone: (866) 325-4210
Fax: (888) 322-5877
www.xylem.com/goulds

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EZ Series® In-Site®
with SUB-X™ LT or C-Level™ Sensor

Installation and Operation Manual

US Patent Nos. 10,251,284 B2; 8,336,385; 8,567,242 and 8,650,949

c UL us LISTED

Control Panel



SUB-X™ LT or C-Level™ Sensor



Recommended

High Alarm Float



Redundant Off Float



WARNING!

ELECTRICAL SHOCK HAZARD
Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes. UL Type 4X enclosures are for indoor or outdoor use.

Warranty void if panel is modified.

For information regarding operation, available options, or servicing questions, please call SJE Rhombus Technical Support.

SJE Rhombus offers a five-year limited warranty on the control panel and a two-year limited warranty on the SUB-X™ LT or C-Level™ sensor. For complete terms and conditions, please visit **www.sjerhombus.com**.

Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.

Manufactured by:
SJE Rhombus
Detroit Lakes, MN, USA

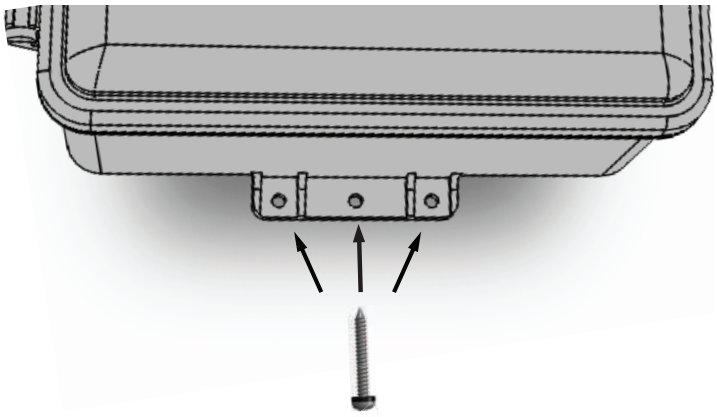
Technical Support: +1 800-746-6287
techsupport@sjerhombus.com
www.sjerhombus.com

Mounting the Control Panel

1 Install top fastener using appropriate anchor.



2 Install bottom fastener(s) using appropriate anchors.

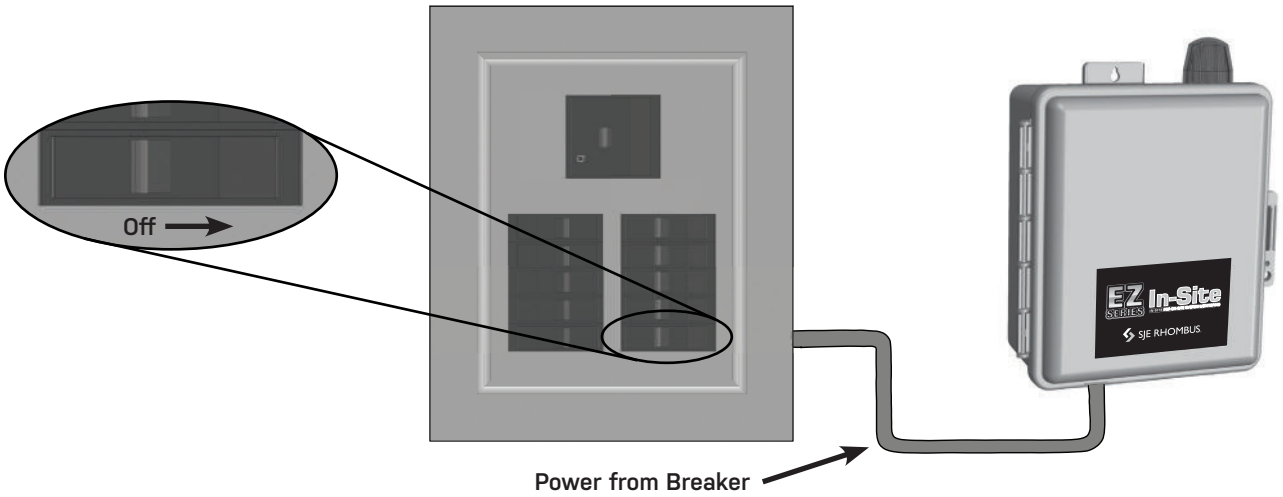


Installing the SUB-X™ LT or C-Level™ Sensor & Recommended Float Switches

The EZ Series® In-Site® CL control panel operates with a SUB-X™ LT or C-Level™ sensor and 1 or 2 recommended float switches. The SUB-X™ LT or C-Level™ sensor operates the Pump Start, Stop and Alarm functions. The back-up float switches are for redundant off and high level alarm.

⚠WARNING!

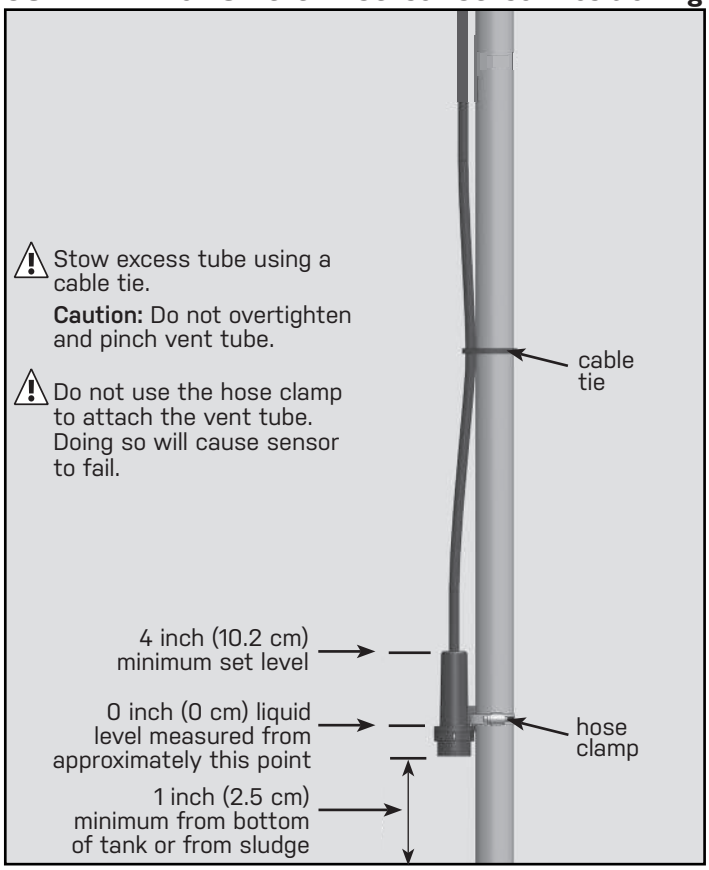
Ensure all supply power to the control panel is turned OFF before installing or servicing the SUB-X™ LT or C-Level™ sensor, float switches, or pumps in the tank. Failure to do so could result in serious or fatal shock.



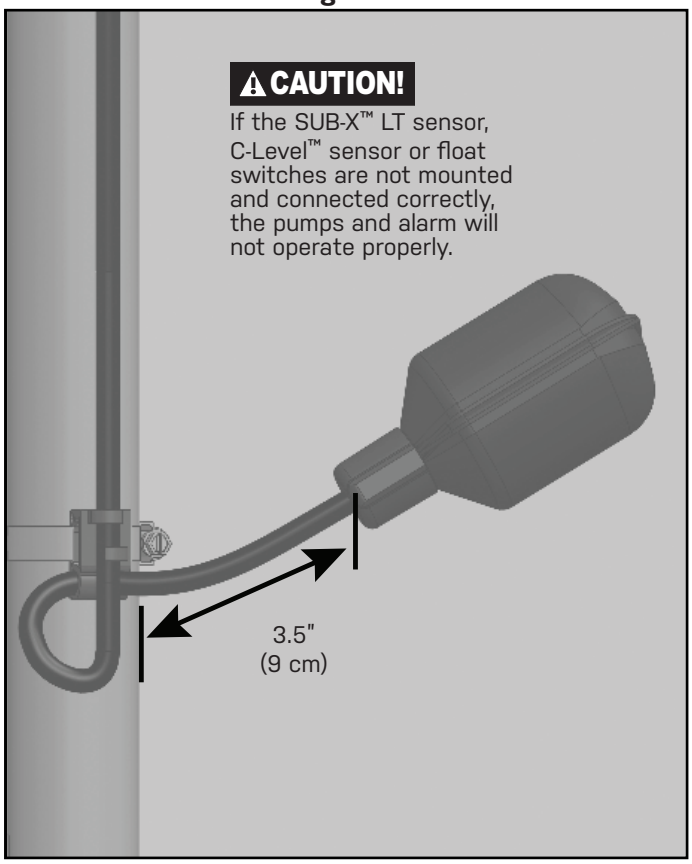
NOTE

Do not run SUB-X™ LT or C-Level™ sensor cable or float switch cables in the same conduit as the pump cables.

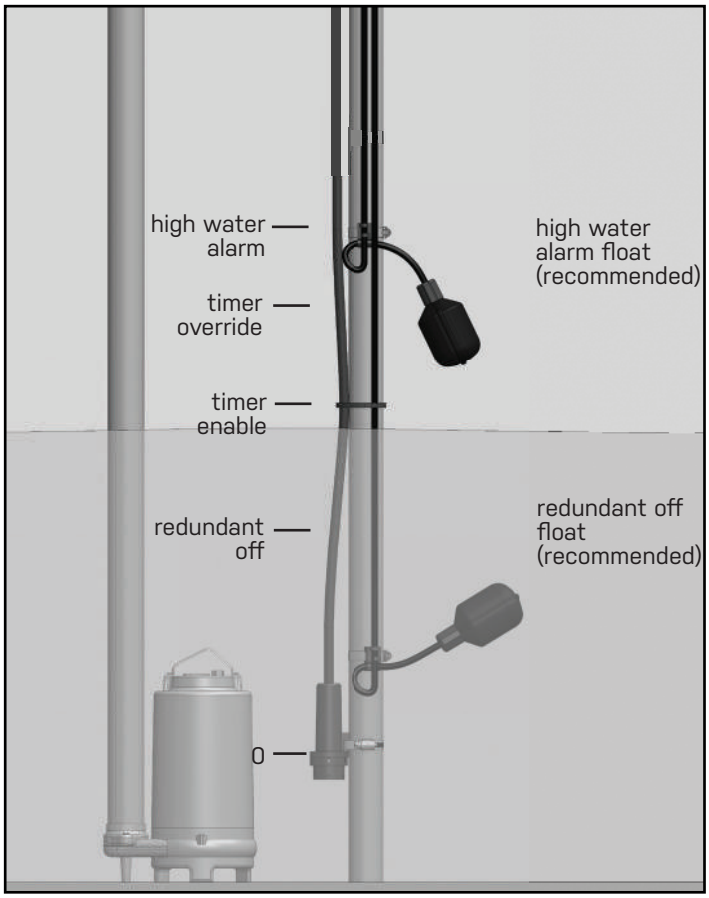
SUB-X™ LT or C-Level™ Sensor Sensor Positioning



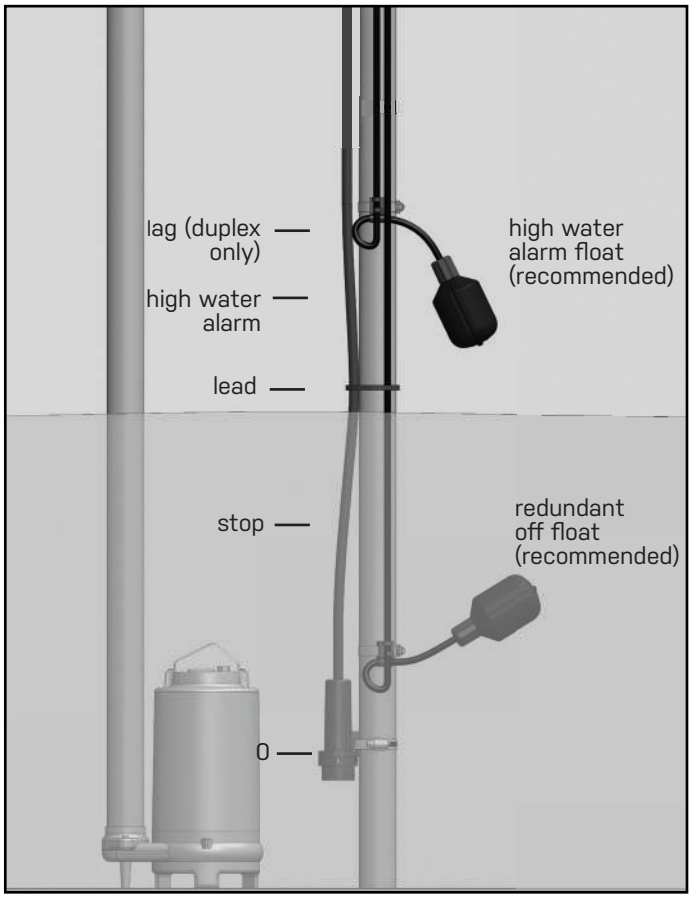
Float Switch Positioning



Timed Dose



Demand Dose



Wiring the Control Panel

1 Locate conduit entrance at the bottom of the enclosure as shown. Check local codes for the number of power circuits required. The schematic is located on the inside cover of the control panel.

⚠ CAUTION!

Be sure the incoming voltage is the same as the pump motor nameplate.

Providing separate pump and control/alarm power sources is recommended.

Type 4X conduit must be used to maintain a Type 4X rating of the control panel.

2 Connect the following wires to the proper terminals:

- incoming power for each pump circuit breaker
- incoming power for control/alarm
- pump 1
- pump 2 (duplex only)
- SUB-X™ LT or C-Level™ sensor
- float switches (recommended)

See schematic label on inside cover of the control panel for details.

3 Verify correct operation of control panel after installation is complete.

Setup and Operation

EZ Series® In-Site® control panels are designed for pump control and system monitoring via a Bluetooth® wireless connection. The EZ Series® In-Site® App must be used to configure the control panel.

App download available on:

Download on the App Store

GET IT ON Google Play

EZ In-Site Connect

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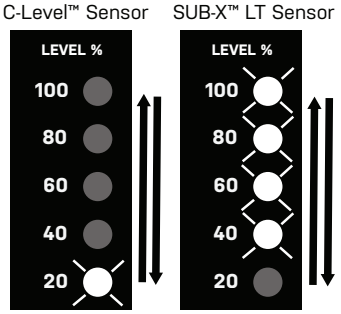
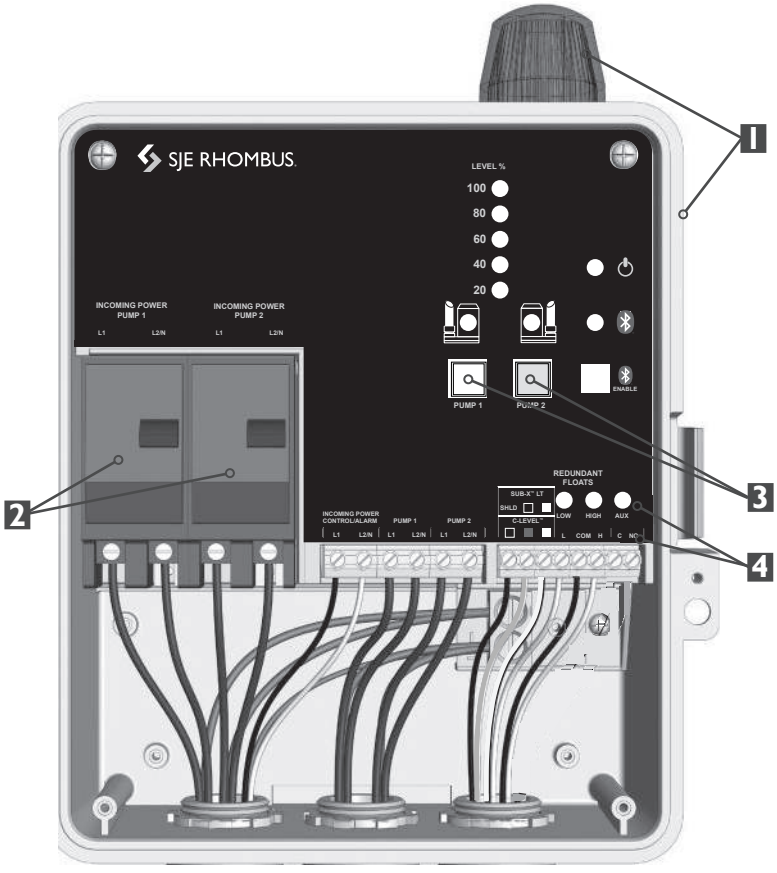
Changing Sensor Mode



1. Press and hold the panel TEST/SILENCE pushbutton, then apply control/alarm power.
   - Single level indicator on chases up and down to indicate current mode is set to C-Level™ Sensor.
   - Single level indicator off chases up and down to indicate current mode is set to SUB-X™ LT sensor.
2. Continue to hold the TEST/SILENCE pushbutton as level indicator chase changes state.
3. Release the TEST/SILENCE pushbutton when the level indicator chase ceases and alarm beacon lights. This takes approximately 25 seconds to complete.
4. Sensor mode change is complete.



Duplex Model Shown

⚠ CAUTION! Seal the electrical conduit with an approved sealing compound to prevent moisture or gases from entering into the control panel.

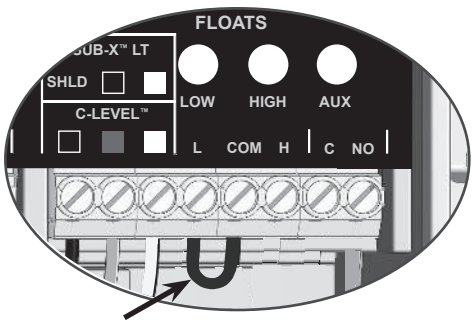
1 Alarm System (Indicator Light and Horn)
When an alarm condition occurs, the red light and horn will be activated.

If the TEST/SILENCE button is pressed and released, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset.

2 Circuit Breakers
Each pump circuit has a thermal-magnetic circuit breaker that provides branch circuit protection and a means to disconnect the pump.

3 Pump Manual Run Switches
Push and hold to manually run the pump.

4 Dry Auxiliary Contacts
Normally Open - Contacts are OPEN under normal conditions and CLOSED when alarm condition is present. OPEN during power loss.
Automatically resets once alarm condition is cleared.
Aux contact rating: 120V, 1A



NOTE If redundant off float is not used, a jumper must be installed in its place.

PN 1064580E 02/25
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Map Scale: 1:2,610 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 21, Sep 10, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Sparta loamy sand, 0 to 2 percent slopes	4.5	33.1%
8B	Sparta loamy sand, 2 to 6 percent slopes	7.1	51.8%
327	Dickman sandy loam, 0 to 2 percent slopes	2.1	15.1%
Totals for Area of Interest		**13.7**	**100.0%**

Washington County, Minnesota

8B—Sparta loamy sand, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1t936
Elevation: 700 to 1,200 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Sparta and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sparta

Setting

Landform: Outwash terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

Ap,AB - 0 to 16 inches: loamy sand
Bw - 16 to 28 inches: loamy sand
C - 28 to 60 inches: sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Dickman
Percent of map unit: 4 percent
Hydric soil rating: No

Sparta, bedrock substratum
Percent of map unit: 3 percent
Hydric soil rating: No

Hubbard
Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 21, Sep 10, 2025

DEPARTMENT OF NATURAL RESOURCES

National Wetland Inventory



Cowardin Classification

- Aquatic Bed/ Nonpersistent Emergent
- Emergent
- Forested
- Moss/Lichen
- Rock Bottom
- Rocky Shore
- Streambed (Intermittent)
- Scrub-Shrub
- Unconsolidated Bottom (Open Water)
- Unconsolidated Shore (Banks & Sandbars)
- Public Waters Basins
- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse

0 0.05 0.1 0.2 mi

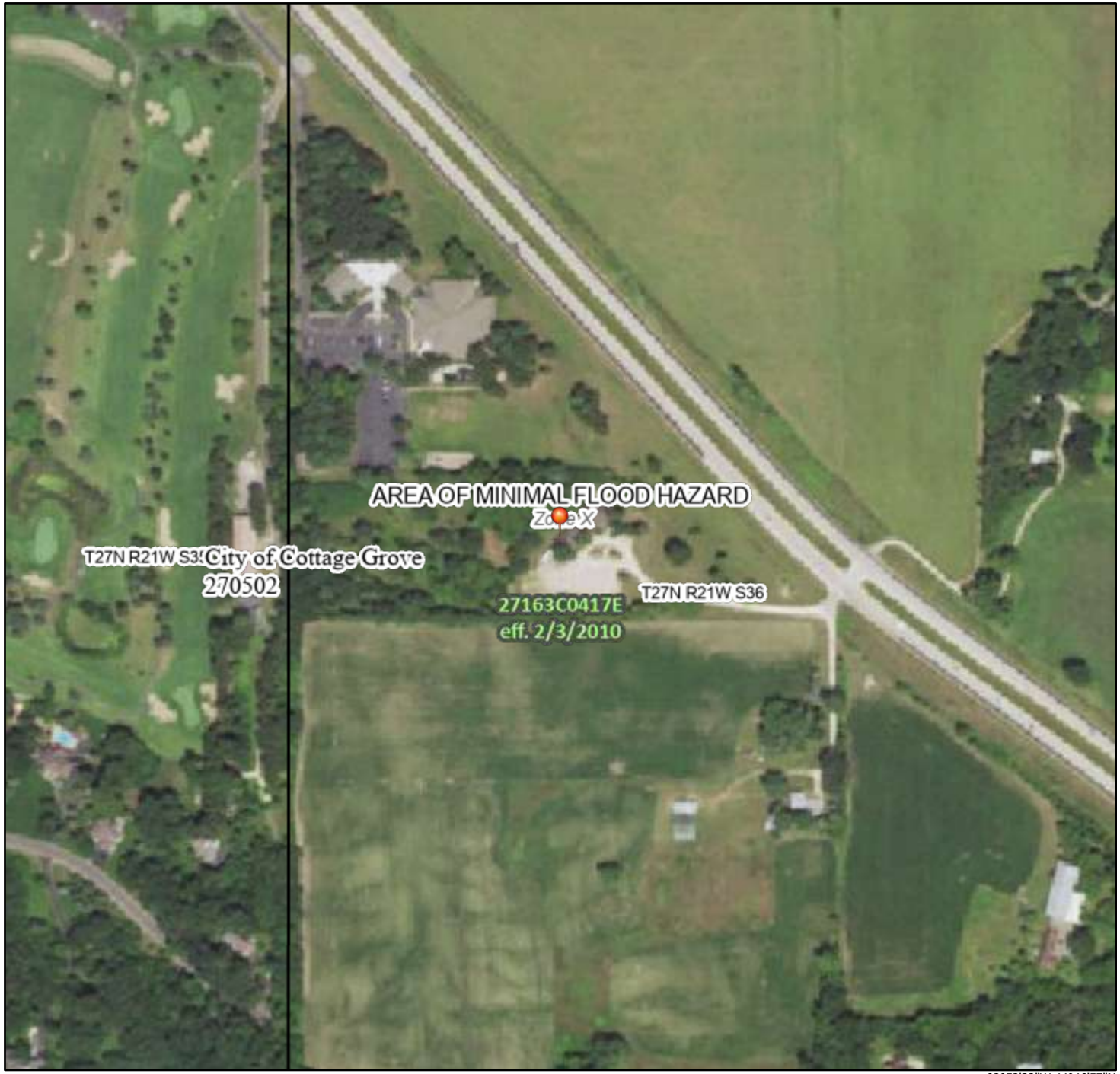
Date Printed: 11/05/2025

This map is for general reference only. Neither the state of Minnesota nor the Minnesota Department of Natural Resources make any representations or warranties with respect to the use of or reliance on the data. There are no guarantees as to the accuracy, currency, completeness, suitability or reliability of this data for any purpose.

National Flood Hazard Layer FIRMette

FEMA

92°53'10"W 44°47'23"N



92°52'32"W 44°46'57"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/5/2025 at 10:26 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

UNIVERSITY OF MINNESOTA



Septic System Management Plan for Above Grade Systems

The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

This **management plan** will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is **YOUR** responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota's *Septic System Owner's Guide* contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

Property Owner	New Life Community Church	Email	
Property Address	11245 Point Douglas Dr S, Cottage Grove	Property ID	3602721230002
System Designer	Alex Pepin (Ten Thirty Environmental Solutions)	Contact Info	612-248-4281
System Installer	Midwest Sewer	Contact Info	
Service Provider/Maintainer		Contact Info	
Permitting Authority	Washington County	Contact Info	651-430-6655
Permit #		Date Inspected	

Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-built of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the *Septic System Owner's Guide*, visit www.bookstores.umn.edu and search for the word "septic" or call 800-322-8642.

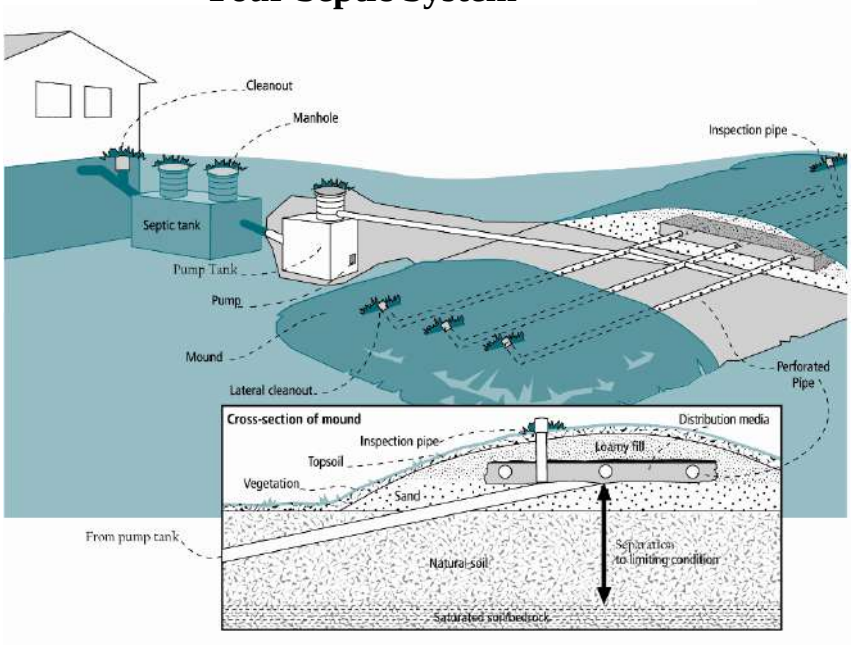
For more information see http://septic.umn.edu

Version: August 2015

UNIVERSITY OF MINNESOTA

Septic System Management Plan for Above Grade Systems

Your Septic System



Septic System Specifics	
System Type: ☑ I ☐ II ☐ III ☐ IV* ☐ V* (*Based on MN Rules Chapter 7080.2200 – 2400)* **Additional Management Plan required*	☐ System is subject to operating permit* ☐ System uses UV disinfection unit* Type of advanced treatment unit _____

Dwelling Type	Well Construction
Number of bedrooms: _____ System capacity/ design flow (gpd): 591 Anticipated average daily flow (gpd): 414 Comments_____ Business? : ☑ Y ☐ N What type? church	Well depth (ft): unknown ❑ Cased well Casing depth: _____ ❑ Other (specify): _____ Distance from septic (ft):_____ Is the well on the design drawing? ☑ Y ☐ N

Septic Tank	
❑ First tank *Tank volume:* 4200 *gallons* Does tank have two compartments? ☐ Y ☐ N ❑ Second tank *Tank volume:* 4200 *gallons* ❑ Tank is constructed of Precast Concrete ❑ Effluent screen: ☑ Y ☐ N Alarm ☑ Y ☐ N	❑ Pump Tank 4200 *gallons* ❑ Effluent Pump *make/model*:_____ Pump capacity _____ GPM TDH _____ Feet of head ❑ Alarm location _____

Soil Treatment Area (STA)	
Mound/At-Grade area (width x length): 40 ft x 125 ft Rock bed size (width x length): 10 ft x 100 ft Location of additional STA: _____ Type of distribution media: Rock	☑ Inspection ports ☑ Cleanouts ☐ Surface water diversions ☐ Additional STA not available



Homeowner Management Tasks

These op*eration and maintenance ac*tivities are your responsibility. *Chart on page 6 can help track your activities.*

Your toilet is not a garbage can. Do not flush anything besides human waste and toilet paper. No wet wipes, cigarette butts, disposal diapers, used medicine, feminine products or other trash!

The system and septic tanks needs to be checked every 24 months

Your service provider or pumper/maintainer should evaluate if your tank needs to be pumped more or less often.

Seasonally or several times per year

- *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- *Soil treatment area.* Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. *Untreated sewage may make humans and animals sick.* Keep bikes, snowmobiles and other traffic off and control borrowing animals.
- *Alarms.* Alarms signal when there is a problem; contact your service professional any time the alarm signals.
- *Lint filter.* If you have a lint filter, check for lint buildup and clean when necessary. If you do not have one, consider adding one after washing machine.
- *Effluent screen.* If you do not have one, consider having one installed the next time the tank is cleaned along with an alarm.

Annually

- *Water usage rate.* A water meter or another device can be used to monitor your average daily water use. Compare your water usage rate to the design flow of your system (listed on the next page). Contact your septic professional if your average daily flow over the course of a month exceeds 70% of the design flow for your system.
- *Caps.* Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- *Water conditioning devices.* See Page 5 for a list of devices. When possible, program the recharge frequency based on *water demand (gallons)* rather than *time (days)*. Recharging too frequently may negatively impact your septic system. Consider updating to demand operation if your system currently uses time,
- *Review your water usage rate.* Review the Water Use Appliance chart on Page 5. Discuss any major changes with your service provider or pumper/maintainer.

During each visit by a service provider or pumper/maintainer

- Make sure that your service professional services the tank through the manhole. (NOT though a 4" or 6" diameter inspection port.)
- Ask how full your tank was with sludge and scum to determine if your service interval is appropriate.
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.



Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. At each visit a written report/record must be provided to homeowner.

Plumbing/Source of Wastewater

- Review the Water Use Appliance Chart on Page 5 with homeowner.
  Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

Septic Tank/Pump Tanks

- *Manhole lid*. A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- *Liquid level*. Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the soil treatment area.)
- *Inspection pipes*. Replace damaged or missing pipes and caps.
- *Baffles*. Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- *Effluent screen*. Check to make sure it is in place; clean per manufacturer recommendation. Recommend retrofitted installation if one is not present.
- *Alarm*. Verify that the alarm works.
- *Scum and sludge*. Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

Pump

- *Pump and controls*. Check to make sure the pump and controls are operating correctly.
- *Pump vault*. Check to make sure it is in place; clean per manufacturer recommendations.
- *Alarm*. Verify that the alarm works.
- *Drainback*. Check to make sure it is draining properly.
- *Event counter or elapsed time meter*. Check to see if there is an event counter or elapsed time meter for the pump. If there is one or both, calculate the water usage rate and compare to the anticipated use listed on Design and Page 2. Dose Volume: _____ gallons: Pump run time: _____ Minutes

Soil Treatment Area

- *Inspection pipes*. Check to make sure they are properly capped. Replace caps and pipes that are damaged.
- *Surfacing of effluent*. Check for surfacing effluent or other signs of problems.
- *Lateral flushing*. Check lateral distribution; if cleanouts exist, flush and clean at recommended frequency.
- *Vegetation* - Check to see that a good growth of vegetation is covering the system.

All other components – evaluate as listed here:



Water-Use Appliances and Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	• Uses additional water. • Adds solids to the tank. • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Use of a garbage disposal is not recommended. • Minimize garbage disposal use. Compost instead. • To prevent solids from exiting the tank, have your tank pumped more frequently. • Add an effluent screen to your tank.
Washing machine	• Washing several loads on one day uses a lot of water and may overload your system. • Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.	• Choose a front-loader or water-saving top-loader, these units use less water than older models. • Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents. Limit use of bleach-based detergents and fabric softeners. • Install a lint filter after the washer and an effluent screen to your tank • Wash only full loads and think even – spread your laundry loads throughout the week.
Dishwasher	• Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area. • New models promote “no scraping”. They have a garbage disposal inside.	• Use gel detergents. Powdered detergents may add solids to the tank. • Use detergents that are low or no-phosphorus. • Wash only full loads. • Scrape your dishes anyways to keep undigested solids out of your septic system.
Grinder pump (in home)	• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Expand septic tank capacity by a factor of 1.5. • Include pump monitoring in your maintenance schedule to ensure that it is working properly. • Add an effluent screen.
Large bathtub (whirlpool)	• Large volume of water may overload your system. • Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.	• Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time. • Use oils, soaps, and cleaners in the bath or shower sparingly.
Clean Water Uses	**Impacts on System**	**Management Tips**
High-efficiency furnace	• Drip may result in frozen pipes during cold weather.	• Re-route water directly out of the house. Do not route furnace discharge to your septic system.
Water softener Iron filter Reverse osmosis	• Salt in recharge water may affect system performance. • Recharge water may hydraulically overload the system.	• These sources produce water that is not sewage and should not go into your septic system. • Reroute water from these sources to another outlet, such as a dry well, draintile or old drainfield. • When replacing, consider using a demand-based recharge vs. a time-based recharge. • Check valves to ensure proper operation; have unit serviced per manufacturer directions
Surface drainage Footing drains	• Water from these sources will overload the system and is prohibited from entering septic system.	



Homeowner Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

Activity	Date accomplished									
Check frequently:										
Leaks: check for plumbing leaks*										
Soil treatment area check for surfacing**										
Lint filter: check, clean if needed*										
Effluent screen (if owner-maintained)***										
Alarm**										
Check annually:										
Water usage rate (maximum gpd _____)										
Caps: inspect, replace if needed										
Water use appliances – review use										
Other:										

*Monthly

**Quarterly

***Bi-Annually

Notes: Clean effluent filter at every maintenance visit. If add iron filter, divert reject water out of septic system. Recommend using low flow fixtures (<1.5 gpm). Also recommend installing a Moen Flo water meter (or similar product) to monitor water usage and detect leaks. Examples of these are shown on the following pages.

"As the owner of this SSTS, I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in this Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Property Owner Signature: Date

Management Plan Prepared By: Alex Pepin Certification # 9844

Permitting Authority: Washington County

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flo BY MOEN

AWARD POPULAR SCIENCE BEST OF WHAT'S NEW 2018 WINNER

BEST OF KBIS WINNER SMART HOME TECHNOLOGY

The smart home water security system

- Flo by Moen is a mainline water monitoring device for the home.
- The device monitors water, identifies leaks and alerts homeowners of these issues to protect the home.
- Real-time alerts through the smartphone app help inform homeowners on water usage on a daily, weekly and monthly basis.
- Features notifications for remote shutoff option for homeowner via mobile app and automatic shutoff if a catastrophic leak is detected in the home.

MOEN®

flō BY MOEN



MODEL NO. 900-001

Whole-Home Water Security
Flo by Moen monitors the entire water system for big leaks, microleaks and even invisible leaks behind walls.

Proactive Protection
Daily health tests help keep the home leak-free and alert the user when there's an issue.

Water Shutoff
Remote water shutoff from the user's phone and automatic water shutoff for protection even when they're offline.

Visit **moen.ca/flo** for additional information.
Professional installation recommended.
Insurance discounts may be available based on carrier and region. Please check with your local insurance representative for eligibility.

Microleak™ Technology
Advanced sensors detect leaks as small as one drop of water per minute.

Support
On-call experts help users identify and troubleshoot detected leaks.

Savings
Save water and money while protecting the home and possessions from water damage.

App compatibility:

Works with amazon alexa | works with the Google Assistant | Works with IFTTT

FloProtect™

- Water damage deductible guarantee $2,500*USD*
- Proactive monitoring and water concierge
- Enhanced water usage data
- Extended product warranty (3 years)
- Insurance Verification Letter
- $5*USD* per month fee with 30-day free trial

In the Box

- Flo by Moen device
- 3/4" – 14 NPT, Threaded brass tailpieces (×2)
- 10' power supply
- Spare O-rings (×2)
- Installation spacer
- 5/16" hex key
- Installation guide

Where is Flo by Moen installed?

One device is installed on the main water supply line and paired with the home's Wi-Fi. From here, Flo by Moen can capture all vulnerabilities in the potable water system.



MOEN®

© 2019 Moen Incorporated

Not as accurate as Moen unit – however good at identifying leaks and less expensive and easier install





Droplet (https://shop.hydrificwater.com/pages/buy-droplet)

Smart Home Water Sensor

- Droplet is an all-in-one smart water sensor that uses powerful ultrasonic sensors and AI to track your household water use.
- Protect your home from water damage with instant leak alerts and get detailed insights into how each appliance in your home is using water.
- Instant Leak Alerts
- Real-Time Water Tracking
- $199.00

Description

Meet your new essential water tool.

Droplet is the most advanced water precision sensor that detects leaks instantly and gives you full control of your water use.

Best-in-class precision readings

Dual ultrasonic sensors scan water flow up to 50 times per second, detecting flows as low as 0.1 liters per minute for the most accurate leak detection and water tracking on the market.

Total control of your water

Get insights into your water bills with detailed breakdowns into your household water usage monthly, daily or even hourly.

See where your water is going

Pinpoint the appliances using the most water and understand your water use. Advanced AI monitors your water patterns so you can track and view your habits easily.

One Device for Your Entire Home

Other water monitors require you to place multiple sensors around the home where you think leaks are likely to occur. One Droplet in a single location is all you need to monitor your entire home's water system for leaks.

Self-install in minutes

No tools or plumber necessary. Simply clamp and connect in minutes to start tracking water and saving money.

H2OPTION® SIPHONIC DUAL FLUSH ELONGATED TOILET
VITREOUS CHINA

H2OPTION® SIPHONIC DUAL FLUSH ELONGATED TOILET



❑ **2887.218**
- Vitreous china
- Ultra high efficiency
  - Full Flush (4.8 Lpf/1.28 gpf)
  - Partial Flush (3.4 Lpf/0.92 gpf)
- Elongated siphon action bowl with direct-fed jet
- Meets EPA WaterSense® criteria
- MaP PREMIUM listed
- Includes EverClean® antimicrobial surface
- PowerWash® rim scrubs bowl with each flush
- 305mm (12") rough-in
- Fully glazed 2" Trapway
- Generous 9" x 8" water surface area
- Chrome plated top mounted push button actuator
- Sanitary bar on bowl
- 2 color matched bolt caps
- Limited lifetime warranty on chinaware and limited five year warranty on all mechanical parts

❑ **2887.518** Same as above, except with Tank with AquaGuard Liner

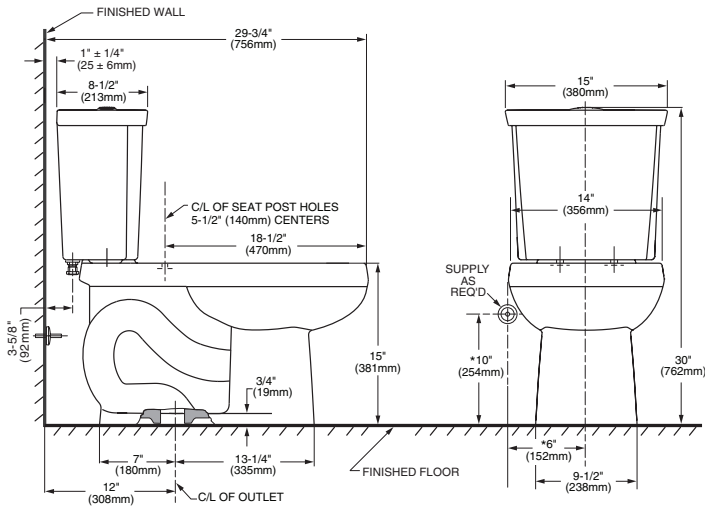
Separate Component Parts:
❑ **3706.216** Bowl
❑ **4133A.218** Tank
❑ **4133A.518** Tank with AquaGuard Liner

Nominal Dimensions:
756 x 380 x 762mm
(29-3/4" x 15" x 30")

Fixture only, seat and supply by others

Compliance Certifications -
Meets or Exceeds the Following Specifications:
- ASME A112.19.2-2008/CSA B45.1-08 for Vitreous China Fixtures
- CALGreen and Califonia Energy Commission (CEC) Compliant
- US EPA WaterSense® criteria for UHETs

To Be Specified:
❑ Color: ❑ White ❑ Bone ❑ Linen
❑ Seat: American Standard #5257A.65C Easy Lift and Clean Elongated Seat with Cover and Slow Close hinges
❑ Alternate Seat:
❑ Supply with stop:



NOTES:
THIS COMBINATION IS DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.
* DIMENSION SHOWN FOR LOCATION OF SUPPLY IS SUGGESTED. SUPPLY NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerance established by ANSI Standard A112.19.2
These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.

WaterSense Meets EPA Criteria
Certified by IAPMO R&T

WATER EFFICIENT PRODUCT

© 2015 AS America Inc.



NIAGARA CONSERVATION

PRESSURE COMPENSATING NEEDLE SPRAY FAUCET AERATOR

Our Niagara Conservation branded Dual Spray Swivel Aerator with Pause Valve directs the water flow where it's needed the most providing greater efficiencies. It offers two stream options: a full force multiple stream and a splash-free bubble stream that can be changed by twisting the body. This aerator contains a 360° swivel which helps to reduce water use by directing the water flow where it's needed. This aerator also features a pause action valve that reduces flow to a trickle while keeping temperature constant.

THE FEATURES

- Dual threaded
- Fits most male and female threaded faucets, Male: 15/16-27, Female: 55/64-27
- Pressure compensating technology guarantees a consistent flow rate across a wide range of pressure
- Needle Spray
- 10 year warranty***

CERTIFICATION & PERFORMANCE REQUIREMENTS

- ASME A112.18.1 / CSA B125.1; ANSI/NSF 61



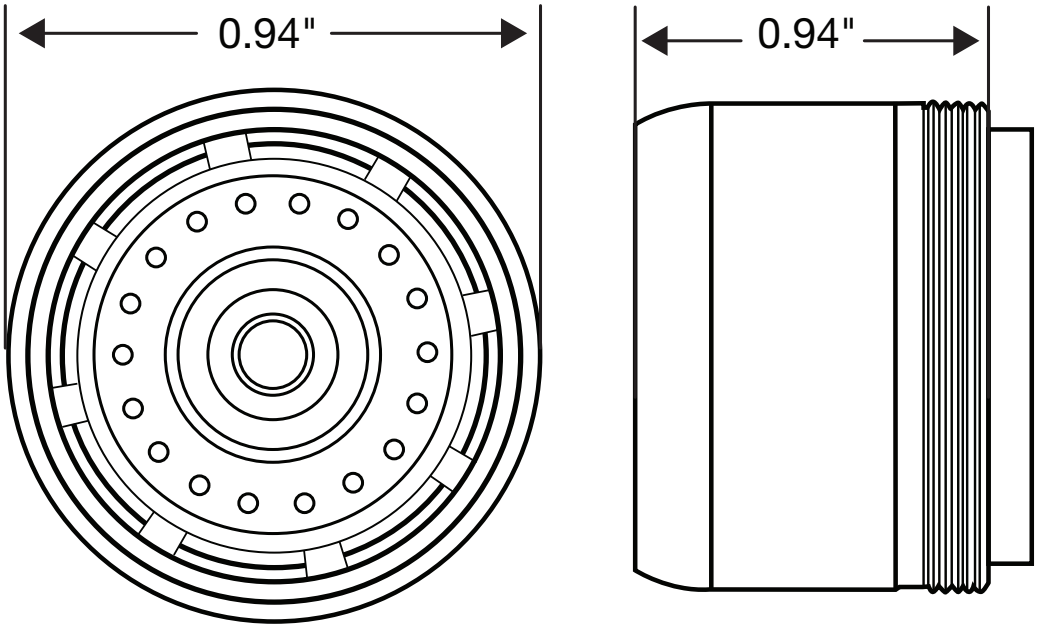
N3205NBN-PC-T

MODEL #	SPRAY	FINISH	FLOW RATE	WATERSENSE	CASE QTY.
N3205N-PC	Needle	Chrome	0.5 GPM	No	500
N3205NBN-PC-T	Needle	Brushed Nickel	0.5 GPM	No	500
N3210N-PC	Needle	Chrome	1.0 GPM	Yes	500
N3215N-PC	Needle	Chrome	1.5 GPM	Yes	500

THE POTENTIAL ANNUAL SAVINGS*

	FLOW RATE	WATER	ELECTRIC HEATING	GAS HEATING
DOLLAR SAVINGS	0.5 GPM	$124	$107	$52
UTILITY SAVINGS	0.5 GPM	14,892 gallons	842 kWh	46 therms
DOLLAR SAVINGS	1.0 GPM	$104	$67	$37
UTILITY SAVINGS	1.0 GPM	10,512 gallons	594 kWh	33 therms
DOLLAR SAVINGS	1.5 GPM	$51	$39	$21
UTILITY SAVINGS	1.5 GPM	6,132 gallons	347 kWh	19 therms

THE DIMENSIONS**



*Factors in calculating savings potential:

- 3-person households each person using a faucet 8 minutes per day, 365 days per year (AWWARF Residential Study)
- Comparing water use with these aerator vs. a standard 2.2 GPM unit
- US city average water and sewer cost of $8.3 per 1,000 gallons (study done by NUS Consulting Group 2011)
- Average cost of electricity 0.113¢ per kWh (Energy Star Nov. 2013 Lightbulb Calculator — http://www.energystar.gov/?c=cfls.pr_cfls_savings)
- Average cost of gas $1.137 per therm (Bureau of Labor Statistics April 2014)
- Calculations done by http://www.fishnick.com/savewater/tools/watercalculator

**Dimensions are subject to change

***WARRANTY DETAILS

AM Conservation Group, Inc. guarantees to the original purchaser or recipient of an aerator that it is free from defects in material and workmanship for a period of 10 years. AM Conservation Group, Inc. will at our choice replace any part of the aerator which is in our opinion defective provided that the product has not been abused, misused, altered, or damaged after its purchase. This includes damage due to the use of tools or harsh chemicals. In the event a product has been discontinued, AM Conservation Group, Inc. will replace it with what we determine to be the closest product. AM Conservation Group, Inc. is not responsible for labor charges, installation, or other consequential cost. AM Conservation Group, Inc.'s responsibility shall not exceed the original cost of the product.

1701 Charleston Regional Parkway, Suite A | Charleston, SC 29492
(843) 971-1414 | www.amconservationgroup.com

Specifications

McKenna Single-Handle Pull-Down Sprayer Kitchen Faucet

MODEL	SKU#	FINISH
HD67726W-1201	1005604253	Chrome
HD67726W-1208D2	1005604255	Stainless Steel
HD67726W-1210H	1005604254	Matte Black
HD67726W-124405	314006951	Matte Gold

FEATURES

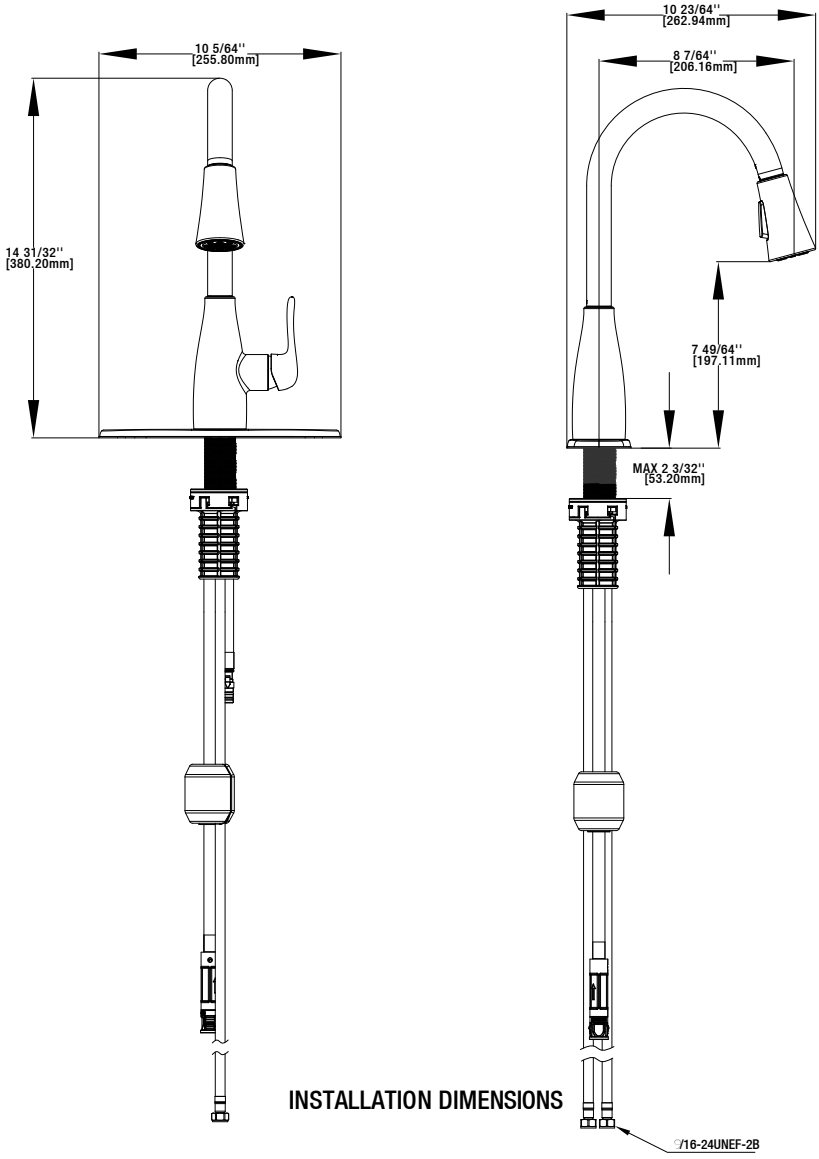
- Requires 1 Hole Sink with 8" On-Center
- Max Flow Rate: 1.8 gpm (6.8 L/min) at 60 psi
- Max Countertop Thickness: 2 3/32"
- Spout Reach: 8 7/64"
- Spout Height: 7 49/64"
- Ceramic Valve for Lifetime Drip-Free Operation
- With Zinc Lever Handle
- Fast Mount Installation

CODE COMPLIANCE

- IAPMO Certified: ASME A112.18.1/CSA B125.1
- NSF 61 Section 9
- NSF 372
- Calgreen Certified
- Meets AB 1953 Lead Standard
- ADA Compliant

WARRANTY

- Limited Lifetime Warranty



INSTALLATION DIMENSIONS

Glacier Bay reserves the right to make changes in specifications and materials and to change and discontinue models, both without notice or obligation. Dimensions are for reference only.

Landscaping Septic Systems

COLLEGE OF FOOD, AGRICULTURAL AND NATURAL RESOURCE SCIENCES

Mary H. Meyer, *Extension Horticulturist*
Brad Pedersen, *Extension Horticulturist (retired)*
Marguerite Jaster, *Landscape Design Assistant*
Department of Horticultural Science
James Anderson, *Extension Soil Scientist, Department of Soil, Water, and Climate (retired)*
Kenneth M. Olson, *Extension Educator (retired)*
David M. Gustafson, *Extension Specialist, Onsite Sewage Treatment, Water Resources Center*

Landscaping near and around septic systems is of concern to many homeowners. Whether drainfields or mounds, Minnesota septic systems must have a minimum of three feet of unsaturated soil between the drainfield or point of infiltration and limiting soil condition such as hardpan, bedrock or saturated soil in order to properly treat sewage. A mound system is required if three feet of separation cannot be achieved with an inground trench system. Mound systems are designed to maximize the absorption capacity of existing soil (see Figure 1). Mound location, size, shape, construction procedures and maintenance of the mound all interact in determining how well the system will function. Placement of plants on and near the mound must be done with care to ensure a properly functioning septic system. Plants enhance the system by removing moisture and nutrients from the soil and providing cover to prevent erosion.

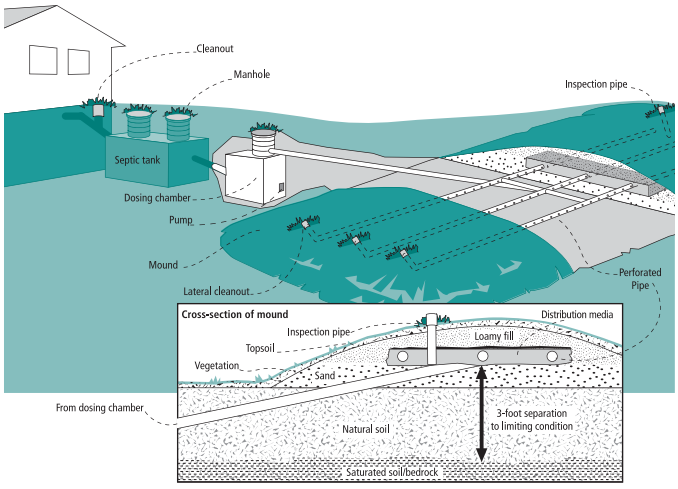


Figure 1. Cross section of a mound system.

Mound Placement

A rectangular mound rising 18 inches to 5 feet above the surface of a relatively flat home landscape may be quite noticeable and possibly very unsightly. Careful design planning **before the mound system is installed** can help to create a sustainable landscape with lower maintenance costs, greater environmental benefits, and much higher aesthetic value. Mounds can be placed to suit individual landscaping and lot size needs (see Figures 2 and 3). Properly landscaped areas around the mound can serve as privacy barriers, windbreaks for homes and a screen from unsightly views.

As a homeowner considering the placement of a septic mound, know your options. *The earlier in the process that you become involved in expressing your preferences, the more options you will have.* For instance, before the house is designed or built, potential septic locations, along with soil borings and percolation tests, can give some control over the placement and final outcome. State and local laws set distances from wells and lakes, based on well casing depth and lake classification. Property lines (PL) or rights-of-way set backs are usually 10 feet (see Figure 4). Additionally, on even a slight slope, it is paramount that the mound rockbed be on the contour for proper operation of the system. Soil must not be moved to create a different slope, as this reduces the ability of the soil to accept the effluent. Once the drainfield or mound is determined, protect it from compaction and disturbance to ensure proper sewage treatment.

When planning a landscape, there should be an **invisible or concept line** the eye follows around the yard (see Figures 2, 3 and 4). Where space allows, this line is a graceful curve which represents the division between two different types of plant material (turf or ground cover versus shrubs) or between plants and hard goods (turf, patio or deck). The concept line becomes a real bedline where the lawn ends and the shrubs begin. If your property is large enough to plan

This publication is meant to be used in conjunction with the *Septic System Owners Guide*, Item # 06583 which further explains the site requirements for placement and location of a mound system. See back page for ordering information.

UNIVERSITY OF MINNESOTA
EXTENSION

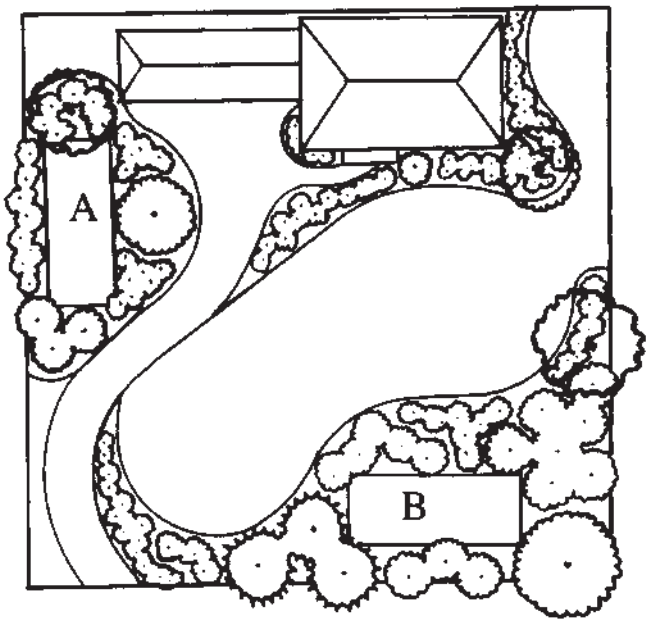


Figure 2. A and B represent possible placement of mound septic systems.

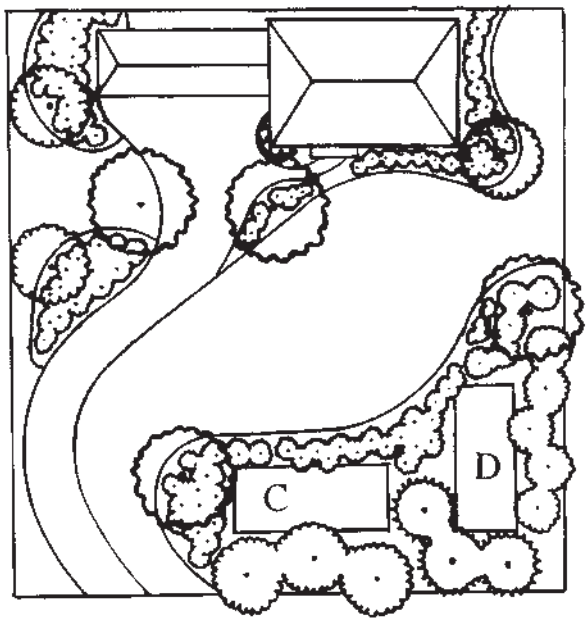


Figure 3. C and D show additional mound system locations.

an **unbroken turf area** as the **first priority**, then place the septic system beyond the bedline disguising it as part of a shrub or perennial area or screening it with trees or large shrubs. If your property is smaller, blending the mound into the overall landscape is still the key. Try moving the focal point from the mound to other plants or features. **Extending the actual berm** with additional topsoil at the same height and curving the perimeter, then sloping down and away can conceal the existence of the system (see Figure 4). If the drainfield must be located near a drive, patio, or walkway, retaining walls may be used to save space, but only on the uphill side of the berm. Connect the extended berm to another large feature in the yard, such as a pool enclosure or other fenced area, using retaining walls for transition. ALWAYS design with the entire yard or viewing area in mind—connect it to the whole picture.

Guidelines for Planting on and Near Septic Mounds

It is very important that the integrity of the mound be kept intact and that soil does not wash away. A permanent vegetation cover is required to minimize topsoil loss. Open sites are more susceptible to frost, heaving and erosion. Plants trap snow which acts as a mulch and prevents erosion.

- Topsoil on the mound should be a minimum of 6 inches and a maximum of 16 inches.
- Do not till when planting.
- Establish a cover as soon as possible to limit erosion.
- Always wear gloves when working over septic systems to minimize your contact with soil.
- Use plants that do not like water or wet soils near the septic system. This will prevent their root systems from interfering with the septic system. The larger the plant, the more extensive (not necessarily deeper) the root system.
- **Do not place** trees and shrubs **ON** the mound; they may be planted at the foot or on side slopes. Frame the mound with trees and shrubs at a distance, but use only herbaceous (non-woody) plants on the mound itself. Trees should be planted a minimum of 20 feet from the edge of the mound. Trees known for seeking water reservoirs, such as poplar, maple, willow and elm, should be planted at least 50 feet from the mound. Shrubs should not be planted on top of the mound.
- Avoid irrigation and fertilization on a mound; in fact, never plan to irrigate this area. Use plants that can withstand dry conditions. Plants listed on the back page tolerate and thrive on natural rainfall in Minnesota.
- Minimize traffic on the mound, both human and animal, to avoid soil compaction. Do not exercise pets or stake pets on septic mounds. Never drive a car or other vehicle across the mound or mow when the soil is wet. Compacted soil can lead to soil erosion and impedes the flow of air around the system. In winter, activity on a mound can cause frost to penetrate resulting in freezing problems.
- Do not plant edible plants, such as vegetables and herbs on a mound or drainfield.
- Annually inspect the mound for animal damage such as burrowing and tunneling. Control animals at the first sign of tunneling or burrowing before damage is extensive.
- Root barriers (geotextiles impregnated with a long-lasting herbicide that kills plant roots) have been used around mounds. Installation is expensive and can be avoided with proper plant selection.

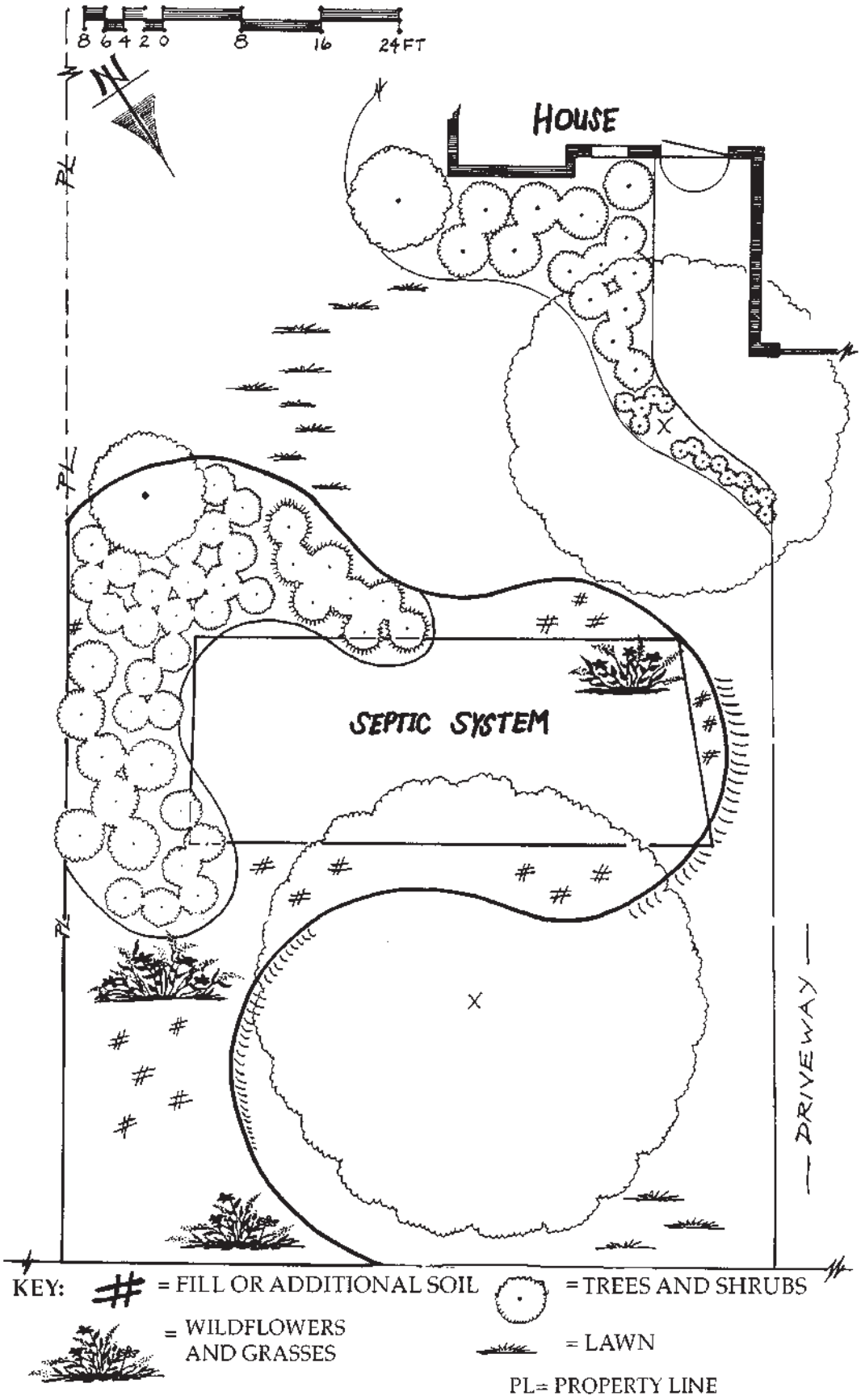


Figure 4. Model landscape plan for mound septic system.

Suggested Plants for Use on Septic Mounds

Herbaceous plants, such as **wildflowers and grasses**, are good choices for mound plantings. Grasses are especially desirable due to their fibrous root systems which hold soil in place. Grasses also provide year-round cover.

The following native prairie plants grow well on dry soils and would be good choices for a mound septic system:

Wildflowers

prairie onion (Allium stellatum)
pussytoes (Antennaria neglecta)
butterflyweed (Asclepias tuberosa)
heath aster (Aster ericodes)
bigleaf aster (Aster macrophyllus)*
Pennsylvania sedge (Carex pensylvanica)*
prairie clover (Dalea spp.)
pale purple coneflower (Echinacea angustifolia)
rattlesnake master (Eryngium yuccifolium)
wild geranium (Geranium maculatum)*
prairie smoke (Geum triflorum)
oxeye (Helianthus helianthoides)
rough blazing star (Liatris aspera)
wild bergamot (Monarda fistulosa)
penstemon (Penstemon spp.)
pasqueflower (Pulsatilla patens)
violets (Viola spp.)*

Grasses

sideoats grama (Bouteloua curtipendula)
blue grama (Bouteloua gracilis)
little bluestem (Schizachyrium scoparium)
prairie dropseed (Sporobolus heterolepis)
June grass (Koeleria macrantha)

* *shade tolerant*

These plants are propagated by seed or plants. A combination of both will make a faster cover. Use a mulch of clean straw or a cover crop of annual ryegrass or oats to prevent erosion while the plants become established.

Low maintenance lawn grasses, such as fine fescues, can make a dense cover and only need to be mowed once or twice a year. Mow in October and late June to reduce weeds. Fescues are traditional lawn grasses that tolerate dry soils and shady sites. A mixture of fine-textured fescues, such as creeping red, hard and sheep's fescues *(Festuca rubrum, Festuca longifolia, Festuca ovina)*, in equal proportions can be seeded at the rate of 3.5 pounds per 1000 square feet. Traditional lawn grasses, such as common Kentucky bluegrass and perennial ryegrass, can be planted on a mound and regularly mowed. Mowing will increase evaporation from the mound and aid in rodent control.

Perennial flowers, such as daylilies and peonies, can be grown; however, extra care must be taken to mulch or plant close together so soil will not be exposed and erode. Low maintenance plants that do not need tending and care (remember minimal traffic on the mound) are best. Enjoy from afar, and do not walk on the mound.



Figure 5. Pasqueflower is a native wildflower that tolerates dry soil conditions.

Proper selection and placement of plants best suited to the site means that those plants will be healthier, more attractive, and have fewer pest problems.

References and Further Information

Septic System Owners Guide, Item # 06583
Plants in Prairie Communities, Item # 03238

The publications can be ordered from University of Minnesota Extension. Go to http://shop.extension.umn.edu or call 1-800-876-8636.

For landscape design publications, refer to SULIS URL in Extension site: www.sustland.umn.edu

For more information about septic systems, refer to UMN Onsite Sewage Treatment Program website: http://septic.umn.edu

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Item # 06986
2008
www.extension.umn.edu

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DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

14949 62nd Street North P.O. Box 6

Stillwater, MN 55082-0006

Office: 651-430-6655 TTY: 651-430-6246 Fax: 651-430-6730

Community City Of Cottage Grove

Permit Number 2025-3556

Owner New Life Comm Chur

Owner Address Po Box 546 , Hastings Mn 55033

Applicant Midwest Services

PERMISSION IS HEREBY GRANTED

To execute the work specified in this permit on the following identified property upon express condition that said persons and their agents, and employees shall conform in all respects to the provisions of Ordinance #206, Washington county Development Code, Chapter Four, Subsurface Sewage Treatment System Regulations. This permit may be revoked at any time upon violation of any of the provisions of said ordinance.

Project Address 11245 Point Douglas Dr S, City Of Cottage Grove

Geo Code 3602721230002

Designer Ten Thirty Environmental Solutions, SBC

Type of System: Replacement System Mound

Design Criteria

Depth to Restriction: 30 Inches

Land Slope 4.00 %

Flow Rate: 2460.00 GPD

Mound Sizing

Rock Bed Width: 10.00 Feet

Rock bed Length: 100.00 Feet

Absorption Width: 20.00 Feet

Depth of Clean Sand: 1.00 Feet

Downslope Dike Width: 16.00 Feet

Upslope Dike: 10.00 Feet

Length of Dike: 126.00 Feet

Pressure Distribution

Number of Laterals: 3

Perforation Spacing: 3.0 Feet

Perforation Diameter: 3/16 Inch

Lateral Diameter: 1-1/2 Inches

Total Dynamic Head: 49 Feet

Pump 1: 59 GPM

Tank Sizes

Tank 1: 4200 Gallons

Tank 2: 4200 Gallons

Pump Tank 1: 4200 Gallons

Authorized Work/Special Conditions

The granting of this permit does not alleviate the applicant from obtaining any other Federal, State, or local permits required by law for this project.

*CENTER MANIFOLD *Design requires secondary protection within manholes - CONSIDER a hatch w/ padlock to access dual alternating pump *calibrate pump and verify GPM after install *Time dose panel with elapsed time meter, event counter & alarm *Use of non-registered tanks allowed, a licensed Professional Engineer to sign off the tank meeting Minn. R. 7080.2010 *New building sewer for other establishment to be permitted/inspected by others (DOLI) *New well to meet SSTS setbacks (properly abandon existing well) *Approval for SSTS - project to meet local city land use and watershed district requirements prior to construction

*** Abandon old tank(s) properly., Call at least 24 hours before the time you need an inspection., Domestic strength waste only. Industrial waste and hazardous wastes cannot enter the septic system., Effluent Filter & Alarm required on outlet of last tank in series - must have handle to access from final grade., Establish a vegetative cover over the soil treatment area within 30 days of the installation. Protect the soil treatment area from erosion until the vegetative cover is established., Install a meter to monitor wastewater flow., Installer must verify head and elevation so the proper pump size is used., Install individual sewage treatment system as per approved design in area tested and shown on the site plan., Install only when soil is below the plastic limit (dry soil conditions)., Insulate tank lids to a value of R-10 if tanks are 2-feet or less from the surface., Pressurized laterals can be no further apart than 36 inches and require accessible cleanouts at the end of each lateral., Rope off and protect tested area from all vehicle traffic., System must be operated in accordance with the attached Management Plan., This system must be installed by a certified/licensed sewage treatment system installer holding a current license with the Minnesota Pollution Control Agency. , Use of tanks registered with the Minnesota Pollution Control Agency required.
All permitted SSTS work must include an inspection and scheduled 24 hours in advance by calling 651-430-6655. Required Inspections: Final, Rough-Up, Soil Treatment Area, Tank Inspection, Abandon existing tank(s) properly

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Permit Issuance Date: 11/26/2025
Permit Expiration Date: 11/26/2026

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a323ee3c9d5a7ca16c20b2c8c4bc49ed
Sarah Borrell 11/26/2025 - Issued

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Providing Sound, Balanced, Comprehensive Natural Resource Solutions

Memorandum

Date: December 29th, 2025

To: Jay Riggs, South Washington Watershed District (LGU)

CC: Benjamin Myre, New Life Evangelical Free Church
Nick Adam, Rehder & Associates

From: Archie MacKinnon, Kjolhaug Environmental Services (KES)

Re: Site Assessment for Wetlands and No Wetland Determination
11245 Point Douglas Drive South, Cottage Grove (KES 2025-223)

Kjolhaug Environmental Services (KES) conducted a desktop review of the 10.12-acre, 11245 Point Douglas Drive South site in Cottage Grove, MN to evaluate the presence and extent of wetlands. KES utilized the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual (87 Manual) Routine Level 1 delineation method based on offsite information. Based on the review of available information, no wetland was identified on the property.

The site is located in Section 36, Township 27 North, Range 21 West, City of Cottage Grove, Washington County, Minnesota. The site is situated southwest of US 10 and east of the River Oaks Golf Course (**Figure 1**). The site boundary corresponds to Washington County PID 3602721230002 (11245 Point Douglas Dr S; 10.12 acres).

The site consists of the New Life Evangelical Free Church and associated parking lot, lawn and woods. Surrounding land use consists of agricultural fields to the south and north, a golf course to the west and a church to the north. Existing conditions are depicted in **Figure 2**.

Attachment A of this memo includes a Joint Application Form for Activities Affecting Water Resources in Minnesota, which is submitted to the South Washington Watershed District to request concurrence with the no-wetland determination under the Minnesota Wetland Conservation Act (WCA).

Review of NWI, Soils, DNR, and NHD Information

The National Wetlands Inventory (NWI) (Minnesota Geospatial Commons and Minnesota Department of Natural Resources 2019) did not show any wetlands within or near the site boundary (**Figure 3**).

The Soil Survey (USDA NRCS SSURGO 2024) did not identify any hydric soil units mapped within the site boundary. Soil types mapped on or near the property are listed in **Table 2** and depicted in **Figure 4**.

Table 2. Soil units on the 11245 Point Douglas Drive South site.

Symbol	Map unit name	Acres in AOI	Percent of AOI	% Hydric	Hydric Rating
8	Sparta loamy sand, 0 to 2 percent slopes	2.7	26.6%	0%	Non-Hydric
8B	Sparta loamy sand, 2 to 6 percent slopes	5.9	58.6%	0%	Non-Hydric
8C	Sparta loamy sand, 6 to 15 percent slopes	0.0	0.1%	0%	Non-Hydric
327	Dickman sandy loam, 0 to 2 percent slopes	1.5	14.8%	0%	Non-Hydric

The Minnesota DNR Public Waters Inventory (Minnesota Department of Natural Resources 2025) did not show any Public Waters, Watercourses, or Wetlands in or within 1,000-ft the site boundary (**Figure 5**).

The National Hydrography Dataset (U.S. Geological Survey 2023) did not show any surface water features within or near the site boundary (**Figure 6**).

No-Wetland Determination

The area of lowest elevation in a depression near the center of the site (876 ft MSL) is located in a non-hydric soil unit, was not indicated on wetland mapping resources and did not exhibit any wetland signatures on aerial photography. For these reasons, this area was determined to be non-wetland.

Based on the lack of mapped hydric soil units, lack of mapped water resources and no observations of wetland signatures on aerial imagery, it was determined that no wetlands are present within the Site Boundary.

Requested Approvals

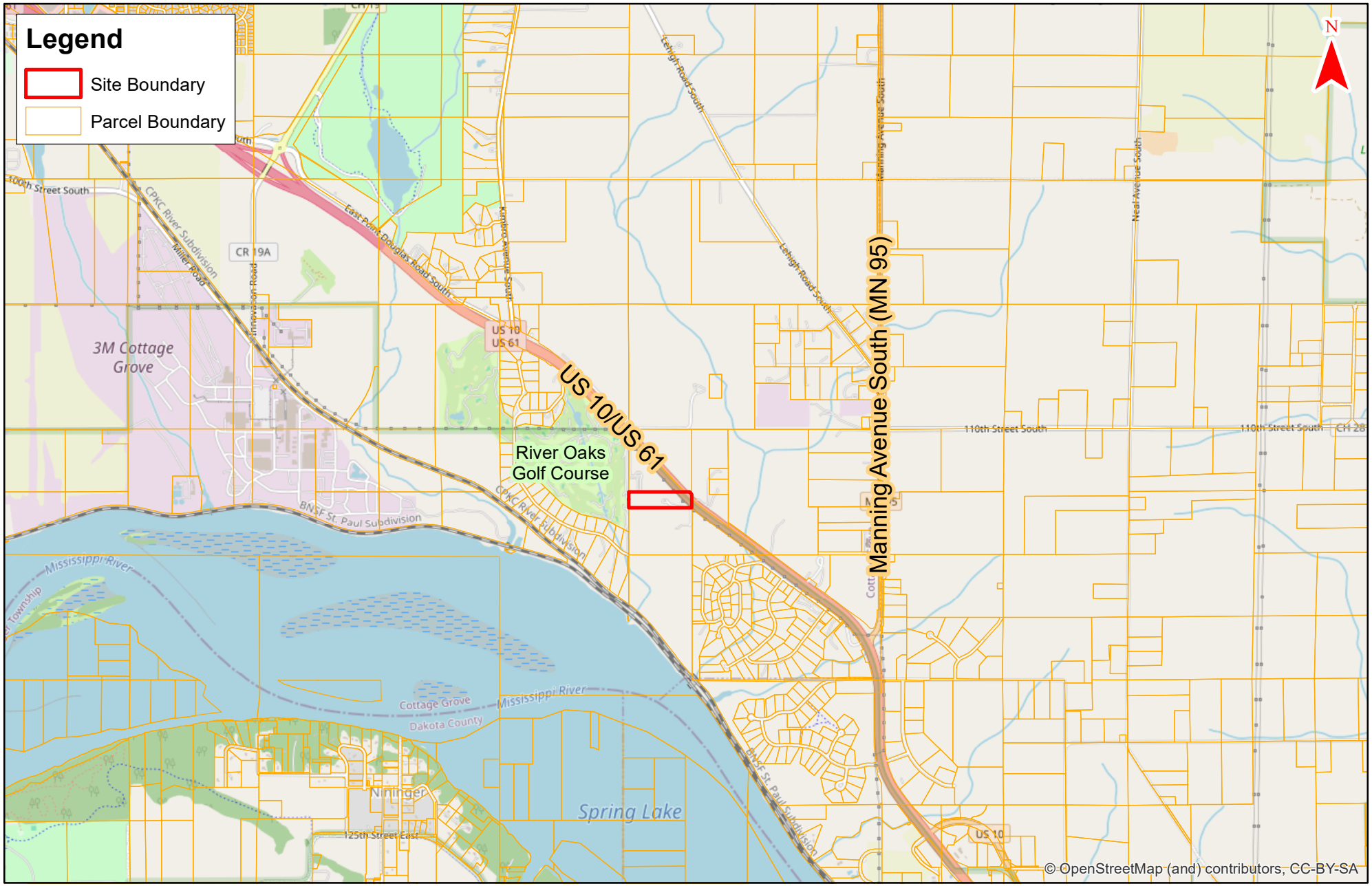
Attachment A of this memo includes a Joint Application Form for Activities Affecting Water Resources in Minnesota, which is submitted to South Washington Watershed District to request concurrence with the no-wetland determination under the Minnesota Wetland Conservation Act (WCA).

11245 Point Douglas Drive South

No Wetland Determination

Figures:

Figure 1 – Site Location
Figure 2 – Existing Conditions
Figure 3 – National Wetlands Inventory
Figure 4 – Soil Survey
Figure 5 – DNR Public Waters
Figure 6 – National Hydrography Dataset



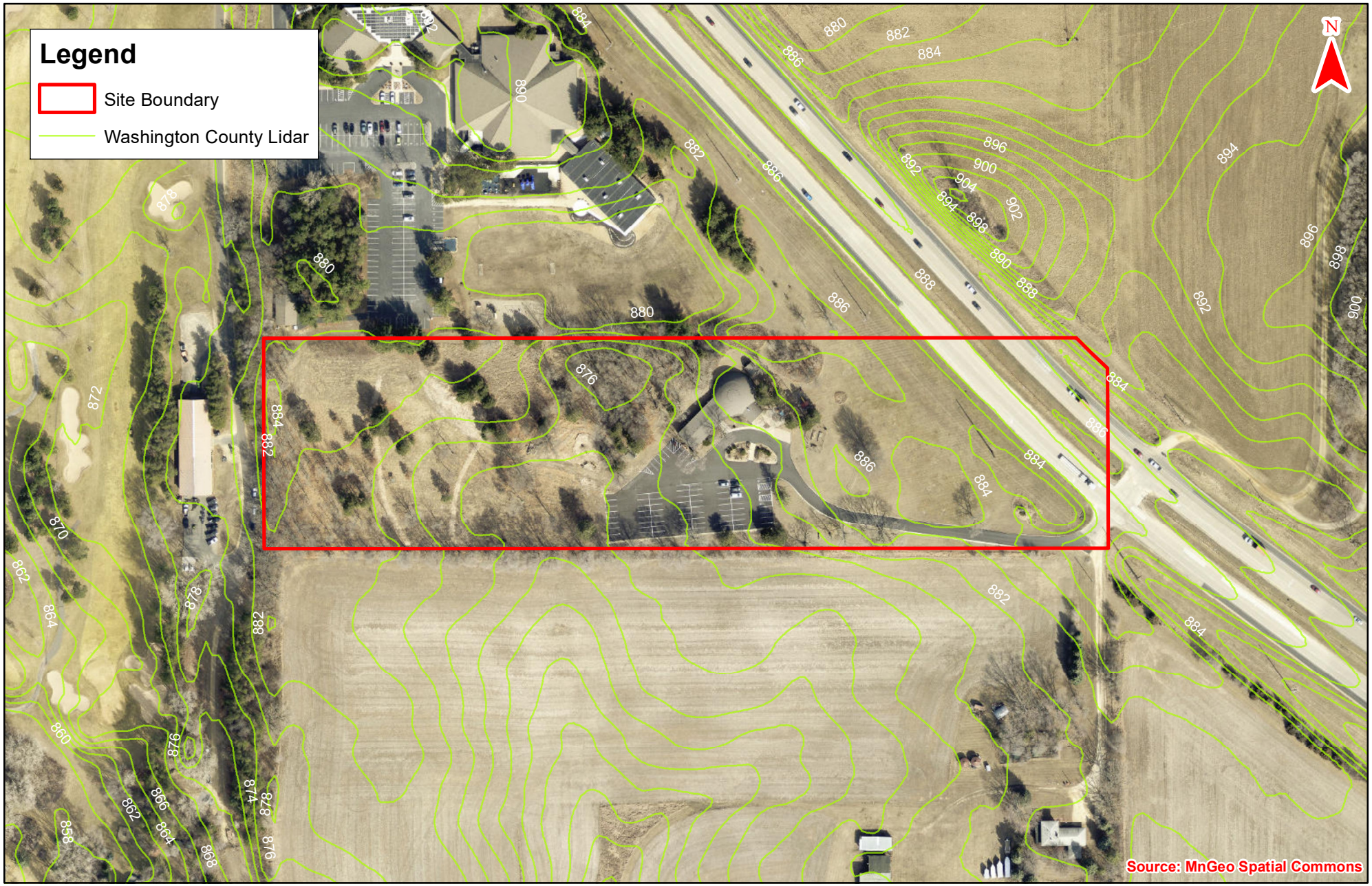
KJOLHAUG ENVIRONMENTAL

0 2,000 Feet

Figure 1 - Site Location

11245 Point Douglas Drive South (KES 2025-223)
Cottage Grove, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.



KJOLHAUG ENVIRONMENTAL

0 200 Feet

Figure 2 - Existing Conditions (2024, Washington County)

11245 Point Douglas Drive South (KES 2025-223)
Cottage Grove, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.



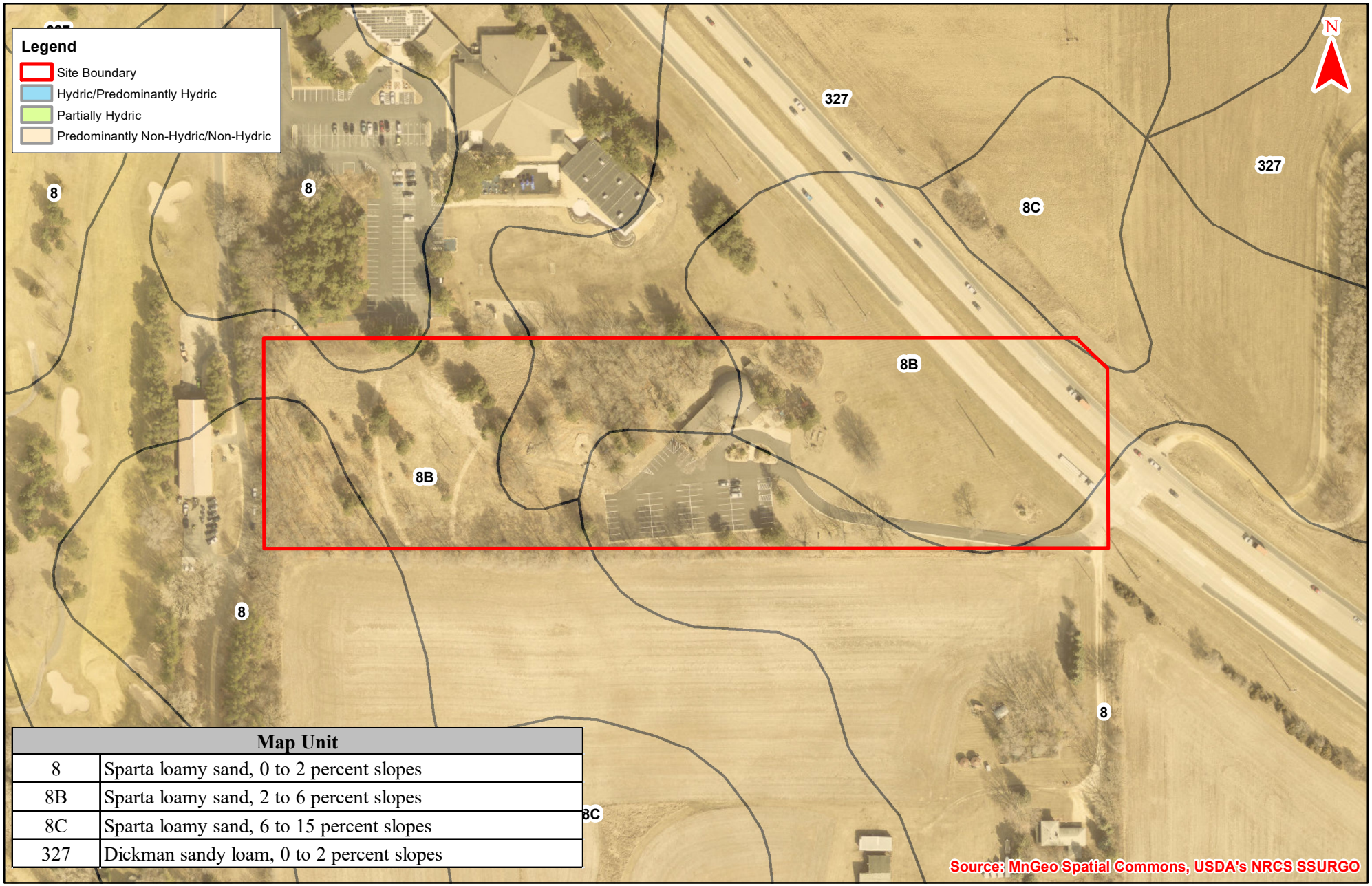
KJOLHAUG ENVIRONMENTAL

0 500 Feet

Figure 3 - MnDNR National Wetlands Inventory Update

11245 Point Douglas Drive South (KES 2025-223)
Cottage Grove, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.



Map Unit	
8	Sparta loamy sand, 0 to 2 percent slopes
8B	Sparta loamy sand, 2 to 6 percent slopes
8C	Sparta loamy sand, 6 to 15 percent slopes
327	Dickman sandy loam, 0 to 2 percent slopes

KJOLHAUG ENVIRONMENTAL

0 200 Feet

Figure 4 - Soil Survey

11245 Point Douglas Drive South (KES 2025-223)
Cottage Grove, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.



KJOLHAUG ENVIRONMENTAL

0 1,000 Feet

Figure 5 - DNR Public Waters Inventory

11245 Point Douglas Drive South (KES 2025-223)
Cottage Grove, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.



KJOLHAUG ENVIRONMENTAL

0 500 Feet

Figure 6 - National Hydrography Dataset

11245 Point Douglas Drive South (KES 2025-223)
Cottage Grove, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.

11245 Point Douglas Drive South

No Wetland Determination

Attachment A

Joint Application Form for Activities Affecting Water Resources in Minnesota

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name: New Life Evangelical Free Church; c/o Benjamin Myre
Mailing Address: 11245 Point Douglas Dr S, Hastings, MN 55033
Phone: 651-437-1545
E-mail Address: bcmyre@hotmail.com

Authorized Contact (do not complete if same as above):
Mailing Address:
Phone:
E-mail Address:

Agent Name: Kjolhaug Environmental Services; c/o Archie MacKinnon
Mailing Address: 2500 Shadywood Road Suite 130, Orono, MN 55331
Phone: 952-217-7689
E-mail Address: archie@kjolhaugenv.com

PART TWO: Site Location Information

County: Washington **City/Township: Cottage Grove**
Parcel ID and/or Address: PID 3602721230002
Legal Description (Section, Township, Range): S: 35, T: 27N, R: 21W
Lat/Long (decimal degrees): 44.786087, -92.881318
Attach a map showing the location of the site in relation to local streets, roads, highways.
Approximate size of site (acres) or if a linear project, length (feet): 10.1 ac.

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted ***prior to*** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

Application is for No Wetland Determination concurrence

PART FOUR: Aquatic Resource Impact[1] Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	**Aquatic Resource Type** (wetland, lake, tributary etc.)	**Type of Impact** (fill, excavate, drain, or remove vegetation)	**Duration of Impact** Permanent (P) or Temporary (T)[1]	**Size of Impact**[2]	**Overall Size of Aquatic Resource** [3]	**Existing Plant Community Type(s)** in Impact Area[4]	**County, Major Watershed #, and Bank Service Area #** of Impact Area[5]

[1]If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".
[2]Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).
[3]This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".
[4]Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.
[5]Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

PART FIVE: Applicant Signature

☐ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: _____ Date: 12.23.25

I hereby authorize Kjolhaug to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

[1] The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.

Attachment A
Request for Delineation Review, Wetland Type Determination, or Jurisdictional Determination

By submission of the enclosed wetland delineation report, I am requesting that the U.S. Army Corps of Engineers, St. Paul District (Corps) and/or the Wetland Conservation Act Local Government Unit (LGU) provide me with the following (check all that apply):

☐ **Wetland Type Confirmation**

☒ **Delineation Concurrence**. Concurrence with a delineation is a written notification from the Corps and a decision from the LGU concurring, not concurring, or commenting on the boundaries of the aquatic resources delineated on the property. Delineation concurrences are generally valid for five years unless site conditions change. Under this request alone, the Corps will not address the jurisdictional status of the aquatic resources on the property, only the boundaries of the resources within the review area (including wetlands, tributaries, lakes, etc.).

☐ **Preliminary Jurisdictional Determination**. A preliminary jurisdictional determination (PJD) is a non-binding written indication from the Corps that waters, including wetlands, identified on a parcel may be waters of the United States. For purposes of computation of impacts and compensatory mitigation requirements, a permit decision made on the basis of a PJD will treat all waters and wetlands in the review area as if they are jurisdictional waters of the U.S. PJDs are advisory in nature and may not be appealed.

☐ **Approved Jurisdictional Determination**. An approved jurisdictional determination (AJD) is an official Corps determination that jurisdictional waters of the United States are either present or absent on the property. AJDs can generally be relied upon by the affected party for five years. An AJD may be appealed through the Corps administrative appeal process.

In order for the Corps and LGU to process your request, the wetland delineation must be prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, any approved Regional Supplements to the 1987 Manual, and the *Guidelines for Submitting Wetland Delineations in Minnesota* (2013).
http://www.mvp.usace.army.mil/Missions/Regulatory/DelineationJDGuidance.aspx

REHDER
& ASSOCIATES, INC.
Civil Engineers & Land Surveyors

STORM WATER MANAGEMENT REPORT

FOR

NEW LIFE EFREE CHURCH

1-28-26

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.

Report Prepared By:

Benjamin J. Quaas, P.E.

Registration Number: 59732

Report Reviewed By:

Nicholas P. Adam

Nicholas P. Adam, P.E.

Registration Number: 43856

REHDER & ASSOCIATES, INC.
Civil Engineers & Land Surveyors

3440 Federal Drive, Suite 110
Eagan, MN 55122
Direct: 651.337.6729
Office: 651.452.5051
Website: www.rehder.com

WORKSHEET

By: BJQ Date: 1/22/2026
Project No: 2393.058 Sheet of
Subject:

VOLUME CONTROL SIZING CALCULATIONS

REQUIRED VOLUME: (1.1 inch off of impervious)

New & Reconstructed Impervious Area = 0.20 Acres

$$= \frac{1.10}{12\text{in./ft}} \times 0.20 \text{ ac} = 0.018 \text{ ac-ft}$$

= **799** **cu.ft.**

PROVIDED VOLUME = **1,017** **cu.ft.** (SEE ATTACHED VOLUME WORKSHEET)

Site has Poorly Graded Sands "SP"
Drawdown Time = 48 hours
Proposed Infiltration rate = 0.8 inch/hour
Allowable Depth of Infiltration:
0.8 in/hr x 48 hours = 38.4 inches (3.2 feet)

Basin Bottom Elevation: 877.0
Basin Outlet Elevation: 878.5
Proposed Depth of Infiltration: **1.5** **ft**

Stage-Area-Storage for Pond 9P: PROPOSED INFILTRATION BASIN

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
877.00	375	0
877.05	392	19
877.10	409	39
877.15	427	60
877.20	445	82
877.25	463	105
877.30	482	128
877.35	501	153
877.40	521	178
877.45	541	205
877.50	561	233
877.55	582	261
877.60	603	291
877.65	624	321
877.70	646	353
877.75	668	386
877.80	691	420
877.85	714	455
877.90	737	491
877.95	761	529
878.00	785	568
878.05	807	607
878.10	829	648
878.15	852	690
878.20	874	733
878.25	897	778
878.30	921	823
878.35	945	870
878.40	969	918
878.45	993	967
878.50	1,017	1,017
878.55	1,042	1,068
878.60	1,068	1,121
878.65	1,093	1,175
878.70	1,119	1,230
878.75	1,145	1,287
878.80	1,171	1,345
878.85	1,198	1,404
878.90	1,225	1,465
878.95	1,252	1,527
879.00	1,280	1,590
879.05	1,309	1,655
879.10	1,339	1,721
879.15	1,368	1,789
879.20	1,399	1,858
879.25	1,429	1,928
879.30	1,460	2,001
879.35	1,491	2,074
879.40	1,522	2,150
879.45	1,554	2,227
879.50	1,586	2,305
879.55	1,619	2,385
879.60	1,651	2,467
879.65	1,684	2,550
879.70	1,718	2,635
879.75	1,751	2,722
879.80	1,786	2,811
879.85	1,820	2,901
879.90	1,855	2,993
879.95	1,890	3,086
880.00	**1,925**	**3,182**

INFILTRATION VOLUME PROVIDED

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	New Life EFREE Church
User Name / Company Name:	Rehder & Associates, Inc.
Date:	1-28-26
Project Description:	
Construction Permit?:	Yes

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55033
Annual Rainfall (inches):	31.4
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land	.01				0.01
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	.53				0.53
			Impervious Area (acres)		.19
				Total Area (acres)	0.73

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land	0.01				0.01
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.53				0.53
			Impervious Area (acres)		0.19
				Total Area (acres)	0.73

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	759	ft3
Volume removed by BMPs towards performance goal:	759	ft^3
Percent volume removed towards performance goal	**100**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	0.6128	acre-ft
Annual runoff volume removed by BMPs:	0.5837	acre-ft
Percent annual runoff volume removed:	**95**	**%**
Post development annual particulate P load:	0.275	lbs
Annual particulate P removed by BMPs:	0.262	lbs
Post development annual dissolved P load:	0.225	lbs
Annual dissolved P removed by BMPs:	0.214	lbs
Total P removed by BMPs	0.476	lbs
Percent annual total phosphorus removed:	**95**	**%**
Post development annual TSS load:	90.8	lbs
Annual TSS removed by BMPs:	86.5	lbs
Percent annual TSS removed:	**95**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abc	1044	759	759	0	100

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abc	0.6128	0	0.5837	0.0291	95

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abc	0.275	0	0.2619	0.0131	95

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abc	0.225	0	0.2143	0.0107	95

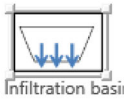
Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abc	0.5	0	0.4762	0.0238	95

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abc	90.84	0	86.52	4.3200000000	95

BMP Schematic



1 - Infiltration basin/
Infiltration trench

REHDER & ASSOCIATES, INC.
Civil Engineers & Land Surveyors

3440 Federal Drive, Suite 110
Eagan, MN 55122
Direct: 651.337.6729
Office: 651.452.5051
Website: www.rehder.com

RATE CONTROL SUMMARY

RUNOFF TO SOUTH

Storm Event	Existing Rate Offsite	Proposed Rate Offsite
	CFS	CFS
2-YR	0.1	0.1
10-YR	0.8	0.8
100-YR	6.6	6.4

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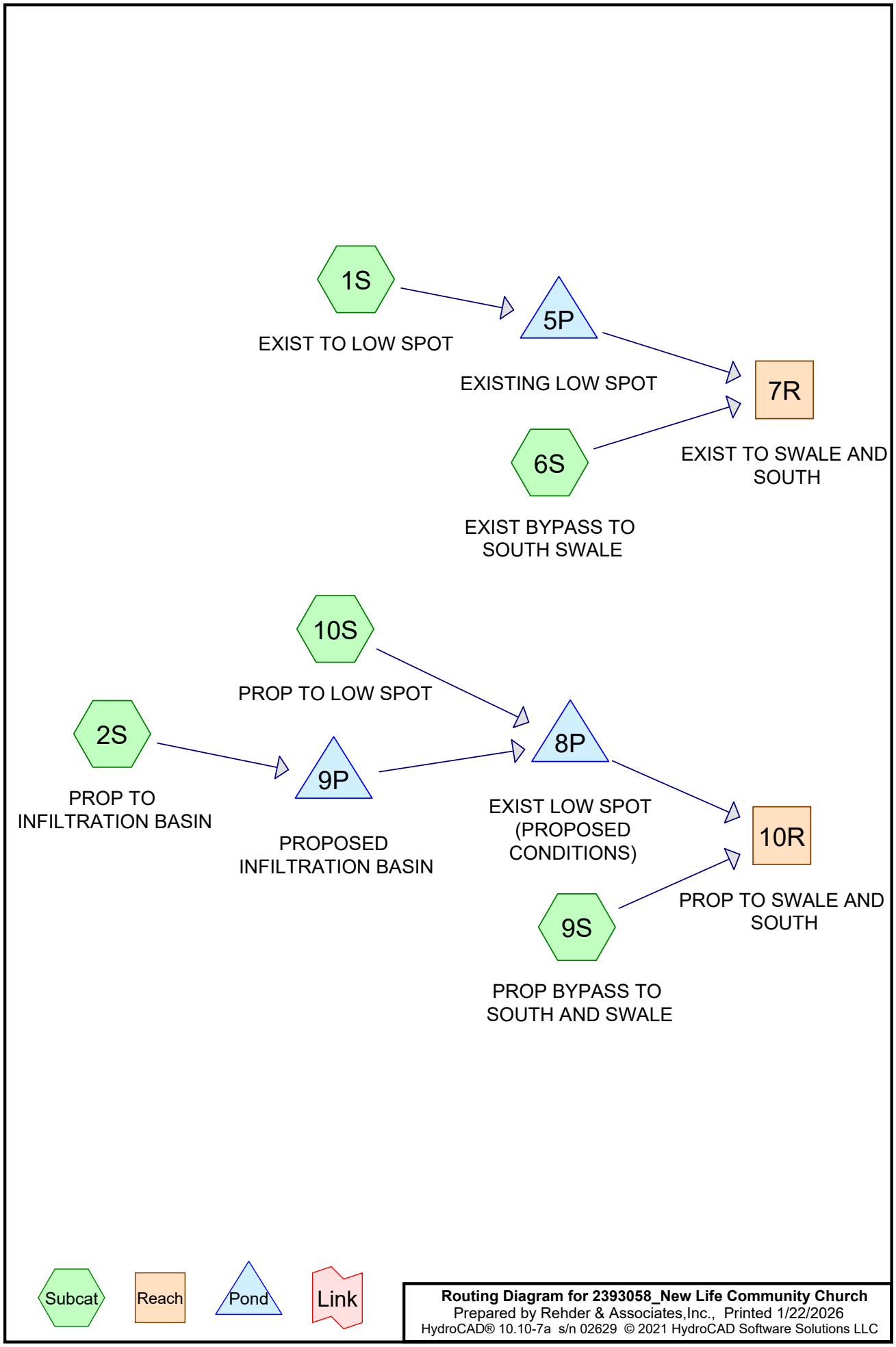


Routing Diagram for 2393058_New Life Community Church
Prepared by Rehder & Associates,Inc., Printed 1/22/2026
HydroCAD® 10.10-7a s/n 02629 © 2021 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	MSE 24-hr	3	Default	24.00	1	2.80	2
2	10-Year	MSE 24-hr	3	Default	24.00	1	4.16	2
3	100-Year	MSE 24-hr	3	Default	24.00	1	7.20	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.890	39	>75% Grass cover, Good, HSG A (1S, 2S, 6S, 9S, 10S)
2.340	98	IMPERVIOUS (1S, 2S, 6S, 9S, 10S)
5.250	30	Woods, Good, HSG A (1S, 2S, 6S, 9S, 10S)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EXIST TO LOW SPOT Runoff Area=1.770 ac 5.08% Impervious Runoff Depth=0.00"
Tc=25.0 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: PROP TO Runoff Area=0.730 ac 26.03% Impervious Runoff Depth=0.13"
Tc=15.0 min CN=54 Runoff=0.03 cfs 0.008 af

Subcatchment 6S: EXIST BYPASS TO Runoff Area=4.470 ac 23.04% Impervious Runoff Depth=0.05"
Tc=25.0 min CN=49 Runoff=0.04 cfs 0.017 af

Subcatchment 9S: PROP BYPASS TO Runoff Area=4.310 ac 22.74% Impervious Runoff Depth=0.05"
Tc=25.0 min CN=49 Runoff=0.04 cfs 0.017 af

Subcatchment 10S: PROP TO LOW SPOT Runoff Area=1.200 ac 4.17% Impervious Runoff Depth=0.00"
Tc=20.0 min CN=35 Runoff=0.00 cfs 0.000 af

Reach 7R: EXIST TO SWALE AND SOUTH Inflow=0.04 cfs 0.017 af
Outflow=0.04 cfs 0.017 af

Reach 10R: PROP TO SWALE AND SOUTH Inflow=0.04 cfs 0.017 af
Outflow=0.04 cfs 0.017 af

Pond 5P: EXISTING LOW SPOT Peak Elev=875.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: EXIST LOW SPOT (PROPOSED Peak Elev=875.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 9P: PROPOSED INFILTRATION Peak Elev=877.24' Storage=101 cf Inflow=0.03 cfs 0.008 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Summary for Subcatchment 1S: EXIST TO LOW SPOT

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond 5P : EXISTING LOW SPOT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

	Area (ac)	CN	Description
	1.000	30	Woods, Good, HSG A
*	0.090	98	IMPERVIOUS
	0.680	39	>75% Grass cover, Good, HSG A
	1.770	37	Weighted Average
	1.680		94.92% Pervious Area
	0.090		5.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 2S: PROP TO INFILTRATION BASIN

Runoff = 0.03 cfs @ 12.55 hrs, Volume= 0.008 af, Depth= 0.13"
Routed to Pond 9P : PROPOSED INFILTRATION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

	Area (ac)	CN	Description
*	0.190	98	IMPERVIOUS
	0.010	30	Woods, Good, HSG A
	0.530	39	>75% Grass cover, Good, HSG A
	0.730	54	Weighted Average
	0.540		73.97% Pervious Area
	0.190		26.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 6S: EXIST BYPASS TO SOUTH SWALE

Runoff = 0.04 cfs @ 13.57 hrs, Volume= 0.017 af, Depth= 0.05"
Routed to Reach 7R : EXIST TO SWALE AND SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

	Area (ac)	CN	Description
*	1.030	98	IMPERVIOUS
	1.740	30	Woods, Good, HSG A
	1.700	39	>75% Grass cover, Good, HSG A
	4.470	49	Weighted Average
	3.440		76.96% Pervious Area
	1.030		23.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 9S: PROP BYPASS TO SOUTH AND SWALE

Runoff = 0.04 cfs @ 13.57 hrs, Volume= 0.017 af, Depth= 0.05"
Routed to Reach 10R : PROP TO SWALE AND SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

	Area (ac)	CN	Description
*	0.980	98	IMPERVIOUS
	1.690	30	Woods, Good, HSG A
	1.640	39	>75% Grass cover, Good, HSG A
	4.310	49	Weighted Average
	3.330		77.26% Pervious Area
	0.980		22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 10S: PROP TO LOW SPOT

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond 8P : EXIST LOW SPOT (PROPOSED CONDITIONS)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

	Area (ac)	CN	Description
*	0.050	98	IMPERVIOUS
	0.810	30	Woods, Good, HSG A
	0.340	39	>75% Grass cover, Good, HSG A
	1.200	35	Weighted Average
	1.150		95.83% Pervious Area
	0.050		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Summary for Reach 7R: EXIST TO SWALE AND SOUTH

Inflow Area = 6.240 ac, 17.95% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.04 cfs @ 13.57 hrs, Volume= 0.017 af
Outflow = 0.04 cfs @ 13.57 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 10R: PROP TO SWALE AND SOUTH

Inflow Area = 6.240 ac, 19.55% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.04 cfs @ 13.57 hrs, Volume= 0.017 af
Outflow = 0.04 cfs @ 13.57 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 5P: EXISTING LOW SPOT

Inflow Area = 1.770 ac, 5.08% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 7R : EXIST TO SWALE AND SOUTH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 875.00' @ 0.00 hrs Surf.Area= 15 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	875.00'	3,574 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
875.00	15	15.0	0	0	15
875.25	785	125.0	76	76	1,241
875.50	2,790	230.0	421	497	4,207
875.75	6,055	305.0	1,080	1,577	7,401
876.00	10,095	410.0	1,997	3,574	13,376

Device	Routing	Invert	Outlet Devices
#1	Primary	875.65'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 10.00 40.00 48.00 Height (feet) 0.35 0.05 0.00 0.35
#2	Discarded	875.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=875.00' (Free Discharge)
↑—**2=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=875.00' (Free Discharge)
↑—**1=Asymmetrical Weir** (Controls 0.00 cfs)

Summary for Pond 8P: EXIST LOW SPOT (PROPOSED CONDITIONS)

Inflow Area = 1.930 ac, 12.44% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 10R : PROP TO SWALE AND SOUTH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 875.00' @ 0.00 hrs Surf.Area= 15 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	875.00'	3,574 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
875.00	15	15.0	0	0	15
875.25	785	125.0	76	76	1,241
875.50	2,790	230.0	421	497	4,207
875.75	6,055	305.0	1,080	1,577	7,401
876.00	10,095	410.0	1,997	3,574	13,376

Device	Routing	Invert	Outlet Devices
#1	Primary	875.65'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 10.00 40.00 48.00 Height (feet) 0.35 0.05 0.00 0.35
#2	Discarded	875.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=875.00' (Free Discharge)
↑—**2=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=875.00' (Free Discharge)
↑—**1=Asymmetrical Weir** (Controls 0.00 cfs)

Summary for Pond 9P: PROPOSED INFILTRATION BASIN

Inflow Area = 0.730 ac, 26.03% Impervious, Inflow Depth = 0.13" for 2-Year event
Inflow = 0.03 cfs @ 12.55 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 15.24 hrs, Volume= 0.008 af, Atten= 74%, Lag= 161.7 min
Discarded = 0.01 cfs @ 15.24 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 8P : EXIST LOW SPOT (PROPOSED CONDITIONS)

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 877.24' @ 15.24 hrs Surf.Area= 460 sf Storage= 101 cf

Plug-Flow detention time= 134.5 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 134.5 min (1,081.0 - 946.5)

Volume	Invert	Avail.Storage	Storage Description
#1	877.00'	3,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
877.00	375	100.0	0	0	375
878.00	785	140.0	568	568	1,148
879.00	1,280	165.0	1,022	1,590	1,774
880.00	1,925	230.0	1,592	3,182	3,827

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.50 Width (feet) 4.00 13.00
#2	Discarded	877.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 15.24 hrs HW=877.24' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=877.00' (Free Discharge)
↑—**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EXIST TO LOW SPOT Runoff Area=1.770 ac 5.08% Impervious Runoff Depth=0.03"
Tc=25.0 min CN=37 Runoff=0.01 cfs 0.005 af

Subcatchment 2S: PROP TO Runoff Area=0.730 ac 26.03% Impervious Runoff Depth=0.55"
Tc=15.0 min CN=54 Runoff=0.35 cfs 0.033 af

Subcatchment 6S: EXIST BYPASS TO Runoff Area=4.470 ac 23.04% Impervious Runoff Depth=0.35"
Tc=25.0 min CN=49 Runoff=0.78 cfs 0.129 af

Subcatchment 9S: PROP BYPASS TO Runoff Area=4.310 ac 22.74% Impervious Runoff Depth=0.35"
Tc=25.0 min CN=49 Runoff=0.75 cfs 0.124 af

Subcatchment 10S: PROP TO LOW SPOT Runoff Area=1.200 ac 4.17% Impervious Runoff Depth=0.01"
Tc=20.0 min CN=35 Runoff=0.00 cfs 0.001 af

Reach 7R: EXIST TO SWALE AND SOUTH Inflow=0.78 cfs 0.129 af
Outflow=0.78 cfs 0.129 af

Reach 10R: PROP TO SWALE AND SOUTH Inflow=0.75 cfs 0.124 af
Outflow=0.75 cfs 0.124 af

Pond 5P: EXISTING LOW SPOT Peak Elev=875.15' Storage=22 cf Inflow=0.01 cfs 0.005 af
Discarded=0.01 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Pond 8P: EXIST LOW SPOT (PROPOSED Peak Elev=875.06' Storage=3 cf Inflow=0.00 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond 9P: PROPOSED INFILTRATION Peak Elev=878.36' Storage=880 cf Inflow=0.35 cfs 0.033 af
Discarded=0.02 cfs 0.033 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.033 af

Summary for Subcatchment 1S: EXIST TO LOW SPOT

Runoff = 0.01 cfs @ 15.13 hrs, Volume= 0.005 af, Depth= 0.03"
Routed to Pond 5P : EXISTING LOW SPOT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.16"

	Area (ac)	CN	Description
	1.000	30	Woods, Good, HSG A
*	0.090	98	IMPERVIOUS
	0.680	39	>75% Grass cover, Good, HSG A
	1.770	37	Weighted Average
	1.680		94.92% Pervious Area
	0.090		5.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 2S: PROP TO INFILTRATION BASIN

Runoff = 0.35 cfs @ 12.30 hrs, Volume= 0.033 af, Depth= 0.55"
Routed to Pond 9P : PROPOSED INFILTRATION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.16"

	Area (ac)	CN	Description
*	0.190	98	IMPERVIOUS
	0.010	30	Woods, Good, HSG A
	0.530	39	>75% Grass cover, Good, HSG A
	0.730	54	Weighted Average
	0.540		73.97% Pervious Area
	0.190		26.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 6S: EXIST BYPASS TO SOUTH SWALE

Runoff = 0.78 cfs @ 12.54 hrs, Volume= 0.129 af, Depth= 0.35"
Routed to Reach 7R : EXIST TO SWALE AND SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.16"

	Area (ac)	CN	Description
*	1.030	98	IMPERVIOUS
	1.740	30	Woods, Good, HSG A
	1.700	39	>75% Grass cover, Good, HSG A
	4.470	49	Weighted Average
	3.440		76.96% Pervious Area
	1.030		23.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 9S: PROP BYPASS TO SOUTH AND SWALE

Runoff = 0.75 cfs @ 12.54 hrs, Volume= 0.124 af, Depth= 0.35"
Routed to Reach 10R : PROP TO SWALE AND SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.16"

	Area (ac)	CN	Description
*	0.980	98	IMPERVIOUS
	1.690	30	Woods, Good, HSG A
	1.640	39	>75% Grass cover, Good, HSG A
	4.310	49	Weighted Average
	3.330		77.26% Pervious Area
	0.980		22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 10S: PROP TO LOW SPOT

Runoff = 0.00 cfs @ 19.52 hrs, Volume= 0.001 af, Depth= 0.01"
Routed to Pond 8P : EXIST LOW SPOT (PROPOSED CONDITIONS)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.16"

	Area (ac)	CN	Description
*	0.050	98	IMPERVIOUS
	0.810	30	Woods, Good, HSG A
	0.340	39	>75% Grass cover, Good, HSG A
	1.200	35	Weighted Average
	1.150		95.83% Pervious Area
	0.050		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Summary for Reach 7R: EXIST TO SWALE AND SOUTH

Inflow Area = 6.240 ac, 17.95% Impervious, Inflow Depth = 0.25" for 10-Year event
Inflow = 0.78 cfs @ 12.54 hrs, Volume= 0.129 af
Outflow = 0.78 cfs @ 12.54 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 10R: PROP TO SWALE AND SOUTH

Inflow Area = 6.240 ac, 19.55% Impervious, Inflow Depth = 0.24" for 10-Year event
Inflow = 0.75 cfs @ 12.54 hrs, Volume= 0.124 af
Outflow = 0.75 cfs @ 12.54 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 5P: EXISTING LOW SPOT

Inflow Area = 1.770 ac, 5.08% Impervious, Inflow Depth = 0.03" for 10-Year event
Inflow = 0.01 cfs @ 15.13 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 18.85 hrs, Volume= 0.005 af, Atten= 21%, Lag= 223.0 min
Discarded = 0.01 cfs @ 18.85 hrs, Volume= 0.005 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 7R : EXIST TO SWALE AND SOUTH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 875.15' @ 18.85 hrs Surf.Area= 344 sf Storage= 22 cf

Plug-Flow detention time= 51.7 min calculated for 0.005 af (100% of inflow)
Center-of-Mass det. time= 51.6 min (1,152.5 - 1,100.8)

Volume	Invert	Avail.Storage	Storage Description
#1	875.00'	3,574 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
875.00	15	15.0	0	0	15
875.25	785	125.0	76	76	1,241
875.50	2,790	230.0	421	497	4,207
875.75	6,055	305.0	1,080	1,577	7,401
876.00	10,095	410.0	1,997	3,574	13,376

Device	Routing	Invert	Outlet Devices
#1	Primary	875.65'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 10.00 40.00 48.00 Height (feet) 0.35 0.05 0.00 0.35
#2	Discarded	875.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 18.85 hrs HW=875.15' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=875.00' (Free Discharge)
↑—**1=Asymmetrical Weir** (Controls 0.00 cfs)

Summary for Pond 8P: EXIST LOW SPOT (PROPOSED CONDITIONS)

Inflow Area = 1.930 ac, 12.44% Impervious, Inflow Depth = 0.01" for 10-Year event
Inflow = 0.00 cfs @ 19.52 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 20.28 hrs, Volume= 0.001 af, Atten= 2%, Lag= 46.0 min
Discarded = 0.00 cfs @ 20.28 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 10R : PROP TO SWALE AND SOUTH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 875.06' @ 20.28 hrs Surf.Area= 100 sf Storage= 3 cf

Plug-Flow detention time= 25.4 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 25.4 min (1,216.1 - 1,190.7)

Volume	Invert	Avail.Storage	Storage Description
#1	875.00'	3,574 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
875.00	15	15.0	0	0	15
875.25	785	125.0	76	76	1,241
875.50	2,790	230.0	421	497	4,207
875.75	6,055	305.0	1,080	1,577	7,401
876.00	10,095	410.0	1,997	3,574	13,376

Device	Routing	Invert	Outlet Devices
#1	Primary	875.65'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 10.00 40.00 48.00 Height (feet) 0.35 0.05 0.00 0.35
#2	Discarded	875.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 20.28 hrs HW=875.06' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=875.00' (Free Discharge)
↑—**1=Asymmetrical Weir** (Controls 0.00 cfs)

Summary for Pond 9P: PROPOSED INFILTRATION BASIN

Inflow Area = 0.730 ac, 26.03% Impervious, Inflow Depth = 0.55" for 10-Year event
Inflow = 0.35 cfs @ 12.30 hrs, Volume= 0.033 af
Outflow = 0.02 cfs @ 17.65 hrs, Volume= 0.033 af, Atten= 95%, Lag= 321.5 min
Discarded = 0.02 cfs @ 17.65 hrs, Volume= 0.033 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 8P : EXIST LOW SPOT (PROPOSED CONDITIONS)

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 878.36' @ 17.65 hrs Surf.Area= 950 sf Storage= 880 cf

Plug-Flow detention time= 626.8 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 627.3 min (1,507.0 - 879.6)

Volume	Invert	Avail.Storage	Storage Description
#1	877.00'	3,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
877.00	375	100.0	0	0	375
878.00	785	140.0	568	568	1,148
879.00	1,280	165.0	1,022	1,590	1,774
880.00	1,925	230.0	1,592	3,182	3,827

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.50 Width (feet) 4.00 13.00
#2	Discarded	877.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 17.65 hrs HW=878.36' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=877.00' (Free Discharge)
↑—**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EXIST TO LOW SPOT Runoff Area=1.770 ac 5.08% Impervious Runoff Depth=0.69"
Tc=25.0 min CN=37 Runoff=0.68 cfs 0.102 af

Subcatchment 2S: PROP TO Runoff Area=0.730 ac 26.03% Impervious Runoff Depth=2.16"
Tc=15.0 min CN=54 Runoff=1.93 cfs 0.131 af

Subcatchment 6S: EXIST BYPASS TO Runoff Area=4.470 ac 23.04% Impervious Runoff Depth=1.69"
Tc=25.0 min CN=49 Runoff=6.56 cfs 0.629 af

Subcatchment 9S: PROP BYPASS TO Runoff Area=4.310 ac 22.74% Impervious Runoff Depth=1.69"
Tc=25.0 min CN=49 Runoff=6.33 cfs 0.606 af

Subcatchment 10S: PROP TO LOW SPOT Runoff Area=1.200 ac 4.17% Impervious Runoff Depth=0.55"
Tc=20.0 min CN=35 Runoff=0.34 cfs 0.055 af

Reach 7R: EXIST TO SWALE AND SOUTH Inflow=6.56 cfs 0.650 af
Outflow=6.56 cfs 0.650 af

Reach 10R: PROP TO SWALE AND SOUTH Inflow=6.37 cfs 0.668 af
Outflow=6.37 cfs 0.668 af

Pond 5P: EXISTING LOW SPOT Peak Elev=875.69' Storage=1,232 cf Inflow=0.68 cfs 0.102 af
Discarded=0.10 cfs 0.081 af Primary=0.24 cfs 0.021 af Outflow=0.33 cfs 0.102 af

Pond 8P: EXIST LOW SPOT (PROPOSED Peak Elev=875.72' Storage=1,398 cf Inflow=1.92 cfs 0.144 af
Discarded=0.10 cfs 0.082 af Primary=0.99 cfs 0.062 af Outflow=1.10 cfs 0.144 af

Pond 9P: PROPOSED INFILTRATION Peak Elev=878.73' Storage=1,264 cf Inflow=1.93 cfs 0.131 af
Discarded=0.02 cfs 0.042 af Primary=1.64 cfs 0.089 af Outflow=1.66 cfs 0.131 af

Summary for Subcatchment 1S: EXIST TO LOW SPOT

Runoff = 0.68 cfs @ 12.51 hrs, Volume= 0.102 af, Depth= 0.69"
Routed to Pond 5P : EXISTING LOW SPOT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.20"

	Area (ac)	CN	Description
	1.000	30	Woods, Good, HSG A
*	0.090	98	IMPERVIOUS
	0.680	39	>75% Grass cover, Good, HSG A
	1.770	37	Weighted Average
	1.680		94.92% Pervious Area
	0.090		5.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 2S: PROP TO INFILTRATION BASIN

Runoff = 1.93 cfs @ 12.25 hrs, Volume= 0.131 af, Depth= 2.16"
Routed to Pond 9P : PROPOSED INFILTRATION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.20"

	Area (ac)	CN	Description
*	0.190	98	IMPERVIOUS
	0.010	30	Woods, Good, HSG A
	0.530	39	>75% Grass cover, Good, HSG A
	0.730	54	Weighted Average
	0.540		73.97% Pervious Area
	0.190		26.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 6S: EXIST BYPASS TO SOUTH SWALE

Runoff = 6.56 cfs @ 12.41 hrs, Volume= 0.629 af, Depth= 1.69"
Routed to Reach 7R : EXIST TO SWALE AND SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.20"

	Area (ac)	CN	Description
*	1.030	98	IMPERVIOUS
	1.740	30	Woods, Good, HSG A
	1.700	39	>75% Grass cover, Good, HSG A
	4.470	49	Weighted Average
	3.440		76.96% Pervious Area
	1.030		23.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 9S: PROP BYPASS TO SOUTH AND SWALE

Runoff = 6.33 cfs @ 12.41 hrs, Volume= 0.606 af, Depth= 1.69"
Routed to Reach 10R : PROP TO SWALE AND SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.20"

	Area (ac)	CN	Description
*	0.980	98	IMPERVIOUS
	1.690	30	Woods, Good, HSG A
	1.640	39	>75% Grass cover, Good, HSG A
	4.310	49	Weighted Average
	3.330		77.26% Pervious Area
	0.980		22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**

Summary for Subcatchment 10S: PROP TO LOW SPOT

Runoff = 0.34 cfs @ 12.47 hrs, Volume= 0.055 af, Depth= 0.55"
Routed to Pond 8P : EXIST LOW SPOT (PROPOSED CONDITIONS)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.20"

	Area (ac)	CN	Description
*	0.050	98	IMPERVIOUS
	0.810	30	Woods, Good, HSG A
	0.340	39	>75% Grass cover, Good, HSG A
	1.200	35	Weighted Average
	1.150		95.83% Pervious Area
	0.050		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry,**

Summary for Reach 7R: EXIST TO SWALE AND SOUTH

Inflow Area = 6.240 ac, 17.95% Impervious, Inflow Depth = 1.25" for 100-Year event
Inflow = 6.56 cfs @ 12.41 hrs, Volume= 0.650 af
Outflow = 6.56 cfs @ 12.41 hrs, Volume= 0.650 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 10R: PROP TO SWALE AND SOUTH

Inflow Area = 6.240 ac, 19.55% Impervious, Inflow Depth = 1.28" for 100-Year event
Inflow = 6.37 cfs @ 12.50 hrs, Volume= 0.668 af
Outflow = 6.37 cfs @ 12.50 hrs, Volume= 0.668 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 5P: EXISTING LOW SPOT

Inflow Area = 1.770 ac, 5.08% Impervious, Inflow Depth = 0.69" for 100-Year event
Inflow = 0.68 cfs @ 12.51 hrs, Volume= 0.102 af
Outflow = 0.33 cfs @ 13.12 hrs, Volume= 0.102 af, Atten= 51%, Lag= 36.7 min
Discarded = 0.10 cfs @ 13.12 hrs, Volume= 0.081 af
Primary = 0.24 cfs @ 13.12 hrs, Volume= 0.021 af
Routed to Reach 7R : EXIST TO SWALE AND SOUTH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 875.69' @ 13.12 hrs Surf.Area= 5,133 sf Storage= 1,232 cf

Plug-Flow detention time= 145.7 min calculated for 0.102 af (100% of inflow)
Center-of-Mass det. time= 145.9 min (1,052.4 - 906.5)

Volume	Invert	Avail.Storage	Storage Description
#1	875.00'	3,574 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
875.00	15	15.0	0	0	15
875.25	785	125.0	76	76	1,241
875.50	2,790	230.0	421	497	4,207
875.75	6,055	305.0	1,080	1,577	7,401
876.00	10,095	410.0	1,997	3,574	13,376

Device	Routing	Invert	Outlet Devices
#1	Primary	875.65'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 10.00 40.00 48.00 Height (feet) 0.35 0.05 0.00 0.35
#2	Discarded	875.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 13.12 hrs HW=875.69' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.23 cfs @ 13.12 hrs HW=875.69' (Free Discharge)
↑—**1=Asymmetrical Weir** (Weir Controls 0.23 cfs @ 0.26 fps)

Summary for Pond 8P: EXIST LOW SPOT (PROPOSED CONDITIONS)

Inflow Area = 1.930 ac, 12.44% Impervious, Inflow Depth = 0.90" for 100-Year event
Inflow = 1.92 cfs @ 12.35 hrs, Volume= 0.144 af
Outflow = 1.10 cfs @ 12.59 hrs, Volume= 0.144 af, Atten= 43%, Lag= 14.7 min
Discarded = 0.10 cfs @ 12.59 hrs, Volume= 0.082 af
Primary = 0.99 cfs @ 12.59 hrs, Volume= 0.062 af
Routed to Reach 10R : PROP TO SWALE AND SOUTH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 875.72' @ 12.59 hrs Surf.Area= 5,586 sf Storage= 1,398 cf

Plug-Flow detention time= 107.3 min calculated for 0.144 af (100% of inflow)
Center-of-Mass det. time= 107.5 min (967.7 - 860.2)

Volume	Invert	Avail.Storage	Storage Description
#1	875.00'	3,574 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
875.00	15	15.0	0	0	15
875.25	785	125.0	76	76	1,241
875.50	2,790	230.0	421	497	4,207
875.75	6,055	305.0	1,080	1,577	7,401
876.00	10,095	410.0	1,997	3,574	13,376

Device	Routing	Invert	Outlet Devices
#1	Primary	875.65'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 10.00 40.00 48.00 Height (feet) 0.35 0.05 0.00 0.35
#2	Discarded	875.00'	**0.800 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 12.59 hrs HW=875.72' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.98 cfs @ 12.59 hrs HW=875.72' (Free Discharge)
1=Asymmetrical Weir (Weir Controls 0.98 cfs @ 0.45 fps)

Summary for Pond 9P: PROPOSED INFILTRATION BASIN

Inflow Area = 0.730 ac, 26.03% Impervious, Inflow Depth = 2.16" for 100-Year event
Inflow = 1.93 cfs @ 12.25 hrs, Volume= 0.131 af
Outflow = 1.66 cfs @ 12.34 hrs, Volume= 0.131 af, Atten= 14%, Lag= 5.2 min
Discarded = 0.02 cfs @ 12.34 hrs, Volume= 0.042 af
Primary = 1.64 cfs @ 12.34 hrs, Volume= 0.089 af
Routed to Pond 8P : EXIST LOW SPOT (PROPOSED CONDITIONS)

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 878.73' @ 12.34 hrs Surf.Area= 1,134 sf Storage= 1,264 cf

Plug-Flow detention time= 227.7 min calculated for 0.131 af (100% of inflow)
Center-of-Mass det. time= 228.9 min (1,069.2 - 840.3)

Volume	Invert	Avail.Storage	Storage Description
#1	877.00'	3,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

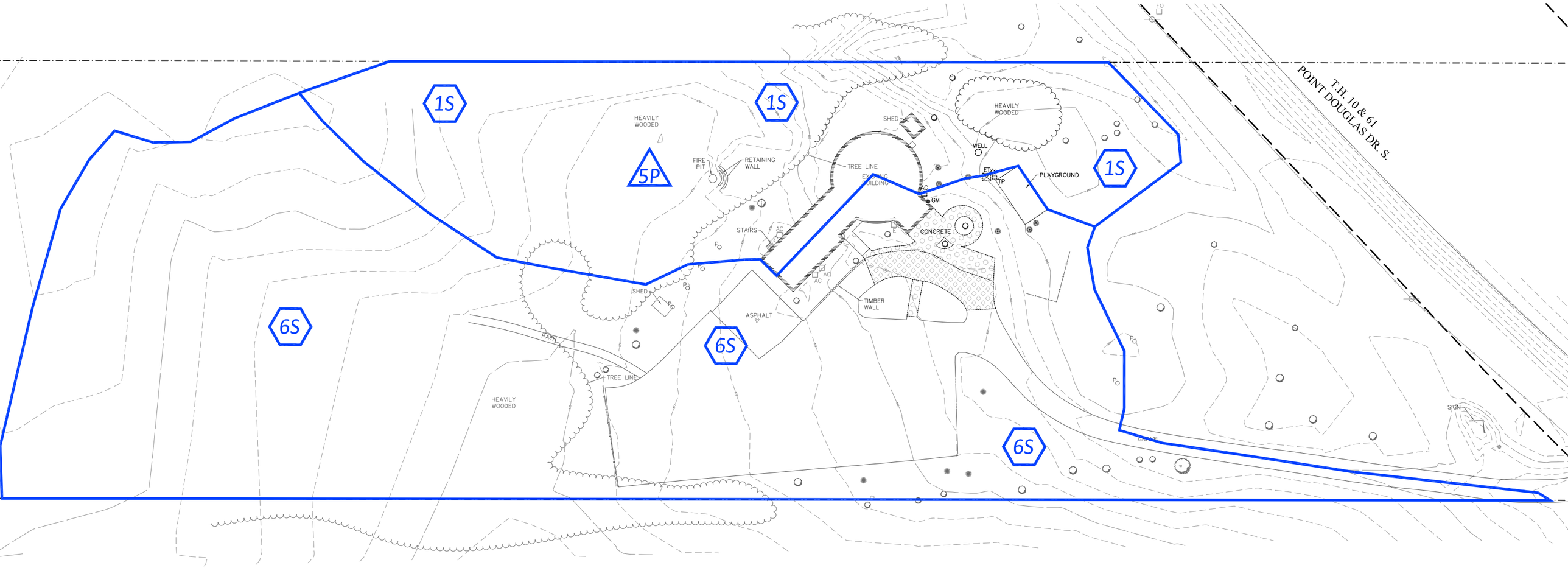
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
877.00	375	100.0	0	0	375
878.00	785	140.0	568	568	1,148
879.00	1,280	165.0	1,022	1,590	1,774
880.00	1,925	230.0	1,592	3,182	3,827

Device	Routing	Invert	Outlet Devices
#1	Primary	878.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.50 Width (feet) 4.00 13.00
#2	Discarded	877.00'	**0.800 in/hr Exfiltration over Surface area**

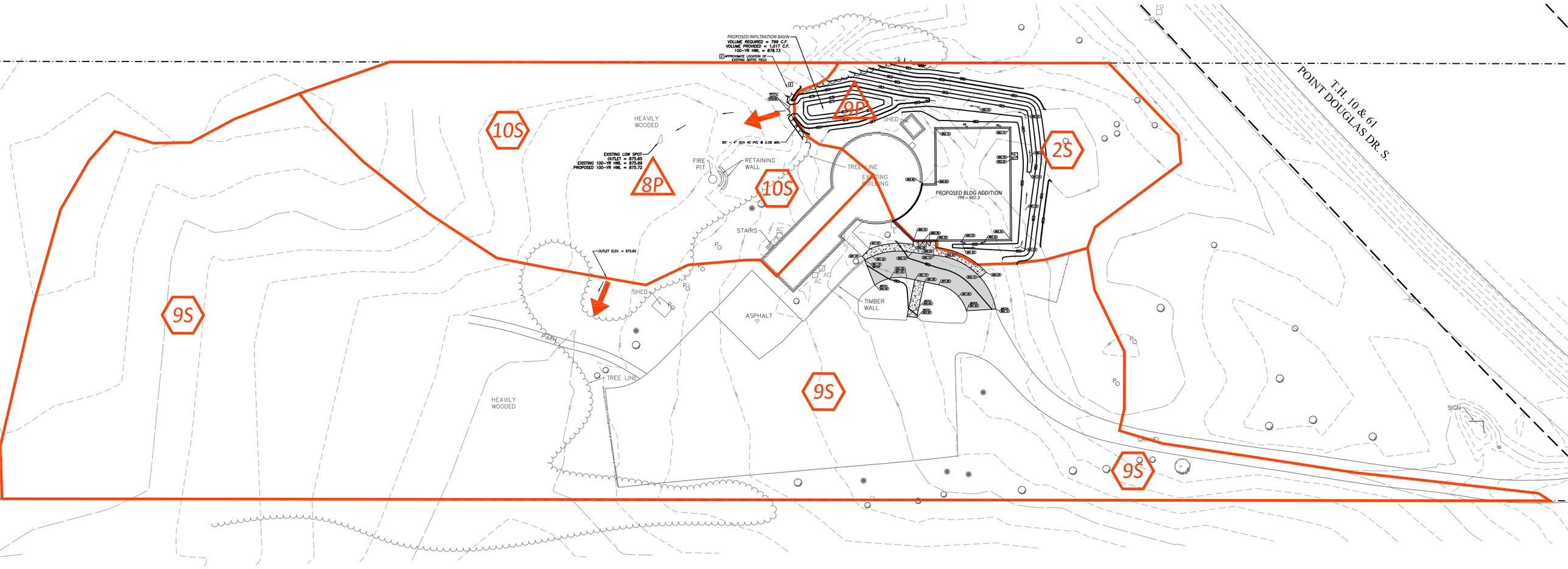
Discarded OutFlow Max=0.02 cfs @ 12.34 hrs HW=878.73' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.61 cfs @ 12.34 hrs HW=878.73' (Free Discharge)
↑—**1=Custom Weir/Orifice** (Weir Controls 1.61 cfs @ 1.52 fps)

EXISTING DRAINAGE AREA PLAN
SCALE: 1" = 70'



PROPOSED DRAINAGE AREA PLAN
SCALE: 1" = 70'



INDEPENDENT TESTING TECHNOLOGIES
337 31st Avenue South • Waite Park, MN 56387 • (320) 253-4338 • www.independenttestingtech.com

AUGUST 14, 2023

PROJECT 23-235
REPORT OF GEOTECHNICAL EXPLORATIONS

For

NEW LIFE EVANGELICAL FREE CHURCH
BUILDING ADDITION
HASTINGS, MINNESOTA

Prepared For:

VANMAN ARCHITECTS & BUILDERS

INDEPENDENT TESTING TECHNOLOGIES
337 31st Avenue South • Waite Park, MN 56387 • (320) 253-4338 • www.independenttestingtech.com

August 14, 2023

Ms. Holly Burley
Vanman Architects & Builders
6701 West 23rd Street
Minneapolis, MN 55426

RE: 23-235 Report of Geotechnical Exploration
New Life Evangelical Free Church
Hastings, Minnesota

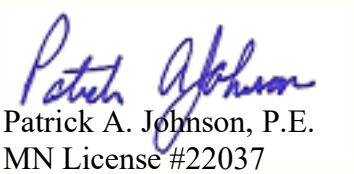
Dear Ms. Burley:

Independent Testing Technologies, Inc. is pleased to submit the results of our subsurface investigation program for this project in Hastings, Minnesota. This report represents our work on this project as authorized by you. An electronic copy is enclosed.

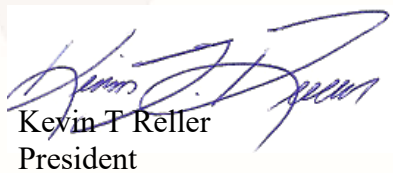
The soils on this site are well suited for the proposed building and site improvements. The soils encountered were fine grained, poorly graded sand (SP, SP-SM) overlying deep silty sand (SM) and clayey sand (SC-SM) glacial till. Groundwater was not observed to the depths explored in any of the borings at the time of drilling. Soil samples obtained during our investigation will be stored at our office for thirty days after the date of this report. After that time, they will be disposed of unless you advise otherwise.

Ms. Burley, it has been our pleasure to work with you on this project. Independent Testing appreciated the opportunity to perform this geotechnical evaluation and look forward to continuing our participation during the construction phase of this project. Please contact Patrick Johnson if you have any questions regarding this report. Please contact Tyler Burkes if you would like a proposal for the materials testing services that will be needed.

Sincerely,



Patrick A. Johnson, P.E.
MN License #22037



Kevin T Reller
President

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.



Patrick A. Johnson

Date: August 14, 2023 License No.: 22037

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GEOTECHNICAL EXPLORATIONS
VANMAN ARCHITECTS & BUILDERS
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA
PROJECT 23-235

A. Introduction

This report is being prepared for use by our client on this specific project. We intend to present this report and our findings in the same logical manner that led us to arrive at our recommendations. This report is based on some general assumptions regarding the anticipated construction based on experience with similar projects. These assumptions and the entire report should be reviewed immediately upon receipt.

Purpose:

The purpose of our investigation was to evaluate the existing soil and water conditions on this site and provide a report of our findings and recommendations regarding design and construction of the proposed site improvements. The project consists of construction of an addition to the existing church at 11245 Point Douglas Drive South in Hastings. The addition will be a one story, slab-on-grade, masonry block wall structure on standard cast-in-place concrete spread footings. In accordance with your written authorization, we have conducted a subsurface exploration program for the proposed project.

Scope of Services:

Our authorized scope of services included the following:

1. To investigate the subsurface soil and water conditions encountered at seven (7) split-spoon soil boring locations. The borings were planned to be twenty (20) feet deep at each location.
2. To provide a report of our findings including the results of our subsurface investigation and recommendations regarding earthwork, fill and compaction, building foundation suitability, soil bearing capacities, estimated settlement, wall backfill, floor slab support, parking lot subgrade preparation and bituminous pavement design.

General Site Conditions:

The site is an existing church at 11245 Point Douglas Drive South in Hastings. The site lies between the river and US Highway 10 on the north side of the Mississippi River. The site is a lightly wooded, level lot.

Available Subsurface Information:

According to the Geologic Map of Minnesota, Quaternary Geology, prepared by Howard C. Hobbs and Joseph E. Goebel (1982, Minnesota Geological Survey), this site lies within an outwash unit of the St. Croix Moraine Association. It is associated with the Wadena Lobe glaciation of Pleistocene, Late Wisconsinan age. The drift is derived from parent material consisting of igneous and metamorphic rocks of the Canadian Shield.

According to the Soil Survey of Washington County prepared by the Soil Conservation Service, the site lies within the Sparta loamy and sand Dickman sandy loam. These consist of nearly level, excessively drained, sandy, and gravelly loams over coarse sands on outwash plains and stream terraces. The individual soils mapped on this site are sandy and have no limitations for development of small commercial building sites.

B. Exploration Program

Seven (7) split-spoon soil borings were conducted on this project. The borings were planned to be advanced to depths of 20 feet using a 3 ¼ inch I.D. hollow stem auger. Samples were obtained every 2 ½ feet for the first 10 feet and every 5 feet thereafter using a 2-inch O.D. split spoon sampler in accordance with the American Society for Testing and Materials (ASTM D1586). Standard penetration values (N-values) were obtained at each sample interval by driving the sampler into the soil using a 140-pound hammer falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler 12 inches is known as the standard penetration resistance or N-value. Where the sampler cannot be driven at least 6 inches by 50 blows of the hammer, the total number of blows as well as the distance driven is reported on the boring logs.

Groundwater levels were noted during drilling and immediately after completion. The holes were sealed with a mixture of bentonite grout and auger cuttings. Some settlement of the bore holes may be expected. The borings were conducted with a truck mounted drill rig. The ground surface elevations at each boring are based on an assumed elevation of 100.0 for the floor at the main entrance to the existing building.

Exploration Results:

Borings SB-1 through SB-4 were conducted in the parking lot and encountered 2.0 to 9.0 inches aggregate surfacing. Below the aggregate, boring SB-1 encountered dark silty sand (SM) fill to 2.5 feet, followed by fine grained, poorly graded sand (SP) to 20.0 feet and then silty sand (SM) to termination at 21.5 feet. Below the aggregate, boring SB-2 encountered native, fine grained, poorly graded sand with silt (SP-SM) to 7.5 feet, followed by poorly graded sand (SP) to 20.0 feet and then silty sand (SM) to termination at 21.5 feet. Below the aggregate, boring SB-3 encountered native, fine grained, poorly graded sand (SP) to termination at 21.5 feet. Below the aggregate, boring SB-4 encountered native, fine grained, poorly graded sand (SP) to 15.0 feet, followed by silty sand (SM) to termination at 21.5 feet.

Borings SB-5 through SB-7 were conducted in the open yard areas and encountered silty sand (SM) topsoil at the surface to depths of 7.5 to 19.0 inches. Below the topsoil, boring SB-5 encountered native, fine grained, poorly graded sand (SP) to 2.5 feet, followed by silty sand (SM) to 5.0 feet, poorly graded sand (SP) to 9.5 feet, silty clayey sand (SC-SM) to 15.0 feet, poorly graded sand with silt (SP-SM) to 20.0 feet and poorly graded sand (SP) to termination at 21.5 feet. Below the topsoil, boring SB-6 encountered poorly graded sand with silt (SP-SM) fill to 5.0 feet, followed by native, fine grained, poorly graded sand (SP) to 7.5 feet, silty sand (SM) to 15.0 feet, and then poorly graded sand with silt (SP-SM) to termination at 21.5 feet. Below the topsoil, boring SB-7 encountered native, fine grained, poorly graded sand (SP) to 5.0 feet, followed by poorly graded sand with silt (SP-SM) to 7.5 feet, silty sand (SM) to 10.0 feet, poorly graded sand (SP) to 15.0 feet, clayey sand (SC) to 20.0 feet and then poorly graded sand with silt (SP-SM) to termination at 21.5 feet.

Penetration Test Results:

The standard penetration blow counts in the native sand soils (SP, SP-SM, SM, SC) below the topsoil ranged from 2 to more than 50, which are very low to very high, indicating that they are in a very loose to very dense condition. Refusal of the spoon occurred at a couple intervals, especially deeper. Refusal of the auger did not occur in any of the borings. Drilling was moderately difficult.

Water Level Observations:

Observations of the subsurface water conditions were made during drilling operations. Groundwater was not encountered in any of the borings at the time of drilling.

The water levels were observed over a short period of time. However, we feel the water levels observed are an accurate representation of the true groundwater conditions on this site due to the high permeability of the native sand soils. It should be noted that fluctuations in the level of the groundwater can occur due to variations in rainfall, temperature, spring thaw and other factors not evident at the time of our investigation.

Mottled soils were observed. Mottled soils are a historical indication of a temporarily or seasonally saturated soil condition. Grey soils were also observed. Grey soils are an indication of a permanently saturated soil condition.

C. Engineering Review

Discussion:

Based on our findings, the site appears to be very well suited for the anticipated building and site improvements. The native, poorly graded sands (SP, SP-SM) and silty sands (SM) are excellent material for building support. The poorly graded sands (SP, SP-SM) are also excellent for pavement support.

We understand the building will be one story, masonry wall structure on standard concrete spread footings. Maximum foundation loads could be expected to be in the range of 5 to 7 kips per linear foot for strip footings and 100 to 150 kips for column pads. Groundwater is not expected to have an impact on construction.

D. Recommendations

The following recommendations are based on our understanding of the proposed project. If our understanding of the project is not accurate, or if changes are made to the project scope, please inform us so that our recommendations can be amended, if necessary. We have included recommendations regarding earthwork and construction that may help in cost estimates and aid in design. We should be allowed to review the proposed construction plans to provide further detailed recommendations, if necessary. Without the opportunity to review the final construction plans, the recommendations made in this report may no longer be valid.

Site Grading:

We recommend the topsoil be stripped from the entire building pad and parking lot areas prior to beginning construction. The topsoil should be removed from the site or stockpiled for re-use as landscape material. We estimate this will require an excavation of 7.5 to 19 inches. We recommend the pavement and aggregate be removed from the proposed building area also.

We recommend the existing fill be removed from the building area. The fill can remain in the parking lot area. We estimate this will require an excavation of 5 feet in the vicinity of boring SB-6. More fill associated with prior construction is likely to be uncovered in the proposed building addition area.

After removal of the topsoil, fill and aggregate, we recommend clean, inorganic, mineral soil be used as fill to bring the building and parking lot areas to grade. The native, on site soils appear suitable for this purpose. We recommend the bottom of the excavation be observed by a soils engineer or a qualified technician to verify that native, competent material has been reached. We recommend the excavation be oversized one foot for every foot of fill required to reach planned grade (1:1 oversizing). Soils can change dramatically over short horizontal distances. Therefore, these depths should be used as a guide. We recommend clean, mineral fill, meeting the requirements of structural fill, be placed, and compacted to bring the building and parking lot areas to grade.

Structural Fill:

The on-site soils consisting of poorly graded sands (SP, SP-SM) are considered excellent for use as structural fill. These soils are generally easy to work with and compact with vibratory compaction equipment. They are not susceptible to moisture variations. The silty sand (SM) can be susceptible to moisture variations and may need to be dried if they become wet prior to compaction. They were very dry at the time of our exploration.

No organic soils, roots, stumps, logs, brush, etc. should be used as structural fill below any foundation or pavement section. We recommend that all fill material be free of soft, wet, or

frozen soils, highly expansive soils, rubble, debris, and rocks in excess of 6 inches in diameter. The fill should be as uniform as possible both in composition and moisture content.

We recommend all fill be compacted to the minimum relative density levels shown in the table below:

Location	Recommended Compaction Level (Percent of Std. Proctor ASTM D698)
Below Footings and Foundations, Interior Wall Backfill	98 %
Exterior Wall Backfill	95%
Below Pavements, deeper than 3 feet from finished subgrade	95%
Below Pavements within 3 feet of finished subgrade	100%
Landscape Areas	90%

We recommend all fill placed in the building and parking lot areas be compacted in 8-inch loose lifts. All fill should be compacted at a moisture content within plus or minus 3% of the optimum moisture as determined by a standard proctor. We recommend compaction tests be taken on any fill in the building and parking lot areas at a rate of one test per 2 vertical feet per 2,500 square foot area, with a minimum of two tests per fill area.

Foundations:

The N-values recorded in the penetration borings indicate that the existing native soils on this site are in a loose to medium dense condition capable of supporting the anticipated structures placed on standard spread footings. All footings should be placed on native sands (SP, SP-SM, SM) or properly compacted structural fill.

We recommend all exterior footings be placed at a minimum depth of 42 inches below the proposed final grade to provide protection from frost damage. Interior footings in heated areas can be placed at any convenient depth as long as they are on firm, native soils, or properly compacted fill. In unheated areas, we recommend the footings be placed 60 inches deep due to increased frost penetration depths in unheated areas.

We recommend any foundations placed on native soils or on properly compacted fill should be proportioned for a maximum net allowable soil bearing pressure of 3000 psf. The recommended bearing pressure is a net value and represents the actual loads that may be transmitted to the soil independent of overburden pressures.

Floor Slab

We recommend a minimum of 6 inches of clean, free draining washed sand with less than 5% passing a No. 200 sieve be placed beneath the floor slabs. This will provide a capillary break and a uniform level subgrade for the floor slabs. We recommend floor slabs be designed using a modulus of subgrade reaction of 300 pounds per cubic inch.

We recommend a vapor moisture barrier consisting of a minimum of 6-mil polyethylene sheeting. A vapor barrier should be placed under all concrete floors on ground that are likely to receive an impermeable floor finish or be used for any purpose where the passage of water vapor through the floor is undesirable. Floor coverings such as linoleum, vinyl tile, carpeting, wood, and synthetic surfacing effectively seal the moisture within the slab where it eventually may loosen, buckle, or blister the floor covering.

In order to lessen the moisture post-construction, we recommend using a low water-cement ratio concrete, less than .45. We recommend allowing the slab a 2-month drying period and testing the slab's moisture condition before installing any floor covering.

Wall Backfill

We assume the walls will be backfilled with on-site sand materials. We recommend all interior wall backfill be compacted to at least 98% of standard proctor maximum density. Exterior wall backfill should be compacted to at least 95% of standard proctor maximum density. We recommend below grade walls be designed using a coefficient of active pressure (K_A) of 0.33, an at-rest coefficient (K_0) of 0.50, and a passive coefficient (K_P) of 3.0. We recommend below grade walls be designed using the bulk unit weight of 120 pounds per cubic foot.

E. Pavement Recommendations

The expected subgrade soils consisting of fine grained, poorly graded sands (SP, SP-SM) and fine grained, silty sands (SM) encountered on this site are classified as A-3 soils in accordance with the American Association of State Highway Transportation Officials (AASHTO) classification system. A-3 soils are rated excellent material for use as parking lot subgrade material. Based on our experience with similar soils, we recommend an R-value of 70 be assumed for the anticipated subgrade materials.

Based on an assumed R-value of 70, we recommend the following bituminous pavement section for light duty truck and car parking lots:

Thickness	Course/Description	G.E.
2.0”	Mn Dot 2360 SPWEB240 Bituminous	4.5”
2.0”	Mn Dot 2360 SPNWB230 Bituminous	4.5”
6.0”	Mn Dot 3138 Class 5 or 6 Aggregate Base	6.0”
10.0”	TOTAL	15.0”

For concrete pavement, we recommend 5.0 inches of 4500 psi compressive strength concrete placed on 3 inches of aggregate base.

In using the above R-value for bituminous pavement design, it is essential that the subgrade be constructed of uniform soils at a moisture content and density in accordance with Mn Dot specification 2105 and capable of passing a test roll in accordance with Mn Dot specification 2111. The native, undisturbed soils may need preparation (drying and compacting) to pass a proof roll. If the subgrade is not compacted, uniform and capable of passing a test roll, then we recommend the subgrade be scarified and recompacted or subcut and geotextile fabric placed along with select granular material meeting Mn Dot specification 3149. The top of subgrade should be compacted to a minimum of 100% of standard proctor maximum density. The subgrade should be sloped towards the edges to provide drainage.

F. Closing

Our work was performed for geotechnical purposes only and not to document the presence or

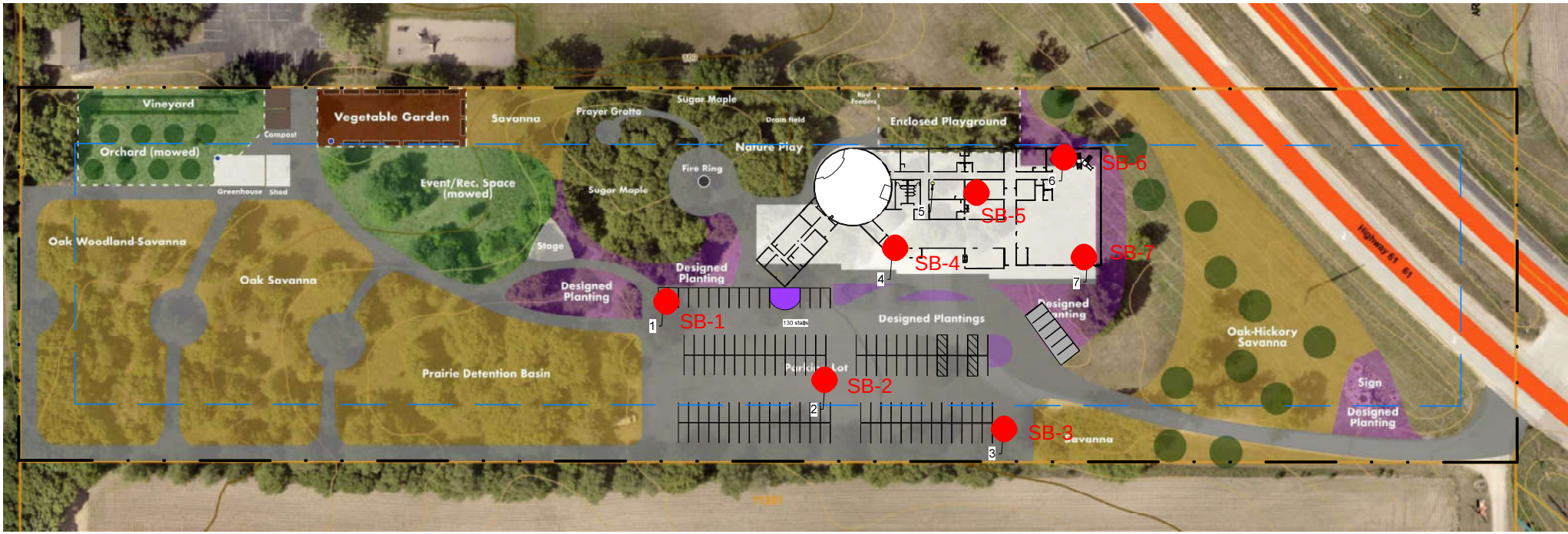
extent of any contamination on the site. We can note that our crew did not detect any obvious contamination by sight or smell during drilling operations. However, human senses are limited in terms of contamination detection and, therefore, the lack of detection through human sensing does not preclude the possibility of the presence of contamination of the site.

This report represents the result of our subsurface investigation and is based on information gathered at specific locations. Subsurface conditions can change a great deal over short horizontal distances. Also, the actual interface between strata will likely be a gradual transition rather than an abrupt change as represented on the boring logs.

Geotechnical engineering is based extensively on opinion. Therefore, the data contained in this report should be used as a guide, and we recommend that construction monitoring be performed by a qualified geotechnical engineer or technician. We recommend ITT be retained to perform construction observation and materials testing on this project due to our familiarity with the soils. Any changes in the subsurface conditions from those found during this geotechnical investigation should be brought to the attention of a soils engineer.

APPENDIX 1

BORING LOCATION PLAN



NEW LIFE EV FREE, HASTINGS MN

5.26.23

SITE

VANMAN
architects and builders

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APPENDIX 2

SOIL BORING LOGS

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/27/23** *BORING #:* **SB-1**
START TIME: **8:30** *END TIME:* **9:15**
METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**
LOCATION: **See Boring Location Plan** *ELEVATION:* **94.0** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
2.0"		2.0 inches of Aggregate				
	SM	SILTY SAND, fine grained, dark brown.	1	4	6.2	
2.5		FILL				
	SP	POORLY GRADED SAND, fine grained, brown.	2	3	5.8	
5.0		fine to medium grained	3	10	8.6	
			4	14	8.3	
10.0		light brown.	5	15	6.7	
15.0			6	8	5.4	
20.0						
	SM	SILTY SAND, fine grained, yellow-brown, mottled.	7	48	14.2	
21.5		Boring complete to 21.5 feet. No water encountered during drilling. No water encountered to cave-in at 12' 1" after completion.				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/27/23** *BORING #:* **SB-2**
START TIME: **9:15** *END TIME:* **10:00**
METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**
LOCATION: **See Boring Location Plan** *ELEVATION:* **96.3** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
6.0"		6.0 inches of Aggregate				
	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, brown.				
			1	8	5.3	
5.0						
			2	12	5.4	
7.5						
	SP	POORLY GRADED SAND, fine grained, brown.	3	10	5.4	
10.0		fine to medium grained				
			4	8	7.0	
15.0		fine grained, w/ GRAVEL				
			5	50*	2.7	* 50 blows for 6 inches
20.0						
	SM	SILTY SAND, fine grained, light yellow, mottled.	6	52	4.8	
21.5						
		Boring complete to 21.5 feet. No water encountered during drilling. No water encountered to cave-in at 11' 3" after completion.				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/27/23** *BORING #:* **SB-3**
START TIME: **10:00** *END TIME:* **10:45**
METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**
LOCATION: **See Boring Location Plan** *ELEVATION:* **97.5** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
7.0"		7.0 inches of Aggregate				
	SP	POORLY GRADED SAND, fine grained, brown.				
			1	5	2.7	
5.0			2	7	3.1	
			3	10	8.3	
10.0			4	6	4.2	
15.0		fine to medium grained	5	4	2.3	
20.0			6	*	N/R	* 50 blows for 2 inches
21.5		Boring complete to 21.5 feet. No water encountered during drilling. No water encountered to cave-in at 11' 9" after completion.				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/27/23** *BORING #:* **SB-4**
START TIME: **11:00** *END TIME:* **11:45**
METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**
LOCATION: **See Boring Location Plan** *ELEVATION:* **98.0** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
9.0"		**9.0 inches of Aggregate**				
	SP	**POORLY GRADED SAND, fine grained, brown.**				
			1	**16**	2.5	
5.0						
			2	**11**	3.3	
			3	**11**	5.1	
10.0						
			4	**11**	3.4	
15.0						
	SM	**SILTY SAND, fine grained, light grey, mottled.**	**5**	**22**	9.0	
20.0						
21.5			**6**	**45**	10.5	
		Boring complete to 21.5 feet. **No water encountered during drilling.** **No water encountered to cave-in at 11' 3" after completion.**				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/28/23** *BORING #:* **SB-5**
START TIME: **8:00** *END TIME:* **8:45**

METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**

LOCATION: **See Boring Location Plan**
ELEVATION: **99.9** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
7.5"	SM	SILTY SAND, fine grained, black, TOPSOIL.				
2.5	SP	POORLY GRADED SAND, fine grained, brown.	1	3	5.4	
5.0	SM	SILTY SAND, fine grained, brown,	1	19	8.3	
9.5	SP	POORLY GRADED SAND, fine grained, brown.	2	14	6.6	
			3	13	10.5	
15.0	SC-SM	SILTY CLAYEY SAND, fine grained, brown.	4	3	11.2	
20.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, brown.	5	12	9.8	
21.5	SP	POORLY GRADED SAND, fine to medium grained, w/ GRAVEL, brown.	6	52	2.4	
		Boring complete to 21.5 feet. No water encountered during drilling. No water encountered to cave-in at 12' 7" after completion.				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/28/23** *BORING #:* **SB-6**
START TIME: **8:45** *END TIME:* **9:15**
METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**
LOCATION: **See Boring Location Plan** *ELEVATION:* **102.3** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
19.0"	SM	**SILTY SAND, fine grained, black, TOPSOIL.**	1	2	8.7	
5.0	SP-SM	**POORLY GRADED SAND w/ SILT, dark brown/black FILL**	2	3	5.6	
7.5	SP	**POORLY GRADED SAND, fine grained, brown.**	3	17	4.6	
10.0	SM	**SILTY SAND, fine grained, brown.**	4	9	11.8	
15.0		**reddish brown.**	5	14	9.0	
20.0	SP-SM	**POORLY GRADED SAND w/ SILT, fine to medium grained, reddish brown.**	6	19	10.0	
21.5			7	42	7.8	
		Boring complete to 21.5 feet. **No water encountered during drilling.** **No water encountered to cave-in at 11' 7" after completion.**				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: **23-235** **VANMAN ARCHITECTS & BUILDERS**
NEW LIFE EVANGELICAL FREE CHURCH
HASTINGS, MINNESOTA

DATE: **7/28/23** *BORING #:* **SB-7**
START TIME: **9:15** *END TIME:* **10:00**
METHOD: **3 ¼" I.D. Hollow Stem Auger**
CREW: **CD/ SP**
LOCATION: **See Boring Location Plan** *ELEVATION:* **103.1** **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	W_n	Notes
12.0"	SM	SILTY SAND, fine grained, dark brown, TOPSOIL.	1	2	7.1	
5.0	SP	POORLY GRADED SAND, fine grained, brown.	2	2	4.8	
7.5	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, brown.	3	6	15.5	
10.0	SM	SILTY SAND, fine grained, brown, mottled.	4	10	22.8	
15.0	SP	POORLY GRADED SAND, fine to medium grained, brown.	5	18	28.2	
20.0	SC	CLAYEY SAND, fine grained, reddish brown, mottled.	6	12	11.8	
21.5	SP-SM	POORLY GRADED SAND w/ SILT, fine to medium grained, brown, mottled.	7	21	4.3	
		Boring complete to 21.5 feet. No water encountered during drilling. No water encountered to cave-in at 11' 7" after completion.				

Unified Soil Classification (USC) System (from ASTM D 2487)

Major Divisions			Group Symbol	Typical Names
Course-Grained Soils More than 50% retained on the 0.075 mm (No. 200) sieve	**Gravels** 50% or more of course fraction retained on the 4.75 mm (No. 4) sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands 50% or more of course fraction passes the 4.75 (No. 4) sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils More than 50% passes the 0.075 mm (No. 200) sieve	**Silts and Clays** Liquid Limit 50% or less		ML	Inorganic silts, very fine sands, rock four, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly/sandy/silty/lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

Prefix: G = Gravel, S = Sand, M = Silt, C = Clay, O = Organic
Suffix: W = Well Graded, P = Poorly Graded, M = Silty, L = Clay, LL < 50%, H = Clay, LL > 50%

DEPARTMENT OF TRANSPORTATION

Metropolitan District
1500 County Road B-2 West
Roseville, MN 55113

January 13, 2025

Joe Fox
Project Engineer
City of Cottage Grove
12800 Ravine Parkway South
Cottage Grove, MN 55016

SUBJECT: **New Life Church Addition**
MnDOT Review #**S25-041**
NW Quad of US 61 and Point Douglas Dr
11245 Point Douglas Dr
Cottage Grove, Washington County

Dear Joe Fox,

Thank you for submitting the site plans for the New Life Church Addition. The Minnesota Department of Transportation (MnDOT) has reviewed the documents, and has the following comments:

US 61 Intersections
At-grade intersections along US 61 are being phased out and converted to J-turns as this corridor approaches capacity for traditional intersections. Please be aware that, in the future, the median at this location may be closed, allowing only right-in / right-out access. Left turns would then be made using a median U-turn. Advance notice would be provided before any changes take place.

Please contact Matthew Schleusner, East Area Coordinator, at matthew.schleusner@state.mn.us or 612-270-3696 with any questions.

Water Resources
A MnDOT drainage permit may be required before development occurs. The permit applicant shall demonstrate that the off-site runoff entering MnDOT drainage system(s) and/or right of way will not increase. The drainage permit application, including the information below, should be submitted online to: https://olpa.dot.state.mn.us/OLPA/. Please upload this letter with the drainage permit application.

The following information must be submitted with the drainage permit application:

1. Grading plans, drainage plans, and hydraulic calculations demonstrating that proposed flows to MnDOT right of way remain the same as existing conditions or are reduced.
2. Existing and proposed drainage area maps with flow arrows and labeling that corresponds with the submitted calculations.
3. Hydro CAD model and PDF of output for the 2, 10, and 100-year Atlas 14 storm events.

Once a drainage permit application is submitted, a thorough review will be completed and additional information may be requested. Please contact Jason Swenson, Water Resources Engineering, at jason.swenson@state.mn.us or 651-234-7539 with any questions.

Permits
Any work that affects MnDOT right of way will require an appropriate permit. All permits are available and must be applied at: https://olpa.dot.state.mn.us/OLPA/. Upload this letter when applying for permits.

For questions regarding permit submittal requirements, please contact Jeff Dierberger of MnDOT's Metro District Permits Section at jeffrey.dierberger@state.mn.us or 651-775-0404.

Review Submittal Options
MnDOT's goal is to complete reviews within 30 calendar days. Review materials received electronically can be processed more rapidly. Do not submit files via a cloud service or SharePoint link. In order of preference, review materials may be submitted as:

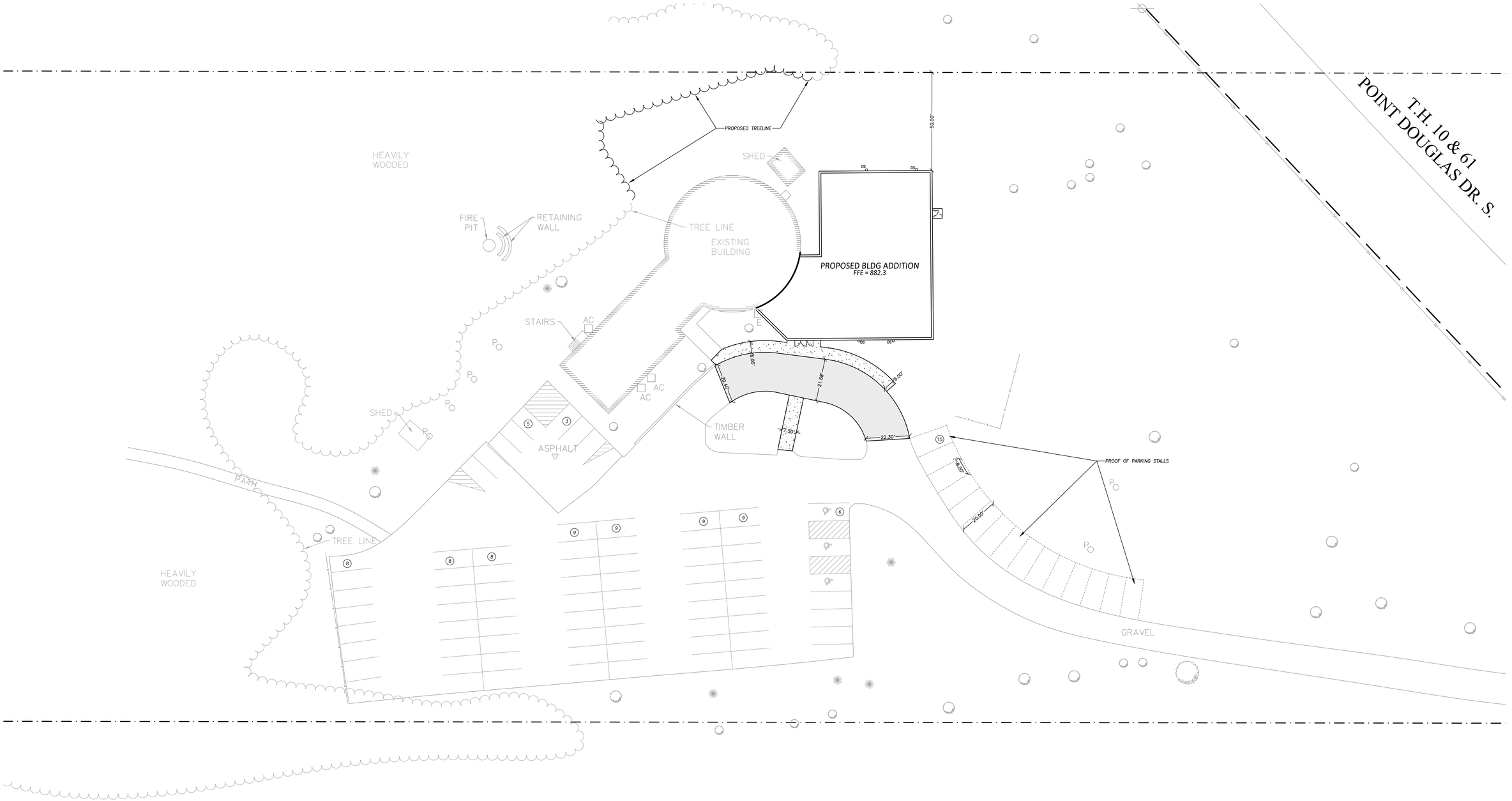
1. Email documents and plans to metrodevreviews.dot@state.mn.us. Attachments may not exceed 20 MB (megabytes) per email. Documents can be zipped as well. If multiple emails are necessary, number each email.
2. Files over 20 MB can also be uploaded to MnDOT's Web Transfer Client site: https://mft.dot.state.mn.us. Contact metrodevreviews.dot@state.mn.us, and staff will create a shared folder in which files can be uploaded to. Please send an accompanying email with a narrative for the development.

You are welcome to contact me at regina.burstein@state.mn.us with any questions.

Sincerely,

Regina Burstein
Senior Planner

Copy sent via email:
Jason Swenson, Water Resources
Jeff Dierberger, Permits
Ben Klismith, Right of Way
Kaare Festvog, Traffic
Amrish Patel, Transit
Matthew Schleusner, Area Coordinator
Heather Gardner, Design
Michael Kowski, Maintenance
Molly McCormick, Ped/Bike/ADA Planning
Brandon JB Nelson, Surveying
Tod Sherman, Planning
Cameron Muhic, Planning
Scott Shaffer, Planning
Joseph Widing, Metropolitan Council



CODE COMPLIANCE:

1. WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LAWS, CODES & REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION.
2. NOTIFY THE OWNER'S ENGINEER OF DISCREPANCIES BETWEEN THE WORK AND APPLICABLE CODES. DO NOT WORK IN AN AFFECTED AREA UNTIL THE DISCREPANCY HAS BEEN RESOLVED.
3. VERIFY CODES IN EFFECT AT THE TIME OF THE NOTICE TO PROCEED AND STAY CURRENT WITH CODE CHANGES WHICH AFFECT THE WORK UNTIL SUBSTANTIAL COMPLETION.

Boundary topographical & utility information was prepared by M&P Associates. This information has not been verified as to its accuracy or completeness by Rehder & Associates, Inc.

GOPHER STATE ONE CALL

CALL 48 HOURS BEFORE YOU DIG
TWIN CITY AREA 651-454-0002
MN. TOLL FREE 1-800-252-1166

SITE SUMMARY

SITE AREA = 8.68 ACRES
DISTURBED AREA = 0.58 ACRES
EXISTING IMPERVIOUS AREA = 1.24 ACRES (14.3%)
POST CONSTRUCTION IMPERVIOUS AREA = 1.33 ACRES (15.3%)
OPEN SPACE = 100% - 15.3% = 84.7%
NEW IMPERVIOUS AREA = 1.33 - 1.24 = 0.09 ACRES
RECONSTRUCTED IMPERVIOUS AREA = 0.11 ACRES

PARKING STALLS REQUIRED

ASSEMBLY = 299 SEATS @ 1 STALL/4 SEATS =	= 75 STALLS
CHILD CLASSROOM = 11 CLASSROOMS @ 1 STALL/CLASSROOM	= 11 STALLS
CHILD CLASSROOM = 184 STUDENTS @ 1 STALL/100 STUDENTS	= 2 STALLS
TOTAL	= 88 STALLS

PARKING STALLS PROVIDED

STANDARD STALLS	= 71 STALLS
ACCESSIBLE STALLS	= 3 STALLS
PROOF OF PARKING STALLS	= 15 STALLS
TOTAL	= 88 STALLS

LEGEND

- BOUNDARY/ROW/BLOCK LINE
- EASEMENT
- BUILDING/PARKING SETBACK LINE
- PROPOSED CONCRETE
- PROPOSED BITUMINOUS

N

0 10 20 40 60
Scale in Feet

REHDER & ASSOCIATES, INC.
Civil Engineers & Land Surveyors
3440 Federal Drive, Suite 110
Eagan, MN 55122
Telephone 651-452-5051
www.rehder.com

PROJECT NO.: 251-2393.058 DRAWING FILE: 2393058.DWG

I hereby certify that this plan 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.

PRELIMINARY

Name _____ Date _____ Reg. No. _____

Issued
CITY SUBMITTAL 1-28-26

SITE DIMENSION PLAN
NEW LIFE EFREE CHURCH
CITY OF COTTAGE GROVE

SHEET NUMBER
C2

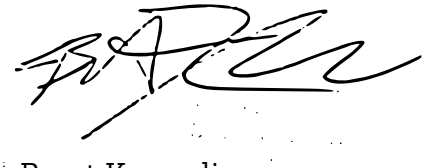
New Life
EVANGELICAL FREE CHURCH

Letter of Concurrence

To whom it may concern,

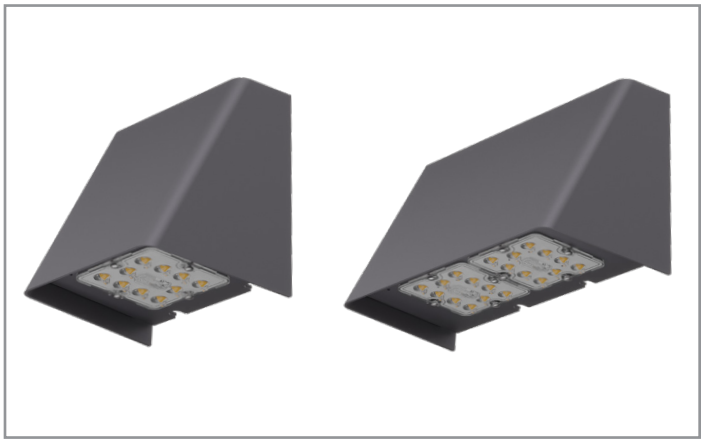
New Life Evangelical Free Church located at 11245 Point Douglas Dr S, Hastings, MN, 55033, authorizes Station 19 Architects to represent us with respect to Planning Applications at Planning Commission / City Council meeting.

Respectfully,



Brent Kompelien
Senior Pastor

Project		**Catalog #**		**Type**	
Prepared by		**Notes**		**Date**	



McGraw-Edison

GKO Gekko

Wall Mount Luminaire

Product Features

Light ARchitect™ FADC

Product Certifications

DLC LISTED [1] DLC LISTED PREMIUM [1] ISO CERTIFIED UL CERTIFIED FC CLASS A IP66

BAA BUY AMERICAN ACT AVAILABLE TAA TRADE AGREEMENTS ACT AVAILABLE BABA BUILD AMERICA BUY AMERICA AVAILABLE DARKSKY APPROVED [2] 5 YEAR LIMITED WARRANTY RoHS COMPLIANT

Interactive Menu

- Ordering Information page 2
- Product Specifications page 2
- Optical Configurations page 3
- Energy and Performance Data page 4
- Control Options page 10

Quick Facts

- Available in small and medium housing sizes
- Choice of 5 optical distributions
- 11 lumen packages from 750 up to 13,500
- Efficacies up to 169 lumens per watt

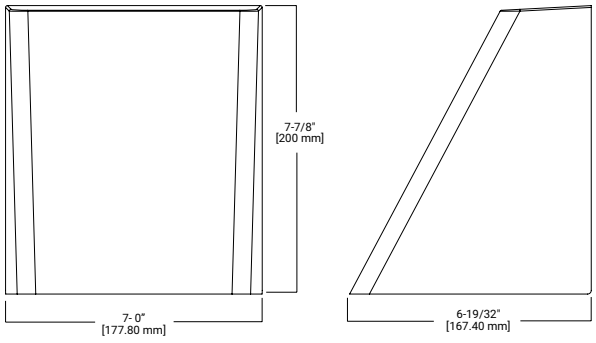
Connected Systems

- WaveLinx PRO Wireless
- WaveLinx LITE Wireless

Dimensional Details

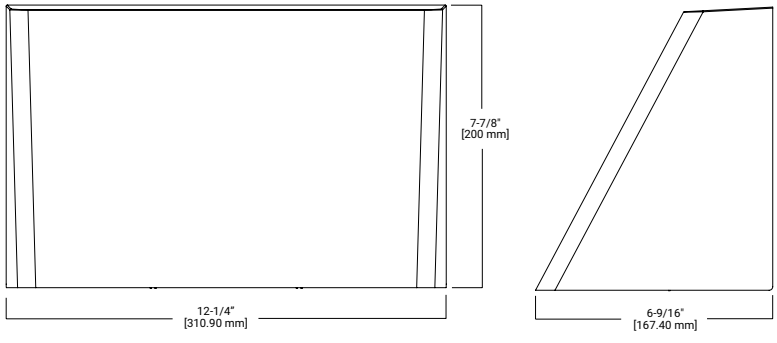
PB1

Net Weight: 6.0 lbs (2.7 kg)



PB2

Net Weight: 10.6 lbs (4.8 kg)



NOTES:
1. Visit https://www.designlights.org/search/ to confirm qualification. Not all product variations are DLC qualified.
2. IDA Certified for 3000K CCT and warmer only.

Ordering Information

SAMPLE NUMBER: **GKO-PB2A-740-U-T3-BK**

Product Family	Light Engine Configuration		Lumen Output	Color Temperature	Voltage	Distribution	Finish
	Light Engine	Size					
GKO=Gekko Wall Luminaire **BAA-GKO**=Gekko Buy American Act Compliant [13] **TAA-GKO**=Gekko Trade Agreements Act Compliant [13] **BABAF-GKO**=Gekko Build America Buy America Act Compliant for FHWA funded projects [14]	**PB**=Mini 10-LED Light Square	**1**=Small, 1 Square **2**=Medium, 2 Squares	**A**=Output Level 1 **B**=Output Level 2 **C**=Output Level 3 **D**=Output Level 4 **E**=Output Level 5 **F**=Output Level 6 [1]	**722**=70 CRI, 2200K CCT **727**=70 CRI, 2700K CCT **730**=70 CRI, 3000K CCT **735**=70 CRI, 3500K CCT **740**=70 CRI, 4000K CCT **750**=70 CRI, 5000K CCT **827**=80 CRI, 2700K CCT **830**=80 CRI, 3000K CCT **835**=80 CRI, 3500K CCT **840**=80 CRI, 4000K CCT **850**=80 CRI, 5000K CCT **AMB**=Amber 590nm [2]	**U**=120-277V **1**=120V **2**=208V **3**=240V **4**=277V **8**=480V [15, 17] **9**=347V [17]	**T1**=Type I **T2R**=Type II Round **T2U**=Type II Urban **T3**=Type III **T4W**=Type IV Wide	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic **NW**=New White

Options (Add as Suffix)	Controls and Systems Options (Add as Suffix)	Accessories (Order Separately)
F=Single Fused (120, 277 or 347, Specify Voltage) **FF**=Double Fused (208, 240 or 480, Specify Voltage) **20MSP**=Parallel 20kV MOV Surge Protective Device **20K**=Series 20kV UL1449 Fused Surge Protective Device **2L**=Two Circuits [3] **EBP**=6W Battery Pack **CBP**=6W Battery Pack, Cold Weather Rated [4, 10] **CBP-CEC**=8W Battery Pack, Cold Weather Rated, CEC Compliant [4, 10] **HSS**=Factory Installed House Side Shield **HA**=50C° High Ambient [10] **CC**=Coastal Construction [5]	**BPC**=Button Type Photocontrol (120, 208, 240 or 277V. Must Specify Voltage) **FADC**=Field Adjustable Dimming Controller [8] **SPB1=**Dimming Occupancy Sensor with Bluetooth Interface, <8' Mounting [6, 7, 8, 11] **SPB2=**Dimming Occupancy Sensor with Bluetooth Interface, 8' - 20' Mounting [6,7,8,11] **MS/DIM-L08**=Motion Sensor for Dimming Operation, <8' Mounting [7, 8, 11, 12] **MS/DIM-L20**=Motion Sensor for Dimming Operation, 8'-20' Mounting [7, 8, 11, 12] **WPS2WH**=WaveLinx Pro, SR Driver, Dimming Motion and Daylight, WAC Programmable, 7'-15' Mounting [7, 8, 11, 16] **WPS4WH**=WaveLinx Pro, SR Driver, Dimming Motion and Daylight, WAC Programmable, 15'-40' Mounting [7, 8, 11, 16] **WLS2WH**=WaveLinx Lite, SR Driver, Dimming Motion and Daylight, Bluetooth Programmable, 7'-15' Mounting [7, 8, 11] **WLS4WH**=WaveLinx Lite, SR Driver, Dimming Motion and Daylight, Bluetooth Programmable, 15'-40' Mounting [7, 8, 11]	**PBHSS**=House Side Shield (Single) [9] **PBPFS**=Perimeter Fence Shield Kit (4 Pieces) **FSIR-100**= Wireless Configuration Tool for MS/DIM [12] **MA1252**=10kV Surge Module Replacement **BB/GKO-XX**=Surface mount backbox [19]

NOTES:
1. Output Level 6 not available with PB2
2. Narrow-band 590nm +/- 5nm for wildlife and observatory use. Choose Output Level 1; supplied at 300mA for PB1, 600mA for PB2. Not available with HA option. Exact luminaire wattage available in IES files.
3. Not available with PB1. Not available with FF option, or controls options at 347V or 480V.
4. Operates at -20°C to +40°C. Not available with PB1 or HA option.
5. Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654.
6. Smart device with mobile application required to change system defaults. See controls section for details.
7. Includes integral photosensor.
8. Not available with PB1 at Output Level 1 or 2. Not available with other motion activated control options.
9. One required per PB light square.
10. Combination of CBP and HA not available with PB2 at output level 4 or 5.
11. When motion controls are selected, PB1 uses surface mount sensor in PB2 housing. PB2 uses side-mount motion sensor in PB2 housing.
12. The FSIR-100 configuration tool is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Cooper Lighting Solutions for more information.
13. Only product configurations with these designated prefixes are built to be compliant with the Buy American Act of 1933 (BAA) or Trade Agreements Act of 1979 (TAA), respectively. Please refer to DOMESTIC PREFERENCES website for more information. Components shipped separately may be separately analyzed under domestic preference requirements.
14. Only product configurations with these prefixes are built to be compliant with the Buy American Act of 1933 (BAA) or the Build America Buy America Act (BABA). BABA is the minimum Government compliance requirement for the Build America Buy America standards which is part of the Infrastructure and Investment Jobs Act (IIJA). Individual Government Agencies may have more stringent compliance standards. Please refer to the DOMESTIC PREFERENCES website or consult the CLS Domestic Preferences team for more information. Components shipped separately may be separately analyzed under domestic preference requirements.
15. 480V not to be used with ungrounded or impedance grounded systems.
16. WAC Gateway required to enable field-configurability: Order WAC-PoE and WPOE-120 (10V to PoE injector) power supply if needed.
17. Not available with PB1A and PB1B.
18. Operates at 0°C to +55°C.
19. Replace XX with color designation. Includes 5 gasketed 3/4" conduit entry points.

Product Specifications

Construction
- Available in small (1 square) and medium (2 square) sizes
- Die-cast aluminum housing
- IP66 rated housing
- IK10 impact rated

Optics
- 10-LED square light engine
- 5 optical distributions
- IDA Certified (3000K CCT and warmer only)
- 2 versions of field-installable shielding for superior spill light control
  - Single-piece snap-on square shields (HSS)
  - Multiple-piece configurable vertical perimeter shielding (PFS)

Electrical
- Standard with 0-10V dimming
- Standard with 10kV surge device
- 10kV or 20kV surge protective options with series or parallel configurations
- -40°C to 40°C ambient temperature operating range with optional high ambient (HA) 50°C

Controls
- Luminaire available with the field adjustable dimming controller (FADC) to manually adjust wattage and reduce the total lumen output and light levels. Default setting is the highest position at the lumen output selected

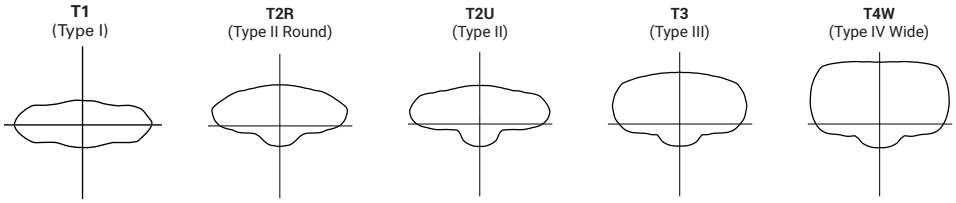
Finish
- Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness
- 3,000-hours per ASTM B117, with a scribe rating of 7 per ASTM D1654 for standard color finish
- Coastal Construction (CC) option available

Typical Applications
- Exterior wall, walkway

Compliance
- BAA domestic preference option meets BAA requirements. See DOMESTIC PREFERENCES website or consult the CLS Domestic Preferences team for more information
- FHWA and FTA agencies are utilizing their BAA rules for BABA compliance. Cooper's products with a BAA designation are manufactured in the US and utilize a BAA COTS exemption rule for compliance. To verify a configured product with specific accessories and options meet BABA Domestic Preference Requirements; submit this catalog number to Cooper Lighting Quotation team for validation by our Engineering and Manufacturing teams.
- Please refer to the DOMESTIC PREFERENCES website or consult the CLS Domestic Preferences team for more information. Components shipped separately may be separately analyzed under domestic preference requirements

Warranty
- Five year limited warranty, consult website for details. www.cooperlighting.com/legal

Optical Distributions



Energy and Performance Data

Lumen Maintenance

Ambient Temperature	25,000 hours*	50,000 hours*	60,000 hours*	100,000 hours*	L70*
25°C	98.1%	96.3%	95.6%	92.8%	>102,000
40°C	98.0%	96.1%	95.3%	92.3%	>102,000
50°C	97.8%	95.6%	94.8%	91.4%	>102,000

Note: * Calculations provided in accordance with IES TM-21-11 using the configuration resulting in highest LED temperature.

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

FADC Settings

FADC Position	Percent of Typical Lumen Output
1	25%
2	48%
3	56%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

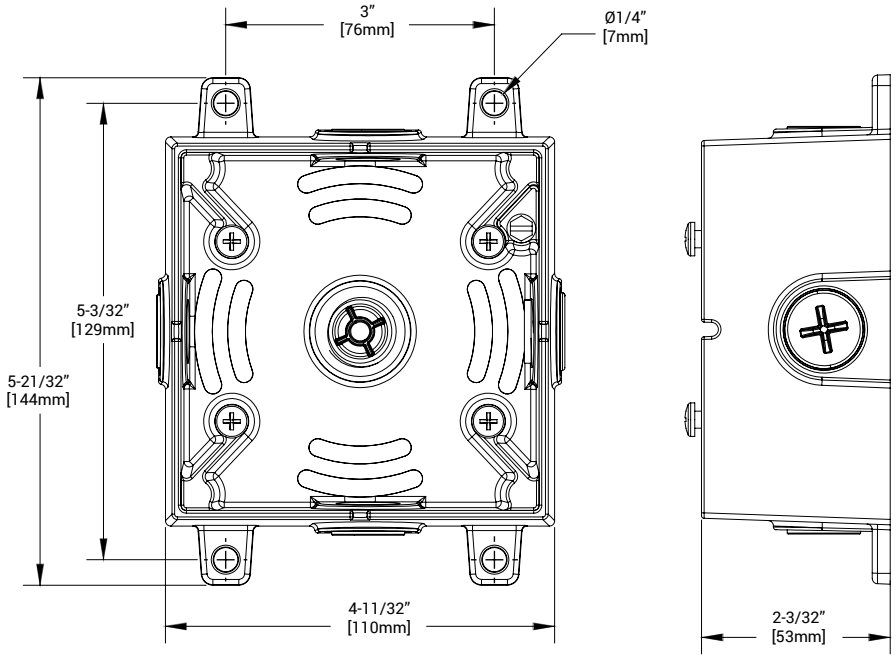
Note: +/-5% typical value

LED Color Multipliers

	CCT				
	2200	2700	3000	4000	5000
CRI	Lumen Multiplier*				
70	0.83	0.92	0.95	1.00	1.00

Note: * Estimates, refer to IES files for accuracy.

Accessories



Energy and Performance Data

View GKO Gekko IES files

Number of Light Squares			1 Square (PB1)						2 Squares (PB2)				
Output Level			A	B	C	D	E	F	A	B	C	D	E
Drive Current			180mA	300mA	520mA	740mA	1100mA	1500mA	800mA	1250mA	1700mA	1130mA	1500mA
Nominal Power (Watts)			6	9	17	25	38	54	26	41	57	78	107
Input Current @ 120V (A)			0.040	0.079	0.145	0.218	0.328	0.465	0.224	0.353	0.494	0.640	0.875
Input Current @ 208V (A)			0.025	0.048	0.085	0.127	0.189	0.264	0.131	0.203	0.280	0.367	0.498
Input Current @ 240V (A)			0.023	0.044	0.075	0.112	0.165	0.230	0.115	0.176	0.243	0.320	0.432
Input Current @ 277V (A)			0.021	0.041	0.067	0.099	0.144	0.200	0.102	0.154	0.212	0.280	0.375
Input Current @ 347V (A)			n/a	n/a	0.056	0.076	0.112	0.156	0.079	0.121	0.166	0.219	0.300
Input Current @ 480V (A)			n/a	n/a	0.045	0.058	0.083	0.114	0.060	0.089	0.121	0.160	0.217
CCT/ CRI	Optics		PB1A	PB1B	PB1C	PB1D	PB1E	PB1F	PB2A	PB2B	PB2C	PB2D	PB2E
70 CRI 2200K CCT	T1	Lumens	671	1,307	2,244	3,184	4,504	5,814	3,658	5,547	7,241	9,059	11,179
		Lumens per Watt	140	141	132	124	116	107	138	133	124	119	107
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3
	T2R	Lumens	647	1,259	2,161	3,067	4,338	5,600	3,523	5,342	6,974	8,726	10,767
		Lumens per Watt	135	135	127	120	112	103	133	128	120	115	103
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	640	1,246	2,138	3,034	4,292	5,541	3,486	5,286	6,901	8,634	10,653
		Lumens per Watt	133	134	126	119	111	102	132	126	119	113	102
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T3	Lumens	637	1,241	2,130	3,023	4,276	5,520	3,473	5,266	6,875	8,601	10,613
		Lumens per Watt	133	133	125	118	110	101	131	126	118	113	101
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2
	T4W	Lumens	618	1,203	2,066	2,932	4,147	5,353	3,368	5,107	6,667	8,341	10,293
		Lumens per Watt	129	129	122	115	107	98	127	122	115	109	98
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
70 CRI 2700K CCT	T1	Lumens	744	1,449	2,487	3,529	4,992	6,445	4,055	6,148	8,026	10,042	12,391
		Lumens per Watt	155	156	146	138	129	118	153	147	138	132	118
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	717	1,395	2,395	3,399	4,808	6,207	3,905	5,921	7,731	9,672	11,934
		Lumens per Watt	149	150	141	133	124	114	147	142	133	127	114
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	709	1,381	2,370	3,363	4,757	6,142	3,864	5,859	7,649	9,570	11,808
		Lumens per Watt	148	148	139	131	123	113	146	140	131	126	113
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	707	1,375	2,361	3,350	4,739	6,118	3,849	5,837	7,620	9,533	11,763
		Lumens per Watt	147	148	139	131	122	112	145	140	131	125	112
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	685	1,334	2,290	3,249	4,596	5,934	3,733	5,661	7,390	9,246	11,409
		Lumens per Watt	143	143	135	127	119	109	141	135	127	121	109
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2

Number of Light Squares			1 Square (PB1)						2 Squares (PB2)				
Output Level			A	B	C	D	E	F	A	B	C	D	E
Drive Current			180mA	300mA	520mA	740mA	1100mA	1500mA	800mA	1250mA	1700mA	1130mA	1500mA
Nominal Power (Watts)			6	9	17	25	38	54	26	41	57	78	107
Input Current @ 120V (A)			0.040	0.079	0.145	0.218	0.328	0.465	0.224	0.353	0.494	0.640	0.875
Input Current @ 208V (A)			0.025	0.048	0.085	0.127	0.189	0.264	0.131	0.203	0.280	0.367	0.498
Input Current @ 240V (A)			0.023	0.044	0.075	0.112	0.165	0.230	0.115	0.176	0.243	0.320	0.432
Input Current @ 277V (A)			0.021	0.041	0.067	0.099	0.144	0.200	0.102	0.154	0.212	0.280	0.375
Input Current @ 347V (A)			n/a	n/a	0.056	0.076	0.112	0.156	0.079	0.121	0.166	0.219	0.300
Input Current @ 480V (A)			n/a	n/a	0.045	0.058	0.083	0.114	0.060	0.089	0.121	0.160	0.217
CCT/ CRI	Optics		PB1A	PB1B	PB1C	PB1D	PB1E	PB1F	PB2A	PB2B	PB2C	PB2D	PB2E
70 CRI 3000K CCT	T1	Lumens	760	1,480	2,541	3,606	5,100	6,585	4,143	6,282	8,201	10,260	12,660
		Lumens per Watt	158	159	149	141	132	121	156	150	141	135	121
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	732	1,426	2,447	3,473	4,912	6,342	3,990	6,050	7,899	9,882	12,194
		Lumens per Watt	153	153	144	136	127	116	151	145	136	130	116
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	725	1,411	2,422	3,436	4,861	6,275	3,948	5,986	7,815	9,778	12,065
		Lumens per Watt	151	152	142	134	126	115	149	143	134	128	115
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	722	1,405	2,412	3,423	4,842	6,251	3,933	5,964	7,786	9,741	12,019
		Lumens per Watt	150	151	142	134	125	115	148	143	134	128	115
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	700	1,363	2,340	3,320	4,696	6,063	3,814	5,784	7,551	9,447	11,657
		Lumens per Watt	146	147	138	130	121	111	144	138	130	124	111
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
70 CRI 3500K CCT	T1	Lumens	774	1,507	2,587	3,672	5,193	6,705	4,218	6,396	8,350	10,447	12,891
		Lumens per Watt	161	162	152	143	134	123	159	153	143	137	123
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	746	1,452	2,492	3,536	5,002	6,458	4,063	6,160	8,043	10,062	12,416
		Lumens per Watt	155	156	147	138	129	118	153	147	138	132	119
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	738	1,436	2,466	3,499	4,949	6,390	4,020	6,095	7,958	9,956	12,285
		Lumens per Watt	154	154	145	137	128	117	152	146	137	131	117
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	735	1,431	2,456	3,486	4,930	6,365	4,005	6,072	7,928	9,918	12,238
		Lumens per Watt	153	154	144	136	127	117	151	145	136	130	117
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	713	1,388	2,382	3,381	4,782	6,173	3,884	5,889	7,689	9,619	11,869
		Lumens per Watt	149	149	140	132	124	113	147	141	132	126	113
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2

Number of Light Squares			1 Square (PB1)						2 Squares (PB2)				
Output Level			A	B	C	D	E	F	A	B	C	D	E
Drive Current			180mA	300mA	520mA	740mA	1100mA	1500mA	800mA	1250mA	1700mA	1130mA	1500mA
Nominal Power (Watts)			6	9	17	25	38	54	26	41	57	78	107
Input Current @ 120V (A)			0.040	0.079	0.145	0.218	0.328	0.465	0.224	0.353	0.494	0.640	0.875
Input Current @ 208V (A)			0.025	0.048	0.085	0.127	0.189	0.264	0.131	0.203	0.280	0.367	0.498
Input Current @ 240V (A)			0.023	0.044	0.075	0.112	0.165	0.230	0.115	0.176	0.243	0.320	0.432
Input Current @ 277V (A)			0.021	0.041	0.067	0.099	0.144	0.200	0.102	0.154	0.212	0.280	0.375
Input Current @ 347V (A)			n/a	n/a	0.056	0.076	0.112	0.156	0.079	0.121	0.166	0.219	0.300
Input Current @ 480V (A)			n/a	n/a	0.045	0.058	0.083	0.114	0.060	0.089	0.121	0.160	0.217
CCT/ CRI	Optics		PB1A	PB1B	PB1C	PB1D	PB1E	PB1F	PB2A	PB2B	PB2C	PB2D	PB2E
70 CRI 4000K 5000K CCT	T1	Lumens	809	1,575	2,703	3,836	5,426	7,005	4,407	6,683	8,724	10,915	13,468
		Lumens per Watt	169	169	159	150	140	129	166	160	150	143	129
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	779	1,517	2,604	3,695	5,226	6,747	4,245	6,436	8,403	10,513	12,972
		Lumens per Watt	162	163	153	144	135	124	160	154	144	138	124
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T2U	Lumens	771	1,501	2,576	3,656	5,171	6,676	4,200	6,368	8,314	10,402	12,835
		Lumens per Watt	161	161	152	143	134	122	158	152	143	137	123
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	768	1,495	2,566	3,642	5,151	6,650	4,184	6,344	8,283	10,362	12,786
		Lumens per Watt	160	161	151	142	133	122	158	152	142	136	122
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	745	1,450	2,489	3,532	4,996	6,450	4,058	6,153	8,033	10,050	12,401
		Lumens per Watt	155	156	146	138	129	118	153	147	138	132	118
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2

Number of Light Squares			1 Square (PB1)						2 Squares (PB2)				
Output Level			A	B	C	D	E	F	A	B	C	D	E
Drive Current			180mA	300mA	520mA	740mA	1100mA	1500mA	800mA	1250mA	1700mA	1130mA	1500mA
Nominal Power (Watts)			6	9	17	25	38	54	26	41	57	78	107
Input Current @ 120V (A)			0.040	0.079	0.145	0.218	0.328	0.465	0.224	0.353	0.494	0.640	0.875
Input Current @ 208V (A)			0.025	0.048	0.085	0.127	0.189	0.264	0.131	0.203	0.280	0.367	0.498
Input Current @ 240V (A)			0.023	0.044	0.075	0.112	0.165	0.230	0.115	0.176	0.243	0.320	0.432
Input Current @ 277V (A)			0.021	0.041	0.067	0.099	0.144	0.200	0.102	0.154	0.212	0.280	0.375
Input Current @ 347V (A)			n/a	n/a	0.056	0.076	0.112	0.156	0.079	0.121	0.166	0.219	0.300
Input Current @ 480V (A)			n/a	n/a	0.045	0.058	0.083	0.114	0.060	0.089	0.121	0.160	0.217
CCT/ CRI	Optics		PB1A	PB1B	PB1C	PB1D	PB1E	PB1F	PB2A	PB2B	PB2C	PB2D	PB2E
80 CRI 2700K CCT	T1	Lumens	686	1,335	2,292	3,253	4,601	5,940	3,737	5,667	7,398	9,256	11,421
		Lumens per Watt	143	144	135	127	119	109	141	136	127	121	109
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3
	T2R	Lumens	661	1,286	2,208	3,133	4,432	5,721	3,600	5,458	7,126	8,915	11,000
		Lumens per Watt	138	138	130	122	115	105	136	131	122	117	105
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	654	1,273	2,185	3,100	4,385	5,661	3,562	5,400	7,050	8,821	10,884
		Lumens per Watt	136	137	129	121	113	104	134	129	121	116	104
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T3	Lumens	651	1,268	2,176	3,088	4,368	5,640	3,548	5,380	7,024	8,787	10,843
		Lumens per Watt	136	136	128	121	113	103	134	129	121	115	104
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	632	1,230	2,111	2,995	4,237	5,470	3,441	5,218	6,812	8,522	10,516
		Lumens per Watt	132	132	124	117	109	100	130	125	117	112	100
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
80 CRI 3000K CCT	T1	Lumens	713	1,387	2,382	3,380	4,780	6,172	3,883	5,887	7,686	9,616	11,866
		Lumens per Watt	148	149	140	132	124	113	147	141	132	126	113
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3
	T2R	Lumens	686	1,336	2,294	3,255	4,604	5,944	3,740	5,670	7,403	9,262	11,428
		Lumens per Watt	143	144	135	127	119	109	141	136	127	122	109
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	679	1,322	2,270	3,221	4,556	5,881	3,700	5,611	7,325	9,164	11,308
		Lumens per Watt	142	142	134	126	118	108	140	134	126	120	108
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T3	Lumens	677	1,317	2,261	3,208	4,538	5,859	3,686	5,589	7,297	9,129	11,265
		Lumens per Watt	141	142	133	125	117	108	139	134	125	120	108
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	656	1,277	2,193	3,112	4,401	5,682	3,575	5,421	7,077	8,854	10,925
		Lumens per Watt	137	137	129	122	114	104	135	130	122	116	104
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2

Number of Light Squares			1 Square (PB1)						2 Squares (PB2)				
Output Level			A	B	C	D	E	F	A	B	C	D	E
Drive Current			180mA	300mA	520mA	740mA	1100mA	1500mA	800mA	1250mA	1700mA	1130mA	1500mA
Nominal Power (Watts)			6	9	17	25	38	54	26	41	57	78	107
Input Current @ 120V (A)			0.040	0.079	0.145	0.218	0.328	0.465	0.224	0.353	0.494	0.640	0.875
Input Current @ 208V (A)			0.025	0.048	0.085	0.127	0.189	0.264	0.131	0.203	0.280	0.367	0.498
Input Current @ 240V (A)			0.023	0.044	0.075	0.112	0.165	0.230	0.115	0.176	0.243	0.320	0.432
Input Current @ 277V (A)			0.021	0.041	0.067	0.099	0.144	0.200	0.102	0.154	0.212	0.280	0.375
Input Current @ 347V (A)			n/a	n/a	0.056	0.076	0.112	0.156	0.079	0.121	0.166	0.219	0.300
Input Current @ 480V (A)			n/a	n/a	0.045	0.058	0.083	0.114	0.060	0.089	0.121	0.160	0.217
CCT/ CRI	Optics		PB1A	PB1B	PB1C	PB1D	PB1E	PB1F	PB2A	PB2B	PB2C	PB2D	PB2E
80 CRI 3500K CCT	T1	Lumens	724	1,409	2,419	3,433	4,856	6,270	3,944	5,981	7,808	9,769	12,054
		Lumens per Watt	151	152	142	134	125	115	149	143	134	128	115
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	697	1,357	2,330	3,307	4,677	6,038	3,799	5,760	7,520	9,409	11,610
		Lumens per Watt	145	146	137	129	121	111	143	138	129	123	111
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	690	1,343	2,306	3,272	4,628	5,975	3,759	5,700	7,441	9,310	11,487
		Lumens per Watt	144	144	136	128	120	110	142	136	128	122	110
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	687	1,338	2,297	3,259	4,610	5,952	3,745	5,678	7,413	9,274	11,444
		Lumens per Watt	143	144	135	127	119	109	141	136	127	122	109
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	667	1,298	2,228	3,161	4,471	5,773	3,632	5,507	7,189	8,995	11,099
		Lumens per Watt	139	140	131	123	116	106	137	132	124	118	106
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
80 CRI 4000K CCT	T1	Lumens	748	1,455	2,498	3,544	5,014	6,473	4,072	6,175	8,061	10,085	12,445
		Lumens per Watt	156	156	147	138	130	119	154	148	139	132	119
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	720	1,401	2,406	3,414	4,829	6,234	3,922	5,947	7,764	9,714	11,986
		Lumens per Watt	150	151	142	133	125	114	148	142	133	127	114
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	712	1,387	2,380	3,378	4,778	6,168	3,881	5,884	7,682	9,611	11,860
		Lumens per Watt	148	149	140	132	123	113	146	141	132	126	113
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	710	1,381	2,371	3,365	4,760	6,145	3,866	5,862	7,653	9,575	11,815
		Lumens per Watt	148	149	139	131	123	113	146	140	131	126	113
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
	T4W	Lumens	688	1,340	2,300	3,264	4,616	5,960	3,750	5,685	7,422	9,286	11,458
		Lumens per Watt	143	144	135	127	119	109	141	136	128	122	109
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2

Number of Light Squares			1 Square (PB1)						2 Squares (PB2)				
Output Level			A	B	C	D	E	F	A	B	C	D	E
Drive Current			180mA	300mA	520mA	740mA	1100mA	1500mA	800mA	1250mA	1700mA	1130mA	1500mA
Nominal Power (Watts)			6	9	17	25	38	54	26	41	57	78	107
Input Current @ 120V (A)			0.040	0.079	0.145	0.218	0.328	0.465	0.224	0.353	0.494	0.640	0.875
Input Current @ 208V (A)			0.025	0.048	0.085	0.127	0.189	0.264	0.131	0.203	0.280	0.367	0.498
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Input Current @ 480V (A)			n/a	n/a	0.045	0.058	0.083	0.114	0.060	0.089	0.121	0.160	0.217
CCT/ CRI	Optics		PB1A	PB1B	PB1C	PB1D	PB1E	PB1F	PB2A	PB2B	PB2C	PB2D	PB2E
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		Lumens per Watt	156	156	147	138	130	119	154	148	139	132	119
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3
	T2R	Lumens	720	1,401	2,406	3,414	4,829	6,234	3,922	5,947	7,764	9,714	11,986
		Lumens per Watt	150	151	142	133	125	114	148	142	133	127	114
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	T2U	Lumens	712	1,387	2,380	3,378	4,778	6,168	3,881	5,884	7,682	9,611	11,860
		Lumens per Watt	148	149	140	132	123	113	146	141	132	126	113
		BUG Rating	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3
	T3	Lumens	710	1,381	2,371	3,365	4,760	6,145	3,866	5,862	7,653	9,575	11,815
		Lumens per Watt	148	149	139	131	123	113	146	140	131	126	113
		BUG Rating	B0-U0-G0	B0-U0-G0	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2
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		Lumens per Watt	143	144	135	127	119	109	141	136	128	122	109
		BUG Rating	B0-U0-G0	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2

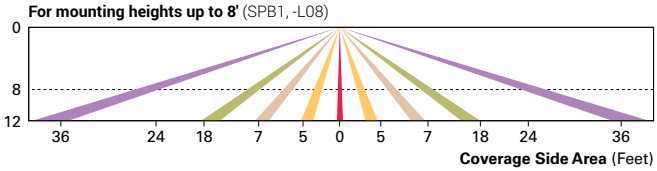
Control Options

0-10V This fixture is offered standard with 0-10V dimming driver(s). Standard with 0-10V dimming wire leads for use with a lighting control panel or other control method.

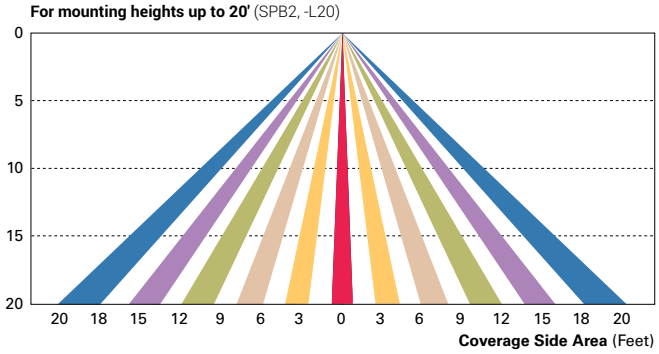
Photocontrol (BPC) Optional button-type photocontrol (BPC) provides a flexible solution to enable “dusk-to-dawn” lighting by sensing light levels.

Dimming Occupancy Sensor (SPB, MS/DIM-LXX) These sensors are factory installed in the luminaire housing. When the SPB or MS/DIM sensor options are selected, the occupancy sensor is connected to a dimming driver and the entire luminaire dims when there is no activity detected. When activity is detected, the luminaire returns to full light output. The MS/DIM sensor is factory preset to dim down to approximately 50 percent power with a time delay of five minutes. SPB motion sensors require the Sensor Configuration mobile application by Wattstopper to change factory default dimming level, time delay, sensitivity and other parameters. Available for iOS and Android devices. The SPB sensor is factory preset to dim down to approximately 10% power with a time delay of five minutes. The MS/DIM occupancy sensors require the FSIR-100 programming tool to adjust factory defaults.

For mounting heights up to 8' (SPB1, -L08)



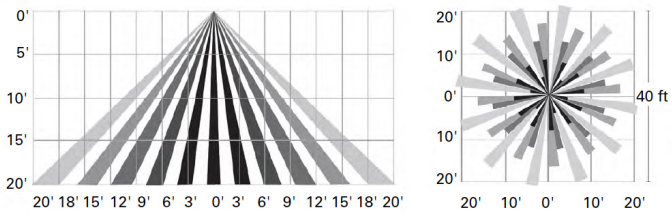
For mounting heights up to 20' (SPB2, -L20)



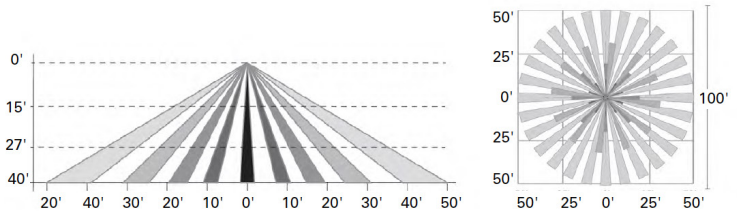
WaveLinx Wireless Control and Monitoring System

Operates on a wireless mesh network based on IEEE 802.15.4 standards enabling wireless control of outdoor lighting. WaveLinx (WPS2 to WPS4) outdoor wireless sensors offer passive infrared (PIR) occupancy and photocell for closed loop daylight harvesting. Sensors are factory preset to dim down to 50% after 15 minutes of no motion detected. Two lens options are available for mount[1]ing heights of 7′ to 40′. Use the WaveLinx mobile application for set-up and configuration. At least one Wireless Area Controller (WAC) is required for full functionality and remote communication (including adjustment of any factory pre-sets). WaveLinx Lite (WLS4 and WLS2) outdoor wireless sensors provide PIR occupancy and photocell for closed loop daylight harvesting. Sensors are factory preset to dim down to 50% after 15 minutes of no motion detected. Two lens options are available for mounting heights of 7′ to 40′. Use the WaveLinx Lite mobile application for set-up and configuration. WAC not required. The out-of-box functionality is ON at dusk and OFF at dawn.

For mounting heights up to 15' (WPS2 and WLS2)



For mounting heights up to 40' (WPS4 and WLS4)



Cooper Lighting Solutions
1121 Highway 74 South
Peachtree City, GA 30269
P. 770-486-4800
www.cooperlighting.com

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Specifications and dimensions
subject to change without notice.

Cottage Grove
Where Pride and Prosperity Meet

February 3, 2026

Nick Adam
Rehder & Associates, Inc.
3440 Federal Drive
Suite 110
Eagan, MN 55122

Dear Nick,

Below are comments on the engineering plans you submitted to the City of Cottage Grove on January 26, 2026. The plans reviewed were: 4638-New Life EFree Church_City Submittal_01.28.26.

General Comments:

1. Septic plans should be reviewed by the county.
2. No NPDES permit is required as the total disturbed area is less than 1 acre. A City of Cottage Grove grading permit will be required, available online here: Grading Permit | Cottage Grove, MN.
3. See attached review from MnDOT. This was forwarded to you on 1/13/26.

Sheet C1.

4. The city requires proof of well sealing be submitted. Please forward the well-sealing documentation to me.

Sheet C3

5. City freeboard rules state that the lowest adjacent grade must be 3 feet above a high water level. Since there are no survey shots on the north side of the existing church it is not possible to tell if this is met. LAG must be 881.73 or higher in order to meet the rule. Please provide LAG survey shots or edit grading to meet the rule.
6. Under Erosion Control Notes
    a. Note 2: please check MnDOT rules for sweeping highways. Consider changing note to state that no tracking onto Hwy 61 is allowed. Sweep driveway daily or as needed.
    b. Rock construction entrance is required. Detail is shown on Sheet C4 but its location is not shown on C3.
7. Show location of the new well and the water connection to the church.

Landscape Plan A01

8. Trees on north side of addition could potentially block swale to infiltration basin. Add proposed contours to this sheet to show that no drainage conflicts exist.

STAFF REPORT CASE: SP/CUP2026-007

ITEM: 6.2

PUBLIC MEETING DATE: 2/23/26 **TENTATIVE COUNCIL REVIEW DATE: 3/4/26**

APPLICATION

APPLICANT: CA Commercial Development

REQUEST: A Site Plan Review of a proposed Panera restaurant and a Conditional Use Permit to allow a drive-through.

SITE DATA

LOCATION: 7162 East Point Douglas Road South

ZONING: Mixed Use

GUIDED LAND USE: Mixed Use

LAND USE OF ADJACENT PROPERTIES:	CURRENT	GUIDED
NORTH:	Commercial	Mixed Use
EAST:	Commercial	Mixed Use
SOUTH:	Commercial	Mixed Use
WEST:	Commercial	Mixed Use

SIZE: Building = 2,631 square feet

DENSITY: N/A

RECOMMENDATION

Approval, subject to the conditions stipulated in this staff report.

COTTAGE GROVE PLANNING DIVISION

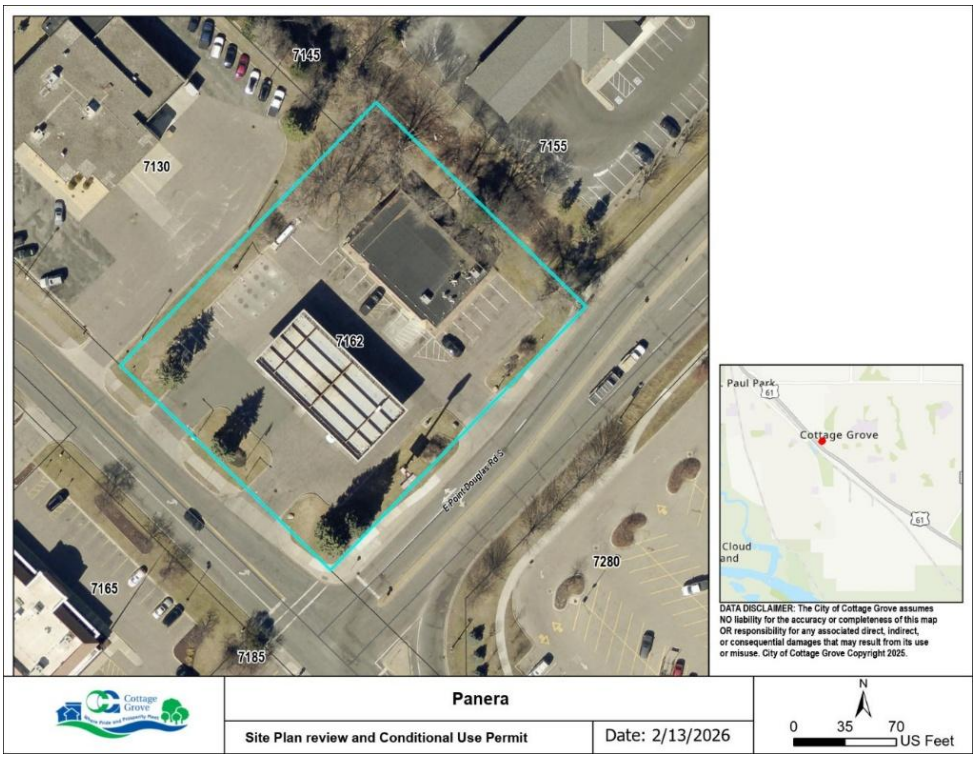
Planning Staff Contact: Max Erickson, Planner; 651-458-2862, merickson@cottagegrovemn.gov

Application Accepted: 1/28/2026 60-Day Review Deadline: 3/29/2026

Planning Staff Report
Panera Bread – Restaurant with a Drive-Up Window
Planning Case No. SP/CUP 2026-007
February 23, 2026

Proposal

CA Commercial Development (Applicant), on behalf of Realty Income Properties 3, LLC (Property Owner), has submitted an application for a Site Plan Review and Conditional Use Permit to redevelop the site at 7162 East Point Douglas Road to construct a restaurant with a drive-up window. The building is proposed to be 2,631 square feet with a drive-up window and additional site improvements proposed, including stormwater, parking lot, and landscaping improvements.



Site Location

Review Schedule
Application Received: January 28, 2026
Application Accepted: January 28, 2026
Planning Commission Meeting: Febuary 23, 2026
Tentative City Council Meeting: March 4, 2026
60-Day Review Deadline: March 29, 2026

Background

The property was originally platted in 1888 as St Paul Park Acre Lots creating several residential lots. Over time, as commercial development occurred in the area, the lots in the original subdivision were combined to create what is now a 1.15-acre mixed-used commercial lot.

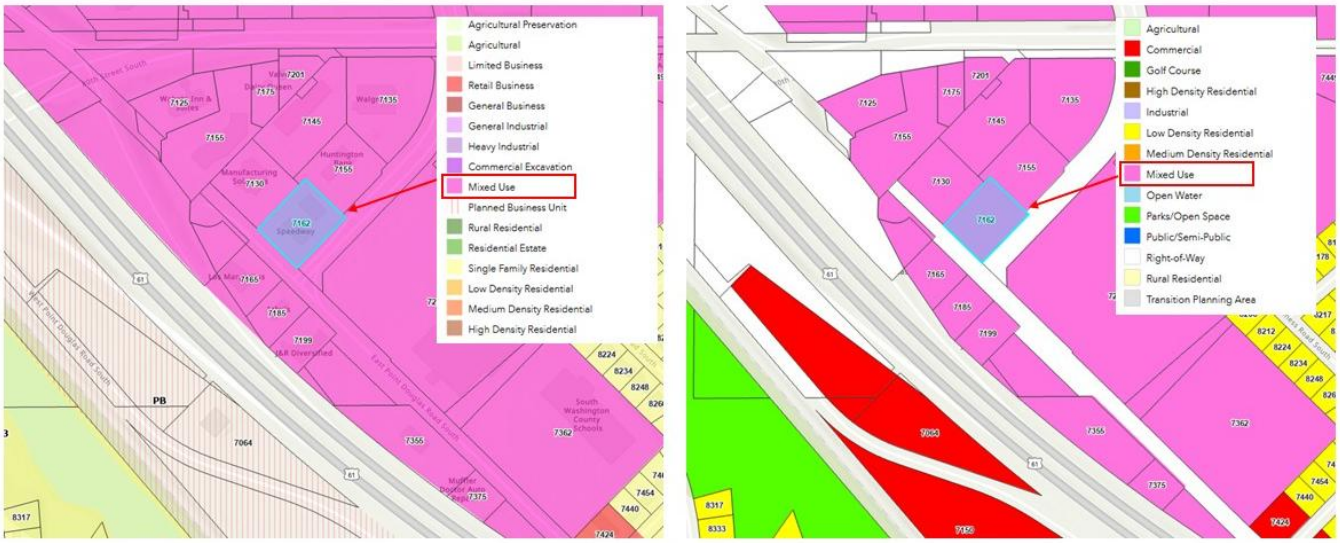
The site is located on the corner of East Point Douglas Road, west of Hy-Vee and north of Las Margaritas and Arby's. In 1981, a Conditional Use Permit was approved for construction of and operation of a Motor Fuel Station (Super America) via Resolution 81-126. In 2018 with the branding change to Speedway, the site underwent façade and sign updates to represent the new brand.

Speedway closed in 2025, and the property has been actively marketed for sale since that time. The fuel canopy and fuel tanks have been removed and an environmental study on the site has been completed to determine any potential contamination from the long-standing fuel tanks. Pace Analytical Services, LLC collected samples identifying minor contamination. The findings are under review by the Minnesota Pollution Control Agency (MPCA), who will determine mitigation requirements, if any. The Applicant will be required to provide verification of acceptance by the MPCA prior to issuance of a building permit.

Planning Considerations

Zoning and Comprehensive Plan

The parcel is zoned Mixed Use Business and is guided Mixed Use in the 2040 Comprehensive Plan. Restaurants with a drive-up window are permitted as a conditional use in the Mixed-Use Business District.



Current Zoning 2040 Future Use

Current Zoning and Future Land Use

Conditional Use Permit

When evaluating any conditional use permit application, the Planning Commission shall consider the following findings:

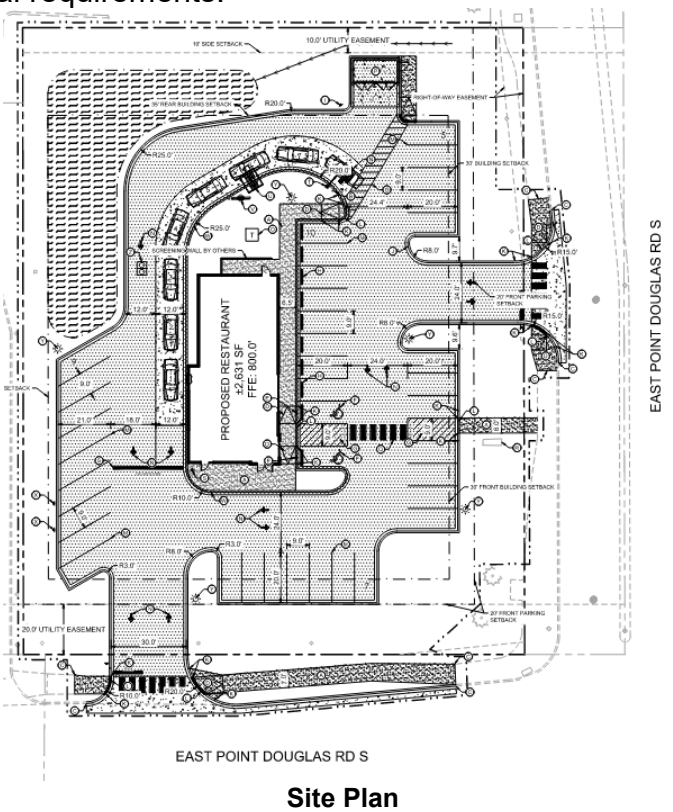
1. *Compliance with and effect upon the Comprehensive Plan, including public facilities and capital improvement plans.*

2. *The establishment, maintenance or operation of the conditional use will promote and enhance the general public welfare and will not be detrimental to or endanger the public health, safety, morals or comfort.*
3. *The conditional use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted, nor substantially diminish and impair property values within the neighborhood.*
4. *The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding property for uses permitted in the district.*
5. *Adequate public facilities and services are available or can be reasonably provided to accommodate the use which is proposed.*
6. *The conditional use shall, in all other respects, conform to the applicable regulations of the district in which it is located.*
7. *The conditional use complies with the general and specific performance standards as specified by the Zoning Code.*

The use as a Restaurant with a drive-up window is consistent with the findings above as described in this report.

Site Plan

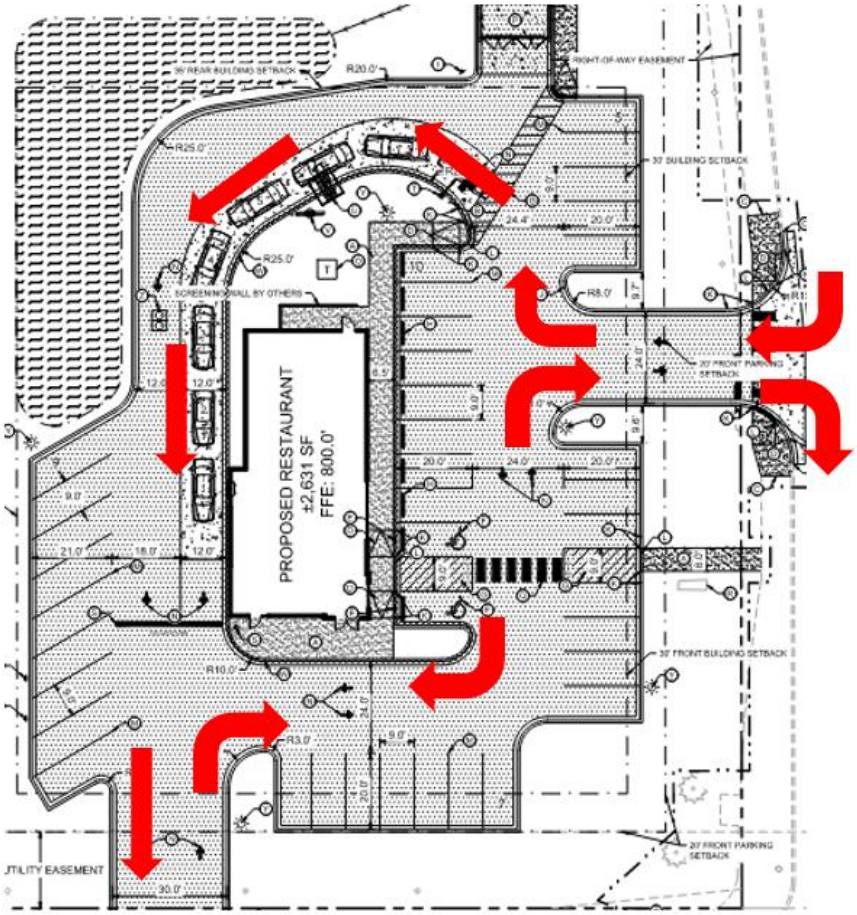
The Applicant is proposing to remove the existing building and construct an approximate 2,600 square foot building with indoor and outdoor seating. The building will include a drive-through lane and window. The proposal includes complete redevelopment of the site; therefore, the plans submitted address all required code standards including minimum parking, stormwater standards, and architectural material requirements.



Site Plan

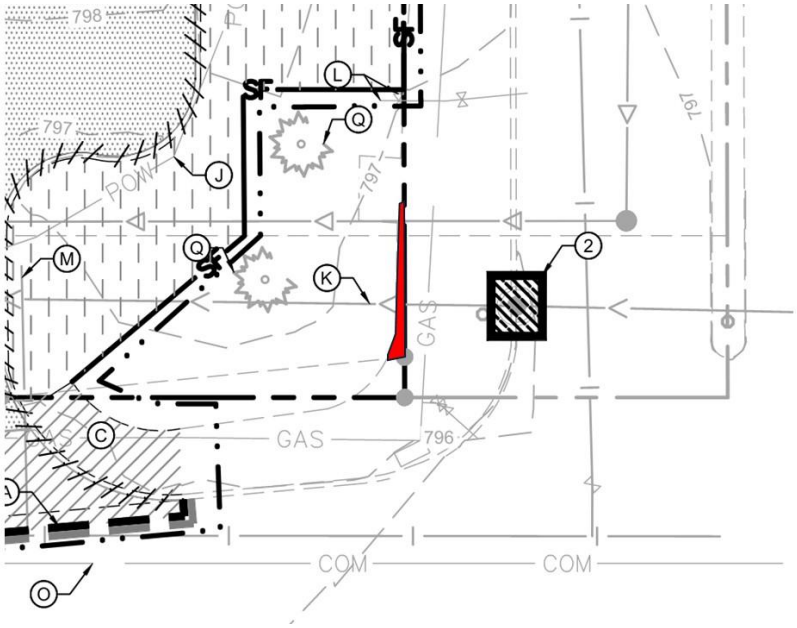
Site Access and Traffic

There are currently three driveway accesses to the site off East Point Douglas Road, one from the east and two at the south side. The Applicant is proposing to remove the southeast access near the corner of East Point Douglas Road. Modifications are proposed to reduce the width of the northeastern access to 26 feet to increase efficiency of the site traffic flow. The traffic pattern of the drive-through lane will be of a counterclockwise fashion whereas the southern parking area will flow either direction.



Traffic Flow

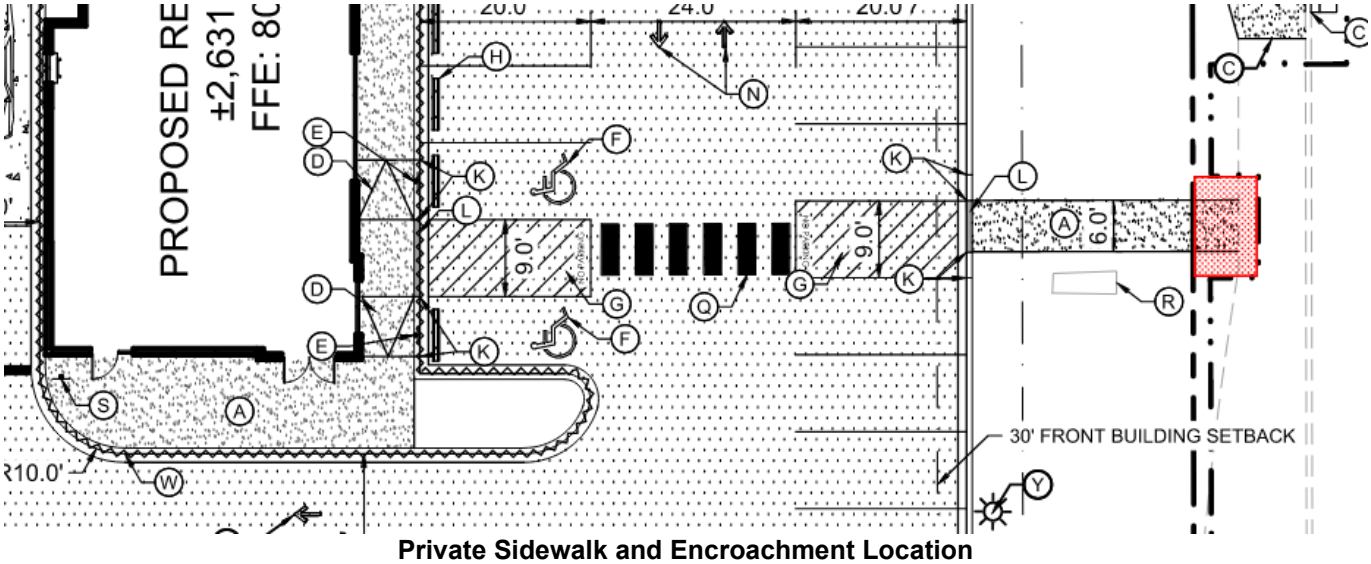
A public sidewalk system runs along the southern and eastern edges of the property along East Point Douglas Road. With the removal of the southeastern access, the applicant will reconnect the existing sidewalk to the southwest corner. One small segment of this sidewalk currently encroaches onto private property and is outside of the existing right-of-way easement. To ensure future access by the city for maintenance and/or replacement, it is imperative that this segment of sidewalk be within a sidewalk easement. This easement will be required to be recorded prior to the issuance of a building permit.



Required Sidewalk Easement (Red)

Additionally, an existing paved area for a bench exists along the sidewalk on the southeast corner of the site. The bench has since been removed, and no transit stop currently exists or is planned. The Applicant will be required to remove this portion of pavement.

Near the east access, the Applicant is proposing to install a private sidewalk connection connecting their site to existing sidewalks. The proposed sidewalk connection will encroach within the city's right-of-way; therefore, the Applicant shall enter into an encroachment agreement with the city prior to issuance of a building permit.

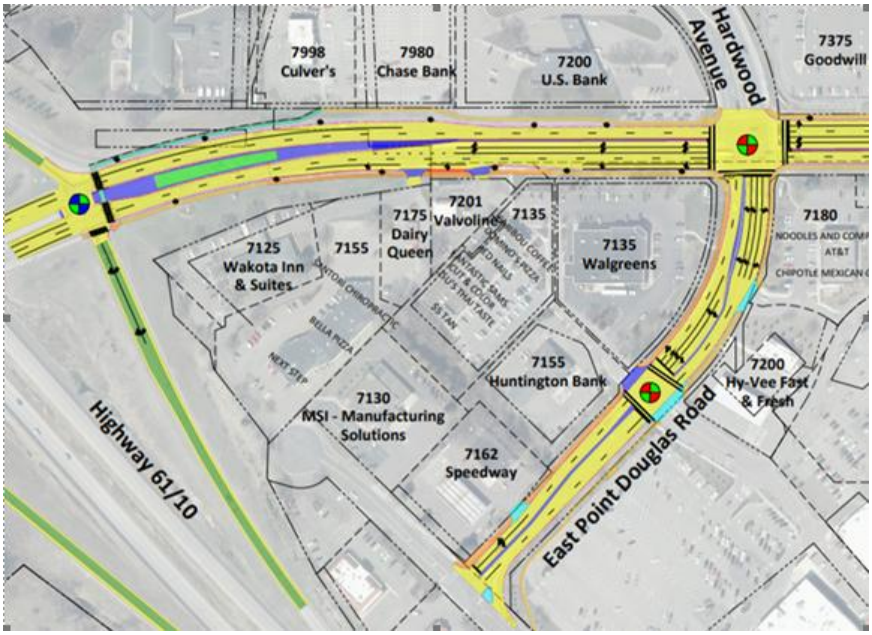


Private Sidewalk and Encroachment Location

80th Street and East Point Douglas Road Improvements

The city is reconstructing 80th Street from Highway 61 to Ideal Avenue as well as East Point Douglas Road south of 80th Street to the intersection of East Point Douglas Road in 2026, which will likely occur at the same time as the construction of the Panera site. The reconstruction of the

access on the east side of the site and the proposed connection to the utilities within East Point Douglas Road will require coordination between city staff, contractors, and the Applicant to ensure efficiency in both projects.



Proposed 80th St and East Pt Douglas Improvements

Parking

Restaurants with a drive-in are required to provide 1 space for each 3 seats based on capacity design, plus employee parking. The Applicant is proposing an eating area that will accommodate 60 customer seats with 8 employees at a given time.

This requires parking based on the following: 60 seats divided by 3 seats equals 20 parking spaces. Adding 8 additional spaces for employees, 28 parking spaces are required per code for the site. The Applicant is proposing 38 total spaces, which exceeds the standard requirement. Nine of the proposed parking spaces will be angle parking with an 18-foot depth along the one-way drive through area and the remainder of the parking spaces will be at 90 degrees with a 24-foot depth.

Additionally, special zoning standards in City Code Title 11-4-2 require fast-food drive-up locations to accommodate vehicle stacking up to 6 cars per drive though lane without obstructing pedestrian or parking lot traffic. The Applicant is proposing one drive-through lane with vehicle stacking to accommodate at least eight vehicles at a time.

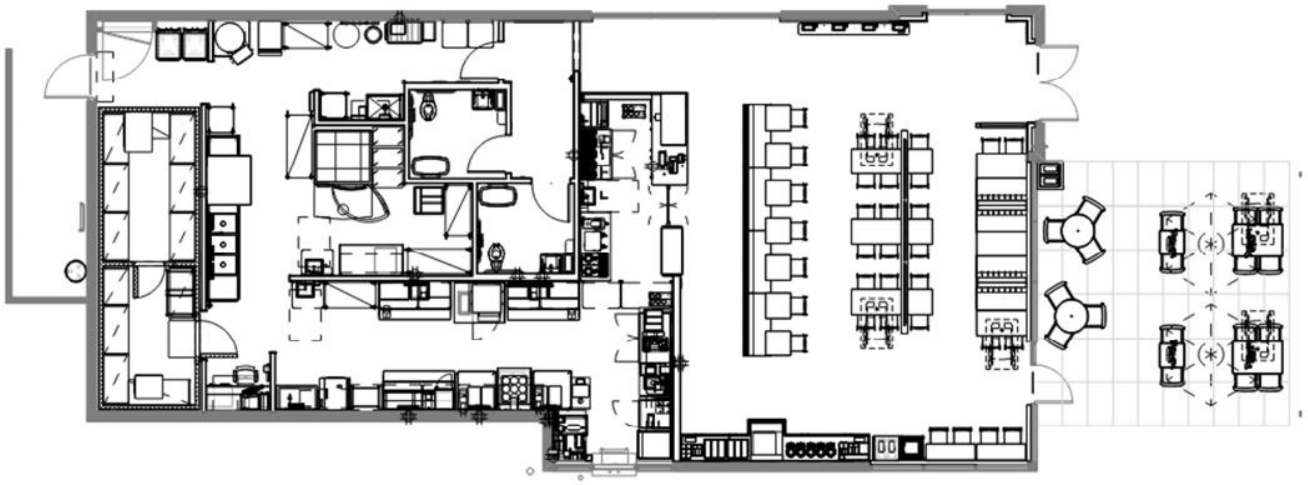
All proposed parking meets the setback standard within the Mixed Use Business District. As this site is a corner lot, a 20-foot setback for the parking lot is required from both street frontages and a 10-foot setback from side and rear lot lines. The proposed parking lot complies with these setbacks.

Outdoor Seating and Dining

The Applicant has proposed outdoor seating and dining to include 18 seats. Outdoor dining and eating is regulated by City Code Title 11-4-16 and includes several requirements.

- The seating must not interfere with traffic circulation.
- Seating must be located in a controlled area with one available access to pedestrian traffic.
- Seating shall not interfere with any entrance or exit and shall not interfere with required safety measures.
- Outdoor seating must be less than 30 percent of the square footage of the principal building
- Outdoor seating must be defined by the use of fencing or landscaping.

The applicant has proposed an approximate 400 square foot outdoor seating area, which is 15 percent of the proposed 2,631 square foot building. No additional parking is required for the proposed outdoor seating and dining area with the proposed 18 seats.



Proposed Floor Plan

Tree Preservation

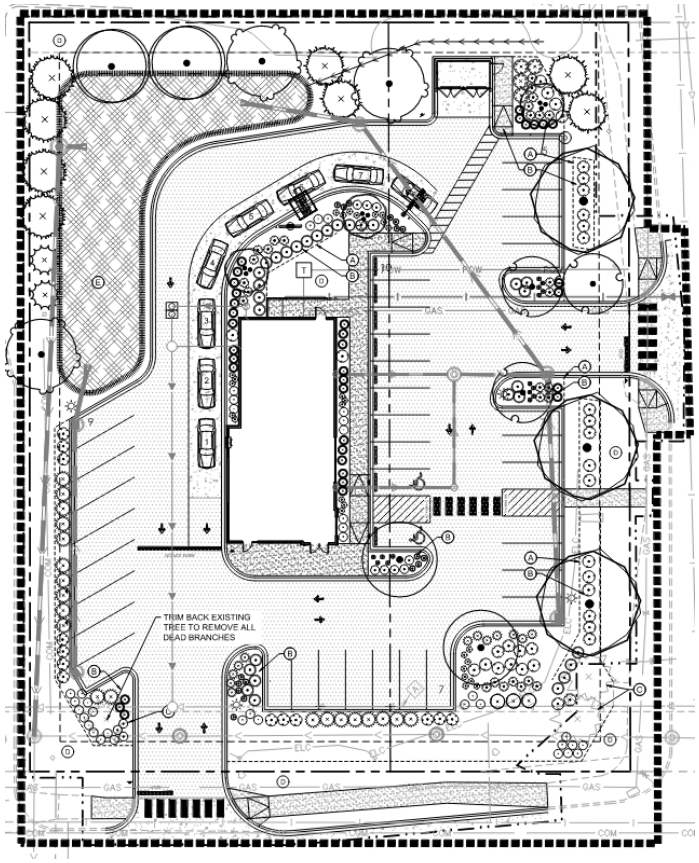
City Code Title 11-3-13D allows up to 40 percent removal of qualifying inches in business and commercial districts without mitigation, while City Code Title 11-3-13E(6) allows an exception for the requirement for a tree inventory and preservation plan if fewer than 25 trees are removed. The Applicant has identified removing 11 trees onsite; therefore, a tree inventory and mitigation plan is not required per city code.

Landscaping

The Applicant has submitted a detailed landscape plan including proposed additional landscaping throughout the site. Landscaping will be installed around the parking lot, perimeter of the property, and around the drive-through area.

City Code requires a certain number of trees and shrubs to be planted based on site disturbance area and the coefficients found in Title 11-3-12 of the City Code. Based on the site area identified (50,094 square feet) and each coefficient relevant to the Mixed-Use Business District, the following number of trees and shrubs are required. The Applicant's landscape plan meets the minimum landscape requirements.

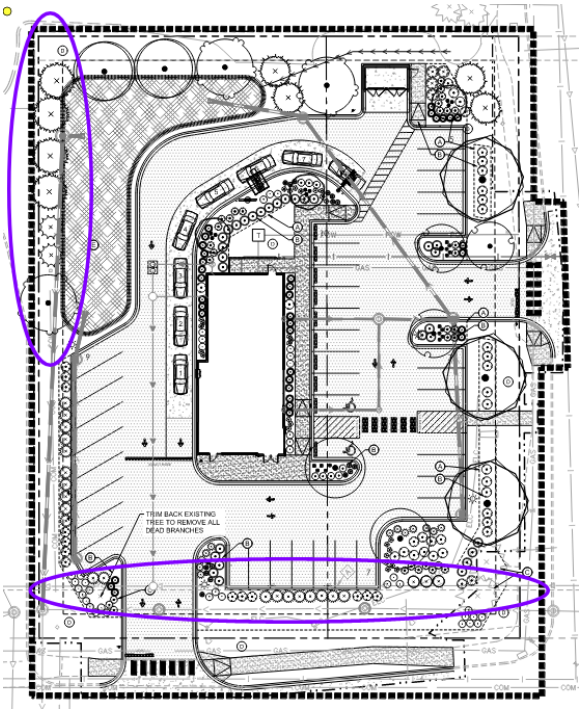
Required Landscaping (50,094 square foot site area)			
Trees	**Coefficient**	**Plantings Required**	**Proposed Plantings**
Overstory Deciduous	0.0002786	14	14
Coniferous	0.0002600	13	13 (2 existing to remain, 11 to be planted)
Shrubs	0.0006	30	287



Landscaping Plan

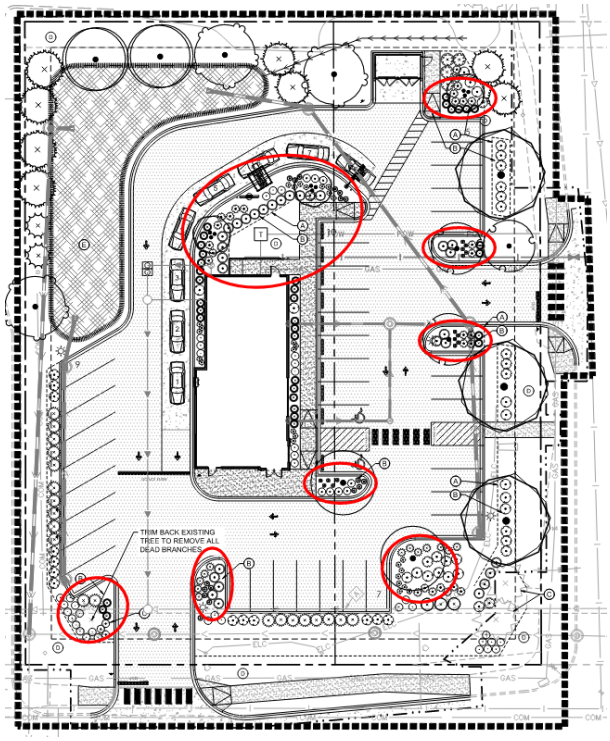
City Code requires that the perimeters of buildings that face public streets or parking lots shall be landscaped for a length equal to half of the building dimension. The Applicant has provided a landscape plan to reflect the requirements of City Code with landscaping along the west and east sides of the building. With limited space on the site and the addition of an outside seating area to the south, building perimeter landscaping will be provided along entire eastern side of the building to compensate for no perimeter landscaping on the southern side covering greater than half of building areas that face public streets and parking lots.

As part of the proposed landscaping plan, the Applicant is proposing to install trees within the perimeter 10-foot drainage and utility easement on the eastern property line. The applicant also proposes the installation of a limited number of conifers and shrubs within the existing utility easement on the south side of the property. The Applicant understands at any time the city requires access to these easements, the landscaping may be removed, and the property owner will be responsible for replacement of the landscaping within the easements.



Proposed Plantings Within Easements

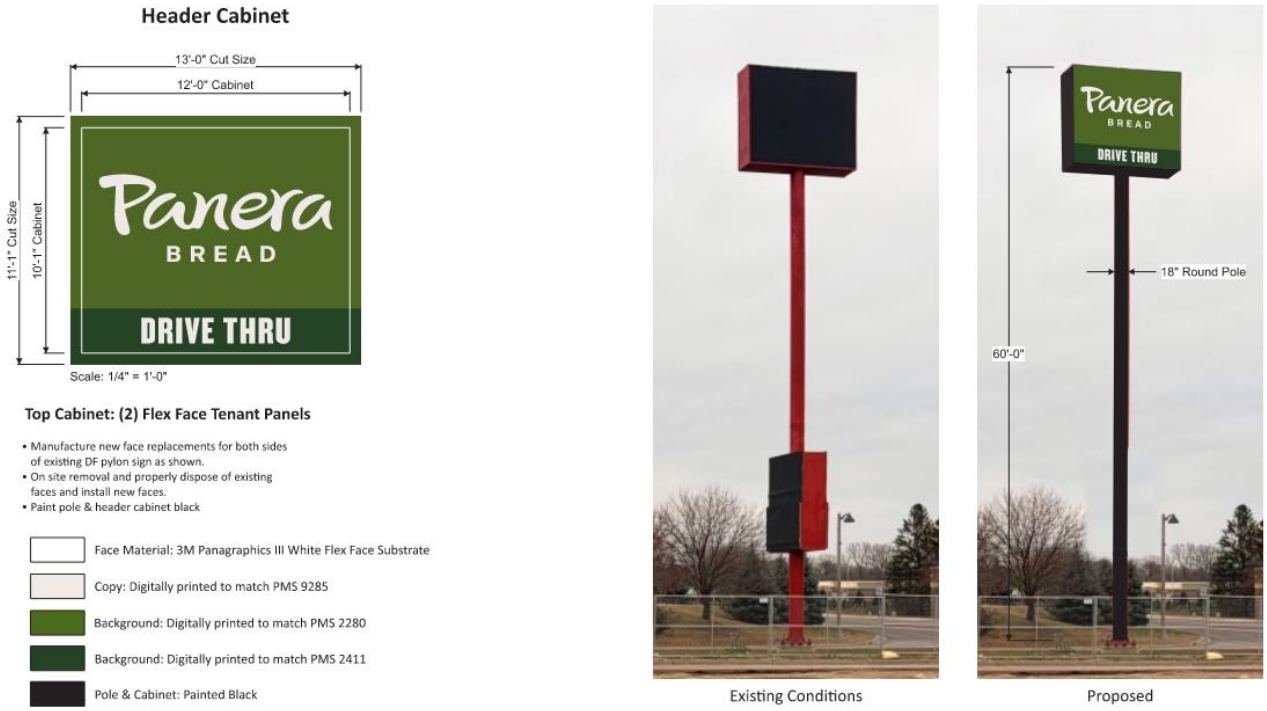
City Code Title 11-3-12B(1) requires interior parking lots that are greater than 25 stalls include parking lot islands covering at least 8 percent of the area of the parking lot. The proposed parking area is approximately 17,700 square feet, which requires 8 percent, or roughly 1,400 square feet, of landscaped islands. The Applicant has provided 2,480 square feet of internal parking landscaping to be constructed, exceeding the required code standard for parking islands.



Proposed Parking Lot Landscape Islands

Signage

At the time of construction, or some time prior to 1993, a 60-foot pylon sign was permitted to be constructed on the site. The city's current sign code does not allow for signs to be taller than 15 feet in height and must have a base width consistent with the sign face. The current pylon sign is considered to be a legal non-conforming sign and is therefore permitted to remain; however, legal non-conforming signs shall not be expanded. The Applicant proposes to utilize the existing sign and is not proposing to expand the legal non-conformity. The Applicant is proposing to remove the lower cabinet, replace the sign face of the upper cabinet, and paint the pole and sign. These proposed modifications are permitted to maintain the legal non-conformity. At any time additional modification or expansions are proposed to the sign, it must be brought into compliance with current city sign standards.

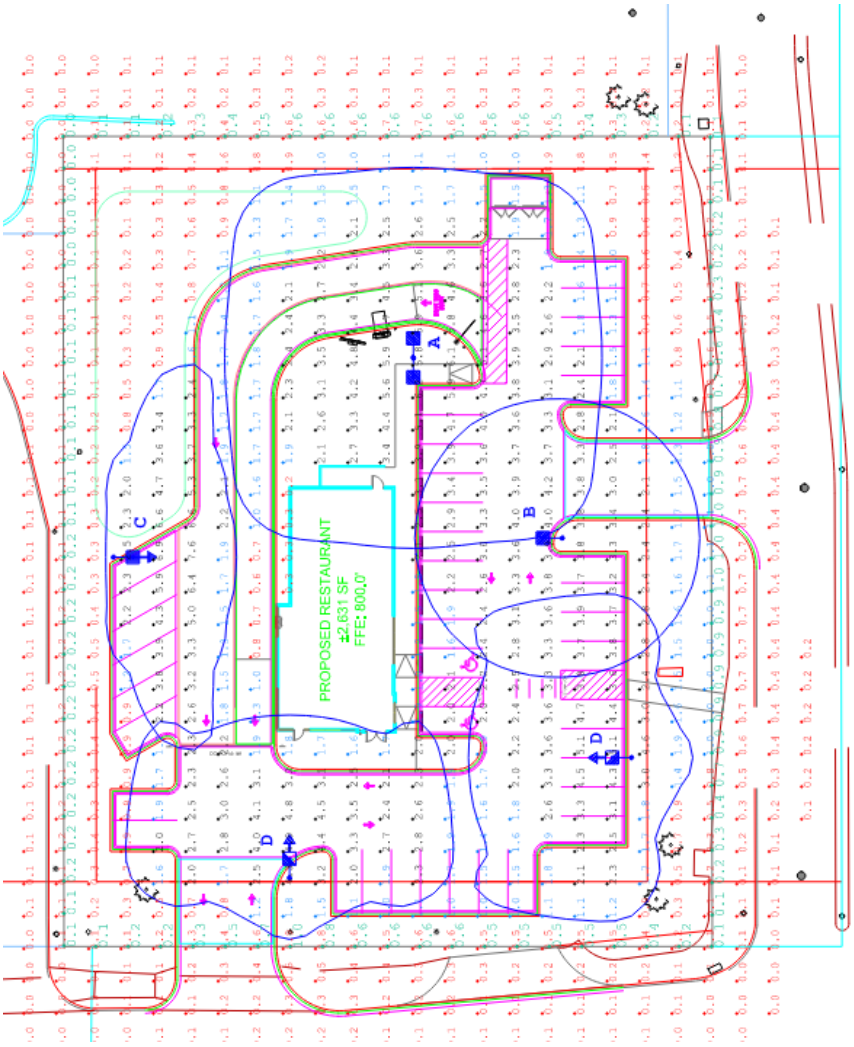


Proposed Pylon Alterations

The Applicant is proposing to add a menu board with speaker box at the drive-through. Special zoning provisions in Title 11-4-2 regulate standards for these types of signs in drive-through establishments. The menu board must not be lit after hours, and all speaker boxes must remain 50 feet from any adjacent residential lot or use. No residential lot abuts this property, and this request complies with City Code. A sign permit shall be required to be secured prior to installation of additional signage on the property.

Lighting

The applicant proposes adding several lighting features to illuminate the parking areas. City code standard requires 1-foot candle or less when measured at property lines abutting a commercial district. The Applicant has provided a photometric plan indicating lighting will be less than 1-foot candle at all property lines.

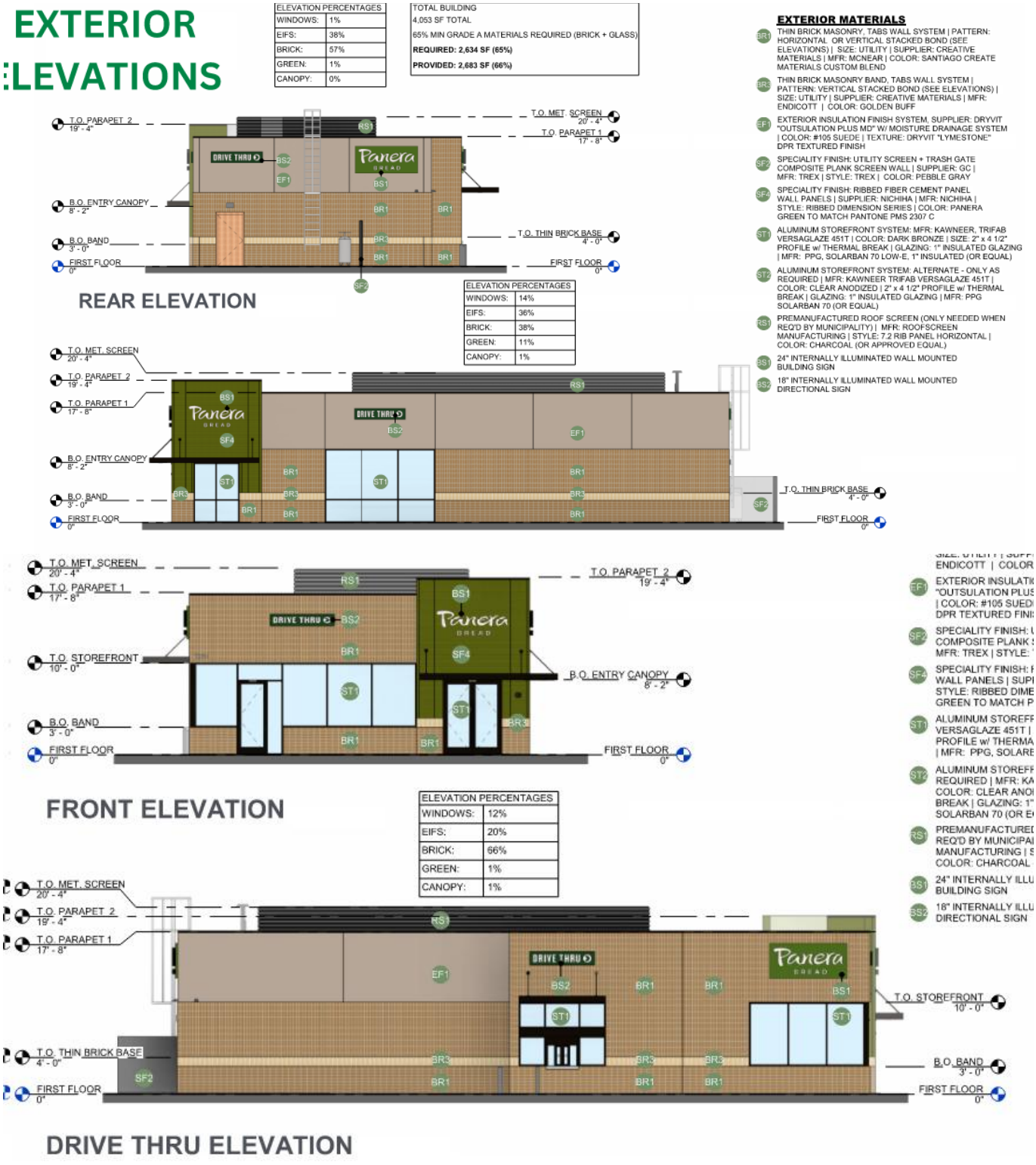


Photometric Plan

Architectural Materials

City code requires non-residential buildings within business districts to use at least three different Class I materials and be composed of no less than 65 percent Class I and 2 materials and not more than 10 percent Class 4. The Applicant is proposing 66 percent of the building to consist of different textures of masonry brick and glass, all Class I materials. Additionally, a green fiber cement material will accent the proposed brick material. All materials and colors chosen are to reflect the Panera brand.

Material	Class	Percent
Two types of Masonry Brick	1	66%
Transparent Glass	1	
Fiber Cement Panel (Green)	3	32%
Aluminum Framing and Canopy	4	2%



Exterior Materials

Mechanical Screening

The Applicant is proposing mechanical equipment on the roof of the building. Per City Code rooftop mechanical equipment must be screened from all property lines of residential and adjacent roads rights-of-way with raised parapet or with comparable and compatible exterior building

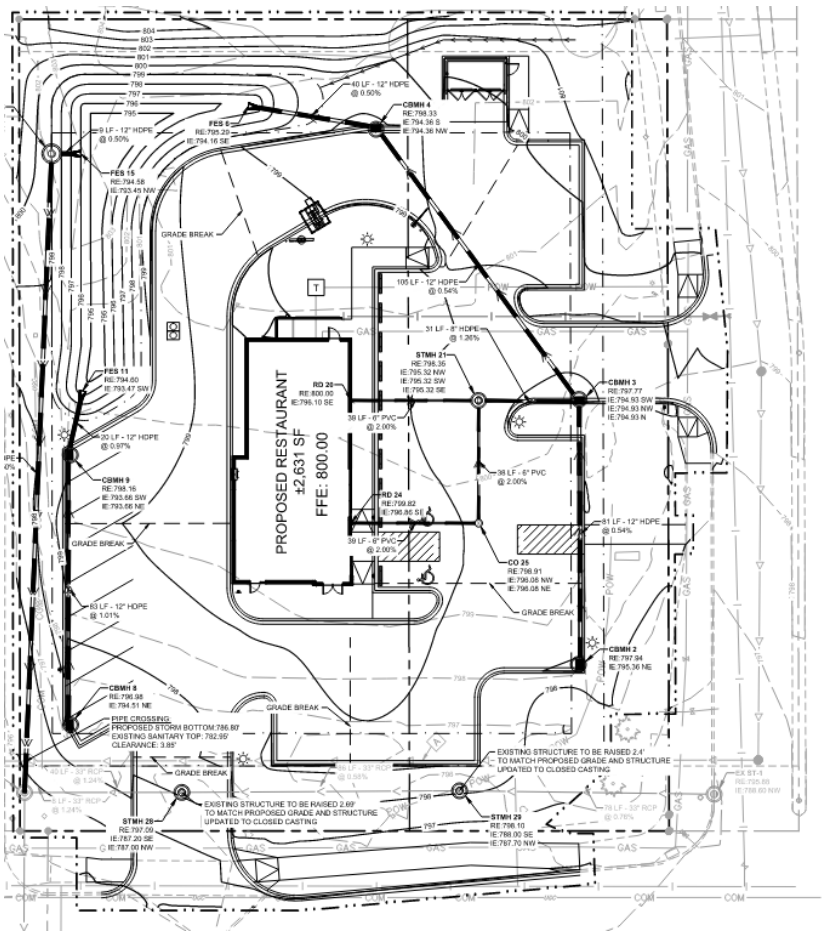
materials. The Applicant is proposing to screen rooftop mechanical screening which will block views from the adjacent right-of-way. Final material shall complement the proposed structure per city code.

Trash Enclosure

Trash enclosures are regulated by City Code Title 11-3-8 and are required to be setback at least 10 feet from all property lines and shall be situated on a poured in place concrete base that extends at least 6 feet beyond the opening of the door. The walls shall be a minimum 6 feet in height and of a masonry material or composite fencing consistent with the principal structure. All doors shall be of an opaque maintenance free design that is not chain link with vinyl slats. The Applicant has proposed constructing a trash enclosure to all minimum specifications outlined in City Code including use of materials consistent with the principal structure.

Stormwater

A new stormwater management system is proposed for the site with a basin in the northwest corner and connection to existing stormwater infrastructure to manage stormwater and meet best management practices. The stormwater plan will be required to meet all City Code standards and comments in the Bolton and Menk plan review memo dated 2/17/26. A stormwater maintenance agreement is required for the maintenance of the private stormwater BMP infrastructure and shall be required prior to issuance of a building permit.

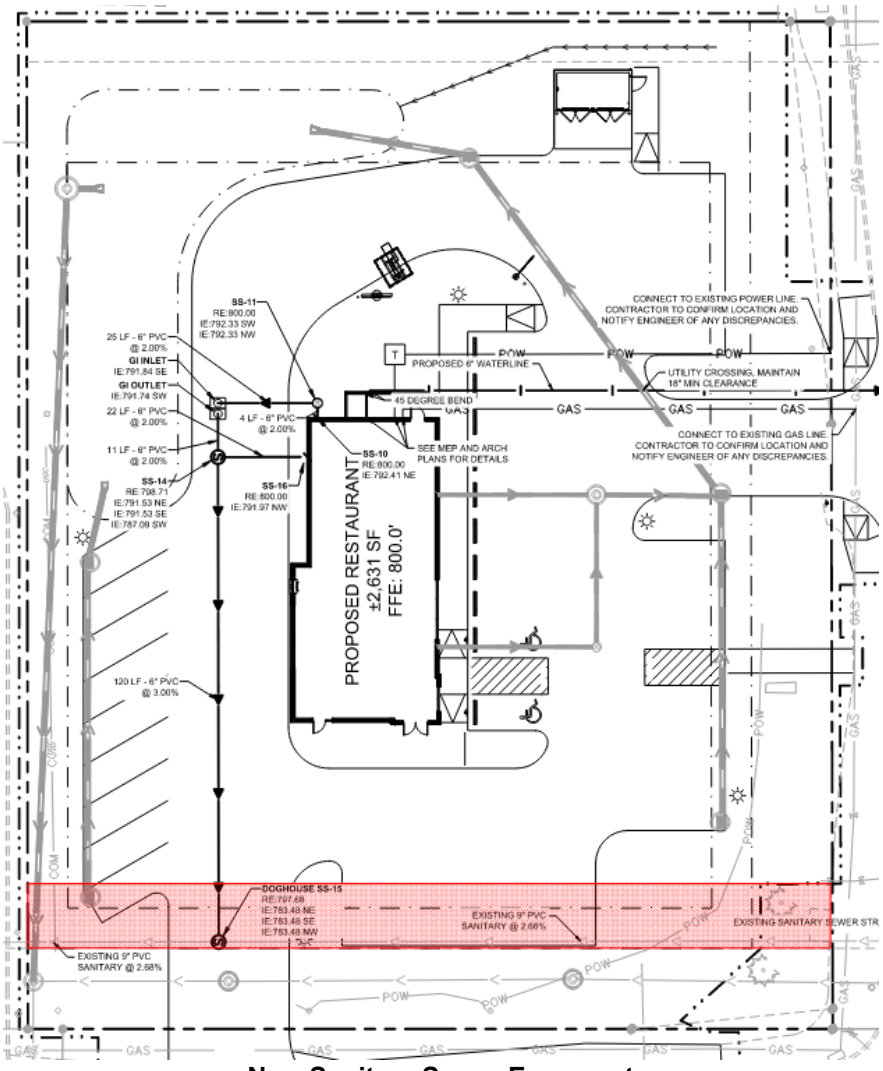


Stormwater Plan

Utilities

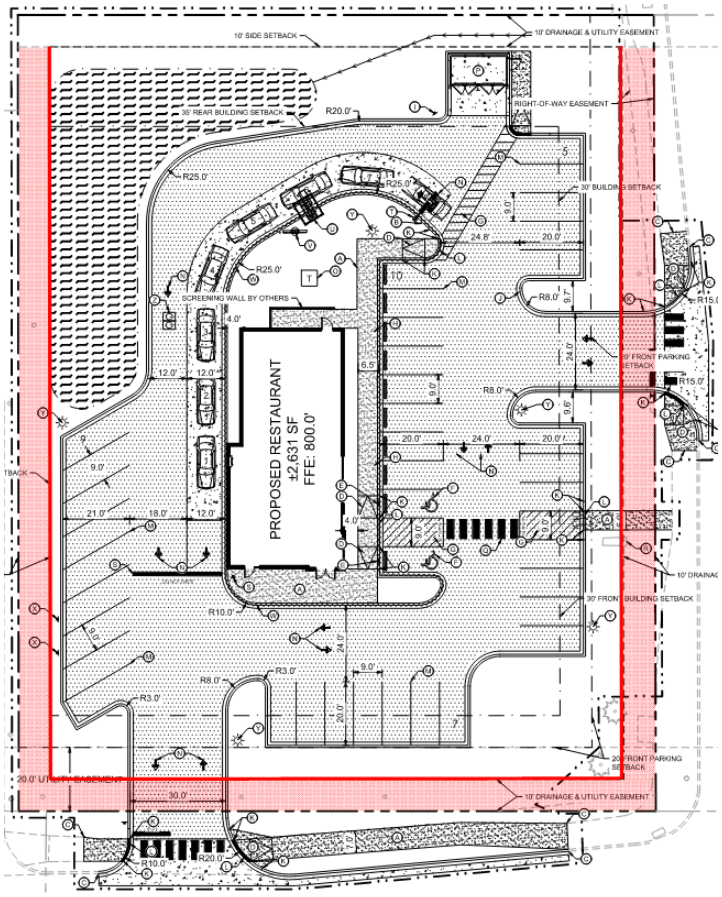
A new water service to the building will be connected to the water main on the east side of the site, and a new sanitary service will connect to the sewer on the south side of the site. Stormwater discharge from the basin will be connected to an existing manhole on the south side of the site.

An existing utility easement on the southern side of the property was established to provide access to the water, storm, and sewer pipes extending west to east across the site. The easement did not encompass the sanitary sewer pipe; therefore, the Applicant will be required to provide an additional easement to ensure the city has access to the sanitary sewer pipe.



New Sanitary Sewer Easement

As this property was originally platted in 1888 as multiple lots, it does have the typical 10-foot perimeter drainage and utility easements around the entire perimeter of the property. A 10-foot perimeter drainage and utility easement is required to be recorded for the remainder of the property prior to issuance of a building permit.



Required 10ft Drainage and Utility Easement

Impervious Surface Coverage

Maximum impervious surface coverage in the Mixed Use Business District is 70 percent of the total lot area. Existing impervious surface is at 67 percent, and the Applicant proposes to decrease impervious surface to 54.85 percent.

Public Hearing Notices

The public hearing notice for the February 23, 2026, Planning Commission meeting was published in the *Saint Paul Pioneer Press* and mailed to 16 property owners within 500 feet of the proposed project on February 11, 2026. Staff has not received any comments at the time of writing the report.

Recommendation

That the Planning Commission recommend that the City Council approve the Site Plan Review and Conditional Use Permit for construction of a restaurant with a drive-up window, and site improvements at 7162 East Point Douglas Road, subject to the conditions listed below:

General Development

1. The project shall be completed in accordance with the plans submitted as amended by the conditions of approval. Any significant changes to the plans, as determined by planning staff, shall require review and approval by the Planning Commission and City Council.

2. All applicable permits (i.e., building, demo, electrical, grading, right-of-way, and mechanical) and a commercial plan review packet must be completed, submitted, and approved by the City prior to the commencement of any construction activities. Detailed construction plans must be reviewed and approved by the Building Official, City Engineer, and Fire Marshal. All applicable fees and letters of credit shall be received by the City prior to issuance of any permits.

3. Site Plan Review and Conditional Use Permit approval shall expire one year from the date of City Council approval unless a building permit has been requested or a time extension has been granted by the City Council. The City Council may extend the expiration date of such approval upon written application by the entity to whom the approval was granted.

4. A Stormwater Management Agreement shall be recorded prior to issuance of a building permit.

5. The Applicant shall provide acceptance of the environmental review of the site by the Minnesota Pollution Control Agency prior to issuance of a building permit.

Landscaping

6. Installation of landscaping shall occur in a timely fashion and be consistent with an approved plan. Prior to the issuance of a building permit, a letter of credit in the amount of 150 percent of the landscape estimate shall be submitted to the City as required by City ordinance. The financial guarantee shall be held until all required plantings are installed. At such time of installation, the Planning Department shall conduct an inspection to verify compliance with the landscape plan. If the inspection is approved, 50 percent of the financial guarantee shall be released. One year from the date of initial inspection, a follow-up inspection shall be conducted to verify survivability. If the follow-up inspection is approved, the remainder of the financial guarantee shall be released.

7. Irrigation shall be provided for all landscaped areas. The irrigation system shall consist of an underground sprinkling system that is designed by a professional irrigation installer to meet the water requirements of the site's specific vegetation. The system shall be detailed on the final landscape plan prior to issuance of a building permit.

Construction and Grading

8. An NPDES Permit is required. The grading and erosion control plan must comply with NPDES Permit requirements and city grading permit requirements. Erosion control devices must be installed prior to commencement of any grading activity. Erosion control must be performed in accordance with the recommended practices of the Minnesota Stormwater Manual and the conditions stipulated in Title 9-7-1, Erosion Control During Construction, of the City's Subdivision Ordinance. The Applicant shall be responsible for the costs for the City to inspect the site in relation to erosion control conformance.

9. The Applicant must provide the City with an as-built survey of private utilities and grades.

10. The Applicant will be required to conduct all major activities to construct the improvements during the following hours of operation:

Monday through Friday	7:00 A.M. to 7:00 P.M.
Saturday	9:00 A.M. to 7:00 P.M.
Sunday	Not Allowed

Any deviations from the above hours are subject to approval of the City.

11. The Applicant shall, within 24 hours, or more often if required by the City Engineer, clear from the public streets and property any soil, earth, or debris resulting from construction work by the Applicant or its agents or assigns. All debris, including brush, vegetation, trees, and demolition materials, shall be properly disposed of off-site; burying construction debris, trees, and other vegetation is prohibited. Burning of trees and structures is prohibited, except for fire training only.

Performance Standards

12. Rubbish, waste, and recycling containers shall be stored within an appropriately sized enclosed structure compliant with City ordinance screening requirements and shall always be maintained so as not cause odors or other public nuisances.

13. The only permitted modification to the legal non-conforming Sign is replacement of the sign face. The lower sign cabinet shall be removed prior to issuance of a Certificate of Occupancy. All signs proposed require a separate sign permit.

14. The proposed Outside Dining Area shall conform to the approved plans and must maintain compliance with the zoning standards for outdoor seating, including

    a. Seating areas shall not interfere with circulation in any required parking, loading, maneuvering, or pedestrian area.
    b. Seating shall be in a controlled or cordoned area acceptable to the City with at least one opening to an acceptable pedestrian walk.
    c. Seating shall remain 150 feet from any residential use.
    d. No public address system or external music, live or recorded, shall be audible from a nonbusiness or nonindustrial use or district.
    e. The seating area shall have an improved and maintained surface.
    f. Seating shall be located so as not to compromise safety. Seating shall not obstruct the entrance or any required exits or be located on landscaping or parking areas. If located on private sidewalks or walkways, it shall be located so as to leave a minimum of a four (4) foot wide passage for pedestrians. Applicable building and fire codes for ingress and egress shall be met.
    g. Additional parking for thirty (30) outdoor seats or less is not required. Any additional seating over thirty (30) seats shall provide required parking based on one (1) space per four (4) seats.
    h. The outdoor seating area shall be subordinate to the principal use and shall not exceed thirty percent (30%) of the square footage of the principal use building space. An outdoor seating area exceeding thirty percent (30%) requires a conditional use permit.

i. The outdoor seating area shall be defined with the use of landscaping and/or permanent attractive fencing.

15. The Applicant shall enter into an encroachment agreement with the City for the proposed private sidewalk within the East Point Douglas Road right-of-way prior to the issuance of a building permit.

16. All proposed Mechanical equipment shall be screened from view of the adjacent road right-of-way and be composed of material that is complimentary to the proposed building.

17. A 10-foot perimeter drainage and utility easement is required to be recorded prior to the issuance of a building permit.

18. The Applicant shall record a utility easement encompassing all city utility infrastructure along the southerly property line prior to issuance of a building permit.

19. The Applicant shall record a sidewalk easement that covers the sidewalk along the southwestern side of the property which is not incorporated in public right-of-way. The easement shall be recorded prior to issuance of a building permit.

20. The Applicant shall remove the paved bench area along the sidewalk at the southeast corner of the property prior to issuance of a certificate of occupancy.

19. The Applicant grants the City, its agents, employees, officers, and contractors permission to enter the site to perform all necessary inspections during grading and construction activities.

20. Dust control measures must be in place to prevent dust and erosion, including, but not limited to daily watering, silt fences, and seeding. The City Engineer may impose reasonable measures to reduce dust at the site.

Prepared by
Max Erickson
Planner

Attachments
Submitted Site and Civil Plans
Submitted Floor Plans and Elevations
Submitted Stormwater Report
Engineering Memorandum – Bolton & Menk Dated 2/17/2026

SITE DEVELOPMENT PLANS
FOR
PANERA - COTTAGE GROVE

7162 E POINT DOUGLAS RD S, SECTION 17, TOWNSHIP 27 NORTH, RANGE 21 WEST
COTTAGE GROVE, WASHINGTON COUNTY, MN

PROJECT TEAM:

ENGINEER
KIMLEY-HORN AND ASSOCIATES, INC.

PREPARED BY: BRAIN M. WURDEMAN, P.E.
11995 SINGLETREE LN, SUITE 225
EDEN PRAIRIE, MN 55344
TELEPHONE: (612) 315-1272

LANDSCAPE ARCHITECT
767 EUSTIS STREET, SUITE 100
ST. PAUL, MN 55114
TELEPHONE: (651) 645-4197
CONTACT: RYAN HYLLESTED, P.L.A.

OWNER / DEVELOPER

CA COMMERCIAL
3805 EDWARDS RD, SUITE 390
CINCINNATI, OH 45209
TELEPHONE: (513) 757-1409
CONTACT: LEONARD CARLSON

SURVEYOR
SUNDE LAND SURVEYING
9001 EAST BLOOMINGTON FREEWAY
(35W), SUITE 118
BLOOMINGTON, MN 55420-3435
TELEPHONE: (952) 881-2455
CONTACT: LEONARD F. CARLSON, P.L.S.



VICINITY
N.T.S.

Sheet List Table	
Sheet Number	Sheet Title
C000	COVER SHEET
C100	GENERAL NOTES
C200	DEMO & EROSION AND SEDIMENT CONTROL PLAN
C301	EROSION AND SEDIMENT CONTROL PHASE 2 PLAN
C302	EROSION AND SEDIMENT CONTROL DETAILS
C400	SITE DIMENSION PLAN
C401	SITE DETAILS
C402	SITE DETAILS
C500	GRADING PLAN
C501	STORM SEWER PLAN
C502	GRADING DETAILS
C600	UTILITY PLAN
C601	UTILITY DETAILS
L100	LANDSCAPE PLAN
L101	LANDSCAPE DETAILS
P100	PHOTOMETRIC PLAN

NOTES:

1. CONTRACTOR SHALL CONFIRM THAT THE EXISTING CONDITIONS FOR THE SITE MATCH WHAT IS SHOWN ON THE DRAWINGS INCLUDED PRIOR TO CONSTRUCTION.
2. IF REPRODUCED, THE SCALES SHOWN ON THESE PLANS ARE BASED ON A ANSI full bleed D (34.00 x 22.00 Inches) SHEET.
3. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICES COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICES.
4. ALL GENERAL CONTRACTOR WORK TO BE COMPLETED (EARTHWORK, FINAL UTILITIES, AND FINAL GRADING) BY THE MILESTONE DATE IN PROJECT DOCUMENTS.

BENCHMARKS

SITE BENCHMARKS:
(LOCATIONS SHOWN ON SURVEY)

SBM #1 - TOP OF NUT OF FIRE HYDRANT ON THE NORTHERLY SIDE OF EAST POINT DOUGLAS RD., ±33 FT NORTHWEST OF THE MOST WESTERLY PROPERTY CORNER OF THE SITE.
ELEVATION = 798.36 FT

SBM #2 - TOP OF THE SOUTHERLY MOST BOLT ON THE SPEEDWAY SIGN, ±83 FT NORTHEASTERLY OF THE MOST SOUTHERLY PROPERTY CORNER OF THE SITE.
ELEVATION = 801.35 FT

Know what's **below.** **Call** before you dig.

PRELIMINARY - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2026 KIMLEY-HORN AND ASSOCIATES, INC.
11995 SINGLETREE LN, SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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.

BRIAN M. WURDEMAN, P.E.
DATE: 01/26/2026 LIC. NO. 53113 MN

KHA PROJECT	161369000
DATE	01/26/2026
SCALE	AS SHOWN
DESIGNED BY	ARF
DRAWN BY	AKK
CHECKED BY	MTL

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

COVER SHEET

SHEET NUMBER
C000

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This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

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This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR AND SUBCONTRACTORS SHALL OBTAIN A COPY OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS OF THE LOCAL JURISDICTION AND STATE DEPARTMENT OF TRANSPORTATION AND BECOME FAMILIAR WITH THE CONTENTS PRIOR TO COMMENCING WORK. UNLESS OTHERWISE NOTED, ALL WORK SHALL CONFORM AS APPLICABLE TO THESE STANDARDS AND SPECIFICATIONS.
3. PERFORM ALL WORK IN COMPLIANCE WITH APPLICABLE CITY REGULATIONS, STATE CODES, AND O.S.H.A. STANDARDS. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING THE NECESSARY MATERIALS & LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS, AND IN ACCORDANCE WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE APPROPRIATE APPROVING AUTHORITIES.
4. CONTRACTOR SHALL CLEAR AND GRUB ALL AREAS UNLESS OTHERWISE INDICATED, REMOVING TREES, STUMPS, ROOTS, MUCK, EXISTING PAVEMENT AND ALL OTHER DELETERIOUS MATERIAL.
5. THE EXISTING SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS QUALITY LEVEL "D" UNLESS OTHERWISE NOTED. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ACSE 38/02, ENTITLED STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF SUBSURFACE QUALITY DATA BY THE FHA. EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME OF THE TOPOGRAPHIC SURVEY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ENTIRELY ACCURATE. FINDING THE ACTUAL LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE DONE BEFORE COMMENCING ANY WORK IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PROVIDE 48 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND BONDS IF REQUIRED PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONSTRUCTION DOCUMENTS INCLUDING PLANS, SPECIFICATIONS, GEOTECHNICAL REPORT AND SPECIAL CONDITIONS AND COPIES OF ANY REQUIRED CONSTRUCTION PERMITS.
9. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND NOTIFICATION TO THE ENGINEER.
10. ALL COPIES OF COMPACTION, CONCRETE AND OTHER REQUIRED TEST RESULTS ARE TO BE SENT TO THE OWNER DIRECTLY FROM THE TESTING AGENCY.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND MAINTAINING AS-BUILT INFORMATION WHICH SHALL BE RECORDED AS CONSTRUCTION PROGRESSES OR AT THE COMPLETION OF APPROPRIATE CONSTRUCTION INTERVALS AND SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT DRAWINGS TO THE OWNER FOR THE PURPOSE OF CERTIFICATION TO JURISDICTIONAL AGENCIES AS REQUIRED. ALL AS-BUILT DATA SHALL BE COLLECTED BY A STATE PROFESSIONAL LAND SURVEYOR WHOSE SERVICES ARE ENGAGED BY THE CONTRACTOR.
12. ANY WELLS DISCOVERED ON SITE THAT WILL HAVE NO USE MUST BE PLUGGED BY A LICENSED WELL DRILLING CONTRACTOR IN A MANNER APPROVED BY ALL JURISDICTIONAL AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY WELL ABANDONMENT PERMITS REQUIRED.
13. ANY WELL DISCOVERED DURING EARTH MOVING OR EXCAVATION SHALL BE REPORTED TO THE APPROPRIATE JURISDICTIONAL AGENCIES WITHIN 24 HOURS AFTER DISCOVERY IS MADE.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK THAT WOULD BE AFFECTED. FAILURE TO NOTIFY OWNER OF AN IDENTIFIABLE CONFLICT PRIOR TO PROCEEDING WITH INSTALLATION RELIEVES OWNER OF ANY OBLIGATION TO PAY FOR A RELATED CHANGE ORDER.
15. SHOULD CONTRACTOR ENCOUNTER ANY DEBRIS LADEN SOIL, STRUCTURES NOT IDENTIFIED IN THE DOCUMENTS, OR OTHER SOURCE OF POTENTIAL CONTAMINATION, THEY SHALL IMMEDIATELY CONTACT THE ENGINEER AND OWNER.
16. CONTRACTOR SHALL NOTIFY OWNER AND/OR ENGINEER 48 HOURS IN ADVANCE OF THE FOLLOWING ACTIVITIES: PRE-CONSTRUCTION MEETING, SUBGRADE PREPARATION, BASE INSTALLATION, ASPHALT INSTALLATION, UNDERGROUND PIPING AND UTILITIES INSTALLATION, INSTALLATION OF STRUCTURES, CHECK VALVES, HYDRANTS, METERS, ETC., SIDEWALK INSTALLATION, CONNECTIONS TO WATER AND SEWER MAINS, TESTS OF UTILITIES.

THIRD PARTY SUPPLEMENTAL INFORMATION

KIMLEY-HORN ASSUMES NO LIABILITY FOR ANY ERRORS, INACCURACIES, OR OMISSIONS CONTAINED WITHIN SUPPLEMENTAL INFORMATION PROVIDED BY THIRD PARTY CONSULTANTS.

1. **BOUNDARY & TOPOGRAPHIC SURVEY**
   PERFORMED BY: SUNDE LAND SURVEYING
   ADDRESS: 9001 EAST BLOOMINGTON FREEWAY (35W), SUITE 118 BLOOMINGTON, MN 55420-3435
   PHONE: 952-881-2455
   DATED: 12/09/2025
2. **GEOTECHNICAL EVALUATION REPORT**
   PERFORMED BY: PENDING
   ADDRESS: PENDING
   PHONE: PENDING
   DATED: PENDING
3. **CONSTRUCTION TESTING**
   TEST REPORTS REQUIRED FOR CLOSE OUT INCLUDE, BUT ARE NOT LIMITED TO:
   - DENSITY TEST REPORTS
   - BACTERIOLOGICAL TESTS OF WATER SYSTEM
   - PRESSURE TEST OF WATER/SEWER
   - LEAK TESTS ON SEWER SYSTEM AND GREASE TRAPS
   - ANY OTHER TESTING REQUIRED BY THE AGENCY/MUNICIPALITY

EROSION CONTROL NOTES

1. THE STORM WATER POLLUTION PREVENTION PLAN ("SWPPP") IS COMPRISED OF THE EROSION CONTROL PLAN, THE STANDARD DETAILS, THE PLAN NARRATIVE, ATTACHMENTS INCLUDED IN THE SPECIFICATIONS OF THE SWPPP, PLUS THE PERMIT AND ALL SUBSEQUENT REPORTS AND RELATED DOCUMENTS.
2. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN AND THE STATE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT (NPDES PERMIT) AND BECOME FAMILIAR WITH THEIR CONTENTS.
3. BEST MANAGEMENT PRACTICES (BMP'S) AND CONTROLS SHALL CONFORM TO FEDERAL, STATE, OR LOCAL REQUIREMENTS OR MANUAL OF PRACTICE, AS APPLICABLE. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL CONTROLS AS DIRECTED BY THE PERMITTING AGENCY OR OWNER.
4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND SHALL MAINTAIN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS FOR THE DURATION OF CONSTRUCTION.
5. THE CONTRACTOR SHALL FIELD ADJUST AND/OR PROVIDE ADDITIONAL EROSION CONTROL BMP'S AS NEEDED TO PREVENT EROSION AND OFF-SITE SEDIMENT DISCHARGE FROM THE CONSTRUCTION SITE. LOG AND RECORD ANY ADJUSTMENTS AND DEVIATIONS FROM THE APPROVED EROSION CONTROL PLANS WITHIN THE SWPPP DOCUMENTS STORED IN THE JOB SITE TRAILER.
6. BMPS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN, AND IN THE STORM WATER POLLUTION PREVENTION PLAN, SHALL BE MAINTAINED IN FULLY FUNCTIONAL CONDITION AS REQUIRED BY ALL JURISDICTIONS UNTIL NO LONGER REQUIRED FOR A COMPLETED PHASE OF WORK OR FINAL STABILIZATION OF THE SITE. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE CHECKED BY A CERTIFIED PERSON AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A 0.5-INCH OR GREATER RAINFALL EVENT.
7. EROSION & SEDIMENT CONTROL BMPS SHALL BE MAINTAINED IN ACCORDANCE WITH THE FOLLOWING:
   - 7.1. INLET PROTECTION DEVICES AND BARRIERS SHALL BE REPAIRED OR REPLACED IF THEY SHOW SIGNS OF UNDERMINING OR DETERIORATION.
   - 7.2. ALL SEEDED AREAS SHALL BE CHECKED REGULARLY TO VERIFY THAT A HEALTHY STAND OF VEGETATION IS MAINTAINED. SEEDED AREAS SHOULD BE FERTILIZED, WATERED AND RE-SEEDED AS NEEDED. REFER TO THE LANDSCAPE PLAN AND PROJECT SPECIFICATIONS.
   - 7.3. SILT FENCES SHALL BE REPAIRED TO THEIR ORIGINAL CONDITIONS IF DAMAGED. SEDIMENT SHALL BE REMOVED FROM THE SILT FENCES WHEN IT REACHES ONE-THIRD THE HEIGHT OF THE SILT FENCE.
   - 7.4. THE ROCK CONSTRUCTION ENTRANCE(S) SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC ADDITIONS OF ROCK TOP DRESSING AS CONDITIONS DEMAND.
   - 7.5. THE TEMPORARY PARKING AND STORAGE AREA SHALL BE KEPT IN GOOD CONDITION (SUITABLE FOR PARKING AND STORAGE). THIS MAY REQUIRE PERIODIC ADDITIONS OF TOP DRESSING IF THE TEMPORARY PARKING CONDITIONS DEMAND.
   - 7.6. PERFORM ALL MAINTENANCE OPERATIONS IN A TIMELY MANNER BUT IN NO CASE LATER THAN 2 CALENDAR DAYS FOLLOWING THE INSPECTION.

PAVING AND STRIPING NOTES

1. ALL PAVING, CONSTRUCTION, MATERIALS, AND WORKMANSHIP WITHIN JURISDICTION'S RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE LOCAL CITY OR COUNTY SPECIFICATIONS AND STANDARDS, OR THE STATE DOT SPECIFICATIONS AND STANDARDS IF NOT COVERED BY LOCAL CITY OR COUNTY REGULATIONS.
2. ALL SIGNS, PAVEMENT MARKINGS, AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D) AND CITY STANDARDS.
3. CONTRACTOR SHALL FURNISH ALL PAVEMENT MARKINGS FOR FIRE LANES, ROADWAY LANES, PARKING STALLS, ACCESSIBLE PARKING SYMBOLS, ACCESS AISLES, STOP BARS AND SIGNS, AND MISCELLANEOUS STRIPING WITHIN THE PARKING LOT AS SHOWN ON THE PLANS.
4. ALL EXPANSION JOINTS SHALL EXTEND THROUGH THE CURB.
5. THE MINIMUM LENGTH OF OFFSET JOINTS AT RADIUS POINTS SHALL BE 2 FEET.
6. ALL JOINTS, INCLUDING EXPANSION JOINTS WITH REMOVABLE TACK STRIPS, SHALL BE SEALED WITH JOINT SEALANT.
7. THE MATERIALS AND PROPERTIES OF ALL CONCRETE SHALL MEET THE APPLICABLE REQUIREMENTS IN THE A.C.I. (AMERICAN CONCRETE INSTITUTE) MANUAL OF CONCRETE PRACTICE.
8. CONTRACTOR SHALL APPLY A SECOND COATING OVER ALL PAVEMENT MARKINGS PRIOR TO ACCEPTANCE BY OWNER FOLLOWED BY A COAT OF GLASS BEADS AS APPLICABLE PER THE PROJECT DOCUMENTS.
9. ANY EXISTING PAVEMENT, CURBS AND/OR SIDEWALKS DAMAGED OR REMOVED WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER AND OWNER.
10. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY SUITABLE ACCESSIBLE ROUTES (PER A.D.A). GRADING FOR ALL SIDEWALKS AND ACCESSIBLE ROUTES INCLUDING CROSSING DRIVEWAYS SHALL CONFORM TO CURRENT ADA STATE/NATIONAL STANDARDS. IN NO CASE SHALL ACCESSIBLE RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL. IN NO CASE SHALL SIDEWALK CROSS SLOPES EXCEED 2% . IN NO CASE SHALL LONGITUDINAL SIDEWALK SLOPES EXCEED 5%. IN NO CASE SHALL ACCESSIBLE PARKING STALLS OR AISLES EXCEED 2% (1.5% TARGET) IN ALL DIRECTIONS. SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVING. NO CONTRACTOR CHANGE ORDERS WILL BE ACCEPTED FOR A.D.A COMPLIANCE ISSUES.
11. MAXIMUM JOINT SPACING IS TWICE THE DEPTH OF THE CONCRETE PAVEMENT IN FEET.

GRADING AND DRAINAGE NOTES

1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2. THE CONTRACTOR SHALL GRADE THE SITE TO THE ELEVATIONS INDICATED AND SHALL ADJUST BMP'S AS NECESSARY AND REGRADE WASHOUTS WHERE THEY OCCUR AFTER EVERY RAINFALL UNTIL A GRASS STAND IS WELL ESTABLISHED OR ADEQUATE STABILIZATION OCCURS.
3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS SO THAT SURFACE RUNOFF WILL DRAIN BY GRAVITY TO NEW OR EXISTING DRAINAGE OUTLETS. CONTRACTOR SHALL ENSURE NO PONDING OCCURS IN PAVED AREAS AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION. EXISTING CASTINGS AND STRUCTURES TO REMAIN SHALL BE ADJUSTED TO MATCH THE PROPOSED FINISHED GRADES.
5. BACKFILL FOR UTILITY LINES SHALL BE PLACED PER DETAILS, STANDARDS, AND SPECIFICATIONS SO THAT THE UTILITY WILL BE STABLE. WHERE UTILITY LINES CROSS THE PARKING LOT, THE TOP 6 INCHES SHALL BE COMPACTED SIMILARLY TO THE REMAINDER OF THE LOT. UTILITY DITCHES SHALL BE VISUALLY INSPECTED DURING THE EXCAVATION PROCESS TO ENSURE THAT UNDESIRABLE FILL IS NOT USED.
6. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF 4" OF TOPSOIL AT COMPLETION OF WORK. ALL UNPAVED AREAS IN EXISTING RIGHTS-OF-WAY DISTURBED BY CONSTRUCTION SHALL BE REGRADED AND SODDED.
7. AFTER PLACEMENT OF SUBGRADE AND PRIOR TO PLACEMENT OF PAVEMENT, CONTRACTOR SHALL TEST AND OBSERVE PAVEMENT AREAS FOR EVIDENCE OF PONDING. ALL AREAS SHALL ADEQUATELY DRAIN TOWARDS THE INTENDED STRUCTURE TO CONVEY STORM RUNOFF. CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER AND ENGINEER IF ANY DISCREPANCIES ARE DISCOVERED.
8. WHERE EXISTING PAVEMENT IS INDICATED TO BE REMOVED AND REPLACED, THE CONTRACTOR SHALL SAW CUT FULL DEPTH FOR A SMOOTH AND STRAIGHT JOINT AND REPLACE THE PAVEMENT WITH THE SAME TYPE AND DEPTH OF MATERIAL AS EXISTING OR AS INDICATED.
9. THE CONTRACTOR SHALL INSTALL PROTECTION OVER ALL DRAINAGE STRUCTURES FOR THE DURATION OF CONSTRUCTION AND UNTIL ACCEPTANCE OF THE PROJECT BY THE OWNER. ALL DRAINAGE STRUCTURES SHALL BE CLEANED OF DEBRIS AS REQUIRED DURING AND AT THE END OF CONSTRUCTION TO PROVIDE POSITIVE DRAINAGE FLOWS.
10. IF DEWATERING IS REQUIRED, THE CONTRACTOR SHALL OBTAIN ANY APPLICABLE REQUIRED PERMITS. THE CONTRACTOR IS TO COORDINATE WITH THE OWNER AND THE DESIGN ENGINEER PRIOR TO ANY EXCAVATION.
11. FIELD DENSITY TESTS SHALL BE TAKEN AT INTERVALS IN ACCORDANCE WITH THE LOCAL JURISDICTIONAL AGENCY OR TO MNDOT STANDARDS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
12. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED AS PER PLANS. THE AREAS SHALL THEN BE SODDED OR SEEDED AS SPECIFIED IN THE PLANS, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL GROWTH IS ESTABLISHED TO MINIMUM COVERAGE OF 70% IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE JOB SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. ALL EARTHEN AREAS WILL BE SODDED OR SEEDED AND MULCHED AS SHOWN ON THE LANDSCAPING PLAN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
14. SOD, WHERE CALLED FOR, MUST BE INSTALLED AND MAINTAINED ON EXPOSED SLOPES WITHIN 48 HOURS OF COMPLETING FINAL GRADING, AND AT ANY OTHER TIME AS NECESSARY, TO PREVENT EROSION, SEDIMENTATION OR TURBID DISCHARGES.
15. THE CONTRACTOR SHALL ENSURE THAT LANDSCAPE ISLAND PLANTING AREAS AND OTHER PLANTING AREAS ARE NOT COMPACTED AND DO NOT CONTAIN ROAD BASE MATERIALS. THE CONTRACTOR SHALL ALSO EXCAVATE AND REMOVE ALL UNDESIRABLE MATERIAL FROM ALL AREAS ON THE SITE TO BE PLANTED AND PROPERLY DISPOSED OF IN A LEGAL MANNER.
16. THE CONTRACTOR SHALL INSTALL ALL UNDERGROUND STORM WATER PIPING PER MANUFACTURER'S RECOMMENDATIONS AND MNDOT SPECIFICATIONS.
17. PAVEMENTS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATION OF THE SITE SPECIFIC GEOTECHNICAL EVALUATION REPORT AND CITY & MNDOT SPECIFICATIONS.
18. SPOT ELEVATIONS REPRESENT THE FINISHED SURFACE GRADE OR FLOWLINE OF CURB UNLESS OTHERWISE NOTED.
19. LIMITS OF CONSTRUCTION ARE TO THE PROPERTY LINE UNLESS OTHERWISE SPECIFIED ON THE PLAN.
20. IMMEDIATELY REPORT TO THE OWNER ANY DISCREPANCIES FOUND BETWEEN ACTUAL FIELD CONDITIONS AND CONSTRUCTION DOCUMENTS.
21. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING EXISTING UTILITIES, AND SHALL REPAIR ALL DAMAGE TO EXISTING UTILITIES THAT OCCUR DURING CONSTRUCTION WITHOUT COMPENSATION.
22. BLEND NEW EARTHWORK SMOOTHLY TO TRANSITION BACK TO EXISTING GRADE.
23. ALL PROPOSED GRADES ONSITE SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE INDICATED ON THE PLANS. ANY SLOPES STEEPER THAN 4:1 REQUIRE EROSION AND SEDIMENT CONTROL BLANKET.
24. ADHERE TO ALL TERMS AND CONDITIONS AS NECESSARY IN THE GENERAL N.P.D.E.S. PERMIT AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
25. ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.

WATER STORM SEWER & SANITARY SEWER NOTES

1. THE CONTRACTOR SHALL CONSTRUCT GRAVITY SEWER LATERALS, MANHOLES, GRAVITY SEWER LINES, AND DOMESTIC WATER AND FIRE PROTECTION SYSTEM AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIALS, EQUIPMENT, MACHINERY, TOOLS, MEANS OF TRANSPORTATION AND LABOR NECESSARY TO COMPLETE THE WORK IN FULL AND COMPLETE ACCORDANCE WITH THE SHOWN, DESCRIBED AND REASONABLY INTENDED REQUIREMENTS OF THE CONTRACT DOCUMENTS AND JURISDICTIONAL AGENCY REQUIREMENTS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
2. ALL EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS FOR UTILITY LOCATION AND COORDINATION IN ACCORDANCE WITH THE NOTES CONTAINED IN THE GENERAL CONSTRUCTION SECTION OF THIS SHEET.
3. THE CONTRACTOR SHALL RESTORE ALL DISTURBED VEGETATION IN KIND, UNLESS SHOWN OTHERWISE.
4. DEFLECTION OF PIPE JOINTS AND CURVATURE OF PIPE SHALL NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS. SECURELY CLOSE ALL OPEN ENDS OF PIPE AND FITTINGS WITH A WATERTIGHT PLUG WHEN WORK IS NOT IN PROGRESS. THE INTERIOR OF ALL PIPES SHALL BE CLEAN AND JOINT SURFACES WIPED CLEAN AND DRY AFTER THE PIPE HAS BEEN LOWERED INTO THE TRENCH. VALVES SHALL BE PLUMB AND LOCATED ACCORDING TO THE PLANS.
5. ALL PIPE AND FITTINGS SHALL BE CAREFULLY STORED FOLLOWING MANUFACTURER'S RECOMMENDATIONS. CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE COATING OR LINING IN ANY D.I. PIPE FITTINGS. ANY PIPE OR FITTING WHICH IS DAMAGED OR WHICH HAS FLAWS OR IMPERFECTIONS WHICH, IN THE OPINION OF THE ENGINEER OR OWNER, RENDERS IT UNFIT FOR USE, SHALL NOT BE USED. ANY PIPE NOT SATISFACTORY FOR USE SHALL BE CLEARLY MARKED AND IMMEDIATELY REMOVED FROM THE JOB SITE, AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
6. WATER FOR FIRE FIGHTING SHALL BE MADE AVAILABLE FOR USE BY THE CONTRACTOR PRIOR TO COMBUSTIBLES BEING BROUGHT ON SITE.
7. ALL UTILITY AND STORM DRAIN TRENCHES LOCATED UNDER AREAS TO RECEIVE PAVING SHALL BE COMPLETELY BACK FILLED IN ACCORDANCE WITH THE GOVERNING JURISDICTIONAL AGENCY'S SPECIFICATIONS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
8. UNDERGROUND UTILITY LINES SHALL BE SURVEYED BY A STATE LICENSED PROFESSIONAL LAND SURVEYOR PRIOR TO BACK FILLING.
9. CONTRACTOR SHALL PERFORM, AT THEIR OWN EXPENSE, ANY AND ALL TESTS REQUIRED BY THE SPECIFICATIONS AND/OR ANY AGENCY HAVING JURISDICTION. THESE TESTS MAY INCLUDE, BUT MAY NOT BE LIMITED TO, INFILTRATION AND EXFILTRATION, TELEVISION INSPECTION AND A MANDREL TEST ON GRAVITY SEWER. A COPY OF THE TEST RESULTS SHALL BE PROVIDED TO THE UTILITY PROVIDER, OWNER AND JURISDICTIONAL AGENCY AS REQUIRED.
10. BETWEEN WATER AND SEWER MANHOLES AND PIPES, CONTRACTOR SHALL PROVIDE FOR A MINIMUM HORIZONTAL CLEARANCE OF 10-FEET AND A MINIMUM VERTICAL SEPARATION OF 18-INCHES.
11. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
12. ALL STORM PIPE ENTERING STRUCTURES SHALL BE GASKETED AND/OR GROUTED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT UNLESS OTHERWISE STATED BY CITY AND STATE DESIGN STANDARDS AND SPECIFICATIONS.
13. UNLESS OTHERWISE STATED IN CITY AND STATE DESIGN STANDARDS AND SPECIFICATIONS, ALL STORM SEWER MANHOLES IN PAVED AREAS SHALL BE FLUSH WITH PAVEMENT, AND SHALL HAVE TRAFFIC BEARING RING & COVERS. MANHOLES IN UNPAVED AREAS SHALL BE 6" ABOVE FINISH GRADE. LIDS SHALL BE LABELED "STORM SEWER". EXISTING CASTINGS AND STRUCTURES WITHIN PROJECT LIMITS SHALL BE ADJUSTED TO MEET THESE CONDITIONS AND THE PROPOSED FINISHED GRADE.
14. TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
15. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
16. ALL STORM STRUCTURES SHALL HAVE A SMOOTH UNIFORM POURED MORTAR FROM INVERT IN TO INVERT OUT.
17. ROOF DRAINS SHALL BE CONNECTED TO STORM SEWER BY PREFABRICATED WYES OR AT STORM STRUCTURES. ROOF DRAINS AND TRUCK WELL DRAIN SHALL RUN AT A MINIMUM 2.0% SLOPE, UNLESS NOTED OTHERWISE, AND TIE IN AT THE CENTERLINE OF THE STORM MAIN.
18. PROVIDE INSULATION OF UNDERGROUND ROOF DRAINS AND SANITARY SEWER SERVICES IF ADEQUATE FROST DEPTH CANNOT BE PROVIDED.
19. THE CONTRACTOR SHALL PROTECT EXISTING UNDERGROUND UTILITIES AND APPURTENANCES THAT ARE TO REMAIN FROM DAMAGE DURING CONSTRUCTION OPERATIONS.
20. THE LOCATION OF EXISTING UTILITIES, STORM DRAINAGE STRUCTURES AND OTHER ABOVE AND BELOW-GRADE IMPROVEMENTS ARE APPROXIMATE AS SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, SIZE AND INVERT ELEVATIONS OF EACH PRIOR TO THE START OF CONSTRUCTION.
21. A MINIMUM SEPARATION OF 5-FEET IS REQUIRED BETWEEN UNDERGROUND UTILITIES AND TREES UNLESS A ROOT BARRIER IS UTILIZED.
22. GAS, PHONE AND ELECTRIC SERVICES SHOWN FOR INFORMATIONAL PURPOSES ONLY. DRY UTILITY COMPANIES MAY ALTER THE DESIGN LAYOUT DURING THEIR REVIEW. CONTRACTOR TO COORDINATE FINAL DESIGN AND INSTALLATION WITH UTILITY COMPANIES.
23. COORDINATE UTILITY INSTALLATION WITH IRRIGATION DESIGN AND INSTALLATION.
24. ALL DIMENSIONS ARE TO FLOW LINE OF CURB UNLESS OTHERWISE NOTED. PERIMETER WALL DIMENSIONS ARE TO INSIDE WALL FACE. REFERENCE ARCHITECTURAL PLANS FOR EXACT WALL WIDTH AND SPECIFICATIONS.
25. REFERENCE ARCHITECTURAL PLANS (BY OTHERS) FOR EXACT BUILDING DIMENSIONS, MATERIALS SPECIFICATIONS.
26. REFERENCE M.E.P. PLANS (BY OTHERS) FOR MECHANICAL EQUIPMENT DIMENSIONS AND SPECIFICATIONS.
27. CONTRACTOR SHALL REFERENCE STRUCTURAL PLANS (BY OTHERS) FOR FOOTING AND FOUNDATION PAD PREPARATION SPECIFICATIONS.
28. CONTRACTOR SHALL REFERENCE M.E.P PLANS (BY OTHERS) FOR ROUTING OF PROPOSED ELECTRICAL & COMMUNICATIONS SERVICES AND SITE LIGHTING LAYOUT.

PRELIMINARY - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

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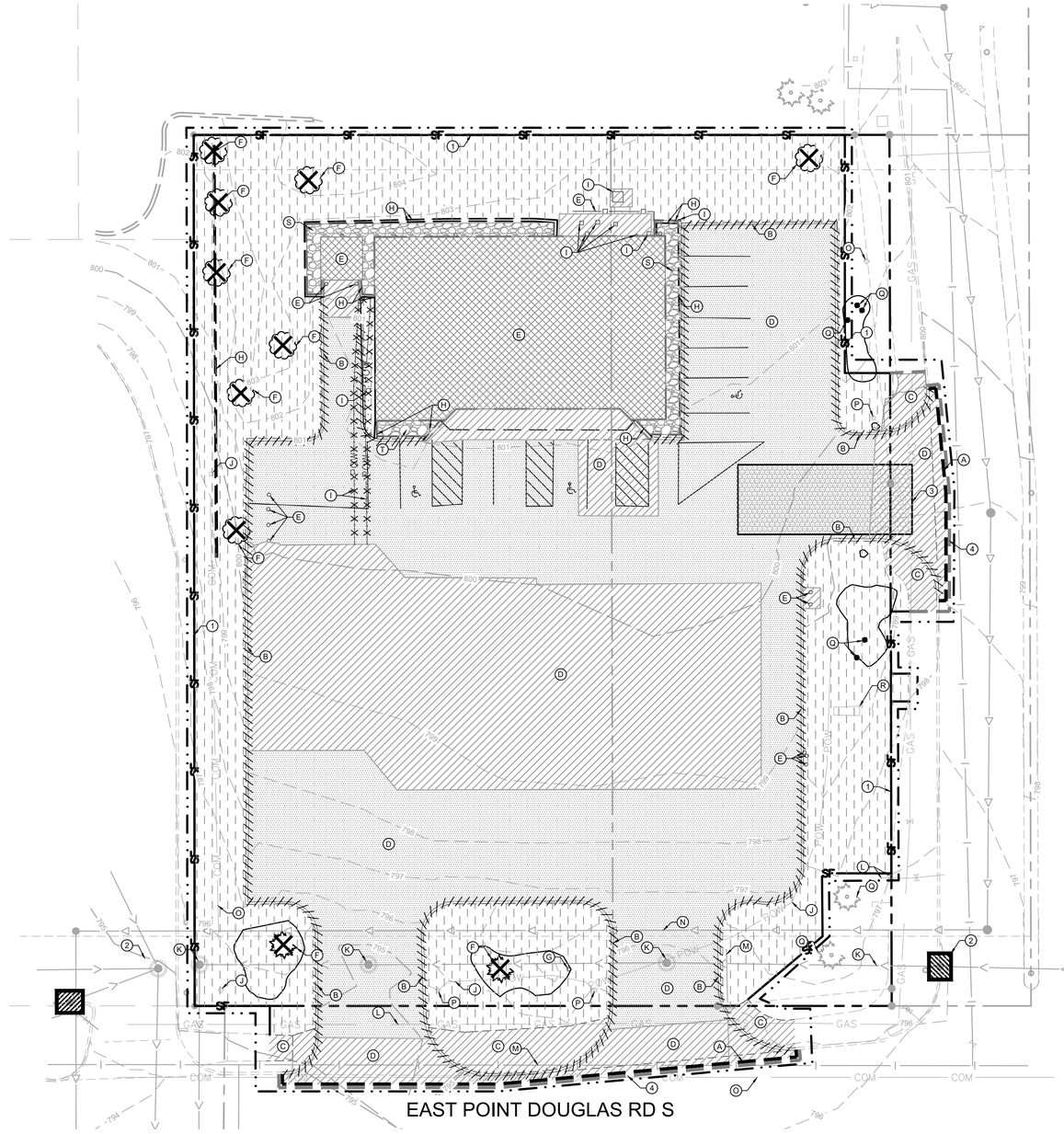
11995 SINGLETREE LN, SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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



LEGEND

- PROPERTY LINE
- REMOVE BITUMINOUS SURFACE
- REMOVE CONCRETE SURFACE
- REMOVE BUILDING
- CLEARING & GRUBBING
- FULL DEPTH SAWCUT
- REMOVE TREE
- REMOVE CONCRETE CURB & GUTTER
- REMOVE UTILITY LINES
- LIMITS OF CONSTRUCTION
- EXISTING RETAINING WALL
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATERMAIN
- EXISTING GAS MAIN
- EXISTING UNDERGROUND TELEPHONE
- EXISTING CONTOUR
- EXISTING CURB & GUTTER
- EXISTING SIGN
- EXISTING STORM MANHOLE
- EXISTING STORM CATCHBASIN
- EXISTING HYDRANT
- EXISTING POWER POLE
- EXISTING LIGHT POLE
- EXISTING TREE
- EXISTING TREE LINE
- ROCK ENTRANCE
- EROSION CONTROL BLANKET
- INLET PROTECTION
- SILT FENCE
- LIMITS OF DISTURBANCE
- BIOROLL

DEMOLITION PLAN NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR THE DEMOLITION, REMOVAL, AND DISPOSAL (IN A LOCATION APPROVED BY ALL GOVERNING AUTHORITIES) OF ALL STRUCTURES, PADS, WALLS, FLUMES, FOUNDATIONS, PARKING, DRIVES, DRAINAGE STRUCTURES, UTILITIES, ETC. SUCH THAT THE IMPROVEMENTS ON THE PLANS CAN BE CONSTRUCTED. FACILITIES TO BE REMOVED SHALL BE UNDERCUT TO SUITABLE MATERIAL AND BROUGHT TO GRADE WITH SUITABLE COMPACTED FILL MATERIAL PER THE PROJECT DOCUMENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DEBRIS FROM THE SITE AND DISPOSING OF THE DEBRIS IN A LAWFUL MANNER AND IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS. THE CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FOR DEMOLITION AND DISPOSAL FROM THE APPROPRIATE LOCAL AND STATE AGENCIES. CONTRACTOR SHALL PROVIDE COPIES OF THE PERMIT AND RECEIPTS OF DISPOSAL OF MATERIALS TO THE OWNER AND OWNERS REPRESENTATIVE, INCLUDING THE TYPE OF DEBRIS AND LOCATION WHERE IT WAS DISPOSED.
3. THE CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ADJACENT PROPERTIES AT ALL TIMES. UTILITY SERVICES SHALL NOT BE INTERRUPTED WITHOUT APPROVAL FROM THE CONSTRUCTION MANAGER AND COORDINATION WITH THE ADJACENT PROPERTIES AND/OR THE CITY.
4. THE CONTRACTOR SHALL COORDINATE WITH RESPECTIVE UTILITY COMPANIES PRIOR TO THE REMOVAL AND/OR RELOCATION OF UTILITIES. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANY CONCERNING PORTIONS OF WORK WHICH MAY BE PERFORMED BY THE UTILITY COMPANY'S FORCES AND ANY FEES WHICH ARE TO BE PAID TO THE UTILITY COMPANY FOR THEIR SERVICES. THE CONTRACTOR IS RESPONSIBLE FOR PAYING ALL FEES AND CHARGES.
5. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANIES TO PROVIDE LOCATIONS OF EXISTING UTILITIES WITHIN PROPOSED WORK AREA.
6. EXISTING SEWERS, PIPING AND UTILITIES SHOWN ARE BASED ON AVAILABLE RECORD PLAN DATA AND/OR FIELD UTILITY MARKINGS AND ARE NOT TO BE INTERPRETED AS THE EXACT LOCATION. ADDITIONAL UNMARKED OBSTACLES MAY EXIST ON THE SITE. VERIFY EXISTING CONDITIONS AND PROCEED WITH CAUTION AROUND ANY ANTICIPATED UNDERGROUND FEATURES. GIVE NOTICE TO AFFECTED UTILITY COMPANIES REGARDING REMOVAL OF SERVICE LINES AND CAP ANY ABANDONED LINES BEFORE PRECEDING WITH THE PROPOSED WORK.
7. ELECTRICAL, TELEPHONE, CABLE, WATER, FIBER OPTIC, AND/OR GAS LINES NEEDING TO BE REMOVED OR RELOCATED SHALL BE COORDINATED WITH THE AFFECTED UTILITY COMPANY. ADEQUATE TIME SHALL BE PROVIDED FOR RELOCATION AND CLOSE COORDINATION WITH THE UTILITY COMPANY IS NECESSARY TO PROVIDE A SMOOTH TRANSITION IN UTILITY SERVICE. CONTRACTOR SHALL PAY CLOSE ATTENTION TO EXISTING UTILITIES WITHIN ANY ROAD RIGHT-OF-WAY DURING CONSTRUCTION.
8. CONTRACTOR MUST PROTECT THE PUBLIC AT ALL TIMES WITH FENCING, BARRICADES, ENCLOSURES, ETC. (AND OTHER APPROPRIATE BEST MANAGEMENT PRACTICES) AS APPROVED BY THE CONSTRUCTION MANAGER. MAINTENANCE OF TRAFFIC CONTROL SHALL BE COORDINATED IN ACCORDANCE WITH THE CITY OF COTTAGE GROVE, WASHINGTON COUNTY, AND MNDOT AS NECESSARY.
9. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION, AND SHALL NOTIFY ADJACENT PROPERTY OWNERS IF ACCESS WILL BE INTERRUPTED OR ALTERED AT ANY TIME DURING CONSTRUCTION.
10. PRIOR TO THE START OF DEMOLITION, INSTALL EROSION CONTROL BMP'S IN ACCORDANCE WITH THE EROSION & SEDIMENT CONTROL PLANS / SWPPP.
11. CONTRACTOR MAY LIMIT SAW-CUT AND PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE IT IS REQUIRED AS SHOWN ON THESE CONSTRUCTION PLANS BUT IF ANY DAMAGE IS INCURRED ON ANY OF THE SURROUNDING PAVEMENT OR CURB, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ITS REMOVAL AND REPAIR.
12. THE CONTRACTOR SHALL COORDINATE WATER MAIN WORK WITH THE CITY WATER AND FIRE DEPARTMENTS TO ENSURE ADEQUATE FIRE PROTECTION IS CONSTANTLY AVAILABLE TO THE SITE AND SURROUNDING PROPERTIES THROUGH ALL PHASES OF CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR ARRANGING/PROVIDING ANY REQUIRED WATER MAIN SHUT OFFS WITH THE CITY OF COTTAGE GROVE. ANY COSTS ASSOCIATED WITH WATER MAIN SHUT OFFS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND NO EXTRA COMPENSATION WILL BE PROVIDED.
13. IN THE EVENT A WELL IS FOUND, THE CONTRACTOR SHALL CONTACT THE ENGINEER AND OWNER IMMEDIATELY. ALL WELLS SHALL BE SEALED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH STATE REQUIREMENTS.
14. IN THE EVENT THAT UNKNOWN CONTAINERS OR TANKS ARE ENCOUNTERED, THE CONTRACTOR SHALL CONTACT THE OWNER AND/OR OWNERS REPRESENTATIVE IMMEDIATELY. ALL CONTAINERS SHALL BE DISPOSED OF AT A PERMITTED LANDFILL PER THE PROJECT DOCUMENTS.
15. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY EXISTING DRAINTILE IS ENCOUNTERED ON SITE; ACTIVE DRAINTILE SHALL NOT BE REMOVED WITHOUT APPROVAL FROM THE ENGINEER.
16. IF CONTAMINATED MATERIAL IS ENCOUNTERED ON THE PROJECT SITE, THE CONTRACTOR SHALL STOP WORK AND NOTIFY THE OWNER AND ENGINEER IMMEDIATELY.

EROSION CONTROL PLAN NOTES

1. THE STORM WATER POLLUTION PREVENTION PLAN ("SWPPP") IS COMPRISED OF THE EROSION CONTROL PLAN, THE STANDARD DETAILS, THE PLAN NARRATIVE, ATTACHMENTS INCLUDED IN THE SPECIFICATIONS OF THE SWPPP, PLUS THE PERMIT AND ALL SUBSEQUENT REPORTS AND RELATED DOCUMENTS.
2. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH LAND DISTURBING ACTIVITIES SHALL OBTAIN A COPY OF THE SWPPP AND NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT, AND BECOME FAMILIAR WITH THEIR CONTENTS.
3. BEST MANAGEMENT PRACTICES (BMP'S) AND CONTROLS SHALL CONFORM TO FEDERAL, STATE AND LOCAL REQUIREMENTS, AS APPLICABLE. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL CONTROLS AS DIRECTED BY THE PERMITTING AGENCY, ENGINEER OR OWNER.
4. SITE ENTRY AND EXIT LOCATIONS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO A PUBLIC ROADWAY FROM THE CONSTRUCTION SITE MUST BE REMOVED AS SOON AS PRACTICABLE. WHEN WASHING IS REQUIRED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN. ANY FINES IMPOSED FOR DISCHARGING SEDIMENT ONTO A PUBLIC RIGHT OF WAY SHALL BE PAID BY THE CONTRACTOR.
5. TEMPORARY SEEDING OR OTHER APPROVED METHODS OF STABILIZATION SHALL BE INITIATED WITHIN 7 DAYS OF THE LAST DISTURBANCE ON ANY AREA OF THE SITE.
6. THE CONTRACTOR SHALL MINIMIZE LAND DISTURBANCE AND CLEARING TO THE MAXIMUM EXTENT PRACTICAL OR AS REQUIRED BY THE GENERAL PERMIT.
7. CONTRACTOR SHALL DENOTE ON THE PLAN THE TEMPORARY PARKING AND STORAGE AREA WHICH SHALL ALSO BE USED AS THE EQUIPMENT MAINTENANCE AND CLEANING AREA, EMPLOYEE PARKING AREA, AND AREA FOR LOCATING PORTABLE FACILITIES, OFFICE TRAILERS, AND TOILET FACILITIES.
8. ALL WASH WATER FROM THE CONSTRUCTION SITE (CONCRETE TRUCKS, VEHICLE CLEANING, EQUIPMENT CLEANING, ETC.) SHALL BE DETAINED AND PROPERLY TREATED BEFORE DISPOSAL.
9. SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS SHALL BE MAINTAINED ON SITE OR READILY AVAILABLE TO CONTAIN AND CLEAN-UP FUEL OR CHEMICAL SPILLS AND LEAKS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL ON SITE. THE USE OF MOTOR OILS AND OTHER PETROLEUM BASED OR TOXIC LIQUIDS FOR DUST SUPPRESSION OPERATIONS IS PROHIBITED.
11. RUBBISH, TRASH, GARBAGE, LITTER, OR OTHER SUCH MATERIALS SHALL BE DEPOSITED INTO SEALED CONTAINERS. MATERIALS SHALL BE PREVENTED FROM LEAVING THE PREMISES THROUGH THE ACTION OF WIND OR STORM WATER DISCHARGE INTO DRAINAGE DITCHES OR WATERS OF THE STATE.
12. STAGING AREAS, STOCKPILES, SPOILS, ETC. SHALL BE LOCATED OUTSIDE OF DRAINAGE WAYS SUCH THAT STORM WATER RUNOFF WILL NOT BE ADVERSELY AFFECTED. PROVIDE STABILIZATION MEASURES SUCH AS PERIMETER EROSION CONTROL BMP'S, SEEDING, OR OTHER COVERING AS NECESSARY TO PREVENT EROSION.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING ANY EROSION CONTROL BMP DISTURBED DURING CONSTRUCTION OPERATIONS. NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DEFICIENCIES IN THE ESTABLISHED EROSION CONTROL MEASURES THAT MAY LEAD TO UNAUTHORIZED DISCHARGE OF STORM WATER POLLUTANTS. UNAUTHORIZED POLLUTANTS INCLUDE (BUT ARE NOT LIMITED TO) EXCESS CONCRETE DUMPING, CONCRETE RESIDUE, PAINTS, SOLVENTS, GREASES, FUELS, LUBRICANT OILS, PESTICIDES, AND SOLID WASTE MATERIALS.
14. EROSION CONTROL BMP'S SHOWN ON THESE PLANS SHALL BE INSTALLED PRIOR TO THE START OF LAND-DISTURBING ACTIVITIES ON THE PROJECT, AND INITIATED AS SOON AS PRACTICABLE.
15. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND SHALL MAINTAIN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS FOR THE DURATION OF CONSTRUCTION.
16. THE CONTRACTOR SHALL FIELD ADJUST AND/OR PROVIDE ADDITIONAL EROSION CONTROL BMP'S AS NEEDED TO PREVENT EROSION AND OFF-SITE SEDIMENT DISCHARGE FROM THE CONSTRUCTION SITE. LOG AND RECORD ANY ADJUSTMENTS AND DEVIATIONS FROM THE APPROVED EROSION CONTROL PLANS WITHIN THE SWPPP DOCUMENTS STORED IN THE JOB SITE TRAILER.

SWPPP UPDATES & AMENDMENTS

THE CONTRACTOR MUST UPDATE THE SWPPP BY NOTING ON THE SITE MAPS IN THE JOB SITE BINDER TO REFLECT THE PROGRESS OF CONSTRUCTION ACTIVITIES AND GENERAL CHANGES TO THE PROJECT SITE FOR THE DURATION OF LAND DISTURBING ACTIVITIES. AT A MINIMUM, UPDATES SHALL BE MADE DAILY TO TRACK CONSTRUCTION PROGRESS DESCRIBED IN THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR NOTING THE LOCATION OF THE JOB SITE TRAILER, TEMPORARY PARKING & LAYDOWN AREAS, PORTA-POTTY, WHEEL WASH, CONCRETE WASHOUT, FUEL & MATERIAL STORAGE, SOLID WASTE CONTAINERS, AND OTHER CONSTRUCTION RELATED FACILITIES THAT MAY IMPACT STORMWATER RUNOFF.

PHASE 1 SEQUENCE OF CONSTRUCTION

1. INSTALL PERIMETER EROSION CONTROL (I.E. SILT FENCE) AND INLET PROTECTION AT EXISTING STORMWATER INLETS.
2. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AND CONCRETE WASHOUT
3. PREPARE TEMPORARY PARKING AND STORAGE AREA.
4. CONSTRUCT AND STABILIZE DIVERSIONS AND TEMPORARY SEDIMENT BASINS.
5. CLEAR AND GRUB THE SITE.
6. BEGIN MASS SITE GRADING AND ROUGH GRADE SITE SUFFICIENTLY TO ESTABLISH PROPOSED DRAINAGE PATTERNS.
7. START CONSTRUCTION OF THE BUILDING PAD AND STRUCTURES.
8. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DISTURBED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE OR AS REQUIRED BY THE NPDES AND/OR CITY GRADING PERMIT(S).

NOTE: THE SEQUENCE OF CONSTRUCTION IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY.

PHASE I BMP QUANTITIES

SILT FENCE	±714 LF
INLET PROTECTION	4 EA
ROCK CONSTRUCTION ENTRANCE	1 EA
BIO ROLL	±247 LF

EROSION CONTROL KEYNOTE LEGEND

1	SILT FENCE
2	INLET PROTECTION
3	ROCK CONSTRUCTION ENTRANCE
4	BIOROLL

DEMOLITION KEYNOTE LEGEND

A	SAWCUT EXISTING PAVEMENT
B	REMOVE EXISTING CURB / LIMITS OF CURB REMOVAL
C	REMOVE EXISTING SIDEWALK / CURB RAMP
D	REMOVE EXISTING PAVEMENT
E	REMOVE EXISTING BUILDING / STRUCTURE
F	REMOVE EXISTING TREE
G	REMOVE EXISTING SIGN / FLAG POLE
H	REMOVE EXISTING WOOD WALL / RETAINING WALL
I	REMOVE EXISTING ELECTRICAL LINE / EQUIPMENT
J	PROTECT EXISTING ELECTRICAL LINE / EQUIPMENT
K	PROTECT EXISTING STORM SEWER LINE / STRUCTURE
L	PROTECT EXISTING NATURAL GAS LINE / STRUCTURE
M	PROTECT EXISTING WATER LINE / HYDRANT / VALVE
N	PROTECT EXISTING SANITARY SEWER LINE / STRUCTURE
O	PROTECT EXISTING UTILITY LINE / STRUCTURE
P	PROTECT EXISTING LIGHT POLE
Q	PROTECT EXISTING TREE
R	PROTECT EXISTING PYLON SIGN
S	REMOVE GRAVEL BACKFILL FROM RETAINING WALL

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

811 Know what's below. Call before you dig.

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No.	REVISIONS	DATE	BY

Kimley»Horn

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11995 SINGLETREE LN, SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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.

BRIAN M. WURDEMAN, P.E.
DATE: 01/26/2026 LIC. NO. 53113 MN

KHA PROJECT	161369000
DATE	01/26/2026
SCALE	AS SHOWN
DESIGNED BY	MTL
DRAWN BY	AKK
CHECKED BY	BMW

DEMO & EROSION AND SEDIMENT CONTROL PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C200

K:\TCW_LDEV\ca commercial\cottage grove, mn\3 Design\CAD\plansheets\C2-DEMO & ESC PH1 PLAN.dwg February 17, 2026 - 2:20pm
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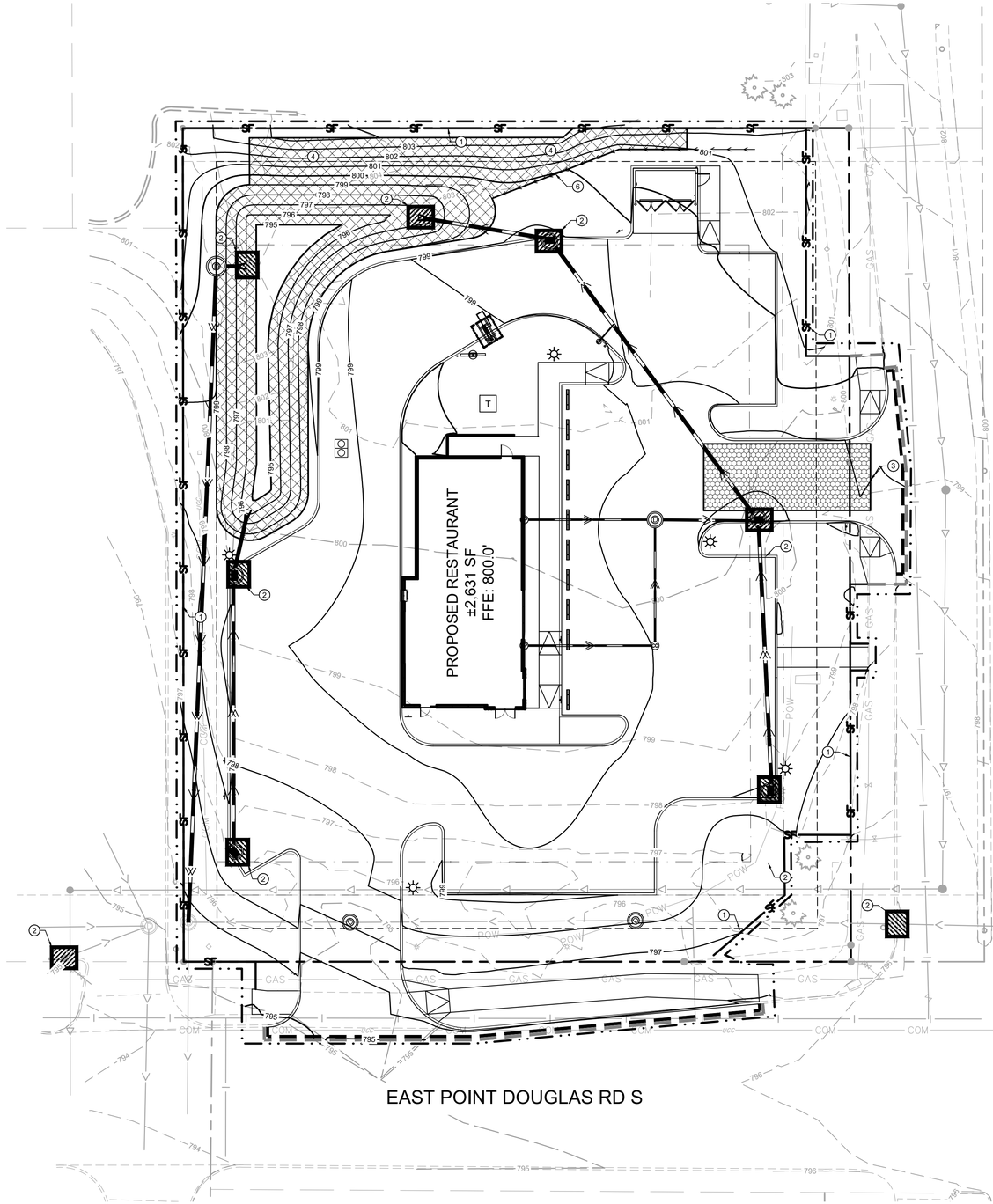

Know what's **below.**
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AREA SUMMARY	
TOTAL PROPERTY AREA	1.15 AC / 50,094 SF
EXISTING IMPERVIOUS AREA	0.79 AC / 33,483 SF
EXISTING PERVIOUS AREA	036 AC / 16,493 SF
PROPOSED IMPERVIOUS AREA	0.71 AC / 30,744 SF
PROPOSED PERVIOUS AREA	0.54 AC / 23,525 SF
TOTAL DISTURBED AREA	1.25 AC / 54,269 SF

PHASE 2 BMP QUANTITIES	
SILT FENCE	±744 LF
INLET PROTECTION	9 EA
ROCK CONSTRUCTION ENTRANCE	1 EA
BIO ROLL	±247 LF
EROSION CONTROL BLANKET	±5,620 SF

KEYNOTE LEGEND

1	SILT FENCE
2	INLET PROTECTION
3	ROCK CONSTRUCTION ENTRANCE
4	EROSION CONTROL BLANKET
5	BIOROLL
6	SWALE

LEGEND

- ROCK ENTRANCE
- EROSION CONTROL BLANKET
- INLET PROTECTION
- SILT FENCE (SF)
- LIMITS OF DISTURBANCE
- BIOROLL

EROSION CONTROL PLAN NOTES

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SWPPP UPDATES & AMENDMENTS

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PHASE 2 SEQUENCE OF CONSTRUCTION

1. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DENUDED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE.
2. CONSTRUCT UNDERGROUND SITE UTILITIES AND STORM SEWER, INCLUDING UNDERGROUND STORMWATER MANAGEMENT SYSTEM.
3. INSTALL APPROPRIATE INLET PROTECTION AT ANY NEW STORM SEWER STRUCTURES AS EACH STRUCTURE IS CONSTRUCTED.
4. COMPLETE SITE GRADING AND PERMANENTLY STABILIZE AREAS TO BE VEGETATED AS THEY ARE BROUGHT TO FINAL GRADE.
5. PLACE PAVEMENT BASE MATERIAL AND INSTALL SUBDRAINAGE SYSTEM.
6. CONSTRUCT PAVEMENTS, CURB & GUTTER, AND SIDEWALKS.
7. AS APPROPRIATE, REPLACE & MAINTAIN INLET PROTECTION DEVICES WITHIN PAVED AREAS AS WORK PROGRESSES.
8. COMPLETE FINAL GRADING AND INSTALL OF PERMANENT STABILIZATION (SEEDING, SODDING, ETC.) WITHIN LANDSCAPED AREAS.
9. WHEN THE SITE HAS ACHIEVED FINAL STABILIZATION AS DEFINED BY THE APPLICABLE EROSION CONTROL PERMITS, REMOVE ALL REMAINING TEMPORARY EROSION & SEDIMENT CONTROL BMP'S AND RE-STABILIZE ANY AREAS DISTURBED BY THE REMOVAL.

NOTE: THE SEQUENCE OF CONSTRUCTION IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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No.	REVISIONS	DATE	BY

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11995 SINGLETREE LN. SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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SCALE	AS SHOWN
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DRAWN BY	AKK
CHECKED BY	BMW

EROSION AND SEDIMENT CONTROL PHASE 2 PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C301

K:\TCW_LDEV\ca commercial\cottage grove, mn\3 Design\CAD\plansheets\C3-EROS DETAILS.dwg February 17, 2026 - 2:21pm

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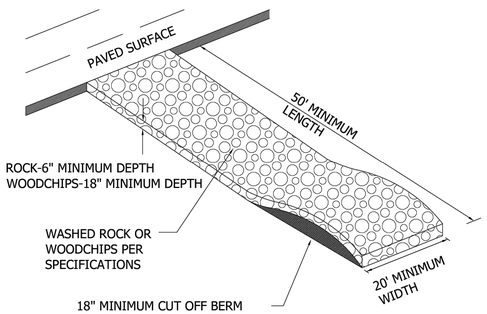


NOTES:
1. FILTER FABRIC SHALL BE PLACED UNDER ROCK OR WOODCHIPS TO STOP MUD MIGRATION THROUGH ROCK.
2. ENTRANCE MUST BE MAINTAINED REGULARLY TO PREVENT SEDIMENTATION TRACKING.

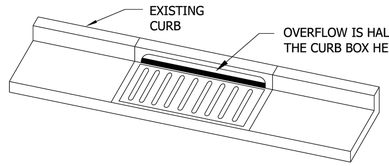
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONSTRUCTION ENTRANCE
ROCK AND WOODCHIP
COTTAGE GROVE, MINNESOTA

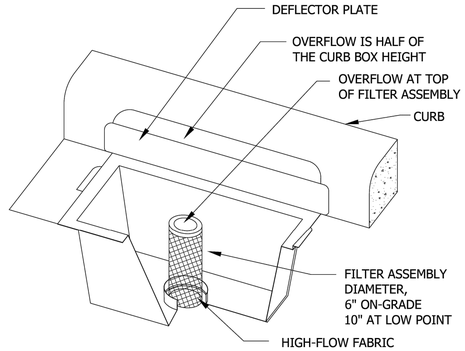
JANUARY 2025

PLATE NO. ERO-12

48_ERO12.DWG



NOTE: USE WIMCO ROAD DRAIN CG-23 OR CG-3290-VB (DEPENDING ON CASTING TYPE) HIGH FLOW INLET PROTECTION CURB AND GUTTER MODELS, OR CITY APPROVED EQUAL.



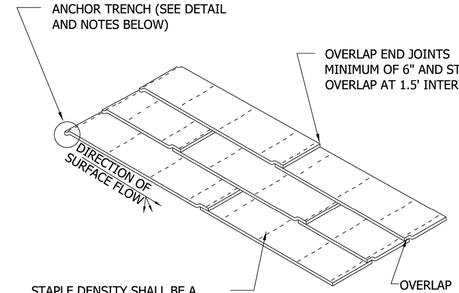
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
INLET PROTECTION CATCH BASIN INSERT
COTTAGE GROVE, MINNESOTA

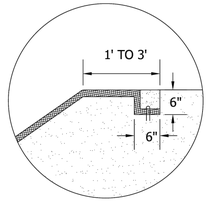
JANUARY 2025

PLATE NO. ERO-9

48_ERO9.DWG



ANCHOR TRENCH
1. DIG 6" X 6" TRENCH
2. LAY BLANKET IN TRENCH
3. STAPLE AT 1.5' INTERVALS
4. BACKFILL WITH NATURAL SOIL AND COMPACT
5. BLANKET LENGTH SHALL NOT EXCEED 100' WITHOUT AN ANCHOR TRENCH



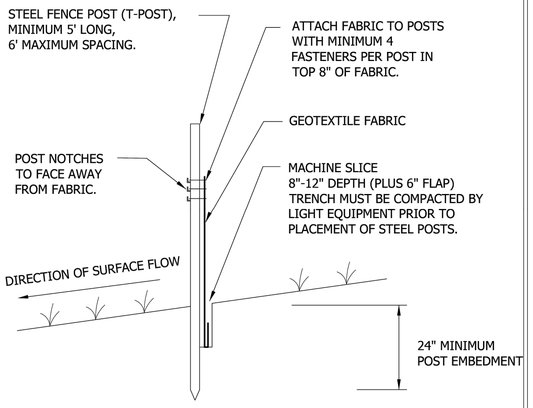
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
ROLLED EROSION PREVENTION PRODUCTS INSTALLATION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-5

48_ERO5.DWG



NOTE:
HEAVY-DUTY SILT FENCE INSTALLATION METHODS SHOULD BE USED WHEN DIRECTED BY THE CITY.

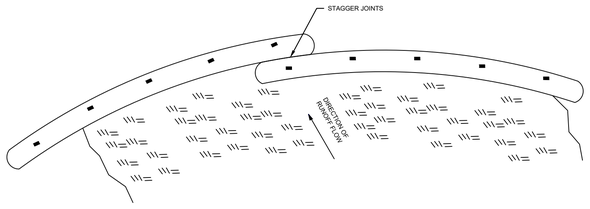
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
MACHINE SLICED SILT FENCE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-1

48_ERO1.DWG



NOTES:
1. STRAW WATTLE SHALL BE COMPACTED STRAW AND/OR ORGANIC FIBER MATERIAL.
2. STRAW OR FIBER SHALL BE WRAPPED IN UV STABILIZED DEGRADABLE TUBULAR POLYPROPYLENE PLASTIC NETTING.

1 **BIO-ROLL**
NO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

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11995 SINGLETREE LN, SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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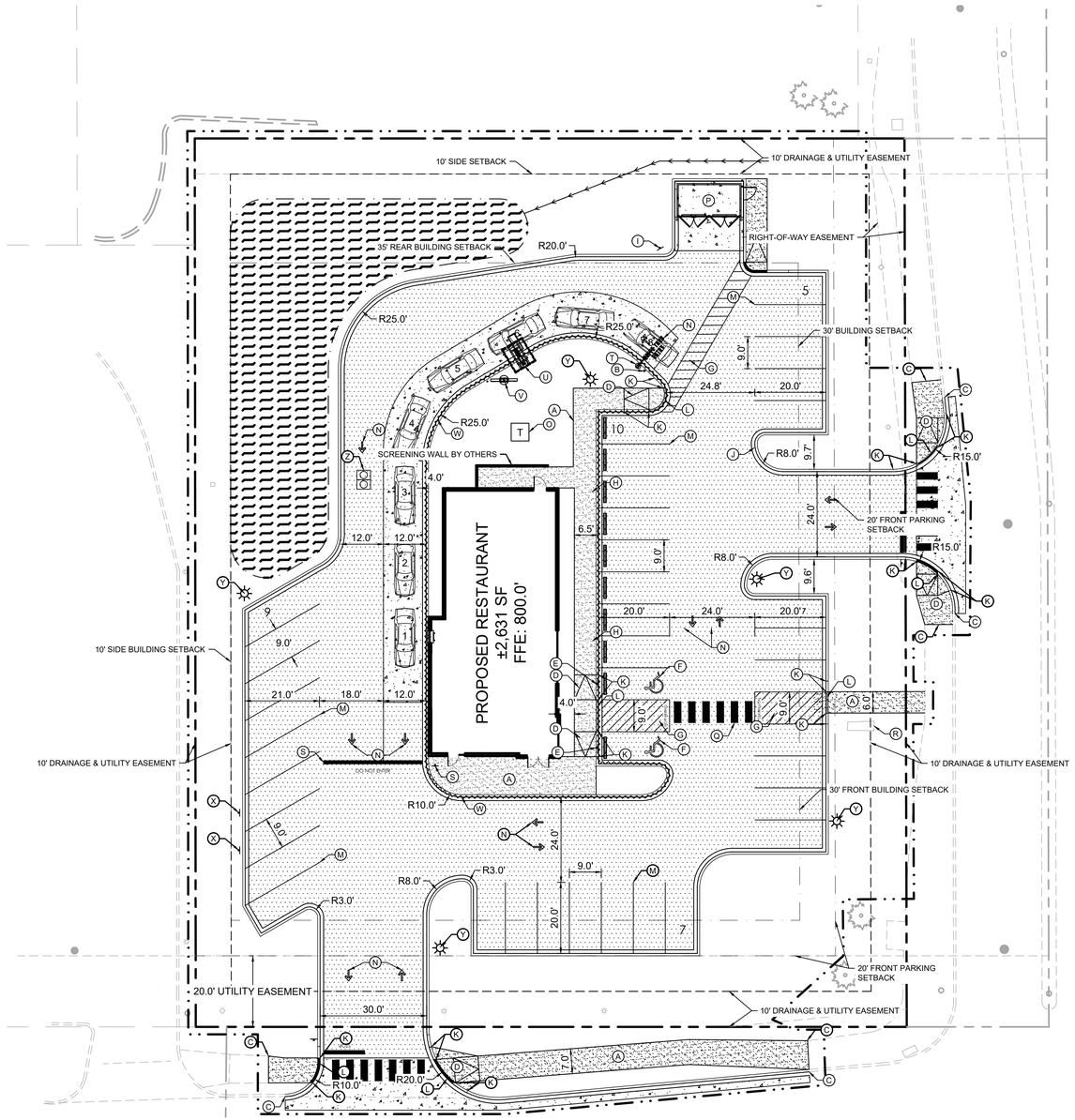
BRIAN M. WURDEMAN, P.E.
DATE: 01/28/2026 LIC. NO. 53113 MN

KHA PROJECT	161369000
DATE	01/28/2026
SCALE	AS SHOWN
DESIGNED BY	MTL
DRAWN BY	AKK
CHECKED BY	BMW

EROSION AND SEDIMENT CONTROL DETAILS

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C302



EAST POINT DOUGLAS RD S

SITE PLAN NOTES

1. REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF STOOPS, TRUCK DOCKS, TRASH ENCLOSURES & PRECISE BUILDING DIMENSIONS. REFER TO THE SITE ELECTRICAL PLAN FOR LOCATIONS OF PROPOSED LIGHT POLES, CONDUITS, AND ELECTRICAL EQUIPMENT.
2. REFER TO CERTIFIED SITE SURVEY OR PLAT FOR EXACT LOCATION OF EXISTING EASEMENTS, PROPERTY BOUNDARY DIMENSIONS, AND ADJACENT RIGHT-OF-WAY & PARCEL INFORMATION.
3. DIMENSIONS AND RADII ARE DRAWN TO THE FACE OF CURB, UNLESS OTHERWISE NOTED. DIMENSIONS ARE ROUNDED TO THE NEAREST TENTH FOOT, AND AREAS ARE ROUNDED TO THE NEAREST SQUARE FOOT.
4. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATING EXISTING SITE IMPROVEMENTS THAT CONFLICT WITH THE PROPOSED WORK, INCLUDING BUT NOT LIMITED TO TRAFFIC SIGNS, LIGHT POLES, ABOVEGROUND UTILITIES, ETC. PERFORM WORK IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS AND PROJECT SITE WORK SPECIFICATIONS. COST SHALL BE INCLUDED IN BASE BID.
5. TYPICAL PARKING STALL DIMENSIONS SHALL BE 9.0-FEET IN WIDTH AND 20-FEET IN LENGTH UNLESS OTHERWISE INDICATED.
6. MONUMENT SIGN(S) ARE DETAILED ON THE ARCHITECTURAL PLANS AND ARE SHOWN FOR GRAPHICAL & INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO VERIFY SIGN DIMENSIONS, LOCATION AND REQUIRED PERMITS WITH THE OWNER.

KEYNOTE LEGEND

A	CONCRETE SIDEWALK - SEE DETAIL
B	6" CONCRETE FILLED BOLLARD - SEE DETAIL
C	MATCH EXISTING EDGE OF PAVEMENT/ CURB & GUTTER
D	ACCESSIBLE CURB RAMP - SEE DETAIL
E	ACCESSIBLE PARKING SIGN, SIGN AND POST FURNISHED BY SIGN VENDOR. BOLLARD AND CONCRETE FOUNDATION PROVIDED BY GC
F	ACCESSIBLE PARKING SYMBOL - SEE DETAIL
G	AREA STRIPED WITH 4" SYSL @ 45° 2' O.C.
H	CONCRETE WHEEL STOP, SEE DETAIL
I	SITE DIRECTIONAL SIGN (SEE ARCH PLANS FOR DETAILS)
J	B612 CURB AND GUTTER (TYP.) - SEE DETAIL
K	TRANSITION CURB - SEE DETAIL
L	FLUSH CURB - SEE DETAIL
M	4" WIDE PAINTED SOLID LINE, TYP.
N	TRAFFIC FLOW PAVEMENT MARKINGS, TYP. (SEE DETAILS)
O	PROPOSED TRANSFORMER, CONCRETE PAD, & BOLLARDS (SEE MEP PLANS FOR DETAILS).
P	TRASH ENCLOSURE (SEE ARCH PLANS FOR DETAILS)
Q	ACCESSIBLE CROSSWALK - SEE DETAIL
R	EXISTING PYLON SIGN
S	'DO NOT ENTER' SIGN & STOP BAR - SEE DETAIL
T	CLEARANCE BAR (SEE ARCH PLANS FOR DETAILS)
U	ORDER POINT CANOPY W/ DIGITAL ORDER SCREEN & BOLLARD @ 7 CAR STACK -- INDICATES 140' FROM CENTER POINT OF DRIVE THRU WINDOW TO ORDER POINT FOOTING & CONDUIT W/ BOLLARD
V	5 PANEL MENU BOARD, FOOTING & CONDUIT
W	OUTFALL B612 CURB AND GUTTER (TYP.) - SEE DETAIL
X	DRIVE THRU PULL FORWARD PARKING SIGNS - REFER TO ARCH PLANS
Y	PROPOSED LIGHT POLE - REFER TO ARCH PLANS
Z	GREASE INTERCEPTOR - REFER TO MEP PLANS

LEGEND

- PROPERTY LINE
- SETBACK LINE
- DRAINAGE AND UTILITY EASEMENT
- PROPOSED CURB AND GUTTER
- PROPOSED OUTFALL CURB AND GUTTER
- STANDARD DUTY ASPHALT PAVMENT — SEE DETAILS FOR SECTION
- HEAVY DUTY CONCRETE PAVEMENT — SEE DETAILS FOR SECTION
- STANDARD DUTY CONCRETE PAVEMENT / SIDEWALK — SEE DETAILS FOR SECTION
- STORM WATER AREA — SEE GRADING PLAN FOR DETAILS

PROPERTY SUMMARY

TOTAL PROPERTY AREA	1.15 AC / 50,094 SF
DISTURBED AREA	1.25 AC / 54,269 SF
EXISTING IMPERVIOUS AREA	0.79 AC / 33,483 SF / 67.00%
EXISTING PERVIOUS AREA	0.36 AC / 16,493 SF / 33.00%
PROPOSED IMPERVIOUS AREA	0.63 AC / 27,476 SF / 54.85%
PROPOSED PERVIOUS AREA/GREEN SPACE	0.52 AC / 22,468 SF / 45.15%
NET DECREASE IN IMPERVIOUS AREA	0.14 AC / 6,007 SF

SITE DATA

EXISTING ZONING	MU - MIXED USE
PROPOSED ZONING	MU - MIXED USE
PROPOSED LAND USE	RESTAURANT
PARKING SETBACKS	FRONT= 20' SIDE = NOT PERMITTED REAR = 35'
BUILDING SETBACKS	FRONT = 30' SIDE = 10' (30' ADJACENT TO STREET) REAR = 35'

BUILDING DATA

TOTAL BUILDING AREA	2,631 SF
PERCENT OF TOTAL PROPERTY AREA	5.19%
MAXIMUM BUILDING HEIGHT	40 FT
MAXIMUM COVERAGE	70%

PARKING SUMMARY

REQUIRED PARKING	20 SPACES @ 1 PER EACH 3 SEATS (60 TOTAL) + EACH EMPLOYEE (8 TOTAL)
REQUIRED VEHICLE STACKING	6 SPACE
TOTAL PROPOSED PARKING	38 SPACES
REQUIRED ACCESSIBLE PARKING	2 STANDARD SPACES 1 VAN ACCESSIBLE
PROPOSED ACCESSIBLE PARKING	2 STANDARD SPACES 1 VAN ACCESSIBLE

GRAPHIC SCALE IN FEET
0 10 20 40

Know what's **below.** **Call** before you dig.

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No.	REVISIONS	DATE	BY

Kimley»Horn
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BRIAN M. WURDEMAN, P.E. | MN | LIC. NO. 53113 | DATE: 01/26/2026

KHA PROJECT	161369000		
DATE	01/26/2026		
SCALE	AS SHOWN	DESIGNED BY	MTL
		DRAWN BY	AKK
		CHECKED BY	BMW

SITE DIMENSION PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
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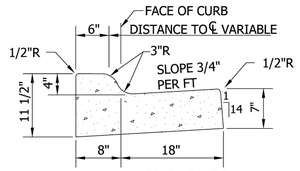

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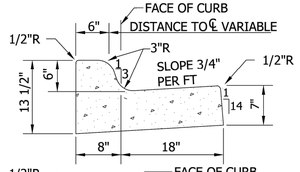

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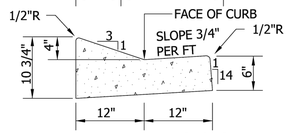
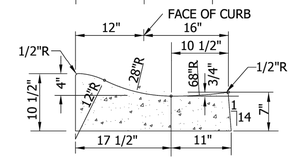


SURMOUNTABLE D-412 MOD



SURMOUNTABLE D-428 MOD

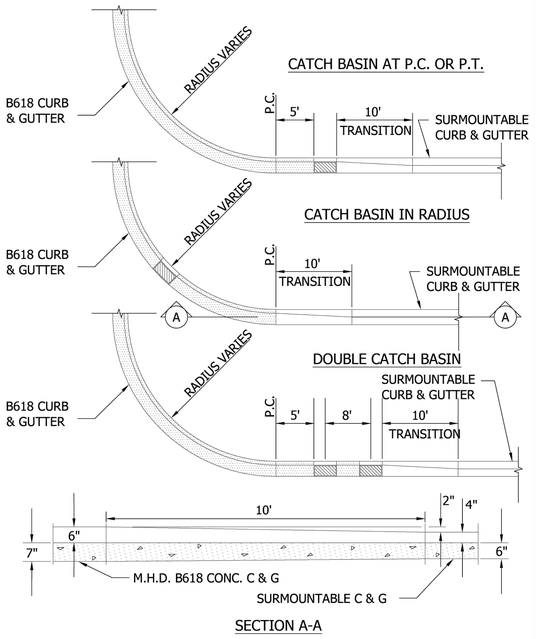
Cottage Grove
Where Pride and Prosperity Meet

STANDARD DETAILS
CURB AND GUTTER
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO.
STR-10

48_STR10.DWG



SECTION A-A

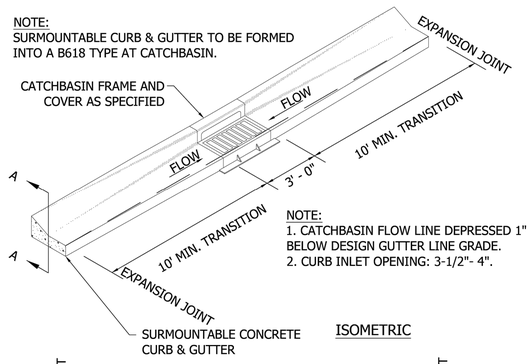
Cottage Grove
Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE CURB AND GUTTER TRANSITION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

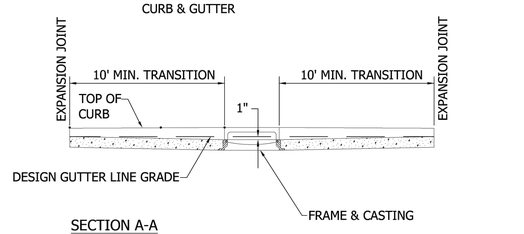
PLATE NO.
STR-12

48_STR12.DWG



ISOMETRIC

NOTE:
1. CATCHBASIN FLOW LINE DEPRESSED 1" BELOW DESIGN GUTTER LINE GRADE.
2. CURB INLET OPENING: 3-1/2"- 4".



SECTION A-A

Cottage Grove
Where Pride and Prosperity Meet

STANDARD DETAILS
SURMOUNTABLE CURB AND GUTTER CONSTRUCTION AT CATCHBASIN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

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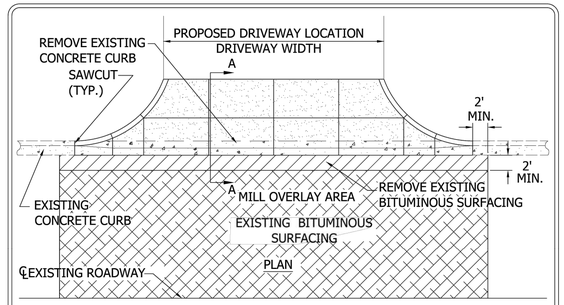
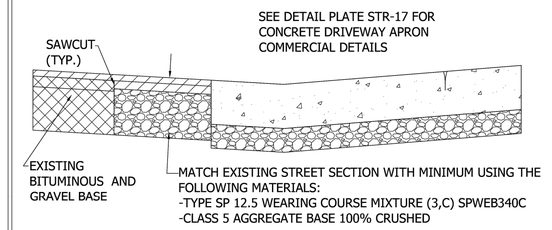
48_STR13.DWG





SECTION A-A

NOTES:
1. CITY RIGHT-OF-WAY PERMIT IS REQUIRED PRIOR TO CONSTRUCTION.
2. FOR MATERIAL SPECIFICATION, REFER TO RIGHT-OF-WAY PERMIT.

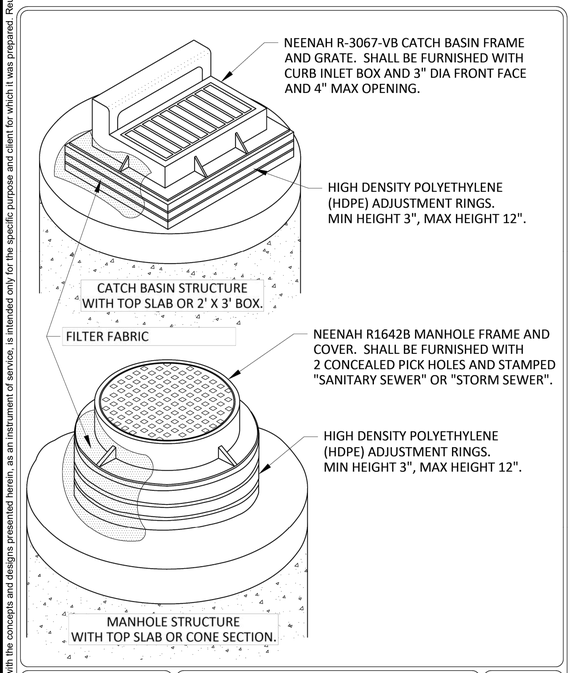
Cottage Grove
Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE COMMERCIAL DRIVEWAY APRON OR CURB AND GUTTER CONNECT TO EXISTING STREET
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO.
STR-21

48_STR21.DWG



Cottage Grove
Where Pride and Prosperity Meet

STANDARD DETAILS
CATCHBASIN AND MANHOLE ADJUSTMENT
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO.
STR-23

48_STR23.DWG

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SCALE	AS SHOWN
DESIGNED BY	ARF
DRAWN BY	AKK
CHECKED BY	MTL

SITE DETAILS

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C401

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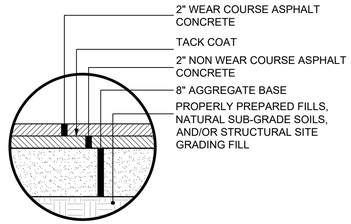
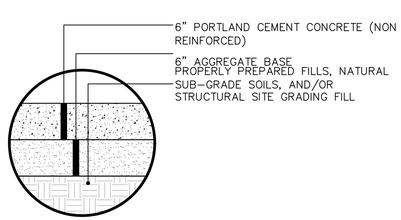
PAVEMENT SECTIONS SHOWN ARE PROVIDED AS A REFERENCE ONLY. REFER TO GEOTECHNICAL REPORT FOR ALL PAVEMENT, SUBGRADE PREPARATION AND COMPACTION REQUIREMENTS.



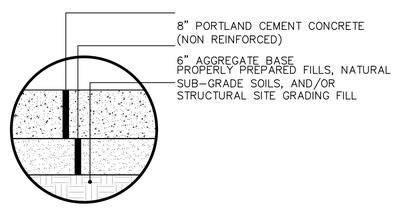
1 STANDARD DUTY ASPHALT PAVMENT SECTION

NO SCALE



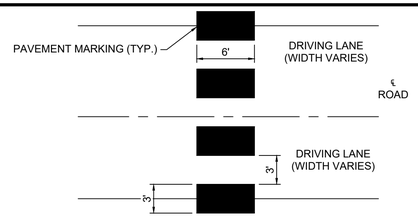
2 STANDARD DUTY CONCRETE PAVMENT SECTION

NO SCALE



3 HEAVY DUTY CONCRETE PAVMENT SECTION

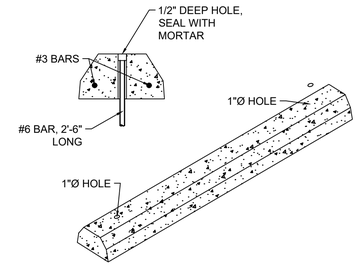
3



NOTE:
1. TAPED AREAS TO BE CENTERED AND ALIGNED ON CENTER LINE AND LANE LINES. MAKE ADJUSTMENTS IN CENTER MEDIAN AREA.
2. ZEBRA CROSSWALKS SHALL BE WHITE POLYMER-PREFORMED TAPE OR AN ACCEPTABLE EQUALIVANT APPROVED BY THE ENGINEER.
3. A MINIMUM OF 1.5 FT. CLEAR DISTANCE MUST BE LEFT ADJACENT TO CURB. IF LAST STRIPED AREA FALLS INTO THIS DISTANCE, IT MUST BE OMITTED.
4. REMOVE ALL CONFLICTING PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.
5. AT SKEWED CROSSWALKS, THE TAPED AREAS ARE TO REMAIN PARALLEL TO THE LANE LINES.
6. WHERE PAVEMENT MARKINGS CAN NOT BE INLAYED INTO THE HOT MAT, PAVEMENT SHALL BE GROOVED FOR THE INSTALLATION OF THE POLYMER-PREFORMED MARKINGS. SEE Mn/DOT STANDARD SPECIFICATION 2564.

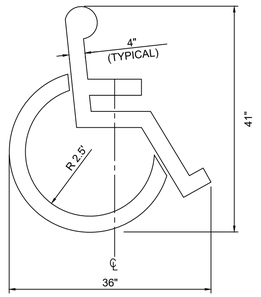
4 CROSSWALK STRIPING

NTS



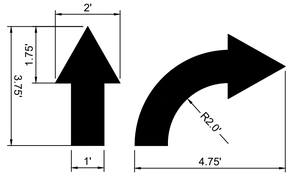
5 PRECAST WHEEL STOP

NTS



6 ACCESSIBLE PARKING SYMBOL

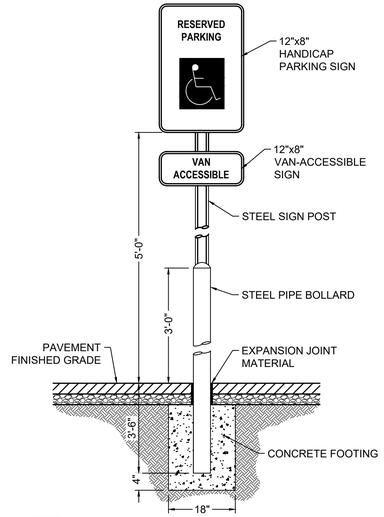
NO SCALE



NOTE: ALL TRAFFIC FLOW ARROWS TO BE SOLID WHITE REFLECTIVE TRAFFIC PAINT AS PER DIMENSIONS ABOVE

7 TRAFFIC ARROW

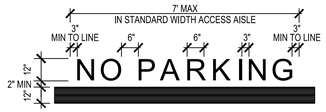
NO SCALE



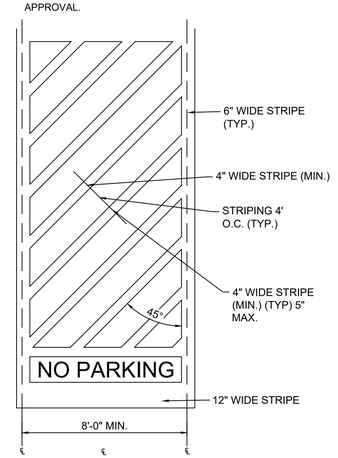
NOTES:
1. SIGNS SHALL BE 18 GAUGE STEEL, WITH BAKED ENAMEL WHITE LETTERS AND BORDER ON BLUE BACKGROUND, WHERE APPLICABLE.
2. POST SHALL BE 3"x3" 11-GAUGE GALVANIZED SQUARE STEEL
3. BOLLARD SHALL BE 6"Ø SCH-40 STEEL PIPE FILLED WITH CONCRETE & PAINTED YELLOW
4. SIGNS SHALL COMPLY WITH LOCAL MUTCD REQUIREMENTS

8 ACCESSIBLE PARKING SIGN IN BOLLARD

NO SCALE



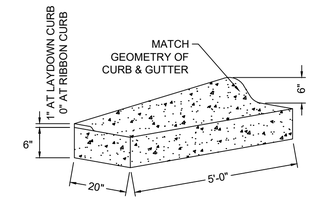
NOTE:
1. LETTERING SHALL BE 12" HIGH, 6" WIDE, 2" THICK, SPACED 3" APART, OR AS APPROVED BY OWNER.
2. NOTIFY ENGINEER OF STENCIL BEING USED AND SUBMIT LAYOUT FOR APPROVAL.



NOTE: IS DIMENSION SHOWN ON SITE PLAN

9 ACCESS AISLE STRIPING LAYOUT

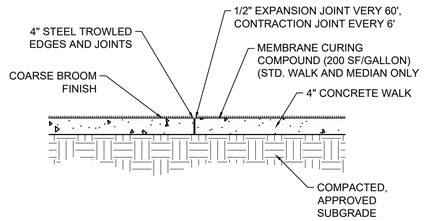
NO SCALE



NOTES:
1. REFER TO CONCRETE CURB & GUTTER DETAIL FOR SPECIFICATIONS AND AGGREGATE BASE COURSE DIMENSIONS

10 CONCRETE CURB TAPER

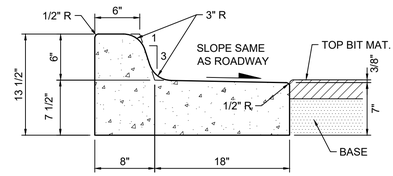
NO SCALE



NOTES:
1. ALL EXCAVATION, COMPACTION AND BACKFILL INCIDENTAL TO UNIT PRICE BID FOR 4" SIDEWALK

11 CONCRETE SIDEWALK

NO SCALE



12 B618 CURB & GUTTER (OUTFALL)

NO SCALE

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No.	REVISIONS	DATE	BY

Kimley»Horn
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11995 SINGLETREE LN, SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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BRIAN M. WURDEMAN, P.E.
MN
LIC. NO. 53113
DATE: 01/28/2026

KHA PROJECT	
161369000	
DATE	
01/28/2026	
SCALE	AS SHOWN
DESIGNED BY	MTL
DRAWN BY	AKK
CHECKED BY	BMW

SITE DETAILS

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C402

K:\TCW_LDEV\ca commercial\cottage grove, mn\3 Design\CAD\plansheets\C5-GRADING PLAN.dwg February 17, 2026 - 2:27pm
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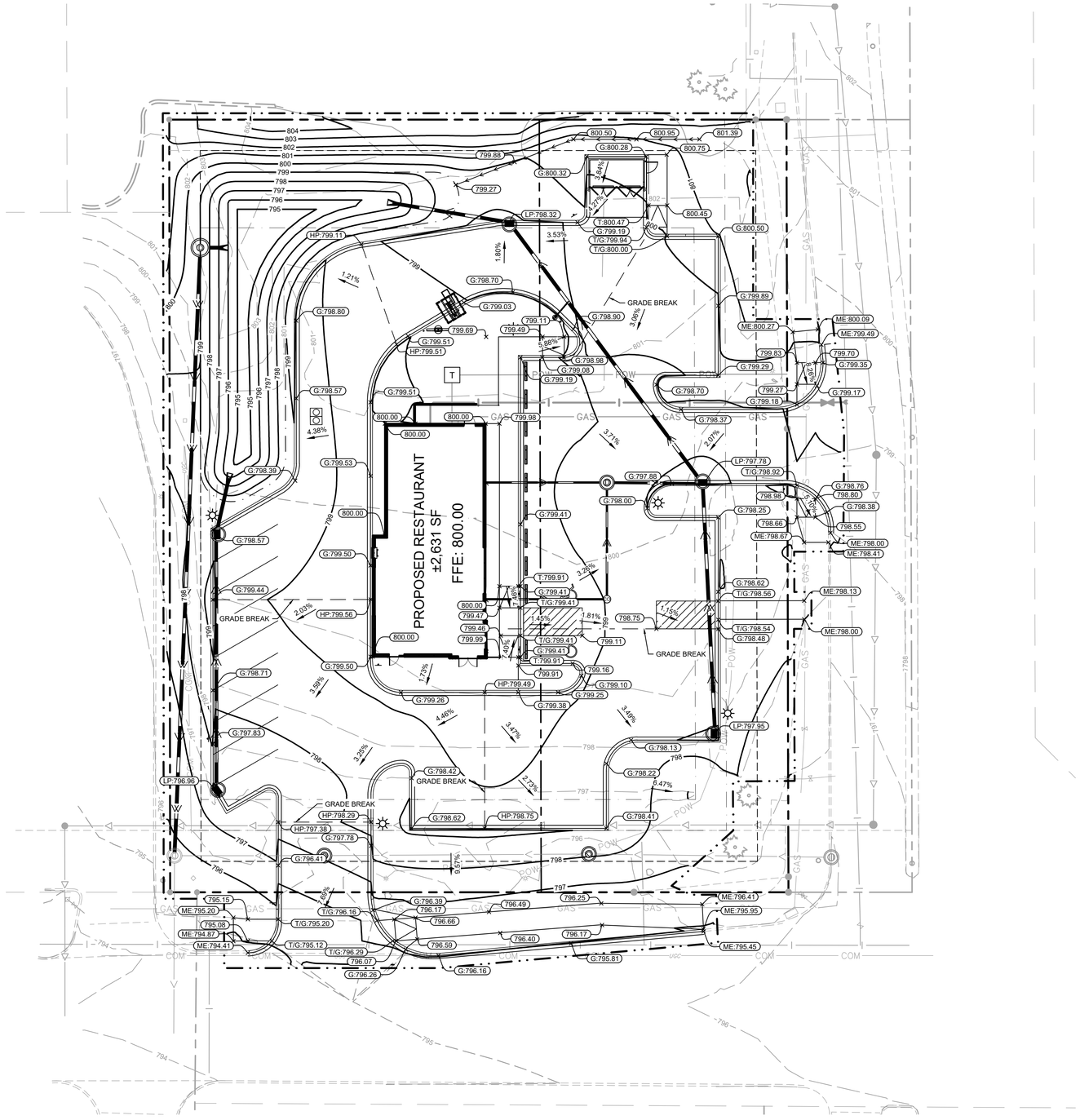

LEGEND

	PROPERTY LINE
928	EXISTING CONTOUR
925	PROPOSED CONTOUR
	PROPOSED RIDGE LINE
	PROPOSED SWALE
100.00	PROPOSED SPOT ELEVATION
HP:0.0	PROPOSED HIGH POINT ELEVATION
LP:0.0	PROPOSED LOW POINT ELEVATION
G:0.00	PROPOSED GUTTER ELEVATION
T:0.00	PROPOSED TOP OF CURB ELEVATION
T/G:0.0	PROPOSED FLUSH PAVEMENT ELEVATION
ME:0.0	MATCH EXISTING ELEVATION
EOF:0.0	PROPOSED EMERGENCY OVERFLOW ELEVATION
TW:0.0 BW:0.0	PROPOSED GRADE AT TOP/BOTTOM OF WALL
0.0%	PROPOSED DRAINAGE DIRECTION
0.00%	PROPOSED GRADE BETWEEN POINTS

GRADING PLAN NOTES

1. PERFORM GRADING WORK IN ACCORDANCE WITH APPLICABLE CITY SPECIFICATIONS AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
4. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
5. IN PAVED AREAS, ROUGH GRADE TO SUBGRADE ELEVATION AND LEAVE THE SITE READY FOR SUB-BASE.
6. SUBGRADE EXCAVATION SHALL BE BACKFILLED IMMEDIATELY AFTER EXCAVATION TO HELP OFFSET ANY STABILITY PROBLEMS DUE TO WATER SEEPAGE OR STEEP SLOPES. WHEN PLACING NEW SURFACE MATERIAL ADJACENT TO EXISTING PAVEMENT, THE EXCAVATION SHALL BE BACKFILLED PROMPTLY TO AVOID UNDERMINING OF EXISTING PAVEMENT.
7. ELEVATIONS SHOWN REPRESENT FINISHED SURFACE GRADES. SPOT ELEVATIONS ALONG CURB & GUTTER REPRESENT THE FLOW LINE UNLESS OTHERWISE NOTED
8. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
9. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF PAVEMENTS AND CURB AND GUTTER WITH SMOOTH UNIFORM SLOPES THAT PROVIDE POSITIVE DRAINAGE TO COLLECTION POINTS. MAINTAIN A MINIMUM SLOPE OF 1.25% IN ASPHALT PAVEMENT AREAS AND A MINIMUM SLOPE OF 0.50% IN CONCRETE PAVEMENT AREAS.
10. MAINTAIN A MINIMUM SLOPE OF 0.50% ALONG CURB & GUTTER. REVIEW PAVEMENT GRADIENT AND CONSTRUCT "INFALL" CURB WHERE PAVEMENT DRAINS TOWARD THE GUTTER, AND "OUTFALL" CURB WHERE PAVEMENT DRAINS AWAY FROM THE GUTTER.
11. INSTALL A MINIMUM OF 4-INCHES OF AGGREGATE BASE MATERIAL UNDER PROPOSED CONCRETE CURB & GUTTER, SIDEWALKS, AND TRAILS UNLESS OTHERWISE DETAILED.
12. GRADING FOR SIDEWALKS AND ACCESSIBLE ROUTES, INCLUDING CROSSING DRIVEWAYS, SHALL CONFORM TO CURRENT STATE & NATIONAL ADA STANDARDS:

    ACCESSIBLE RAMP SLOPES SHALL NOT EXCEED 8.3% (1:12).
    SIDEWALK CROSS-SLOPES SHALL NOT EXCEED 2.0%.
    LONGITUDINAL SIDEWALK SLOPES SHALL NOT EXCEED 5.0%.
    ACCESSIBLE PARKING STALLS AND ACCESS AISLES SHALL NOT EXCEED 2.0% IN ANY DIRECTION. A MAXIMUM SLOPE OF 1.50% IS PREFERRED.

    SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVEMENT INSTALLATION. CHANGE ORDERS WILL NOT BE ACCEPTED FOR ADA COMPLIANCE ISSUES.
13. UPON COMPLETION OF LAND DISTURBING ACTIVITIES, RESTORE ADJACENT OFFSITE AREAS DISTURBED BY CONSTRUCTION TO MATCH OR EXCEED THE ORIGINAL CONDITION. LANDSCAPE AREAS SHALL BE RE-VEGETATED WITH A MINIMUM OF 4-INCHES OF TOPSOIL.
14. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

811 Know what's **below.** **Call** before you dig.

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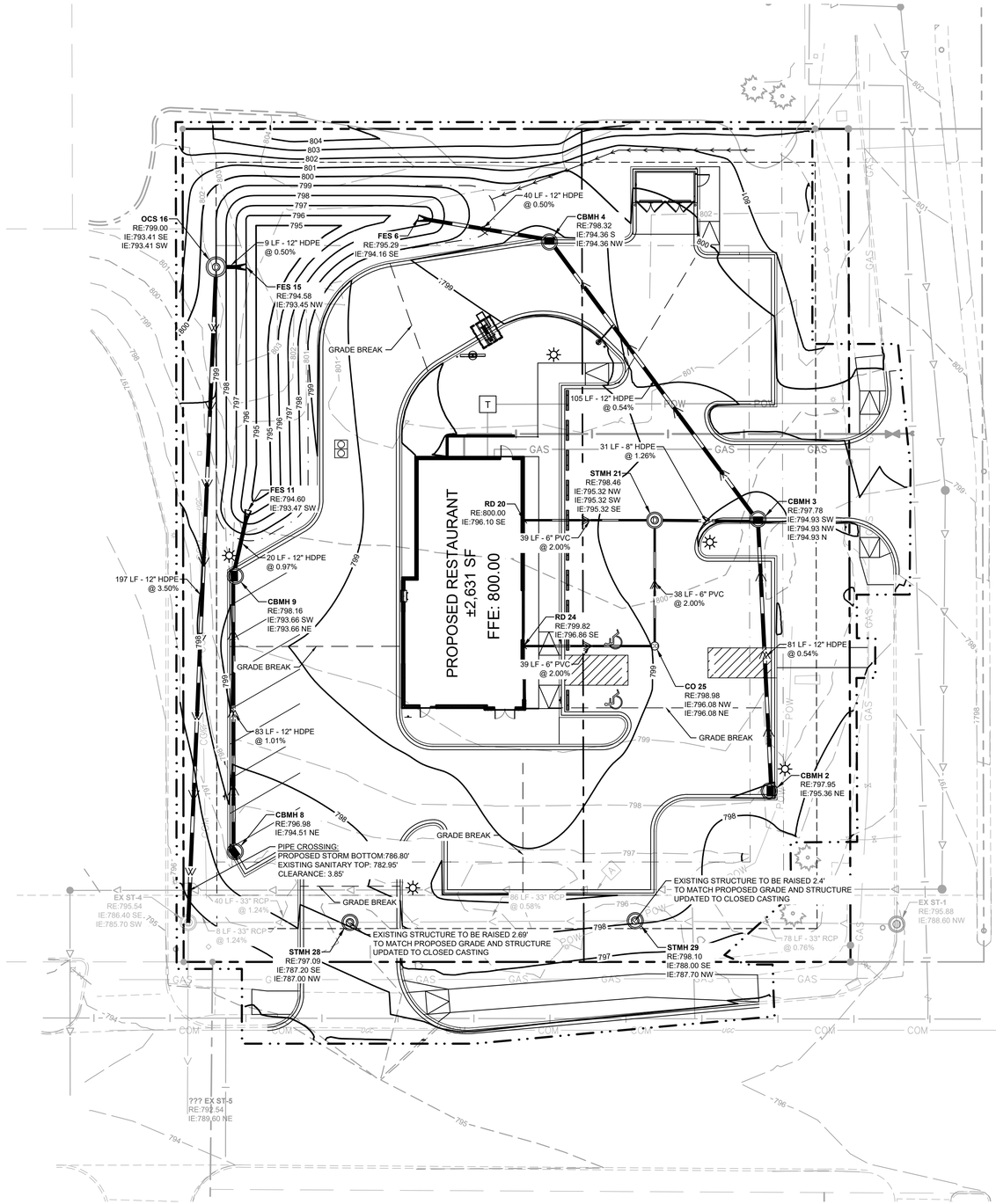
DATE: 01/26/2026 | MN LIC. NO. 53113

KHA PROJECT	161369000
DATE	01/26/2026
SCALE	AS SHOWN
DESIGNED BY	MTL
DRAWN BY	AKK
CHECKED BY	BMW

GRADING PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE | MN

SHEET NUMBER
C500



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED RIDGE LINE
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED STORM MANHOLE/ CATCH BASIN (CURB INLET CASTING)
- PROPOSED STORM SEWER CLENOUT
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER

FILTRATION BMP NOTES

1. TO THE EXTENT PRACTICABLE, LIMIT USE OF HEAVY CONSTRUCTION EQUIPMENT WITHIN THE BOUNDARIES OF THE PROPOSED INFILTRATION BMP. UTILIZE AN EXCAVATOR WITH A TOOTHED BUCKET TO AVOID COMPACTING OR SMEARING OF SOILS.
2. AFTER INITIAL EXCAVATION AND ROUGH GRADING, PROVIDE A MINIMUM OF TWO (2) DOUBLE RING INFILTROMETER TESTS WITHIN THE INFILTRATION AREA AT THE ELEVATION OF THE BASIN BOTTOM. PROVIDE THE RESULTS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO COMPLETING INSTALLATION OF THE BASIN OR UNDERGROUND SYSTEM.
3. IF CLAY SOILS ARE ENCOUNTERED, OVER-EXCAVATE AS NECESSARY TO REACH NATIVE SANDY/SILTY SOIL. BACKFILL THE ADDITIONAL EXCAVATION WITH SUITABLE ENGINEERED FILL MATERIAL.
4. IF NATIVE SUBGRADE SOILS AT THE BOTTOM OF THE PROPOSED INFILTRATION AREA ARE DETERMINED TO NOT BE CONDUCIVE TO THE DESIGN INFILTRATION REQUIREMENTS, REMOVE AND REPLACE THE POORLY INFILTRATION SOILS TO A DEPTH WHERE THE EXISTING NATIVE SUBGRADE SOILS MEET OR EXCEED THE DESIGN INFILTRATION REQUIREMENTS AS REVIEWED BY THE ENGINEER.
5. FINAL EXCAVATION OF THE INFILTRATION AREA AND INSTALLATION OF ANY ENGINEERED SOIL MUST OCCUR IN DRY CONDITIONS TO PREVENT SMEARING AND COMPACTION.
6. REMOVE ANY EXCESS SOILS THAT ENTER THE INFILTRATION BASIN PRIOR TO FINAL STABILIZATION.
7. UPON COMPLETION OF THE INFILTRATION/FILTRATION SYSTEM INSTALLATION AND FINAL STABILIZATION OF THE TRIBUTARY AREA, PROVIDE DOCUMENTATION THAT THE BMP DRAINS DOWN WITHIN 48 HOURS.

STORM SEWER NOTES

1. INSTALL STORM SEWER IN ACCORDANCE WITH APPLICABLE CITY OR STATE SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. STORM SEWER PIPE SHALL BE AS FOLLOWS:
   RCP: ASTM C-76
   HDPE: ASTM F-714, F-894
   PVC: ASTM D-2729
   PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE AS FOLLOWS:
   PE: ASTM F-6667
   PVC: ASTM D-2729
   FITTINGS SHALL BE AS FOLLOWS:
   RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
   HDPE: ASTM D-3212
   PVC: ASTM D-2729, JOINTS PER ASTM D-3212
   PVC SCH40: ASTM D-2665, F-794, F-1866
4. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
5. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
6. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
7. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
8. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
9. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
10. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
11. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
12. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.

NORTH

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DATE: 01/26/2026 LIC. NO. 53113 MN

KHA PROJECT	161369000
DATE	01/26/2026
SCALE	AS SHOWN
DESIGNED BY	ARF
DRAWN BY	AKK
CHECKED BY	MTL

STORM SEWER PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C501

K:\TCW_LDEV\ca commercial\cottage grove, mn\3 Design\CAD\plansheets\C5-STORM PLAN.dwg February 17, 2026 - 2:21pm
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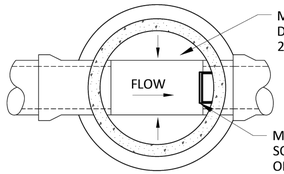
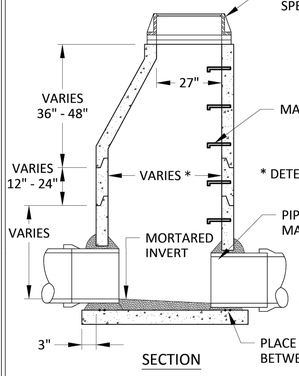


MORTAR BOTTOM OF MANHOLE TO 1/2 DIAMETER AT PIPE AND SLOPE MORTAR 2" TOWARD INVERT.

MANHOLE STEPS SHALL BE PLACED SO THAT OFFSET VERTICAL PORTION OF CONE IS FACING DOWNSTREAM.

PLAN



CASTING AND ADJUSTMENT RINGS AS SPECIFIED. PER DETAIL PLATE STR-23.

MANHOLE STEPS 16" MAX ON CENTER.

* DETERMINED BY PIPE SIZE

PIPE SHALL BE CUT TO BE 2"-4" INSIDE MANHOLE WALL.

DOGHOUSES SHALL BE MORTARED BOTH INSIDE AND OUTSIDE OF MANHOLE. WATERSTOP GASKET REQUIRED FOR POLYPROPYLENE PIPE.

PLACE 2 BEADS OF RAMNEK OR EQUAL, BETWEEN BOTTOM SLAB AND BARREL SECTION

SECTION

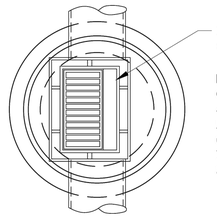
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STORM SEWER MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-1

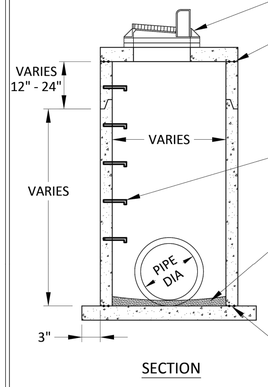
48_STO1.DWG



24"X36" SLAB OPENING FOR CASTING SPECIFIED

DIMENSION FROM BACK OF CURB TO CENTER OF PIPE:
4' DIA. MH - 9" IN FROM BACK OF CURB
5' DIA. MH - 3" IN FROM BACK OF CURB
6' DIA. MH - 3" BEHIND BACK OF CURB
7' DIA. MH - 9" BEHIND BACK OF CURB
8' DIA. MH - 15" BEHIND BACK OF CURB

PLAN



CASTING AND ADJUSTMENT RINGS AS SPECIFIED. PER DETAIL PLATE STR-23.

TOP OF BARREL SECTION BELOW TOP SLAB TO HAVE FLAT TOP EDGE SEALED WITH 2 BEADS OF RAMNEK OR EQUAL.

MANHOLE STEPS 16" MAX ON CENTER.

MORTAR BOTTOM
DOGHOUSES SHALL BE MORTARED BOTH INSIDE AND OUTSIDE OF MANHOLE. WATERSTOP GASKET REQUIRED FOR POLYPROPYLENE PIPE.

PLACE 2 BEADS OF RAMNEK OR EQUAL BETWEEN BOTTOM SLAB AND BARREL SECTION.

SECTION

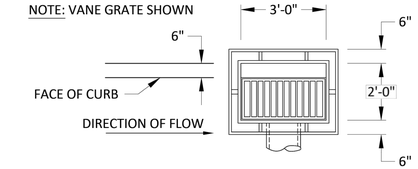
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CATCH BASIN MANHOLE
COTTAGE GROVE, MINNESOTA

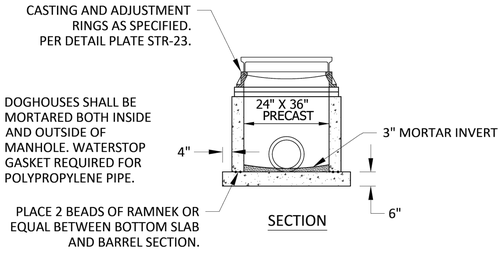
JANUARY 2025

PLATE NO. STO-5

48_STO5.DWG



PLAN



DOGHOUSES SHALL BE MORTARED BOTH INSIDE AND OUTSIDE OF MANHOLE. WATERSTOP GASKET REQUIRED FOR POLYPROPYLENE PIPE.

PLACE 2 BEADS OF RAMNEK OR EQUAL BETWEEN BOTTOM SLAB AND BARREL SECTION.

SECTION

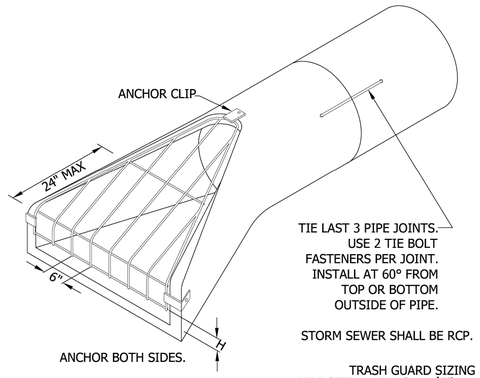
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CATCH BASIN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-7

48_STO7.DWG



ANCHOR BOTH SIDES.

ISOMETRIC

TIE LAST 3 PIPE JOINTS. USE 2 TIE BOLT FASTENERS PER JOINT. INSTALL AT 60° FROM TOP OR BOTTOM OUTSIDE OF PIPE.

STORM SEWER SHALL BE RCP.

TRASH GUARD SIZING

PIPE SIZE	BARS	'H'	BOLTS
12"-18"	3/4"Ø	3"-4"	5/8"
21"-42"	1"Ø	4"-6"	3/4"
48"-72"	1 1/4"Ø	6"-8"	1"

SEE CITY PLATE NO. STO-12 AND STO-13 FOR RIPRAP PLACEMENT.

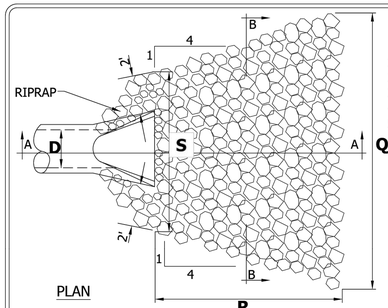
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
FLARED END SECTION AND TRASH GAURD
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-11

48_STO11.DWG



PLAN

(15' MIN.)

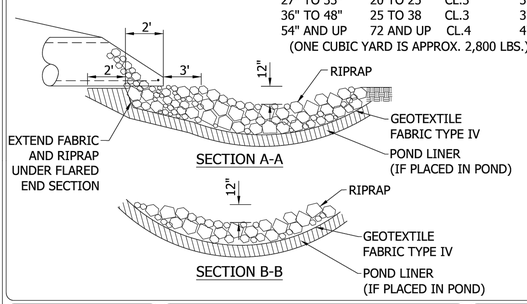
RIPRAP AREA SIZES

D	Q	R	S
12"	11'	15'	7'
24"	15'	15'	9'
36"	19'	15'	11'
48"	20'	16'	12'
54"	25'	22'	13'

RIPRAP REQUIREMENTS

D	CY	CLASS	DEPTH
12" TO 24"	15 TO 20	CL.3	3'
27" TO 33"	20 TO 25	CL.3	3'
36" TO 48"	25 TO 38	CL.3	3'
54" AND UP	72 AND UP	CL.4	4'

(ONE CUBIC YARD IS APPROX. 2,800 LBS.)



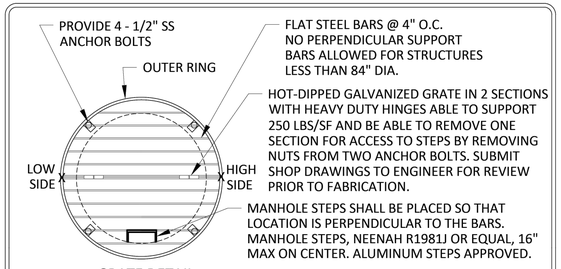
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
RIPRAP AT FLARED END SECTION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-12

48_STO12.DWG



FLAT STEEL BARS @ 4" O.C.
NO PERPENDICULAR SUPPORT BARS ALLOWED FOR STRUCTURES LESS THAN 84" DIA.

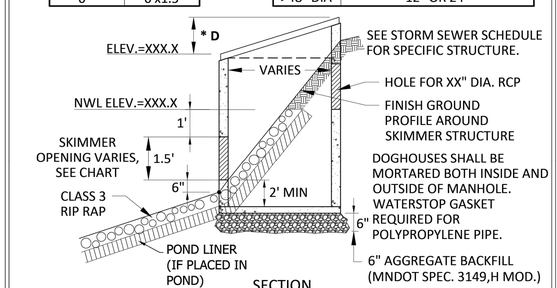
HOT-DIPPED GALVANIZED GRATE IN 2 SECTIONS WITH HEAVY DUTY HINGES ABLE TO SUPPORT 250 LBS/SF AND BE ABLE TO REMOVE ONE SECTION FOR ACCESS TO STEPS BY REMOVING NUTS FROM TWO ANCHOR BOLTS. SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.

MANHOLE STEPS SHALL BE PLACED SO THAT LOCATION IS PERPENDICULAR TO THE BARS. MANHOLE STEPS, NEENAH R1981J OR EQUAL, 16" MAX ON CENTER. ALUMINUM STEPS APPROVED.

GRATE DETAIL

MANHOLE DIAMETER	SKIMMER OPENING
4'	3'x1.5'
5'	4.5'x1.5'
6'	6'x1.5'

DIAMETER	* D (TOP OF STRUCTURE SLOPE)
48" DIA	9" OR 18"
>48" DIA	12" OR 24"



SEE STORM SEWER SCHEDULE FOR SPECIFIC STRUCTURE.

HOLE FOR XX" DIA. RCP

FINISH GROUND PROFILE AROUND SKIMMER STRUCTURE

DOGHOUSES SHALL BE MORTARED BOTH INSIDE AND OUTSIDE OF MANHOLE. WATERSTOP GASKET REQUIRED FOR POLYPROPYLENE PIPE.

6" AGGREGATE BACKFILL (MNDOT SPEC. 3149,H MOD.)

SECTION

Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STANDARD SKIMMER STRUCTURE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-16

48_STO16.DWG

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11995 SINGLETREE LN. SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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BRIAN M. WURDEMAN, P.E. — MN LIC. NO. 53113 — DATE: 01/28/2026

KHA PROJECT 161369000
DATE 01/28/2026
SCALE AS SHOWN
DESIGNED BY MTL
DRAWN BY AKK
CHECKED BY BMW

GRADING DETAILS

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C502

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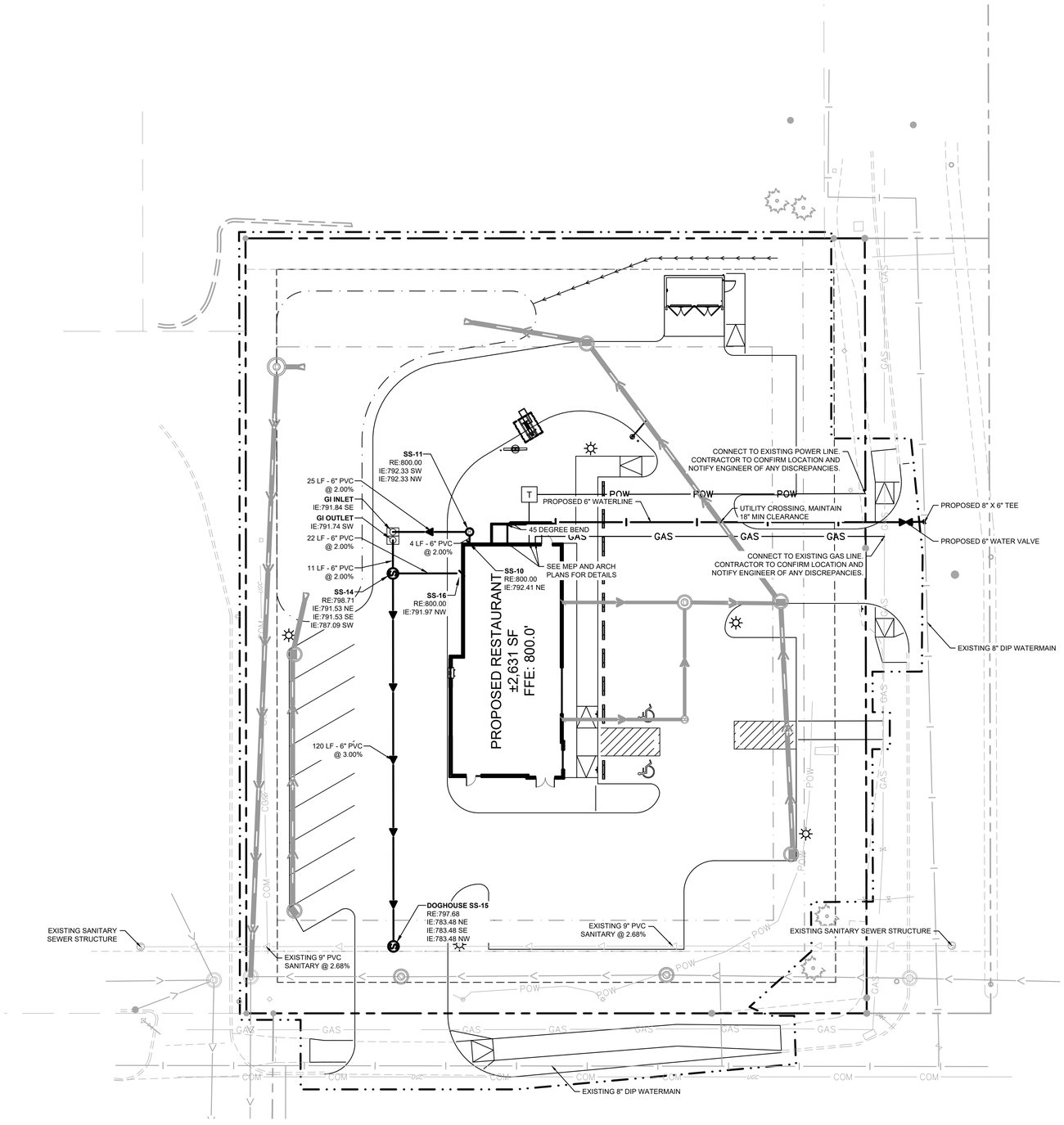

LEGEND

EXISTING	PROPOSED	
		GATE VALVE
		HYDRANT
		REDUCER
		TEE
		SANITARY SEWER MANHOLE
		SANITARY CLEANOUT
		WATERMAIN
		SANITARY SEWER
		STORM SEWER
POW	POW	UNDERGROUND ELECTRIC
COM	COM	TELEPHONE
GAS	GAS	GAS MAIN

UTILITY PLAN NOTES

1. INSTALL UTILITIES IN ACCORDANCE WITH APPLICABLE CITY SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
4. SANITARY SEWER PIPE SHALL BE:
   PVC: ASTM D-2729, D-3034
   PVC SCH 40: ASTM D-1785, F-714, F-894
   SANITARY SEWER FITTINGS SHALL BE:
   PVC: ASTM D-2729, D-3034
   PVC SCH40: ASTM D-2665, F-2794, F-1866
5. WATER MAIN PIPE SHALL BE:
   PVC: ASTM D-1785, D-2241, AWWA C-900
   DUCTILE IRON: AWWA C-150
   WATER MAIN FITTINGS SHALL BE:
   PVC: ASTM D-2464, D-2466, D-2467, F-1970, AWWA C-907
   DUCTILE IRON: AWWA C-153, C-110, ASME 316.4
5. STORM SEWER PIPE SHALL BE:
   RCP: ASTM C-76
   HDPE: ASTM F-714, F-894
   PVC: ASTM D-2729
   PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE:
   PE: ASTM F-6667
   PVC: ASTM D-2729
   STORM SEWER FITTINGS SHALL BE:
   RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
   HDPE: ASTM D-3212
   PVC: ASTM D-2729, JOINTS PER ASTM D-3212
   PVC SCH40: ASTM D-2665, F-794, F-1866
6. WHEN CONNECTING TO AN EXISTING UTILITY LINE, FIELD VERIFY THE LOCATION, DEPTH, AND SIZE OF THE EXISTING PIPE(S) PRIOR TO INSTALLATION OF THE NEW LINES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
7. PLACE AND COMPACT ALL FILL MATERIAL PRIOR TO INSTALLATION OF PROPOSED UNDERGROUND UTILITIES. MINIMUM TRENCH WIDTH SHALL BE 2 FEET.
8. MAINTAIN A MINIMUM OF 7'-6" COVER ON ALL WATER LINES.
9. FOR WATER LINES AND STUB-OUTS UTILIZE MECHANICAL JOINTS WITH RESTRAINTS SUCH AS THRUST BLOCKING, WITH STAINLESS STEEL OR COBALT BLUE BOLTS, OR AS INDICATED IN THE CITY SPECIFICATIONS AND PROJECT DOCUMENTS.
10. MAINTAIN 18-INCH MINIMUM VERTICAL SEPARATION WHERE SEWER PIPE CROSSES WATER LINES (OUTSIDE EDGE OF PIPE TO OUTSIDE EDGE OF PIPE OR STRUCTURE). PROVIDE 10-FOOT HORIZONTAL SEPARATION BETWEEN SEWER PIPE AND WATER LINES.
11. IN THE EVENT OF A VERTICAL CONFLICT BETWEEN WATER LINES, SANITARY LINES, STORM LINES AND GAS LINES (OR ANY OBSTRUCTION EXISTING AND PROPOSED), THE SANITARY PIPE MATERIAL SHALL BE PVC SCHEDULE 40 OR PVC C900 AND HAVE MECHANICAL JOINTS AT LEAST 10 FEET ON EITHER SIDE OF THE CENTER LINE OF THE CROSSING. THE WATER LINE SHALL HAVE MECHANICAL JOINTS WITH APPROPRIATE FASTENERS AS REQUIRED TO PROVIDE A MINIMUM OF 18-INCH VERTICAL SEPARATION MEETING REQUIREMENTS OF ANSI A21.10 OR ANSI 21.11 (AWWA C-151) (CLASS 50).
12. ALL PVC & HDPE SEWER AND WATER PIPE SHALL HAVE A TRACER WIRE INSTALLED IN THE TRENCH AND TERMINATED PER THE DETAILS.
13. UNDERGROUND UTILITY LINES SHALL BE INSTALLED, INSPECTED AND APPROVED PRIOR TO PLACING BACKFILL.
14. IN PAVEMENT AREAS, RAISE MANHOLE CASTINGS TO BE FLUSH WITH PROPOSED FINISHED SURFACE GRADE. IN GREEN AREAS, RAISE MANHOLE CASTINGS TO BE ONE FOOT ABOVE FINISHED GROUND ELEVATION & INSTALL A WATERTIGHT LID.
15. REFER TO PLUMBING PLANS FOR LOCATION, SIZE AND ELEVATION OF UTILITY SERVICE CONNECTIONS AND ROOF DRAINS TO THE INTERIOR BUILDING SYSTEMS. BACKFLOW DEVICES (DDCV AND PRZ ASSEMBLIES) & METERS ARE LOCATED INSIDE THE BUILDING.
16. CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
17. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES. COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
18. REFER TO THE SITE ELECTRICAL PLANS FOR SPECIFICATIONS OF THE PROPOSED SITE LIGHTING AND ELECTRICAL EQUIPMENT.
19. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
20. EXCESS MATERIAL, ABANDONED UTILITY ITEMS, AND OTHER UNUSABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
21. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
22. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
23. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
24. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
25. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.

Know what's **below.** **Call** before you dig.

GRAPHIC SCALE IN FEET
0 10 20 40

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No.	REVISIONS	DATE	BY

Kimley»Horn
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PHONE: 612-315-1272
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BRIAN M. WURDEMAN, P.E.
DATE: 01/26/2026 LIC. NO. 53113 MN

KHA PROJECT	161369000
DATE	01/26/2026
SCALE	AS SHOWN
DESIGNED BY	MTL
DRAWN BY	AKK
CHECKED BY	BMW

UTILITY PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
C600

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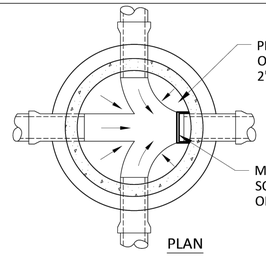

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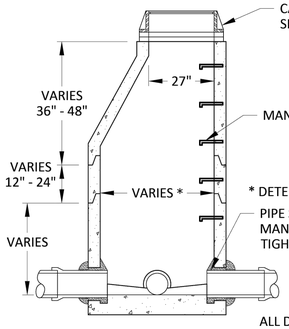

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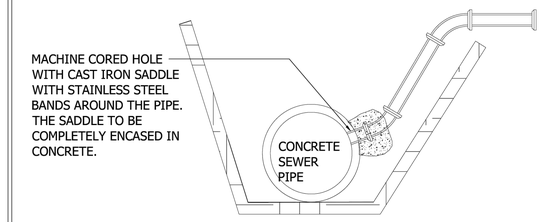
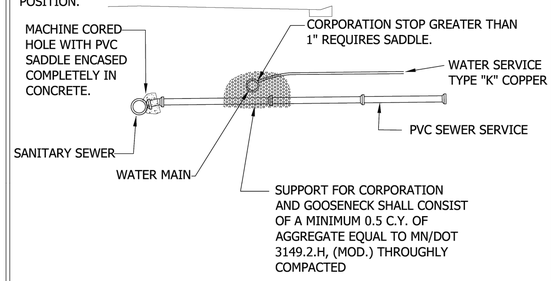
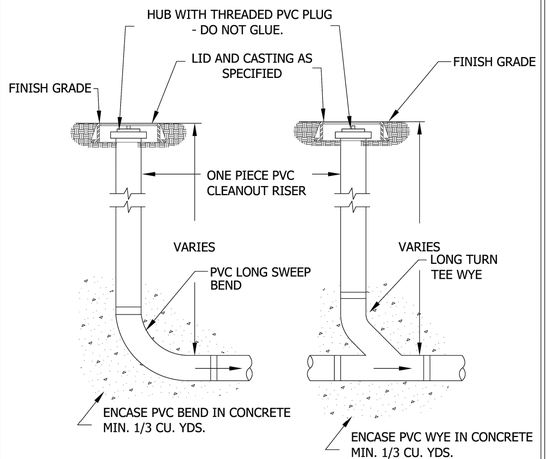


CONCRETE SANITARY OR STORM SEWER

NOTE: SERVICE CONNECTIONS TO BE AT 2 O'CLOCK OR 10 O'CLOCK POSITION.

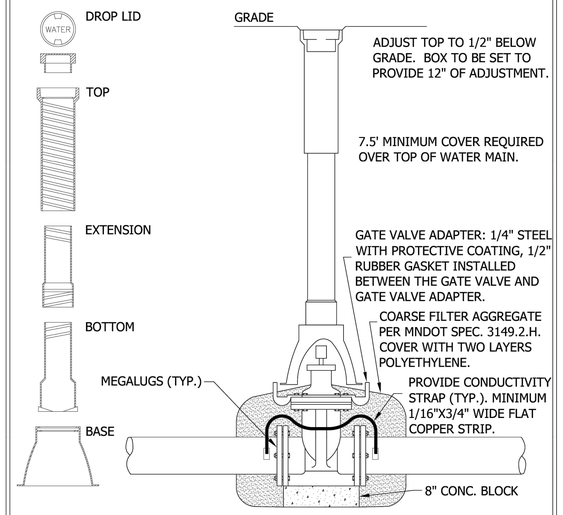


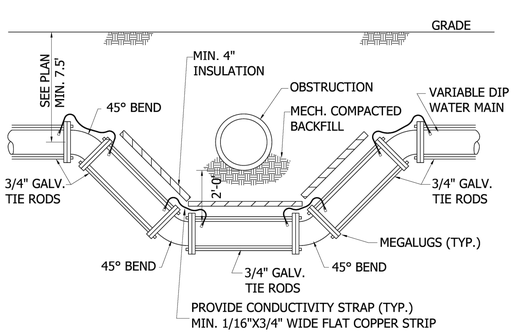
WATER AND PVC SANITARY SEWER



END OF LINE CLEANOUT

IN LINE CLEANOUT





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BRIAN M. WURDEMAN, P.E. — MN — LIC. NO. 53113 — DATE: 01/28/2026

KHA PROJECT	161369000
DATE	01/28/2026
SCALE	AS SHOWN
DESIGNED BY	MTL
DRAWN BY	AKK
CHECKED BY	BMW

UTILITY DETAILS

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE — MN

SHEET NUMBER
C601

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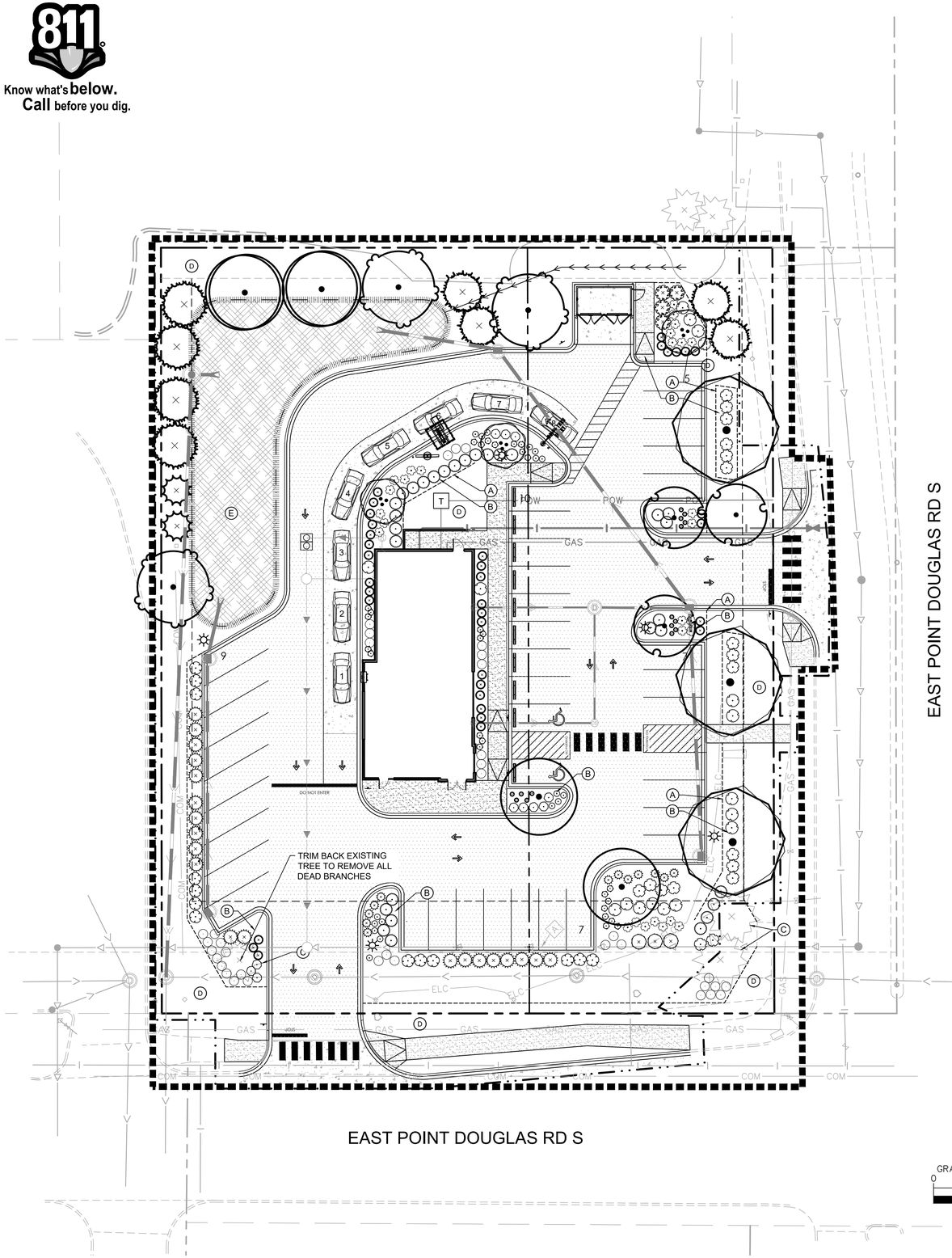

LANDSCAPE SUMMARY

ZONE: MU - MIXED USE

PARKING LOT REQUIREMENTS

LOT PERIMETER REQUIRED:	THE AREA WITHIN FIFTEEN FEET (15') OF A PARKING LOT PERIMETER SHALL BE LANDSCAPED WITH CLUSTERED LANDSCAPED MATERIALS.
LOT PERIMETER PROVIDED:	THE AREA WITHIN FIFTEEN FEET (15') OF A PARKING LOT PERIMETER PLANTED WITH CLUSTERED LANDSCAPED MATERIALS.
INTERIOR ISLAND AREA REQUIREMENT:	PARKING LOTS WITH MORE THAN TWENTY-FIVE (25) PARKING STALLS SHALL CONTAIN INTERIOR LANDSCAPED ISLANDS OR OTHER LANDSCAPED TRAFFIC CONTROL OR NATURAL STORMWATER MANAGEMENT FEATURES MAKING UP AT LEAST EIGHT PERCENT (8%) OF THE PARKING LOT AREA IN SIZE.
INTERIOR ISLAND AREA REQUIRED:	1,417 S.F. = (17,718 S.F. PARKING LOT AREA * 0.08)
INTERIOR ISLAND AREA PROVIDED:	2,480 S.F.

BUILDING PERIMETER REQUIREMENTS

BUILDING PERIMETER REQUIREMENT:	THE SIDES OF A BUILDING THAT FACE A PUBLIC STREET OR PARKING LOT SHALL BE LANDSCAPED FOR A LENGTH EQUAL TO ONE-HALF (1/2) OF THE BUILDING DIMENSION.
BUILDING LANDSCAPE REQUIRED:	59 L.F. = (118 BUILDING L.F. / 2)
BUILDING LANDSCAPE PROVIDED:	46 L.F.

OPEN SPACE REQUIREMENTS

OPEN SPACE REQUIREMENT:	AT LEAST 30% OF TOTAL GROSS DEVELOPMENT SITE TO BE OPEN SPACE. OPEN SPACE AREAS TO NOT BE COVERED BY BUILDING OR IMPERVIOUS SURFACE AND TO BE PLANTED WITH TREES, SHRUBS, FLOWERS OR NATIVE PLANT SPECIES.
OPEN SPACE REQUIRED:	15,028 S.F. = (50,094 SITE AREA S.F. * .30)
OPEN SPACE PROVIDED:	22,015 S.F. / 44%

MINIMUM PLANT QUANTITY REQUIREMENTS

TREE AND SHRUB REQUIREMENT:	THE NUMBER OF TREES AND SHRUBS REQUIRED SHALL BE CALCULATED BY MULTIPLYING THE SITE AREA IN SQUARE FEET BY THE COEFFICIENTS IN THE FOLLOWING TABLE FOR EACH LANDSCAPE MATERIAL:

OVERSTORY DECIDUOUS:	0.0002786
CONIFEROUS:	0.0002600
SHRUBS:	0.0006

TREES AND SHRUBS REQUIRED:	14 OVERSTORY DECIDUOUS = (50,094 SITE AREA S.F. * 0.0002786) 13 CONIFEROUS = (50,094 SITE AREA S.F. * 0.0002600) 30 SHRUBS = (50,094 SITE AREA S.F. * 0.0006)
TREES AND SHRUB PROVIDED:	14 OVERSTORY DECIDUOUS 13 CONIFEROUS = 2 EXISTING + 11 PROPOSED 287 SHRUBS

LANDSCAPE LEGEND

- EXISTING CONIFEROUS TREE (TYP.)
- EDGER (TYP.)
- APPROXIMATE LIMITS OF SEEDING/ SEEDING ALL DISTURBED AREAS (TYP.)
- SEED EDGE (TYP.)
- SEED WITH MNDOT WD MIX: WET DITCH SEED MIX (TYP.)

LANDSCAPE KEYNOTES (A)

(A) EDGER (TYP.)
(B) DOUBLE SHREDDED HARDWOOD MULCH (TYP.)
(C) EXISTING TREE TO REMAIN (TYP.)
(D) SOD (TYP.)
(E) MNDOT WD MIX: WET DITCH SEED MIX (TYP.)

PLANT KEY

SYMBOL	CODE	COMMON / BOTANICAL NAME
CONIFEROUS TREE		
	BHS	BLACK HILLS SPRUCE PICEA GLAUCA 'DENSATA'
	WHC	WHITE CEDAR THUJA OCCIDENTALIS `WHITE CEDAR`
	WHP	WHITE PINE PINUS STROBUS
ORNAMENTAL TREE		
	ALS	AUTUMN BRILLANCE SERVICEBERRY AMELANCHIER X GRANDIFLORA `AUTUMN BRILLANCE`
OVERSTORY TREE		
	BOL	BOULEVARD LINDEN TILIA AMERICANA 'BOULEVARD'
	HCK	COMMON HACKBERRY CELTIS OCCIDENTALIS
	IHL	IMPERIAL HONEYLOCUST GLEDITSIA TRIACANTHOS VAR. INERMIS `IMPERIAL`
	KCY	ESPRESSO KENTUCKY COFFEETREE GYMNOCLADUS DIOICA `ESPRESSO`
	SWO	SWAMP WHITE OAK QUERCUS BICOLOR
CONIFEROUS SHRUBS		
	HZA	HETZ MIDGET ARBORVITAE THUJA OCCIDENTALIS `HETZ MIDGET`
	SCJ	SCANDIA JUNIPER JUNIPERUS SABINA `SCANDIA`
	SGJ	SEA GREEN JUNIPER JUNIPERUS CHINENSIS `SEA GREEN`
	TCA	TECHNY ARBORVITAE THUJA OCCIDENTALIS `TECHNY`
	WBM	MUGO WHITE BUD PINE PINUS MUGO `WHITE BUD`
DECIDUOUS SHRUBS		
	ANH	ANNABELLE HYDRANGEA HYDRANGEA ARBORESCENS `ANNABELLE`
	BLC	IROQUOIS BEAUTY BLACK CHOKEBERRY ARONIA MELANOCARPA `IROQUOIS BEAUTY` TM
	GLS	GRO-LOW FRAGRANT SUMAC RHUS AROMATICA `GRO-LOW`
	LDN	LITTLE DEVIL NINEBARK PHYSOCARPUS OPULIFOLIUS `DONNA MAY` TM
ORNAMENTAL GRASSES		
	BAG	BLONDE AMBITION BLUE GRAMA GRASS BOUTELOUA GRACILIS `BLONDE AMBITION`
	HMS	HEAVY METAL SWITCHGRASS PANICUM VIRGATUM 'HEAVY METAL'
	KFG	KARL FOERSTER FEATHER REED GRASS CALAMAGROSTIS X ACUTIFLORA `KARL FOERSTER`
PERENNIALS		
	AFS	AUTUMN FIRE SEDUM SEDUM X 'AUTUMN FIRE'
	BJB	BLUE JEAN BABY RUSSIAN SAGE PEROVSKIA ATRIPLICIFOLIA 'BLUE JEAN BABY'
	WLC	WALKER'S LOW CATMINT NEPETA X FAASSENII 'WALKER'S LOW'

NOTE:
SEE SHEET L101 FOR FULL PLANT SCHEDULE

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Kimley»Horn
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PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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RYAN A. HYLLESTED, PLA
DATE: 01/28/2026 LIC. NO. 53828 MN

KHA PROJECT	161369000
DATE	01/28/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	CFK
CHECKED BY	RAH

LANDSCAPE PLAN

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
L100

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K:\TCW_LDEV\ca commercial\cottage grove, mn\3 Design\CAD\plansheets\L1-LANDSCAPE DETAILS.DWG February 19, 2026 - 8:48am
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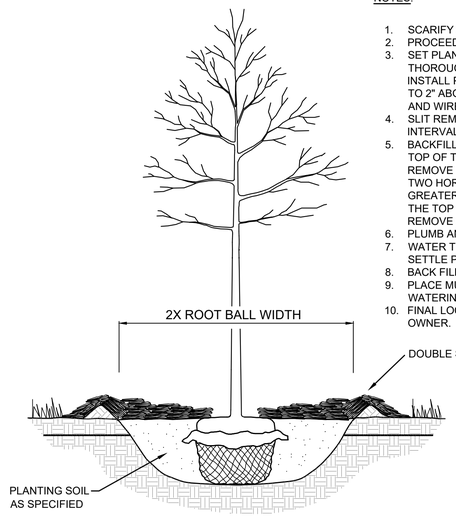
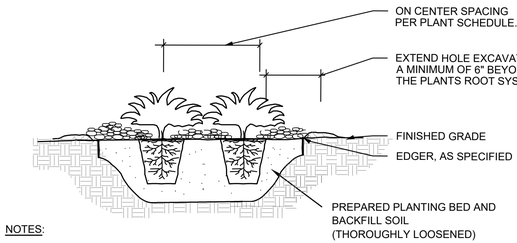


NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING.
3. SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE WITH BURLAP AND WIRE BASKET, (IF USED), INTACT.
4. SLIT REMAINING TREATED BURLAP AT 6" INTERVALS.
5. BACKFILL TO WITHIN APPROXIMATELY 12" OF THE TOP OF THE ROOTBALL, THEN WATER PLANT. REMOVE THE TOP 1/3 OF THE BASKET OR THE TOP TWO HORIZONTAL RINGS WHICHEVER IS GREATER. REMOVE ALL BURLAP AND NAILS FROM THE TOP 1/3 OF THE BALL. REMOVE ALL TWINE. REMOVE OR CORRECT STEM GIRDLING ROOTS.
6. PLUMB AND BACKFILL WITH PLANTING SOIL.
7. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
8. BACK FILL VOIDS AND WATER SECOND TIME.
9. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
10. FINAL LOCATION OF TREE TO BE APPROVED BY OWNER.

1 TREE PLANTING DETAIL

SCALE: N.T.S. L101

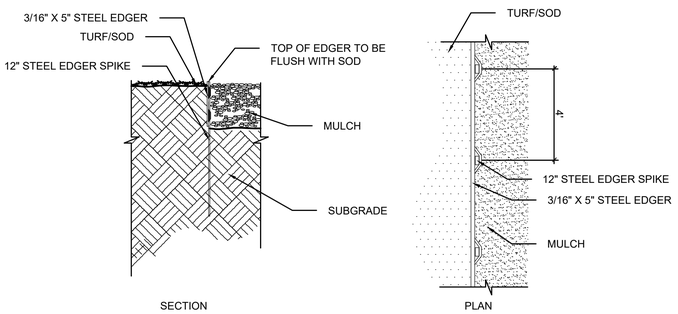


NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING OF TOP AND ROOT.
3. REMOVE CONTAINER AND SCORE OUTSIDE OF SOIL MASS TO REDIRECT AND PREVENT CIRCLING FIBROUS ROOTS. REMOVE OR CORRECT STEM GIRDLING ROOTS.
4. PLUMB AND BACKFILL WITH PLANTING SOIL.
5. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
6. BACK FILL VOIDS AND WATER SECOND TIME.
7. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
8. MIX IN 3-4" OF ORGANIC COMPOST.

2 SHRUB / PERENNIAL PLANTING DETAIL

SCALE: N.T.S. L101



3 STEEL EDGER DETAIL

SCALE: N.T.S. L101

PLANT SCHEDULE

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CONT	CAL
CONIFEROUS TREE						
	BHS	4	BLACK HILLS SPRUCE	PICEA GLAUCA 'DENSATA'	B & B	6` HT.
	WHC	4	WHITE CEDAR	THUJA OCCIDENTALIS `WHITE CEDAR`	B & B	6` HT.
	WHP	2	WHITE PINE	PINUS STROBUS	B & B	5` HT.
ORNAMENTAL TREE						
	ALS	3	AUTUMN BRILLANCE SERVICEBERRY	AMELANCHIER X GRANDIFLORA `AUTUMN BRILLANCE`	B & B	6` HT.
OVERSTORY TREE						
	BOL	3	BOULEVARD LINDEN	TILIA AMERICANA 'BOULEVARD'	B & B	2.5" CAL.
	HCK	2	COMMON HACKBERRY	CELTIS OCCIDENTALIS	B & B	2.5" CAL.
	IHL	2	IMPERIAL HONEYLOCUST	GLEDITSIA TRIACANTHOS VAR. INERMIS `IMPERIAL`	B & B	2.5" CAL.
	KCY	3	ESPRESSO KENTUCKY COFFEETREE	GYMNOCLADUS DIOICA `ESPRESSO`	B & B	2.5" CAL.
	SWO	3	SWAMP WHITE OAK	QUERCUS BICOLOR	B & B	2.5" CAL.

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CONT	SPACING
CONIFEROUS SHRUBS						
	HZA	12	HETZ MIDGET ARBORVITAE	THUJA OCCIDENTALIS `HETZ MIDGET`	#5 CONT.	3` O.C.
	SCJ	3	SCANDIA JUNIPER	JUNIPERUS SABINA `SCANDIA`	#5 CONT.	5` O.C.
	SGJ	20	SEA GREEN JUNIPER	JUNIPERUS CHINENSIS `SEA GREEN`	#5 CONT.	5` O.C.
	TCA	4	TECHNY ARBORVITAE	THUJA OCCIDENTALIS `TECHNY`	#5 CONT.	5` O.C.
	WBM	35	MUGO WHITE BUD PINE	PINUS MUGO `WHITE BUD`	#5 CONT.	3` O.C.
DECIDUOUS SHRUBS						
	ANH	17	ANNABELLE HYDRANGEA	HYDRANGEA ARBORESCENS `ANNABELLE`	#5 CONT.	4` O.C.
	BLC	13	IROQUOIS BEAUTY BLACK CHOKEBERRY	ARONIA MELANOCARPA `IROQUOIS BEAUTY` TM	#5 CONT.	4` O.C.
	GLS	30	GRO-LOW FRAGRANT SUMAC	RHUS AROMATICA `GRO-LOW`	#5 CONT.	4` O.C.
	LDN	18	LITTLE DEVIL NINEBARK	PHYSOCARPUS OPULIFOLIUS `DONNA MAY` TM	#5 CONT.	4` O.C.
ORNAMENTAL GRASSES						
	BAG	27	BLONDE AMBITION BLUE GRAMA GRASS	BOUTELOUA GRACILIS `BLONDE AMBITION`	#1 CONT.	20" O.C.
	HMS	37	HEAVY METAL SWITCHGRASS	PANICUM VIRGATUM 'HEAVY METAL'	#1 CONT.	3` O.C.
	KFG	15	KARL FOERSTER FEATHER REED GRASS	CALAMAGROSTIS X ACUTIFLORA `KARL FOERSTER`	#1 CONT	18" O.C.
PERENNIALS						
	AFS	17	AUTUMN FIRE SEDUM	SEDUM X 'AUTUMN FIRE'	#1 CONT.	24" O.C.
	BJB	28	BLUE JEAN BABY RUSSIAN SAGE	PEROVSKIA ATRIPLICIFOLIA 'BLUE JEAN BABY'	#1 CONT.	3` O.C.
	WLC	11	WALKER'S LOW CATMINT	NEPETA X FAASSENII 'WALKER'S LOW'	#1 CONT	30" O.C.

NOTE:
QUANTITIES ON PLAN SUPERSEDE LIST QUANTITIES IN THE EVENT OF A DISCREPANCY.

ABBREVIATIONS:
B&B = BALLED AND BURLAPPED CAL. = CALIPER HT. = HEIGHT MIN. = MINIMUM O.C. = ON CENTER SP. = SPECIES QTY. = QUANTITY

LANDSCAPE NOTES

PLANTING

1. CONTACT COMMON GROUND ALLIANCE AT 811 OR CALL811.COM TO VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY PLANTS OR LANDSCAPE MATERIAL.
2. ACTUAL LOCATION OF PLANT MATERIAL IS SUBJECT TO FIELD AND SITE CONDITIONS.
3. NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
4. ALL SUBSTITUTIONS MUST BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO SUBMISSION OF ANY BID AND/OR QUOTE BY THE LANDSCAPE CONTRACTOR.
5. PROVIDE TWO YEAR GUARANTEE OF ALL PLANT MATERIALS. THE GUARANTEE BEGINS ON THE DATE OF THE LANDSCAPE ARCHITECT'S OR OWNER'S WRITTEN ACCEPTANCE OF THE INITIAL PLANTING. REPLACEMENT PLANT MATERIAL SHALL HAVE A ONE YEAR GUARANTEE COMMENCING UPON PLANTING.
6. ALL PLANTS TO BE SPECIMEN GRADE, MINNESOTA-GROWN AND/OR HARDY. SPECIMEN GRADE SHALL ADHERE TO, BUT IS NOT LIMITED BY, THE FOLLOWING STANDARDS:
   ALL PLANTS SHALL BE FREE FROM DISEASE, PESTS, WOUNDS, SCARS, ETC.
   ALL PLANTS SHALL BE FREE FROM NOTICEABLE GAPS, HOLES, OR DEFORMITIES.
   ALL PLANTS SHALL BE FREE FROM BROKEN OR DEAD BRANCHES.
   ALL PLANTS SHALL HAVE HEAVY, HEALTHY BRANCHING AND LEAFING.
   CONIFEROUS TREES SHALL HAVE AN ESTABLISHED MAIN LEADER AND A HEIGHT TO WIDTH RATIO OF NO LESS THAN 5:3.
7. PLANTS TO MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2014 OR MOST CURRENT VERSION) REQUIREMENTS FOR SIZE AND TYPE SPECIFIED.
8. PLANTS TO BE INSTALLED AS PER MNLA & ANSI STANDARD PLANTING PRACTICES.
9. INSTALL PLANTS BY PLANT INSTALLATION PERIOD INFORMATION IN THE LATEST STANDARD PLANTING DETAILS FROM MNDOT. PLANTINGS BEFORE OR AFTER THESE DATES ARE DONE AT RISK.
10. PLANTS SHALL BE IMMEDIATELY PLANTED UPON ARRIVAL AT SITE. PROPERLY HEEL-IN MATERIALS IF NECESSARY; TEMPORARY ONLY.
11. PRIOR TO PLANTING, FIELD VERIFY THAT THE ROOT COLLAR/ROOT FLARE IS LOCATED AT THE TOP OF THE BALLED & BURLAP TREE. IF THIS IS NOT THE CASE, SOIL SHALL BE REMOVED DOWN TO THE ROOT COLLAR/ROOT FLARE. WHEN THE BALLED & BURLAP TREE IS PLANTED, THE ROOT COLLAR/ROOT FLARE SHALL BE EVEN OR SLIGHTLY ABOVE FINISHED GRADE.
12. OPEN TOP OF BURLAP ON BB MATERIALS; REMOVE POT ON POTTED PLANTS; SPLIT AND BREAK APART PEAT POTS.
13. PRUNE PLANTS AS NECESSARY - PER STANDARD NURSERY PRACTICE AND TO CORRECT POOR BRANCHING OF EXISTING AND PROPOSED TREES.
14. WRAP ALL SMOOTH-BARKED TREES - FASTEN TOP AND BOTTOM. REMOVE BY APRIL 1ST.
15. STAKING OF TREES AS REQUIRED; REPOSITION, PLUMB AND STAKE IF NOT PLUMB AFTER ONE YEAR.

SOIL

16. THE NEED FOR SOIL AMENDMENTS SHALL BE DETERMINED UPON SITE SOIL CONDITIONS PRIOR TO PLANTING. LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT FOR THE NEED OF ANY SOIL AMENDMENTS.
17. BACKFILL SOIL AND TOPSOIL TO ADHERE TO MNDOT STANDARD SPECIFICATION 3877 (LOAM TOPSOIL BORROW) AND TO BE EXISTING TOP SOIL FROM SITE FREE OF ROOTS, ROCKS LARGER THAN ONE INCH, SUBSOIL DEBRIS, AND LARGE WEEDS UNLESS SPECIFIED OTHERWISE. MINIMUM 4" DEPTH TOPSOIL FOR ALL LAWN GRASS AREAS AND 12" DEPTH TOPSOIL FOR TREE, SHRUBS, AND PERENNIALS.

MULCH

18. MULCH TO BE AT ALL TREE, SHRUB, PERENNIAL, AND MAINTENANCE AREAS. TREE AND SHRUB PLANTING BEDS SHALL HAVE 4" DEPTH OF DOUBLE SHREDDED HARDWOOD MULCH. DOUBLE SHREDDED HARDWOOD MULCH TO BE USED AROUND ALL PLANTS WITHIN TURF AREAS. PERENNIAL AND ORNAMENTAL GRASS BEDS SHALL HAVE 2" DEPTH DOUBLE SHREDDED HARDWOOD MULCH. MULCH TO BE FREE OF DELETERIOUS MATERIAL AND NATURAL IN COLOR (DYE-FREE), OR APPROVED EQUAL. ROCK MULCH TO BE TRAP ROCK, BUFF LIMESTONE, RIVER ROCK, 1 1/2" DIAMETER, AT MINIMUM 4" DEPTH, OR APPROVED EQUAL. APPLY PRE-EMERGENT HERBICIDE PRIOR TO MULCH PLACEMENT PER MANUFACTURER RECOMMENDATIONS, USE PREEN OR PRE-APPROVED EQUAL. ROCK MULCH TO BE ON COMMERCIAL GRADE FILTER FABRIC, BY TYPAR, OR APPROVED EQUAL WITH NO EXPOSURE. MULCH AND FABRIC TO BE APPROVED BY OWNER PRIOR TO INSTALLATION. MULCH TO MATCH EXISTING CONDITIONS (WHERE APPLICABLE).

EDGER

19. EDGING TO BE COMMERCIAL GRADE COL-MET (OR EQUAL) STEEL EDGING; 3/16" THICK x 5" TALL, COLOR BLACK, OR SPADED EDGE, AS INDICATED. STEEL EDGING SHALL BE PLACED WITH SMOOTH CURVES AND STAKED WITH METAL SPIKES NO GREATER THAN 4 FOOT ON CENTER WITH TOP OF EDGER AT GRADE, FOR MOWERS TO CUT ABOVE WITHOUT DAMAGE. UTILIZE CURBS AND SIDEWALKS FOR EDGING WHERE POSSIBLE. WHERE EDGING TERMINATES AT A SIDEWALK, BEVEL OR RECESS ENDS TO PREVENT TRIP HAZARD. SPADED EDGE TO PROVIDE V-SHAPED DEPTH AND WIDTH TO CREATE SEPARATION BETWEEN MULCH AND GRASS. INDIVIDUAL TREE, SHRUB, OR RAIN-GARDEN BEDS TO BE SPADED EDGE, UNLESS NOTED OTHERWISE. EDGING TO MATCH EXISTING CONDITIONS (WHERE APPLICABLE).

SEED/SOD

20. ALL DISTURBED AREAS TO BE SODDED OR SEEDED, UNLESS OTHERWISE NOTED. SOD TO BE STANDARD MINNESOTA GROWN AND HARDY BLUEGRASS MIX, FREE OF LAWN WEEDS. ALL TOPSOIL AREAS TO BE RAKED TO REMOVE DEBRIS AND ENSURE DRAINAGE. SLOPES OF 3:1 OR GREATER SHALL BE STAKED. SEED AS SPECIFIED, PER MNDOT SPECIFICATIONS AND SUPPLIER/MANUFACTURER RECOMMENDATIONS. IF NOT INDICATED ON LANDSCAPE PLAN, SEE EROSION CONTROL PLAN.

IRRIGATION

21. PROVIDE IRRIGATION TO ALL PLANTED AREAS ON SITE. IRRIGATION SYSTEM TO BE DESIGN/BUILD BY LANDSCAPE CONTRACTOR. LANDSCAPE CONTRACTOR TO PROVIDE SHOP DRAWINGS TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION OF IRRIGATION SYSTEM. CONTRACTOR TO PROVIDE OPERATION MANUALS, AS-BUILT PLANS, AND NORMAL PROGRAMMING. SYSTEM SHALL BE WINTERIZED AND HAVE SPRING STARTUP DURING FIRST YEAR OF OPERATION. SYSTEM SHALL HAVE ONE-YEAR WARRANTY ON ALL PARTS AND LABOR. ALL INFORMATION ABOUT INSTALLATION AND SCHEDULING CAN BE OBTAINED FROM THE GENERAL CONTRACTOR. SYSTEM SHALL INCLUDE A RAIN SENSOR AND APPROPRIATE TECHNOLOGY. CONTROLLER TO BE COMMERCIAL GRADE, EPA WATERSENSE APPROVED, CAPABLE OF FLOW SENSING AND OPERATING A MASTER VALVE ON / OFF BY STATION. IRRIGATION SYSTEM TO INCLUDE FLOW SENSOR AND WIRED RAIN / FREEZE SENSOR. PROVIDE MASTER VALVE. THE IRRIGATION SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ZONE PARAMETERS: HEAD-TO-HEAD COVERAGE AND NO SPRAYING OVER WALKS. SEPARATE LAWN ZONES BY MICROCLIMATE- LAWN ON NORTH SIDE OF BUILDING VS LAWN ON SOUTH SIDE OF BUILDING, LAWN ON SLOPE VS LAWN ON LEVEL GRADE. LAWN AREAS TO HAVE MULTI-STREAM ROTARY SPRINKLERS/ SPRAYS/ ROTORS. SHRUB AND PERENNIAL BED AREAS TO HAVE DRIP. TREES IN LAWN AREA TO BE COVERED BY MULTI-STREAM ROTARY SPRINKLERS/ SPRAYS/ ROTORS. TREES IN SHRUBS / PERENNIAL BED AREA TO BE WATERED WITH DRIP IRRIGATION. ALL IRRIGATION HEADS TO BE PRESSURE REGULATED.

ESTABLISHMENT

22. PROVIDE NECESSARY WATERING OF PLANT MATERIALS UNTIL THE PLANT IS FULLY ESTABLISHED OR IRRIGATION SYSTEM IS OPERATIONAL. OWNER WILL NOT PROVIDE WATER FOR CONTRACTOR.
23. REPAIR, REPLACE, OR PROVIDE SOD/SEED AS REQUIRED FOR ANY ROADWAY BOULEVARD AREAS ADJACENT TO THE SITE DISTURBED DURING CONSTRUCTION.

WARRANTY

24. REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO OWNER.
25. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS UNTIL PROJECT COMPLETION, BUT IN NO CASE, LESS THAN FOLLOWING PERIOD; 1 YEAR AFTER PROJECT COMPLETION. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS BY PRUNING, CULTIVATING, AND WEEDING AS REQUIRED FOR HEALTHY GROWTH. RESTORE PLANTING SAUCERS. TIGHTEN AND REPAIR STAKE AND GUY SUPPORTS AND RESET TREES AND SHRUBS TO PROPER GRADES OR VERTICAL POSITION AS REQUIRED. RESTORE OR REPLACE DAMAGED WRAPPINGS. SPRAY AS REQUIRED TO KEEP TREES AND SHRUBS FREE OF INSECTS AND DISEASE. REPLENISH MULCH TO THE REQUIRED DEPTH. MAINTAIN LAWNS FOR 60 DAYS AFTER INSTALLING SOD INCLUDING MOWING WHEN SOD RECITES 4" IN HEIGHT. WEED PLANTING BEDS AND MULCH SAUCERS AT MINIMUM ONCE A MONTH DURING THE GROWING SEASON. PROVIDE A MONTHLY REPORT TO THE OWNER ON WEEDING AND OTHER MAINTENANCE RESPONSIBILITIES.

PRELIMINARY - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2026 KIMLEY-HORN AND ASSOCIATES, INC.
11995 SINGLETREE LN, SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

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 LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

RYAN A. HYLLESTED, PLA
MN
LIC. NO. 53828
DATE: 01/28/2026

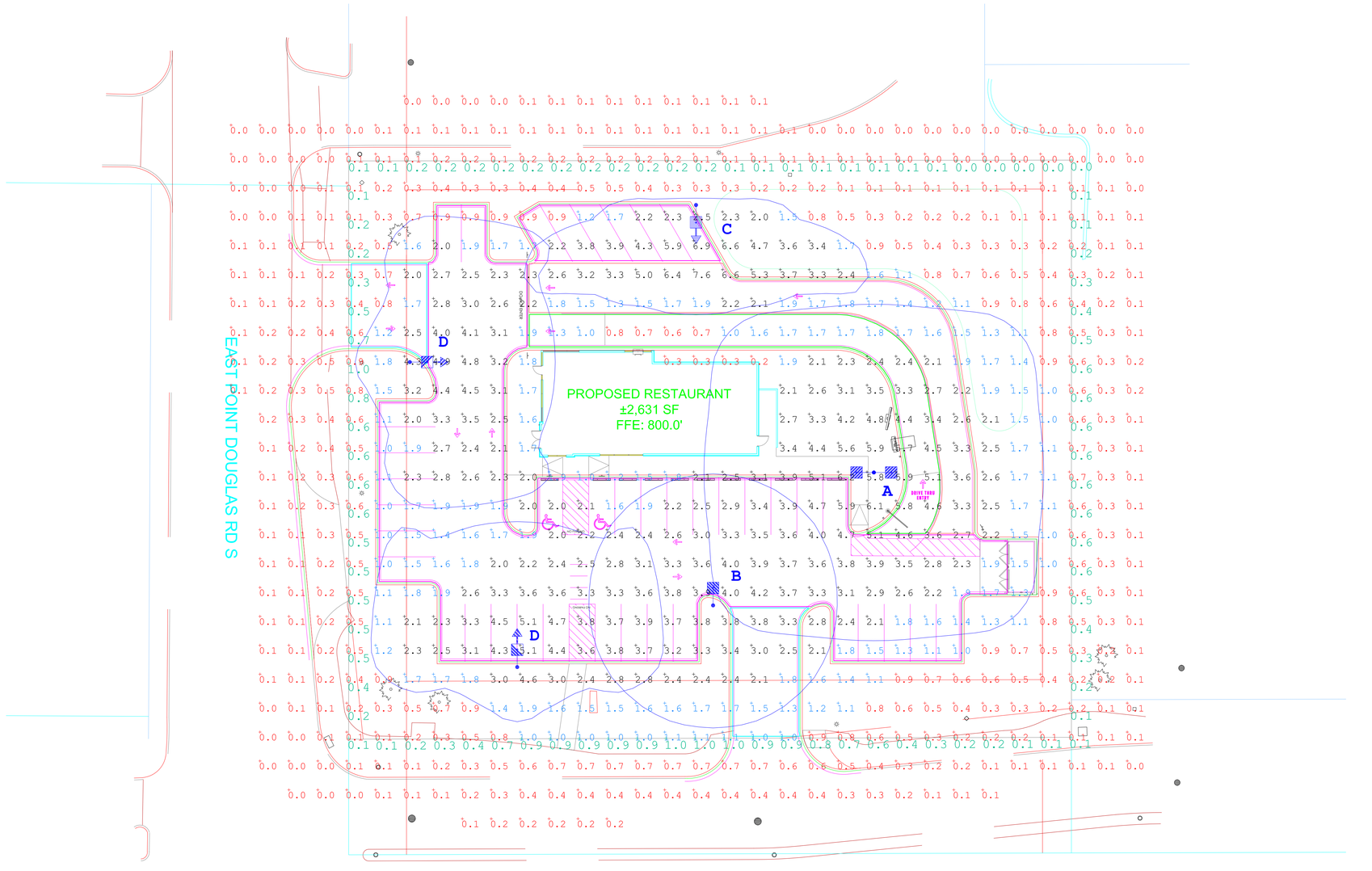
KHA PROJECT	
161369000	
DATE	01/28/2026
SCALE	AS SHOWN
DESIGNED BY	KHA
DRAWN BY	KHA
CHECKED BY	RAH

LANDSCAPE DETAILS

PANERA - COTTAGE GROVE
PREPARED FOR
CA COMMERCIAL
COTTAGE GROVE MN

SHEET NUMBER
L101

REVISIONS		
Rev #	Date	BY:



Based on the information provided, all dimensions and luminaire locations shown represent recommended positions. The engineer and/or architect must determine applicability of the layout to existing or future field conditions.

This lighting pattern represents illumination levels calculated from laboratory data taken under controlled conditions utilizing current industry standard lamp ratings in accordance with Illuminating Engineering Society approved methods. Actual performance of any manufacturer's luminaire may vary due to variation in electrical voltage, tolerance in lamps and other variable field conditions.

Calculation Summary

Label	Units	Avg	Max	Min	Avg/Min	Max/Min	PtSpcLr	PtSpcTb
PROPERTY LINE	Fc	0.39	1.0	0.0	N.A.	N.A.	10	N.A.
DRIVE	Fc	2.69	7.6	1.2	2.24	6.33	10	10
DRIVE THRU	Fc	2.32	5.1	0.6	3.87	8.50		
ENTRANCE DRIVES	Fc	1.89	3.8	0.7	2.70	5.43		
PARKING	Fc	2.93	6.9	0.9	3.26	7.67		

Luminaire Schedule

WLS19059 PANERA COTTAGE GROVE, MN PM: HOLLY PLEASE EMAIL US FOR PRICING AT HOLLY@WLSLIGHTING.COM

Symbol	Qty	Label	Lum. Lumens	LLF	Description	Lum. Watts
	1	A	20431	0.950	WLS-SL2-A1-18K-SM-40-70-T5-SLW 25' MOUNTING HEIGHT	134.5
	1	B	20431	0.950	WLS-SL2-A1-18K-SM-40-70-T5-SLW 25' MOUNTING HEIGHT	134.5
	1	C	15379	0.950	WLS-SL2-A1-32K-MD-40-70-T4-BLS-SLW 25' MOUNTING HEIGHT	225.48
	2	D	19443	0.950	WLS-SL2-A1-18K-SM-40-70-T4-SLW 25' MOUNTING HEIGHT	134.5

6820 CORPORATION PKWY
FORT WORTH, TX 76126
WWW.WLSLIGHTING.COM

WLS LIGHTING + ELECTRICAL

817-731-0020

PM:HOLLY

BY: J.P.

SHEET 1 OF 1

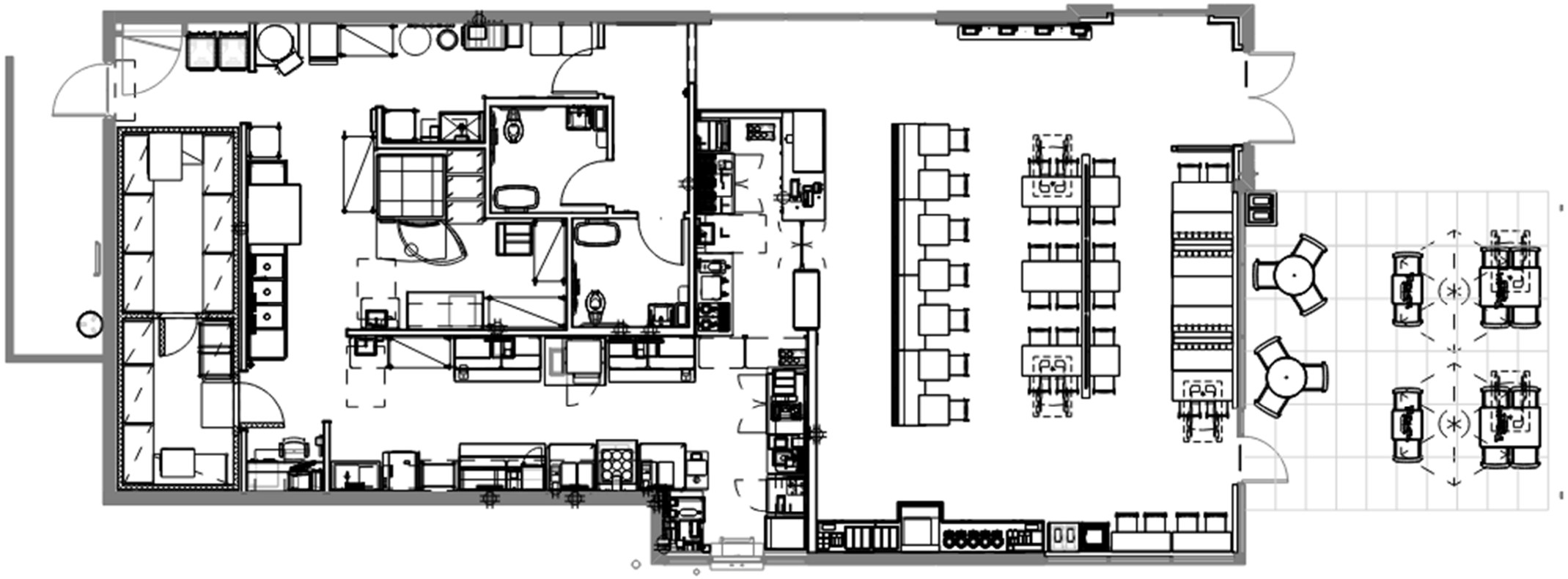
PANERA
COTTAGE GROVE, MN

WLS-19059

DATE -1/19/26

SCALE: 1"=20'

PROPOSED FLOOR PLAN



EXTERIOR ELEVATIONS

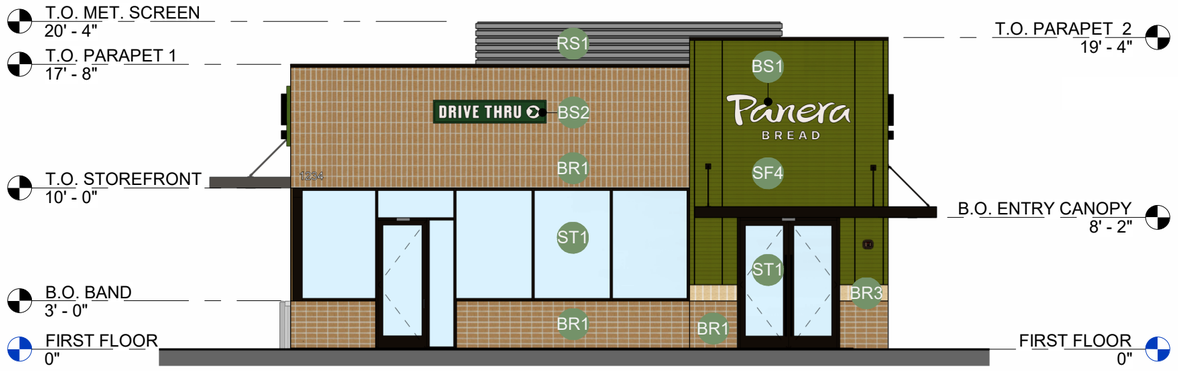
ELEVATION PERCENTAGES	
WINDOWS:	35%
EIFS:	0%
BRICK:	41%
GREEN:	23%
CANOPY:	1%

TOTAL BUILDING
4,053 SF TOTAL

65% MIN GRADE A MATERIALS REQUIRED (BRICK + GLASS)

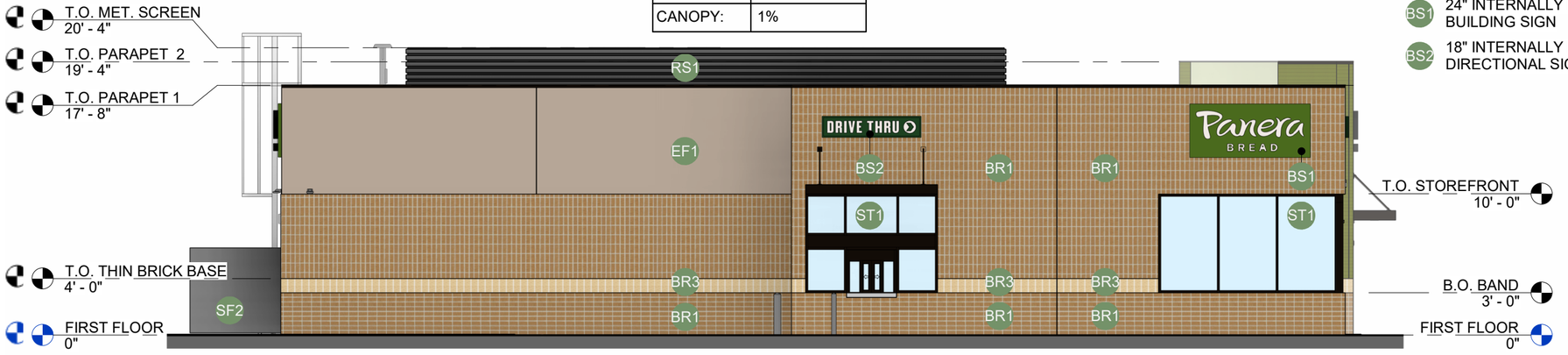
REQUIRED: 2,634 SF (65%)

PROVIDED: 2,683 SF (66%)



FRONT ELEVATION

ELEVATION PERCENTAGES	
WINDOWS:	12%
EIFS:	20%
BRICK:	66%
GREEN:	1%
CANOPY:	1%



DRIVE THRU ELEVATION

EXTERIOR MATERIALS

- BR1 — THIN BRICK MASONRY, TABS WALL SYSTEM | PATTERN: HORIZONTAL OR VERTICAL STACKED BOND (SEE ELEVATIONS) | SIZE: UTILITY | SUPPLIER: CREATIVE MATERIALS | MFR: MCNEAR | COLOR: SANTIAGO CREATE MATERIALS CUSTOM BLEND
- BR3 — THIN BRICK MASONRY BAND, TABS WALL SYSTEM | PATTERN: VERTICAL STACKED BOND (SEE ELEVATIONS) | SIZE: UTILITY | SUPPLIER: CREATIVE MATERIALS | MFR: ENDICOTT | COLOR: GOLDEN BUFF
- EF1 — EXTERIOR INSULATION FINISH SYSTEM, SUPPLIER: DRYVIT "OUTSULATION PLUS MD" W/ MOISTURE DRAINAGE SYSTEM | COLOR: #105 SUEDE | TEXTURE: DRYVIT "LYMESTONE" DPR TEXTURED FINISH
- SF2 — SPECIALITY FINISH: UTILITY SCREEN + TRASH GATE COMPOSITE PLANK SCREEN WALL | SUPPLIER: GC | MFR: TREX | STYLE: TREX | COLOR: PEBBLE GRAY
- SF4 — SPECIALITY FINISH: RIBBED FIBER CEMENT PANEL WALL PANELS | SUPPLIER: NICHIHA | MFR: NICHIHA | STYLE: RIBBED DIMENSION SERIES | COLOR: PANERA GREEN TO MATCH PANTONE PMS 2307 C
- ST1 — ALUMINUM STOREFRONT SYSTEM: MFR: KAWNEER, TRIFAB VERSAGLAZE 451T | COLOR: DARK BRONZE | SIZE: 2" x 4 1/2" PROFILE w/ THERMAL BREAK | GLAZING: 1" INSULATED GLAZING | MFR: PPG, SOLARBAN 70 LOW-E, 1" INSULATED (OR EQUAL)
- ST2 — ALUMINUM STOREFRONT SYSTEM: ALTERNATE - ONLY AS REQUIRED | MFR: KAWNEER TRIFAB VERSAGLAZE 451T | COLOR: CLEAR ANODIZED | 2" x 4 1/2" PROFILE w/ THERMAL BREAK | GLAZING: 1" INSULATED GLAZING | MFR: PPG SOLARBAN 70 (OR EQUAL)
- RS1 — PREMANUFACTURED ROOF SCREEN (ONLY NEEDED WHEN REQ'D BY MUNICIPALITY) | MFR: ROOFSCREEN MANUFACTURING | STYLE: 7.2 RIB PANEL HORIZONTAL | COLOR: CHARCOAL (OR APPROVED EQUAL)
- BS1 — 24" INTERNALLY ILLUMINATED WALL MOUNTED BUILDING SIGN
- BS2 — 18" INTERNALLY ILLUMINATED WALL MOUNTED DIRECTIONAL SIGN

PANERA BREAD | COTTAGE GROVE, MN

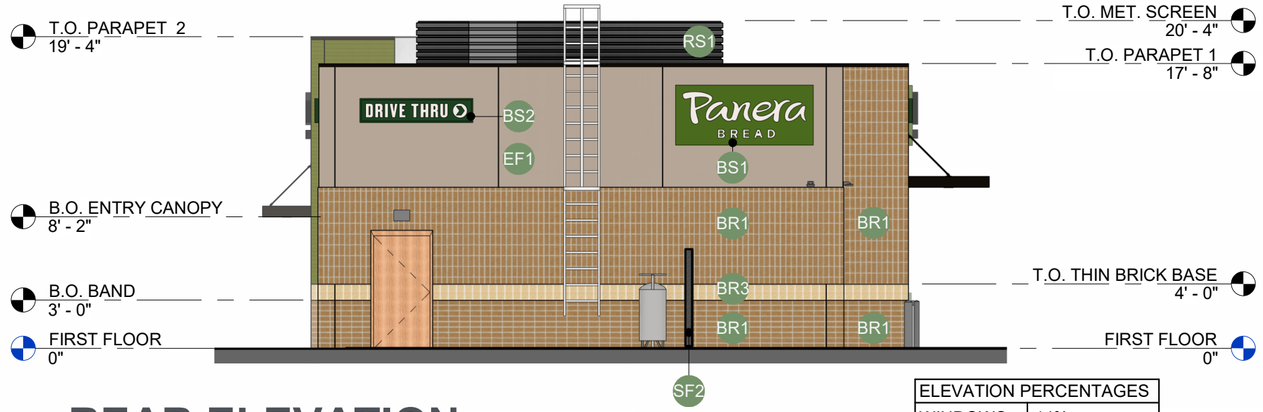
COMMERCIAL DEVELOPMENT

GPD GROUP, INC.

EXTERIOR ELEVATIONS

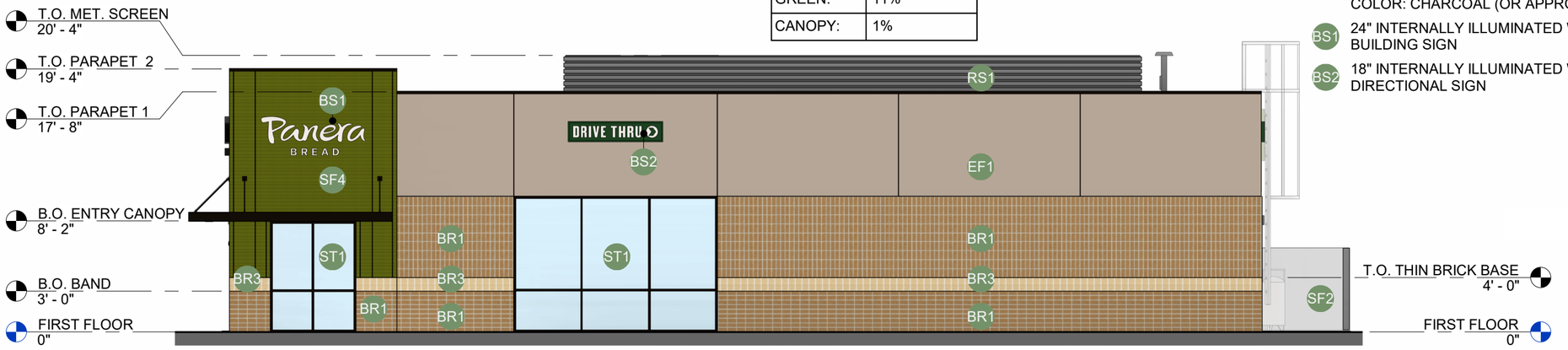
ELEVATION PERCENTAGES	
WINDOWS:	1%
EIFS:	38%
BRICK:	57%
GREEN:	1%
CANOPY:	0%

TOTAL BUILDING
4,053 SF TOTAL
65% MIN GRADE A MATERIALS REQUIRED (BRICK + GLASS)
REQUIRED: 2,634 SF (65%)
PROVIDED: 2,683 SF (66%)



REAR ELEVATION

ELEVATION PERCENTAGES	
WINDOWS:	14%
EIFS:	36%
BRICK:	38%
GREEN:	11%
CANOPY:	1%



SIDE ELEVATION

EXTERIOR MATERIALS

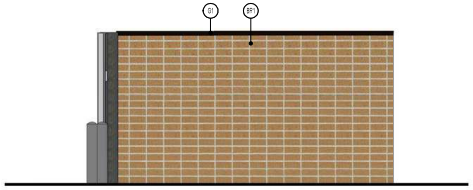
- **BR1** THIN BRICK MASONRY, TABS WALL SYSTEM | PATTERN: HORIZONTAL OR VERTICAL STACKED BOND (SEE ELEVATIONS) | SIZE: UTILITY | SUPPLIER: CREATIVE MATERIALS | MFR: MCNEAR | COLOR: SANTIAGO CREATE MATERIALS CUSTOM BLEND
- **BR3** THIN BRICK MASONRY BAND, TABS WALL SYSTEM | PATTERN: VERTICAL STACKED BOND (SEE ELEVATIONS) | SIZE: UTILITY | SUPPLIER: CREATIVE MATERIALS | MFR: ENDICOTT | COLOR: GOLDEN BUFF
- **EF1** EXTERIOR INSULATION FINISH SYSTEM, SUPPLIER: DRYVIT "OUTSULATION PLUS MD" W/ MOISTURE DRAINAGE SYSTEM | COLOR: #105 SUEDE | TEXTURE: DRYVIT "LYMESTONE" DPR TEXTURED FINISH
- **SF2** SPECIALITY FINISH: UTILITY SCREEN + TRASH GATE COMPOSITE PLANK SCREEN WALL | SUPPLIER: GC | MFR: TREX | STYLE: TREX | COLOR: PEBBLE GRAY
- **SF4** SPECIALITY FINISH: RIBBED FIBER CEMENT PANEL WALL PANELS | SUPPLIER: NICHIHA | MFR: NICHIHA | STYLE: RIBBED DIMENSION SERIES | COLOR: PANERA GREEN TO MATCH PANTONE PMS 2307 C
- **ST1** ALUMINUM STOREFRONT SYSTEM: MFR: KAWNEER, TRIFAB VERSAGLAZE 451T | COLOR: DARK BRONZE | SIZE: 2" x 4 1/2" PROFILE w/ THERMAL BREAK | GLAZING: 1" INSULATED GLAZING | MFR: PPG, SOLARBAN 70 LOW-E, 1" INSULATED (OR EQUAL)
- **ST2** ALUMINUM STOREFRONT SYSTEM: ALTERNATE - ONLY AS REQUIRED | MFR: KAWNEER TRIFAB VERSAGLAZE 451T | COLOR: CLEAR ANODIZED | 2" x 4 1/2" PROFILE w/ THERMAL BREAK | GLAZING: 1" INSULATED GLAZING | MFR: PPG SOLARBAN 70 (OR EQUAL)
- **RS1** PREMANUFACTURED ROOF SCREEN (ONLY NEEDED WHEN REQ'D BY MUNICIPALITY) | MFR: ROOFSCREEN MANUFACTURING | STYLE: 7.2 RIB PANEL HORIZONTAL | COLOR: CHARCOAL (OR APPROVED EQUAL)
- **BS1** 24" INTERNALLY ILLUMINATED WALL MOUNTED BUILDING SIGN
- **BS2** 18" INTERNALLY ILLUMINATED WALL MOUNTED DIRECTIONAL SIGN

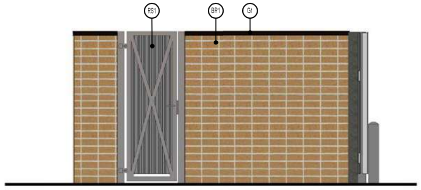
Panera BREAD
COMMERCIAL DEVELOPMENT

PANERA BREAD | COTTAGE GROVE, MN

GPD GROUP, INC.

TRASH ENCLOSURE



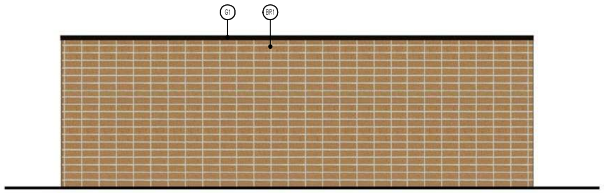


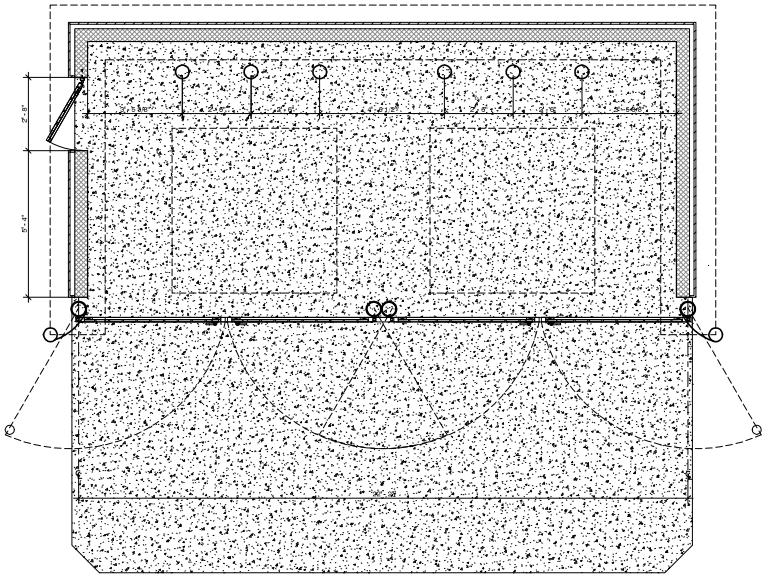
EXTERIOR MATERIALS

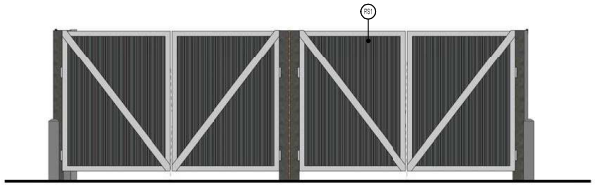
BR1 THIN BRICK MASONRY, TABS WALL SYSTEM | PATTERN: HORIZONTAL OR VERTICAL STACKED BOND (SEE ELEVATIONS) | SIZE: UTILITY | SUPPLIER: CREATIVE MATERIALS | MFR: MCNEAR | COLOR: SANTIAGO CREATE MATERIALS CUSTOM BLEND

G1 ALUMINUM STOREFRONT SYSTEM/COPING: MFR: KAWNEER, TRIFAB VERRSAGLAZE 451T | COLOR: DARK BRONZE | SIZE: 2" x 4 1/2" PROFILE w/ THERMAL BREAK | GLAZING: 1" INSULATED GLAZING | MFR: PPG, SOLARBAN 70 LOW-E, 1" INSULATED (OR EQUAL)

SB1 SPECIALITY FINISH: UTILITY SCREEN + TRASH GATE COMPOSITE PLANK SCREEN WALL | SUPPLIER: GC | MFR: TREX | STYLE: TREX | COLOR: PEBBLE GRAY



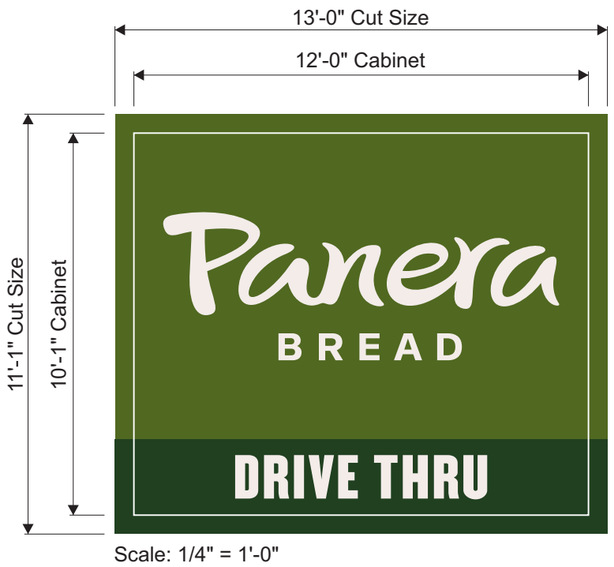




PANERA BREAD | COTTAGE GROVE, MN

S01 (2) Flex Faces for Pylon Header

Header Cabinet



Scale: 1/4" = 1'-0"

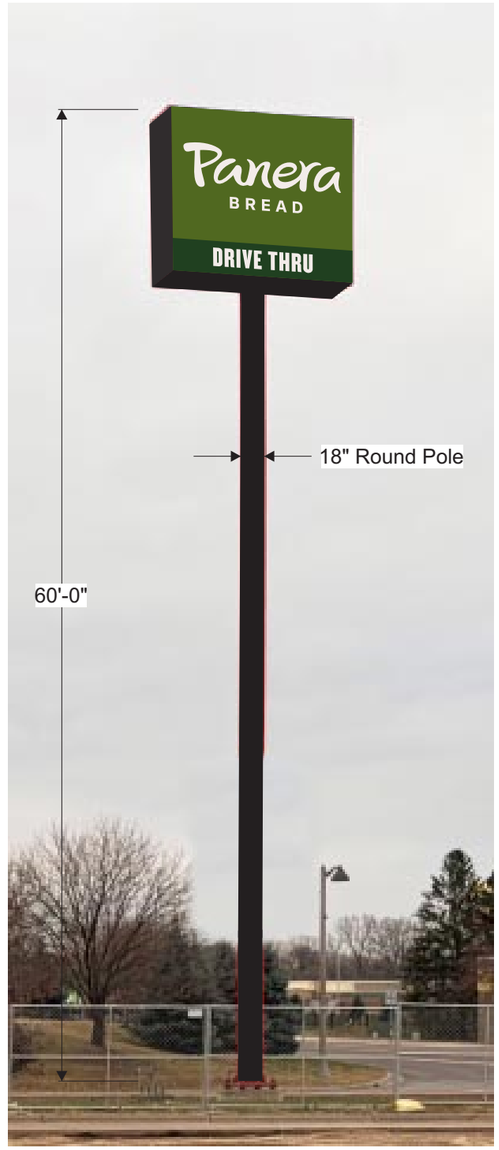
Top Cabinet: (2) Flex Face Tenant Panels

- Manufacture new face replacements for both sides of existing DF pylon sign as shown.
- On site removal and properly dispose of existing faces and install new faces.
- Paint pole & header cabinet black

	Face Material: 3M Panagraphics III White Flex Face Substrate
	Copy: Digitally printed to match PMS 9285
	Background: Digitally printed to match PMS 2280
	Background: Digitally printed to match PMS 2411
	Pole & Cabinet: Painted Black



Existing Conditions



Proposed

atlas BRANDING THE WORLD
National Headquarters: 1077 West Blue Heron Blvd.
West Palm Beach, Florida 33404
800.772.7932
www.atlasbtw.com

Revisions:	
01/27/2026 RW - added measurements & additional option	...
02/10/2026 RW - removed lower cabinet & readerboard	...
...	...
...	...
...	...

Panera BREAD

PM: Tyler N.	Address: 7162 East Point Douglas Rd.		
Drawn By: RW	City State: Cottage Grove, MN 55016		
Date: 01/23/2026	Drawing #: 240381	Page #:	1

BOLTON & MENK
Real People. Real Solutions.

3507 High Point Drive North
Bldg. 1 Suite E130
Oakdale, MN 55128

Ph: (651) 704-9970
Bolton-Menk.com

MEMORANDUM

Date: 02/17/2026

To: Paul Sponholz, PE

From: Mike Boex, PE

Subject: Panera Plan Review
City of Cottage Grove, MN
Project No.: 26X.142531.000

This memo summarizes the review of the Panera located at 7162 East Point Douglas Road, submitted by Kimley Horn, dated 1/28/2026.

Site Development Plans

Sheet C000:

1. On the final plans, identify the vertical datum of the benchmarks used on the project.
2. On the final plans, please add a note on the cover sheet that the City of Cottage Grove's Standard Specifications for Street and Utility Construction shall govern for all improvements within the public right-of-way or public easement.

Sheet C200:

3. The city will provide old site plans for reference of existing sewer and water services, although accuracy shall be independently verified by the designer.
4. The existing concrete pad (former bench pad) beyond the existing sidewalk on East Point Douglas Road should be removed with this project.
5. The City will be reconstructing 80th Street in 2026, including the portion of East Point Douglas Road south of 80th Street to the intersection of the frontage road (also East Point Douglas Rd). There will be portions of time (approximate end of May to early August) when the section of East Point Douglas Road south of 80th Street will be closed for construction, so access to the site will need to occur from the frontage road. More coordination will need to occur during construction, once the city's contractor determines a schedule.
    a. The frontage road portion of East Point Douglas Road along TH-61/10 will be reconstructed in 2027.

Sheet C400:

6. Concrete driveway aprons shall be constructed in accordance with city standard detail STR-17.
    a. As depicted, the concrete apron appears to extend too far into the street.
    b. The apron on the east side of the site shall be placed prior to wear course paving on East Point Douglas Road (approximately October, schedule to be coordinated with the City during construction).

Bolton & Menk is an equal opportunity employer.

7. The exposed 2-ft exposed aggregate strip should be provided for sidewalk work on the east side of the site, matching the existing conditions.
8. An encroachment agreement for the private sidewalk in right-of-way will be required.
9. Generally, a 6-ft sidewalk should be provided along the frontage road.
    a. On the northwest side, sidewalk should be removed to and connect to the existing pedestrian ramp at the neighboring property. The new sidewalk can transition from the existing 8-ft wide ramp to the new 6-ft ramp proposed with this project. 6-ft walk can then be extended along the south side of the property. A 2-ft exposed aggregate strip shall be provided at any point where the sidewalk is 2-ft or less behind the curb and gutter.
10. Clarify why wheel stops are being provided when it appears 6" barrier curb is proposed, based on elevations on Sheet C500 and keynotes related to curb transitions and curb ramps on this sheet.
11. Easements:
    a. Provide additional right-of-way easement for the existing sidewalk in southeast corner of the site. The easement should extend 3-ft beyond the edge of the sidewalk in all locations
    b. Provide a drainage and utility easement over the sanitary sewer main along the south side.
        i. The easement should extend 15-ft north of the existing sanitary sewer pipe and as far south as the existing Drainage and Utility easement over the storm pipe.
    c. Provide a perimeter 10-ft perimeter drainage and utility easement on the other three-sides of the property.
12. Do not provide crosswalk markings on the concrete aprons in city right-of-way or easement.
13. Stop bars and stop signs appear to be depicted but are not labeled with keynotes.

<u>Sheet C500:</u>

14. Label the 100-year high water level within the filtration basin.
15. Clearly label all basin and local drainage emergency overflow locations and elevations on the plan to ensure conformance to city freeboard standards.
16. The last storm structure prior to a pond shall include a sump.
    a. Please add 3' sumps within CBMH4 and CBMH9 for pretreatment.
17. Freeboard Standards:
    a. For stormwater facilities with emergency overflows, the low adjacent grade elevation for all new structures must be a minimum of 3 feet above both the peak surface water elevation for the 100-year precipitation event and 2 feet above the emergency overflow elevation of any immediately adjacent new stormwater basin.
    b. For backyard and side-yard conveyance and temporary ponding areas, there must be at least 1 foot between the overland overflow elevation and the low adjacent grade elevation of the adjacent structure.

c. Freeboard: The Building FFE is shown on the plans as elevation 800.0 feet. The highwater level simulated within the filtration basin is 797.48. This does not meet the minimum 3 feet freeboard requirements between the 100-year HWL and the FFE. Additionally, there needs to be a minimum 2 feet of freeboard between the EOF and the FFE. Please work to comply with the freeboard requirements.

Sheet C501:

18. Provide confirmation of existing sanitary pipe elevations along the south side of the site vs. the proposed storm crossing. The city's records (attached) indicate the sewer may be at a higher elevation than depicted on these plans.
19. Confirm and submit documentation of the existing storm sewer pipe sizes/elevations, as well as the diameter and materials of the existing manhole at the proposed storm sewer connection. There appears to be an intermediate slab and cone within the structure, so the connection should be better understood.
    a. It is not clear what the existing storm pipe labels (size, length, grade) are pointing to.
20. Evaluate potential conflicts with existing utilities; the proposed light pole should be shifted so it is not immediately on top of the existing sanitary sewer. Moving the light north towards the parking lot 10-ft from the sewer is preferred.
21. Filter Basin:
    a. Please show the layout and elevations of the proposed filter basin drain tile on the plans.
    b. Please show drain tile sizes and installation details including connections to the outlet structure and cleanouts. Please be consistent with the plans and the HydroCAD model (model simulates the drain tile as 6" diameter at elevation 793 and 0% grade).
    c. Filtration BMP Notes: The stormwater narrative report explains that: "*Due to the existing soil conditions on the site, the previous use of the property, and its proximity to the wellhead protection 10-year composite groundwater capture zone, filtration techniques will be used to achieve water quality standards*." The filtration BMP notes include comments focused on infiltration basins such as the requirement: "After initial excavation and rough grading, provide a minimum of two (2) double ring infiltrometer tests with the infiltration area…" Please review the notes to focus on the proposed filtration basin needs.
    d. FES 6 and FES 11 labeled invert elevations are 794.16 and 793.47, which are below the bottom elevation of the filter basin. Please match the invert elevations to the proposed filter bottom elevation and extend the pipes to the filter bottom.
    e. Please include typical cross section and details of filtration basin.
    f. Filter media: For a successful vegetation establishment, the City recommends providing a Filter Topsoil Borrow (MnDOT 3877.2G) consisting of 70% sand (meeting the gradation requirements of 3126 "Fine Aggregate for Portland Cement Concrete") and 30% Grade 2 Compost (MnDOT 3890). Lower compost levels have typically proved difficult when establishing vegetation in basins. Please include a filtration soil media within the filter basin to match the City standard mix or explain the approach.

Sheet C502:

22. Detail STO-16 represents a skimmer structure with a submerged opening in the front of the structure. Sheet C501 depicts a pipe and flared-end section in front of the structure, so it doesn't appear detail STO-16 is appropriate. Please create a detail for the structure, labeling rim and outlet pipe elevations, and if a weir wall is intended within the structure, label and depict those features.

Sheet C600:

23. Only DIP watermain will be allowed; please revise all plan notes accordingly (#5, #12).
    a. A wet tap of the existing city main should be noted (city detail WAT-5).
24. The proposed water connection will need to consider the city's schedule related to the 2026 80th Street/East Point Douglas Rd project. This connection cannot impact new work on East Point Douglas Rd in 2026. If schedules cannot be coordinated, the water connection should occur on the frontage road side of the site.
25. Similar to previous comments, provide confirmation of existing sanitary pipe elevations along the south side of the site to ensure the sanitary design as proposed will work.
26. Clarify "Doghouse SS-15" as it appears to be a new manhole.

Sheet C601:

27. It doesn't appear that detail SER-2 will be used. Remove if it will not be used or clarify where it's intended.

Sheet L100:

28. The city will allow shrubs in utility easements, acknowledging they are the responsibility of the property owner and will be at risk for replacement if the City needs to do any utility work.
    a. Similarly, trees can remain in the 10-ft easement that is being requested on the west side of the site acknowledging they could be at risk of future city work.
29. It is not recommended to plant trees within 5-ft of the private water service pipe or private storm sewer.

Sheet L101:

30. Irrigation: clarify irrigation is intended for all sodded areas onsite, including turf areas in the public right-of-way abutting East Point Douglas Road.

Stormwater:

31. Consider using an infiltration basin in lieu of filtration. The site is outside the 10-year capture zone.
32. HydroCAD:
    a. HydroCAD is simulating two primary outlets for the filter basin 1P: 18" RCP and a 4' weir at elevation 796.72 feet (elevation of the water quality treatment volume). If the weir is intended to flow to the outlet pipe, please adjust the routing within HydroCAD.
    b. Sheet C501 shows a 12" HDPE filter basin outlet pipe at elevation 793.4 and 3.5% grade. HydroCAD is simulating an 18" RCP at elevation 793 and 1.5% grade. Please update the plans and model to be consistent on pipe diameter, material, slope and elevation.
33. MIDS Water Quality Model:
    a. For water quality analyses using the MIDS model, the South Washington Watershed District (SWWD) Standards Manual (November 2023) includes required adjustments to

the MIDS model listed below. Please update the model retention requirement and TP EMC values.

Model	*Parameter*	*Required*
MIDS	*Retention Requirement*	*1.0 inch*
MIDS	*Total Phosphorus EMC, Change from Default 0.3 mg/l*	*0.31 mg/l*

The Standards Manual is available at the link below:
SWWD_Standards-Guidance-Manual_Final_11062023.pdf (swwdmn.org)

34. The water quality summary table on Page 6 of the Stormwater Report has the "TSS" and "TP" row names flipped in the table. Please correct the row names. The proposed loading and percent retained values shown in the table reflect the BMP outflows rather than the outflows from the whole site. Please update the water quality summary table to include proposed loads and percentage retained values for the whole site.

35. The conclusion listed on Page 7 of the Stormwater Report indicates that the proposed project TP loading exceeds the allowable loading by 0.53 lbs./year. Please correct the exceedance value to 0.78 lbs./year as shown in the table below.

    a. If the on-site BMPs are not sufficient to achieve the required TP rates, one option is to convert the filter basin to an infiltration basin, another option is to pay a TP mitigation cash dedication. The cost for commercial development is $22,868.00 per lb. of TP removal (or $17,837 for 0.78 lbs. of credit).

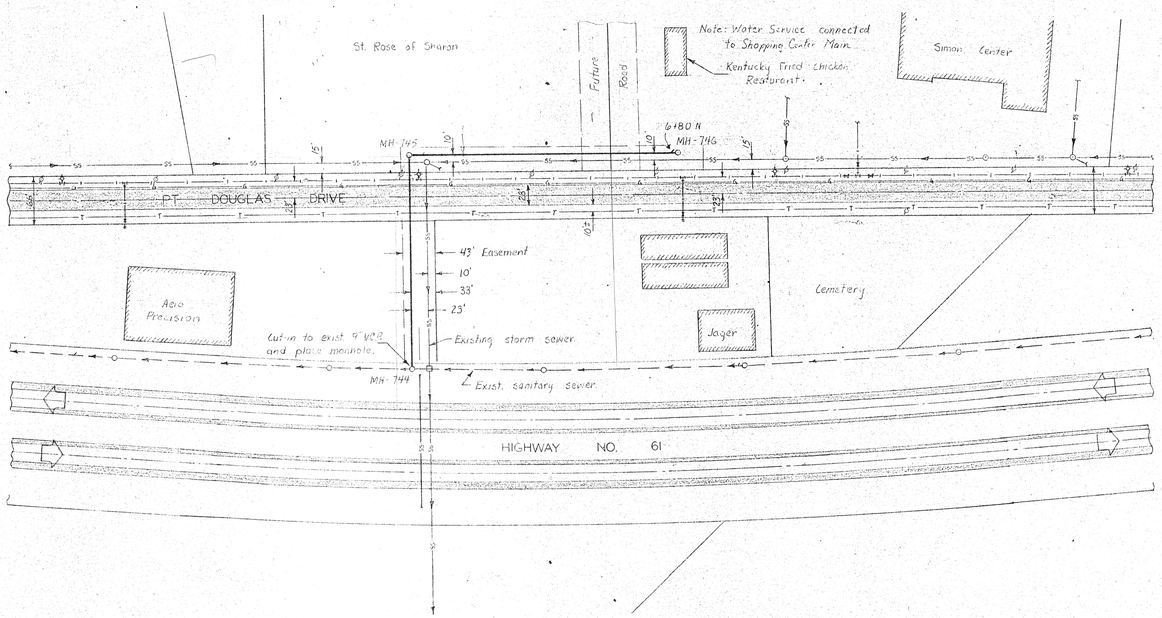
Total Phosphorus Credits		
Allowable loading rate (0.22 lbs/acre/year)	0.28	Lb./Year
Total phosphorus load	1.62	Lb./Year
Total phosphorus removed by filter BMP	0.56	Lb./Year
Total Phosphorus Exported	1.06	Lb./Year
Excess phosphorus above allowable	0.78	Lb./Year
Cost of phosphorus credits ($22,868/lbs.)	$17,837	$

36. Testing: The City will require post-construction testing to verify the filtration rate and drawdown period of any filtration basin.

37. The City will require an executed stormwater maintenance agreement for the proposed stormwater features on the site.

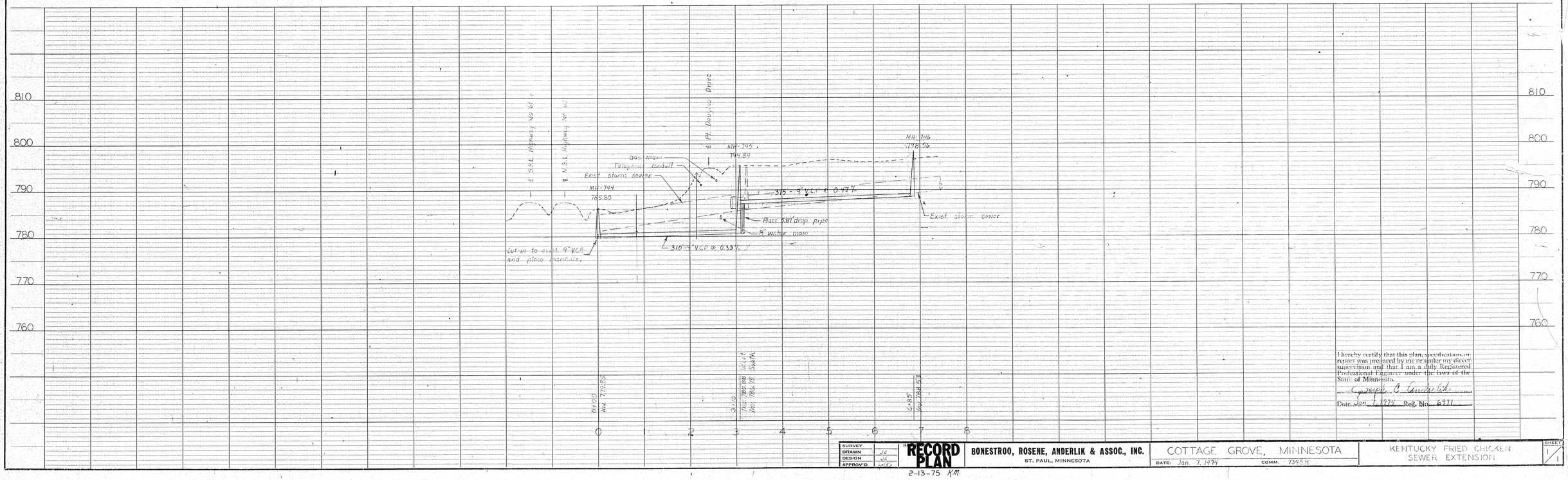
38. NPDES Construction Stormwater Permit: As this project disturbs more than 1 acre, an NPDES Construction Stormwater Permit and SWPPP will be required.

39. Models: Please note that digital copies of the final version stormwater models and shapefiles or CAD drawings of existing and proposed drainage areas are to be submitted to the city once the review and revision process is complete.



POINT DOUGLAS DRIVE

Scale: 1" = 100' Horz.
1" = 10' Vert.



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

Joseph C. Anderlik

Date Jan. 7, 1974 Reg. No. 6971

SURVEY	
DRAWN	JA
DESIGN	JA
APPROV'D	JAC

RECORD PLAN

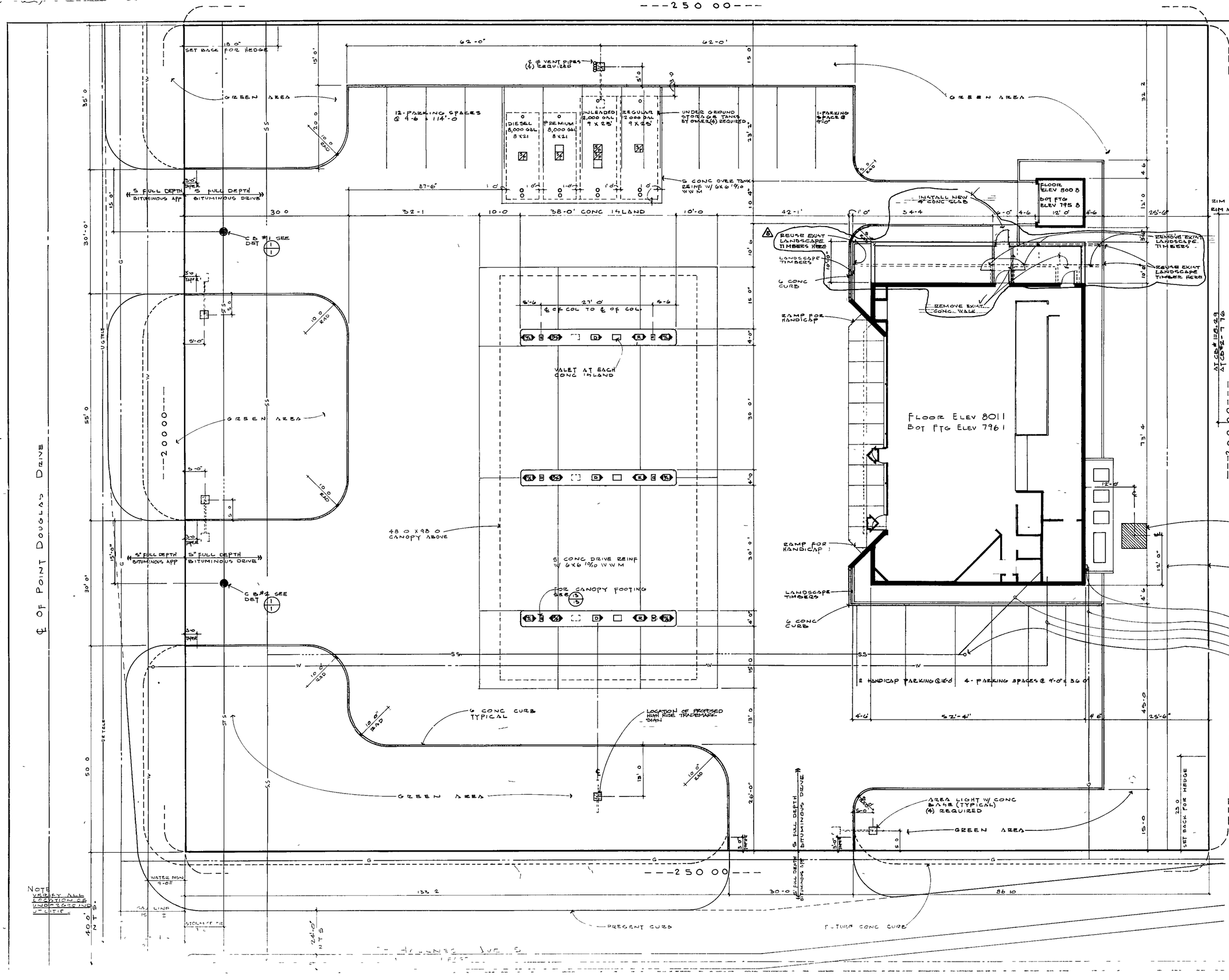
2-13-75 KM

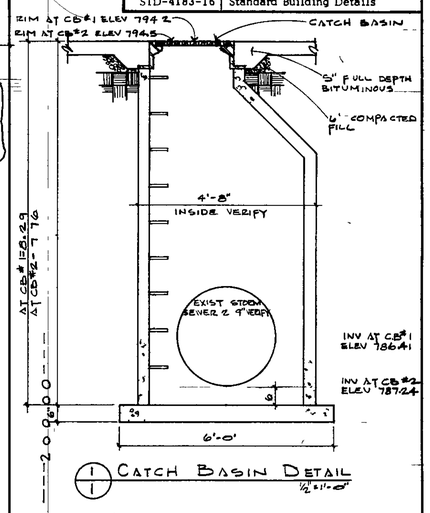
BONESTROO, ROSENE, ANDERLIK & ASSOC., INC.
ST. PAUL, MINNESOTA

COTTAGE GROVE, MINNESOTA
DATE: Jan. 7, 1974 COMM. 7348H

KENTUCKY FRIED CHICKEN SEWER EXTENSION

SHEET 1/1





1/1 CATCH BASIN DETAIL
1/2" = 1'-0"

BENCH MARK:
TOP OF NUT OF FIRST HYD ELEV 798 04

CITY OF COTTAGE GROVE
BUILDING INSPECTION DEPT
OFFICIAL [signature] DATE 1-30-85

ISSUE NO.	DATE	DRAWN BY	CHECKED BY	ISSUE DATE
5	1/4/85	NEW ADDITION CB		
4	4/30/82	CURB ADDED @ BLDG. CB		
3	11/25/81	ISSUED FOR CONSTRUCTION CB		
2	11/13/81	ADDITIONAL PARKING CB		
1	10/28/81	ISSUED FOR PERMITS CB		

SUPERAMERICA
DIVISION OF ASHLAND OIL INC
SAINT PAUL PARK MINNESOTA

SITE PLAN
7160 POINT DOUGLAS DRIVE
COTTAGE GROVE, MINNESOTA

DRAWN BY C B | SCALE 1 - 10 0
APPROVED | P 4183-1

STAFF REPORT CASE: ZA/PUD/PP/MS2026-004

ITEM: 6.3

PUBLIC MEETING DATE: 2/23/26 TENTATIVE COUNCIL REVIEW DATE: 3/18/26

APPLICATION

APPLICANT: Twin Cities Land Development

REQUEST: A Zoning Amendment, Planned Unit Development (PUD), Preliminary Plat, and Minor Subdivision to rezone 148.72 acres of land from AG-2, Agricultural, to R-4, Transitional Residential, for a subdivision consisting of 575 residential lots, including 306 townhome lots and 269 single-family lots.

SITE DATA

LOCATION: East of Keats Avenue (CSAH 19) at 77th St. and South of 70th St.

ZONING: AG-2, Agricultural

GUIDED LAND USE: Low Density Residential, Medium Density Residential, High Density Residential, Parks/Open Space

LAND USE OF ADJACENT PROPERTIES:	CURRENT	GUIDED
NORTH:	Agricultural	Medium Density Residential
EAST:	Agricultural	Low Density Residential
SOUTH:	Agricultural	Low Density Residential
WEST:	Residential	Low Density Residential

SIZE: 148.72 acres

DENSITY: 4.35 units per acres

RECOMMENDATION

Approval, subject to the conditions stipulated in this staff report.

COTTAGE GROVE PLANNING DIVISION

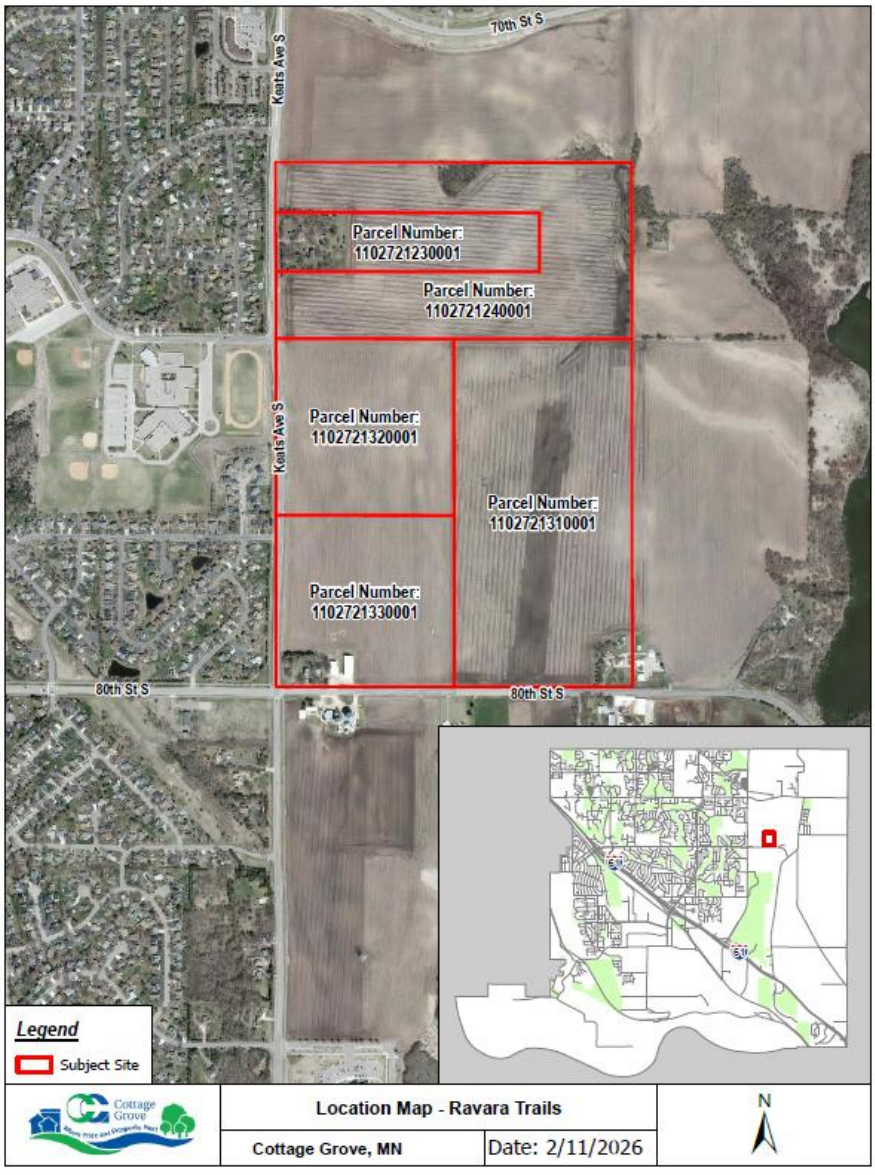
Planning Staff Contact: Samanth Pierret, Senior Planner; 651-458-2825; spierret@cottagegrovemn.gov

Application Accepted: 12/31/2025 120-Day Review Deadline: 4/30/2026

Planning Staff Report
Ravara Trails
Planning Case No. 2026-003ZA, PUD, PP, MS
February 23, 2026

Proposal

Twin Cities Land Development has submitted an application for a Zoning Amendment, Planned Unit Development (PUD), Preliminary Plat, and Minor Subdivision for a subdivision consisting of 575 residential lots including 306 townhome lots and 269 single-family lots. The subject site is located east of Keats Avenue (CSAH 19) north of 77th Street and south of 70th Street and consists of five parcels totaling approximately 239.5 acres. The proposed development will be on 148.72 acres. The Applicant is proposing to rezone the subject site to R-4, Transitional Residential District.



Review Schedule
Application Received: December 31, 2025
Planning Commission Meeting: February 23, 2026
Tentative City Council Meeting: March 18, 2026
120-Day Review Deadline: April 30, 2026

Background

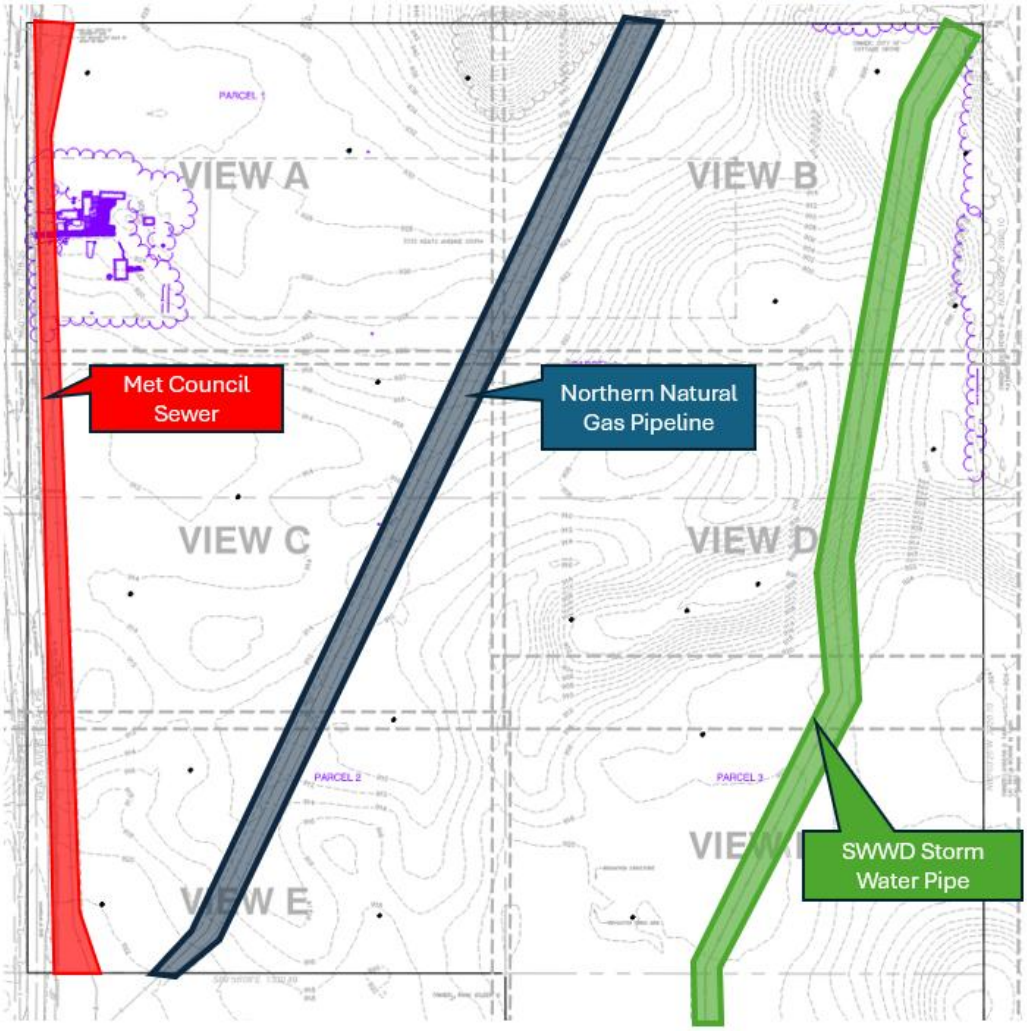
Site Conditions
The subject property consists of five parcels totaling approximately 239.5 acres. The proposed development will be on 148.72 acres. Currently, there are three dwellings on these parcels. The two farmsteads accessed from 80th Street (10052 80th Street and 10478 80th Street) will remain as the proposed development will not impact these residences. One dwelling accessed from Keats Avenue (7333 Keats Avenue) will be removed in preparation for the proposed development. A majority of the parcels are currently used as tilled cropland.



Existing Conditions

A pipeline easement in favor of Northern Natural Gas runs through the center of the development area. The Met Council sanitary sewer line runs along Keats Avenue on the west side of the

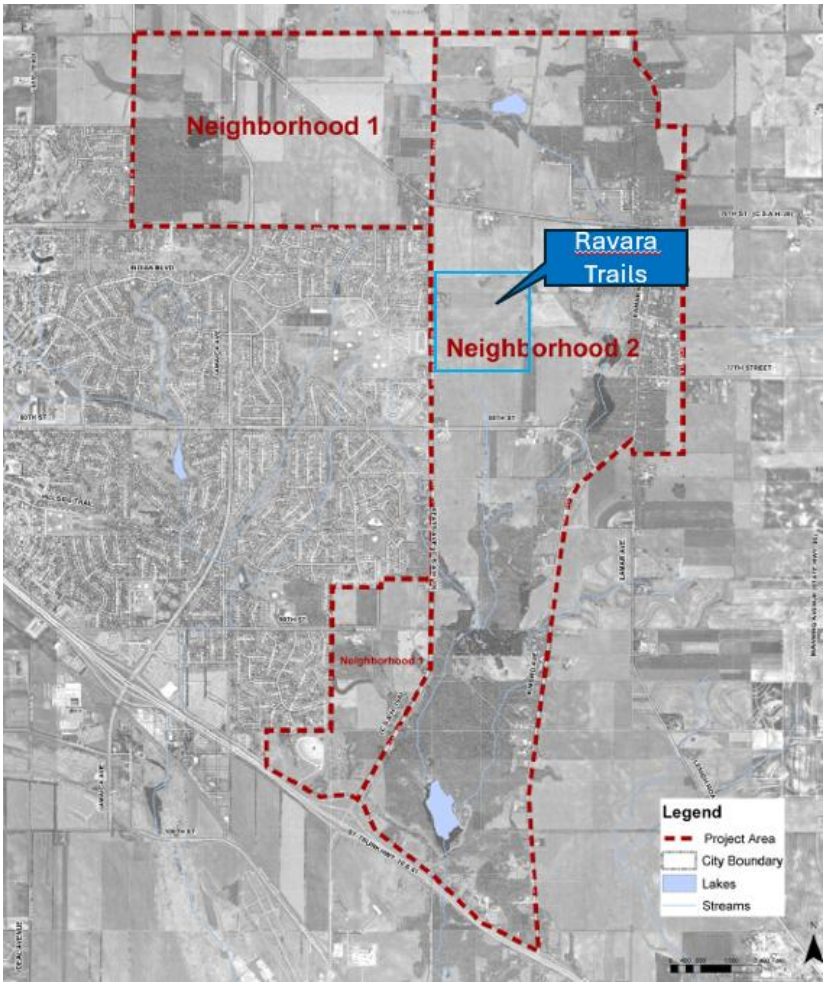
development area, and the South Washington Watershed District storm water pipe is located in an easement on the east side of the project area.



Existing Easements

East Ravine Master Plan

The East Ravine Master Plan was adopted in 2006 to plan and guide future development in the East Ravine Area. The Master Plan describes land use designations, major roadway alignments, parks and open space locations, and the types of utility extensions necessary to serve the area. One of the goals of the Plan is to provide an attractive residential environment that encourages a range of housing opportunities including move-up housing. The Plan area was divided into two zones, Neighborhood 1 and Neighborhood 2. Ravara Trails is located in Neighborhood 2. This area of Neighborhood 2 was planned for medium to low density residential development connected to the future parkway system and open space system via trail segments and greenways. Neighborhood 2 was planned as an attractive living environment for a wide range of housing types.

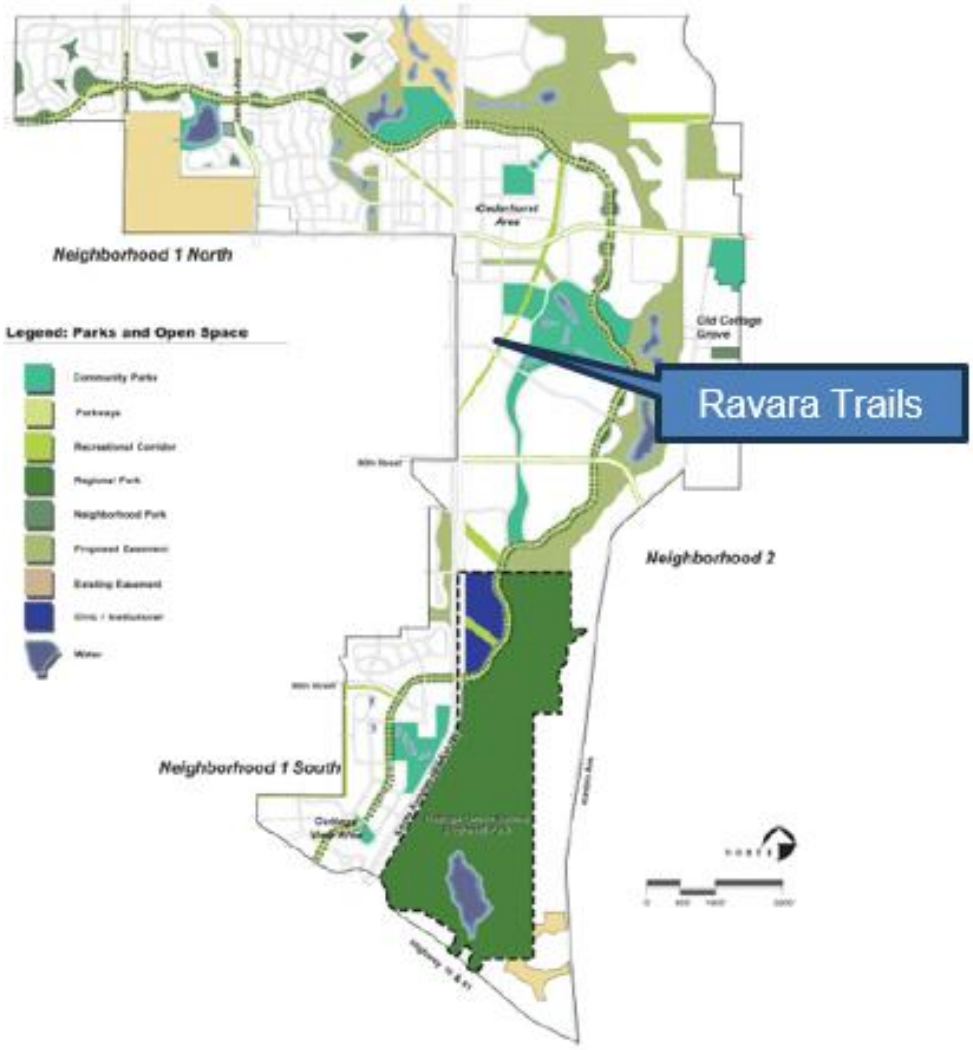


East Ravine Master Plan Neighborhoods - 2006

The Master Plan envisioned the utilization of townhomes and rowhouses with rear garage orientations to keep trash collection and surface parking in the rear of homes with individual units still having a public walk-up, front door access. Low Density areas were anticipated to have large estate lots 85 feet wide or greater and narrower lots between 65-75 feet wide. Over the years, minimum density requirements have increased and narrower lots have become more commonplace by the housing market. Ravara Trails is proposed to have 40-foot-wide and 65-foot-wide lots.

One of the critical features of the Master Plan was the creation of the parkway (Ravine Parkway) to establish a “central spine” through the project area. The parkway would have harmonious design elements such as lighting, plantings, colors, and textures. A segment of Ravine Parkway will be constructed in conjunction with the Ravara Trails development.

A Parks and Open Space Schematic was prepared which showed neighborhood parks, community parks for more intensive recreational activities, and trails along all major roadways (Keats and the parkway). A neighborhood park is proposed in Ravara Trails (Outlot L), and some acreage will be dedicated towards the future community park north of 80th Street to meet park dedication requirements for Ravara Trails.

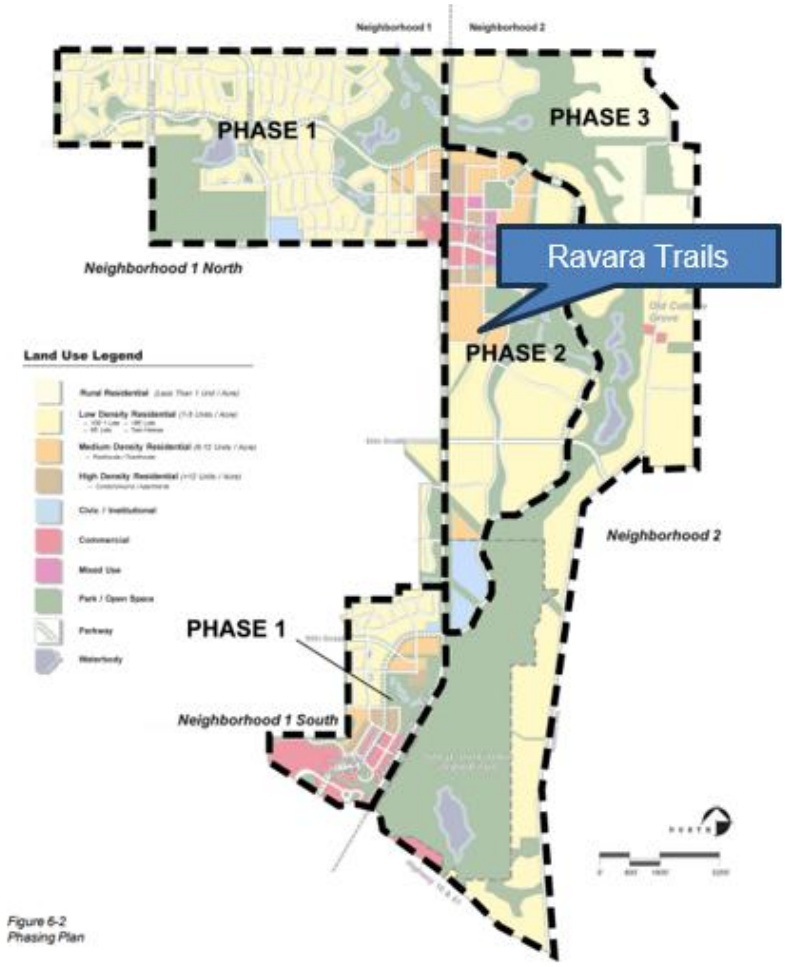


East Ravine Master Plan Parks & Open Space

Planning for utilities in this area included stubbing into the Met Council's sewer interceptor. The Ravara Trails area was in Phase 1 where access is readily available. A water tower is anticipated to be needed near Keats and 70th Street. Stormwater management was proposed to be addressed using a system of ponds and infiltration basins along parkways and in green spaces.

It was anticipated that implementation of the East Ravine Master Plan would be a phased approach taking 20 years or more. The Ravara Trails area was anticipated to develop as a Phase 2 after Neighborhood 1 was close to being built out (which it has).

The proposed Ravara Trails development is meeting several of these goals and standards as seen in the following report.



East Ravine Master Plan – Phasing Plan

AUAR

Part of the East Ravine Master Plan process was completion of an Alternative Urban Areawide Review (AUAR) for the East Ravine neighborhoods. AUARs are used to understand cumulative development/land use impacts at a high level when site and project specifics are unknown.

The AUAR was originally completed in 2005 and is required to be updated every five years to remain valid. The AUAR was most recently updated in November 2025. The 2025 update reflected current conditions including the completion of several residential neighborhoods in Neighborhood 1 and updated traffic volumes. Climate adaptation and resilience information was included as required in the 2025 update and included recommendations encouraging lighter colored roofing, using Stormwater Management Best Practices, and encouraging more vegetation to reduce urban heat islands.

A Mitigation Plan is also part of the AUAR and includes compliance with floodplain regulations, requiring landscape buffers along major roadways, requiring green space that minimizes the need for irrigation, including residential design standards that ensure a variety of housing design, and monitoring actual development versus the AUAR assumptions using the City's GIS system.

The proposed Ravara Trails development is in compliance with the AUAR as seen in the following report.

Planning Considerations

Rezoning and Comprehensive Plan

The subject properties are currently zoned AG-2, Agricultural, and are guided a mixture of Low Density Residential, Medium Density Residential, High Density Residential, and Parks/Open Space in the 2040 Comprehensive Plan. The Comprehensive Plan guides the actions of the community by presenting a vision for the future by identifying policies, strategies, and investments the community will undertake while providing a repository of information. All land use decisions must be consistent with the Comprehensive Plan. Zoning regulations specifically define how land can be used. Zoning divides a jurisdiction into multiple districts, and the Zoning Ordinance provides regulations that guide community development and growth within each district. The zoning regulations are the primary tool used to implement the City's vision in the Comprehensive Plan.



The Applicant is requesting to rezone the properties from AG-2 to R-4, Transitional Residential, which would be in accordance with the long-term growth plan for the parcels. Only 3.77 acres of parcel 1102721330001 (10052 80th Street) and 24.06 acres of parcel 1102721310001 (10478 80th Street) will be rezoned after being split via the Minor Subdivision process. The remaining acreage will remain zoned AG-2 so the current landowners may continue to use the properties for agricultural activities.

Low Density Residential as defined in the Comprehensive Plan allows for 2 to 4 units per acre density, Medium Density Residential allows for 5 to 13 units per acre density, and High Density Residential allows for 14 to 30 units per acre density. The R-4, Transitional Residential District, is intended to provide transitional areas that will allow a mixture of single family detached and single family attached dwellings on smaller lots where property is adjacent to a minor or major collector street and/or where property is adjacent to higher intensity development or land use.

The Applicant is proposing 4.35 units per net acre. Net density is defined as, "The total number of units divided by the total land area less major right of ways (arterials and collectors) and less wetlands protected by the Wetland Conservation Act, provided that the right of way (including major roads) shall not be deducted if dedicated to the City at no cost." The Ravara Trails calculation is shown below:

Gross Acreage of Ravara Trails Development: 148.72 acres
Subtract Existing ROW Keats Avenue: 3.55 acres
Subtract Proposed ROW Ravine Parkway, Keats Avenue, and Indian Blvd: 16.68 acres
Equals Net Acreage: 128.49 acres

Dividing 575 total housing units by the net acreage of 128.49 acres to get 4.5 units per acre. At 4.5 units per acre, the Ravara Trails development falls between Low and Medium Density residential classifications in the Comprehensive Plan. Density is being averaged across the development area including the low-, medium-, and high-density residential areas. The Applicant has clustered the urban townhomes in the area guided for Medium Density Residential and proposed single family lots in the area guided Low Density Residential. The proposed density configuration meets the Comprehensive Plan's guidance for density clustering, keeping higher density residential along Keats Avenue on the northwest side of the development and maintaining single family residential on the south and east sides of the development.

The proposed preliminary plat is consistent with the 2040 Comprehensive Plan in the following ways:

- The Land Use Map in the 2040 Comprehensive Plan identifies the future land use development of the subject property as low to high density residential and parks/open space. The Developer is proposing a mixture of townhomes and single-family lots for the subject property with a neighborhood park, which is consistent with the 2040 Comprehensive Plan.
- The proposed density of 4.5 units per acre is consistent with the Low Density Residential (1-4 units per acre) and Medium Density Residential (5-13 units per acre) land uses.
- The proposed development helps provide the City with a diverse mix of housing types that are needed to serve various income levels and stages of life.
- The proposed preliminary plat and grading plan are consistent with the given land use designation for this area.

Housing Needs Analysis
Maxfield Research and Consulting completed a Housing Needs Analysis (HNA) for the City in 2024. The HNA provided recommendations on the amount and types of housing that should be developed to meet current and future needs of the community.

Single Family Lots:
It is anticipated there will be demand for an additional 1,317 single-family units by 2030 and 1,139 single-family units by 2035. These numbers did not take into account platted lots or lots under active construction during the study period. Subtracting single family lots platted after the study period (Lochridge), there is still demand for 1,269 single family lots by 2030. The Ravara Trails development proposes to plat 269 single family lots leaving approximately 1,000 single family lots to be platted by 2030 to meet market demand.

Townhome Lots:
It is anticipated that there will be demand for an additional 593 owned multi-family units (townhomes) by 2030 and 631 owned multi-family units by 2035. Subtracting townhome lots platted after the study period (Lochridge), there is still demand for 545 multifamily lots by 2030.

The Ravara Trails development proposes to plat 306 townhome lots leaving approximately 239 multifamily lots to be platted by 2030 to meet market demand.

Preliminary Plat

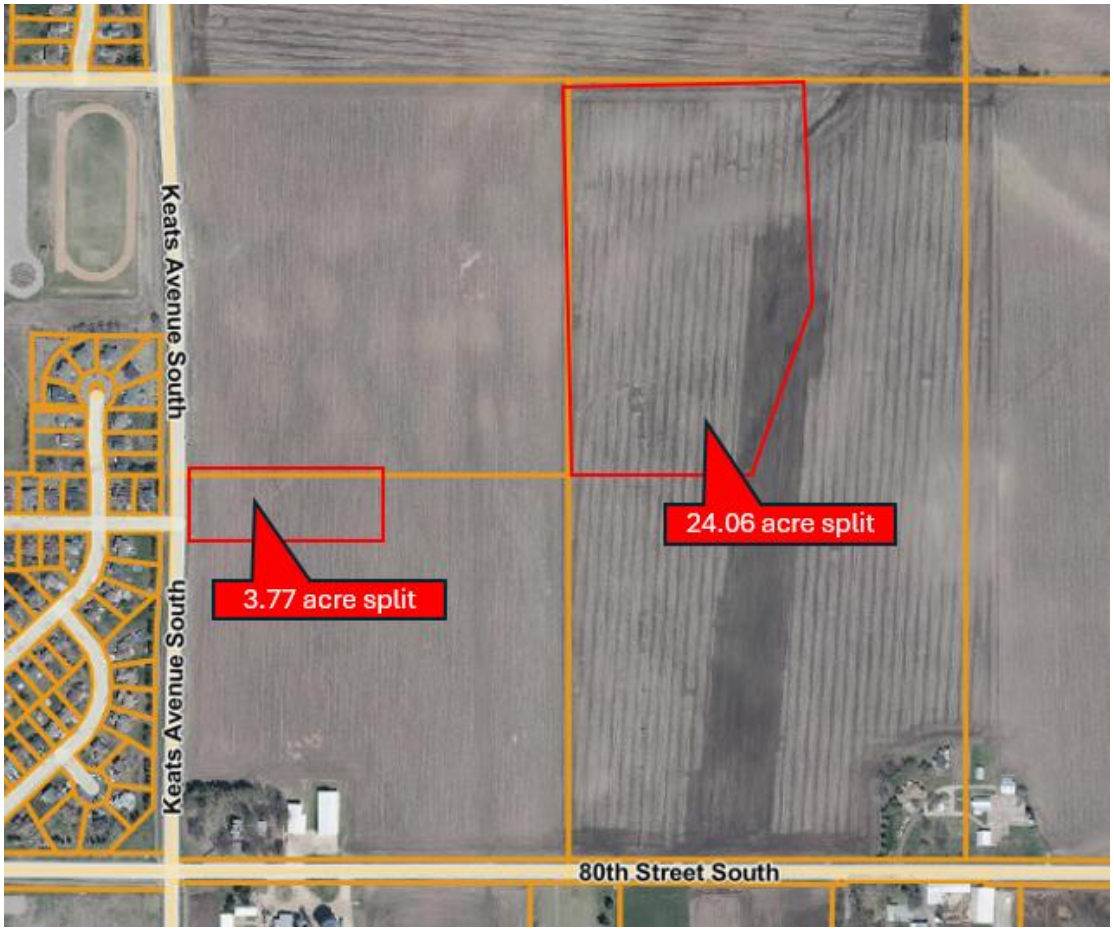
The preliminary plat, as proposed, depicts a logical development given the performance standards of the zoning district. The plat consists of 575 owner-occupied townhome and single-family units. The Applicant has proposed 192 urban townhome lots (garage in rear), 114 suburban townhome lots (garage at front), 105 villa single family lots (40 feet wide), and 164 65-foot-wide single-family lots. The townhomes will be attached in groups of three, four, five, and six units.



The preliminary plat includes proposed Roads A and I terminating at the northern boundary of the development. A temporary turnaround shall be included for vehicles to turn around at Road I until future development is connected from the north. Road A shall have future road connection barricades and signage until future development connects to the north. Barricades are suitable at Road A because there are no residential lots fronting on this section of Road A. Utilities will be stubbed in Roads A and I in anticipation of future development on the north side of the development. A segment of Ravine Parkway will also be constructed to the northern boundary of the project. Utilities will be stubbed across Ravine Parkway at Indian Boulevard in anticipation of future development to the east and northeast. The Applicant has also proposed to bring 77th Street across Keats Avenue as a second access to the development. Utilities will be stubbed at 77th Street and Road C to facilitate future utility connections when 77th Street is extended.

Minor Subdivision

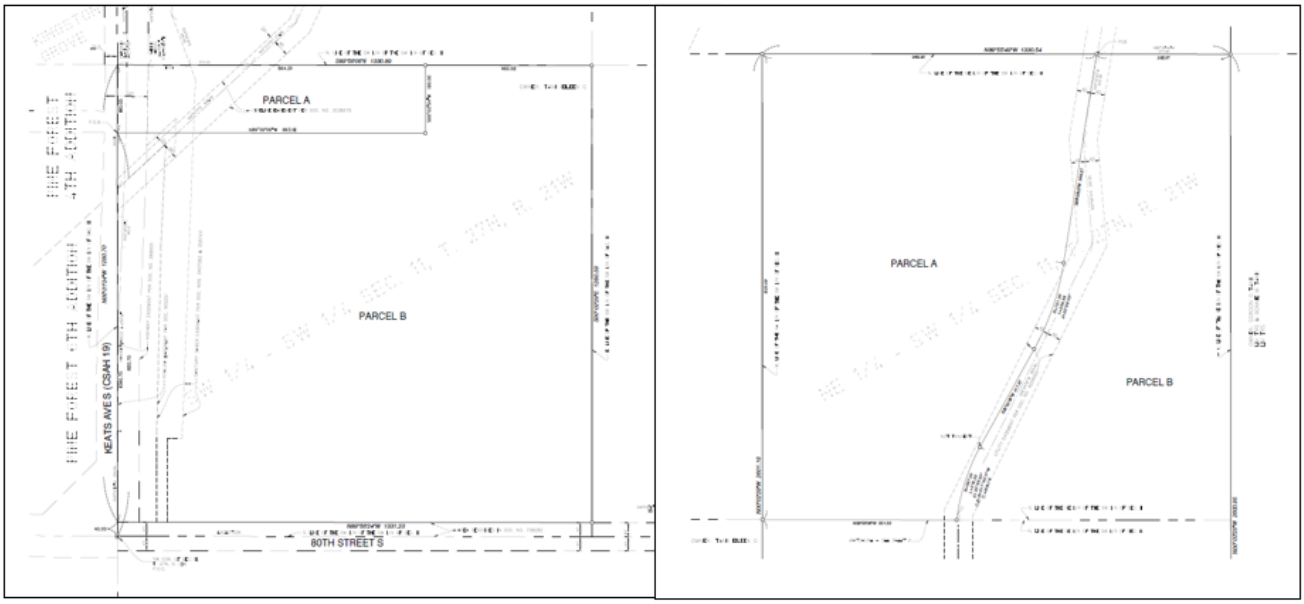
The Applicant has requested to split 3.77 acres from parcel 1102721330001 (10052 80th Street) leaving 35.36 acres as tilled farmland with the farmstead to be owned by the current landowner. The Applicant has also requested to split 24.06 acres of parcel 1102721310001 (10478 80th Street) leaving 55.41 acres as tilled farmland with the farmstead to be owned by the current landowner.



Proposed Minor Subdivisions

Splitting the properties is allowed without platting via a Minor Subdivision per Title 10-2-1 of the Cottage Grove Subdivision Ordinance, which states that platting may be waived for the division of a single parcel of land into two separate parcels. The newly created parcels must meet all requirements of the Subdivision and Zoning Ordinances and be located in the R-1, R-2, AG-1, or AG-2 Districts.

The parcels are currently zoned AG-2 and the remaining acreage with farmsteads and tillable fields will be greater than the minimum lot size of ten acres. The acreage to be split must immediately be combined with land in the Ravara Trails plat to ensure lots greater than ten acres are created.



Minor Subdivision Surveys

Planned Unit Development

The Planned Unit Development (PUD) is a zoning tool that provides additional flexibility for development that an underlying zoning district would not otherwise allow. For example, a PUD may make exceptions to setbacks or lot widths. To provide multiple product types on varying lot sizes, the Applicant is proposing lot width and side yard setback reductions and flexibility from the required landscape buffer along major roads. A PUD is also required to allow private streets in the townhome areas. In return for the flexibility, the Applicant will plat lots for a variety of life-cycle home products including attached townhomes, villas, and traditional single-family homes. The Applicant has also included guest parking lots in the townhome area, and the private streets will not allow parking on either side of the street. The proposed development meets or exceeds all other zoning code requirements.

Zoning Development Standards

The development performance standards of the requested zoning district classifications and those requested as part of the development are detailed below. The Applicant has requested a Planned Unit Development (PUD) as part of their application. The PUD would support multiple product types on varying lot sizes and the inclusion of private streets in the townhome areas.

The development performance standards of the requested zoning district classifications are detailed below. As part of the PUD request, the Developer is proposing 40-foot-wide lots with reduced side yard setbacks on the house side. These adjusted setbacks allow for the lots to support varying product types within the development. Reduced side yard setbacks were approved for the 40-foot-wide lots in Mississippi Landing and Settler's Bluff developments.

Lot Development Performance Standards			
Standard	**R-4 District**	**Proposed 40' Lot Width**	**Proposed 65' Lot Width**
Minimum lot width at the front setback	45 feet	**40 feet**	65 feet
Minimum side yard setback, house	7.5 feet	**5 feet**	7.5 feet
Minimum side yard setback, garage	5 feet	5 feet	5 feet
Minimum front yard setback	25 feet	25 feet	25 feet
Minimum rear yard setback	30 feet	30 feet	30 feet
Corner lot setback	20 feet	20 feet	20 feet
Maximum Principal structure height	35 feet	35 feet	35 feet
Maximum Impervious Surface Coverage	50%	50%	50%

Townhome building units must have a fifteen foot setback between buildings; ten feet for residential garages; be at least 25 feet from R-1, R-2, and R-3 Districts; and have at least two paved off-street parking spaces. The proposed buildings comply with these distance and parking requirements.



Preliminary Plat

Proposed Development Outlots

The proposed preliminary plat creates 21 outlots throughout the development that are proposed to be owned by various entities in the long term. The table and image below provide the proposed outlots and the intended long-term ownership of each outlot.



Proposed Development Outlots

Proposed Development Outlots, Proposed Long-Term Ownership, & Proposed Use		
Proposed Development Outlot	**Proposed Long-Term Ownership**	**Proposed Use**
Outlot A	City	Stormwater pond
Outlot B	HOA	Entry monument and landscaping
Outlot C	Private Ownership	Engineer Review Memo requests Outlot C be incorporated into Lot 1 Block 3
Outlot D	City	Stormwater pond
Outlot E	City	Stormwater Pond
Outlot F	City	Stormwater pond
Outlot G	City	Paved trail in gas easement
Outlot H	City	Paved trail in gas easement
Outlot I	City	Open Space Reserved for Future Pedestrian Underpass, stormwater, Met Council Sewer Interceptor Easement
Outlot J	City	Paved trail in gas easement
Outlot K	City	Paved trail in gas easement
Outlot L	City	Future Neighborhood Park and Water Tower
Outlot M	HOA	Open space around suburban townhomes
Outlot N	HOA	Open space between suburban townhomes
Outlot O	HOA	Open space between suburban townhomes
Outlot P	HOA	Open space between suburban townhomes
Outlot Q	HOA	Open space between urban townhomes
Outlot R	City	Open Space Reserved for Future Pedestrian Underpass, stormwater, Met Council Sewer Interceptor Easement
Outlot S	City	Paved trail in gas easement
Outlot T	Developer	Future lot development area
Outlot U	City	Paved pedestrian connection to Ravine Parkway trail

Outlot T may be retained by the developer until future development connects to Outlot T. The developer that retains Outlot T must agree in the development agreement to negotiate in good faith with the current or future developer/property owner(s) to ensure that a residential lot can be created on Outlot T.

Park Land and Open Space

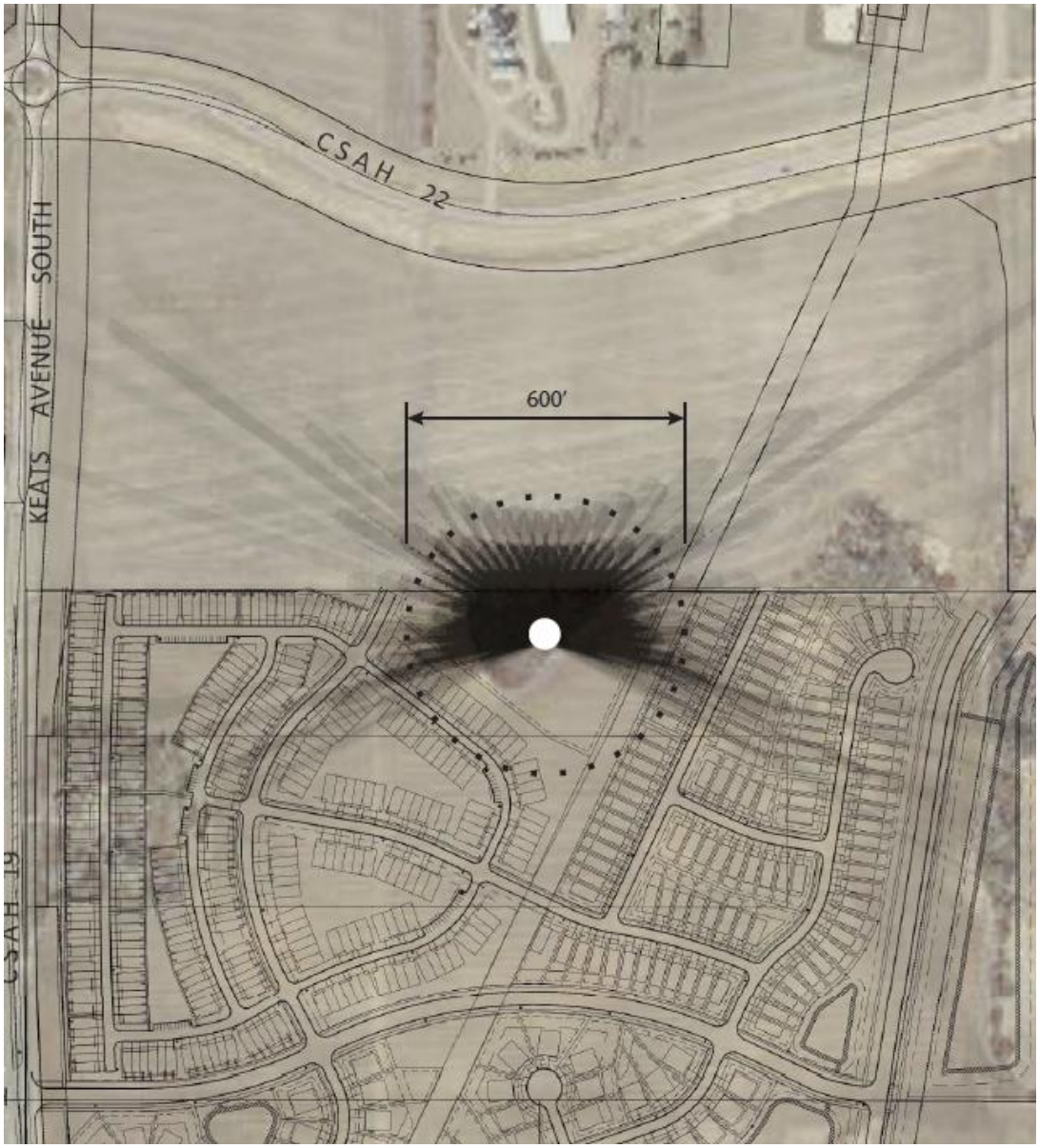
A minimum of 10 percent of developable area (development area less areas below the highwater level of ponding areas and right-of-way) shall be required to be dedicated for new developments to provide residents with public recreation facilities including parks and open spaces as a part of development projects per City Code Title 10-4-3. This equals 12.94 acres in the proposed Ravara Trails development.

Outlot L (4.15 acres) is proposed to be dedicated to the City for a future neighborhood park. The neighborhood park is included in the City's 2040 Comprehensive Plan. Outlot L does not comprise the entirety of the planned park area. Additional land from the parcel to the north will be dedicated upon development of that property to complete the planned park. The future neighborhood park will include a playground, covered shelter, sport court, and open space covered with native plantings. A water tower is planned to be in the center of the park on an existing high point. Vehicular access will be from the north at the time the parcel to the north develops. Park and open space markers are to be installed prior to issuance of a building permit for lots abutting park and open space as identified by the Parks and Recreation Director or their designee.



Preliminary Neighborhood Park Concept with Water Tower

A shadow analysis was performed on the proposed water tower location to analyze the impacts of shadows on proposed residential lots. While the study used existing grades and not the grades proposed in the Ravara Trails development, the analysis is beneficial to show areas that may be shaded at various portions of the day when the water tower is constructed.



Future Water Tower Shade Study

A community park is planned in the south/southeast portion of parcels 1102721420001 and 1102721310001 north of 80th Street. The preliminary Community Park Master Plan will also encompass some land along the north and west sides of Vandenberg Lake. The community park is preliminarily planned to have multiple ball fields, soccer fields, a skate park, splash pad, basketball courts, and a building with restrooms. A trail system will connect the park to planned conserved land along Vandenberg Lake. A canoe/kayak launch on Vandenberg Lake is also proposed. The park will be developed as future development east of Keats continues, as land is able to be acquired from property owners, and as funding is available. At this time, development of park amenities is not planned on the east side of the lake in Old Cottage Grove; however, the public will be able to access the entirety of the lake from the community park as it is a public waterbody.



Preliminary Community Park Concept

Some of the land proposed for the community park is owned by the Tank family, who owns a majority of the land within the proposed Ravara Trails development. Typically, required park areas are dedicated at such time the parcel is sold for development. Given members of the Tank family will retain acreage for farmsteads and tilled cropland that is planned for the future community park, the Tanks will dedicate some acreage towards the future community park to meet park dedication requirements of Ravara Trails.

To meet the required park dedication acreage, the Applicant will be dedicating Outlot L at 3.40 acres (4.15 acres minus water tower area of 1.5 acres). The Applicant will also deed Outlots G, H, J, K, and S to the City for a paved trail connection through the gas easement. The City will provide a credit for the construction of a paved trail in Outlots G, H, J, K, and S. This credit will be based on the estimated construction costs of the trail and is estimated to be an equivalent of 0.64 acres of park dedication. This dedication will be finalized through the development agreement. The trail acreage equivalent of 0.64 acres plus Outlot L dedication of 3.40 acres will be added

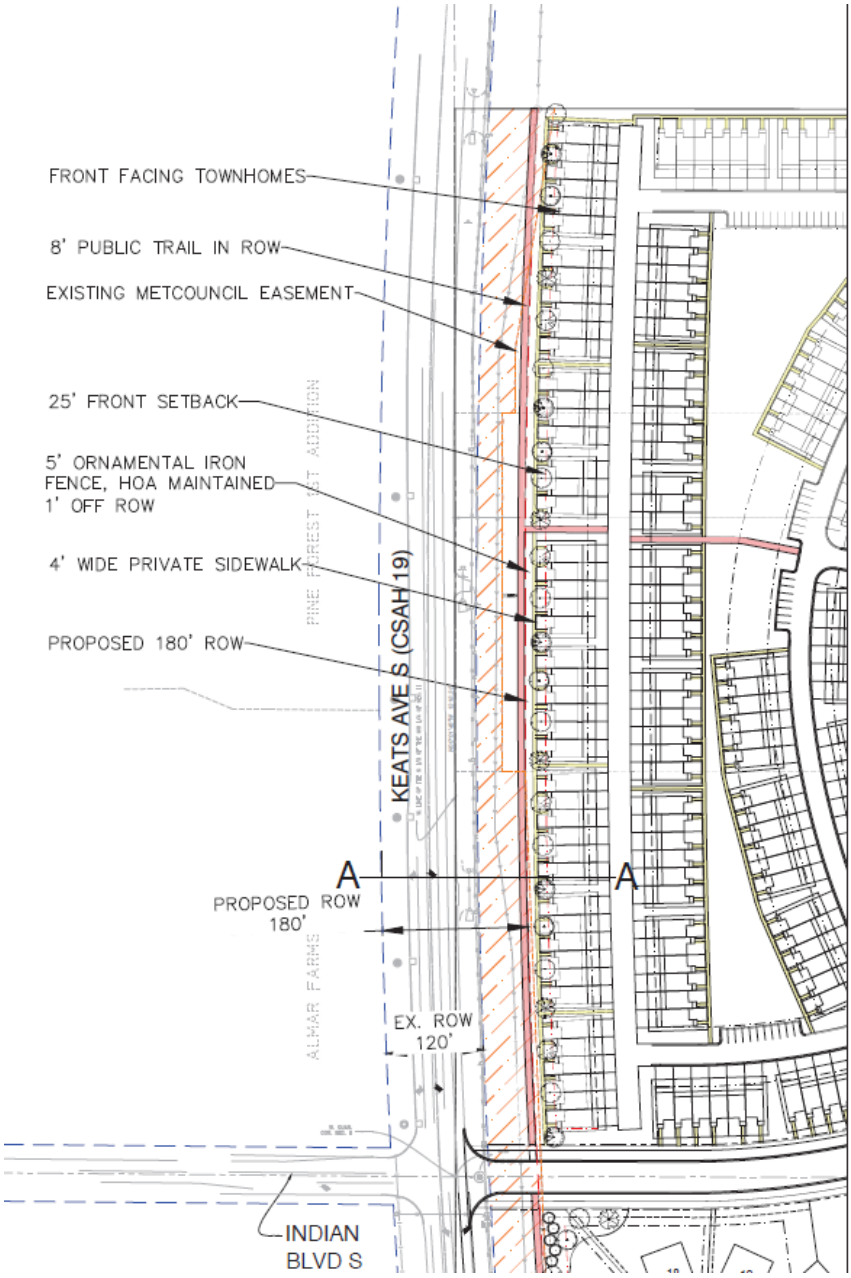
together (4.04 acres) and subtracted from the 12.94 acres of park dedication required. The remaining 8.90 acres will be dedicated and deeded to the city by the Tank family from parcel 1102721310001 in the area proposed for the future community park. A Memorandum of Understanding (MOU) must be signed by the Tanks and the City to document the park dedication requirement.



Transportation

The proposed development will have two access points off Keats Avenue (CSAH 19) at Indian Boulevard and 77th Street. The Applicant's engineer conducted a Traffic Impact Study (TIS) for Ravara Trails dated December 31, 2025. The TIS focuses on the traffic impacts to Keats Avenue. Keats Avenue is a two-lane undivided County roadway. The County recently convened a CSAH 19 Technical Advisory Committee that is actively studying the future of CSAH 19 from Highway 61 to Bailey Road in Woodbury. The City is represented by planning and engineering staff on the committee and the TAC is aware of the proposed Ravara Trails development.

The County requires 180-foot-wide right of way along Keats Avenue in anticipation of future expansion of Keats from two lanes to four lanes. The existing right of way in the area is 120 feet wide. No additional right of way can be obtained on the west side of Keats due to existing development; therefore, the Applicant needs to dedicate the additional 60 feet of right of way necessary to meet 180 feet of width. The Met Council Sewer Interceptor and easement are also located within that 180 feet of right of way.



Keats Avenue Right of Way

The proposed development is anticipated to generate approximately 4,456 daily trips. To facilitate traffic moving in and out of the development, the developer is responsible to construct northbound right turn lanes and southbound left turn lanes on Keats Avenue at 77th Street and Indian Boulevard. These turn lanes would prevent vehicles turning into the proposed development from blocking through vehicles on Keats Avenue. A segment of Ravine Parkway is also required to be constructed with a northbound left turn lane and southbound right turn lane into the proposed development at Indian Boulevard.

Intersections of Keats at Indian Boulevard and 77th Street were studied for proposed levels of service during peak a.m. and p.m. hours. Levels of Service (LOS) are ranked from A to F and correspond to the average delay per vehicle. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. The study also included the impacts to the intersection of Keats Avenue and 80th Street (anticipating the future roundabout) and the intersection of Keats Avenue and 70th Street. All intersections are expected to operate at an overall LOS B or better except for Keats Avenue and 70th, which operates at an overall LOS C during the peak p.m. hours only.

Turn lanes will be added and/or revised on Indian Boulevard and 77th Street as they intersect with Keats Avenue. The city has had conversations with Washington County regarding the final configuration of turn lanes on these intersecting streets. It is anticipated that each side street leg will have a combined through/left turn lane and a right turn lane to accommodate traffic, and additional right-of-way will be available to separate the combined through/left lanes in the future.

With the existing schools along Indian Boulevard, traffic along Keats Avenue is heavier in the area during drop-off and pick-up hours. Although traffic flow is slowed during these times, additional traffic control is not warranted at this time due to the limited hours of increased traffic.



Proposed Turn Lanes



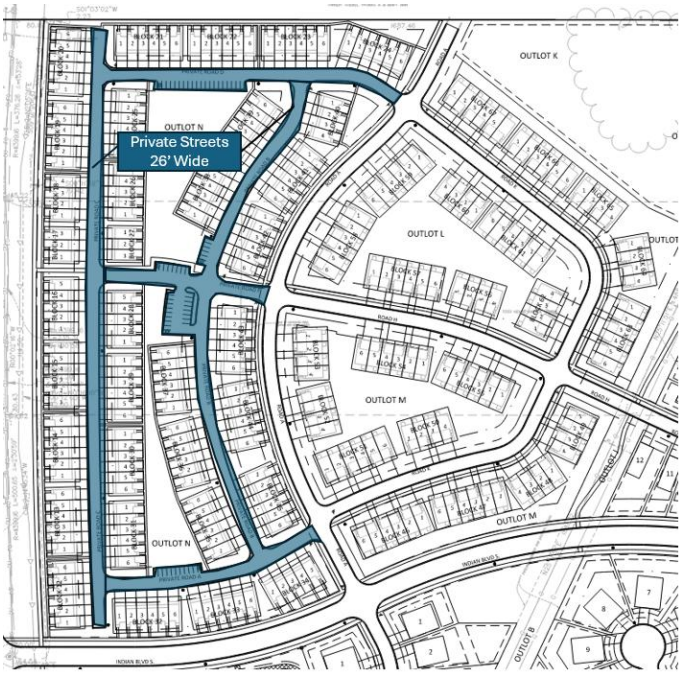
Ravine Parkway Location

In the future, the Indian Boulevard and Keats Avenue intersection may require traffic control such as a stoplight as Ravara Trails and other adjacent developments fill in. The City and County will monitor the intersection to determine when traffic control is warranted.

A segment of Ravine Parkway will be constructed in conjunction with the proposed development. As development continues to the north and south, Ravine Parkway will be extended to 70th Street and 80th Street and will facilitate access to the east side of the proposed development and future development to the east.

The internal road system will include a mixture of public and private streets. Private streets at least 26 feet wide are proposed to be incorporated in the urban townhome areas. No parking will be allowed on the private streets. Instead, parking will be available in driveways and garages and visitors may park in designated visitor parking lots dispersed throughout the townhomes. The parking lots will be connected to the townhome buildings via sidewalks and trails.

Private streets are only allowed via PUD per the City's Subdivision Ordinance. The Applicant has requested PUD consideration for the development. Staff is supportive of the request for private streets in the urban townhome area to allow visitor parking areas to be established along the street. The Urban Townhomes have vehicular access from the rear of the homes, making these streets more synonymous with an alleyway. These private streets will be signed with No Parking on both sides. The remainder of the streets will be public and provide the interconnection to collector streets and future developments to the north, east, and south.

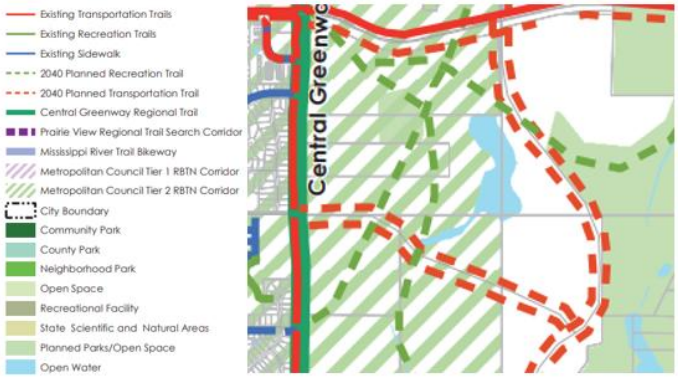


Proposed Private Streets 26 Feet Wide

Trails and Sidewalks

The 2040 Comprehensive Plan depicts planned recreation and transportation trails within the development area. The Central Greenway Regional Trail is also depicted along Keats Avenue. An eight-foot-wide bituminous trail is proposed on both sides of Ravine Parkway. This trail will connect with future segments of trail along Ravine Parkway. Eight-foot-wide trail segments are

required on both sides of Indian Boulevard. An interconnected paved sidewalk system is proposed throughout the neighborhood with six-foot-wide sidewalks throughout. A sidewalk connection is proposed along Road A (public road) up to the future neighborhood park on Outlot L. The proposed development includes the area of an existing pipeline easement. No structures may be constructed over the pipeline easement; however, a paved trail is acceptable.



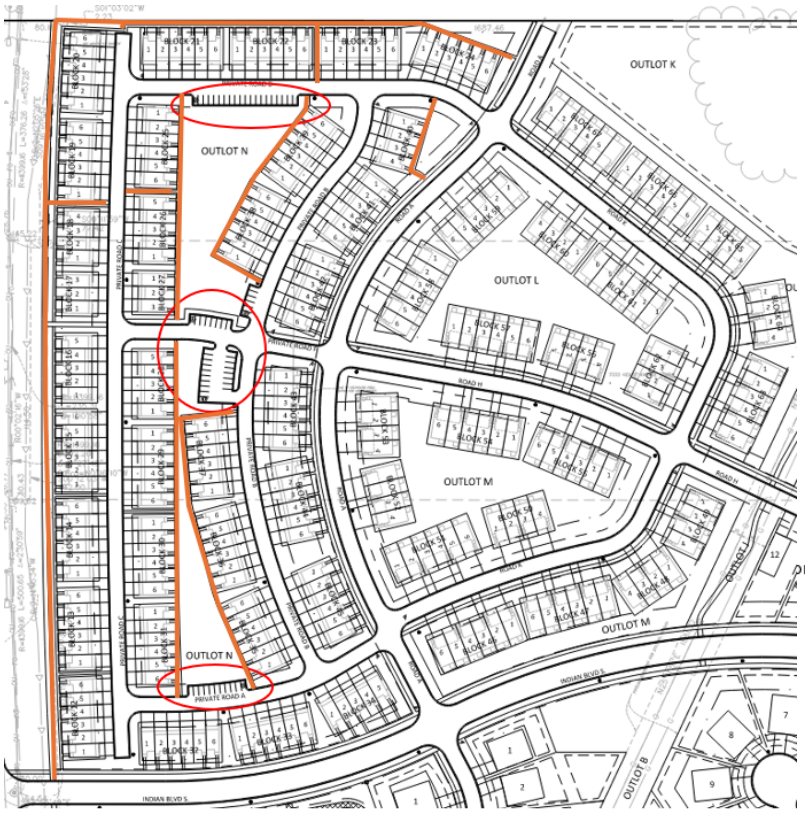
Comprehensive Plan Trail Connections

The development will construct the proposed eight-foot-wide bituminous trail segments as generally outlined in the comprehensive plan (as shown above) as illustrated below. These trail sections include the Central Greenway Regional Trail along the east side of Keats Avenue within County right of way, trails along both sides of Indian Boulevard, a trail within the pipeline easement, and trails along both sides of Ravine Parkway. It is anticipated that these trails will be extended as future development occurs in the area. Marked pedestrian crossings will be provided for the gas easement trail at Indian Boulevard and Road H.



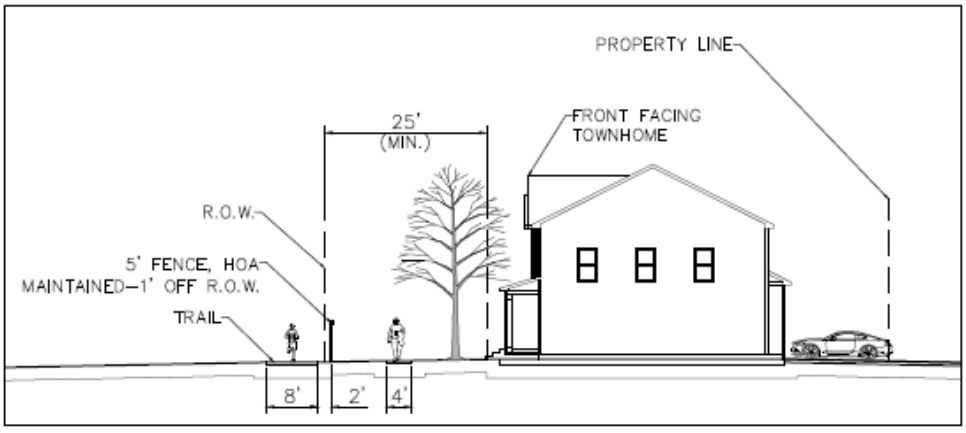
Trail Connections

The urban townhomes will have their front doors connected via a system of internal sidewalks and trails. The internal trail system will also connect visitor parking areas to these sidewalks for access to the townhomes. Some blocks will have paved front door connections onto the public trail along Indian Boulevard and public sidewalk along Road A. This sidewalk connection will be similar to sidewalk connections to front doors in older, historic neighborhoods and communities. Connecting to the public trail/sidewalk prevents a redundant private connection running parallel to the public trail/sidewalk. Property owners will be responsible for maintaining their sidewalk from the trail to their front door.



Private Trail/Sidewalk Connections

The urban townhomes fronting on Keats Avenue will have their own private sidewalk that will be separated from the Central Greenway Regional Trail via a black wrought iron fence and landscaping. This redundancy is necessary to avoid encroaching onto Met Council's sewer interceptor easement and Washington County's right of way with multiple sidewalk connections to the public trail.



Keats Avenue Cross Section at Urban Townhomes

An eight-foot-wide bituminous trail within a 20-foot wide outlot will act as a pedestrian connection to the trail along Ravine Parkway between Lots 19 and 20 Block 6. A 20-foot wide outlot will also be provided at the cul-de-sac of Road D for an 8-foot-wide paved pedestrian connection from the cul-de-sac to Ravine Parkway. These outlots will be owned by the City, and the property owners adjacent to the trail will be responsible for mowing the sod on each side of the trail.



Pedestrian Connectivity

There will not be a painted crosswalk across Keats from Ravara Trails. Given Keats is a 55-mph roadway, pedestrian crossings should not be promoted. The County TAC is studying whether a grade-separated crossing can be installed in the area in the future. The City will maintain Outlots I and R and easement across the backyards of Lots 31 and 32, Block 1 for future space necessary for a potential a grade-separated crossing.

Tree Preservation and Landscaping

The properties currently contain 3,907 existing qualifying inches of trees. City Code Title 11-3-13 allows 25 percent of the qualifying inches identified on site to be removed (976.75 inches). The Applicant proposes to remove 3,415 qualifying inches, an excess of 2,438.25 inches. The excess inches removed must be replaced at a rate of 50 percent; therefore, the Applicant must replace 1,219.12 inches. The Applicant's preliminary landscape plans show 2,485 inches being mitigated by common lot landscaping and individual lot plantings. The developer will also be responsible to remove all trees from Outlot L (future park). The trees should be removed to make space for a future water tower and to ensure the park amenities can be installed without putting responsibility on the City to remove trees in the future. This tree removal will need to be added to tree mitigation calculations for the development.

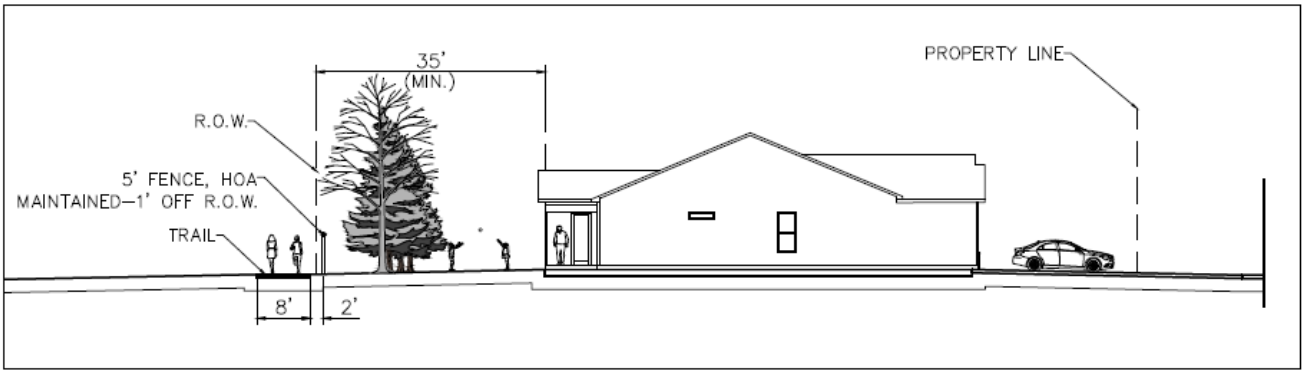
City Code Title 11-6-5 requires a minimum amount of landscape plantings to be installed as a part of development projects within the City. These required plantings include yard trees, building perimeter plantings, and landscape requirements. Lots less than 60 feet wide must have two trees per lot, one in the front yard. Lots 60 feet wide or greater must have three trees per lot, one in the front yard. The maximum canopy spread on lots less than 60 feet wide is 30 feet and a maximum height of 30 feet. Townhouse lots must have one tree per 40 linear feet of site perimeter with one overstory deciduous tree in the front yard between each building group. In addition, each single-family lot is required to have 10 understory shrubs and each townhouse unit must have 5 understory shrubs.



Landscaping Plan

A buffer averaging 50 feet in width but no less than 30 feet wide must run parallel to the rear lot line along Major Roadways in the R-2 through R-5 zoned districts. The buffer shall be a combination of trees, fences, and shrubs that create a minimum of 50 percent year-round opacity at maturity. Keats Avenue and Ravine Parkway are considered major roadways. Part of the PUD consideration is to amend the required buffer along Keats Avenue for the urban townhomes. The urban townhomes front door will face Keats Avenue. The buffer requirement is proposed to be waived via the PUD in favor of a black wrought iron fence separating the right of way from the townhomes with some trees and shrubs being planted in the yard space between the buildings and the fence. These plantings and the fence will be maintained by the HOA to ensure they remain

on site. The Applicant has proposed installing a black wrought iron fence in the rear yards of single-family lots abutting Keats Avenue right of way. The single-family lots will have extra vegetation planted in rear yards to meet buffer requirements. The vegetation and fencing will be maintained by the HOA to ensure they remain on site as a buffer.



Keats Avenue Cross Section at Single Family Lots

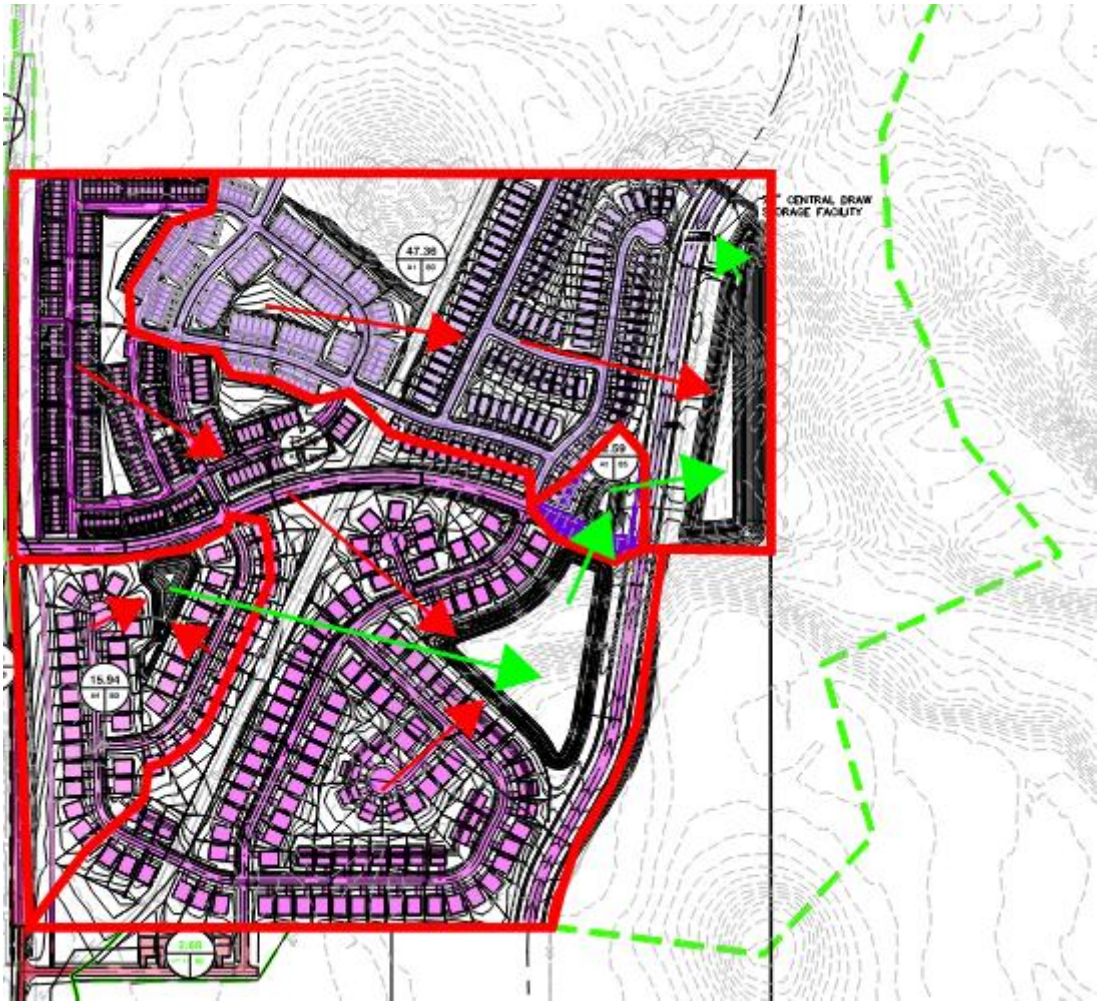
Lots along Ravine Parkway in Blocks 6 and 9 will need additional landscaping buffer from Ravine Parkway. Staff has also requested the Applicant to update landscaping plans showing boulevard trees along Indian Boulevard to maintain a “neighborhood feel” of the street since no homes will front on Indian Boulevard with front yard trees. Boulevard trees are also required along Ravine Parkway as depicted in master planning documents.

A condition of approval will require planning department and City Forester approval of the final landscape plan.

Stormwater Management Plan

The developer’s engineer submitted a stormwater management plan dated December 31, 2025, which has been reviewed by the City. Comments on the plan are included in the review memo dated February 17, 2026. City engineering staff will continue to work with the developer’s engineer to ensure the site meets water quality standards as well as rate and volume control rules. The developer will be required to deed Outlots A, D, E, and F to the City for stormwater purposes. Outlots I and R shall also be dedicated for future drainage that may be required for Keats Avenue. Outlot F contains part of a future larger regional stormwater pond. Access routes from streets to each stormwater pond are required to allow for ongoing maintenance of City infrastructure.

The development site is designed with four stormwater ponds that are connected by storm sewer pipe. The image below shows the general flow of stormwater through the site. Drainage areas within the development are delineated by the red lines and drain to their respective area pond. The green arrows illustrate that Pond 1 drains to Pond 2 which drains to Pond 3 which drains to Pond 4 and then outlets into the 72-inch Central Draw pipe. The image also shows that stormwater from areas outside of the development (as delineated by the green dashed lines) flows into the site; the proposed ponds and storm sewers are designed to handle offsite flow.



Grading

As with all new development projects, site grading is necessary to build the streets, provide proper drainage and ponding, and to create building pads, among other things. City staff and engineering consultants will review grading plans to ensure the plans meet city, state, and watershed district requirements for flood control, erosion control, and drainage. The preliminary grading plan was reviewed by the City's engineering staff, and their review comments are included in the February 17, 2026, plan review memo. Additional grading review will be required upon submittal of final grading and utility plans for the site.

The future City park that will be constructed on the north side of the development will require grading to prepare for future park areas. The Developer shall rough grade and remove material from this area using plans reviewed and approved by the City Engineer and Parks Director.

Utilities

The proposed development will connect to existing watermain and sanitary sewer on the west side of the development at Keats Avenue. They will connect into the Met Council sewer interceptor near Indian Boulevard. The engineering plan review memo dated February 17, 2026, contains comments from city staff and from consulting engineers regarding utility design that will be required to be addressed by the Applicant prior to approval of final plans.

Utilities will be stubbed in proposed Roads A, I, Ravine Parkway, Indian Boulevard, and 77th Street to serve future development to the north, east, and south.

Architecture

The Applicant has submitted conceptual designs of the various home products for reference.



Proposed Urban Townhomes – Home Entrance on One Side, Garage on Other



Proposed Suburban Townhomes – Home Entrance and Garage on Same Side



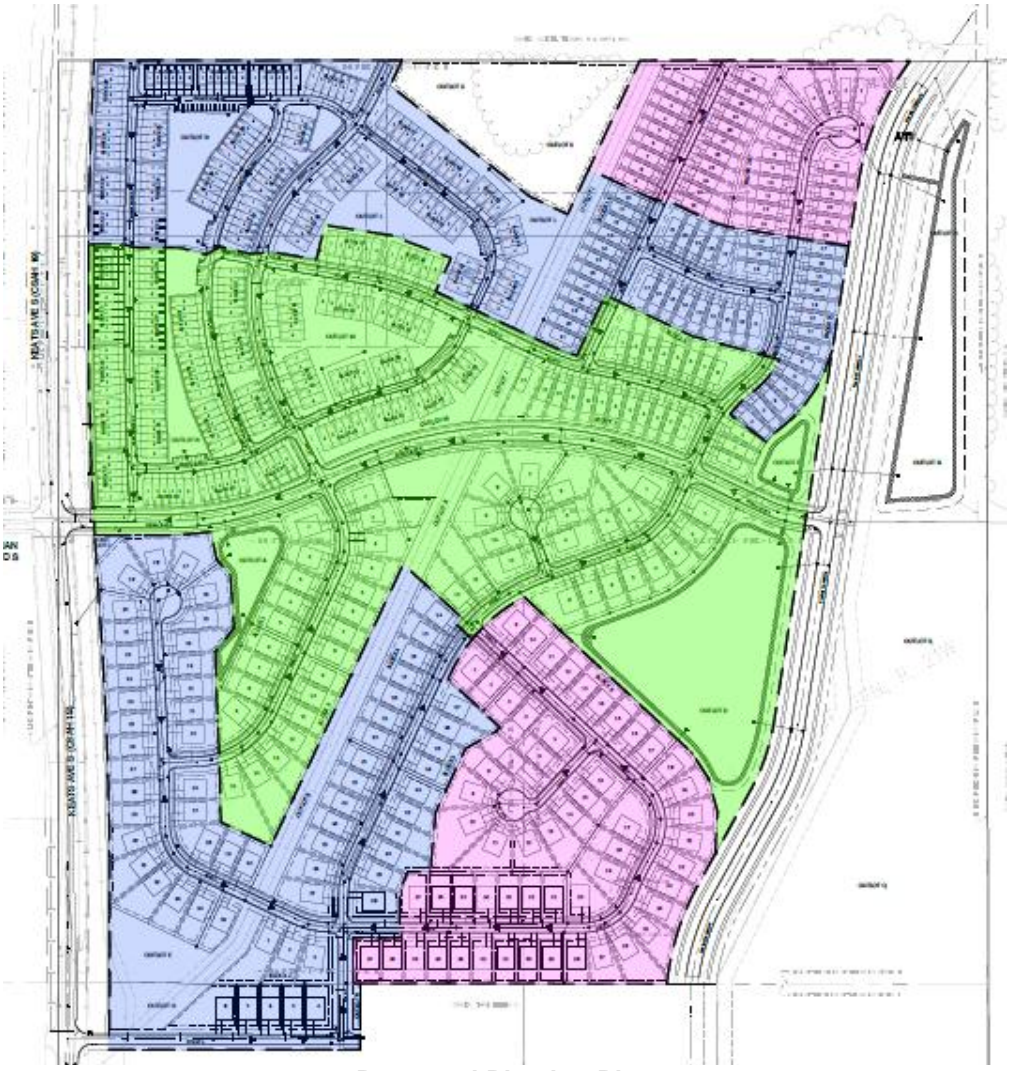
Proposed 40-Foot Wide Single Family Lots



Proposed 65-Foot Wide Single Family Lots

Phasing

The Developer is proposing construction throughout three phases. The area shown in green below indicates the proposed first phase of the development. Phase two is in blue and Phase three is in pink.



Proposed Phasing Plan

Area Charges and Development Fees
Area charges and related development fees for this project will be based on the acreages shown on the final plat. These fees and charges will be accurately adjusted based on the final plat layout and be provided in the development agreement. All fees and charges will be memorialized within the development agreement. Payment to the City will be required at the time the development agreement is fully executed by the City and Developer.

Homeowners Association
Homeowners Associations will be established by the developer. The HOAs will enforce architectural guidelines and will ensure the upkeep of common community amenities including the entrance monument, townhome green spaces, buffer plantings along Keats Avenue, and fencing along Keats Avenue.

Neighborhood Meeting
The Applicant held a neighborhood meeting on February 3, 2026. Notice of the neighborhood meeting was sent to surrounding property owners within 500 feet of the project area. The intent of the meeting was to give neighboring property owners the opportunity to ask questions and present concerns they might have to the developer in the early planning stages of the proposed project. Ten residents attended and spoke with the Applicant and staff about the proposal.

Residents questioned the safety of people (particularly schoolchildren) crossing Keats Avenue to get to Cottage Grove Middle School and Grey Cloud Elementary School. The County's CSAH 19 Technical Advisory Committee is reviewing the area and is aware of the proposed development. Pedestrian underpass feasibility is being studied by the County in the area. The City and County will continue to study the necessity of an underpass and construction options including cost, location, and timing.

There were also multiple questions about the traffic impacts at Indian Boulevard and Keats Avenue, particularly during school pickup and drop off hours. The Applicant performed a traffic analysis in conjunction with their application at the intersections. All intersections would operate at a Level of Service C or better at all hours of the day. A LOS of C indicates a stable flow of vehicles. While school drop-off and pick-up does add significant traffic to the area, streets are not designed for traffic increases during particular hours of the day. In the future, a traffic signal may be needed at Keats and Indian. The City and County will continue to monitor traffic in the area to determine when to install traffic signals.

There was also concern that the schools are already over capacity, and residents questioned whether the school district could handle this many more students. City staff meets regularly with staff from the school district and provides the school district with current and future development information monthly. The school district continues to construct building additions to accommodate students, including an addition to Cottage Grove Middle School currently under construction and a future addition at Grey Cloud Elementary expected to begin construction in spring 2026.

Residents also questioned whether the development would include green space. A portion of a planned neighborhood park will be dedicated as Outlot L. A community park is also planned for an area southeast of the development, north of 80th Street near Vandenberg Lake. The community park will be constructed as land is acquired, as funding is available, and as

development warrants. There is also an existing pipeline easement where no structures may be constructed. The easement will contain a paved public trail to the future neighborhood park.

There were concerns about the density of the development, particularly the number of townhomes in the northwest portion of the development. The property is in a mixture of future land use designations including low, medium, and high density residential. The proposed development as a whole meets Comprehensive Plan land use ratios, and the northwest area is guided Medium Density Residential where higher density is expected. The proposal for townhomes and single-family residential development with varying lot sizes and densities also aligns with the 2024 Housing Market Study for units that could be supported in the community.

Public Hearing Notices
Public hearing notices were mailed to 112 property owners who are within 500 feet of the proposed subdivision and published in the St. Paul Pioneer Press on February 11, 2026.

Recommendation

That the Planning Commission recommend that the City Council approve the following three applications, subject to the conditions of approval.

A. A Minor Subdivision to split 3.77 acres from parcel 1102721330001 and to split 24.06 acres from parcel 1102721310001.

B. A Zoning Amendment to change the zoning of the subject properties from AG-2, Agriculture to R-4, Transitional Residential.

C. A Preliminary Plat and Planned Unit Development for a subdivision to be called Ravara Trails, which will consist of 269 single-family lots, 306 townhome lots, and 21 outlots.

<u>General Development</u>

1. The Applicant and builders must comply with all city ordinances and policies except as may be modified by agreement of the Developer and City staff.

2. The Applicant must obtain appropriate building permits from the City, and permits or approvals from other regulatory agencies including, but not limited to: South Washington Watershed District, Minnesota Department of Health, Minnesota Department of Natural Resources, Northern Natural Gas, Met Council, Washington County, and Minnesota Pollution Control Agency.

3. Demolition permits must be obtained from the City for demolition of existing structures.

4. Appropriate permits must be obtained for sealing existing wells and abandoning existing septic systems. Verification of well sealing and septic system abandonment shall be submitted to the City.

5. The Applicant shall enter into a development agreement with the City. The development agreement shall be executed by the Applicant prior to City Council approval of the final plat.

6. The Applicant shall incorporate into the final plat the recommendations, requirements, and evaluations noted in the Bolton & Menk memorandum dated February 17, 2026, subject to modifications by the City Engineer.

7. The Developer shall agree in the development agreement to negotiate in good faith with the current property owner or future developer and with the City to ensure a residential lot may be created on Outlot T.

8. Any proposed retaining walls shall be constructed on private property and be owned and maintained by private property owners or Homeowners Associations. The City will not accept responsibility for retaining walls.

9. The proposed wrought iron fence and vegetative buffer along Keats Avenue (Lots 19 to 31 Block 1 and Blocks 12 to 20) and vegetative buffer along Ravine Parkway (Lots 20 to 26 Block 6, Lot 1 Block 10, and Lots 23 to 10 Block 9) shall be maintained by the Homeowners Associations and shall remain in place, uniform on all lots, and well maintained.

10. Any proposed fencing installed by any property owner adjoining Ravine Parkway (Lots 20 to 26 Block 6, Lot 1 Block 10, and Lots 23 to 10 Block 9) shall use the same fence design, materials, and color. The fence shall be placed on the house side of any earth-berm or landscaping and must not encroach within the Ravine Parkway right-of-way.

Platting, Land Dedication, and Easements

11. The project shall be completed in accordance with the plans submitted and as amended by the conditions of approval and as approved by the City Engineer. Any significant changes to the plans, as determined by Planning staff, shall require review and approval by the Planning Commission and City Council.

12. Indian Boulevard is anticipated to extend east of Ravine Parkway; therefore, right-of-way shall be dedicated in the area of Outlot F, and a right-of-way easement must be obtained over the unplatted property directly south of Outlot F given it is not currently part of the plat. In combination, these shall total 80 feet of right-of-way. The easement shall be recorded with the final plat and minor subdivisions.

13. Outlots A, D, E, and F shall be deeded to the City at the time of recording the final plat for stormwater purposes. Outlots I and R shall also be deeded to the City at the time of recording the final plat for stormwater and pedestrian purposes.

14. Outlots B, M, N, O, P, and Q shall be owned and maintained by the HOA.

15. Outlot L shall be deeded to the City at the time of recording the final plat for a neighborhood park.

16. The park dedication requirements will be satisfied upon dedication of Outlot L and 8.9 acres of parcel 1102721310001. A memorandum of understanding shall be entered into by the landowner(s) of parcel 1102721310001 and the City to dedicate 8.9 acres for the future

community park. Failure to sign the MOU or dedicate acreage will require the developer to pay cash in lieu of land for park dedication.

17. The Minor Subdivision shall not create any parcels under ten acres. Land under ten acres shall be immediately combined with adjoining parcels to create conforming parcels either via land combination or plat.

18. An outlot shall be created for a pedestrian connection at the end of the Road D cul-de-sac. This outlot shall be deeded to the City. Adjacent property owners shall be responsible for mowing up to the trail segment.

19. Outlot C shall be incorporated into Lot 1 Block 3.

Construction and Grading

20. The Developer must apply for and obtain a grading permit from the City prior to beginning any work on the subject site. Associated financial guarantees shall also be submitted prior to beginning any site work. Grading, Drainage, and Erosion Control plans must be approved by the City Engineer, other necessary permits (i.e. NPDES permit) must be obtained, and a preconstruction meeting must be held prior to issuance of a grading permit.

21. Applicable permits for grading and construction shall be obtained from Northern Natural Gas, South Washington Watershed District, Met Council, and Washington County prior to commencing grading.

22. Upon completing the installation of sanitary, water, and storm utilities, an as-built survey of these utilities must be submitted to the City. Electronic copies of site utilities must be submitted to the City.

23. The Developer shall rough grade, seed, and remove all trees from Outlot L using plans reviewed and approved by the City Engineer and Parks Director.

Lot Performance Standards

24. The architectural standards of the development shall be consistent with the following:

    a. Architectural design is required on all four sides of the principal structure.
    b. Architectural materials must be varying on the front façade of the principal structure (shakes, board and batten, brick or stone, accent siding, shutters, window boxes, etc.).

25. Once a house plan is approved for a given lot, no identical house plan may be constructed on the five lots surrounding it, i.e. the lots adjacent on either side, the lot most directly across the street, and the lots adjacent to the lot most directly across the street.

Utilities

26. The Developer is responsible for providing the necessary easements and costs associated with road and utility improvements serving the site. All drainage and utility easements, as recommended by the City Engineer, must be shown on the final plat and dedicated to the City for public purposes.

27. Drainage and utility easements shall be provided over private roads for City access to public utilities under the roads.

28. Utilities shall be stubbed at proposed Roads A, I, Ravine Parkway, Indian Boulevard, and 77th Street to serve future development to the north, east, and south.

Streets

29. Future road connection signs and barricades shall be provided at the end of streets to be extended in the future.

30. Future trail connection signs and barricades shall be provided at the end of any trail or sidewalk to be extended in the future.

31. Private streets shall be marked “No Parking”

32. A temporary turnaround shall be provided on the northerly point of proposed Road I. If the turnaround will be on neighboring property, an easement shall be recorded with the Final Plat describing the area for temporary turnaround.

33. Connections to Keats Avenue will require turn lane construction on Keats Avenue as well as on the connecting streets of Indian Boulevard and 77th Street. Approvals will be required by the City and the County.

34. The developer shall construct Ravine Parkway and Indian Boulevard to Minnesota State Aid Standards (MSAS).

Landscaping and Irrigation

35. Irrigation systems installed within City right-of-way are solely the responsibility and risk of the Developer, or individual. The City is not responsible or liable for any damage or costs related to installation, damage, or replacement of lawn irrigation systems placed in the boulevard as a result of City use of or future changes in the right of way. The HOA is responsible for the maintenance of the irrigation system within the boulevard area to the back of the curb and within any outlots. An irrigation plan is required to be submitted and approved prior to the issuance of a building permit. The HOA is responsible for irrigation to the back of the curb on Ravine Parkway.

36. All proposed tree locations on the proposed landscape plan shall be reviewed and approved by the City Forester. Deciduous trees should be located a minimum of 5 feet off any utility pipe. Coniferous trees shall be located a minimum of 15 feet off any utility pipe. No trees shall be located within a storm pond high water level or within the pond access routes. Trees shall not be located so as to interfere with hydrants, street lighting, utilities, and traffic signage.

37. The Developer is responsible for establishing the final grades, topsoil, and seeding/sodding of all the lots, outlots, and boulevards within the subdivision.

38. The HOA will be required to maintain vegetation within all HOA owned outlots. including outlots containing monument signage.

39. Prior to releasing the plat for recording, a final landscaping plan shall be approved by planning staff and the City Forester in writing.

40. Boulevard trees shall be included on the revised landscaping plan along Indian Boulevard and Ravine Parkway. Boulevard tree placement shall be approved by the City Forester.

41. Additional vegetative screening shall be provided in the rear yards of lots abutting Ravine Parkway. This screening shall be shown on the final landscaping plan approved by planning staff and the City Forester.

42. All trees and brush shall be removed from proposed Outlot L. Updated tree mitigation calculations shall be provided to Planning staff.

Onsite Infrastructure Improvements

43. A street lighting plan that complies with the City's street lighting plans for the East Ravine area must be submitted by the Developer and approved by the City Engineer prior to Final Plat approval.

44. An eight-foot-wide paved trail shall be installed on the north and south sides of Indian Boulevard and the east and west sides of Ravine Parkway.

45. An eight-foot-wide paved trail shall be installed in Outlots G, H, J, K, and S.

46. The paved trail within the gas line easement in Outlot K shall run the length of the outlot all the way to the north property line.

47. Six-foot concrete sidewalks shall be installed as submitted by the Developer and approved by the City Engineer prior to Final Plat approval.

48. The Developer must place iron monuments at all lot and block corners and at all other angle points on property lines. Iron monuments must be placed after all site and right-of-way grading has been completed in order to preserve the lot markers for future property owners.

49. The Developer is responsible for the cost and installation of public land boundary markers at the corners of private properties abutting Outlots A, D, E, G, H, J, K, and S. The open space markers must be installed before a building permit is issued for the lot that abuts the recommended marker location. The actual number and location of park boundary markers is subject to approval of the Parks Director.

50. The Developer shall contact the electric, telephone, gas, and cable companies that are authorized to provide service to the property to ascertain whether any of those utility providers intend to install underground lines within the development.

51. The Developer is responsible for all street maintenance; upkeep and repair of curbs, boulevards, and sod; and street sweeping until the project is complete. All streets must be maintained free of debris and soil until the subdivision is completed. The Developer hereby agrees to indemnify and hold the City harmless from any and all claims for damages of any nature whatsoever arising out of Developer's acts or omissions in performing the obligations imposed upon Developer by this paragraph.

52. The Homeowners Association will be responsible for the private streets, private parking areas, and private storm sewer in perpetuity. This includes all pavement maintenance, upkeep and repair of curbs, boulevards, sod, pavement markings, storm structures and piping, and street maintenance including but not limited to plowing and sweeping.

53. Drainage and utility easements shall be provided over all private streets to ensure City access to public utilities (water and sanitary sewer) beneath the streets.

54. The Developer will provide to the City copies of test results, suppliers, subcontractors, etc., relating to the work to be performed by the Developer. The Developer agrees to furnish to the City a list of contractors being considered for retention by the developer for the performance of the work described in the development agreement.

55. The Developer is responsible for the control of grass and weeds in excess of eight inches on vacant lots or boulevards within their development. Failure to control grass and weeds will be considered a Developer's default and the City may, at its option, perform the work and the Developer shall promptly reimburse the City for any expense incurred by the City.

56. The Developer will be required to conduct all major activities to construct the public improvements during the following hours of operation:

Monday through Friday	7:00 A.M. to 7:00 P.M.
Saturday	9:00 A.M. to 7:00 P.M. (with prior approval from the City Engineer)
Sunday/City Holidays	Not Allowed

This does not apply to activities that are required on a 24-hour basis such as dewatering or bi-pass pumping, etc. Any deviations from the above hours are subject to approval of the City Engineer.

57. The Developer shall weekly, or more often if required by the City Engineer, clear from the public streets and property any soil, earth, or debris resulting from construction work by the Developer or its agents or assigns. All debris, including brush, vegetation, trees, and demolition materials, shall be properly disposed of off-site; burying construction debris, trees, and other vegetation is prohibited. Burning of trees and structures is prohibited, except for fire training only.

58. The Developer grants the City, its agents, employees, officers, and contractors' permission to enter the site to perform all necessary work and/or inspections during grading and the installation of public improvements by the Developer.

59. Upon completion of the work, the Developer shall provide the City with a full set of as-built plans for City records and transmitted to the City in a DWG AutoCAD format and pdf format. Developer must also furnish the City with a pdf format of the final plat and four prints of the recorded plat. If the Developer does not provide as-builts, the City will produce them at the developer's expense.

60. The Developer is responsible for completing the final grade on all lots and ensuring all boulevards and yards have a minimum of four inches of organic topsoil or black dirt on them. Placement of organic topsoil or black dirt and shrubs must not be transferred to homeowners.

61. Adequate dumpsters must be on site during construction of streets, utilities, and houses. When the dumpsters are full, they must be emptied immediately or replaced with an empty dumpster. The Developer is responsible to require each builder to provide an on-site dumpster to contain all construction debris, thereby preventing it from being blown off-site. It is the responsibility of the Developer to ensure no debris blows on or off site.

62. Adequate portable toilets must be on-site at all times during construction of utilities, roadways, and houses. At no time shall any house under construction be more than 250 feet away from any portable toilet. Toilets must be regularly emptied.

63. After the site is rough graded, but before any utility construction commences or building permits are issued, the erosion control plan shall be implemented by the Developer and inspected and approved by the City. The City may impose additional erosion control requirements if it is determined that the methods implemented are insufficient to properly control erosion.

64. The Developer is responsible for erosion control inspection fees at the current rates. If the Developer does not reimburse the City for the costs the City incurred for such work within thirty (30) days, the City may draw down the letter of credit to pay such costs.

65. All areas disturbed by the excavation and back-filling operations shall be fertilized, mulched, and disc anchored as necessary for seed retention. Time is of the essence in controlling erosion. If the Developer does not comply with the erosion control plan and schedule, or supplementary instructions received from the City, or in an emergency determined at the sole discretion of the City, the City may take such action as it deems appropriate to control erosion immediately. The City will notify the Developer in advance of any proposed action, but failure of the City to do so will not affect the Developer's and the City's rights or obligations. If the Developer does not reimburse the City for any costs of the City incurred for such work within thirty (30) days, the City may draw down the letter of credit to pay such costs.

66. Dust control measures must be in place to prevent dust and erosion, including, but not limited to daily watering, silt fences, and seeding. The City Engineer may impose reasonable measures to reduce dust at the site.

67. Temporary parking during construction shall be permitted on only one side of the street. No construction parking is permitted on Keats Avenue.

68. Property owners with private sidewalk access to public sidewalks or trails shall be responsible for maintaining their private sidewalk from the public sidewalk or trail to their front door including snow removal.

69. The Homeowners Associations shall be responsible for maintenance including snow removal on private trails and sidewalks connecting townhomes and on private streets.

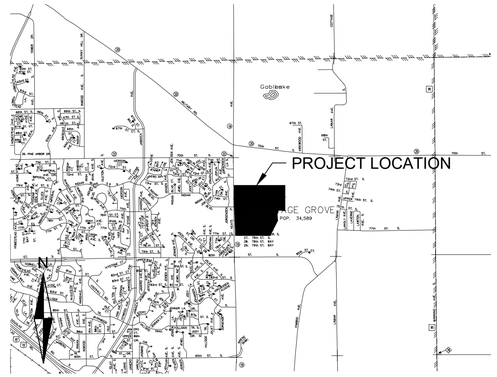
Prepared by:
Samantha Pierret, AICP
Senior Planner

Attachments:
- Ravara Trails Preliminary Plat
- Ravara Trails Civil Drawings 12/31/2025
- Engineering Review Memorandum 02/17/2026
- Ravara Trails Updated Site Plan 02/17/2026
- Narrative

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA





VICINITY MAP

Scale: 1"=4000'

CONTACT LIST

DEVELOPER
Twin Cities Land Development
4800 Olson Memorial Highway, Suite 100
Golden Valley, 55422
Email: tracey@tclanddev.com
Contact: Tracey Rust

CONSULTANT
Alliant Engineering, Inc.
Marquette Avenue South, Suite 700
Minneapolis, MN 55402
Phone: 612.758.3080
Fax: 612.758.3099

ENGINEER
Clark Wicklund
License No. 40922
Email: cwicklund@alliant-inc.com

SURVEYOR
Dan Ekrem
License No. 57366
Email: dekrem@alliant-inc.com

LANDSCAPE ARCHITECT
John Gronhovd
License No. 59233
Email: jgronhovd@alliant-inc.com

PLAN SUBMISSION/REVISION MATRIX

#	SHEET DESCRIPTION	2025-12-31
1	COVER SHEET	X
2-4	EXISTING CONDITIONS PLAN	X
5	DEMO AND REMOVAL PLAN - OVERALL	X
6-11	DEMO AND REMOVAL PLAN - VIEW A-VIEW F	X
12	PRELIMINARY PLAT - OVERALL	X
13-18	PRELIMINARY PLAT - VIEW A-VIEW F	X
19	PARCEL AREA TABLE	X
20	SITE PLAN - OVERALL	X
21	SITE PLAN NOTES AND DETAILS	X
22-27	SITE PLAN - VIEW A-VIEW F	X
28-30	KEATS AVE TURN LANE PLANS	X
31	GRADING AND DRAINAGE PLAN - OVERALL	X
32-37	GRADING AND DRAINAGE PLAN - VIEW A-VIEW F	X
38	GRADING AND DRAINAGE PLAN DETAILS	X
39-42	GRADING PROFILES	X
43-45	POND DETAILS	X
46	EROSION AND SEDIMENT CONTROL PLAN - OVERALL	X
47	EROSION AND SEDIMENT CONTROL NOTES AND DETAILS	X
48-53	EROSION AND SEDIMENT CONTROL PLAN - VIEW A-VIEW F	X
54	SANITARY SEWER AND WATERMAIN PLAN - OVERALL	X
55-60	SANITARY SEWER AND WATERMAIN PLAN - VIEW A-VIEW F	X
61	STORM SEWER PLAN - OVERALL	X
62-67	STORM SEWER PLAN - VIEW A-VIEW F	X
68	STORM SEWER SCHEDULES	X
69	TREE PRESERVATION PLAN - OVERVIEW	X
70-75	TREE PRESERVATION PLAN - VIEW A-VIEW F	X
76	TREE INVENTORY	X
77	LANDSCAPE PLAN - OVERALL	X
78-83	LANDSCAPE PLAN - VIEW A-VIEW F	X
84	LANDSCAPE PLAN - DETAILS	X
85	LIGHTING PLAN - OVERALL	X
86-91	LIGHTING PLAN - VIEW A-VIEW F	X

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA
PRELIMINARY PLAT SUBMITTAL
COVER SHEET

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

1

Sheet 1 of 91

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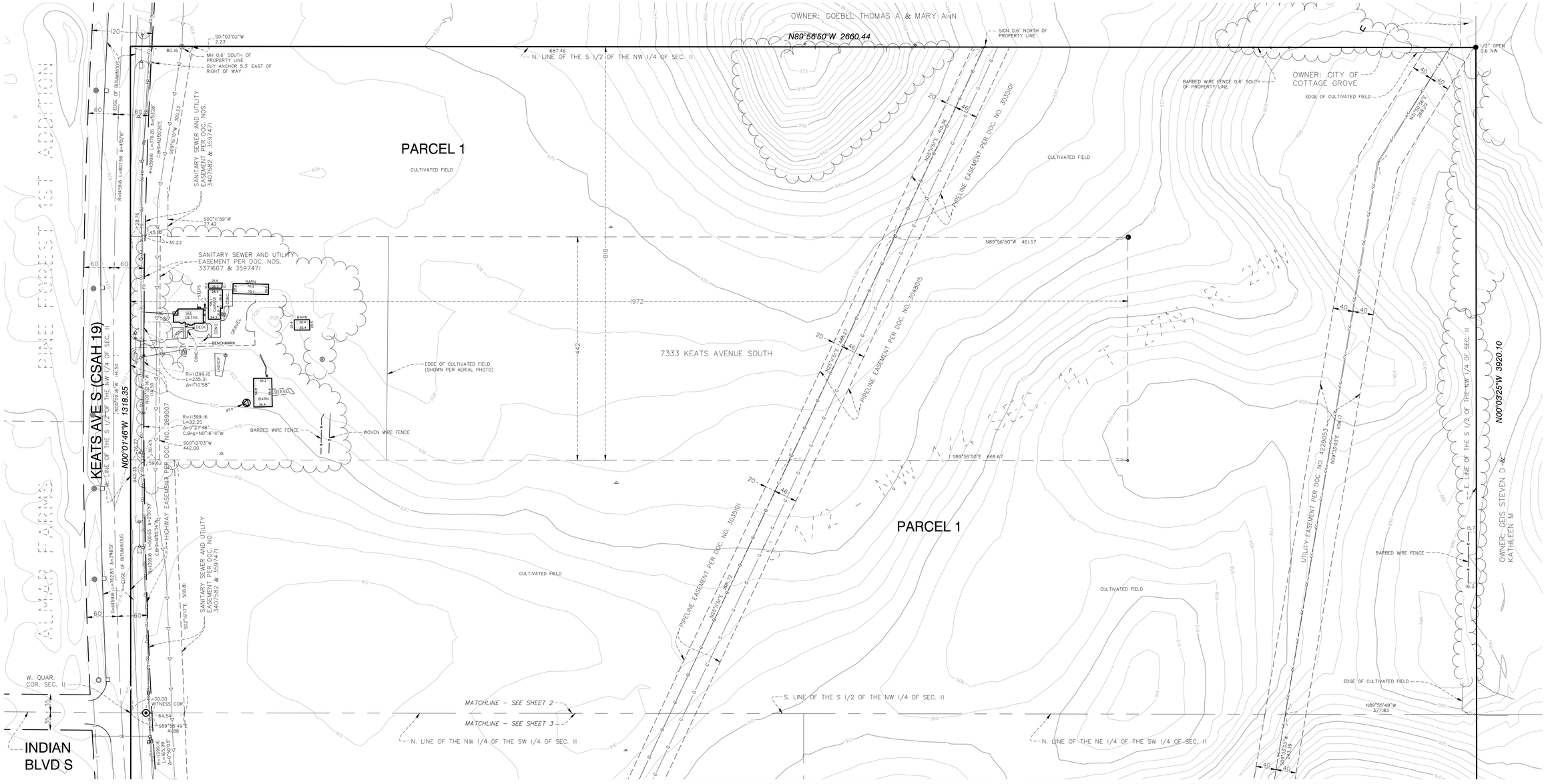
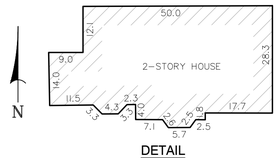


LEGEND

- SET CAP IRON MONUMENT 57366
- FOUND IRON MONUMENT
- FOUND CAST IRON MONUMENT
- TELEPHONE BOX
- SANITARY MANHOLE
- CATCH BASINS
- POWER POLE W/ GUY ANCHOR
- ELECTRIC METER
- GAS METER
- HAND HOLE
- TELEPHONE BOX
- CURB STOP
- WOOD POST
- WELL
- BUSH/SHRUB
- SIGN
- GAS
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- FIBER OPTIC
- OVERHEAD TELEPHONE
- FENCE
- TREE LINE
- EXISTING BUILDING
- FIRE HYDRANT



DETAIL
NOT TO SCALE

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PROPERTY DESCRIPTION - COMM. NO. 705488

Parcel 1:
The South one-half of the Northwest Quarter (S ½ of NW ¼) of Section 11, Township 27 North, Range 21 West, excepting therefrom the South 442 feet of the North 818 feet of the West 1972 feet of said South one-half of the Northwest Quarter (S ½ of NW ¼) of Section 11, Washington County, Minnesota.
(1102721240001)

And

Parcel 2:
The Northwest Quarter of the Southwest Quarter (NW ¼ of SW ¼) of Section 11, Township 27 North, Range 21 West, Washington County, Minnesota.
(1102721320001)

And

Parcel 3:

Part of the East one-half of the Southwest Quarter (NW ¼ of SW ½) of Section 11, Township 27 North, Range 21 West, except the South 40 feet thereof, Washington County, Minnesota.
(Part of 1102721310001. Final Legal Description TBD. See requirement below.)

Abstract Property

PROPERTY DESCRIPTION - COMM. NO. 706056

The South 442 feet of the North 818 feet of the West 1972 feet of the South Half of the Northwest Quarter (S 1/2 of NW 1/4) of Section 11, Township 27 North, Range 21 West, Washington County, Minnesota.

Abstract Property

NOTES

1. This survey and the property description shown here on are based upon information found in the commitments for title insurance prepared by Land Title, Inc, as agent for First American Title Insurance Company, file no. 705488, dated November 7, 2024, and file no. 706056, dated November 22, 2024.

2. The south line of the SE 1/4 - SW 1/4 of Sec. 11, T. 27N, R. 21W is assumed to have a bearing of S89°56'24"E.

3. All distances are in feet.

4. The property has vehicular access to Keats Avenue South (CSAH 19) and 80th Street South, public rights of way.

5. The area of the above described property is 8,727,964 square feet or 200.366 acres.

6. The locations of existing public utilities on or serving the property are depicted based on Gopher State One Call Ticket Nos. 250130469 & 250130388, available city maps, records and observed evidence locations. Lacking excavation, underground utility locations may not be exact. Verify critical utilities prior to construction or design.

7. Benchmark: Top Nut of Hydrant located south of the garage, west of the concrete that is south of said garage, and north of the gravel driveway at 7333 Keats Avenue South has an elevation of 927.87 feet NAVD 88.

N

0 50 100 200
SCALE IN FEET

I hereby certify that this survey, [illegible] report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of

#
Print Name

Signature

#
Date

#
License Number

FOR REVIEW

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TWIN CITIES LAND DEVELOPMENT TC LD

PROJECT
RAVARA TRAILS

PROPERTY ADDRESS
COTTAGE GROVE, MINNESOTA

DOCUMENT
EXISTING CONDITIONS

DESCRIPTION	DATE
CITY SUBMITTAL	2025-12-31

JOB NO.	DRAWN BY:	DATE	DESCRIPTION
4006570-00	DE	2025-12-31	CITY SUBMITTAL
SCALE: 1" = 100'	CHECKED BY: DE		
FIELD DATE:	FIELD CREW: RS, EL, NW, MS, RJ, KJ		

Sheet 1 of 3

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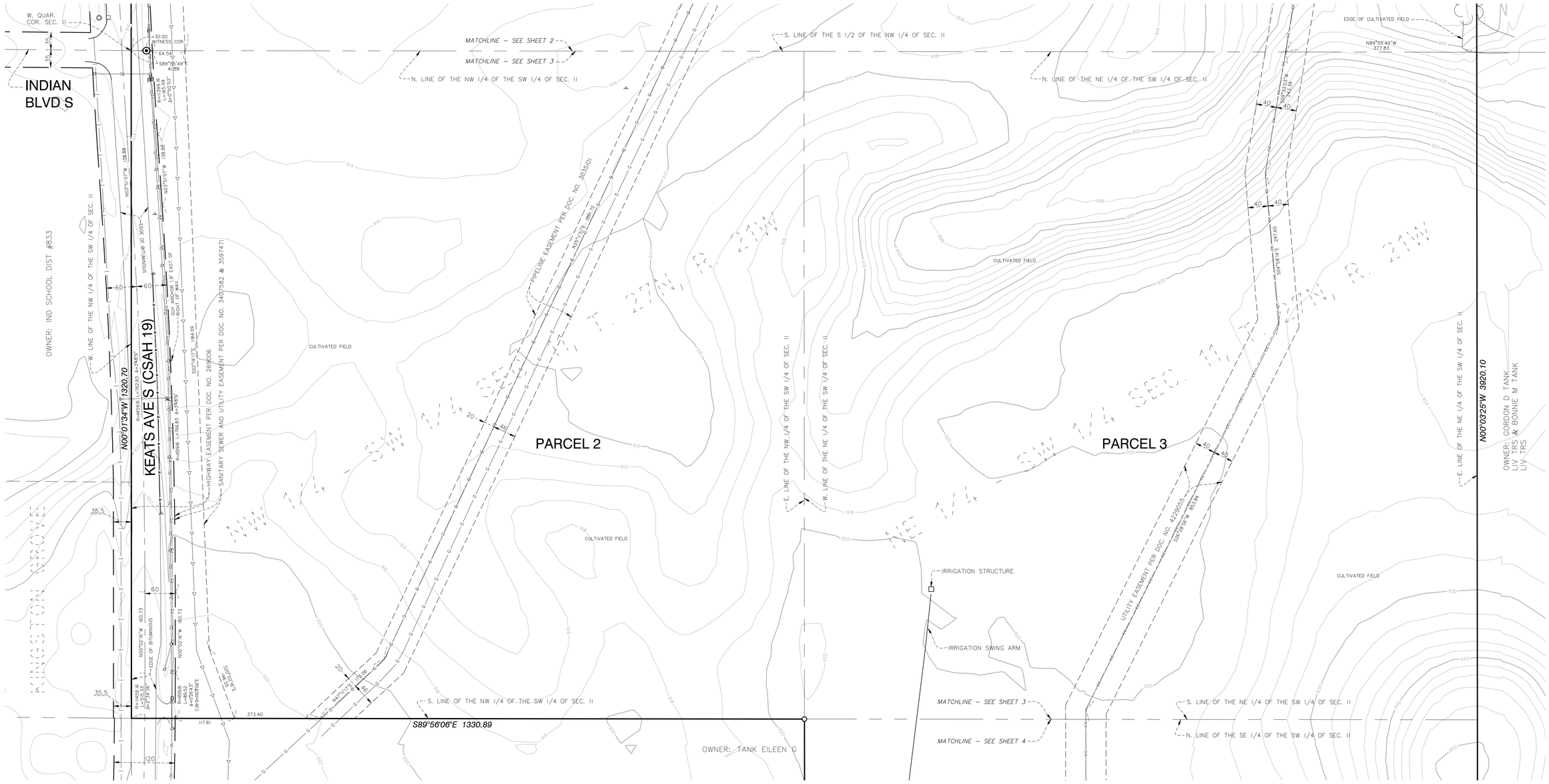

LEGEND

- SET CAP IRON MONUMENT 57366
- FOUND IRON MONUMENT
- FOUND CAST IRON MONUMENT
- TELEPHONE BOX
- SANITARY MANHOLE
- CATCH BASINS
- POWER POLE W/ GUY ANCHOR
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- GAS METER
- HAND HOLE
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- CURB STOP
- WOOD POST
- WELL
- BUSH/SHRUB
- SIGN
- GAS
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- FIBER OPTIC
- OVERHEAD TELEPHONE
- FENCE
- CULVERT
- TREE LINE
- EXISTING BUILDING
- FIRE HYDRANT

N

0 50 100 200
SCALE IN FEET

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TWIN CITIES LAND DEVELOPMENT

PROJECT
RAVARA TRAILS

PROPERTY ADDRESS
COTTAGE GROVE, MINNESOTA

DOCUMENT
EXISTING CONDITIONS

JOB NO.	DRAWN BY:	DATE	DESCRIPTION
4000570-00	DE	2025-12-31	CITY SUBMITTAL
SCALE	CHECKED BY:		
1" = 100'	DE		
FIELD DATE:	FIELD CREW:		
	RS, EL, MN, MS, RJ, KJ		

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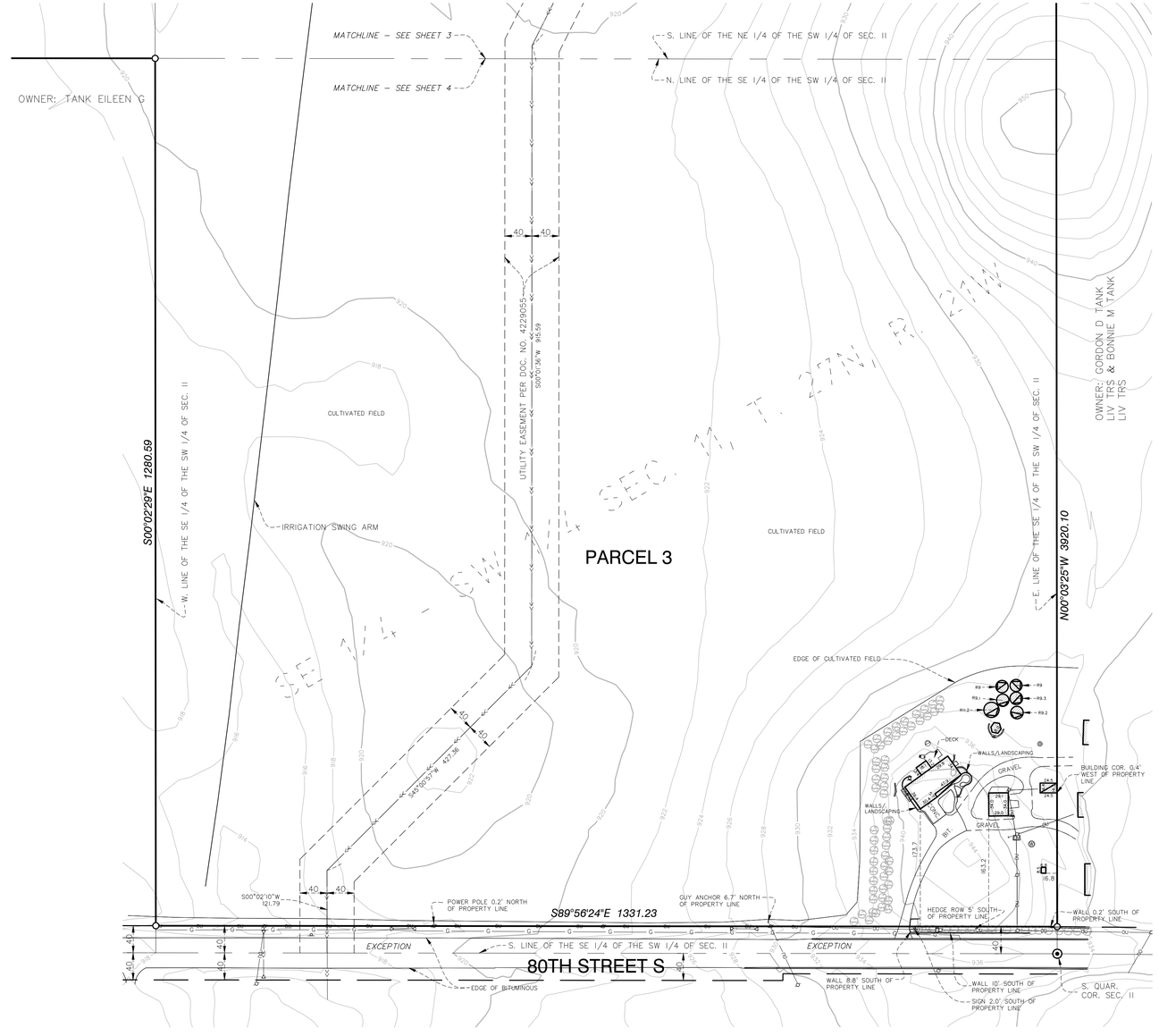

LEGEND

SET CAP IRON MONUMENT 57366	GAS
FOUND IRON MONUMENT	SANITARY SEWER
FOUND CAST IRON MONUMENT	STORM SEWER
TELEPHONE BOX	WATERMAIN
SANITARY MANHOLE	FIBER OPTIC
CATCH BASINS	OVERHEAD TELEPHONE
POWER POLE W/ GUY ANCHOR	FENCE
ELECTRIC METER	CULVERT
GAS METER	TREE LINE
HAND HOLE	
TELEPHONE BOX	EXISTING BUILDING
CURB STOP	FIRE HYDRANT
WOOD POST	
WELL	
BUSH/SHRUB	
SIGN	

N

0 50 100 200
SCALE IN FEET

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TWIN CITIES LAND DEVELOPMENT TC LD

PROJECT
RAVARA TRAILS

PROPERTY ADDRESS
COTTAGE GROVE, MINNESOTA

DOCUMENT
EXISTING CONDITIONS

DESCRIPTION	DATE
CITY SUBMITTAL	2025-12-31

JOB NO. 4006570-00
DRAWN BY: DE
CHECKED BY: DE
SCALE: 1" = 100'
FIELD DATE:
FIELD CREW: RS, EL, WK, MS, RJ, KJ

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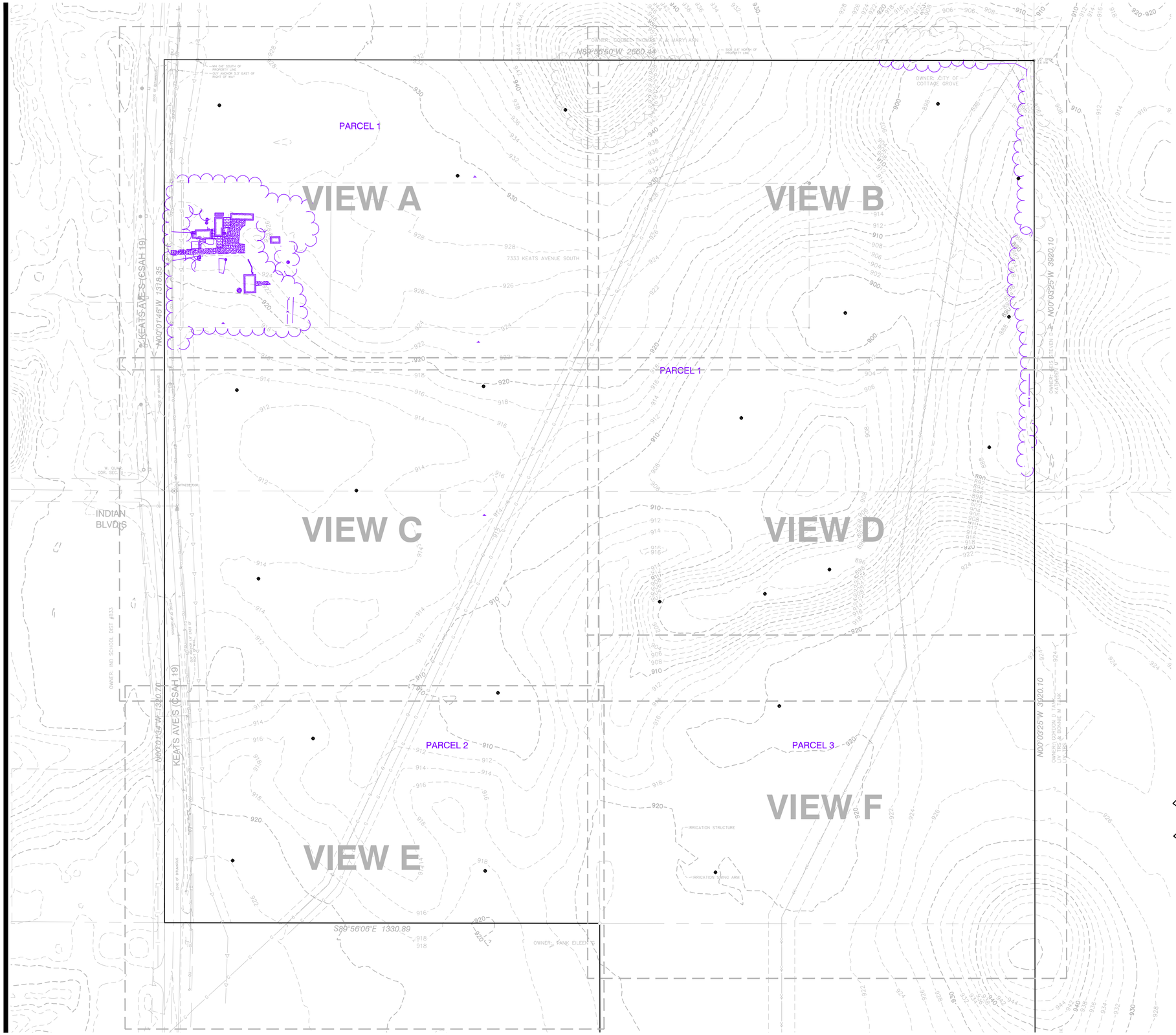

NOTES:

1. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE TO MAKE SURE THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY ALL OF THE PERMITTING AUTHORITIES.
2. CONTRACTOR TO NOTIFY GOPHER STATE ONE CALL, 800-252-1166, 48 HOURS PRIOR TO EXCAVATION WORK. CONTRACTOR SHALL HAVE PRIVATE UTILITIES LOCATED.
3. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES, SUCH AS EXISTING GUTTER GRADES AT THE PROPOSED DRIVEWAYS, PRIOR TO THE START OF SITE GRADING. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM THE PLANS.
4. CONTRACTOR SHALL PROPERLY DISPOSE OF ALL MATERIAL REMOVALS. CONTRACTOR TO SALVAGE ALL MATERIALS POSSIBLE AND COORDINATE WITH OWNER ON FINAL USE.
5. PRIOR TO EARTH DISTURBANCE, INSTALL EROSION AND SEDIMENT CONTROL AS NECESSARY TO PREVENT SEDIMENT TRANSPORT OFFSITE DURING CONSTRUCTION WORK. INSTALL SILT FENCE AND INLET PROTECTION AT DISTURBANCE LIMITS.
6. SEE TREE PRESERVATION SHEETS FOR TREE REMOVALS AND INDIVIDUAL TREE LOCATIONS.
7. DEVELOPER OR CONTRACTOR TO PROVIDE A COPY OF WELL SEALING RECORDS ONCE WELL SEALING IS COMPLETE.
8. ALL EXISTING FEATURES AS SHOWN BUT ALSO INCLUDING UNDERGROUND UTILITIES SHALL BE REMOVED FROM PUBLIC ROW. NO ABANDONMENT IS ALLOWED.
9. ALL REMOVALS IN AREAS OF NO MASS GRADING SHALL INCLUDE RESTORATION OF AREA COMPLETE WITH SEEDING AND APPROPRIATE EROSION CONTROL.
10. ALL REMOVAL LIMITS DEPICTED AND ESTIMATED AND ASSUMED CONTRACTOR WILL REMOVE AT NEAREST EXISTING JOINTS OR PANELS.

LEGEND:

- REMOVE GRAVEL ROADS
- REMOVE BUILDING
- REMOVE CONCRETE
- TREE CLEARING LIMITS.
- SOIL BORING
- EXISTING GAS PIPELINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER

DEMOLITION TO BE COMPLETED BY OTHERS. ALL STRUCTURES AND UTILITIES TO BE DEMOLISHED BEFORE MASS GRADING AND STREET AND UTILITY CONSTRUCTION.

N

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0 75 150 300
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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

DEMO AND REMOVAL PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA

FOR REVIEW ONLY
PRELIMINARY
NOT FOR CONSTRUCTION

Clark Wicklund
Date
40922
License no.

QA/QC CHECK

By
Date

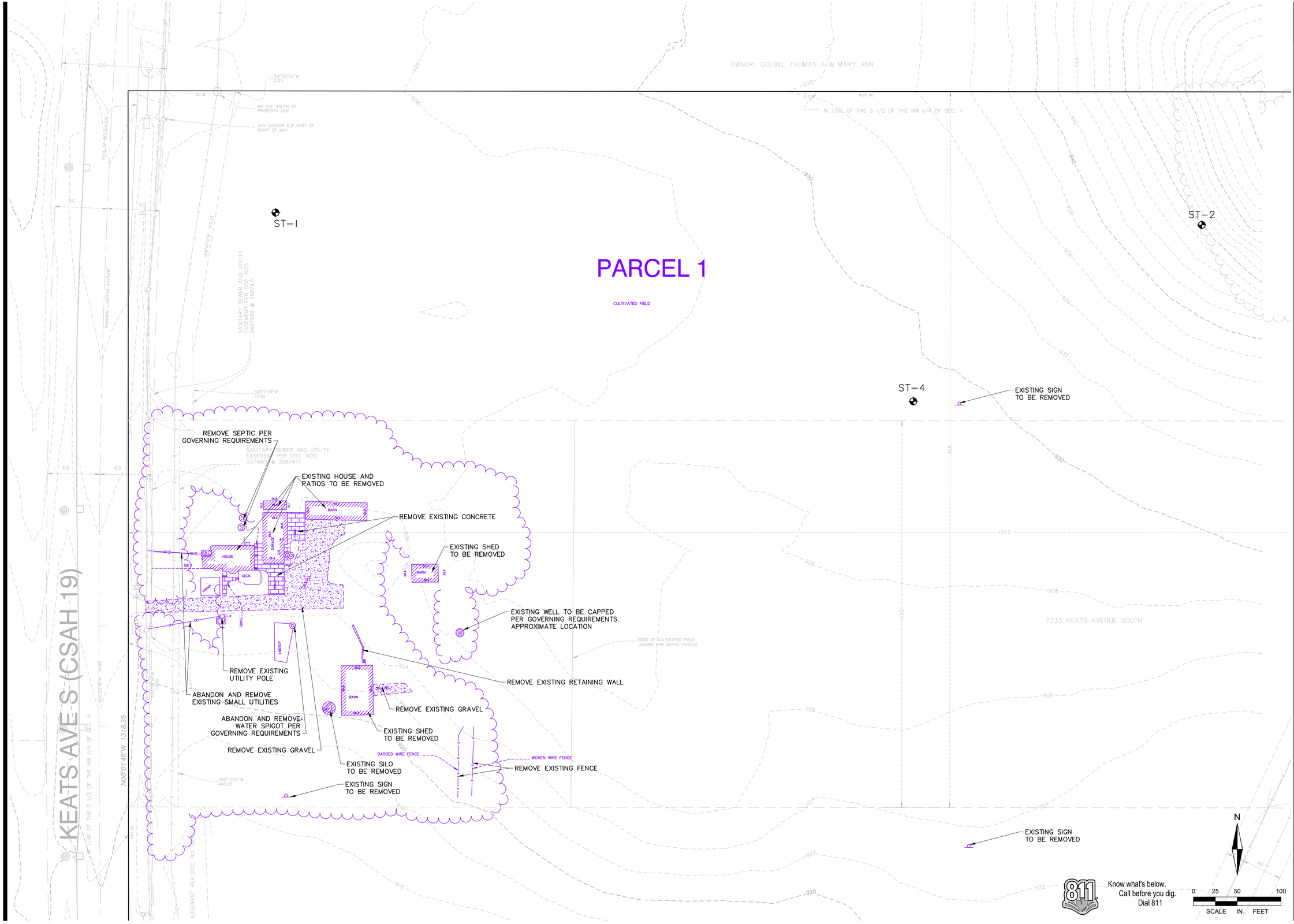
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

5

Sheet 5 of 91

File Location: X:\4000570-00\001140 Design\00 Sheets - Preliminary\DEMOLITION.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:24:47 PM



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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

DEMO AND REMOVAL PLAN - VIEW A

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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Date 40922 License no.

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QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

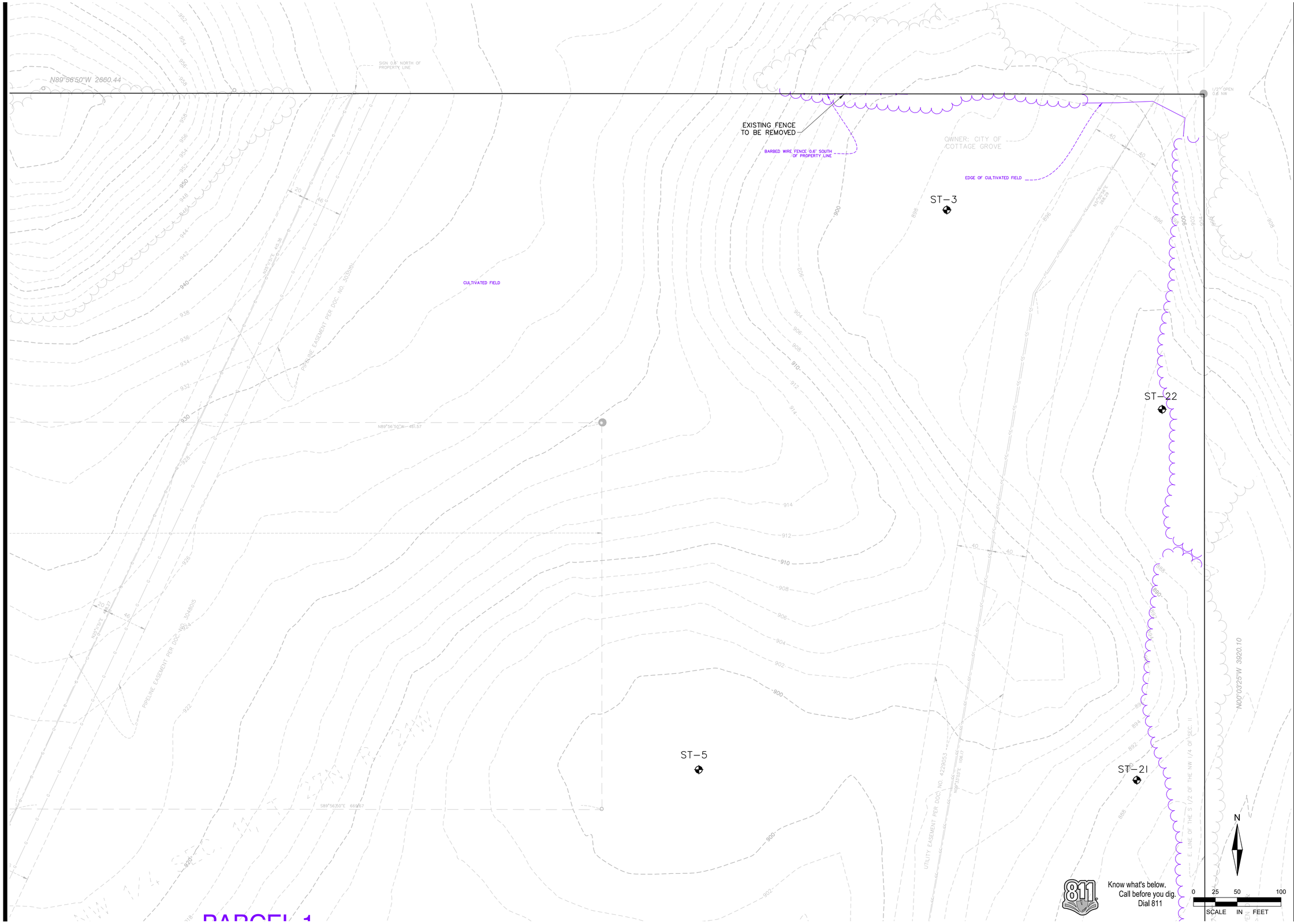
Drafted By: LRJ

Project No.: 4000570-00

6

Sheet 6 of 91

File Location: X:\4000570-00\001\40 Design\00 Sheets - Preliminary\DEMOLITION.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:12:51 PM



PARCEL 1

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

DEMO AND REMOVAL PLAN - VIEW B

DESCRIPTION	DATE
City Submittal	2025-12-31

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PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

Clark V. Vichlund — 40922
Date — License no.

QA/QC CHECK

By — Date

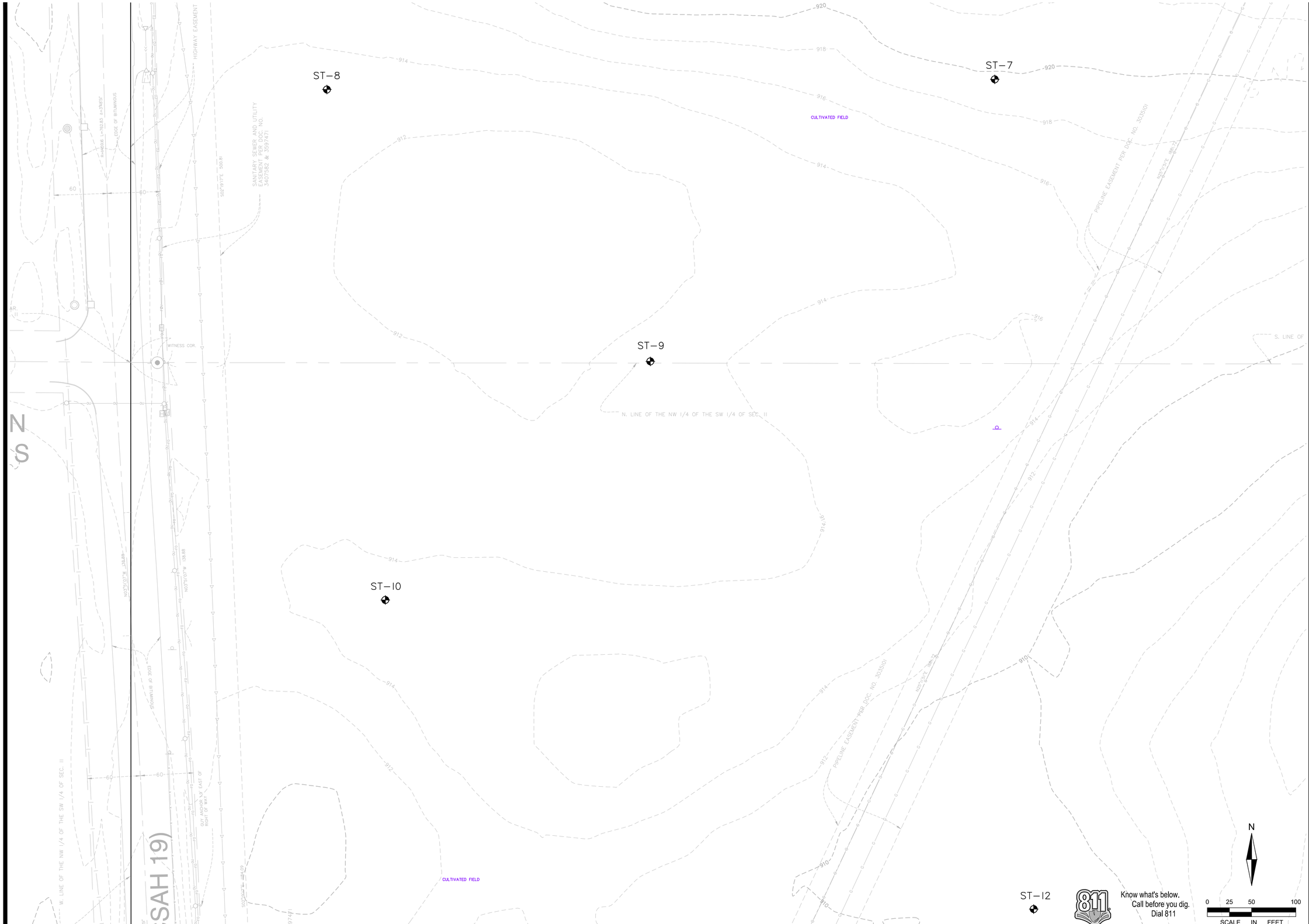
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

7

Sheet 7 of 91

File Location: X:\4000570-00\0140 Design\00 Sheets + Preliminary\DEMOLITION.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:12:46 PM



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

DEMO AND REMOVAL PLAN - VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

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Clark Vilcheck

Date 40922 License no.

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NOT FOR CONSTRUCTION

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

8

Sheet 8 of 91

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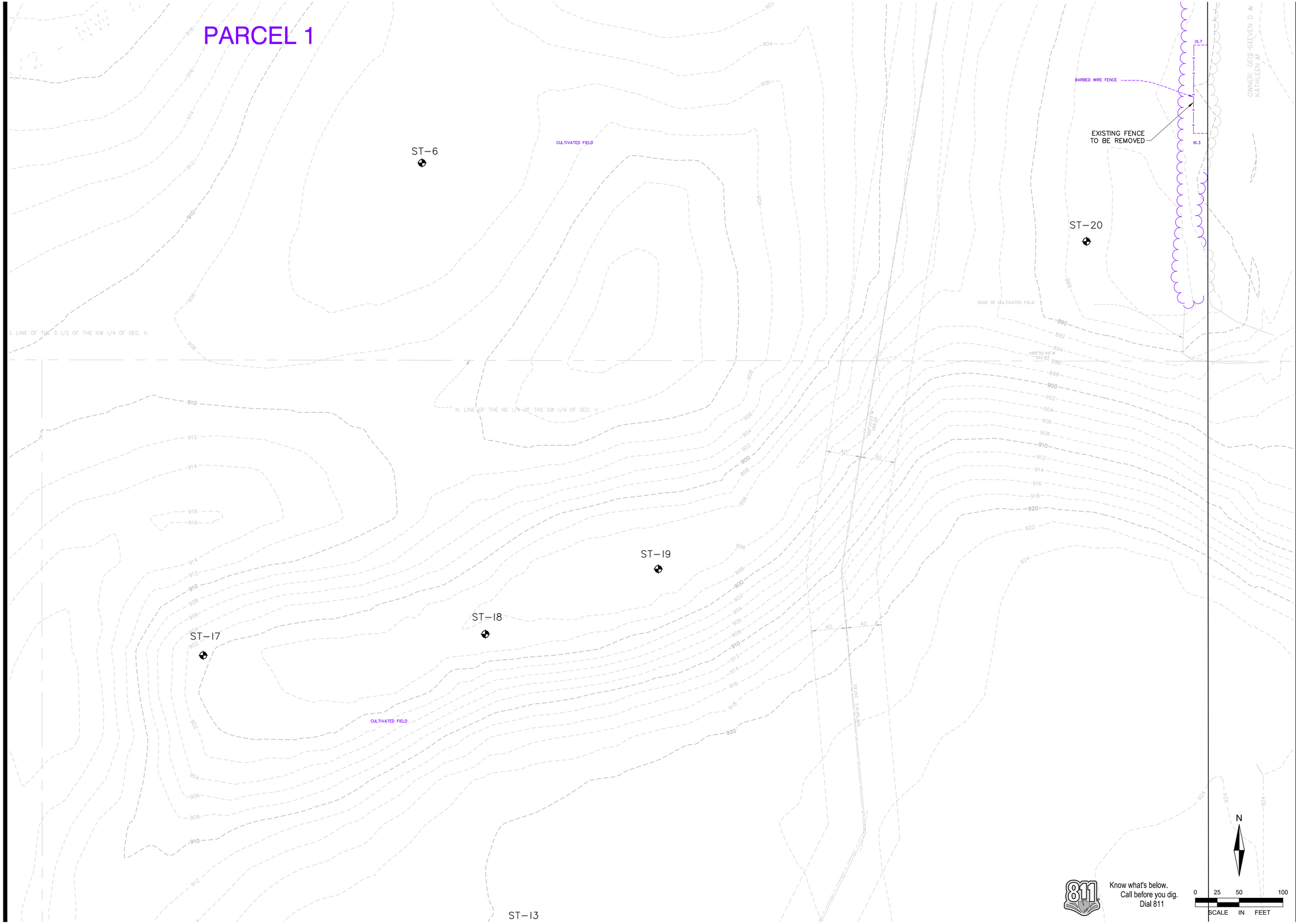

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
DEMO AND REMOVAL PLAN - VIEW D

DATE	DESCRIPTION
2025-12-31	City Submittal

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Clark Vilcinskus
Date

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License no.

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QA/QC CHECK

By Date

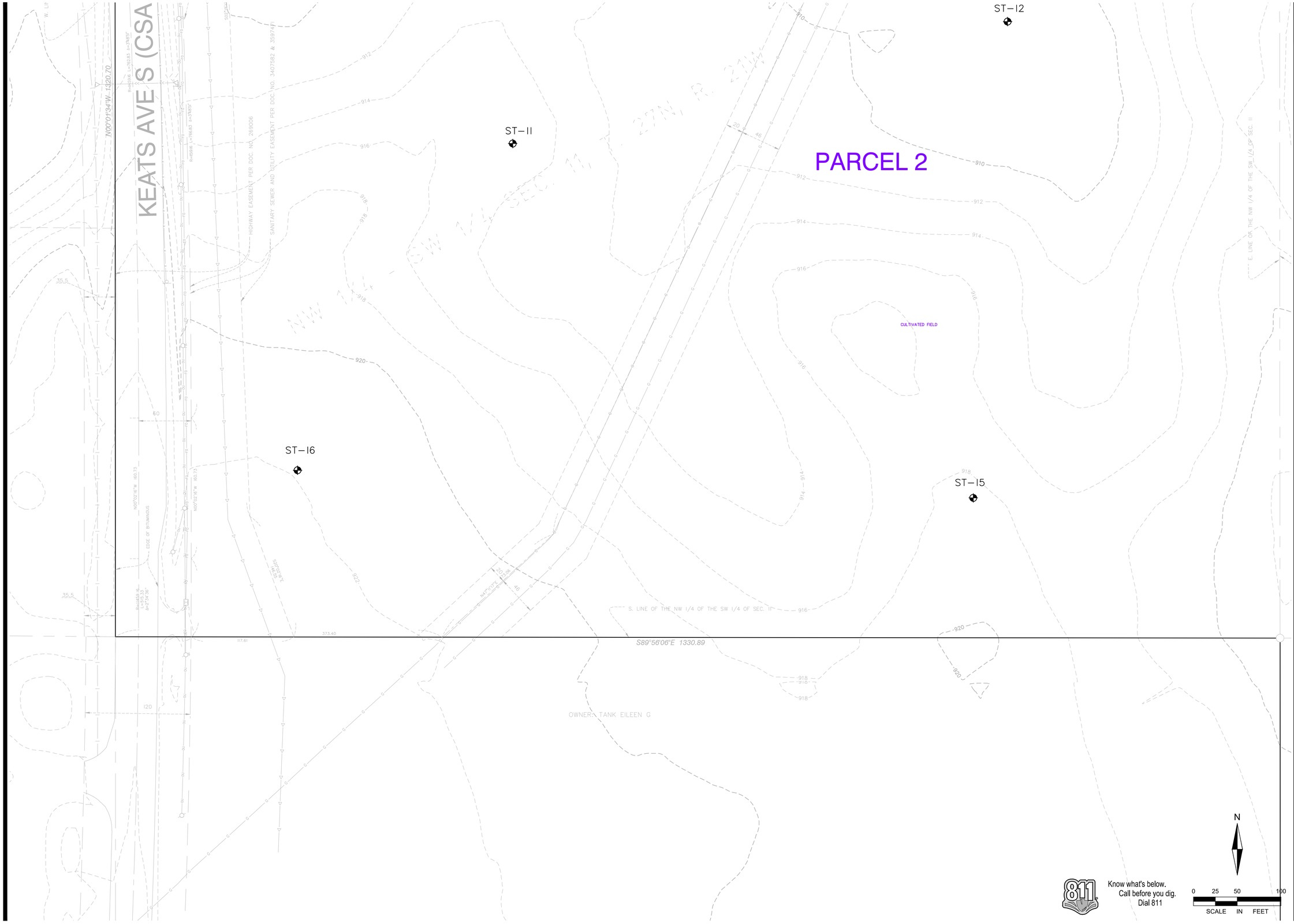
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

9

Sheet 9 of 91

File Location: X:\4000570-00\00140 Design\00 Sheets - Preliminary\DEMOLITION.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:13:06 PM



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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

DEMO AND REMOVAL PLAN - VIEW E

DATE	DESCRIPTION
2025-12-31	City Submittal

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PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Villoriuna

Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

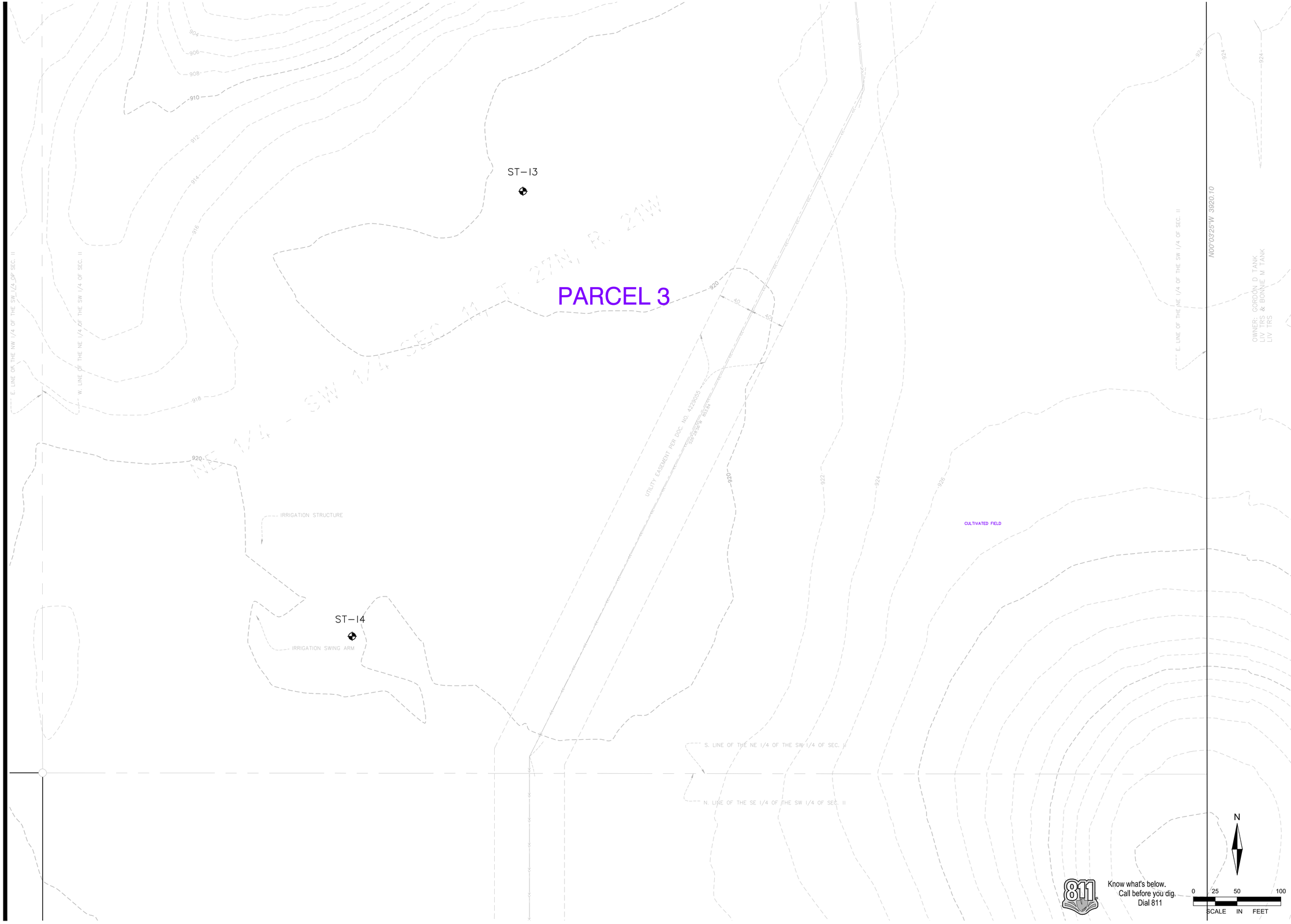
Drafted By: LRJ

Project No.: 4000570-00

10

Sheet 10 of 91

File Location: X:\4000570-00\001140 Design\00 Sheets - Preliminary\DEMOLITION.dwg Plotted By: Logan.Josephson on December 31, 2025 at 12:13:11 PM



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

DEMO AND REMOVAL PLAN - VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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FOR REVIEW ONLY
PRELIMINARY
NOT FOR CONSTRUCTION

Clark Wicklund
Date

40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

11

Sheet 11 of 91

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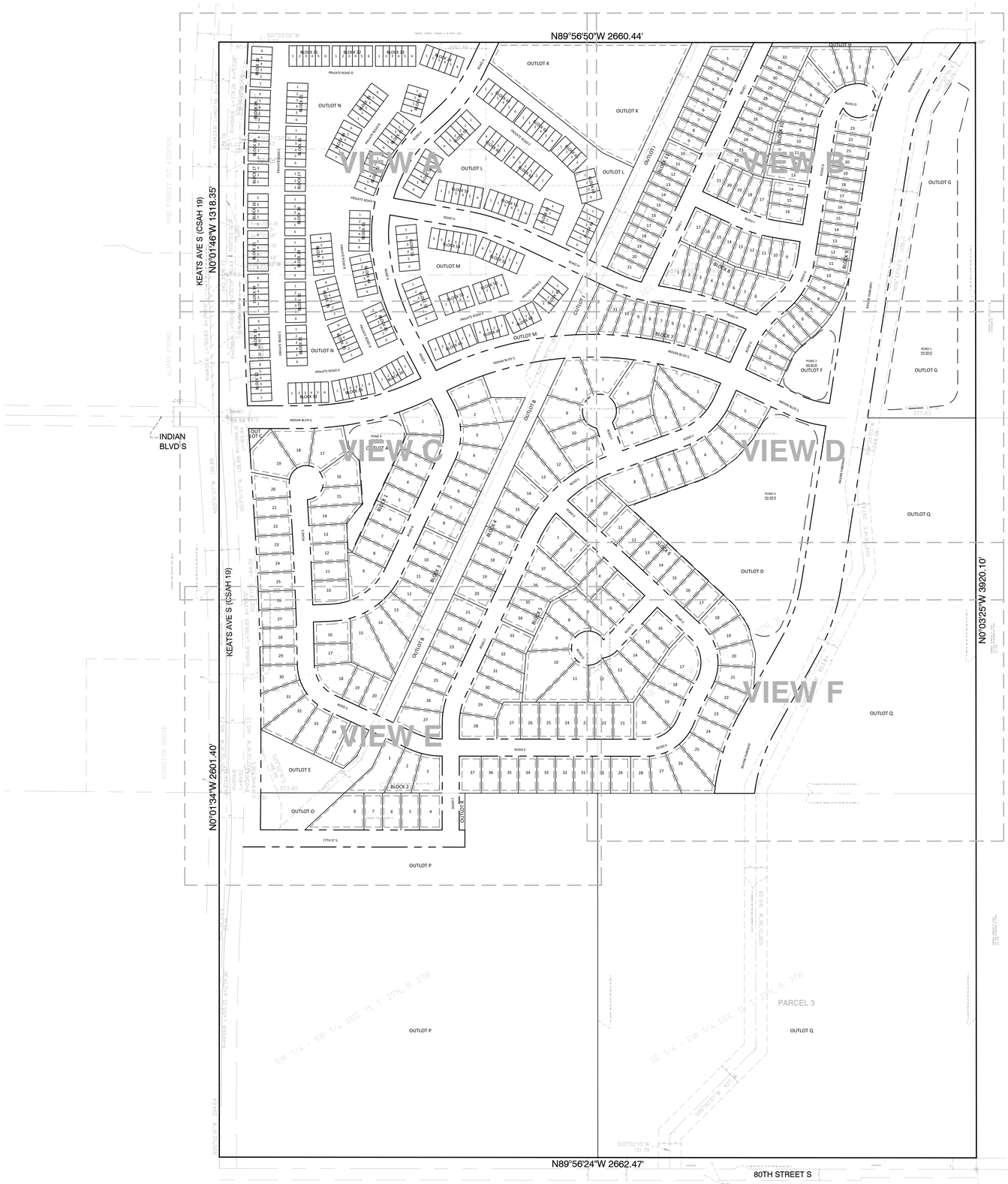
N89°56'50"W 2660.44'
N89°56'24"W 2662.47'
80TH STREET S
KEATS AVE S (CSAH 19)
N0°01'46"W 1318.35'
N0°01'34"W 2601.40'
N0°03'25"W 3920.10'
INDIAN BLVD S
VIEW A
VIEW B
VIEW C
VIEW D
VIEW E
VIEW F
OUTLOT K
OUTLOT L
OUTLOT M
OUTLOT N
OUTLOT A
OUTLOT B
OUTLOT C
OUTLOT D
OUTLOT E
OUTLOT F
OUTLOT G
OUTLOT O
OUTLOT P
OUTLOT Q
PARCEL 3
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
BLOCK 6
BLOCK 7
BLOCK 8
BLOCK 9
BLOCK 10
BLOCK 11
BLOCK 12
BLOCK 13
BLOCK 14
BLOCK 15
BLOCK 16
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BLOCK 22
BLOCK 23
BLOCK 24
BLOCK 25
BLOCK 26
BLOCK 27
BLOCK 28
BLOCK 29
BLOCK 30
BLOCK 31
BLOCK 32
BLOCK 33
BLOCK 34
BLOCK 35
BLOCK 36
BLOCK 37
PRIVATE ROAD A
PRIVATE ROAD B
PRIVATE ROAD C
PRIVATE ROAD D
ROAD A
ROAD B
ROAD C
ROAD D
ROAD E
ROAD F
ROAD G
ROAD H
POND 1
POND 2
POND 3
POND 4
777TH ST S
S00°03'02"W
S00°02'10"W 121.79'
S89°57'50"E 1973.40'
S89°57'50"E 1973.40'
S89°57'50"E 1973.40



DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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City & Vicinity Map

Date: 40922

License no.

QA/QC CHECK

By: Date:

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

Sheet 13 of 91

13

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

PRELIMINARY PLAT - VIEW A

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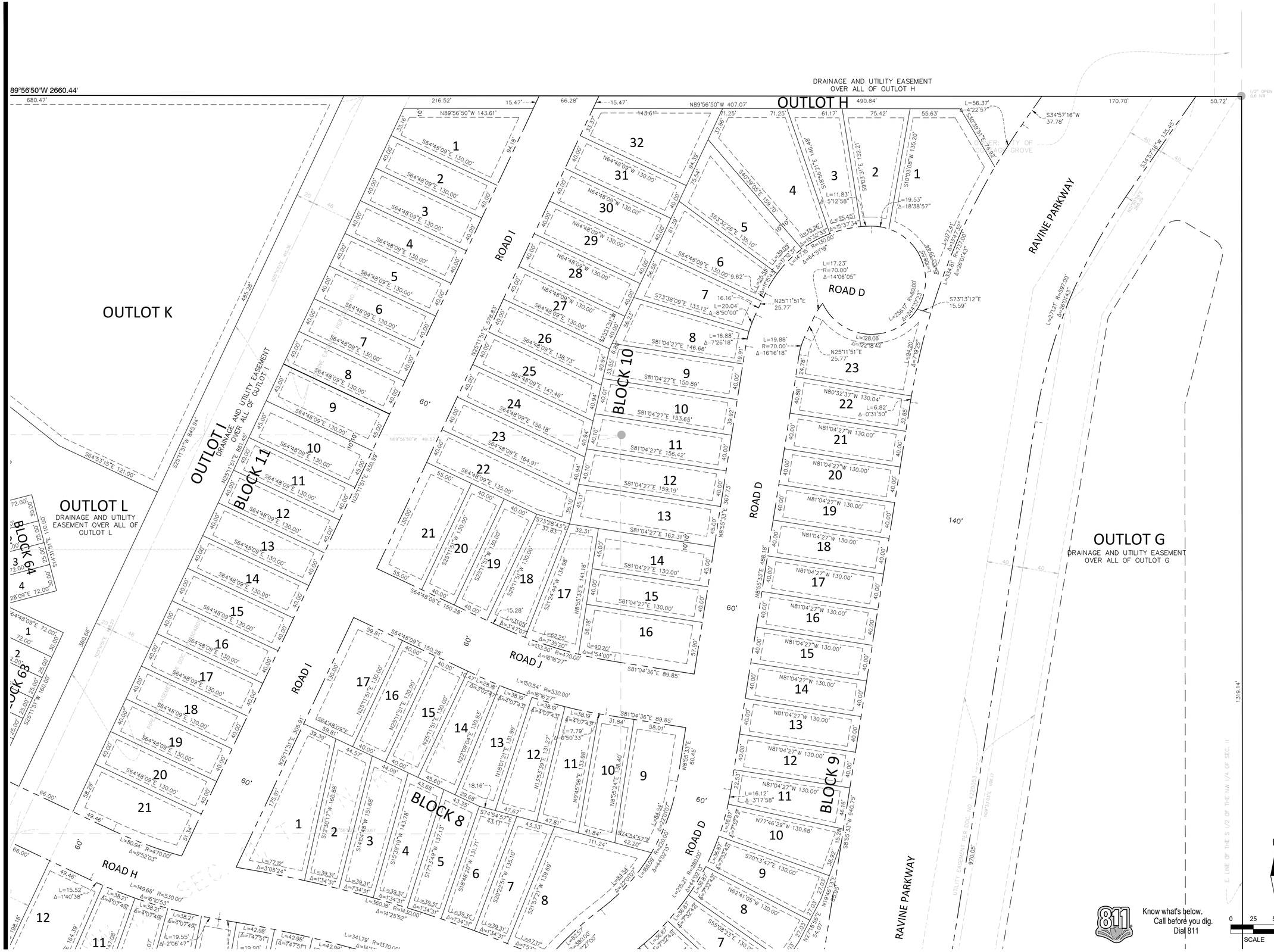
File Location: X:\4000570-00\001\40 Design\00 Sheets - Preliminary\PRELIMINARY PLAT.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:13:38 PM


89°56'50"W 2660.44'
680.47'
216.52'
15.47'
66.28'
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT H
OUTLOT H
N89°56'50"W 407.07'
490.84'
L=56.37'
Δ=4°22'57"
S34°57'16"W 37.78'
170.70'
50.72'
OUTLOT K
OUTLOT I
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT I
OUTLOT L
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT L
OUTLOT G
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT G
ROAD I
ROAD D
ROAD J
ROAD H
BLOCK 10
BLOCK 8
BLOCK 9
BLOCK 11
BLOCK 64
BLOCK 63
RAVINE PARKWAY
N89°56'50"W 143.61'
N89°56'50"W 461.37'
S64°48'09"E 130.00'
N64°48'09"W 130.00'
S81°04'27"E 146.66'
S81°04'27"E 150.89'
S81°04'27"E 153.65'
S81°04'27"E 156.42'
S81°04'27"E 159.19'
S81°04'27"E 162.31'
S81°04'27"E 130.00'
S81°04'36"E 89.85'
N81°04'27"W 130.00'
N25°11'51"E 25.77'
S73°13'12"E 15.59'
S25°11'51"W 845.94'
S64°53'15"E 121.00'
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S64°48'09"E 59.81'
S73°28'43"E 37.83'
S21°24'14"W 134.98'
S20°22'57"W 135.10'
S18°48'20"W 131.71'
S17°13'49"W 137.13'
S15°39'19"W 143.78'
S14°04'48"W 151.68'
S12°30'17"W 160.68'
S10°55'46"W 169.59'
S09°21'15"W 178.49'
S07°46'44"W 187.40'
S06°12'13"W 196.30'
S04°37'42"W 205.21'
S03°03'11"W 214.11'
S01°28'40"W 223.02'
S00°06'03"E 231.92'
S01°40'54"E 240.83'
S03°15'25"E 249.73'
S04°49'56"E 258.64'
S06°24'27"E 267.54'
S07°58'58"E 276.45'
S09°33'29"E 285.35'
S11°07'59"E 294.26'
S12°42'30"E 303.16'
S14°17'01"E 312.07'
S15°51'32"E 320.97'
S17°26'03"E 329.88'
S18°48'09"E 338.78'
S18°48'09"E 347.69'
S18°48'09"E 356.59'
S18°48'09"E 365.50'
S18°48'09"E 374.40'
S18°48'09"E 383.31'
S18°48'09"E 392.21'
S18°48'09"E 401.12'
S18°48'09"E 410.02'
S18°48'09"E 418.93'
S18°48'09"E 427.83'
S18°48'09"E 436.74'
S18°48'09"E 445.64'
S18°48'09"E 454.55'
S18°48'09"E 463.45'
S18°48'09"E 472.36'
S18°48'09"E 481.26'
S18°48'09"E 490.17'
S18°48'09"E 499.07'
S18°48'09"E



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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

PRELIMINARY PLAT- VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

FOR REVIEW PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund

Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

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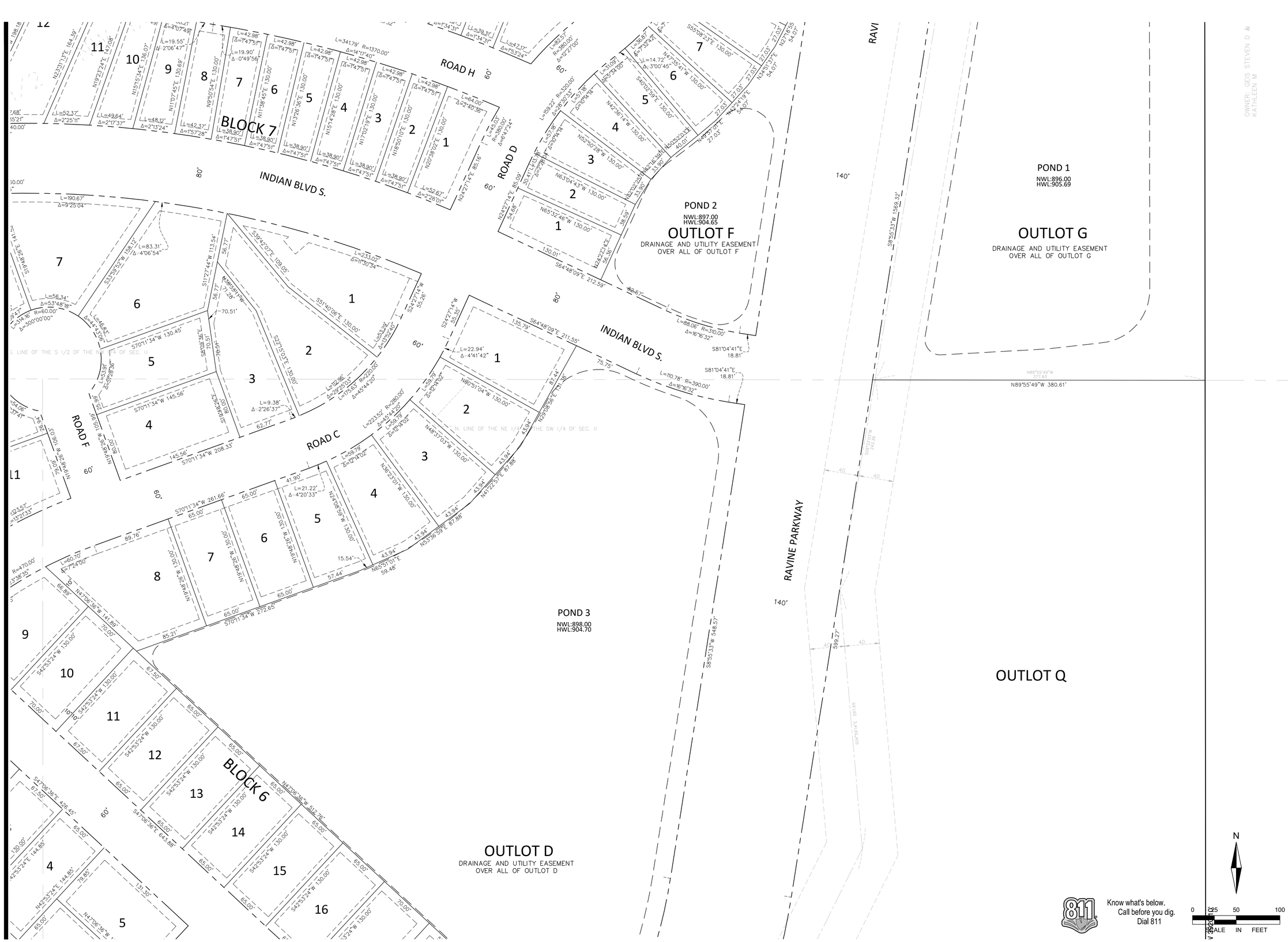
Sheet 15 of 91

File Location: X:\4000570-00\00140 Design\00 Sheets - Preliminary\PRELIMINARY PLAT.dwg Plotted By: Logan Josephson on December 2025 at 12:13:48 PM



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PRELIMINARY PLAT - VIEW D

DATE	DESCRIPTION
2025.12.31	City Submittal

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Clark Wicklund
Date

40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 16 of 91

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PRELIMINARY PLAT SUBMITTAL

PRELIMINARY PLAT- VIEW E

DATE	DESCRIPTION
2025-12-31	City Submittal

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Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

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Sheet 17 of 91

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PRELIMINARY PLAT- VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

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NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 18 of 91

File Location: X:\4000570-00\001\401 Design\00 Sheets - Preliminary\PRELIMINARY PLAT.dwg Plotted By: Logan Josephson on Dec 30, 2025 at 12:14:02 PM

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B1-L1	14,203	0.33
B1-L2	10,238	0.24
B1-L3	8,710	0.20
B1-L4	8,710	0.20
B1-L5	9,100	0.21
B1-L6	9,100	0.21
B1-L7	8,710	0.20
B1-L8	8,531	0.20
B1-L9	13,376	0.31
B1-L10	10,772	0.25
B1-L11	8,477	0.19
B1-L12	8,526	0.20
B1-L13	8,637	0.20
B1-L14	10,603	0.24
B1-L15	10,919	0.25
B1-L16	12,509	0.29
B1-L17	15,893	0.36
B1-L18	13,335	0.31
B1-L19	17,577	0.40
B1-L20	10,257	0.24
B1-L21	8,466	0.19
B1-L22	8,483	0.19
B1-L23	8,483	0.19
B1-L24	8,484	0.19
B1-L25	8,467	0.19
B1-L26	8,469	0.19
B1-L27	8,468	0.19
B1-L28	8,465	0.19
B1-L29	8,460	0.19
B1-L30	10,369	0.24
B1-L31	14,078	0.32
B1-L32	15,382	0.35
B1-L33	11,792	0.27
B1-L34	11,198	0.26
B1-L35	10,518	0.24
B2-L1	17,228	0.40
B2-L2	11,923	0.27
B2-L3	12,264	0.28
B2-L4	10,400	0.24
B2-L5	8,450	0.19
B2-L6	8,450	0.19
B2-L7	8,450	0.19
B2-L8	17,968	0.41
B3-L1	10,847	0.25
B3-L2	17,304	0.40
B3-L3	13,169	0.30
B3-L4	10,302	0.24
B3-L5	8,637	0.20
B3-L6	8,450	0.19
B3-L7	8,450	0.19
B3-L8	8,775	0.20
B3-L9	8,775	0.20
B3-L10	8,450	0.19
B3-L11	8,582	0.20
B3-L12	9,966	0.23
B3-L13	12,010	0.28
B3-L14	16,809	0.39
B3-L15	20,428	0.47
B3-L16	10,306	0.24
B3-L17	9,359	0.21

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B3-L18	12,114	0.28
B3-L19	8,450	0.19
B3-L20	8,869	0.20
B4-L1	14,982	0.34
B4-L3	10,851	0.25
B4-L4	11,645	0.27
B4-L5	9,703	0.22
B4-L6	16,948	0.39
B4-L7	16,544	0.38
B4-L8	16,995	0.39
B4-L9	13,605	0.31
B4-L10	10,022	0.23
B4-L11	11,477	0.26
B4-L12	16,154	0.37
B4-L13	13,323	0.31
B4-L14	11,021	0.25
B4-L15	9,475	0.22
B4-L16	8,775	0.20
B4-L17	8,450	0.19
B4-L18	8,450	0.19
B4-L19	8,450	0.19
B4-L20	9,100	0.21
B4-L21	8,775	0.20
B4-L22	9,032	0.21
B4-L23	8,450	0.19
B4-L24	8,450	0.19
B4-L25	9,388	0.22
B4-L26	10,533	0.24
B4-L27	13,770	0.32
B5-L1	11,027	0.25
B5-L2	8,775	0.20
B5-L3	8,775	0.20
B5-L4	9,415	0.22
B5-L5	10,484	0.24
B5-L6	8,534	0.20
B5-L7	13,634	0.31
B5-L8	10,246	0.24
B5-L9	12,912	0.30
B5-L10	22,616	0.52
B5-L11	16,255	0.37
B5-L12	13,985	0.32
B5-L13	13,560	0.31
B5-L14	9,600	0.22
B5-L15	8,793	0.20
B5-L16	10,075	0.23
B5-L17	15,279	0.35
B5-L18	9,848	0.23
B5-L19	13,028	0.30
B5-L20	12,811	0.29
B5-L21	9,425	0.22
B5-L22	8,450	0.19
B5-L23	8,450	0.19
B5-L24	8,450	0.19
B5-L25	8,450	0.19
B5-L26	8,450	0.19
B5-L27	10,196	0.23
B5-L28	10,759	0.25
B5-L29	9,551	0.22
B5-L30	30,851	0.71
B5-L33	9,100	0.21

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B5-L34	8,775	0.20
B5-L35	8,450	0.19
B5-L36	9,955	0.23
B5-L37	12,029	0.28
B6-L1	10,969	0.25
B6-L2	9,645	0.22
B6-L3	9,645	0.22
B6-L4	9,645	0.22
B6-L5	8,849	0.20
B6-L6	8,450	0.19
B6-L7	8,450	0.19
B6-L8	15,356	0.35
B6-L9	10,876	0.25
B6-L10	9,100	0.21
B6-L11	8,775	0.20
B6-L12	8,450	0.19
B6-L13	8,450	0.19
B6-L14	8,450	0.19
B6-L15	8,450	0.19
B6-L16	8,450	0.19
B6-L17	9,100	0.21
B6-L18	10,063	0.23
B6-L19	10,166	0.23
B6-L20	10,166	0.23
B6-L21	10,393	0.24
B6-L22	9,236	0.21
B6-L23	8,814	0.20
B6-L24	9,558	0.22
B6-L25	13,283	0.30
B6-L26	15,846	0.36
B6-L27	11,101	0.25
B6-L28	9,166	0.21
B6-L29	9,100	0.21
B6-L30	8,450	0.19
B6-L31	8,450	0.19
B6-L32	8,450	0.19
B6-L33	8,450	0.19
B6-L34	8,450	0.19
B6-L35	8,450	0.19
B6-L36	8,450	0.19
B6-L37	10,075	0.23
B7-L1	7,450	0.17
B7-L2	5,323	0.12
B7-L3	5,323	0.12
B7-L4	5,323	0.12
B7-L5	5,323	0.12
B7-L6	5,323	0.12
B7-L7	5,323	0.12
B7-L8	5,322	0.12
B7-L9	5,716	0.13
B7-L10	6,108	0.14
B7-L11	6,797	0.16
B7-L12	12,215	0.28
B8-L1	9,639	0.22
B8-L2	6,475	0.15
B8-L3	6,103	0.14
B8-L4	5,788	0.13
B8-L5	5,529	0.13
B8-L6	5,485	0.13
B8-L7	5,657	0.13

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B8-L8	11,751	0.27
B8-L9	7,762	0.18
B8-L10	5,533	0.13
B8-L11	5,685	0.13
B8-L12	5,638	0.13
B8-L13	5,677	0.13
B8-L14	5,485	0.13
B8-L15	5,200	0.12
B8-L16	5,200	0.12
B8-L17	7,775	0.18
B9-L1	7,218	0.17
B9-L2	5,384	0.12
B9-L3	5,940	0.14
B9-L4	5,940	0.14
B9-L5	5,584	0.13
B9-L6	5,922	0.14
B9-L7	5,922	0.14
B9-L8	5,922	0.14
B9-L9	5,922	0.14
B9-L10	5,948	0.14
B9-L11	5,516	0.13
B9-L12	5,200	0.12
B9-L13	5,200	0.12
B9-L14	5,200	0.12
B9-L15	5,200	0.12
B9-L16	5,200	0.12
B9-L17	5,200	0.12
B9-L18	5,200	0.12
B9-L19	5,200	0.12
B9-L20	5,200	0.12
B9-L21	5,200	0.12
B9-L22	5,236	0.12
B9-L23	9,245	0.21
B10-L1	14,332	0.33
B10-L2	6,982	0.16
B10-L3	6,539	0.15
B10-L4	10,804	0.25
B10-L5	8,064	0.19
B10-L6	6,320	0.15
B10-L7	6,050	0.14
B10-L8	6,379	0.15
B10-L9	5,975	0.14
B10-L10	6,078	0.14
B10-L11	6,201	0.14
B10-L12	6,312	0.14
B10-L13	7,234	0.17
B10-L14	5,850	0.13
B10-L15	5,200	0.12
B10-L16	7,504	0.17
B10-L17	6,513	0.15
B10-L18	5,567	0.13
B10-L19	5,200	0.12
B10-L20	5,200	0.12
B10-L21	7,150	0.16
B10-L22	6,661	0.15
B10-L23	6,422	0.15
B10-L24	6,073	0.14
B10-L25	5,724	0.13
B10-L26	5,375	0.12
B10-L27	5,200	0.12

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B10-L28	5,200	0.12
B10-L29	5,200	0.12
B10-L30	5,200	0.12
B10-L31	5,200	0.12
B10-L32	8,304	0.19
B11-L1	8,277	0.19
B11-L2	5,200	0.12
B11-L3	5,200	0.12
B11-L4	5,200	0.12
B11-L5	5,200	0.12
B11-L6	5,200	0.12
B11-L7	5,200	0.12
B11-L8	5,200	0.12
B11-L9	5,850	0.13
B11-L10	5,850	0.13
B11-L11	5,200	0.12
B11-L12	5,200	0.12
B11-L13	5,200	0.12
B11-L14	5,200	0.12
B11-L15	5,200	0.12
B11-L16	5,200	0.12
B11-L17	5,200	0.12
B11-L18	5,200	0.12
B11-L19	5,200	0.12
B11-L20	5,200	0.12
B11-L21	7,392	0.17
B12-L1	1,957	0.04
B12-L2	1,595	0.04
B12-L3	1,595	0.04
B12-L4	1,595	0.04
B12-L5	1,595	0.04
B12-L6	1,958	0.04
B13-L1	1,958	0.04
B13-L2	1,595	0.04
B13-L3	1,595	0.04
B13-L4	1,595	0.04
B13-L5	1,595	0.04
B13-L6	1,957	0.04
B14-L1	1,958	0.04
B14-L2	1,595	0.04
B14-L3	1,595	0.04
B14-L4	1,595	0.04
B14-L5	1,595	0.04
B14-L6	1,957	0.04
B15-L1	1,957	0.04
B15-L2	1,595	0.04
B15-L3	1,595	0.04
B15-L4	1,595	0.04
B15-L5	1,595	0.04
B15-L6	1,957	0.04
B16-L1	1,958	0.04
B16-L2	1,595	0.04
B16-L3	1,595	0.04
B16-L4	1,595	0.04
B16-L5	1,958	0.04
B17-L1	1,958	0.04
B17-L2	1,595	0.04
B17-L3	1,957	0.04
B18-L1	1,958	0.04
B18-L2	1,595	0.04

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B18-L3	1,595	0.04
B18-L4	1,957	0.04
B19-L1	1,957	0.04
B19-L2	1,595	0.04
B19-L3	1,595	0.04
B19-L4	1,595	0.04
B19-L5	1,595	0.04
B19-L6	1,957	0.04
B20-L1	1,958	0.04
B20-L2	1,595	0.04
B20-L3	1,595	0.04
B20-L4	1,595	0.04
B20-L5	1,595	0.04
B20-L6	1,957	0.04
B21-L1	1,958	0.04
B21-L2	1,595	0.04
B21-L3	1,595	0.04
B21-L4	1,595	0.04
B21-L5	1,595	0.04
B21-L6	1,957	0.04
B22-L1	1,958	0.04
B22-L2	1,595	0.04
B22-L3	1,595	0.04
B22-L4	1,595	0.04
B22-L5	1,595	0.04
B22-L6	1,958	0.04
B23-L1	1,957	0.04
B23-L2	1,595	0.04
B23-L3	1,595	0.04
B23-L4	1,595	0.04
B23-L5	1,595	0.04
B23-L6	1,958	0.04
B24-L1	1,957	0.04
B24-L2	1,595	0.04
B24-L3	1,595	0.04
B24-L4	1,595	0.04
B24-L5	1,595	0.04
B24-L6	1,957	0.04
B25-L1	1,957	0.04
B25-L2	1,595	0.04
B25-L3	1,595	0.04
B25-L4	1,595	0.04
B25-L5	1,595	0.04
B25-L6	1,957	0.04
B26-L1	1,958	0.04
B26-L2	1,595	0.04
B26-L3	1,595	0.04
B26-L4	1,595	0.04
B26-L5	1,595	0.04
B26-L6	1,957	0.04
B27-L1	1,957	0.04
B27-L2	1,595	0.04
B27-L3	1,958	0.04
B28-L1	1,957	0.04
B28-L2	1,595	0.04
B28-L3	1,595	0.04
B28-L4	1,595	0.04
B28-L5	1,595	0.04
B28-L6	1,957	0.04
B29-L1	1,958	0.04

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B29-L2	1,595	0.04
B29-L3	1,595	0.04
B29-L4	1,595	0.04
B29-L5	1,595	0.04
B29-L6	1,958	0.04
B30-L1	1,957	0.04
B30-L2	1,595	0.04
B30-L3	1,595	0.04
B30-L4	1,595	0.04
B30-L5	1,595	0.04
B30-L6	1,957	0.04
B31-L1	1,958	0.04
B31-L2	1,595	0.04
B31-L3	1,595	0.04
B31-L4	1,595	0.04
B31-L5	1,595	0.04
B31-L6	1,957	0.04
B32-L1	1,958	0.04
B32-L2	1,595	0.04
B32-L3	1,595	0.04
B32-L4	1,595	0.04
B32-L5	1,595	0.04
B32-L6	1,958	0.04
B33-L1	1,957	0.04
B33-L2	1,595	0.04
B33-L3	1,595	0.04
B33-L4	1,595	0.04
B33-L5	1,595	0.04
B33-L6	1,957	0.04
B34-L1	1,957	0.04
B34-L2	1,595	0.04
B34-L3	1,595	0.04
B34-L4	1,595	0.04
B34-L5	1,957	0.04
B35-L1	1,958	0.04
B35-L2	1,595	0.04
B35-L3	1,595	0.04
B35-L4	1,595	0.04
B35-L5	1,595	0.04
B35-L6	1,958	0.04
B36-L1	1,958	0.04
B36-L2	1,595	0.04
B36-L3	1,595	0.04
B36-L4	1,595	0.04
B36-L5	1,595	0.04
B36-L6	1,958	0.04
B37-L1	1,957	0.04
B37-L2	1,595	0.04
B37-L3	1,595	0.04
B37-L4	1,595	0.04
B37-L5	1,595	0.04
B37-L6	1,958	0.04
B38-L1	1,958	0.04
B38-L2	1,595	0.04
B38-L3	1,595	0.04
B38-L4	1,595	0.04
B38-L5	1,595	0.04
B38-L6	1,957	0.04
B39-L1	1,958	0.04
B39-L2	1,595	0.04

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B39-L3	1,595	0.04
B39-L4	1,595	0.04
B39-L5	1,595	0.04
B39-L6	1,958	0.04
B40-L1	1,958	0.04
B40-L2	1,595	0.04
B40-L3	1,595	0.04
B40-L4	1,958	0.04
B41-L1	1,958	0.04
B41-L2	1,595	0.04
B41-L3	1,595	0.04
B41-L4	1,595	0.04
B41-L5	1,595	0.04
B41-L6	1,957	0.04
B42-L1	1,958	0.04
B42-L2	1,595	0.04
B42-L3	1,595	0.04
B42-L4	1,595	0.04
B42-L5	1,595	0.04
B42-L6	1,958	0.04
B43-L1	1,958	0.04
B43-L2	1,595	0.04
B43-L3	1,595	0.04
B43-L4	1,595	0.04
B43-L5	1,595	0.04
B43-L6	1,958	0.04
B44-L1	1,957	0.04
B44-L2	1,595	0.04
B44-L3	1,595	0.04
B44-L4	1,595	0.04
B44-L5	1,595	0.04
B44-L6	1,958	0.04
B45-L1	1,957	0.04
B45-L2	1,595	0.04
B45-L3	1,595	0.04
B45-L4	1,595	0.04
B45-L5	1,595	0.04
B45-L6	1,957	0.04
B46-L1	2,160	0.05
B46-L2	1,800	0.04
B46-L3	1,800	0.04
B46-L4	1,800	0.04
B46-L5	1,800	0.04
B46-L6	2,160	0.05
B47-L1	2,160	0.05
B47-L2	1,800	0.04
B47-L3	1,800	0.04
B47-L4	2,160	0.05
B48-L1	2,160	0.05
B48-L2	1,800	0.04
B48-L3	1,800	0.04
B48-L4	2,160	0.05
B49-L1	2,160	0.05
B49-L2	1,800	0.04
B49-L3	1,800	0.04
B49-L4	2,160	0.05
B50-L1	2,160	0.05
B50-L2	1,800	0.04
B50-L3	1,800	0.04
B50-L4	2,160	0.05

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B51-L1	2,160	0.05
B51-L2	1,800	0.04
B51-L3	1,800	0.04
B51-L4	2,160	0.05
B52-L1	2,160	0.05
B52-L2	1,800	0.04
B52-L3	1,800	0.04
B52-L4	1,800	0.04
B52-L5	1,800	0.04
B52-L6	2,160	0.05
B53-L1	2,160	0.05
B53-L2	1,800	0.04
B53-L3	1,800	0.04
B53-L4	1,800	0.04
B53-L5	1,800	0.04
B53-L6	2,160	0.05
B54-L1	2,160	0.05
B54-L2	1,800	0.04
B54-L3	1,800	0.04
B54-L4	1,800	0.04
B54-L5	1,800	0.04
B54-L6	2,160	0.05
B55-L1	2,160	0.05
B55-L2	1,800	0.04
B55-L3	1,800	0.04
B55-L4	1,800	0.04
B55-L5	1,800	0.04
B55-L6	2,160	0.05
B56-L1	2,160	0.05
B56-L2	1,800	0.04
B56-L3	1,800	0.04
B56-L4	1,800	0.04
B56-L5	1,800	0.04
B56-L6	2,160	0.05
B57-L1	2,160	0.05
B57-L2	1,800	0.04
B57-L3	1,800	0.04
B57-L4	1,800	0.04
B57-L5	1,800	0.04
B57-L6	2,160	0.05
B58-L1	2,160	0.05
B58-L2	1,800	0.04
B58-L3	1,800	0.04
B58-L4	1,800	0.04
B58-L5	1,800	0.04
B58-L6	2,160	0.05
B59-L1	2,160	0.05
B59-L2	1,800	0.04
B59-L3	1,800	0.04
B59-L4	1,800	0.04
B59-L5	1,800	0.04
B59-L6	2,160	0.05
B60-L1	2,160	0.05
B60-L2	1,800	0.04
B60-L3	1,800	0.04
B60-L4	2,160	0.05
B61-L1	2,160	0.05
B61-L2	1,800	0.04
B61-L3	1,800	0.04
B61-L4	1,800	0.04

PARCEL AREA TABLE		
PARCEL	AREA SF	AREA AC
B61-L5	1,800	0.04
B61-L6	2,160	0.05
B62-L1	2,160	0.05
B62-L2	1,800	0.04
B62-L3	1,800	0.04
B62-L4	2,160	0.05
B63-L1	2,160	0.05
B63-L2	1,800	0.04
B63-L3	1,800	0.04
B63-L4	1,800	0.04
B63-L5	1,800	0.04
B63-L6	2,160	0.05
B64-L1	2,160	0.05
B64-L2	1,800	0.04
B64-L3	1,800	0.04
B64-L4	2,160	0.05
B65-L1	2,160	0.05
B65-L2	1,800	0.04
B65-L3	1,800	0.04
B65-L4	2,160	0.05
B66-L1	2,160	0.05
B66-L2	1,800	0.04
B66-L3	1,800	0.04
B66-L4	1,800	0.04
B66-L5	1,800	0.04
B66-L6	2,160	0.05
B67-L1	2,160	0.05
B67-L2	1,800	0.04
B67-L3	1,800	0.04
B67-L4	1,800	0.04
B67-L5	1,800	0.04
B67-L6	2,160	0.05
OUTLOT A	48,673	1.12
OUTLOT B	109,525	2.51
OUTLOT C	2,980	0.07
OUTLOT D	289,772	6.65
OUTLOT E	58,419	1.34
OUTLOT F	40,518	0.93
OUTLOT G	349,546	8.02
OUTLOT H	9,402	0.22
OUTLOT I	58,865	1.35
OUTLOT J	14,287	0.33
OUTLOT K	180,979	4.15
OUTLOT L	167,682	3.85
OUTLOT M	137,924	3.17
OUTLOT N	379,408	8.71
OUTLOT O	29,281	0.67
OUTLOT P	1,540,442	35.36
OUTLOT Q	2,413,726	55.41
OUTLOT R	2,600	0.06
ROW-INDIAN	169,806	3.90
ROW-INTER-N	313,205	7.19
ROW-INTER-S	458,871	10.53
ROW-KEATS	324,246	7.44
ROW-RAVINE	387,068	8.89
TOTAL	10,432,579	239.50

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RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

PARCEL AREA TABLE

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

Clark Vinci-Iunz — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 19 of 91

File Location: X:\4000570-00\0140 Design\00 Sheets - Preliminary\PRELIMINARY PLAT.dwg Plotted By: Logan Josephson on Dwg.com 2025 ■ 12:14:07 PM



SITE PLAN DATA:

PIDS: 11.027.21.24.0001	60.54 AC
11.027.21.23.0001	20.01 AC
11.027.21.32.0001	40.34 AC
11.027.21.31.0001	79.47 AC
11.027.21.33.0001	39.13 AC
TOTAL GROSS AREA	239.49 AC
OUTLOT P	35.36 AC
OUTLOT Q	55.41 AC
TOTAL PROJECT AREA AREA	148.72 AC
OUTLOT K (PARK DEDICATION)	4.15 AC
EXISTING ROW (KEATS AVE S)	3.55 AC
PROPOSED ROW DEDICATION (KEATS AVE S)	3.89 AC
NET TOTAL PRODUCT AREA	137.13 AC
PROPOSED ROW (FUTURE RAVINE PKWY)	8.89 AC
PROPOSED ROW (FUTURE INDIAN BLVD S)	3.90 AC
PROPOSED ROW (INTERIOR NORTH)	7.19 AC
PROPOSED ROW (INTERIOR SOUTH)	10.53 AC

SITE PLAN OUTLOT DATA:

OUTLOT	OWNER
OUTLOT WITH PONDS: A, D, F, G	CITY
OUTLOT: K (CITY PARK)	CITY
OUTLOT WITH PIPELINE: B, E, I, J, P, O	HOA/DEVELOPER
OUTLOT: C, H, L, M, N, O	HOA/DEVELOPER

SITE PLAN LOT DATA:

URBAN TOWNHOME:

LOT WIDTH MINIMUM:	22 FT
LOT DEPTH MINIMUM:	72.5 FT
END LOT WIDTH:	27 FT
FRONT DOOR SETBACK:	15 FT
KEATS AVE FRONT DOOR SETBACK:	25 FT
GARAGE SETBACK:	25 FT
CORNER SETBACK:	20 FT
BUILDING SEPARATION:	20 FT

SUBURBAN TOWNHOME:

LOT WIDTH MINIMUM:	25 FT
LOT DEPTH MINIMUM:	72 FT
END LOT WIDTH:	30 FT
FRONT SETBACK:	25 FT
CORNER SETBACK:	20 FT
BUILDING SEPARATION:	15 FT

VILLA SINGLE FAMILY LOTS:

LOT WIDTH MINIMUM:	40 FT
LOT DEPTH MINIMUM:	130 FT
SIDE YARD SETBACK:	5 FT
SIDE YARD SETBACK:	5 FT

65' SINGLE FAMILY LOTS:

LOT WIDTH MINIMUM:	65 FT
LOT DEPTH MINIMUM:	130 FT
SIDE YARD SETBACK:	5 FT (GARAGE SIDE)
	7.5 FT (NON-GARAGE SIDE)

LOT TYPE:	UNITS	AREA (AC)	DENSITY (UNITS/AC)
URBAN TOWNHOMES	192	17.83	10.77
SUBURBAN TOWNHOMES	114	15.31	7.45
VILLA SINGLE FAMILY LOTS	105	34.42	3.05
65' SINGLE FAMILY LOTS	164	69.56	2.36
TOTAL UNITS	575	137.12	4.19

GUEST PARKING STALLS: 73

IMPERVIOUS SURFACES:

MAX. IMPERVIOUS SURFACE ALLOWED:

VILLA SINGLE FAMILY LOTS = 50% MAX. PER LOT

65' SINGLE FAMILY LOTS = 40% MAX PER LOT

ATTACHED DWELLINGS = 40% OF TOTAL AREA

SITE NOTES:

1. SEE SHEET 21 FOR TYPICAL LOT DETAILS AND TYPICAL ROAD SECTIONS.
2. ALL CURB RETURNS ARE MEASURED FROM BACK OF CURB UNLESS OTHERWISE NOTED.

LEGEND:

- EASEMENT LINE
- BUILDING SETBACK
- PROPERTY LINE
- LOT LINE
- ROW
- STOP/STREET SIGN
- STREET LIGHT
- POND MAINTENANCE ACCESS (TURF)
- CITY OPEN/PARK MARKER SIGN

N

0 75 150 300

SCALE IN FEET

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

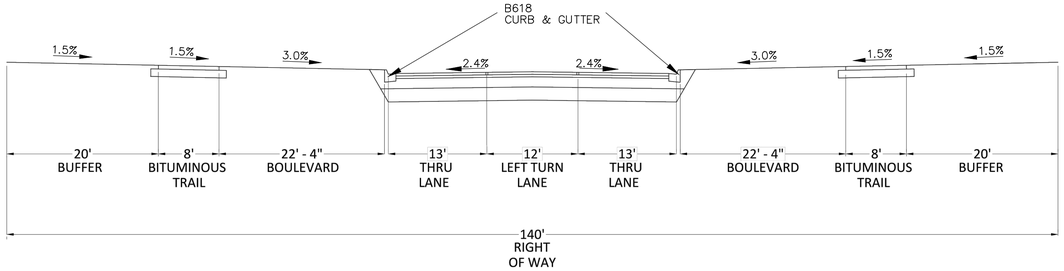
Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

20

Sheet 20 of 91

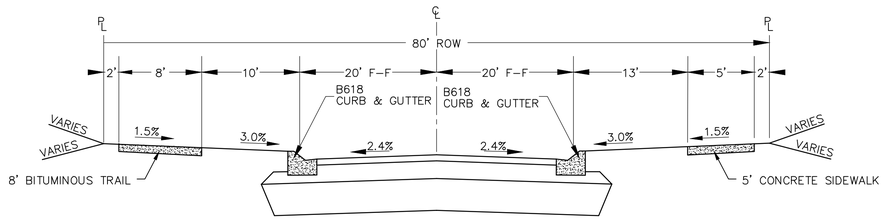
File Location: X:\4000570-00\1140 Design\03 Sheets - Preliminary\SITE.dwg Plotted By: Logan.Josephson on December 31, 2025 at 2:47:03 PM

TYPICAL ROAD SECTIONS



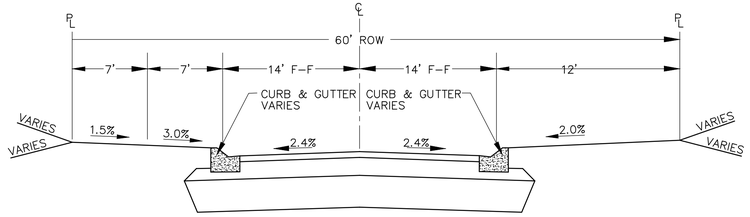
RAVINE PARKWAY S (BY OTHERS) 140' ROW ROAD SECTION

NOT TO SCALE



TYPICAL 80' ROW ROAD SECTION

NOT TO SCALE



TYPICAL 60' ROW ROAD SECTION

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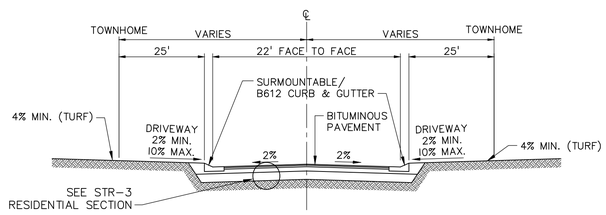
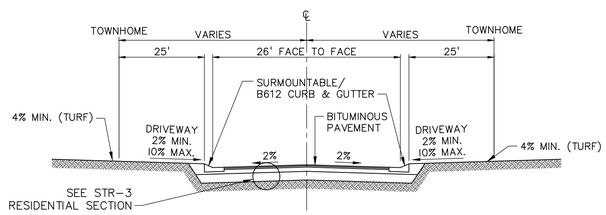


SUBURBAN TH PRIVATE ROAD SECTION (22' F-F)

NOT TO SCALE

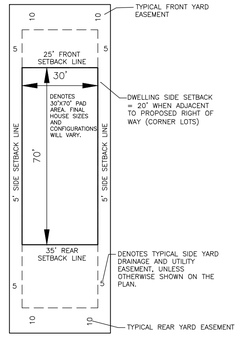


URBAN TH PRIVATE ROAD SECTION (26' F-F)

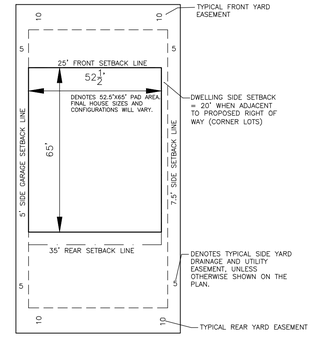
NOT TO SCALE

DEVELOPMENT LOT DETAILS

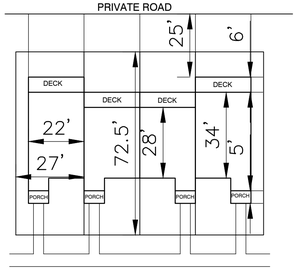
40'x130' SINGLE FAMILY



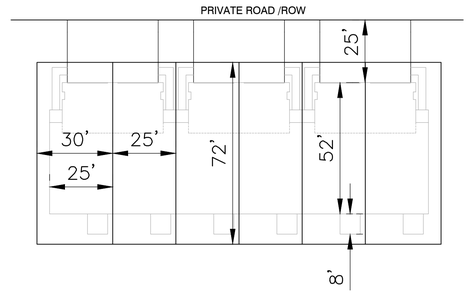
65'x130' SINGLE FAMILY



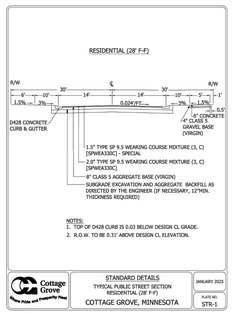
URBAN TOWNHOME FRONT FACE/REAR LOAD

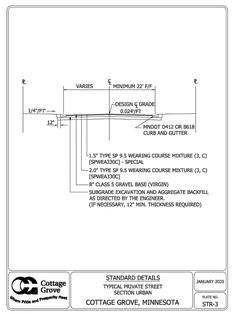


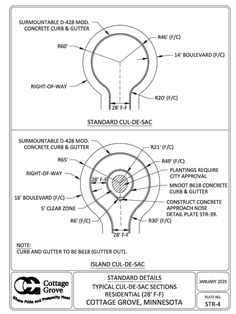
SUBURBAN TOWNHOME PATIO/FRONT LOAD

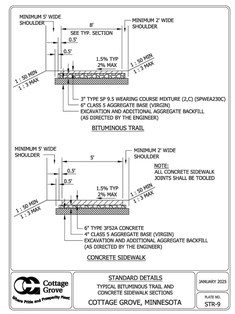


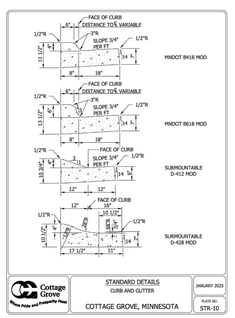
CITY OF COTTAGE GROVE STANDARD DETAILS

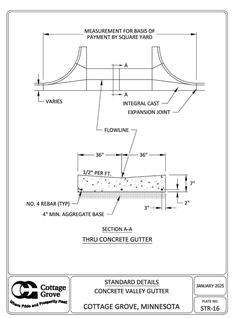


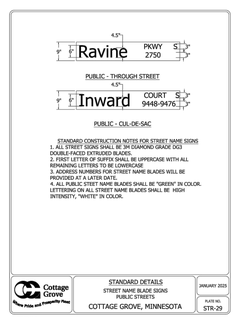


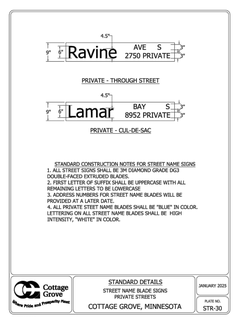












STANDARD DETAILS TYPICAL PUBLIC STREET SECTION RESIDENTIAL (28' F-F) COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-1	48_STR1.DWG
STANDARD DETAILS TYPICAL PRIVATE STREET SECTION URBAN COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-3	48_STR3.DWG
STANDARD DETAILS TYPICAL CUL-DE-SAC SECTIONS RESIDENTIAL (28' F-F) COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-4	48_STR4.DWG
STANDARD DETAILS TYPICAL BITUMINOUS TRAIL AND CONCRETE SIDEWALK SECTIONS COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-9	48_STR9.DWG
STANDARD DETAILS CURB AND GUTTER COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-10	48_STR10.DWG
STANDARD DETAILS CONCRETE VALLEY GUTTER COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-16	48_STR16.DWG
STANDARD DETAILS STREET NAME BLADE SIGNS PUBLIC STREETS COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-29	48_STR29.DWG
STANDARD DETAILS STREET NAME BLADE SIGNS PRIVATE STREETS COTTAGE GROVE, MINNESOTA	JANUARY 2025	PLATE NO. STR-30	48_STR30.DWG

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SITE PLAN NOTES AND DETAILS

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

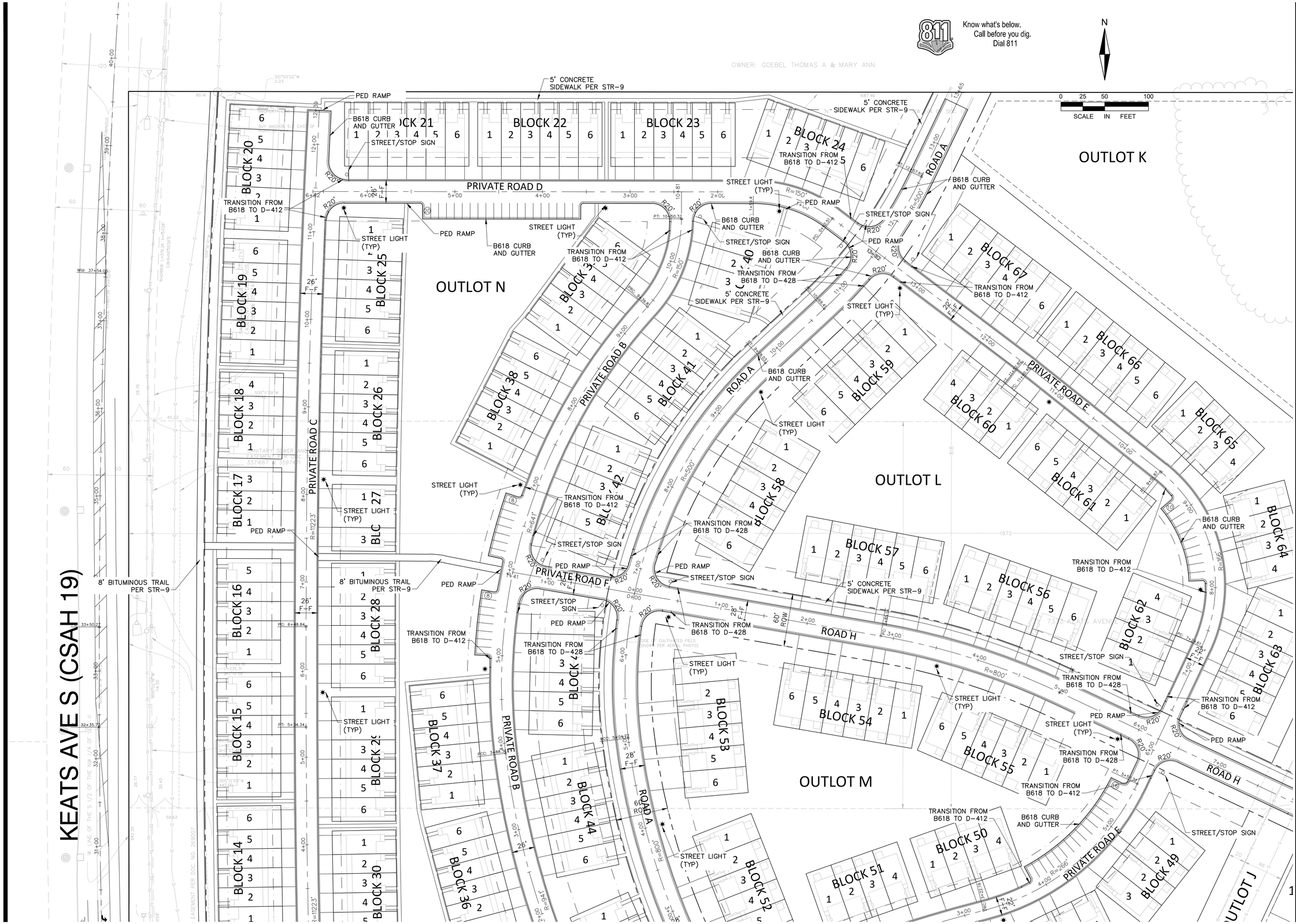
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

21

Sheet 21 of 91

File Location: X:\4000570-00\01\40 Design\00 Sheets - Preliminary\SITE.dwg Plotted By: Logan Josephson on December 31, 2025 at 11:02:02 PM



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW A

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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FOR REVIEW PRELIMINARY NOT FOR CONSTRUCTION

Clark Vincent
Date 40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

22

Sheet 22 of 91

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

FOR REVIEW PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund

Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

23

Sheet 23 of 91

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

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PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 24 of 91

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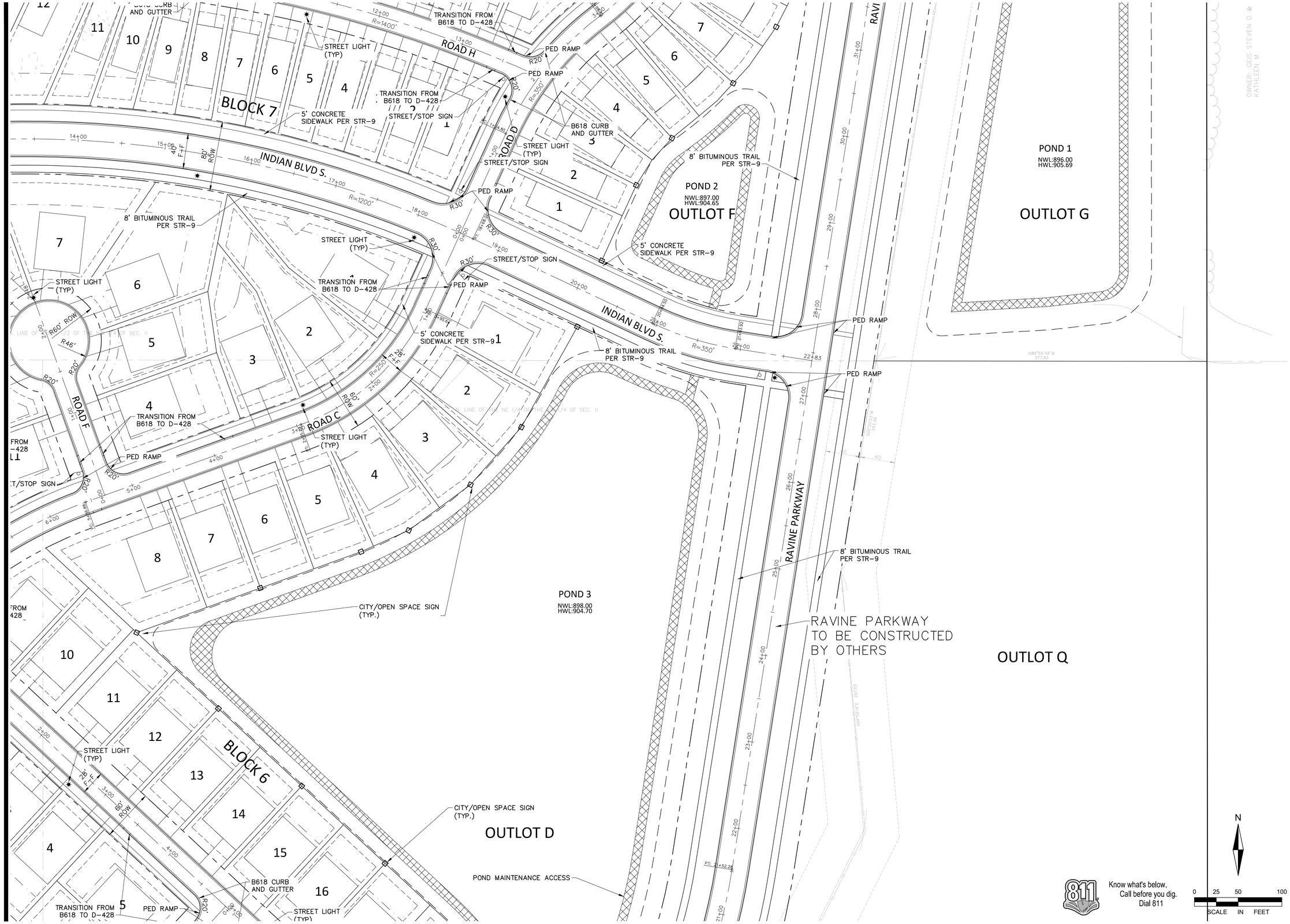

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW D

DESCRIPTION	DATE
City Submittal	2025-12-31

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Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 25 of 91

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RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW E

DESCRIPTION	DATE
City Submittal	2026-12-31

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License no.

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Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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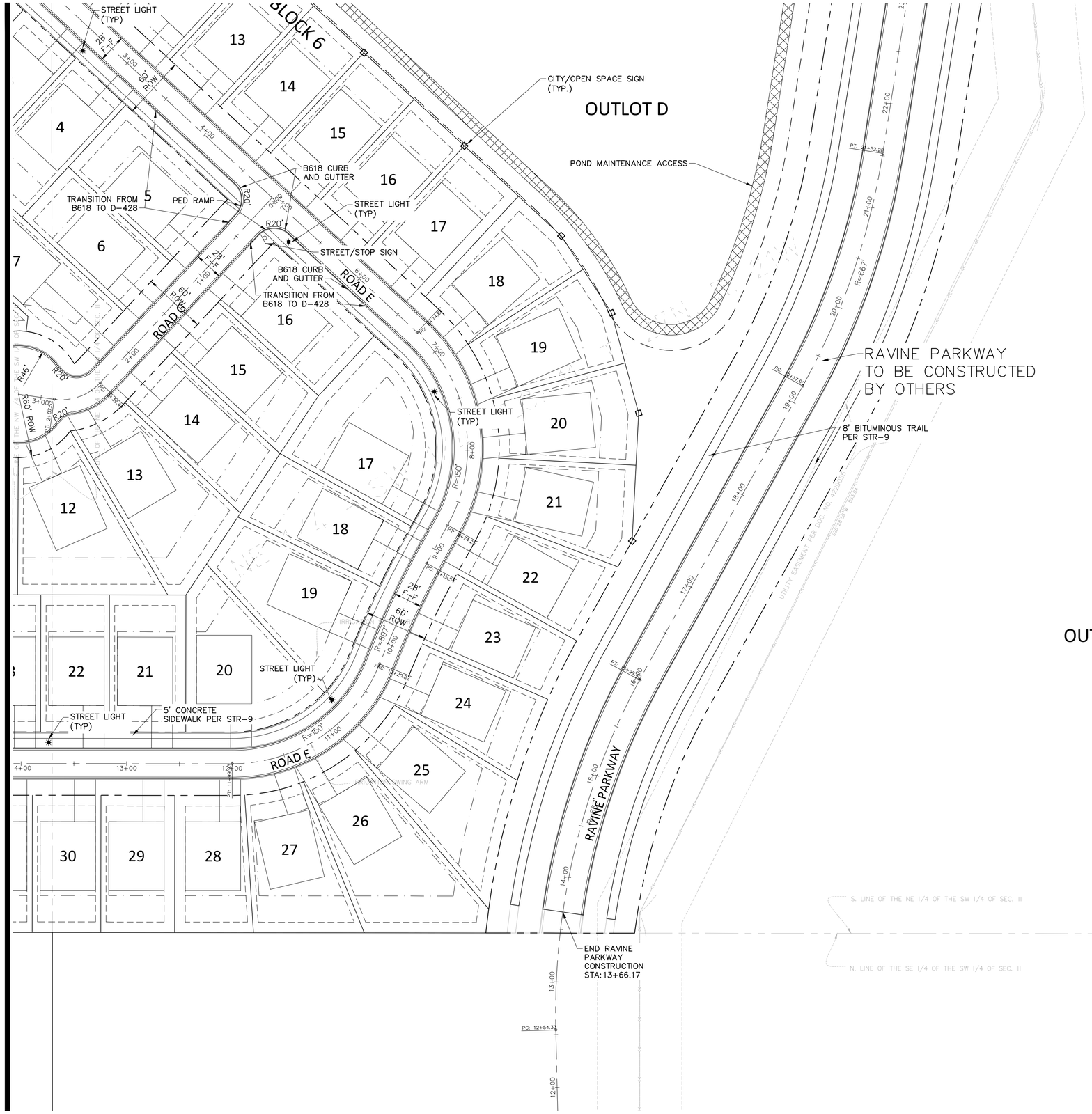

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

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Clark Wicklund — 40922
Date — License no.

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By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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DEMOLITION AND REMOVALS PLAN

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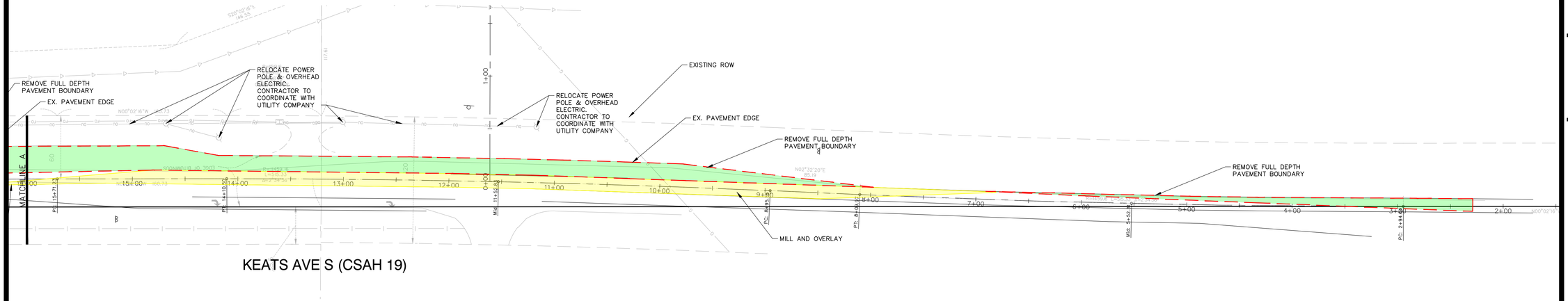
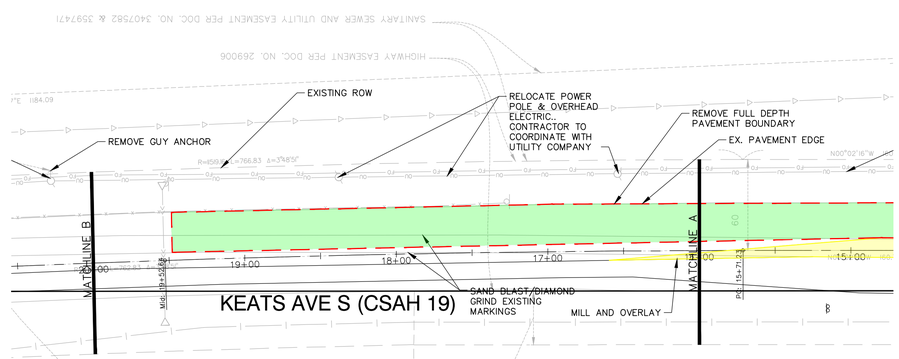
STA: 1+00 - 16+00



LEGEND

- REMOVE FULL DEPTH PAVEMENT
- MILL AND OVERLAY
- REMOVE PAVEMENT

STA:16+00 - 20+00



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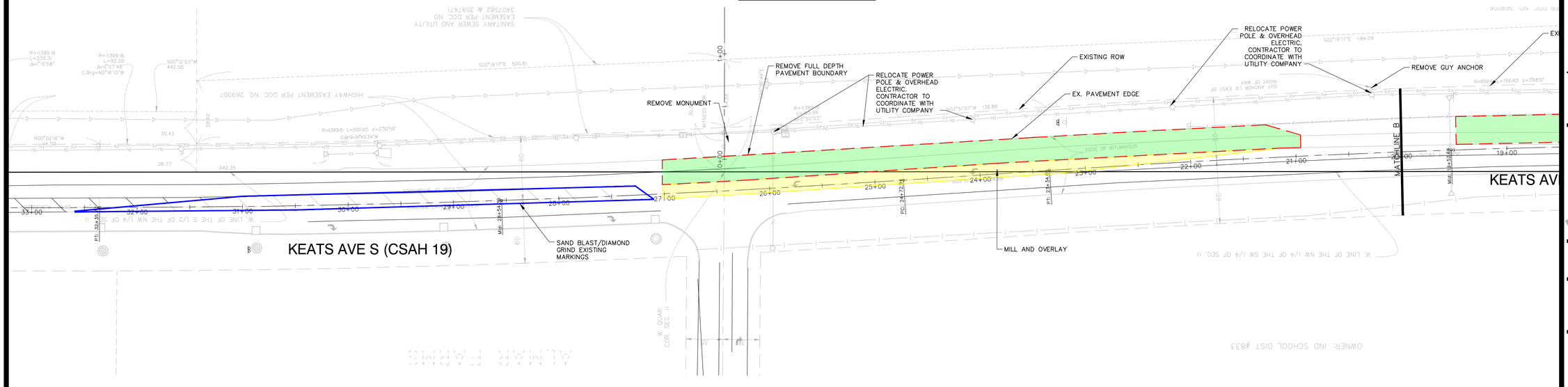
STA: 20+00 - 33+00



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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL KEATS AVE. TURN LANE DEMO AND REMOVALS

DATE	DESCRIPTION
2025-12-31	City Submittal

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Date
40922
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QA/QC CHECK

By
Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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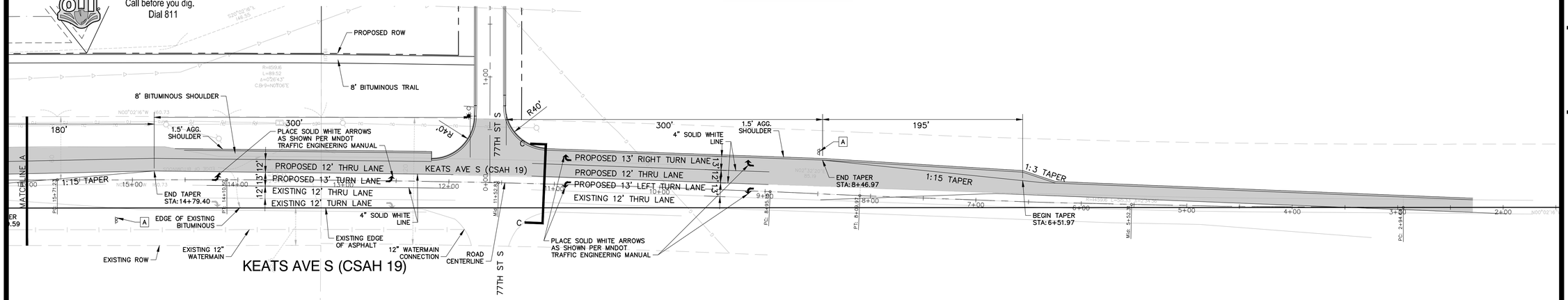
SITE AND PAVEMENT PLAN

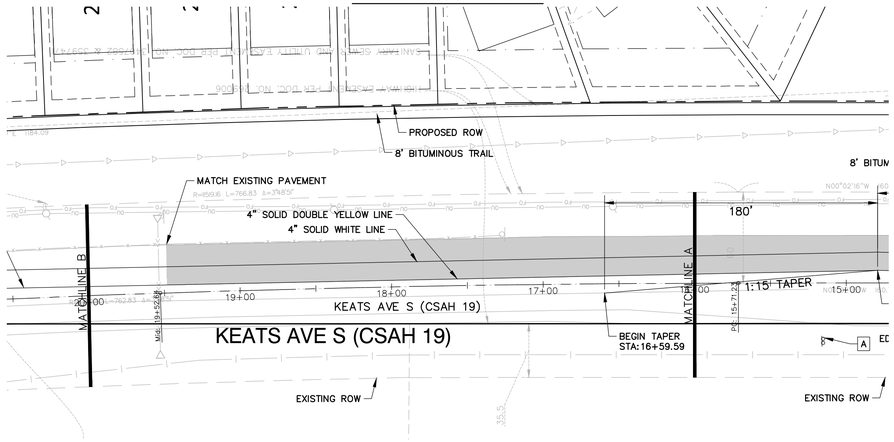
STA: 1+50 - 16+00



LEGEND

FULL DEPTH PAVEMWNT PAVEMENT (SEE INSET A)

STA:16+00 - 20+00



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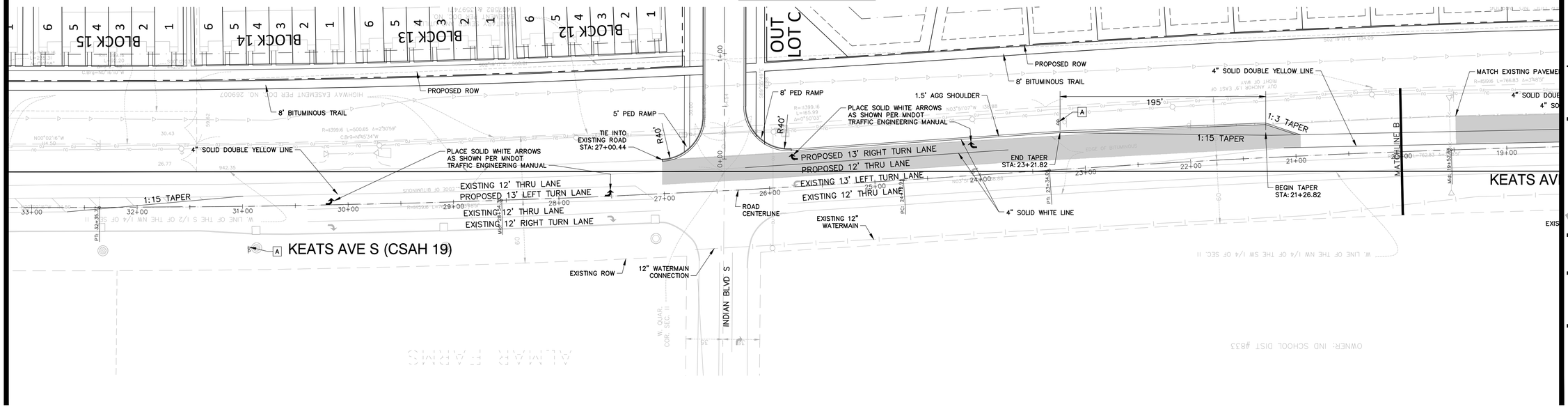

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
KEATS AVE. TURN LANE SITE AND PAVEMENT PLAN

DESCRIPTION	DATE
City Submittal	2025-12-31

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Clark Wicklund
Date 40922 License no.

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PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 29 of 91

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TURN LANE NOTES

1. ALL GRADES ARE TO FINISHED PAVEMENT UNLESS OTHERWISE NOTED.
2. GOVERNING SPECIFICATIONS SHALL BE THE LATEST EDITION OF MNDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION."
3. ALL TEMPORARY TRAFFIC CONTROL DEVICES AND ALL PERMANENT SIGNING & MARKINGS SHALL CONFORM TO THE MMUTCD, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS, 2014."
4. CONTRACTOR SHALL NOTIFY DAKOTA COUNTY HIGHWAY DEPT. AND SUBMIT A TRAFFIC CONTROL PLAN FOR APPROVAL PRIOR TO PERFORMING ANY WORK WITHIN THE COUNTY RIGHT-OF-WAY.
5. CONTRACTOR SHALL REMOVE ALL CONFLICTING PAVEMENT MARKINGS.
6. ALL TURN LANE STRIPING SHALL BE COMPLETED USING MULTI-COMPONENT PAINT.
7. CONTRACTOR SHALL COORDINATE WORK AROUND AND RELOCATION OF SMALL UTILITIES.
8. DESIGN OF TURN LANES HAVE BEEN IN ACCORDANCE WITH THE TYPICAL SECTIONS PROVIDED BY THE CITY OF LAKEVILLE.

LEGEND

NEW FULL DEPTH PAVEMENT

MILL AND OVERLAY

REMOVE PAVEMENT

NEW BITUMINOUS PAVEMENT (SEE INSET A)

SIGN SCHEDULE

SIGN	SIGN NO.	SIZE	QUANTITY
(A) ONLY ONLY ONLY	R3-8ACA	54" X 30" (BLACK ON WHITE)	4

(INSET A)



LANE PAVEMENT

(SECTION TO BE PROVIDED BY WAASHINGTON COUNTY)

- 4" TYPE SP 12.5 WEARING COURSE MIXTURE (3, C), SPWEB340C (TWO EQUAL LIFTS)
- 2" TYPE SP 12.5 NON-WEARING COURSE MIXTURE (3,B) MNDOT SPEC. 2360, SPNWB330B
- 13.5" AGGREGATE BASE (CV) CLASS 5 MNDOT SPEC. 2211
- 2' SELECT GRANULAR

LEGEND

- NEW FULL DEPTH PAVEMENT THRU AND TURN LANES
- NEW FULL DEPTH PAVEMENT SHOULDER
- MILL & OVERLAY
- INPLACE ROADWAY

SPECIFIC NOTES:

(A) BACKFILL WITH SELECT GRADING MATERIAL.

(B) 1.5' OBSTACLE FREE CLEAR ZONE FROM BACE OF CURB (TYP.)

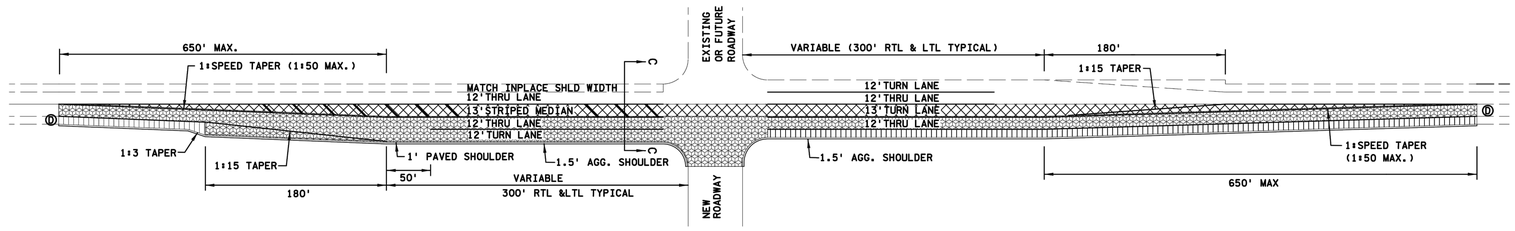
(C) BITUMINOUS PAVEMENT SHALL INCLUDE A SAFETY EDGE. SEE MNDOT TECH. MEMO 16-01-T-01 FOR SAFETY EDGE GUIDELINES.

(D) MATCH INPLACE SHOULDER WIDTH.

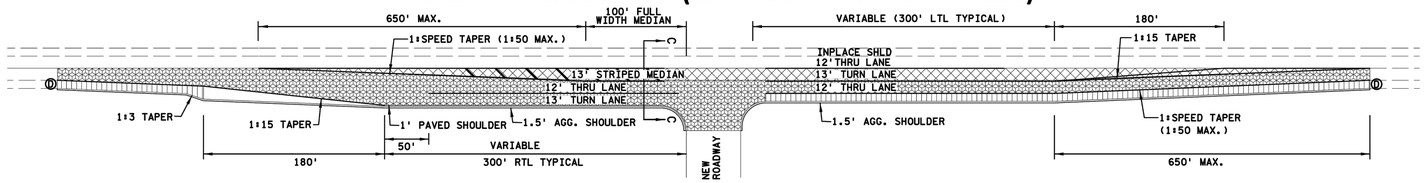
GENERAL NOTES:

- DIMENSIONS SHOWN ARE FOR 12 FOOT LANES WITH A 50 MPH DESIGN SPEED AND CALCULATED AT A 50:1 TAPER.
- DO NOT HATCH MEDIAN AREAS LESS THAN 8' WIDE.
- SEE WASHINGTON COUNTY STANDARD PLANS WC-9000 THRU WC-9009 FOR STRIPING DETAILS.
- DRAWING IS NOT TO SCALE.

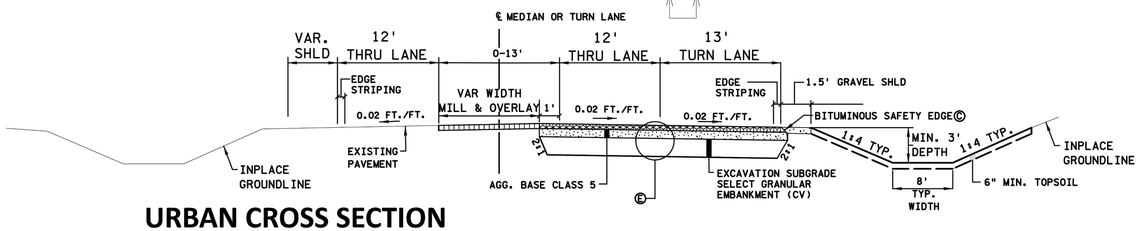
4-LEG INTERSECTION



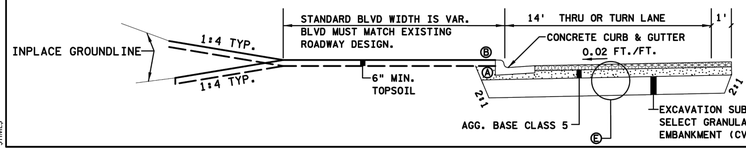
3 LEG INTERSECTION (WITHOUT FUTURE 4TH LEG)



TYPICAL CROSS SECTION C C (RURAL)



URBAN CROSS SECTION



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$TIME$

Washington County	DRAWN BY XXX DESIGNED BY XXX CHECKED BY XXX	LAST REVISION: 05/30/2025	WASHINGTON COUNTY GUIDANCE DOCUMENT TURN LANE STANDARDS NEW ACCESS WIDENING TO NEAR SIDE	SHEET 3 OF 3

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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

KEATS AVE. TURN LANE DETAILS

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

Clark Wicklund — 40922

Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

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Sheet 30 of 91

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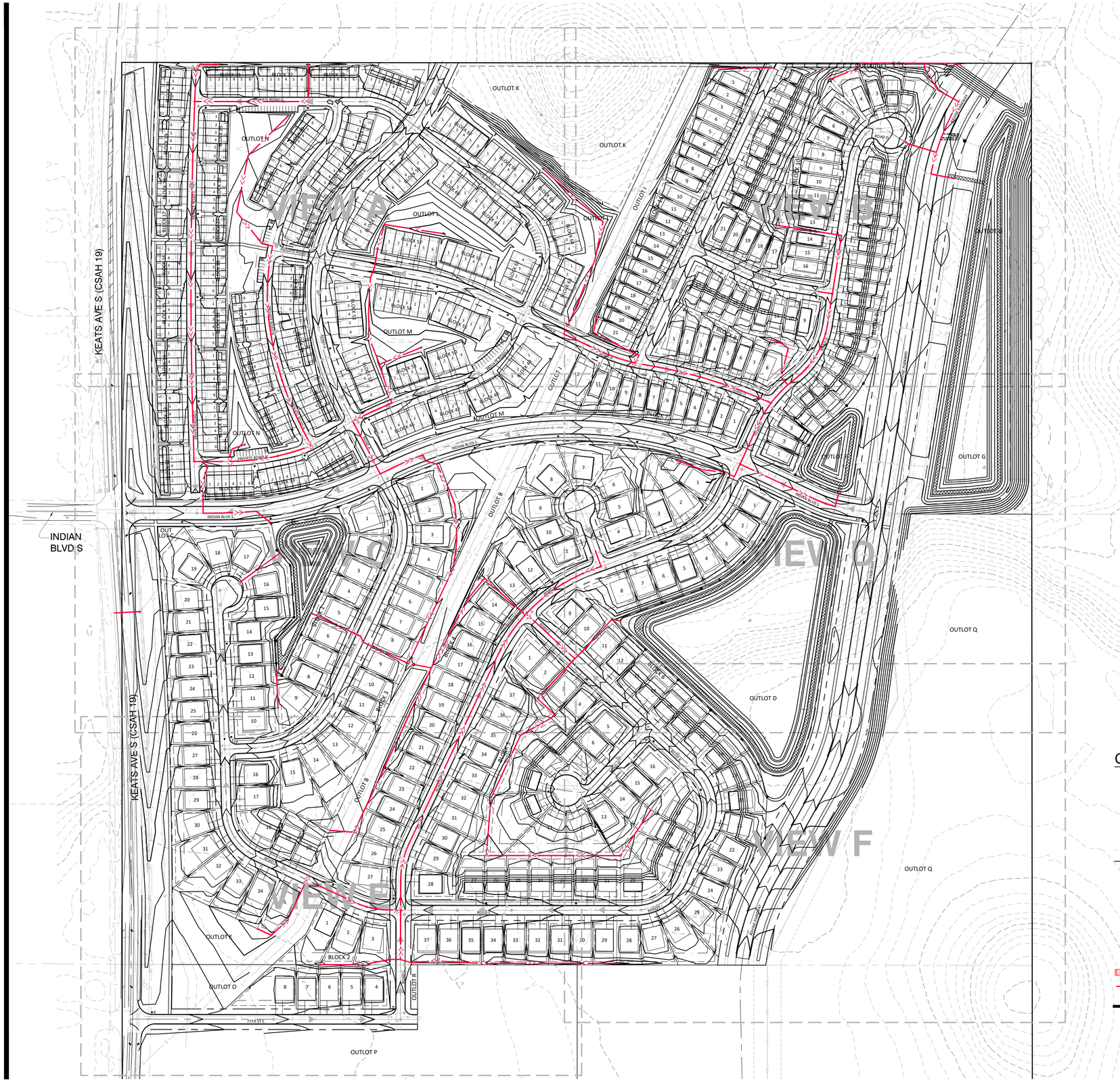

GRADING NOTES:

1. ALL FINISHED GRADES SHALL SLOPE AWAY FROM PROPOSED BUILDINGS AT MINIMUM GRADE OF 2.0%. ALL SWALES SHALL HAVE A MINIMUM SLOPE OF 2.00%.
2. THE CONTRACTOR SHALL KEEP THE ADJACENT ROADWAYS FREE OF DEBRIS AND PREVENT THE OFF-SITE TRACKING OF SOIL IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY AND WATERSHED.
3. NOTIFY GOPHER STATE ONE CALL, AT (800)252-1166, 48 HOURS PRIOR TO START OF CONSTRUCTION.
4. ALL IMPROVEMENTS TO CONFORM WITH CITY OF COTTAGE GROVE CONSTRUCTION STANDARDS SPECIFICATION, LATEST EDITION.
5. CONTRACTOR SHALL COORDINATE ANY NECESSARY ROAD CLOSURE OR RESTRICTIONS WITH CITY. NOTIFY THE CITY AT LEAST 48 HOURS IN ADVANCE OF ANY AGREED UPON TRAFFIC CONTROL AND PROVIDE A TRAFFIC CONTROL PLAN.
6. ROCK CONSTRUCTION ENTRANCES SHALL BE PROVIDED AT ALL CONSTRUCTION ACCESS POINTS.
7. REFER TO GEOTECHNICAL REPORT AND PROJECT MANUAL, FOR SOIL CORRECTION REQUIREMENTS AND TESTING REQUIREMENTS.
8. STRIP TOPSOIL PRIOR TO ANY CONSTRUCTION. REUSE STOCKPILE ON SITE. STOCKPILE PERIMETERS MUST BE PROTECTED WITH SILT FENCE.
9. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE TO MAKE SURE THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY ALL OF THE PERMITTING AUTHORITIES.
10. IMMEDIATELY FOLLOWING GRADING OF (3:1 OR GREATER) SIDE SLOPES AND DRAINAGE SWALES, WOOD FIBER BLANKET OR OTHER APPROVED SOIL STABILIZING METHOD (APPROVED BY ENGINEER) SHALL BE APPLIED OVER APPROVED SEED MIXTURE AND A MINIMUM OF 6" TOPSOIL SHALL BE PLACED IN ALL PUBLIC/CITY ROW BOULEVARD AND MASS GRADED PUBLIC/CITY OUTLOTS. 4" TOPSOIL REQUIRED ELSEWHERE OR PER HOLD DOWN DETAILS.
11. THE GENERAL CONTRACTOR MUST DISCUSS DEWATERING PLANS WITH ALL SUBCONTRACTORS TO VERIFY NPDES REQUIREMENTS. IF DEWATERING IS REQUIRED DURING CONSTRUCTION, CONTRACTOR SHOULD CONSULT WITH EROSION CONTROL INSPECTOR AND ENGINEER TO DETERMINE APPROPRIATE METHOD.
12. REFER TO STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR ALL EROSION AND SEDIMENT CONTROL DEVICE LOCATION, DESCRIPTIONS, NOTES AND DETAILS INCLUDING CONCRETE WASHOUT STATION INSTRUCTIONS.
13. FREEBOARD: THE LOW FLOOR ELEVATION OF PADS SHALL BE AT MINIMUM 3.0 FT ABOVE THE CRITICAL EVENT 100-YEAR ELEVATION AND AT MINIMUM 2.0 FT ABOVE THE EMERGENCY OVERFLOW (EOF) ELEVATION OF NEARBY WATERBODIES AND STORMWATER PONDS. FOR BACK/SIDE YARD CONVEYANCE AND TEMPORARY PONDING AREAS THERE MUST BE 1-FT BETWEEN OVERLAND EMERGENCY OVERFLOW ELEVATION AND LOW ADJACENT ELEVATION OF ADJACENT STRUCTURE.
14. SEE GRADING PROFILES SHEET FOR ADDITIONAL GRADING DETAILS ON ALL ROADWAYS.
15. SEE POND PROFILE AND DETAIL SHEETS FOR ADDITIONAL POND CROSS SECTIONS AND DESIGN DETAIL.
16. SEE TREE PRESERVATION PLAN SHEETS FOR TREE REMOVAL AND TREE PRESERVATION DETAILS.
17. BEDROCK SHALL BE REMOVED AS RECOMMENDED IN GOETECHNICAL REPORT AND PER DETAILS IN THIS PLAN SET.

RETAINING WALL NOTES:

1. ALL RETAINING WALLS SHALL BE ROUGH GRADED AT A 2:1 SLOPE WITH BASE OF SLOPE AT PROPOSED WALL FACE.
2. THE RETAINING WALL SLOPE AREAS ARE TO BE MAINTAINED UNTIL RETAINING WALL CONSTRUCTION OCCURS. ANY EROSION SHALL BE REMEDIED AND RESTORED.
3. BUILDING PERMITS ARE REQUIRED FOR ALL RETAINING WALLS 4 FEET IN HEIGHT OR GREATER AND THE WALLS SHALL BE DESIGNED BY A STRUCTURAL ENGINEER WITH DESIGN REVIEWED AND APPROVED BY THE CITY PRIOR TO INSTALLATION. ANY QUESTIONS REGARDING THE BUILDING PERMITS SHALL BE DIRECTED TO THE CITY BUILDING INSPECTOR.
4. INSTALL SAFETY RAILING ATOP ALL WALLS WHERE REQUIRED BY CODE.
5. RETAINING WALL CONTRACTOR AND/OR RETAINING WALL STRUCTURAL ENGINEER ARE RESPONSIBLE TO REVIEW CIVIL SITE ENGINEERING DRAWINGS. ANY OBSERVED CONCERNS WITH CIVIL SITE ENGINEERING DESIGN ELEMENTS RELATED TO RETAINING WALLS THAT REQUIRE MODIFICATIONS TO THE CIVIL SITE DESIGN IS THEIR RESPONSIBILITY TO COORDINATE WITH PROJECT OWNER AND CIVIL SITE ENGINEER. IF NO COORDINATION IS REQUESTED IT SHALL BE UNDERSTOOD THAT ALL CONDITIONS WITHIN THE CIVIL SITE DESIGN AND PLANS ARE ACCEPTABLE AND ABLE TO BE PROVIDED FOR IN THE RETAINING WALL DESIGN AND CONSTRUCTION.
6. RETAINING WALLS ARE TO BE FINAL DESIGNED AND PERMITTED BY OTHERS.
7. RETAINING WALLS DEPICTED ON ALLIANT GRADING PLAN AS MODULAR BLOCK RETAINING WALLS.

WARNING
HIGH-PRESSURE PIPELINE(S)
EXCAVATION AND/OR CONSTRUCTION PROHIBITED
WITHOUT COMPLIANCE WITH STATE ONE-CALL AND
WITHOUT WRITTEN PERMISSION FROM
NORTHERN NATURAL GAS

GRADING LEGEND:

FRONT OF PAD
954.5 GARAGE FLOOR ELEVATION
955.0 TOP OF FOUNDATION
L(1) HOUSE TYPE, ADDITIONAL REQUIRED STEPS BEYOND TYP. STEP ASSUMED = 0.7"
946.5 LOWEST FLOOR ELEVATION (W &, SW)
949.1 REAR ELEVATION (L, SL, F &, SOG)
REAR OF PAD
(6.3%) PROPOSED DRIVEWAY GRADE FROM SETBACK TO ROW
789 EXISTING CONTOUR
789 PROPOSED CONTOUR
x962.44 PROPOSED SPOT ELEVATION
TW XXX TOP OF WALL ELEVATION
BW XXX BOTTOM OF WALL ELEVATION
DIRECTION OF DRAINAGE
L/SL LOOK OUT / SPLIT LOOK OUT
W WALK OUT / SPLIT WALK OUT
F FULL BASEMENT
SOG SLAB ON GRADE
EOF:726.86 EMERGENCY OVERFLOW ROUTING AND ELEVATAION
EMERGENCY OVERFLOW ROUTING
EXISTING TREE TO REMAIN
TREE PROTECTION LIMIT
PROPOSED CATCH BASINS
PROPOSED STORM SEWER
PROPOSED EASEMENT
PROPERTY LINE
DRAINAGE SWALE - CENTER
LOT LINE
RIGHT-OF-WAY
POND MAINTENANCE ACCESS (TURF)
FEMA ZONE A (PER MAP #27163C0410E)
ST-205 EXISTING SOIL BORING

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL GRADING AND DRAINAGE PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 31 of 91

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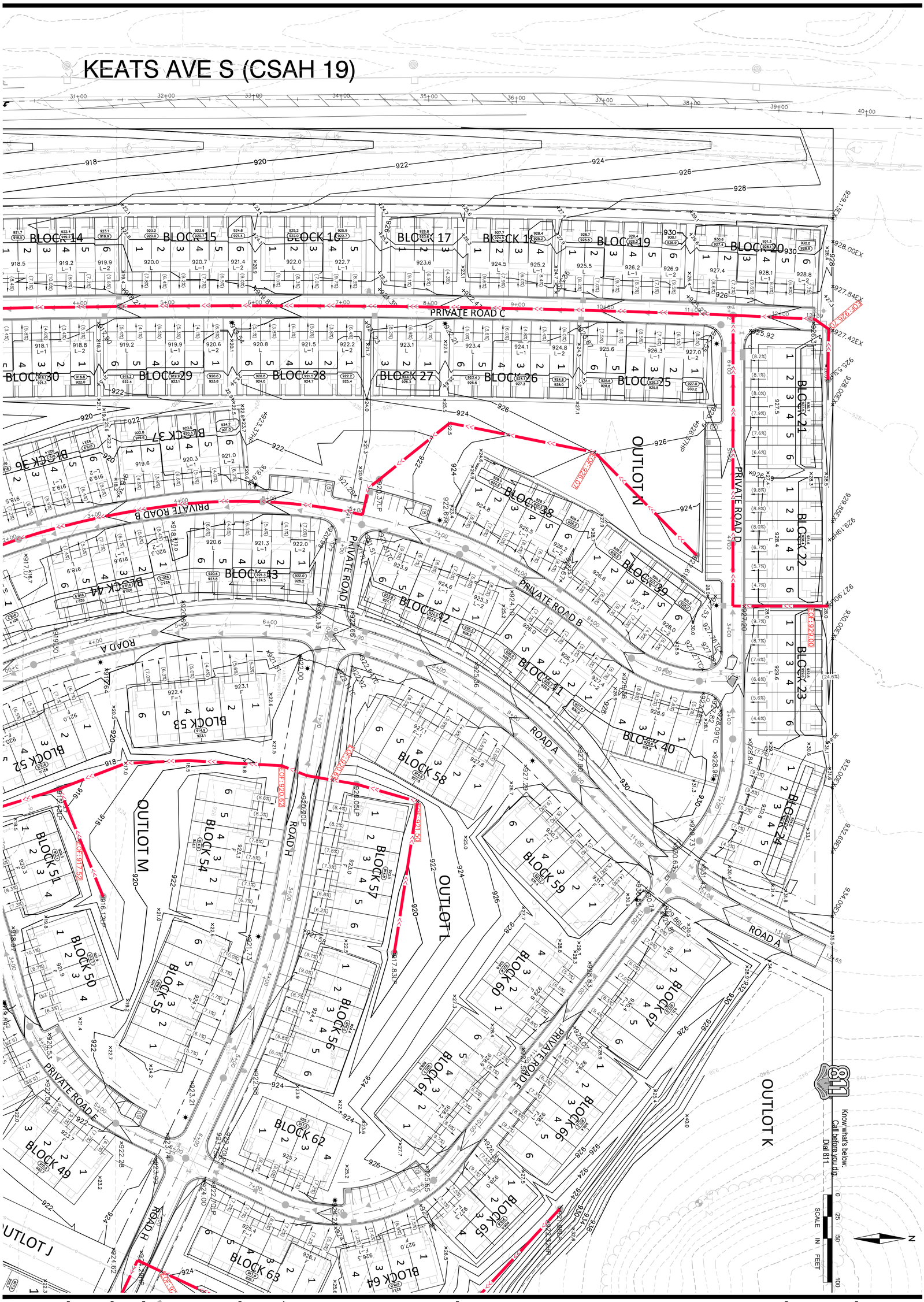

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City & Vicinity Name

Date

40922

License no.

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By

Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

Sheet 32 of 91

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

GRADING AND DRAINAGE PLAN - VIEW A

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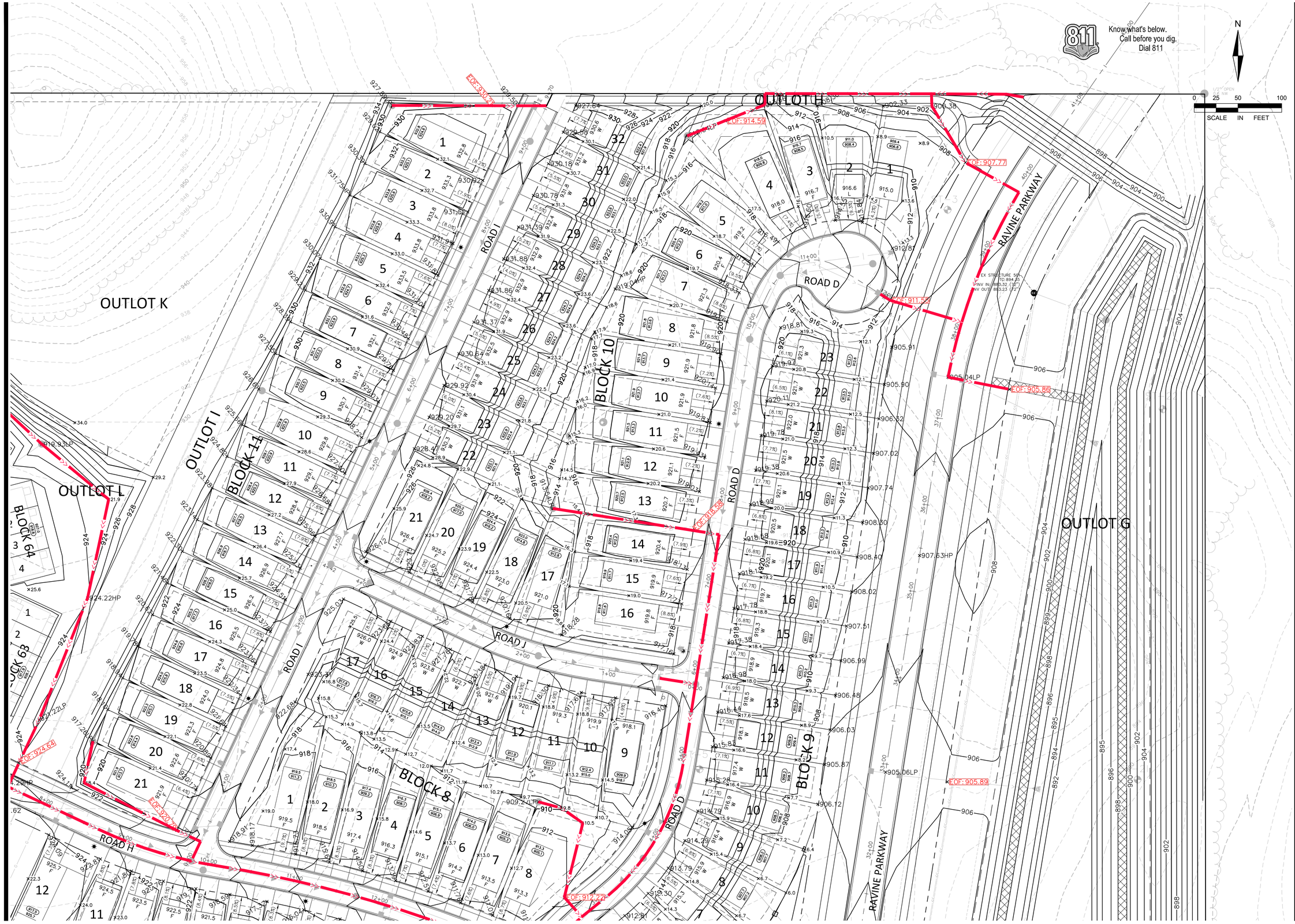

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

GRADING AND DRAINAGE PLAN - VIEW B

DATE	DESCRIPTION
2025.12.31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA

PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

33

Sheet 33 of 91

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
GRADING AND DRAINAGE PLAN - VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

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Clark Wicklund
Date 40922 License no.

QA/QC CHECK

By Date

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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

34

Sheet 34 of 91

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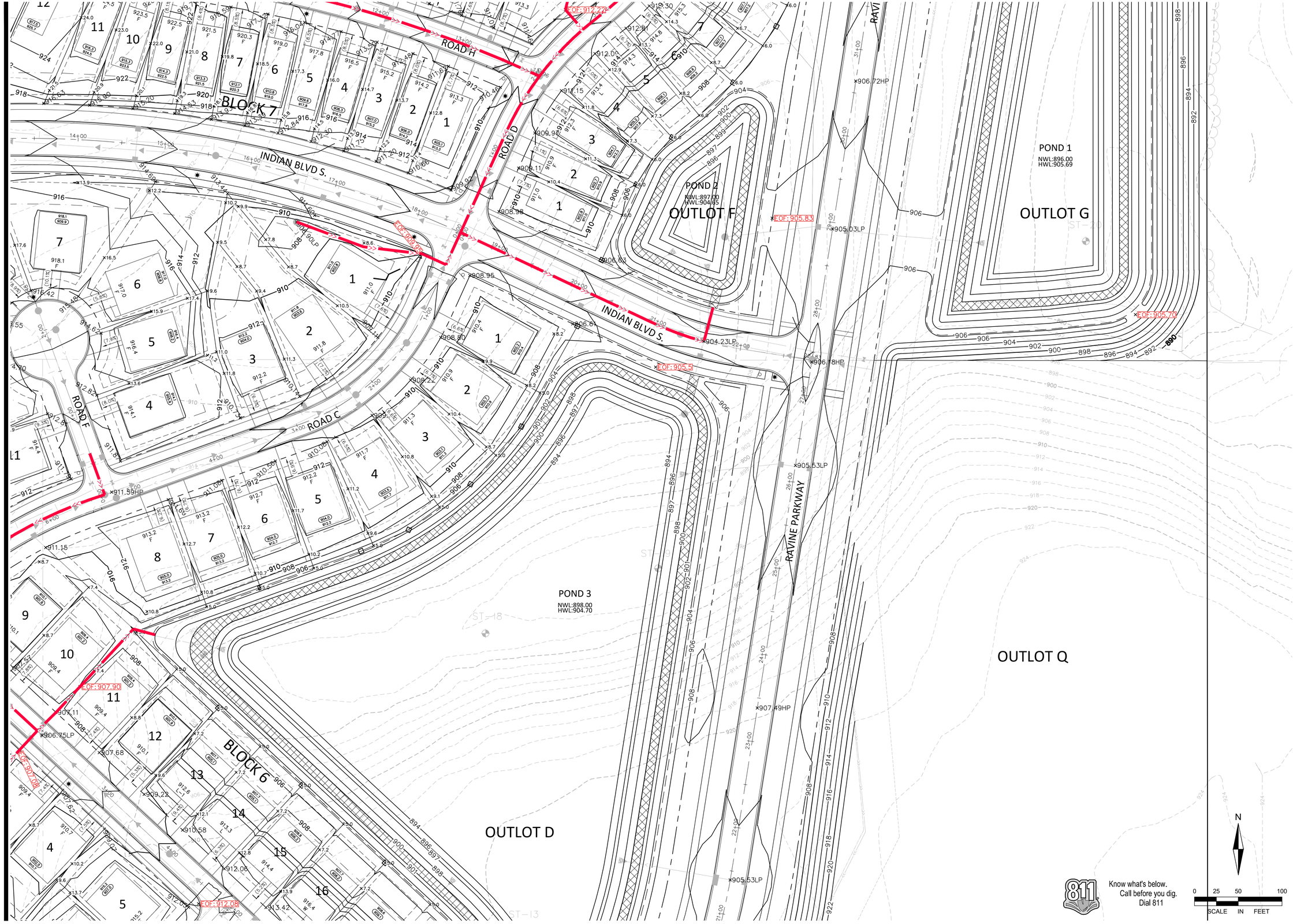

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

GRADING AND DRAINAGE PLAN - VIEW D

DESCRIPTION	DATE
City Submittal	2025-12-31

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40922 — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

35

Sheet 35 of 91

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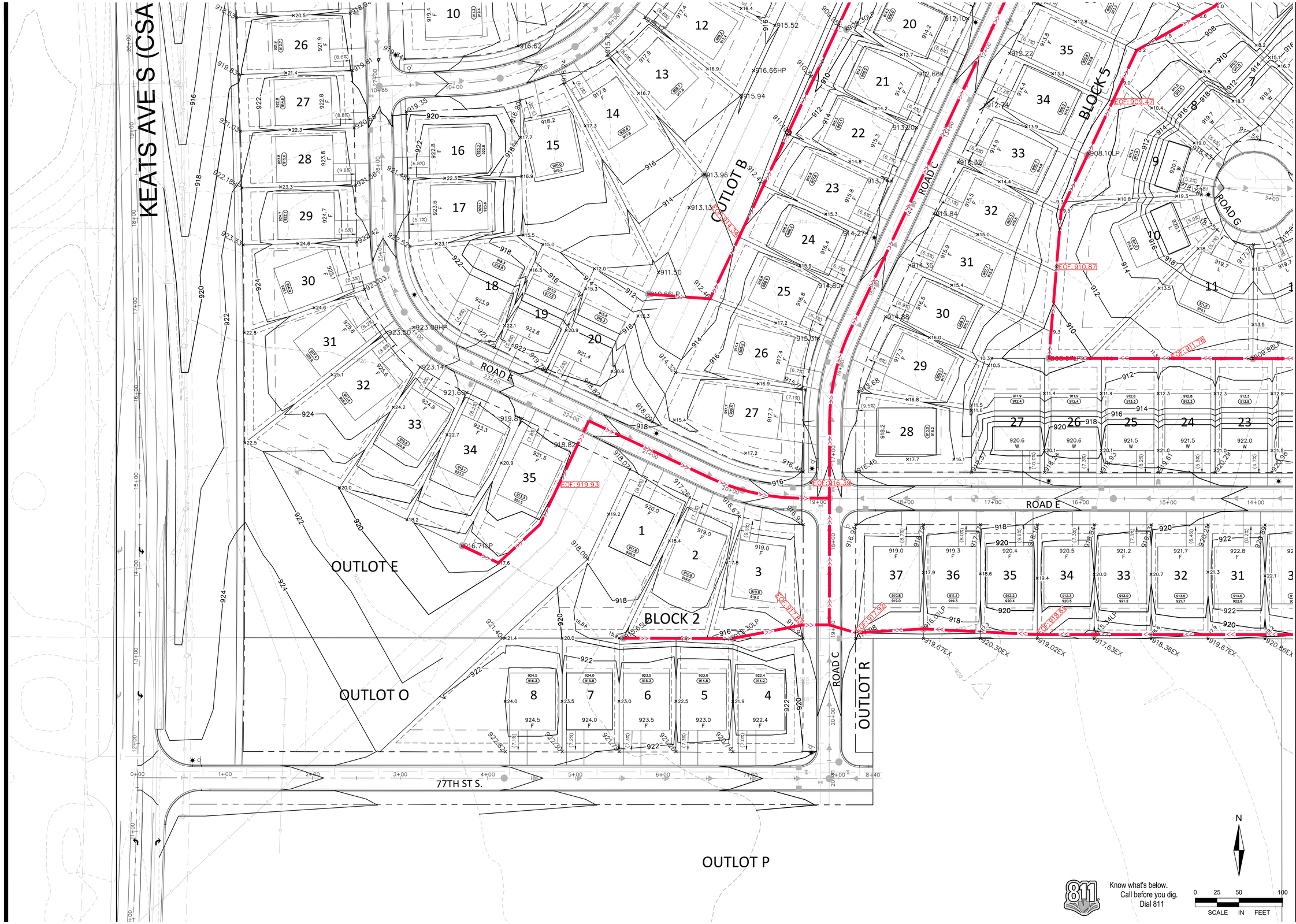

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RAVARA TRAILS

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GRADING AND DRAINAGE PLAN - VIEW E

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PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

36

Sheet 36 of 91

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OUTLOT D

OUTLOT Q

BLOCK 6

ROAD E

ROAD G

RAVINE PARKWAY

×907.68

×909.22

×910.58

×912.06

×914.72

×916.12

×917.17

×918.13

×919.09

×919.63

×920.34

×920.88

×922.41

×922.02

×924.29

×916.43

×918.01

×920.06

×905.53LP

×910.40LP

×909.88LP

×920.86EX

×921.53EX

×921.16EX

×921.20EX

×921.08EX

×921.48EX

×922.43HP

×921.74

×921.21LP

×921.18

×920.14

×913.35

×914.14

×913.42

×914.68

×916.05

×917.08

×917.74

×918.12

×919.09

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×920.18

×920.64

×920.39

×922.39

×922.34

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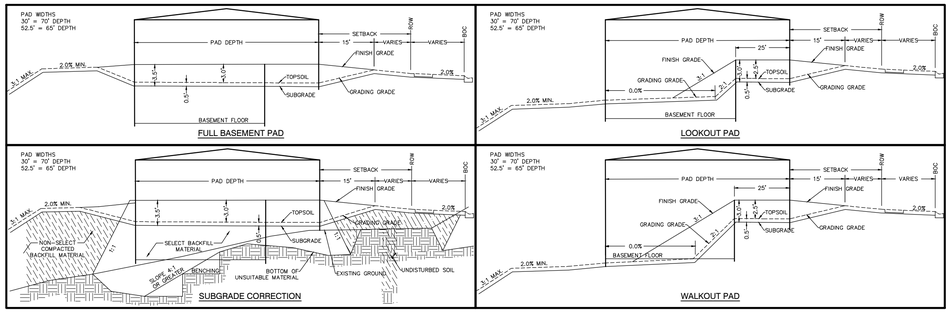

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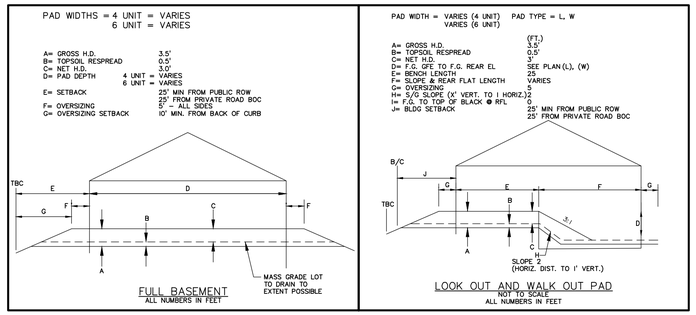

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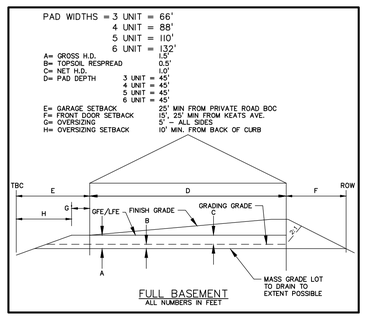

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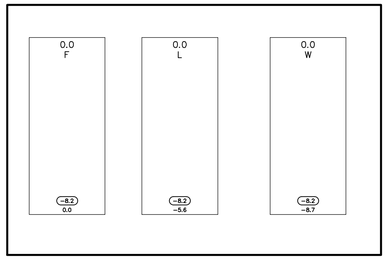

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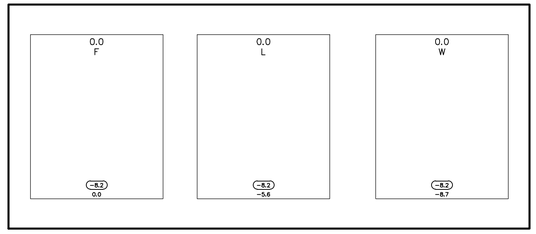

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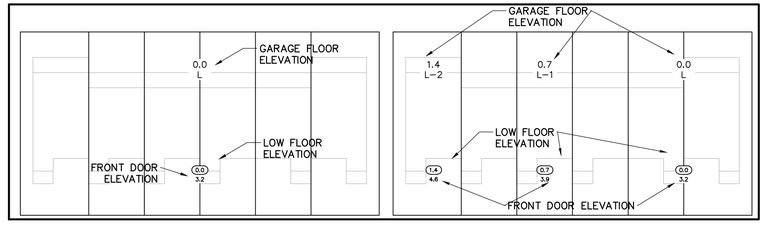

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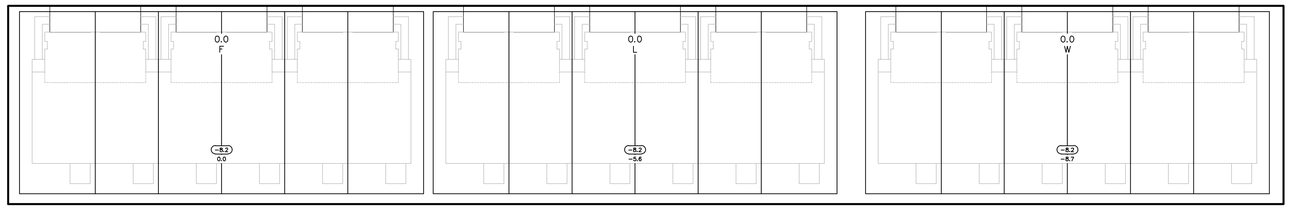

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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

GRADING AND DRAINAGE PLAN DETAILS

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

Clark Vinciguerra — 40922

Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

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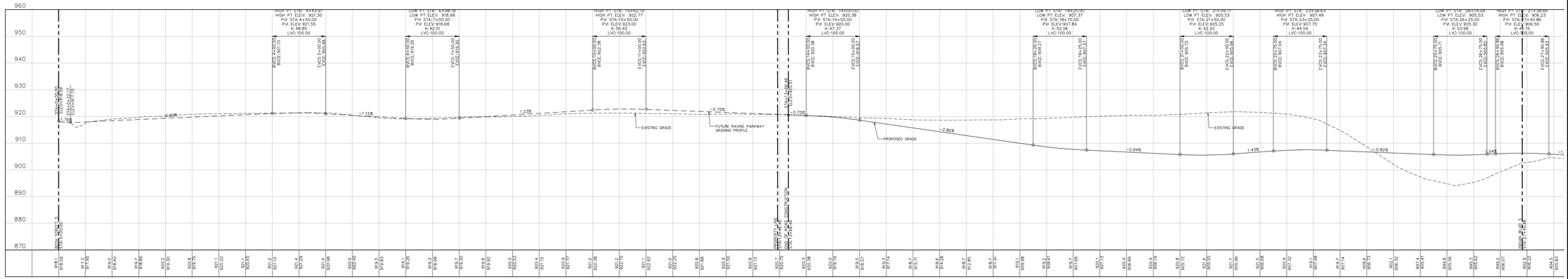

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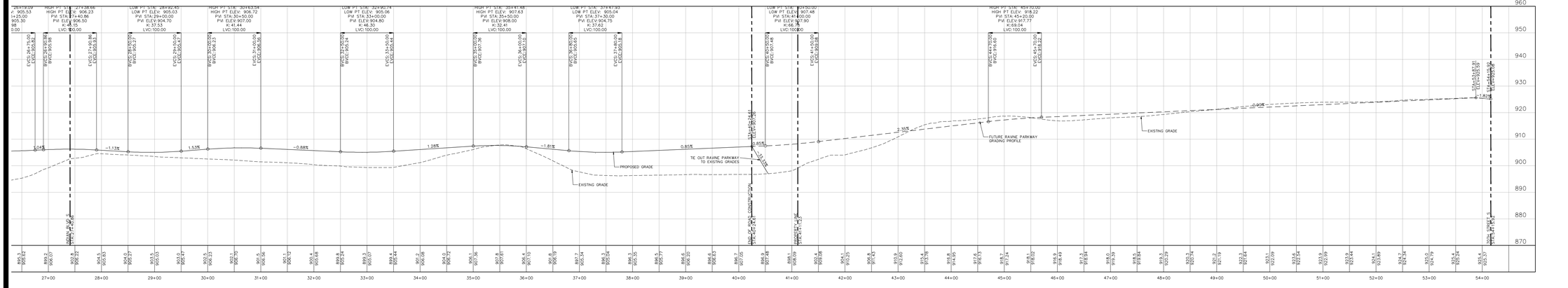

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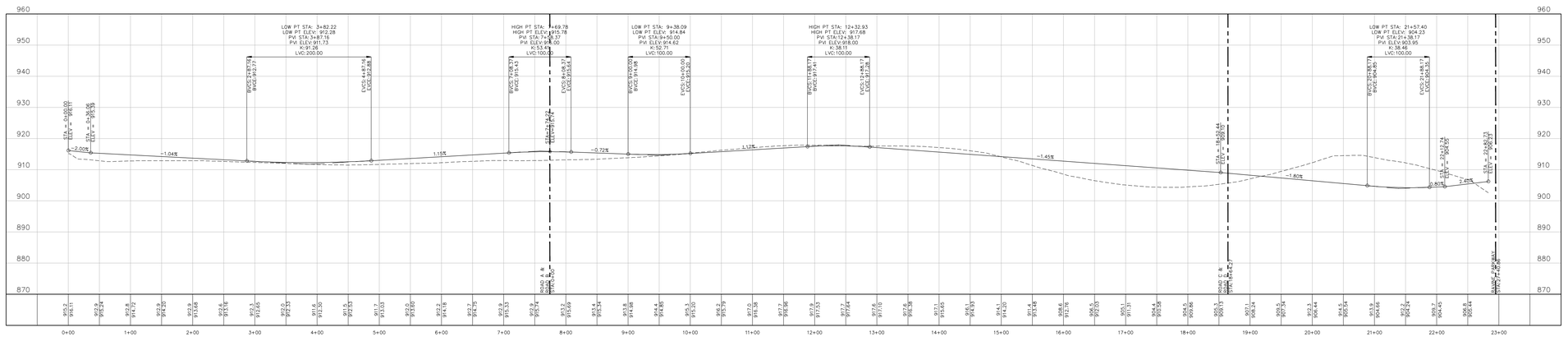

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
GRADING PROFILES

DATE	DESCRIPTION
2026-12-31	City Submittal

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Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

39

Sheet 39 of 91

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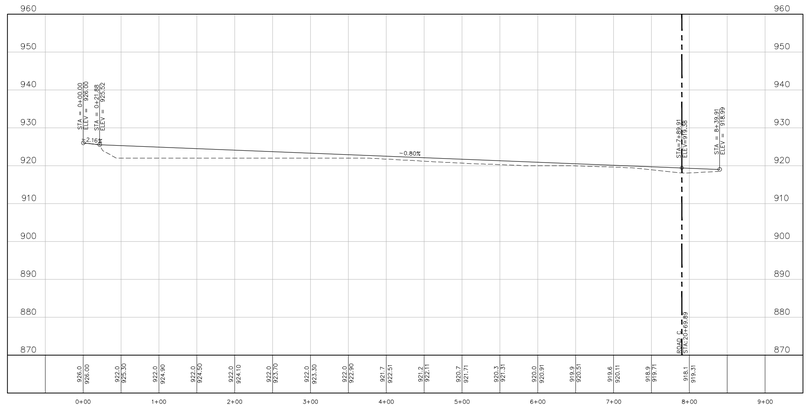
77TH STREET SOUTH



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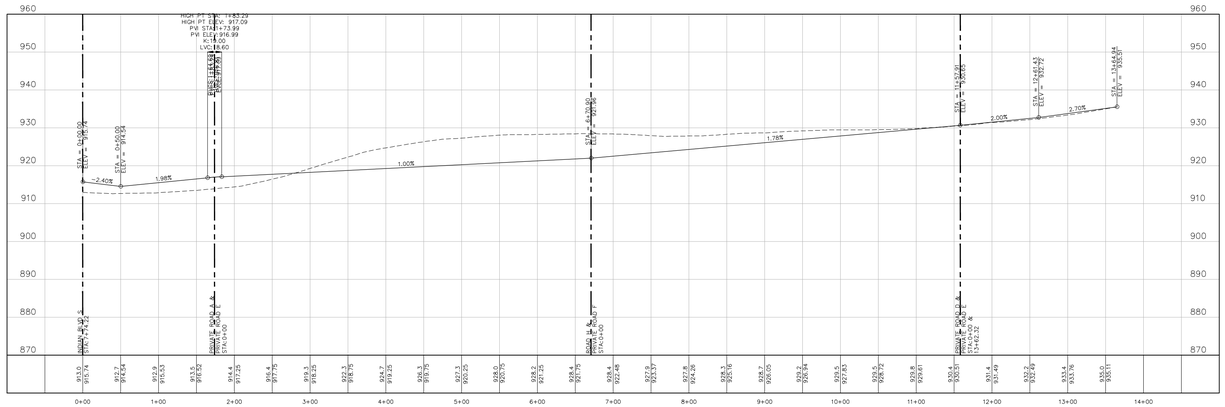

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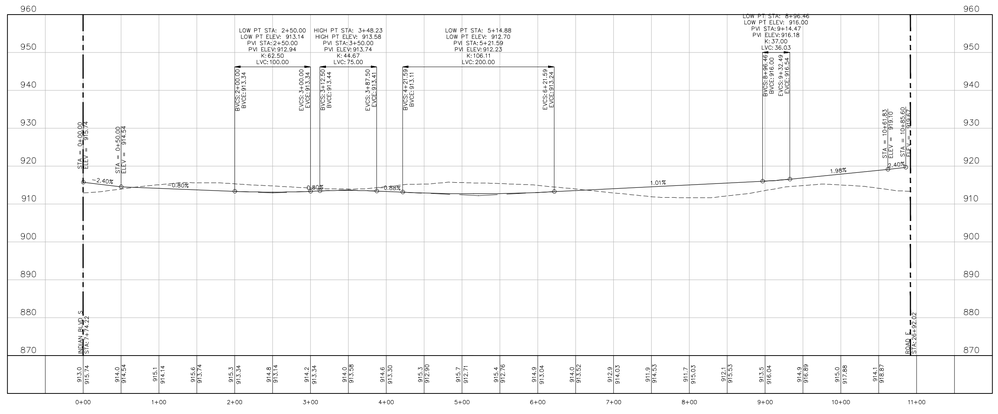

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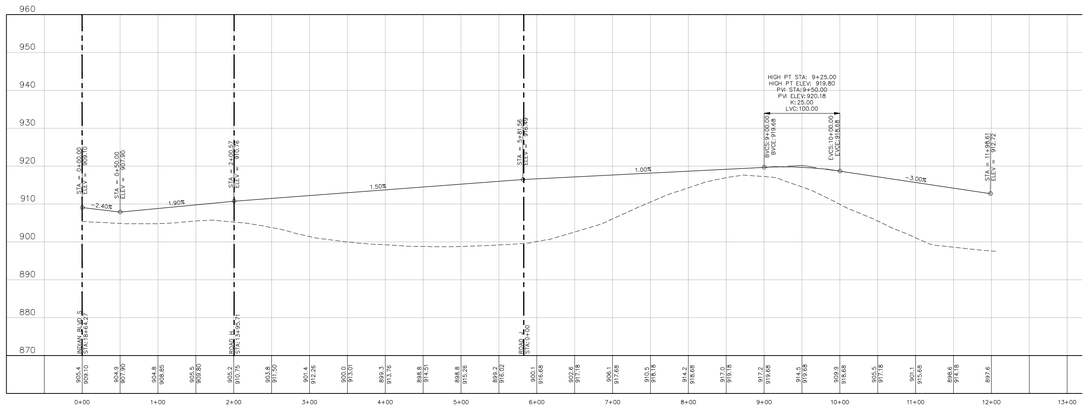

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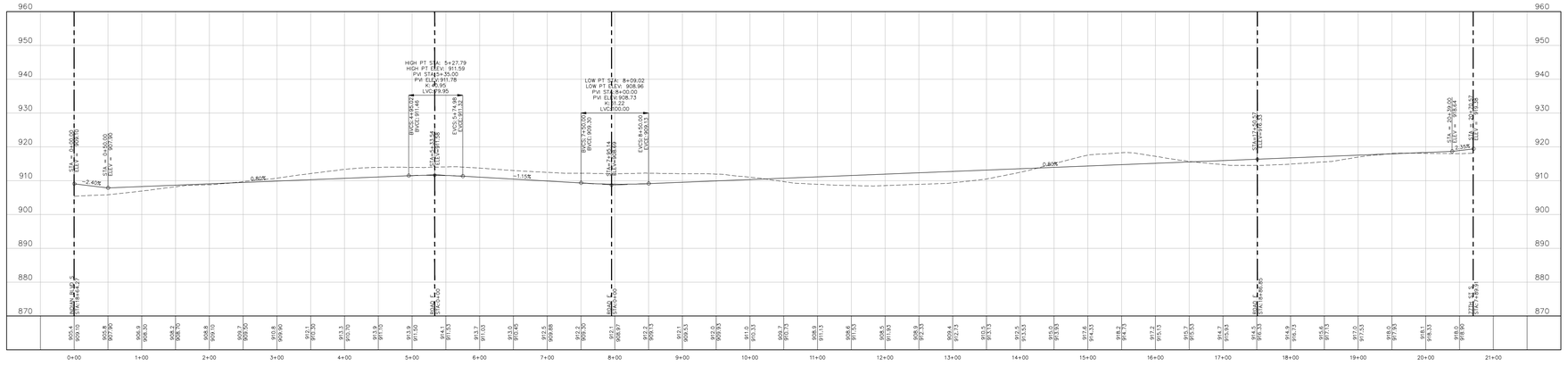

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

GRADING PROFILES (2)

DATE	DESCRIPTION
2025-12-31	City Submittal

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PRELIMINARY

Clark Vicchiullo
Date

40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

40

Sheet 40 of 91

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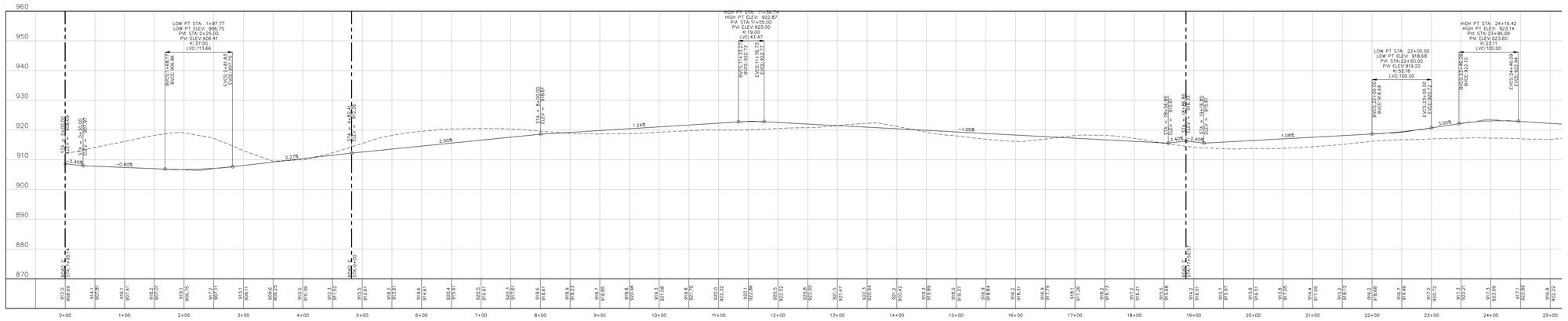

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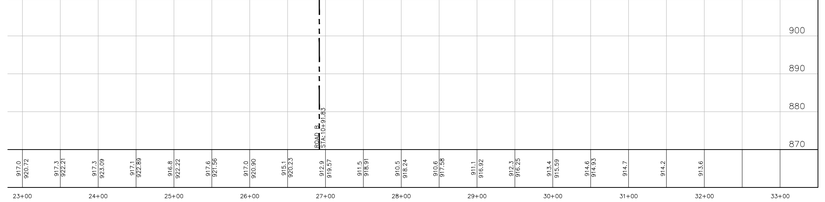

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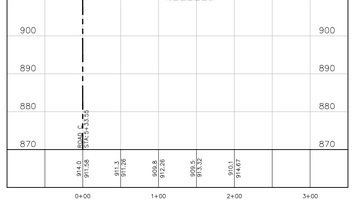

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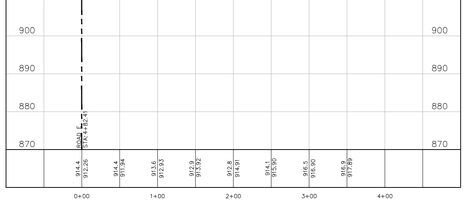

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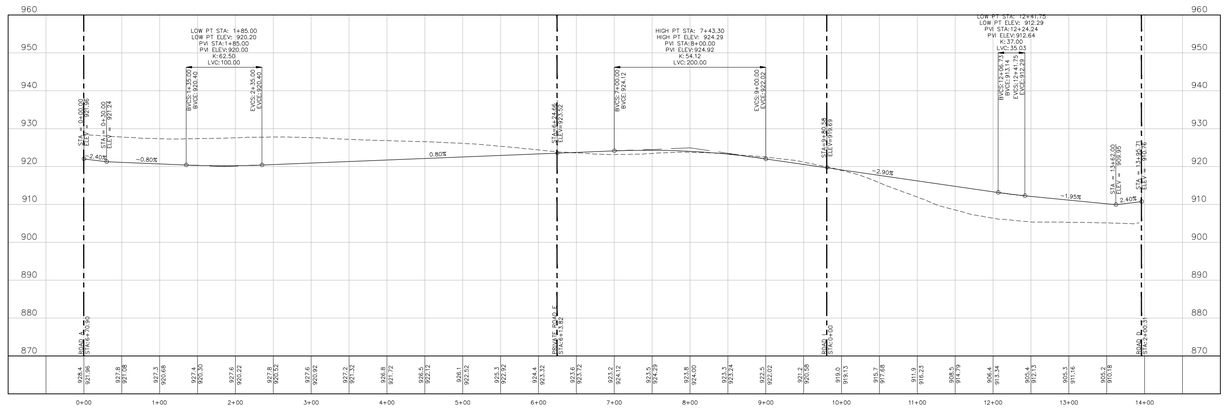

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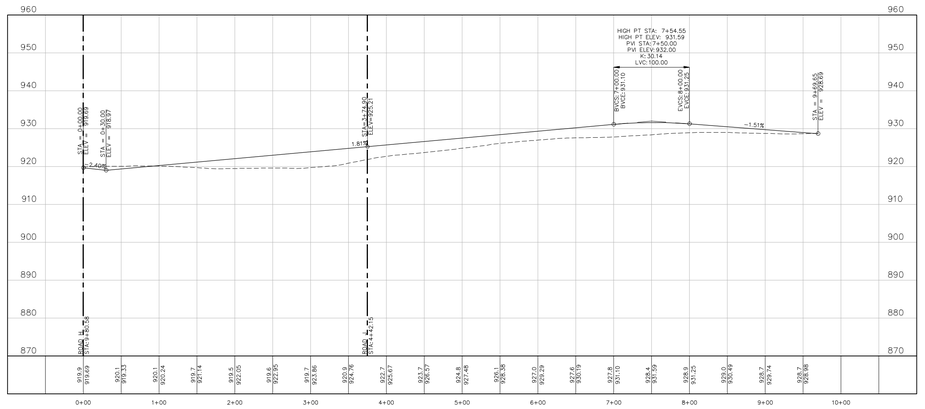

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GRADING PROFILES (3)

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By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

41

Sheet 41 of 91

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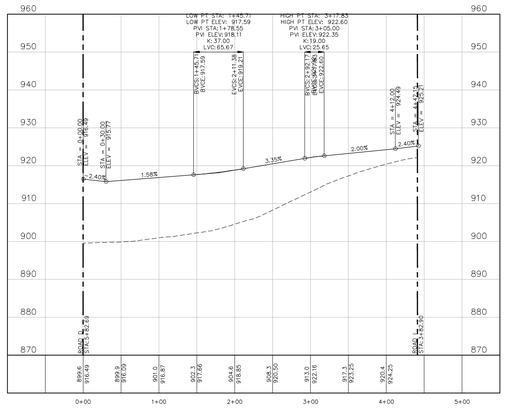

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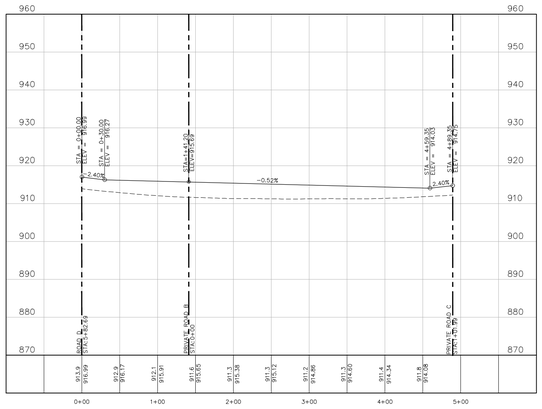

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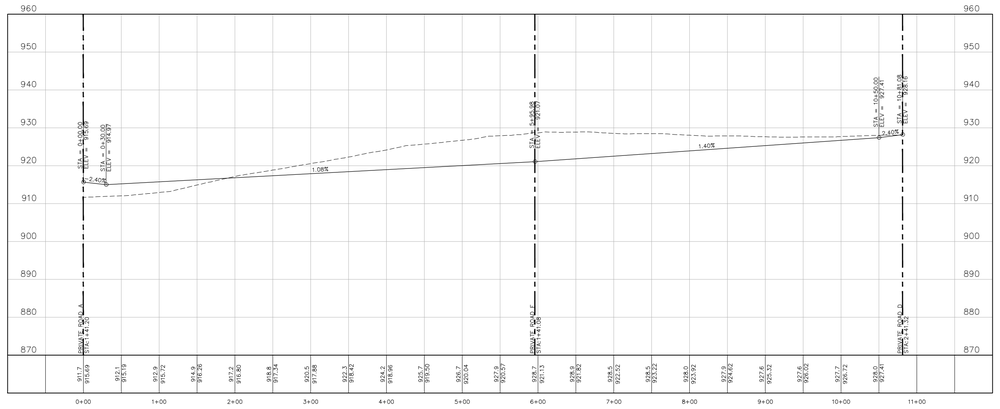

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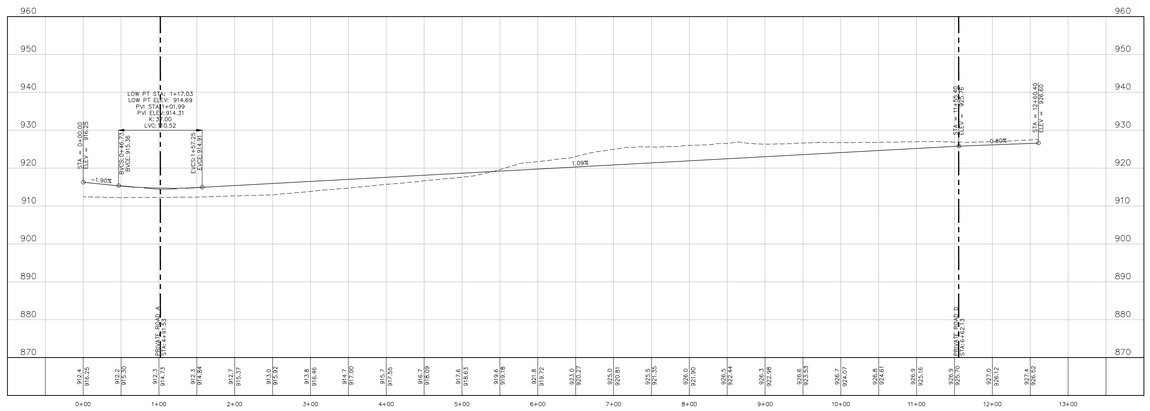

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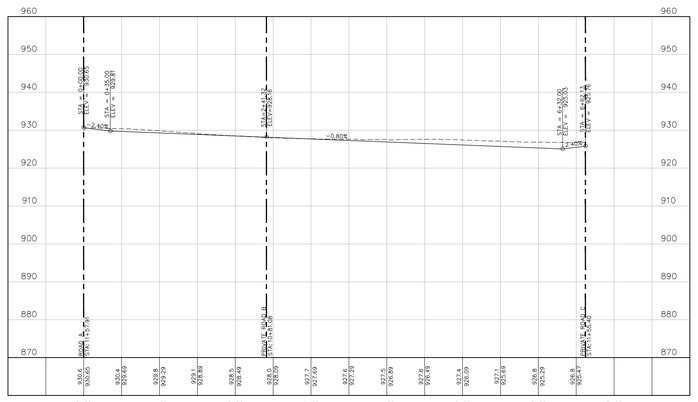

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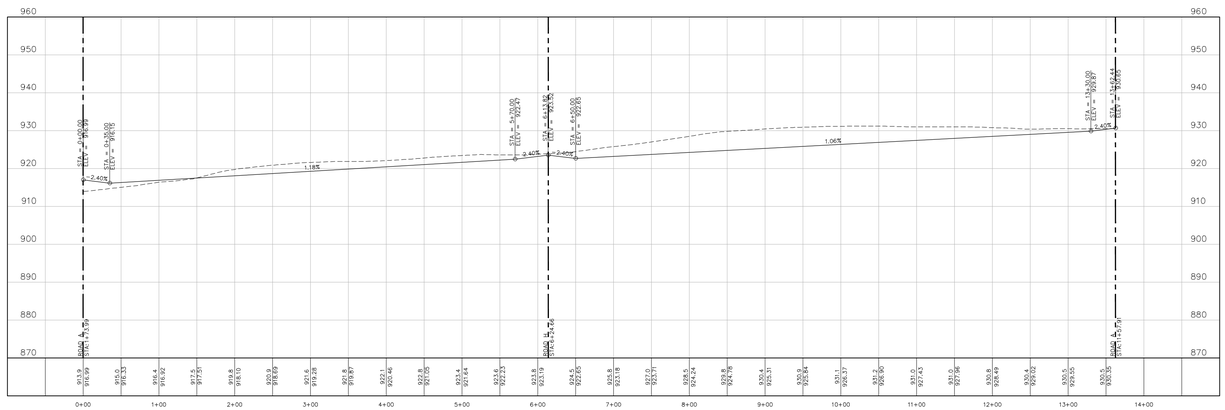

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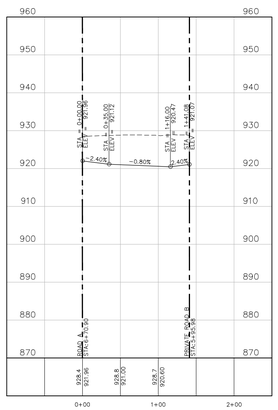

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
GRADING PROFILES (4)

DATE	DESCRIPTION
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Clark Vincent Lund
Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

42

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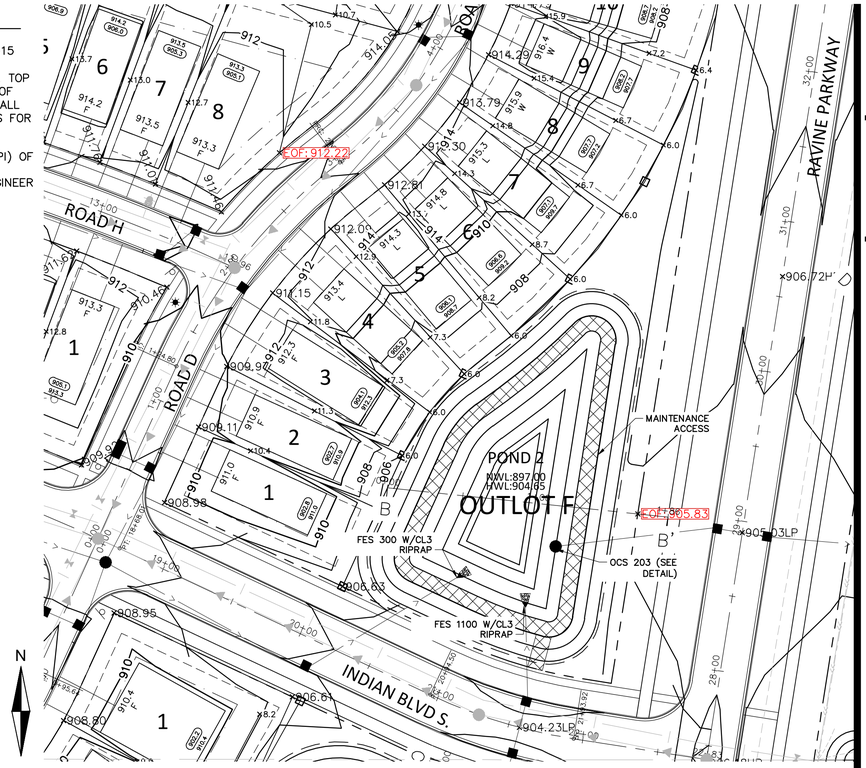
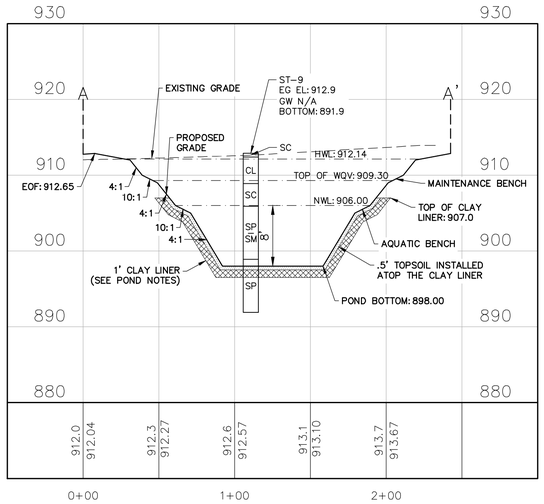
POND NOTES:

1. POND SHALL CONFORM TO CITY STANDARD DETAIL STO-15
2. 12" CLAY LINER SHALL BE INSTALLED AT BASE OF 18" SUBCUT WITH 6" OF TOPSOIL PLACED ATOP CLAY LINER. TOP SOIL AND CLAY LINER TO BE INSTALLED FROM BOTTOM OF THE POND TO 1' ABOVE THE POND NWLL. THE LINER SHALL BE INSTALLED PER CITY OF COTTAGE GROVE STANDARDS FOR THICKNESS AND SPECIFICATION.
3. CLAY LINER SHALL HAVE A MAXIMUM PERMEABILITY OF 1x10^-6 CM/S AND SHALL HAVE A PLASTICITY INDEX (PI) OF 20 OR LESS.
4. CONTRACTOR SHALL WORK WITH THE GEOTECHNICAL ENGINEER TO ASSURE CLAY LINER MATERIAL IS SATISFACTORILY IMPERMEABLE.

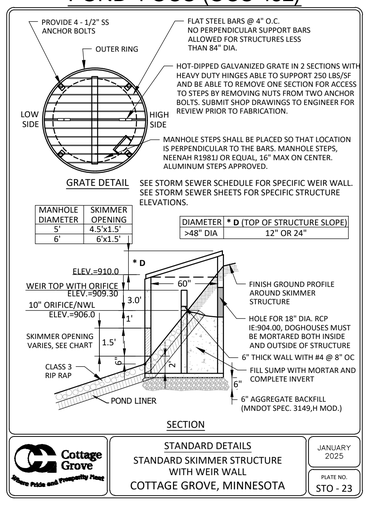
LEGEND:

- EASEMENT LINE
- LOT LINE
- ROW
- 789 EXISTING CONTOUR
- 789 PROPOSED CONTOUR
- PROPOSED CATCH BASINS
- PROPOSED STORM SEWER
- 10' MAINTENANCE ACCESS ROUTE
- ST-205 EXISTING SOIL BORING





POND 4 OCS (OCS 452)



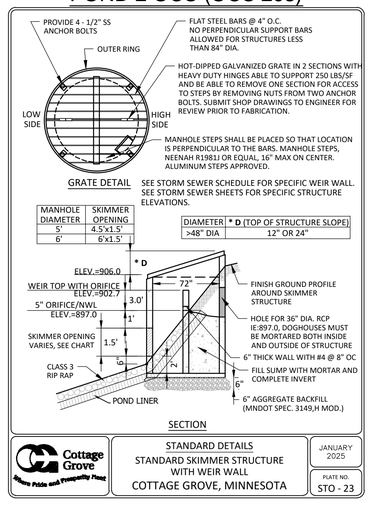
Cottage Grove — Where Pride and Tranquility Meet

STANDARD DETAILS
STANDARD SKIMMER STRUCTURE WITH WEIR WALL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO - 23

POND 2 OCS (OCS 203)

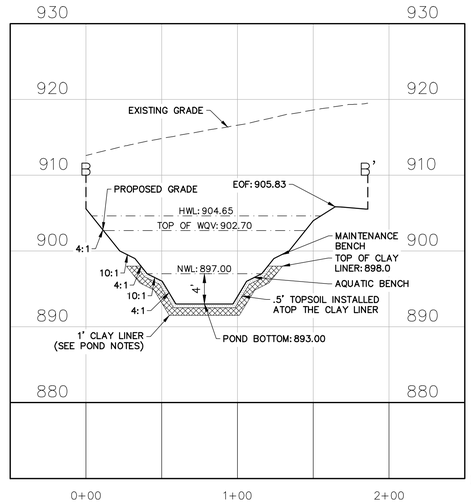


Cottage Grove — Where Pride and Tranquility Meet

STANDARD DETAILS
STANDARD SKIMMER STRUCTURE WITH WEIR WALL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO - 23



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

POND 2 AND 4 DETAILS

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA

Clark Vicklund
Date
40922
License no.

PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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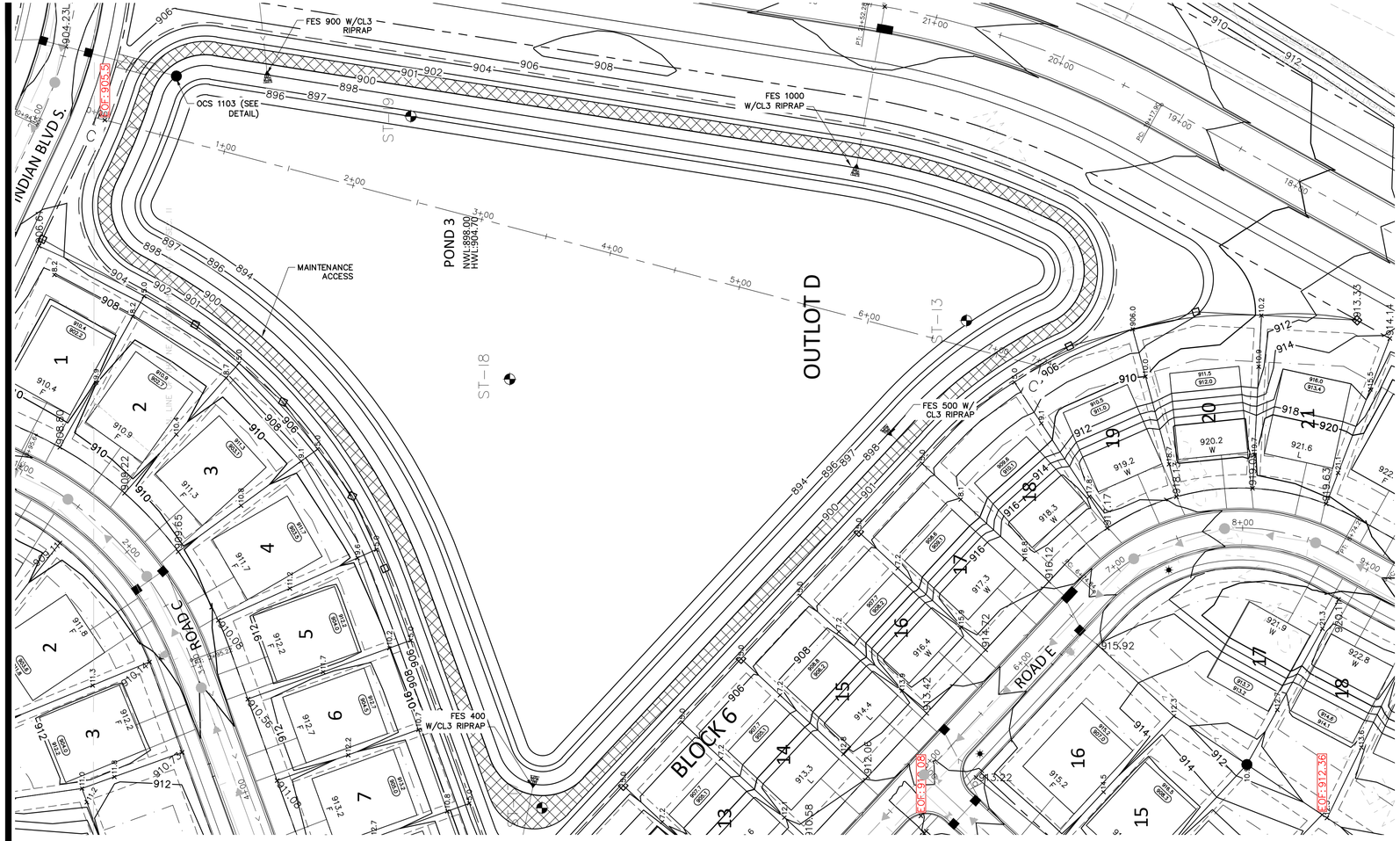
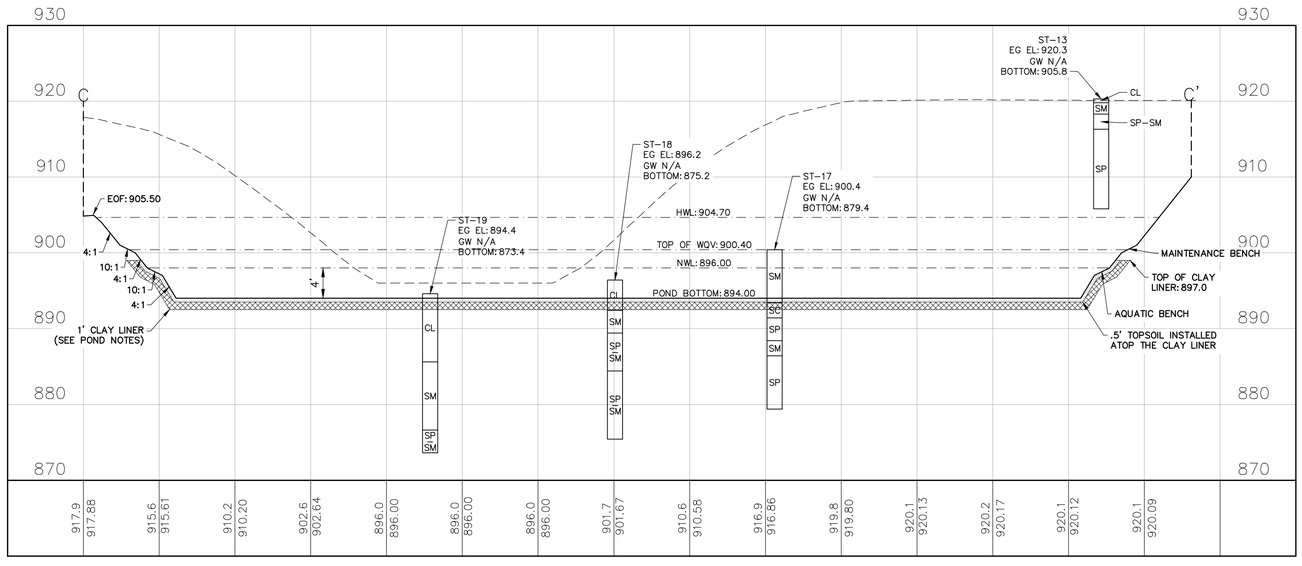
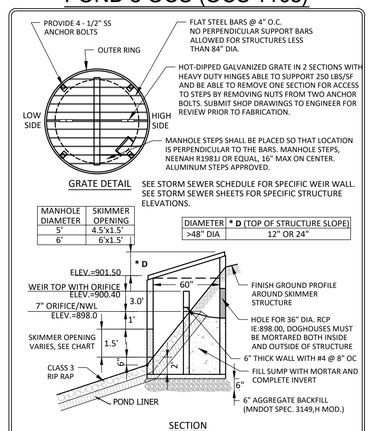




POND 3 OCS (OCS 1103)



MANHOLE DIAMETER	SKIMMER OPENING
5'	4.5'x1.5'
6'	6'x1.5'

DIAMETER	* D (TOP OF STRUCTURE SLOPE)
>48" DIA	12" OR 24"

Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STANDARD SKIMMER STRUCTURE WITH WEIR WALL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO - 23

POND NOTES:

1. POND SHALL CONFORM TO CITY STANDARD DETAIL STO-15
2. 12" CLAY LINER SHALL BE INSTALLED AT BASE OF 18" SUBCUT WITH 6" OF TOPSOIL PLACED ATOP CLAY LINER. TOP SOIL AND CLAY LINER TO BE INSTALLED FROM BOTTOM OF THE POND TO 1' ABOVE THE POND NWLL. THE LINER SHALL BE INSTALLED PER CITY OF COTTAGE GROVE STANDARDS FOR THICKNESS AND SPECIFICATION.
3. CLAY LINER SHALL HAVE A MAXIMUM PERMEABILITY OF 1x10^-6 CM/S AND SHALL HAVE A PLASTICITY INDEX (PI) OF 20 OR LESS.
4. CONTRACTOR SHALL WORK WITH THE GEOTECHNICAL ENGINEER TO ASSURE CLAY LINER MATERIAL IS SATISFACTORILY IMPERMEABLE.

LEGEND:

- EASEMENT LINE
- LOT LINE
- ROW
- 789 EXISTING CONTOUR
- 789 PROPOSED CONTOUR
- PROPOSED CATCH BASINS
- PROPOSED STORM SEWER
- 10' MAINTENANCE ACCESS ROUTE
- ST-205 EXISTING SOIL BORING

N

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

POND 3 DETAIL

DATE	DESCRIPTION
2026-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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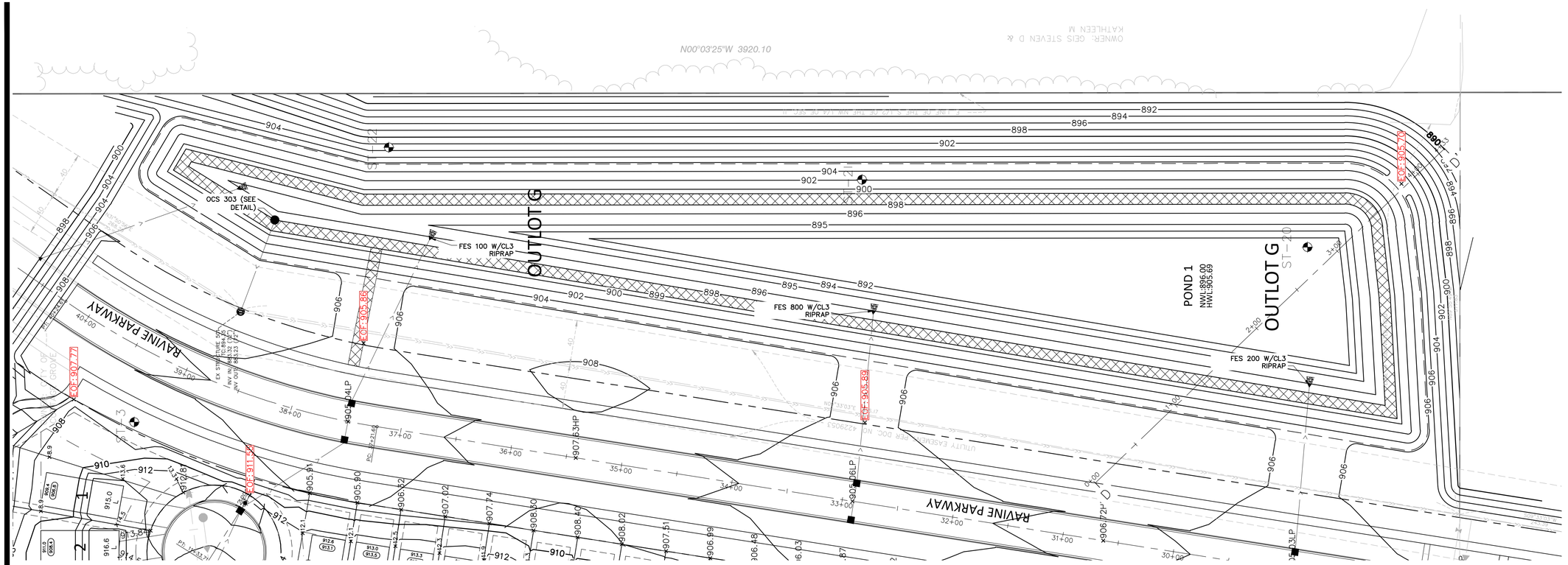
N00°03'25"W 3920.10
OUTLOT G
OUTLOT G
ST-20
POND 1
NWL:896.00
HWL:905.69
FES 100 W/CL3 RIPRAP
FES 800 W/CL3 RIPRAP
FES 200 W/CL3 RIPRAP
OCS 303 (SEE DETAIL)
RAVINE PARKWAY
RAVINE PARKWAY
EOF:907.77
EOF:911.50
EOF:905.86
EOF:905.89
EOF:905.70
Ex STRUCTURE NO. 4
INV IN(SE):884.32 (12")
INV OUT:884.23 (12")
UTILITY EASEMENT PER DOC. NO. 4229824
905.94LP
907.53HP
906.76LP
906.72HP
905.91
905.90
906.22
907.02
907.74
908.03
908.40
908.02
907.51
906.99
906.48
906.03
906.87
905.03LP
898
900
902
904
906
908
910
912
914
892
894
895
896
898
899
890
38+00
37+00
36+00
35+00
34+00
33+00
32+00
31+00
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2+00
3+00
4+00
0+00
1+00
915.0
916.6
913.6
912.4
913.0
913.3
911.0
911.5
912.1
912.5
913.1
913.5
911.9
912.1
912.1
912.1



NOTE TO CONTRACTOR:

THE MASS GRADING CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ALL EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS) (EXCEPT FOR POST GRADE BMPS NEEDED AFTER UTILITY CONSTRUCTION ACTIVITY). THE BMPS ARE TO BE INSTALLED AT A MINIMUM AS SHOWN IN THE PLAN, IF CONDITIONS ARISE, ADDITIONAL BMP SUPPLEMENTATION TO PREVENT SITE EROSION OR SEDIMENT TRANSPORT MAY BE NECESSARY. THE MASS GRADING CONTRACTOR IS RESPONSIBLE FOR ALL BMPS REQUIRED TO COMPLETE THE MASS GRADING ACTIVITIES AND SUBSEQUENT TEMPORARY SOIL STABILIZATION NECESSARY TO PREPARE SITE FOR STREET AND UTILITY CONSTRUCTION AND HOME BUILDING. AT THE COMPLETION OF MASS GRADING WORK AND SATISFACTORY SITE SOIL STABILIZATION, THE DEVELOPER AND MASS GRADING CONTRACTOR SHALL COORDINATE THE TRANSFER OF NPDES PERMIT RESPONSIBILITIES TO THE STREET AND UTILITY CONTRACTOR.

THE STREET AND UTILITY CONTRACTOR WILL THEN ASSUME THE RESPONSIBILITY TO PROVIDE INSPECTION AND MAINTENANCE OF ANY IN-PLACE BMPS AS WELL AS INSTALL THE ADDITIONAL BMPS REQUIRED IN THE STREET AND UTILITY CONSTRUCTION DOCUMENT SWPPP. UPON COMPLETION OF STREET AND UTILITY CONSTRUCTION, THE STREET AND UTILITY CONTRACTOR SHALL REMOVE ANY BMPS INSTALLED DURING THE STREET AND UTILITY PHASE THAT ARE NO LONGER REQUIRED AND COORDINATE THE TRANSFER OF NPDES PERMIT RESPONSIBILITIES BACK TO THE DEVELOPER.

NOTES:

1. SEE SHEET 47 FOR ALL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.

EROSION CONTROL RESPONSIBLE PARTY:

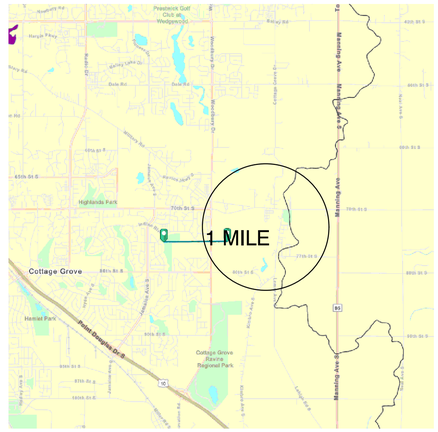
TWIN CITIES LAND DEVELOPMENT

SITE IMPERVIOUS DATA

PRE-CONSTRUCTION ACRES OF IMPERVIOUS:	1.85 AC
POST-CONSTRUCTION ACRES OF IMPERVIOUS:	55.14 AC
TOTAL NEW IMPERVIOUS SURFACE ACRES:	53.29 AC

SWPPP BMP QUANTITIES:

FINAL BMP QUANTITIES TO BE PROVIDED WITHIN CONSTRUCTION DOCUMENT PLAN SET.



VICINITY MAP
NOT TO SCALE

LEGEND:

- EXISTING CONTOUR (789)
- PROPOSED CONTOUR (789)
- PROPOSED RETAINING WALL
- DIRECTION OF DRAINAGE
- PROPOSED CATCH BASINS
- PROPOSED STORM SEWER
- PROPERTY LINE
- LOT LINE
- RIGHT-OF-WAY
- EXISTING VEGETATION LIMITS (APPROX)
- PRE — SF — PROPOSED SILT FENCE (PRE GRADING)
- PST — SF — PROPOSED SILT FENCE (POST GRADING)
- EXISTING TREE TO REMAIN
- INLET PROTECTION
- BIOROLL
- DND — DO NOT DISTURB AREAS
- TEMPORARY DRAINAGE ROUTING DURING MASS GRADING
- ROCK CONSTRUCTION ENTRANCE
- CATAGORY 3 EROSION CONTROL BLANKET
- DEWATERING TRENCH
- WETLAND BUFFER
- TEMPORARY SEDIMENT BASIN
- TEMPORARY DEWATERING CHANNEL

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RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL EROSION AND SEDIMENT CONTROL PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA

Clark Wicklund
Date
40922
License no.

PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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File Location: X:\4000570\4000570-00\00140 Design\00 Sheets - Preliminary\EROSION CONTROL.dwg Plotted By: Logan Josephson on Dec 31, 2025 at 12:18:33 PM

EROSION CONTROL GENERAL NOTES:

1. NO LAND DISTURBING ACTIVITY SHALL OCCUR UNTIL A GRADING PERMIT HAS BEEN ISSUED FROM THE CITY OF COTTAGE GROVE AND THE WATERSHED DISTRICT, UNLESS EXPRESSLY EXTENDED BY A PERMIT, THE HOURS OF OPERATION SHALL BE LIMITED TO 7:00 AM TO 7:00 PM MONDAY-FRIDAY AND 9:00AM TO 7:00 PM SATURDAY.
2. BEST MANAGEMENT PRACTICES (BMP'S) REFER TO EROSION AND SEDIMENT CONTROL PRACTICES DEFINED IN THE MPCA PROTECTING WATER QUALITY IN URBAN AREAS AND THE MINNESOTA CONSTRUCTION SITE EROSION AND SEDIMENT CONTROL PLANNING HANDBOOK.
3. ALL BMP'S SELECTED SHALL BE APPROPRIATE FOR THE TIME OF YEAR, SITE CONDITIONS, AND ESTIMATED DURATION OF USE.
4. ALL WORK AND MATERIALS SHALL BE CONSTRUCTED ACCORDING TO THE APPROVED PLANS. ANY DEVIATION FROM THE APPROVED PLANS SHALL REQUIRE WRITTEN APPROVAL FROM THE ENGINEER OF RECORD.
5. A COPY OF THESE PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
6. THE BOUNDARIES OF THE LAND DISTURBANCE LIMITS SHOWN ON THE PLANS SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. NO DISTURBANCE BEYOND THE DISTURBED LIMITS.
7. WHEREVER POSSIBLE, PRESERVE THE EXISTING TREES, GRASS AND OTHER VEGETATIVE COVER TO HELP FILTER RUNOFF.
8. ESTABLISH A PERMANENT VEGETATIVE COVER ON ALL EXPOSED SOILS WHERE LAND IS COMING OUT OF AGRICULTURAL PRODUCTION. PLANT AS SOON AS POSSIBLE TO ESTABLISH DENSE GRASS FILTER PRIOR TO CONSTRUCTION AND TO MINIMIZE WEED GROWTH.
9. ALL TREES NOT LISTED FOR REMOVAL SHALL BE PROTECTED. DO NOT OPERATE EQUIPMENT WITHIN THE DRIPLINE, ROOT ZONES OR WITHIN TREE PROTECTION FENCE AREAS.
10. ALL EROSION AND SEDIMENT CONTROL FACILITIES (BMP'S) SHALL BE INSTALLED AND IN OPERATION PRIOR TO LAND DISTURBANCE ACTIVITIES AND THEY SHALL BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR EROSION HAS PASSED.
11. SILT FENCE IS REQUIRED AT DOWN GRADIENT PERIMETER OF DISTURBED AREAS AND STOCKPILES. PROTECT WETLANDS, WATERCOURSES AND ADJACENT PROPERTIES FROM SEDIMENTATION AND STORMWATER RUNOFF.
12. THE BMP'S SHOWN ON THE PLANS ARE THE MINIMUM REQUIREMENTS FOR THE ANTICIPATED SITE CONDITIONS. AS CONSTRUCTION PROGRESSES AND UNEXPECTED OR SEASONAL CONDITIONS DICTATE, THE PERMITTEE/CONTRACTOR SHALL ANTICIPATE THAT MORE BMP'S WILL BE NECESSARY TO ENSURE EROSION AND SEDIMENT CONTROL ON THE SITE. DURING THE COURSE OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE PERMITTEE/CONTRACTOR TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY CONSTRUCTION ACTIVITIES AND/OR CLIMATIC EVENTS AND TO PROVIDE ADDITIONAL BMP'S OVER AND ABOVE THE MINIMUM REQUIREMENTS SHOWN ON THE PLANS, AS MAY BE NEEDED TO PROVIDE EFFECTIVE PROTECTION OF WATER AND SOIL RESOURCES.
13. THE BMP'S SHALL BE INSPECTED DAILY BY THE PERMITTEE/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING. SILT FENCES CLEANED OR REPLACED AT SEDIMENT BUILDUP OF 1/2 OF THE FENCE HEIGHT.
14. LAND DISTURBING ACTIVITIES SHALL OCCUR IN INCREMENTS OF WORKABLE SIZE SUCH THAT ADEQUATE BMP CONTROL CAN BE PROVIDED THROUGHOUT ALL PHASES OF CONSTRUCTION. THE SMALLEST PRACTICAL AREA SHALL BE EXPOSED OR OTHERWISE DISTURBED AT ANY ONE TIME.
15. OPERATE TRACK EQUIPMENT (DOZER) UP AND DOWN EXPOSED SOIL SLOPES ON FINAL PASS, LEAVING TRACK GROOVES PERPENDICULAR TO THE SLOPE. DO NOT BACK-BLADE. LEAVE A SURFACE ROUGH TO MINIMIZE EROSION.
16. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED FROM EROSION WITHIN 7 DAYS OF SUBSTANTIAL COMPLETION OF GRADING IN THAT AREA. TEMPORARY SEED AND MULCH SHALL COVER ALL EXPOSED SOILS IF GRADING COMPLETION IS DELAYED LONGER THAN 7 DAYS. PERMANENT SEED AND MULCH OR SOD IS REQUIRED WITHIN 3 DAYS OF COMPLETION OF FINAL GRADING.
17. GENERAL TEMPORARY SEED SHALL BE MNDOT MIX 190 @ 100 LBS. PER ACRE OR APPROVED EQUAL. PERMANENT SEED SHALL BE MNDOT MIX 270 @ 120 LBS. PER ACRE OR APPROVED EQUAL. (PLANTING DATES PER SPEC 2575) MULCH SHALL BE MNDOT TYPE 1 (CLEAN OAT STRAW) @ 2 TONS PER ACRE AND DISK ANCHORED IN PLACE OR APPROVED EQUAL. FERTILIZER SHALL BE 80-80-80 NPK PER ACRE (UNLESS P RESTRICTIONS APPLY) AND INCORPORATED INTO THE SEED BED.
18. POND, BASIN AND WETLAND AREAS SHALL BE SEEDED IN ACCORDANCE WITH LANDSCAPE PLAN.
19. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROPERLY DISPOSED OF WITHIN THIRTY (30) DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED.
20. AN ALTERNATE EROSION & SEDIMENT CONTROL PLAN SHALL BE REQUIRED FOR LAND DISTURBANCES ON EACH LOT AS PART OF ANY FUTURE BUILDING PERMIT FOR THE CONSTRUCTION OF STRUCTURES AND DRIVEWAYS.
21. ALL EROSION AND SEDIMENT CONTROL ITEMS MUST BE IN COMPLIANCE WITH MPCA CSW PERMIT (MN R100001)

EROSION AND SEDIMENT CONTROL MAINTENANCE PROGRAM:

1. INSPECT SILT FENCES IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. IMMEDIATELY REPAIR FAILED OR FAILING SILT FENCE.
2. REPLACEMENT - FABRIC SHALL BE REPLACED PROMPTLY WHEN IT DECOMPOSES OR BECOMES INEFFECTIVE BEFORE THE BARRIER IS NO LONGER NECESSARY.
3. SEDIMENT REMOVAL - SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-THIRD THE HEIGHT OF THE BARRIER. ANY SEDIMENT REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER FABRIC IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH EXISTING GRADE, PREPARED, AND SEEDED WITH THE APPROPRIATE SEED MIX, OR SODDED AS DIRECTED BY THE ENGINEER.
4. REMOVAL OF SILT FENCE - SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPWARD SLOPING AREA HAS BEEN PERMANENTLY STABILIZED. IF THE UPWARD SLOPING AREA IS TO BE EXPOSED LONGER THAN SIX (6) MONTHS, THAT AREA SHALL BE COVERED WITH TEMPORARY VEGETATION WHEN FIRST EXPOSED.
5. THE CONTRACTOR MUST ROUTINELY INSPECT THE CONSTRUCTION SITE ONCE EVERY SEVEN (7) DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS.
6. ALL INSPECTIONS AND MAINTENANCE CONDUCTED DURING CONSTRUCTION MUST BE RECORDED IN WRITING AND THESE RECORDS MUST BE RETAINED WITH THE SWPPP RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY SHALL INCLUDE:

   6.1. DATE AND TIME OF INSPECTIONS;
   6.2. NAME OF PERSON(S) CONDUCTING INSPECTIONS;
   6.3. FINDINGS OF INSPECTIONS, INCLUDING RECOMMENDATIONS FOR CORRECTIVE ACTIONS;
   6.4. CORRECTIVE ACTIONS TAKEN (INCLUDING DATES, TIMES, AND PARTY COMPLETING MAINTENANCE ACTIVIES.)
   6.5. DATE AND AMOUNT OF ALL RAINFALL EVENTS GREATER THAN ½ INCH (0.5 INCHES) IN 24 HOURS:
   6.6. DOCUMENTS OF CHANGES MADE TO THE SWPPP AS REQUIRED IN PART III.A.4.

7. WHERE PARTS OF THE CONSTRUCTION SITE HAVE UNDERGONE FINAL STABILIZATION, BUT WORK REMAINS ON OTHER PARTS OF SITE, INSPECTIONS OF THE STABILIZED AREAS MAY BE REDUCED TO ONCE PER MONTH. WHERE WORK HAS BEEN SUSPENDED DUE TO FROZEN GROUND CONDITIONS, THE REQUIRED INSPECTIONS AND MAINTENANCE MUST TAKE PLACE AS SOON AS RUNOFF OCCURS AT THE SITE OR PRIOR TO RESUMING CONSTRUCTION, WHICHEVER COMES FIRST.

CONSTRUCTION SEQUENCING:

MASS GRADING PHASE:

1. INSTALL STABILIZED CONSTRUCTION ENTRANCES.
2. PREPARE TEMPORARY PARKING AND STORAGE AREA.
3. INSTALL THE PRE-GRADING SILT FENCES AND INLET PROTECTION BMPs ON THE SITE.
4. CONSTRUCT ALL PRE-GRADING EROSION AND SEDIMENTATION CONTROL BMPs.
5. COMPLETE MASS GRADING AND INSTALL TEMPORARY AND PERMANENT SEEDING AND PLANTING.
6. CONSTRUCT POST-GRADING SILT FENCE ON THE SITE.

   NOTE:
   INFILTRATION BASINS TO BE CONSTRUCTED IN AN ORDER WHERE THEY ARE TO BE PROTECTED FROM SILTATION AND HEAVY EQUIPMENT.

STREET & UTILITY PHASE:

1. INSTALL UTILITIES, UNDERDRAINS, STORM SEWERS, CURBS AND GUTTERS.
2. INSTALL RIP RAP AROUND OUTLET STRUCTURES.
3. INSTALL INLET PROTECTION AROUND ALL STORM SEWER STRUCTURES.
4. PREPARE SITE FOR PAVING.
5. PAVE SITE.
6. INSTALL INLET PROTECTION DEVICES.
7. INSTALL POST STREET AND UTILITY SILT FENCE.
8. INSTALL PRIVATE UTILITIES
9. REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES (ONLY IF SITE IS STABILIZED), IF REQUIRED BY THE CONTRACT.

IMPERVIOUS SURFACES:

MAX. IMPERVIOUS SURFACE ALLOWED:

SINGLE FAMILY LOTS = 50% MAX. PER LOT
ATTACHED DWELLINGS = 40% OF TOTAL AREA

EROSION CONTROL SCHEDULE:

1. PRIOR TO ANY CONSTRUCTION OR DEMOLITION, SILT FENCE AND FILTERS SHALL BE INSTALLED AS SHOWN TO INTERCEPT RUNOFF.
2. ALL EROSION CONTROL INSTALLATIONS SHALL REMAIN IN PLACE AND BE MAINTAINED IN GOOD CONDITION BY THE CONTRACTOR UNTIL THE SITE HAS BEEN RE-VEGETATED. CONTRACTOR MAY REMOVE NECESSARY SILT FENCING/FILTERS TO CONSTRUCT ROADWAYS, WHILE MAINTAINING ADEQUATE EROSION CONTROL IN ADJACENT AREA.
3. SUFFICIENT TOPSOIL SHALL BE STOCKPILED AND PRESERVED TO ALLOW FOR THE REPLACEMENT OF 6" OF TOPSOIL FOR DISTURBED AREAS TO BE RE-VEGETATED. COMPACTION MUST BE MINIMIZED DURING CONSTRUCTION ACTIVITY.
4. THE CONTRACTOR SHALL SCHEDULE SITE GRADING, UTILITY INSTALLATION AND PAVEMENT CONSTRUCTION SO THAT THE GENERAL SITE CAN BE MULCHED AND RE-SEEDED SOON AFTER DISTURBANCE. AREAS THAT WILL NOT BE SUBJECT TO CONSTRUCTION TRAFFIC SHALL BE SEEDED (MnDOT MIX 190 @ 100#/AC AND MULCHED OR SODDED WITHIN SEVEN (7) DAYS OF BEING DISTURBED.
5. CONTRACTOR SHALL INSTALL EROSION CONTROL DEVICES AS INDICATED ON THIS EROSION CONTROL PLAN AND ANY ADDITIONAL REQUIRED BASED ON MEANS, METHODS AND SEQUENCES OF CONSTRUCTION.

SEDIMENT CONTROL PRACTICES:

1. SEDIMENT CONTROL PRACTICES MUST MINIMIZE SEDIMENT FROM ENTERING SURFACE WATERS, INCLUDING CURB AND GUTTER SYSTEMS AND STORM SEWER INLETS.
2. SEDIMENT CONTROL PRACTICES MUST BE ESTABLISHED ON ALL DOWN GRADIENT PERIMITERS BEFORE ANY UPGRADIENT LAND DISTURBING ACTIVITIES BEGIN. THESE PRACTICES SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION HAS BEEN ESTABLISHED.
3. THE TIMING OF THE INSTALLATION OF SEDIMENT CONTROL PRACTICES MAY BE ADJUSTED TO ACCOMMODATE SHORT-TERM ACTIVITIES SUCH AS CLEARING OR GRUBBING, OR PASSAGE OF VEHICLES. ANY SHORT-TERM ACTIVITY MUST BE COMPLETED AS QUICKLY AS POSSIBLE AND THE SEDIMENT CONTROL PRACTICES MUST BE INSTALLED IMMEDIATELY AFTER THE ACTIVITY IS COMPLETED. HOWEVER, SEDIMENT CONTROL PRACTICES MUST BE INSTALLED BEFORE THE NEXT PRECIPITATION EVENT EVEN IF THE ACTIVITY IS NOT COMPLETE.
4. ALL STORM DRAIN INLETS MUST BE PROTECTED BY APPROPRIATE BMPS DURING CONSTRUCTION UNTIL ALL SOURCES WITH POTENTIAL FOR DISCHARGING TO THE INLET HAVE BEEN STABILIZED.
5. TEMPORARY SOIL STOCKPILES MUST HAVE SILT FENCES OR OTHER EFFECTIVE SEDIMENT CONTROLS, AND CANNOT BE PLACED IN SURFACE WATERS, INCLUDING STORM WATER CONVEYANCES SUCH AS CURB AND GUTTER SYSTEMS, OR CONDUITS AND DITCHES.
6. SITE CONSTRUCTION ENTRANCES WILL BE AS SHOWN ON THE PLAN. ROCK CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT EACH ENTRANCE.
7. STREET SWEEPING SHALL BE USED IN ADDITION TO ROCK CONSTRUCTION ENTRANCES IF ROCK CONSTRUCTION ENTRANCE ALONE IS NOT ADEQUATE TO PREVENT SEDIMENT TRACKING ONTO THE STREET.

EROSION AND SEDIMENT CONTROL AMENDMENT:

1. SWPPP AMENDMENTS SHALL BE MADE ACCORDING TO THE CONSTRUCTION STORMWATER PERMIT.
2. PERMITTEES MUST AMEND THE SWPPP WITHIN 7 DAYS TO INCLUDE ADDITIONAL OR MODIFIED BMPS WHENEVER THERE IS A CHANGE IN DESIGN, CONSTRUCITON, OPERATION, MAINTENANCE, WEATHER, OR SEASONAL CONDITION HAVING A SIGNIFICANT EFFECT ON THE DISCHARGE OF POLLUTANTS TO SURFACE WATERS OR GROUNDWATER.
3. PERMITTEES MUST AMEND THE SWPPP WITHIN 7 DAYS TO INCLUDE ADDITIONAL OR MODIFIED BMPS WHENEVER INSPECTIONS OR INVESTIGATIONS BY THE SITE OWNER OR OPERATOR, USEPA OR MPCA OFFICIALS INDICATE THE SWPPP IS NOT EFFECTIVE IN ELIMINATING OR SIGNIFICALTY MINIMIZING THE DISCHARGE OF POLLUTATNTS TO SURFACE WATERS OR GROUNDWATER OR THE DISCHARGES ARE CAUSING WATER QUALITY STANDARD EXCEEDANCES OR THE SWPPP IS NOT CONSISTENT WITH THE OBJECTIVES OF USEPA APPROVED TMDL.

FINAL STABILIZATION:

THE CONTRACTOR MUST ENSURE FINAL STABILIZATION OF THE SITE. THE CONTRACTOR MUST SUBMIT A NOTICE OF TERMINATION (NOT) WITHIN 30 DAYS AFTER FINAL STABILIZATION IS COMPLETE, OR ANOTHER OWNER/OPERATOR (PERMITTEE) HAS ASSUMED CONTROL OF ALL AREAS OF THE SITE THAT HAVE NOT UNDERGONE FINAL STABILIZATION. FINAL STABILIZATION CAN BE ACHIEVED IN THE FOLLOWING WAY:

ALL SOIL DISTURBING ACTIVITIES AT THE SITE HAVE BEEN COMPLETED AND ALL SOILS MUST BE STABILIZED BY A UNIFORM PERENNIAL VEGETATIVE COVER WITH A DENSITY OF 70 PERCENT OVER THE ENTIRE PERVIOUS SURFACE AREA, OR OTHER EQUIVALENTMEANS NECESSARY TO PREVENT SOIL FAILURE UNDER EROSIVE CONDITIONS AND;

A. ALL DRAINAGE DITCHES, CONSTRUCTED TO DRAIN WATER FROM THE SITE AFTER CONSTRUCTION IS COMPLETE, MUST BE STABILIZED TO PRECLUDE EROSION;
B. ALL TEMPORARY SYNTHETIC, AND STRUCTURAL EROSION PREVENTION AND SEDIMENT CONTROL BMPS (SUCH AS SILT FENCE) MUST BE REMOVED AS PART OF THE SITE FINAL STABILIZATION; AND
C. THE CONTRACTORS MUST CLEAN OUT ALL SEDIMENT FROM CONVEYANCES AND FROM TEMPORARY SEDIMENTATION BASINS THAT ARE TO BE USED AS PERMANENT WATER QUALITY MANAGEMENT BASINS. SEDIMENT MUST BE STABILIZED TO PREVENT IT FROM BEING WASHED BACK INTO THE BASIN, CONVEYANCES OR DRAINAGE WAYS DISCHARGING OFF-SITE OR TO SURFACE WATERS. THE CLEAN OUT OF PERMANENT BASINS MUST BE SUFFICIENT TO RETURN THE BASIN TO DESIGN CAPACITY.

POLLUTION PREVENTION MANAGEMENT MEASURES:

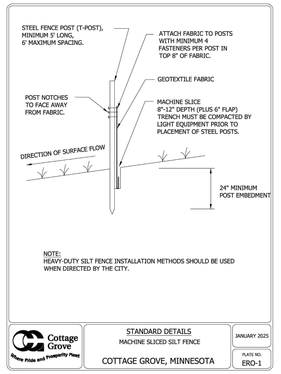
THE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING POLLUTION PREVENTION MANAGEMENT MEASURES ON THE SITE:

1. SOLID WASTE: COLLECTED SEDIMENT, ASPHALT AND CONCRETE MILLINGS, FLOATING DEBRIS, PAPER, PLASTIC, FABRIC, CONSTRUCTION AND DEMOLITION DEBRIS AND OTHER WASTES MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS.
2. HAZARDOUS MATERIAL: OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCES MUST BE PROPERLY STORED, INCLUDING SECONDARY CONTAINMENT, TO PREVENT SPILLS, LEAKS OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE IN COMPLIANCE WITH MPCA REGULATIONS.
3. CONCRETE WASHOUT IS DONE TRUCK BY TRUCK WITH A MOBILE WASHOUT SYSTEM PROVIDED AND COMPLETED BY THE CONCRETE CONTRACTOR. RUNOFF MUST BE CONTAINED AND WASTE PROPERLY DISPOSED OF.
4. NO ENGINE DEGREASING IS ALLOWED ON SITE.
5. STREET SWEEPING IS REQUIRED A MINIMUM OF 1 x PER WEEK OR AS DIRECTED BY CITY ENGINEER.

ACTIVE SWPPP LEGEND

CONSTRUCTION SEQUENCE	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
MULCH BERM													
FIBER ROLLS / MULCH SOCKS													
SILT FENCE													
TEMPORARY MULCH COVER													
TEMPORARY HYDROMULCH													
EROSION CONTROL BLANKET													
ROCK DRIVEWAY / ROCK PADS													
INLET PROTECTION DEVICES													
PAVEMENT (DRIVEWAY/ROADS)													
SOD													
STOCKPILES													

NOTE: CONTRACTOR, GENERAL CONTRACTOR OR SWPPP INSPECTOR TO COMPLETE TABLE AS GRADING PROGRESSES



Cottage Grove — Where Pride and Prosperity Flow

STANDARD DETAILS — MACHINE SLICED SILT FENCE — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-1

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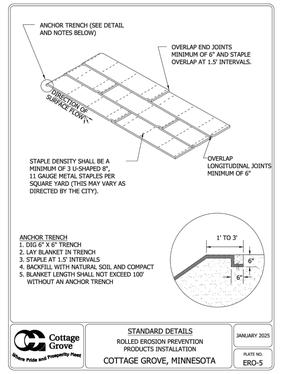
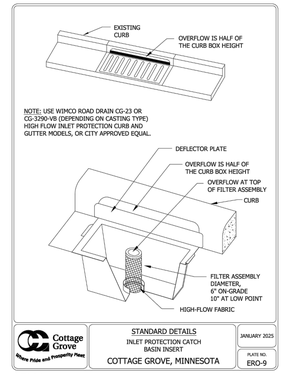


Cottage Grove — Where Pride and Prosperity Flow

STANDARD DETAILS — ROLLED EROSION PREVENTION PRODUCTS INSTALLATION — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-5

4B_ERO5.DWG



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STANDARD DETAILS — INLET PROTECTION CATCH BASIN INSERT — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-9

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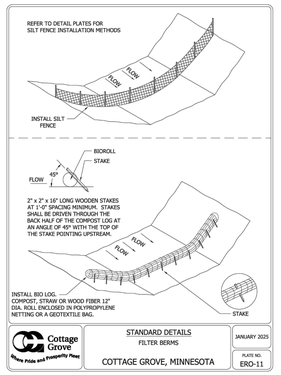

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STANDARD DETAILS — FILTER BERMS — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-11

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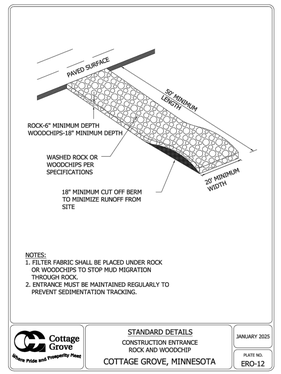

Cottage Grove — Where Pride and Prosperity Flow

STANDARD DETAILS — CONSTRUCTION ENTRANCE ROCK and WOODCHIP — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-12

4B_ERO12.DWG



Cottage Grove — Where Pride and Prosperity Flow

STANDARD DETAILS — SLOPE TRACKING — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-13

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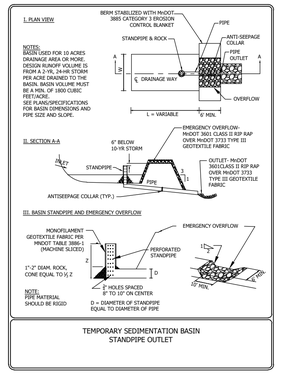

TEMPORARY SEDIMENTATION BASIN STANDPIPE OUTLET

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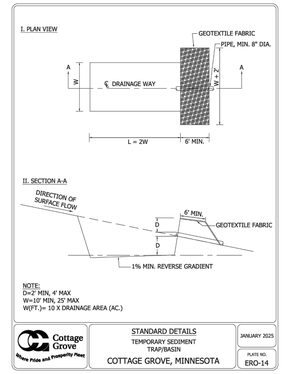

Cottage Grove — Where Pride and Prosperity Flow

STANDARD DETAILS — TEMPORARY SEDIMENT TRAP/BASIN — COTTAGE GROVE, MINNESOTA — JANUARY 2025 — PLATE NO. ERO-14

4B_ERO14.DWG

SEDIMENT BARRIERS
1. SILT FENCE (MnDOT 3886)
2. CURB LOG
3. ROCK WEEPER

INLET PROTECTION DEVICES
1. WIMCO (MnDOT TYPE A & C)
2. INFRASAFE STORM DRAIN/CULVERT
3. SILT SACK (MnDOT TYPE A)
4. DANDY BAG (MnDOT TYPE B)

ANTI-TRACKING CONTROL
1. 2" CRUSHED CLEAR ROCK (LAND DEVELOPMENT)

TEMPORARY SEED MIX
1. MnDOT-100 (OATS 20-120 DAY STABILIZATION)
2. MnDOT-150 (1-2 YEAR STABILIZATION)

PERMANENT SEED MIX/STABILIZATION
1. MnDOT 270 (RESIDENTIAL TURF)
2. SOD

STABILIZATION BMP'S
1. STRAW/HAY MnDOT TYPE 1 MULCH
2. EROSION CONTROL BLANKET MnDOT CAT. 3
3. HYDROMULCH MnDOT TYPE 5
4. TURF REINFORCEMENT MAT SC250 NORTH AMERICAN GREEN OR EQUAL-MNDOT CAT 6

GRADING ACTIVITY
1. CONCRETE WASHOUT IS DONE TRUCK BY TRUCK WITH A MOBILE WASHOUT SYSTEM PROVIDED AND COMPLETED BY THE CONCRETE CONTRACTOR.

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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PRELIMINARY — FOR REVIEW ONLY — NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

47

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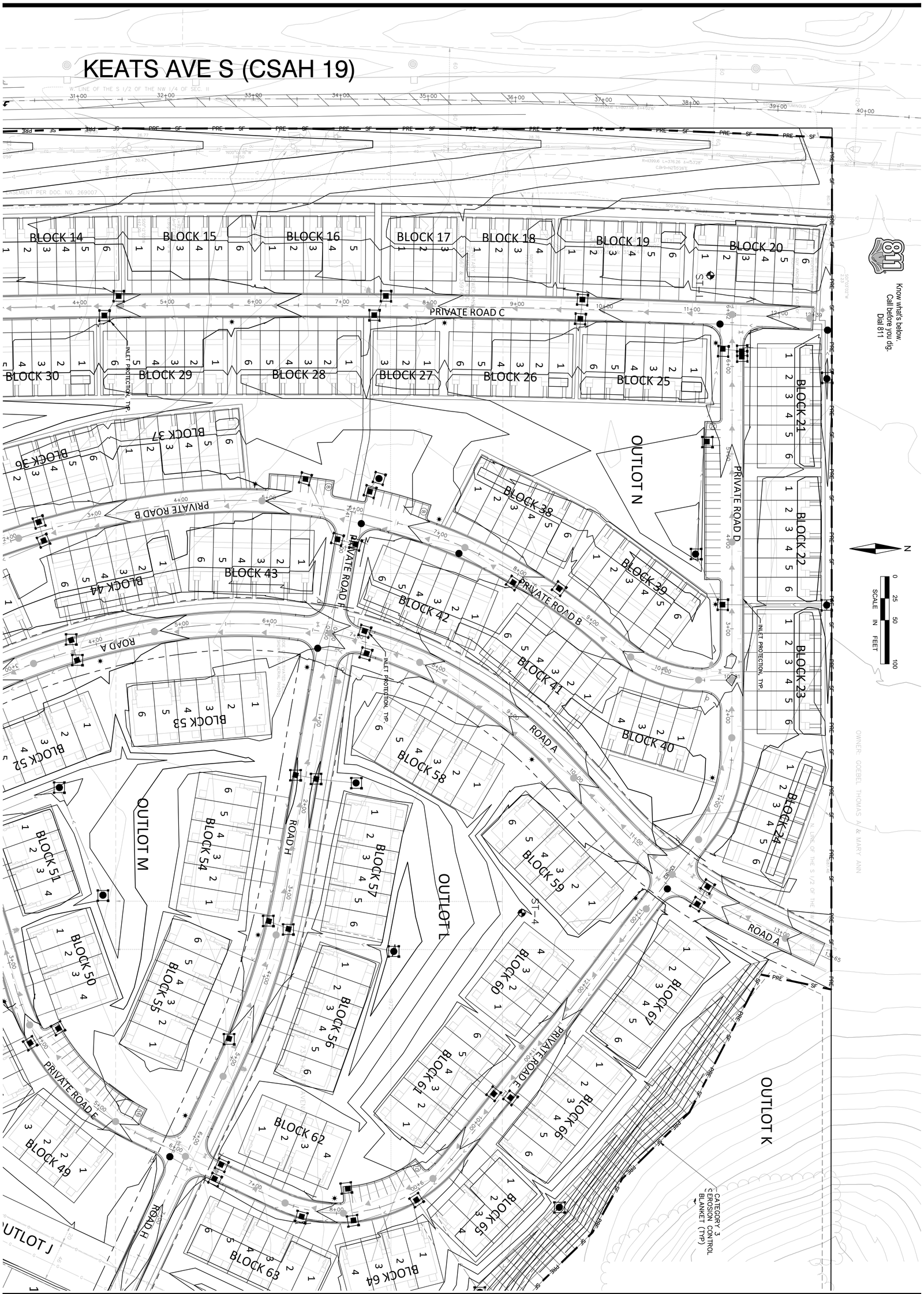

DATE	DESCRIPTION
2025-12-31	City Submittal

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Chris K. Vinciguerra
Date 40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
EROSION AND SEDIMENT CONTROL PLAN - VIEW A

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL EROSION AND SEDIMENT CONTROL PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

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Drafted By: LRJ

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PRELIMINARY PLAT SUBMITTAL
EROSION AND SEDIMENT CONTROL PLAN - VIEW C

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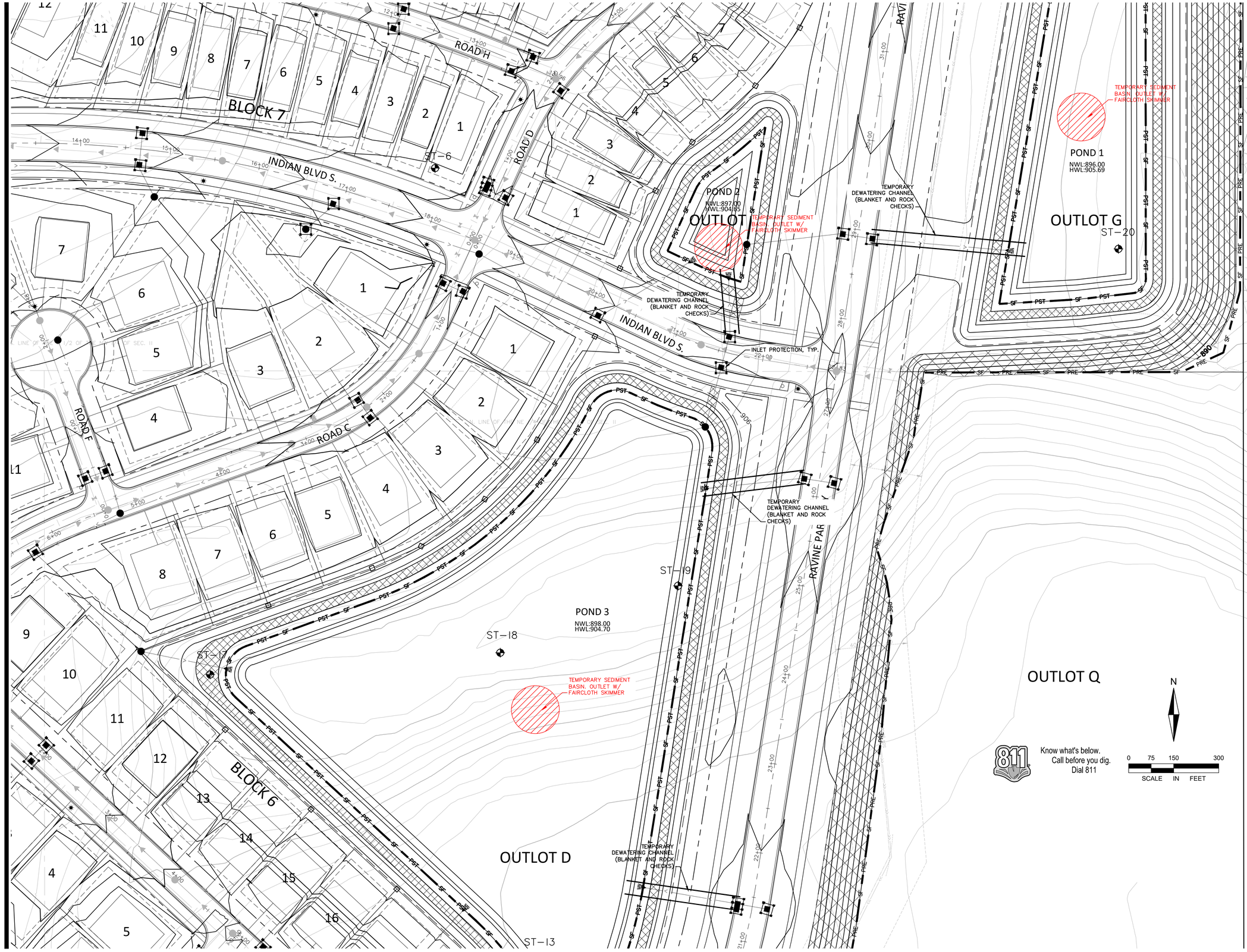

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL EROSION AND SEDIMENT CONTROL PLAN - VIEW D

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Project No.: 4000570-00

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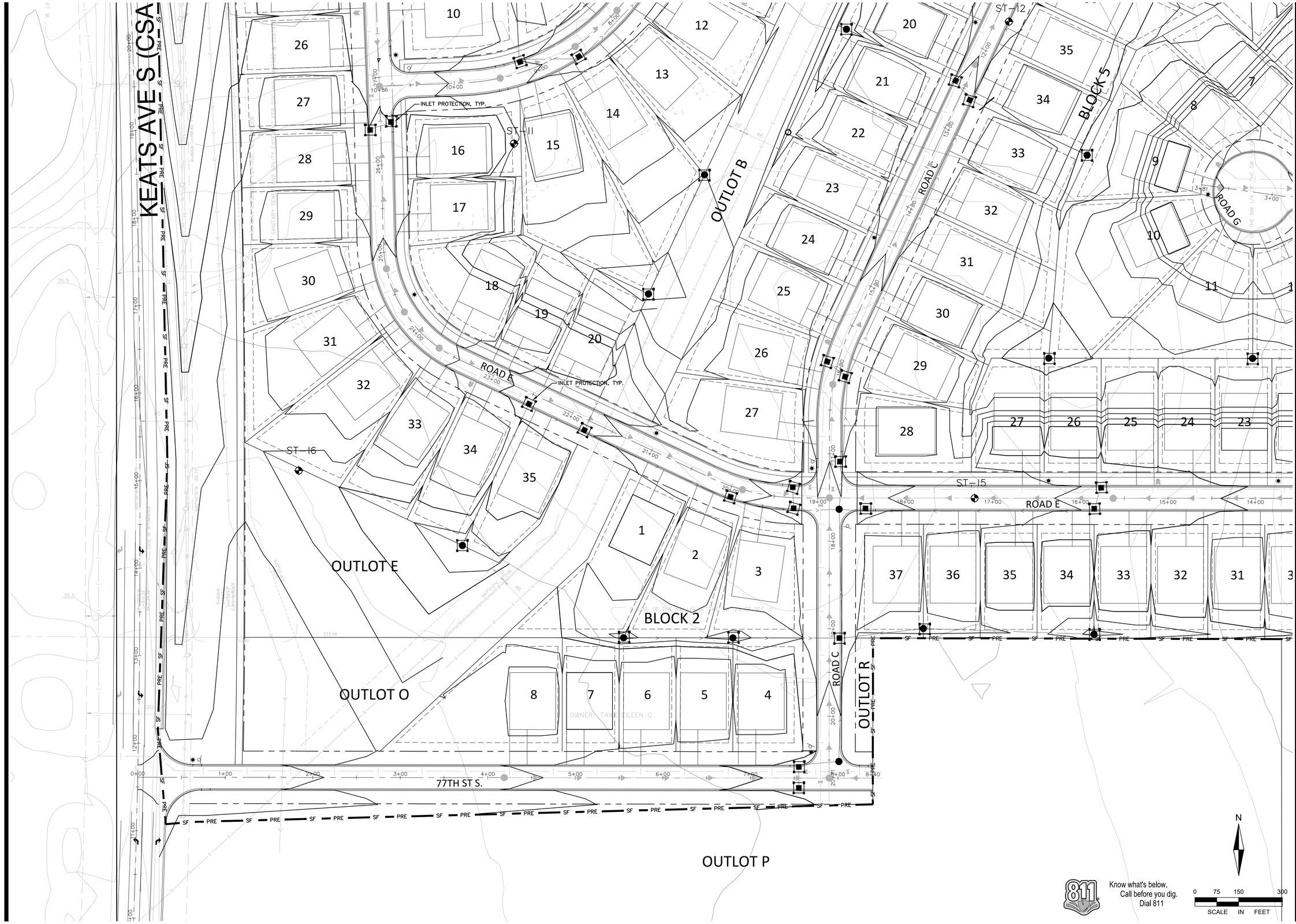

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
EROSION AND SEDIMENT CONTROL PLAN - VIEW E

DESCRIPTION	DATE
City Submittal	2025-12-31

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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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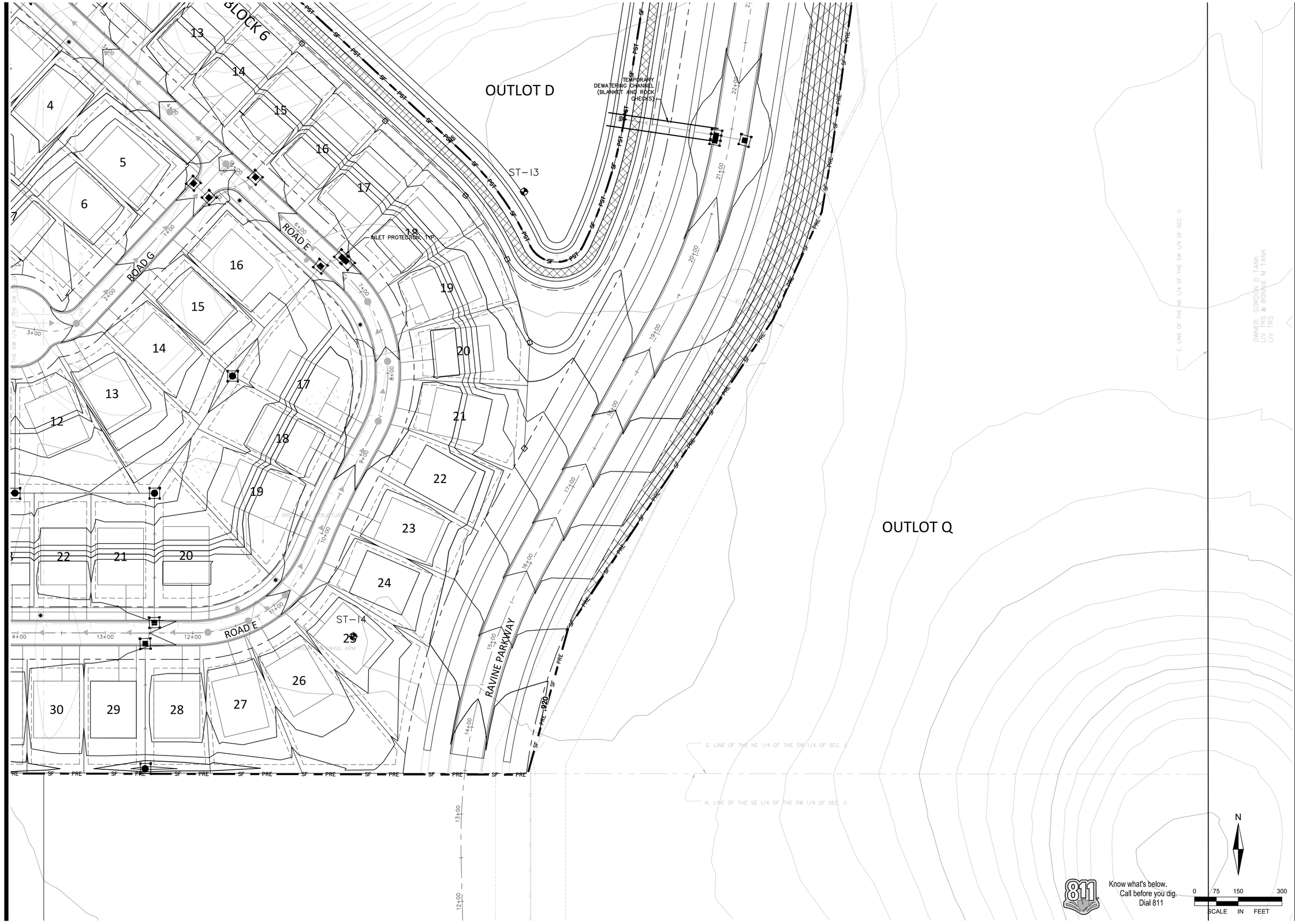

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL EROSION AND SEDIMENT CONTROL PLAN - VIEW F

DATE	DESCRIPTION
2025-12-31	City Submittal

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Date 40922
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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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UTILITY NOTES:

1. EXISTING UTILITIES, SERVICE LOCATIONS AND ELEVATIONS SHALL BE VERIFIED IN FIELD PRIOR TO CONSTRUCTION.
2. MAINTAIN A MIN 24" VERTICAL SEPARATION AT ALL PIPE CROSSINGS. WATER AND SANITARY SEWER TRUNK MAINS TO MAINTAIN 10' HORIZONTAL SEPARATION. LOWER WATERMAIN AS NECESSARY.
3. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS PRIOR TO THE START OF CONSTRUCTION.
4. PROVIDE A MINIMUM OF 4" STYROFOAM BOARD INSULATION FOR ALL STORM SEWER AND WATERMAIN CROSSINGS WHERE VERTICAL OR HORIZONTAL SEPARATION IS LESS THAN 36".
5. ALL UTILITY WORK WITHIN THE R.O.W. SHALL COMPLY WITH THE CITY OF COTTAGE GROVE'S STANDARD SPECIFICATIONS FOR STREET AND UTILITY CONSTRUCTION.
6. NOTIFY GOPHER STATE ONE CALL 48 HOURS IN ADVANCE OF ANY UTILITY WORK.
7. PROVIDE TEMPORARY TRAFFIC CONTROL IN COMPLIANCE WITH MNDOT "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS–FIELD MANUAL" LATEST REVISION, FOR ANY CONSTRUCTION WITHIN PUBLIC R.O.W.
8. ALL SANITARY MANHOLES TO BE 48" DIAMETER CONCRETE W/NEENAH R–1642 CASTING, UNLESS NOTED OTHERWISE.
9. WATERMAIN, SERVICES, AND VALVES SHALL BE INSTALLED WITH MINIMUM 7.5' OF COVER.
10. WATER SERVICES SHALL BE 1" DIA. TYPE K COPPER W/ 1" CORP. STOP AND 1" CURB BOX.
11. SEWER SERVICES SHALL BE 4" PVC SCH 40 MINIMUM 2% SLOPE UNLESS OTHERWISE NOTED ON THE PLANS.
12. SANITARY SEWER SERVICES TO EXTEND 15' PAST ROW WITH RISER AT END OF SERVICE. PER CITY DETAIL SER–1
13. EXTEND CURB STOP 1' BEYOND ROW WHEN SIDEWALK IS PRESENT.
14. WATER SERVICE TAIL TO BE EXTENDED 15' PAST ROW PER CITY DETAIL SER–1.
15. WATER SERVICES MAY BE PLACED IN SAME TRENCH AS SEWER SERVICES PROVIDED THAT A 24" VERTICAL & A 36" HORIZONTAL SEPARATION ARE MAINTANED AND PIPE MATERIALS MEET THE CITY AND BUILDING CODES.
16. ALL CURB BOXES SHALL BE ADJUSTED TO AN ELEVATION OF 1" BELOW FINSHED GRADE.
17. ALL 8" WATERMAIN SHALL 8" CL–52 DIP.
18. CITY TO REIMBURSE DEVELOPER FOR SEWER AND WATER OVER SIZING AND OVER DEPTH.

LEGEND:

- PROPOSED STORM SEWER
- PROPOSED DRAIN TILE
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED CATCH BASIN
- PROPOSED SANITARY MANHOLE
- PROPOSED GATE VALVE
- PROPOSED HYDRANT
- EXISTING GATE VALVE
- EXISTING HYDRANT
- EXISTING WATERMAIN
- EXISTING CATCH BASIN
- EXISTING STORM MANHOLE
- EXISTING STORM SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY SEWER

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SANITARY SEWER AND WATERMAIN PLAN
- OVERALL

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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 54 of 91

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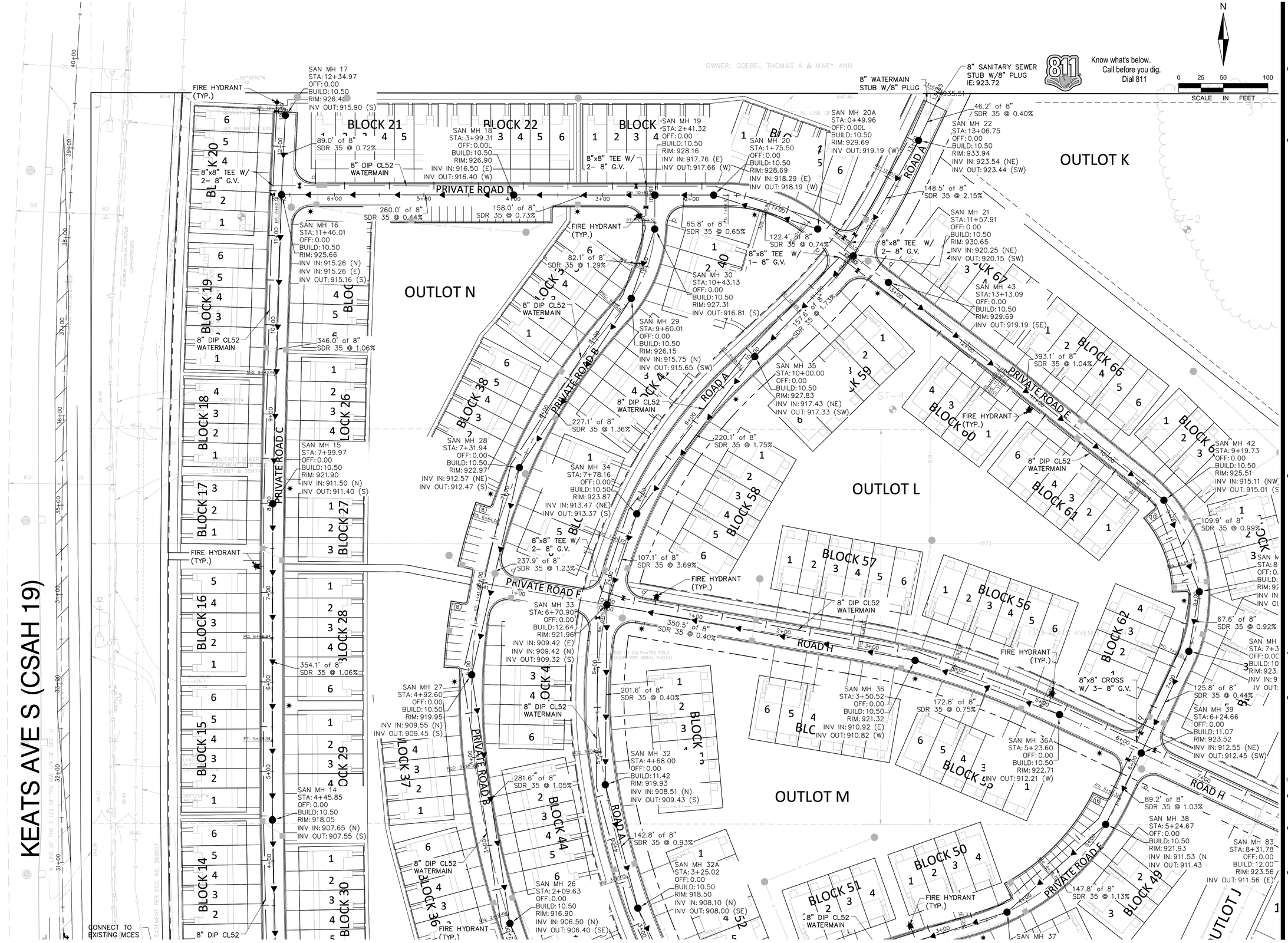

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SANITARY SEWER AND WATERMAIN PLAN - VIEW A

DATE	DESCRIPTION
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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL SANITARY SEWER AND WATERMAIN PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

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Project No.: 4000570-00

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RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SANITARY SEWER AND WATERMAIN PLAN - VIEW C

DATE	DESCRIPTION
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PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

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PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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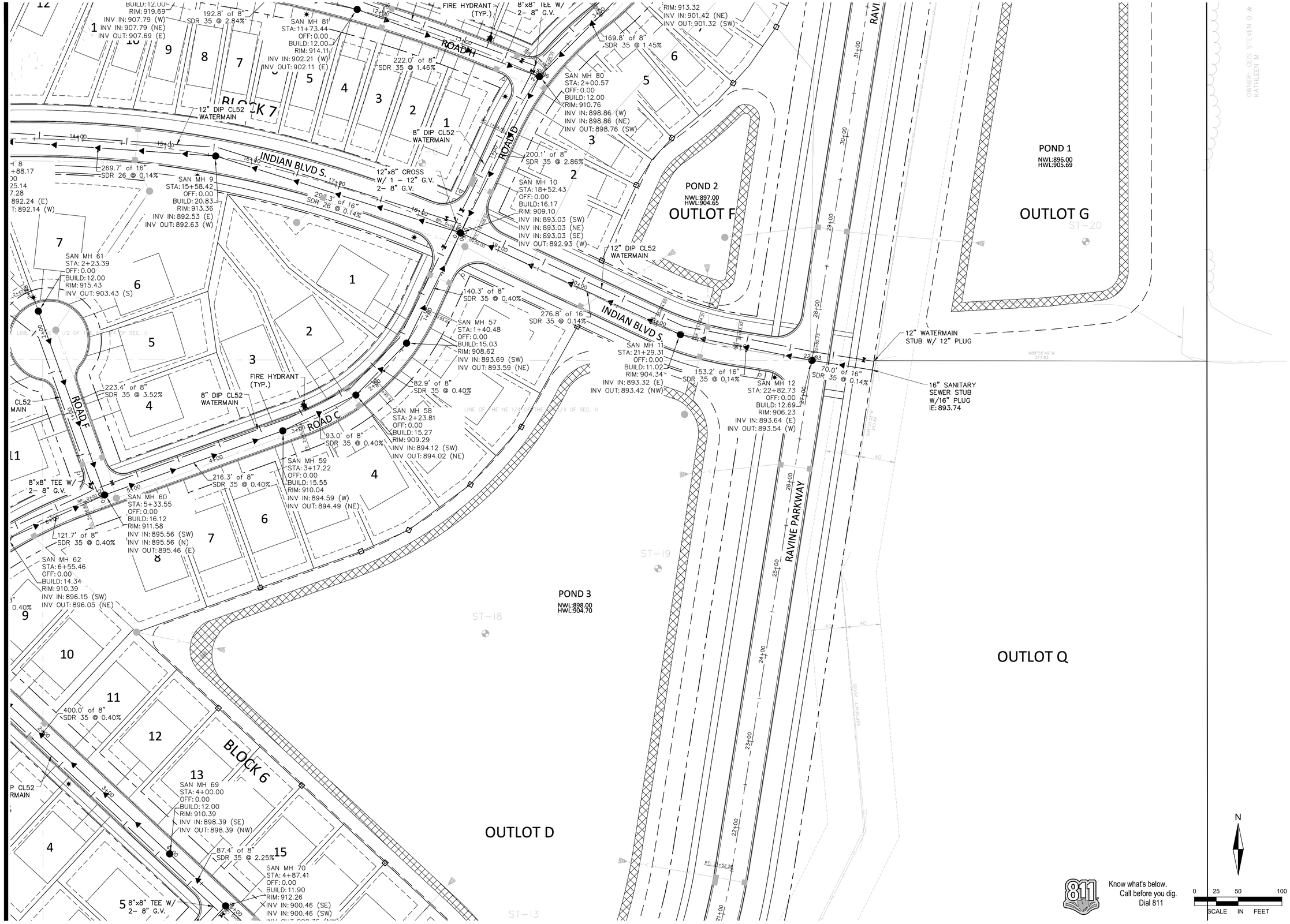

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SANITARY SEWER AND WATERMAIN PLAN - VIEW D

DESCRIPTION	DATE
City Submittal	2025-12-31

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KEATS AVE S (CSA

FIRE HYDRANT (TYP.)

8"x8" TEE W/ 2– 8" G.V.

SAN MH 51
STA: 26+89.94
OFF: 0.00
BUILD: 19.95
RIM: 919.67
INV IN: 899.82 (S)
INV IN: 899.82 (N)
INV OUT: 899.72 (E)

SDR 35 @ 0.40%

SAN MH 49
STA: 8+53.81
OFF: 0.00
BUILD: 16.97
RIM: 915.57
INV IN: 898.70 (SW)
INV OUT: 898.60 (NE)

OFF: 0.00
BUILD: 16.68
RIM: 914.93
INV IN: 898.35 (SW)
INV OUT: 898.25 (NE)

92.8' of 8"
SDR 35 @ 0.40%

138.3' of 8"
SDR 26 @ 0.40%

SAN MH 50
STA: 9+47.12
OFF: 0.00
BUILD: 17.76
RIM: 916.83
INV IN: 899.17 (W)
INV OUT: 899.07 (NE)

8" DIP CL52 WATERMAIN

208.6' of 8"
SDR 26 @ 5.11%

SAN MH 54
STA: 24+81.22
OFF: 0.00
BUILD: 12.00
RIM: 922.47
INV IN: 910.57 (SE)
INV OUT: 910.47 (N)

53.5' of 8"
SDR 35 @ 1.01%

57.4' of 8"
SDR 35 @ 0.56%

SAN MH 55
STA: 24+27.46
OFF: 0.00
BUILD: 12.00
RIM: 923.11
INV OUT: 911.11 (SE)
INV OUT: 911.11 (NW)

SAN MH 56
STA: 23+69.73
OFF: 0.00
BUILD: 12.00
RIM: 922.69
INV IN: 910.79 (NW)
INV OUT: 910.69 (SE)

FIRE HYDRANT (TYP.)

382.3' of 8"
SDR 35 @ 1.63%

ROAD F

OUTLOT B

ROAD C

SAN MH 65
STA: 12+19.95
OFF: 0.00
BUILD: 12.00
RIM: 912.09
INV IN: 900.19 (SW)
INV OUT: 900.09 (NE)

8" DIP CL52 WATERMAIN

600.1' of 8"
SDR 35 @ 0.71%

BLOCK 5

FIRE HYDRANT (TYP.)

SAN MH 72
STA: 3+59.27
OFF: 0.00
BUILD: 12.00
RIM: 918.07
INV OUT: 906.07 (E)

ROAD G

106.7
SDR

FIRE HYDRANT (TYP.)

SAN MH 66
STA: 16+20.62
OFF: 0.00
BUILD: 12.00
RIM: 915.29
INV IN: 903.39 (S)
INV OUT: 903.29 (NE)

8" DIP CL52 WATERMAIN

129.8' of 8"
SDR 35 @ 1.14%

8"x8" CROSS W/ 3– 8" G.V.

8" DIP CL52 WATERMAIN

FIRE HYDRANT (TYP.)

ROAD E

324.2' of 8"
SDR 35 @ 0.85%

380.0' of
SDR 35 @ 0

SAN MH 78
STA: 15+62.62
OFF: 0.00
BUILD: 12.00
RIM: 918.71
INV IN: 906.81 (E)
INV OUT: 906.71 (W)

SAN MH 67
STA: 17+50.57
OFF: 0.00
BUILD: 12.36
RIM: 916.33
INV IN: 903.97 (W)
INV IN: 903.97 (E)
INV IN: 903.97 (S)
INV OUT: 904.87 (N)

SAN MH 68
STA: 19+87.09
OFF: 0.00
BUILD: 12.00
RIM: 916.37
INV IN: 904.47 (NW)
INV OUT: 904.37 (E)

99.8' of 8"
SDR 35 @ 0.40%

OUTLOT E

BLOCK 2

8" DIP CL52 WATERMAIN

320.0' of 8"
SDR 35 @ 1.07%

OUTLOT O

OUTLOT R

12"x8" TEE W/ 1– 12" G.V. 2– 8" G.V.

12" WATERMAIN STUB W/ 12" PLUG

CONNECT TO EXISTING 12" WATERMAIN

BORE 67LF UNDER KEATS AVE S

77TH ST S.

371.1' of 8"
SDR 35 @ 0.77%

60.0' of 8"
SDR 35 @ 0.40%

8" SANITARY SEWER STUB W/8" PLUG
IE: 907.73

SAN MH 67B
STA: 4+18.81
OFF: 0.00L
BUILD: 12.00
RIM: 922.36
INV OUT: 910.36 (E)

8" WATERMAIN STUB W/ 8" PLUG

OUTLOT P

8" SANITARY SEWER STUB W/8" PLUG
IE: 907.61

30.0' of 8"
SDR 35 @ 0.40%

SAN MH 67A
STA: 20+70.57
OFF: 0.00
BUILD: 12.00
RIM: 919.39
INV IN: 907.49 (W)
INV IN: 907.49 (S)
INV IN: 907.49 (E)
INV OUT: 907.39 (N)

N

0 25 50 100
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RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SANITARY SEWER AND WATERMAIN PLAN
- VIEW E

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund
Date
40922
License no.

QA/QC CHECK

By
Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

59

Sheet 59 of 91

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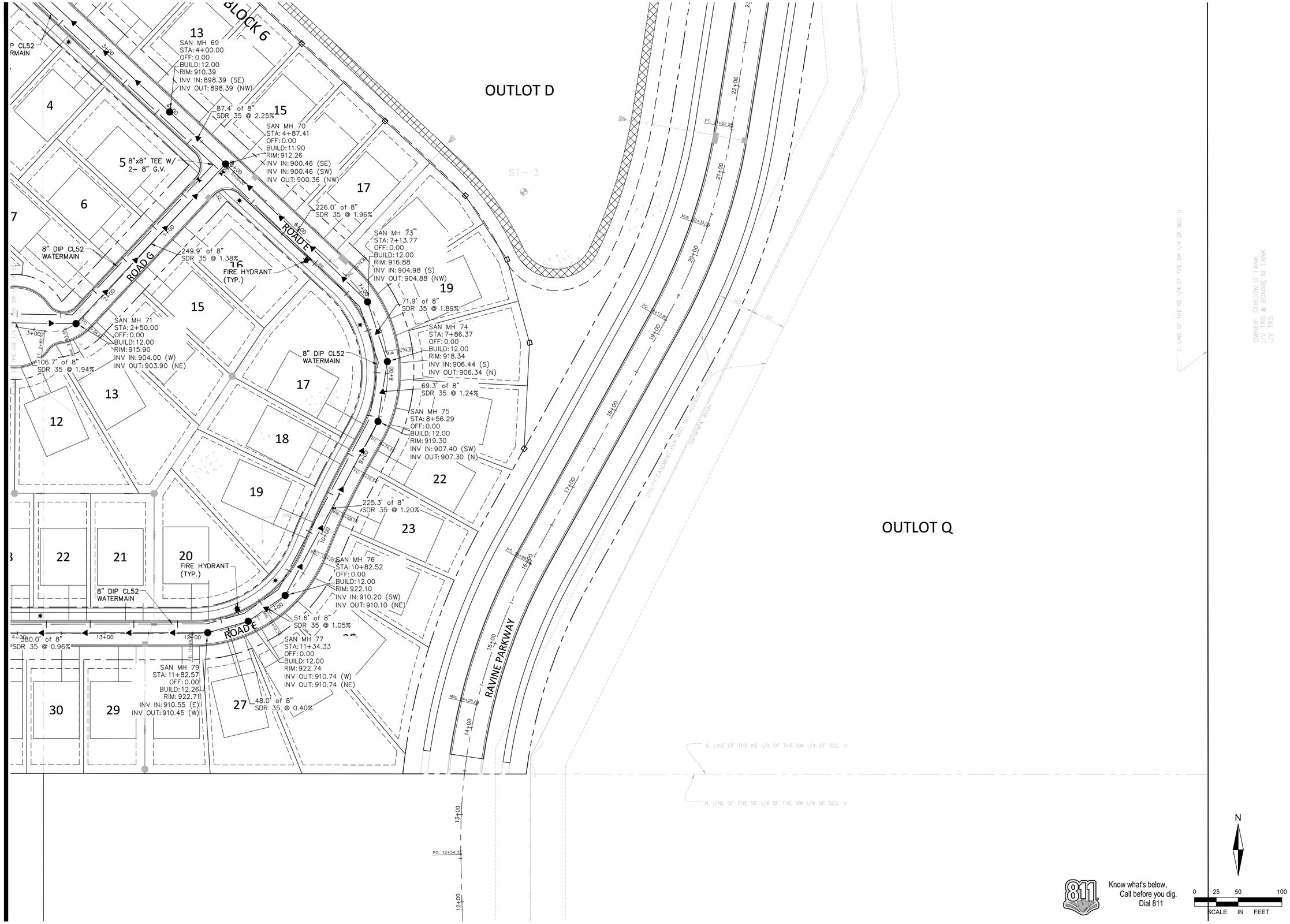

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
SANITARY SEWER AND WATERMAIN PLAN - VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

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NOT FOR CONSTRUCTION

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Date

40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 60 of 91

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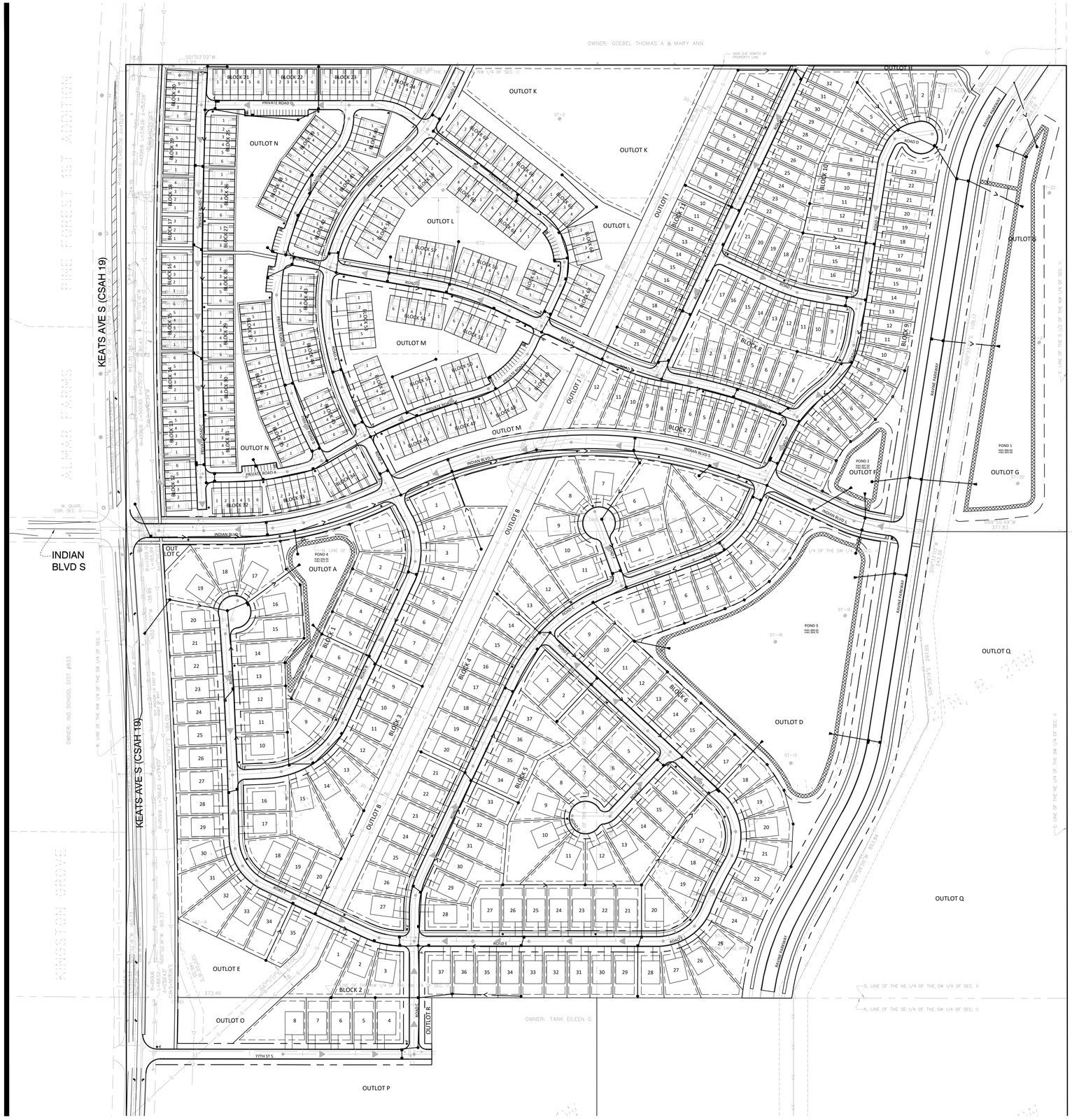

UTILITY NOTES:

1. EXISTING UTILITIES, SERVICE LOCATIONS AND ELEVATIONS SHALL BE VERIFIED IN FIELD PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS PRIOR TO THE START OF CONSTRUCTION.
3. MAINTAIN A MIN 2' VERTICAL SEPARATION AT ALL PIPE CROSSINGS. LOWER WATERMAIN AS NECESSARY.
4. PROVIDE A MINIMUM OF 4" THICK STYROFOAM BOARD INSULATION FOR ALL STORM SEWER AND WATERMAIN CROSSINGS WHERE VERTICAL OR HORIZONTAL SEPARATION IS LESS THAN 36".
5. ALL UTILITY WORK WITHIN THE R.O.W. SHALL COMPLY WITH THE CITY OF COTTAGE GROVE'S STANDARD SPECIFICATIONS FOR STREET AND UTILITY CONSTRUCTION.
6. PROVIDE TEMPORARY TRAFFIC CONTROL IN COMPLIANCE WITH MNDOT "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS–FIELD MANUAL" LATEST REVISION, FOR ANY CONSTRUCTION WITHIN PUBLIC R.O.W.
7. SEE SHEET 68 FOR STORM SEWER DESIGN SCHEDULES.

LEGEND:

- PROPOSED STORM SEWER
- PROPOSED DRAIN TILE
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED CATCH BASIN
- PROPOSED SANITARY MANHOLE
- PROPOSED GATE VALVE
- PROPOSED HYDRANT
- EXISTING GATE VALVE
- EXISTING HYDRANT
- EXISTING WATERMAIN
- EXISTING CATCH BASIN
- EXISTING STORM MANHOLE
- EXISTING STORM SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY SEWER
- POND MAINTENANCE ACCESS
- WETLAND BUFFER

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

STORM SEWER PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

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PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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OWNER: GOEBEL THOMAS A & MARY ANN

KEATS AVE S (CSAH 19)

PRIVATE ROAD C

PRIVATE ROAD B

PRIVATE ROAD D

PRIVATE ROAD E

PRIVATE ROAD F

ROAD A

ROAD H

OUTLOT K

OUTLOT L

OUTLOT M

OUTLOT N

BLOCK 14
BLOCK 15
BLOCK 16
BLOCK 17
BLOCK 18
BLOCK 19
BLOCK 20
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BLOCK 65
BLOCK 66
BLOCK 67

MH 444A
CB 444B
CB 449
CB 446A
CBMH 446
CBMH 445
CBMH 447
CBMH 447A
CBMH 448
MH 444
CB 443
CBMH 442
CB 441
CBMH 440
CB 439
CBMH 438
CB 363
CBMH 362
MH 361
CB 357
CBMH 360B
CBMH 360A
MH 360
CB 359B
CBMH 359
CBMH 359A
CB 426
CBMH 430
CB 431
CBMH 425B
CB 424
CBMH 423
CB 421B
CBMH 421A
CBMH 356
CB 354
CB 351
CBMH 353
CBMH 352
MH 355
CBMH 350
CBMH 349A
CBMH 349
CB 339
MH 337
CBMH 338
CBMH 339A
CB 340A
CBMH 340
CBMH 341
CB 343
CBMH 344
CB 345
CB 348
CBMH 347
MH 346
CBMH 336

ST-2
ST-4

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

STORM SEWER PLAN - VIEW A

DATE	DESCRIPTION
2026-12-31	City Submittal

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By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

62

Sheet 62 of 91

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OUTLOT K
OUTLOT L
OUTLOT H
OUTLOT G
OUTLOT I
BLOCK 10
BLOCK 11
BLOCK 8
BLOCK 9
BLOCK 64
BLOCK 63
ROAD I
ROAD J
ROAD H
ROAD D
RAVINE PARKWAY
CB 335
CBMH 334
CBMH 333
STUB A
CB 106
CBMH 105
CBMH 104
CBMH 101
CBMH 102
TEMPORARY FES 1201
TEMPORARY FES 1200
OCS 303
FES 100
FES 800
CBMH 802
CBMH 801
CB 332
CBMH 331
CBMH 330
CB 319A
CBMH 318
CBMH 319
CBMH 316
CBMH 329
CBMH 342
CBMH 314
CB 315
CBMH 313
CB 328
CBMH 327
CB 336A
CB 312
CBMH 326
CBMH 325
CBMH 311
CBMH 310
CB 323
CB 321
MH 324
MH 336
SIGN 0.6' NORTH OF PROPERTY LINE
SIGNIFICANT TREE
SIGNIFICANT TREE LINE
SIGNIFICANT TREE GROUP



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

STORM SEWER PLAN - VIEW C

DESCRIPTION	DATE
City Submittal	2025-12-31

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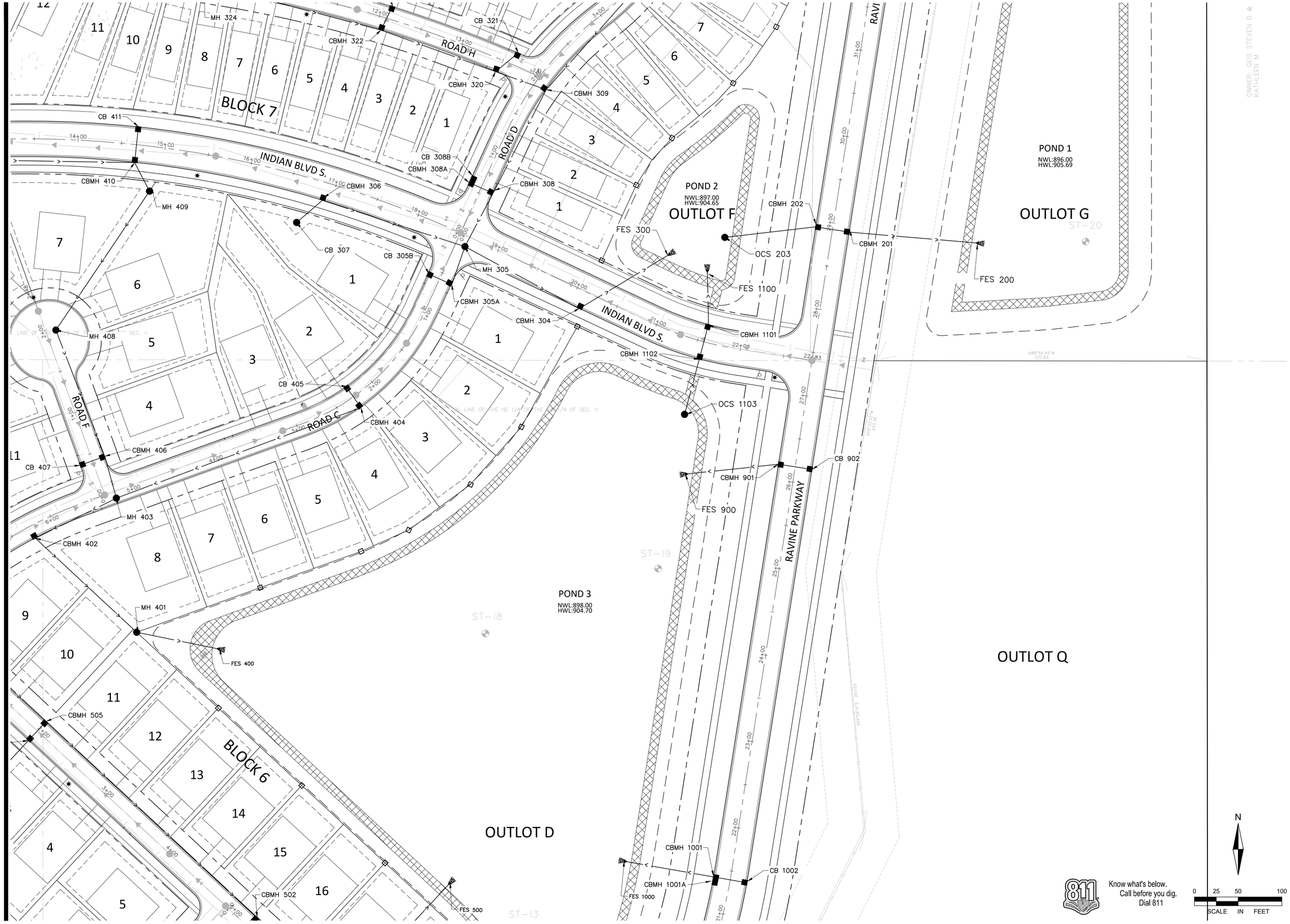

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
STORM SEWER PLAN - VIEW D

DESCRIPTION	DATE
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Drafted By: LRJ
Project No.: 4000570-00

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STORM SEWER PLAN - VIEW E

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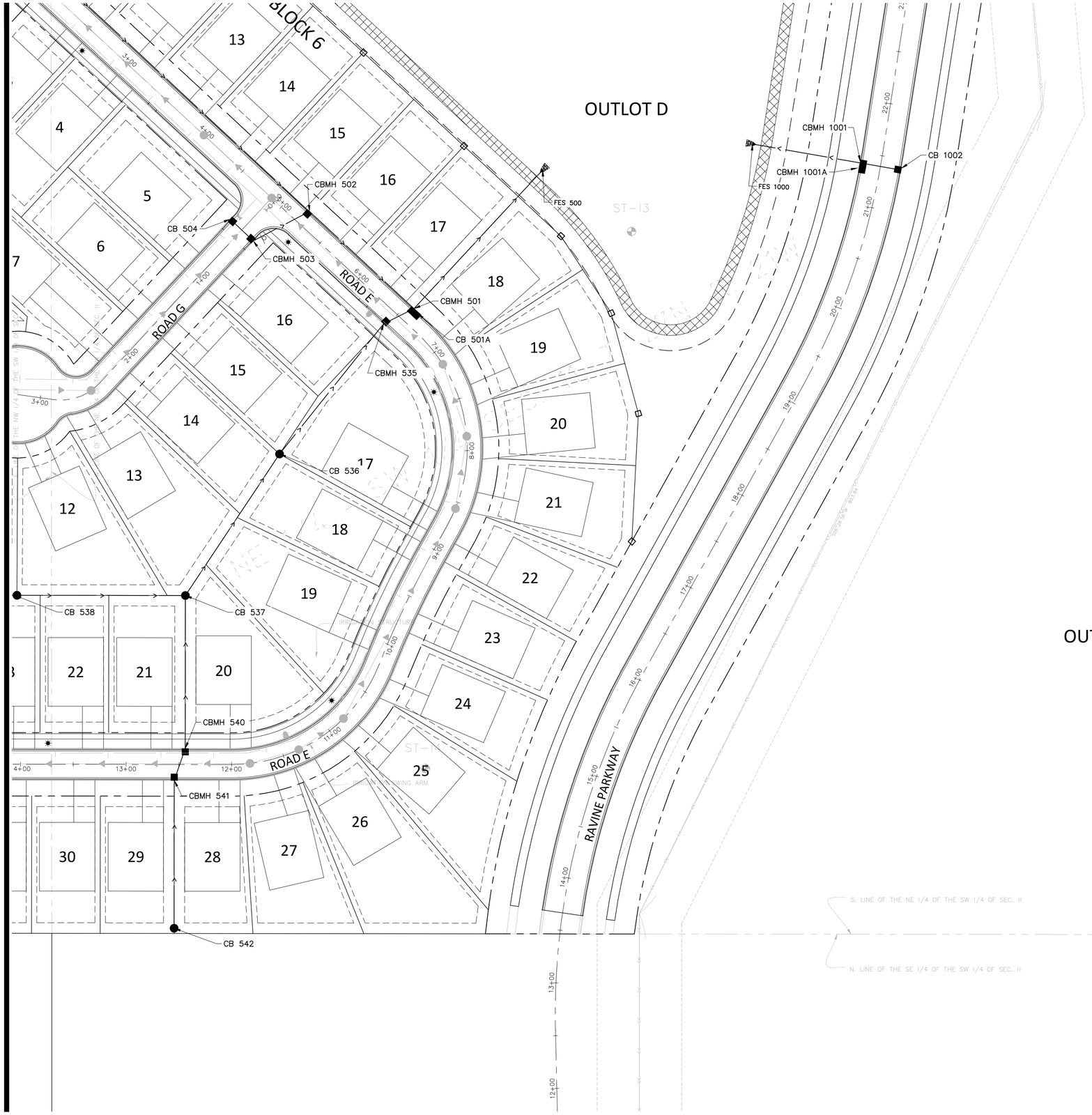

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

STORM SEWER PLAN - VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

67

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STORM SEWER SCHEDULES:

MH/CB		P. DIA.	P. SLOPE	PIPE	PIPE	FROM	TO	RIM	STR.	CAST	BUILD
FROM	TO	[IN]	[FT/FT]	MAT'L	LENGTH [FT]	INVERT	INVERT	ELEV.	TYPE	TYPE	[FT]
CB 106	CBMH 105	12	0.0048	PP	174.75	909.44	908.60	913.64	27"	R-4342	4.20
CBMH 105	CBMH 104	12	0.0180	PP	117.34	908.60	906.49	915.68	48"	R-3501TB	7.08
CBMH 104	CBMH 102	12	0.0571	PP	107.87	906.49	900.33	910.69	48"	R-3501TB	4.20
CBMH 102	CBMH 101	15	0.0172	PP	39.33	900.08	899.40	904.54	48"	R-3067VB	4.46
CBMH 101	FES 100	21	0.0082	RCP	161.99	897.32	896.00	904.54	48"	R-3067VB	7.22
OCS 203	CBMH 202	36	0.0015	RCP	104.33	897.00	896.85	906.00	60"	GRATE	9.00
CBMH 202	CBMH 201	36	0.0015	PP	39.33	896.85	896.79	904.53	60"	R-3067VB	7.68
CBMH 201	FES 200	36	0.0040	RCP	148.18	896.59	896.00	904.53	60"	R-3067VB	7.94
CB 363	CBMH 362	12	0.0126	PP	55.87	920.04	919.34	924.24	2'x3'	R-3501TB	4.20
CBMH 362	MH 361	12	0.0118	PP	70.37	919.34	918.51	923.54	48"	R-3501TB	4.20
MH 361	MH 360	12	0.0148	PP	115.61	918.51	916.80	922.71	48"	R-1642	4.20
CB 360B	CBMH 360A	12	0.0448	PP	19.53	917.17	916.30	920.37	27"	R-4342	3.20
CBMH 360A	MH 360	12	0.0060	PP	38.03	912.10	911.87	920.50	48"	R-3067VB	8.40
MH 360	CBMH 359	12	0.0250	PP	24.38	911.87	911.26	921.00	48"	R-1642	9.13
CB 359B	CBMH 359A	12	0.0044	PP	78.76	915.10	914.75	919.30	2'x3'	R-3067VB	4.20
CBMH 359A	CBMH 359	12	0.0044	PP	27.42	914.75	914.63	920.76	48"	R-3067VB	6.01
CBMH 359	MH 355	18	0.0051	PP	127.10	910.76	910.11	921.11	48"	R-3067VB	10.35
CB 357	CBMH 356	12	0.0044	PP	31.41	917.93	917.79	922.13	2'x3'	R-3067V	4.20
CBMH 356	MH 355	12	0.0150	PP	55.51	917.79	916.96	922.26	48"	R-3067V	4.47
MH 355	CBMH 352	21	0.0053	PP	146.94	909.86	909.08	922.00	48"	R-1642	12.14
CB 354	CBMH 353	12	0.0265	PP	42.82	916.85	915.72	920.05	27"	R-4342	3.20
CBMH 353	CBMH 352	12	0.0044	PP	30.12	915.72	915.58	919.92	48"	R-3501TB	4.20
CBMH 352	CBMH 349	21	0.0083	PP	169.72	909.08	907.67	919.92	48"	R-3501TB	10.84
CB 351	CBMH 350	12	0.0080	PP	120.12	914.63	913.67	917.83	27"	R-4342	3.20
CBMH 350	CBMH 349	12	0.0200	PP	30.21	913.67	913.06	920.93	48"	R-3501TB	7.26
CBMH 349A	CBMH 349	27	0.0039	PP	141.77	907.17	906.61	920.88	48"	R-3501TB	13.71
CBMH 349	MH 337	27	0.0040	PP	150.52	906.61	906.01	922.04	48"	R-3501TB	15.43
CB 348	CBMH 347	12	0.0044	PP	29.55	926.71	926.58	930.91	2'x3'	R-3067V	4.20
CBMH 347	MH 346	12	0.0044	PP	38.21	926.58	926.41	930.98	48"	R-3067V	4.40
MH 346	CBMH 344	12	0.0147	PP	298.66	926.41	922.02	930.81	48"	R-1642	4.40
CB 345	CBMH 344	12	0.0044	PP	25.41	921.97	921.86	926.17	2'x3'	R-3501TB	4.20
CBMH 344	CBMH 341	12	0.0095	PP	159.95	921.86	920.34	926.25	48"	R-3501TB	4.39
CB 343	CBMH 342	12	0.0222	PP	132.97	918.68	915.73	921.88	27"	R-4342	3.20
CBMH 342	CBMH 341	12	0.0222	PP	125.20	915.73	912.95	919.93	48"	R-4342	4.20
CBMH 341	CBMH 340	18	0.0070	PP	76.97	912.45	911.91	924.58	48"	R-3501TB	12.13
CB 340A	CBMH 340	12	0.0052	PP	42.80	919.84	919.62	924.04	2'x3'	R-3067VB	4.20
CBMH 340	CBMH 339A	18	0.0090	PP	60.61	911.91	911.36	923.82	48"	R-3501TB	11.91
CBMH 339A	CBMH 338	21	0.0042	PP	109.22	911.11	910.66	923.21	48"	R-3501TB	12.10
CB 339	CBMH 338	12	0.0044	PP	24.00	917.71	917.60	921.91	2'x3'	R-3067V	4.20
CBMH 338	MH 337	21	0.0052	PP	56.93	910.66	910.36	921.91	48"	R-3067VB	11.25
MH 337	CBMH 336	27	0.0096	PP	187.04	906.01	904.22	923.62	48"	R-1642	17.61
CB 336A	CBMH 336	12	0.0050	PP	102.09	914.06	913.55	917.26	27"	R-4342	3.20
CBMH 336	MH 324	30	0.0062	PP	178.16	903.97	902.86	923.43	60"	R-3501TB	19.46
CB 335	CBMH 334	12	0.0044	PP	160.19	924.69	923.99	927.89	27"	R-4342	3.20
CBMH 334	CBMH 333	12	0.0044	PP	33.75	923.99	923.84	928.71	48"	R-3501TB	4.72
STUB A	CBMH 333	12	0.0062	PP	37.98	924.50	924.26				
CBMH 333	CBMH 330	12	0.0060	PP	410.68	923.84	921.37	928.94	48"	R-3501TB	5.10
CB 332	CBMH 331	12	0.0044	PP	140.69	923.41	922.79	926.61	27"	R-4342	3.20
CBMH 331	CBMH 330	12	0.0110	PP	30.00	922.79	922.46	927.54	48"	R-3501TB	4.75
CBMH 330	CBMH 329	15	0.0130	PP	106.37	921.12	919.74	927.37	48"	R-3067V	6.25
CBMH 329	CBMH 327	15	0.0136	PP	218.70	919.74	916.77	925.44	48"	R-3067V	5.70
CB 328	CBMH 327	12	0.0057	PP	30.00	917.45	917.28	921.65	2'x3'	R-3501TB	4.20
CBMH 327	CBMH 325	15	0.0210	PP	143.84	916.77	913.74	921.48	48"	R-3067V	4.71
CB 326	CBMH 325	12	0.0044	PP	34.37	914.38	914.23	918.58	2'x3'	R-3067VB	4.20
CBMH 325	MH 324	15	0.0300	PP	55.80	913.74	912.07	918.88	48"	R-3067V	5.14
MH 324	CBMH 322	36	0.0041	PP	209.21	902.36	901.51	919.07	72"	R-1642	16.71
CB 323	CBMH 322	12	0.0044	PP	30.36	908.51	908.38	912.71	2'x3'	R-3501TB	4.20
CBMH 322	CBMH 320	36	0.0045	PP	139.26	901.51	900.89	912.83	60"	R-3501TB	11.32
CB 321	CBMH 320	12	0.0044	PP	33.75	905.31	905.16	909.51	2'x3'	R-3067VB	4.20
CBMH 320	CBMH 309	36	0.0048	PP	61.47	900.89	900.59	909.75	60"	R-3067V	8.86
CB 319A	CBMH 319	12	0.0207	PP	85.20	912.10	910.34	915.30	27"	R-4342	3.20
CBMH 319	CBMH 318	12	0.0065	PP	177.31	910.34	909.18	913.54	48"	R-4342	3.20
CBMH 318	CBMH 316	15	0.0035	PP	30.00	908.93	908.83	917.90	48"	R-3501TB	8.97
CBMH 316	CBMH 313	15	0.0062	PP	159.81	908.83	907.84	917.90	48"	R-3501TB	9.07
CB 315	CBMH 314	12	0.0044	PP	244.66	911.46	910.38	915.66	2'x3'	R-3067V	4.20
CBMH 314	CBMH 313	15	0.0038	PP	159.81	910.13	909.53	915.85	48"	R-3067VB	5.72
CBMH 313	CBMH 310	18	0.0083	PP	181.89	907.59	906.08	916.30	48"	R-3501TB	8.71
CB 312	CBMH 311	12	0.0055	PP	126.79	906.07	905.37	909.27	27"	R-4342	3.20
CBMH 311	CBMH 310	12	0.0070	PP	34.41	905.37	905.13	913.43	48"	R-3501TB	8.06
CBMH 310	CBMH 309	21	0.0070	PP	224.24	904.38	902.81	913.70	48"	R-3501TB	9.32
CBMH 309	CBMH 308	36	0.0078	PP	133.11	900.59	899.55	910.26	72"	R-3501TB	9.67
CB 308B	CB 308A	12	0.0200	PP	6.00	903.45	903.33	907.65	60"	R-3067V	4.20
CB 308A	CBMH 308	12	0.0080	PP	30.00	903.33	903.09	907.53	2'x3'	R-3067VB	4.20
CBMH 308	MH 305	36	0.0086	PP	68.92	899.55	898.96	907.54	48"	R-3067V	7.99
CB 307	MH 306	12	0.0055	PP	38.74	903.70	903.49	906.90	27"	R-4342	3.20
CBMH 306	MH 305	12	0.0070	PP	171.35	903.49	902.29	910.91	48"	R-3067V	7.42
CB 305B	CBMH 305A	12	0.0044	PP	30.00	903.28	903.15	907.48	2'x3'	R-3067VB	4.20
CBMH 305A	MH 305	12	0.0044	PP	45.72	903.15	902.95	907.47	48"	R-3067V	4.32
MH 305	CBMH 304	42	0.0042	PP	148.70	898.46	897.84	908.61	84"	R-1642	10.15
CBMH 304	FES 300	48	0.0024	RCP	121.07	897.29	897.00	905.69	72"	R-3067V	8.40

MH/CB		P. DIA.	P. SLOPE	PIPE	PIPE	FROM	TO	RIM	STR.	CAST	BUILD
FROM	TO	[IN]	[FT/FT]	MAT'L	LENGTH [FT]	INVERT	INVERT	ELEV.	TYPE	TYPE	[FT]
CB 455	CBMH 454	12	0.0100	PP	105.44	910.80	909.75	914.00	27"	R-4342	3.20
CBMH 454	CBMH 452	15	0.0100	PP	330.63	909.50	906.19	914.21	48"	R-3067V	4.71
CBMH 452	CBMH 452	12	0.0055	PP	41.35	907.54	907.31	911.74	2'x3'	R-3067VB	4.20
CBMH 452	CBMH 450	18	0.0075	PP	77.58	905.94	905.36	911.75	48"	R-3067VB	5.81
OCS 451	CBMH 450	18	0.0026	RCP	63.21	904.00	903.84	906.00	OCS	GRATE	2.00
CBMH 450	MH 417	36	0.0019	PP	317.76	903.34	902.74	912.10	60"	R-3067V	8.76
CB 449	CBMH 448	12	0.0169	PP	122.03	924.70	922.64	927.90	2'x3'	R-4342	3.20
CBMH 448	CBMH 447A	12	0.0503	PP	64.25	922.64	919.41	926.84	48"	R-3067V	4.20
CBMH 447A	CBMH 447	15	0.0033	PP	129.04	919.16	918.73	922.61	27"	R-4342	3.45
CBMH 447	CBMH 445	15	0.0033	PP	107.55	918.73	918.38	925.00	48"	R-3067VB	6.27
CB 446A	CBMH 446	12	0.0085	PP	6.00	920.62	920.57	924.82	2'x3'	R-3501TB	4.20
CBMH 446	CBMH 445	15	0.0062	PP	27.82	920.32	920.15	924.77	48"	R-3501TB	4.45
CBMH 445	MH 444	18	0.0045	PP	28.30	918.13	918.00	924.67	48"	R-3501TB	6.54
CB 444B	MH 444A	12	0.0044	PP	55.55	922.33	922.09	925.53	48"	R-4342	3.20
MH 444A	MH 444	12	0.0085	PP	123.17	922.09	921.04	927.40	48"	R-1642	5.31
MH 444	CBMH 442	18	0.0046	PP	159.79	918.00	917.26	925.24	48"	R-1642	7.24
CB 443	CBMH 442	12	0.0050	PP	28.06	919.21	919.07	923.41	2'x3'	R-3501TB	4.20
CBMH 442	CBMH 440	18	0.0108	PP	235.41	917.26	914.71	923.39	48"	R-3501TB	6.13
CB 441	CBMH 440	12	0.0050	PP	30.91	916.77	916.62	920.97	2'x3'	R-3501TB	4.20
CBMH 440	CBMH 438	21	0.0074	PP	308.59	914.46	912.19	920.82	48"	R-3501TB	6.36
CB 439	CBMH 438	12	0.0059	PP	32.56	913.46	913.27	917.66	2'x3'	R-3501TB	4.20
CBMH 438	CBMH 437A	21	0.0115	PP	302.67	912.19	908.71	917.47	48"	R-3501TB	5.28
CB 437C	CBMH 437B	12	0.0044	PP	27.04	908.97	908.85	913.17	2'x3'	R-3067V	4.20
CBMH 437B	CBMH 437A	12	0.0120	PP	28.04	908.85	908.51	914.34	27"	R-3501TB	5.49
CBMH 437A	MH 437	24	0.0091	PP	51.69	908.46	907.99	914.35	48"	R-3501TB	5.89
MH 437	CBMH 435	27	0.0048	PP	23.71	907.74	907.63	914.47	60"	R-1642	6.73
CB 436	CBMH 435	12	0.0044	PP	27.67	909.43	909.31	913.63	2'x3'	R-3501TB	4.20
CBMH 435	CBMH 433	27	0.0054	PP	137.71	907.63	906.89	913.70	48"	R-3501TB	6.07
CB 434	CBMH 433A	12	0.0065	PP	16.30	909.13	909.02	913.33	27"	R-4342	4.20
CBMH 433A	CBMH 433	12	0.0085	PP	48.47	909.02	908.61	913.70	48"	R-3067VB	4.68
CBMH 433	CBMH 432	27	0.0071	PP	145.77	906.89	905.86	914.42	48"	R-3501TB	7.53
CBMH 432	MH 427	27	0.0074	PP	45.45	905.86	905.52	915.17	48"	R-3501TB	9.31
CB 431	CBMH 430	12	0.0044	PP	28.02	912.64	912.52	916.84	2'x3'	R-3501TB	4.20
CBMH 430	CBMH 428	12	0.0105	PP	198.94	912.52	910.43	916.81	48"	R-3501TB	4.29
CB 429	CBMH 428	12	0.0044	PP	28.09	910.47	910.35	914.67	2'x3'	R-3501TB	4.20
MH 427	CBMH 428	12	0.0070	PP	41.11	910.10	909.81	914.64	48"	R-3501TB	4.54
MH 427	MH 420	30	0.0058	PP	140.90	905.27	904.46	915.60	60"	R-1642	10.33
CB 426	CBMH 425B	12	0.0044	PP	30.18	914.48	914.35	918.68	2'x3'	R-3501TB	4.20
CBMH 425B	CBMH 425	12	0.0105	PP	159.43	914.35	912.67	918.67	48"	R-3501TB	4.32
CB 425A	CBMH 425	12	0.0044	PP	30.01	912.69	912.56	916.89	2'x3'	R-3067V	4.20
CBMH 425	MH 420	15	0.0061	PP	47.95	912.31	912.02	916.88	48"	R-3067VB	4.57
CB 424	CBMH 423	12	0.0055	PP	127.58	912.92	912.22	916.12	27"	R-4342	3.20
CBMH 423	CBMH 422	12	0.0065	PP	106.36	912.22	911.53	915.43	48"	R-4342	3.21
CBMH 422	CBMH 421	15	0.0040	PP	33.52	911.28	911.14	917.02	48"	R-3501TB	5.74
CB 421B	CBMH 421A	12	0.0044	PP	42.36	915.75	915.56	919.95	2'x3'	R-3067VB	4.20
CBMH 421A	CBMH 421	12	0.0106	PP	235.97	915.56	913.06	920.11	48"	R-3501TB	4.55
CBMH 421	MH 420	15	0.0114	PP	144.02	911.14	909.50	917.28	48"	R-3501TB	6.14
MH 420	CBMH 418	36	0.0046	PP	107.12	903.96	903.47	916.47	72"	R-1642	12.51
CB 419	CBMH 418	12	0.0044	PP	29.38	909.94	909.81	914.14	2'x3'	R-3067V	4.20
CBMH 418	MH 417	36	0.0048	PP	78.92	903.47	903.09	914.10	60"	R-3067V	10.63
MH 417	CBMH 413	48	0.0026	PP	159.10	901.59	901.18	915.73	96"	R-1642	14.14
CB 416	CBMH 413	12	0.0044	PP	231.85	906.12	905.10	909.32	27"	R-4342	3.20
CB 414	CBMH 413	12	0.0055	PP	41.33	910.10	909.87	914.30	2'x3'	R-3067VB	4.20
CBMH 413	MH 412	48	0.0029	PP	246.09	901.18	900.47	914.30	72"	R-3067VB	13.12
MH 412	CBMH 410	48	0.0028	PP	274.93	900.47	899.70	917.18	72"	R-1642	16.71
CB 411	CBMH 410	12	0.0044	PP	41.33	909.95	909.77	914.15	2'x3'	R-3067V	4.20
CBMH 410	MH 409	54	0.0015	PP	36.83	899.65	899.60	914.15	84"	R-3067V	14.50
MH 409	MH 408	54	0.0015	PP	191.56	899.60	899.31	912.20	96"	R-4342	12.60
MH 408	CBMH 406	54	0.0015	PP	154.83	899.31	899.08	914.46	84"	R-1642	15.15
CB 407	CBMH 406	12	0.0044	PP	30.00	906.72	906.59	910.92	2'x3'	R-3067V	4.20
CBMH 406	MH 403	54	0.0015	PP	49.63	899.08	899.01	911.18	84"	R-3067V	12.10
CB 405	CBMH 404	12	0.0044	PP	30.00	904.78	904.65	908.98	2'x3'	R-3501TB	4.20
CBMH 404	MH 403	12	0.0044	PP	298.05	904.65	903.34	909.00	48"	R-3501TB	4.35
MH 403	CBMH 402	54	0.0015	PP	103.16	899.01	898.85	911.39	84"	R-1642	12.38
CBMH 402	MH 401	54	0.0015	PP	157.81	898.85	898.62	910.22	144"	R-3067V	11.37
MH 401	FES 400	54	0.0018	RCP	96.71	898.17	898.00	905.80	84"	R-4342	7.63

MH/CB		P. DIA.	P. SLOPE	PIPE	PIPE	FROM	TO	RIM	STR.	CAST	BUILD
FROM	TO	[IN]	[FT/FT]	MAT'L	LENGTH [FT]	INVERT	INVERT	ELEV.	TYPE	TYPE	[FT]
CB 542	CBMH 541	12	0.0044	PP	140.07	914.03	913.41	917.23	27"	R-4342	3.20
CBMH 541	CBMH 540	12	0.0044	PP	31.76	913.41	913.27	921.63	48"	R-3501TB	8.22
CBMH 540	CBMH 537	12	0.0419	PP	145.00	913.27	907.20	921.74	48"	R-3501TB	8.47
CB 539	CBMH 538	12	0.0044	PP	232.94	905.47	904.45	908.67	27"	R-4342	3.20
CBMH 538	CBMH 537	15	0.0033	PP	159.56	904.20	903.67	909.88	48"	R-4342	5.68
CBMH 537	CBMH 536	15	0.0100	PP	160.87	903.67	902.06	910.40	48"	R-4342	6.73
CBMH 536	CBMH 535	18	0.0051	PP	157.93	901.81	901.00	910.92	48"	R-4342	9.11
CBMH 535	CBMH 501	18	0.0073	PP	32.01	901.00	900.77	915.22	48"	R-3501TB	14.22
CB 534	CBMH 533	12	0.0044	PP	29.33	915.08	914.95	919.28	2'x3'	R-3067V	4.20
CBMH 533	MH 532	12	0.0073	PP	46.01	914.95	914.62	919.30	48"	R-3067V	4.35
MH 532	CBMH 528	12	0.0109	PP	164.62	914.62	912.82	919.54	48"	R-1642	4.92
CB 531	CB 530	12	0.0044	PP	195.11	912.14	911.28	915.34	27"	R-4342	3.20
CB 530	CBMH 528	12	0.0044	PP	93.49	911.28	910.87	916.01	48"	R-4342	4.73
CB 529A	CBMH 529	12	0.0044	PP	124.94	912.45	911.90	915.65	27"	R-4342	3.20
CBMH 529	CBMH 528	12	0.0044	PP	124.67	911.90	911.35	915.30	48"	R-4342	3.40
CBMH 528	MH 521	18	0.0039	PP	147.21	910.37	909.80	917.05	48"	R-3067V	6.68
CB 527	CBMH 526	12	0.0044	PP	175.61	913.71	912.94	916.91	48"	R-4342	3.20
CBMH 526	CBMH 524	12	0.0044	PP	70.00	912.94	912.63	919.13	48"	R-3501TB	6.19
CB 525A	CBMH 525	12	0.0220	PP	150.34	910.76	907.45	913.96	27"	R-4342	3.20
CBMH 525	CBMH 524	12	0.0095	PP	175.00	907.45	905.79	910.66	48"	R-4342	3.21
CBMH 524	CBMH 523B	18	0.0038	PP	183.96	905.29	904.59	918.14	48"	R-3501TB	12.85
CBMH 523B	CBMH 523	18	0.0048	PP	74.15	904.59	904.24	915.99	48"	R-3067V	11.40
CB 523A	CBMH 523	12	0.0064	PP	30.07	911.22	911.03	915.42	2'x3'	R-3501TB	4.20
MH 521	CBMH 523	21	0.0037	PP	52.19	903.99	903.80	915.23	48"	R-3067VB	11.24
CB 522B	CBMH 522A	12	0.0044	PP	31.03	914.04	913.90	918.24	2'x3'	R-3501TB	4.20
CBMH 522A	CBMH 522	12	0.0120	PP	261.33	913.90	910.77	918.16	48"	R-3501TB	4.26
CBMH 522	MH 521	15	0.0057	PP	30.08	910.52	910.35	915.24	48"	R-3067V	4.72
MH 521	CBMH 520	27	0.0042	PP	54.59	903.30	903.07	916.17	60"	R-1642	12.87
CBMH 520	CBMH 519	30	0.0026	PP	96.10	902.82	902.57	915.51	60"	R-3067V	12.69
CB 519A	CBMH 519	12	0.0044	PP	32.44	910.59	910.45	914.79	2'x3'	R-3501TB	4.20
CBMH 519	CBMH 514	30	0.0028	PP	346.54	902.57	901.60	914.88	60"	R-3501TB	12.31
CB 517	CBMH 514	12	0.0044	PP	145.00	904.90	904.26	908.10	27"	R-4342	3.20
CB 516	CBMH 515	12	0.0051	PP	135.00	905.10	904.41	908.30	27"	R-4342	3.20
CBMH 515	CBMH 514	12	0.0160	PP	32.75	904.41	903.89	911.98	48"	R-3501TB	7.57
CBMH 514	CBMH 513	36	0.0016	PP	278.14	901.10	900.66	912.08	60"	R-3501TB	10.98
CB 513A	CBMH 513	12	0.0057	PP	30.00	905.66	905.49	909.86	2'x3'	R-3501TB	4.20
CBMH 513	CBMH 512	36	0.0018	PP	137.92	900.66	900.41	909.69	60"	R-3067V	9.03
CBMH 512	MH 508	36	0.0018	PP	58.99	900.41	900.31	908.55	60"	R-3067V	8.14
CB 511	CBMH 510	12	0.0062	PP	160.37	902.37	901.38	905.57	27"	R-4342	3.20
CBMH 510	MH 508	15	0.0063	PP	31.22	901.13	900.93	908.65	48"	R-3501TB	7.52
CBMH 508	CBMH 505	36	0.0023	PP	184.90	900.31	899.88	908.86	96"	R-1642	8.55
CB 507	CBMH 506	12	0.0056	PP	140.00	901.28	900.50	904.48	27"	R-4342	3.20
CBMH 506	CBMH 505	15	0.0054	PP	30.00	900.25	900.08	906.43	48"	R-3501TB	6.18
CBMH 505	CBMH 502	42	0.0014	PP	328.75	899.38	898.92	906.43	72"	R-3501TB	7.05
CB 504	CBMH 503	12	0.0044	PP	30.00	907.46	907.33	911.66	2'x3'	R-3067V	4.20
CBMH 503	CBMH 502	15	0.0060	PP	59.95	907.08	906.72	911.79	48"	R-3067VB	4.71
CBMH 502	CBMH 501	42	0.0017	PP	135.00	898.92	898.69	912.74	72"	R-3501TB	13.82
CB 501A	CBMH 501	12	0.0200	PP	6.00	911.36	911.24	915.56	2'x3'	R-3501TB	4.20
CBMH 501	FES 500	42	0.0030	RCP	179.00	898.53	898.00	915.44	96"	R-3501TB	16.91
CB 609	CBMH 608	12	0.0044	PP	90.2579	911.8	911.4029	915	27"	R-4342	3.2
CBMH 608	CBMH 607	12	0.0047	PP	69.95	911.40	911.08	915.96	48"	R-3501TB	4.56
CBMH 607	CBMH 606	12	0.0116	PP	117.52	911.08	909.71	915.28	48"	R-3501TB	4.20
CBMH 606	CBMH 602	12	0.0070	PP	218.35	909.71	908.19	914.16	48"	R-3501TB	4.45
CBMH 604	CBMH 602	12	0.0044	PP	30.10	908.59	908.46	912.79	2'x3'	R-3501TB	4.20
CBMH 605	CBMH 602	15	0.0033	PP	249.31	908.21	907.38	912.87	48"	R-3501TB	4.66
CB 603	CBMH 602	15	0.0033	PP	145.00	908.06	907.58	911.51	27"	R-4342	3.45
CBMH 602	CBMH 601A	24	0.0017	PP	12.82	906.63	906.61	912.39	48"	R-3501TB	5.76
CBMH 601A	MH 601	27	0.0017	PP	145.00	906.36	906.12	912.38	48"	R-3501TB	6.02
MH 601	FES 600	27	0.0017	RCP	32.13	906.06	906.00	912.00	48"	R-4342	5.94
CB 709	CBMH 708	12	0.0088	PP	31.12	915.83	915.56	920.03	2'x3'	R-3501TB	4.20
CBMH 708	CBMH 706	12	0.0127	PP	285.03	915.56	911.94	919.76	48"	R-3067V	4.20
CB 707	CBMH 706	12	0.0097	PP	43.72	912.37	911.95	916.57	2'x3'	R-3501TB	4.20
CBMH 706	MH 703	15	0.0089	PP	221.53	911.69	909.71	916.15	48"	R-3501TB	4.46
FES 705	CBMH 704	12	0.0350	PP	115.49	914.09	910.05	914.09	FES		
CBMH 704	MH 703	15	0.0096	PP	165.88	909.80	908.21	913.25	48"	R-4342	3.45
MH 703	CBMH 701	21	0.0056	PP	62.78	907.71	907.35	914.25	48"	R-1642	6.54
CB 702	CBMH 701	12	0.0044	PP	6.00	909.32	909.29	913.52	2'x3'	R-3501TB	4.20
CBMH 701	FES 700	24	0.0059	RCP	175.73	907.03	906.00	913.50	48"	R-3501TB	6.47
CB 802	CBMH 801	12	0.0065	PP	39.32	900.36	900.10	904.56	2'x3'	R-3067VB	4.20
CBMH 801	FES 800	12	0.0175	RCP	152.05	898.66	896.00



LEGEND:

- EXISTING TREE TO REMAIN (1324)
- EXISTING TREE TO BE REMOVED (1324)
- TREE REMOVAL LIMITS/FENCE

TREE PRESERVATION REQUIREMENTS:

QUALIFYING TREE: A HEALTHY TREE MEETING ONE (1) OF THE FOLLOWING DEFINITIONS: A HARDWOOD DECIDUOUS TREE AT LEAST SIX INCHES (6") DBH, A SOFTWOOD DECIDUOUS TREE AT LEAST EIGHT INCHES (8") DBH, OR A CONIFEROUS TREE AT LEAST TEN FEET (10') IN HEIGHT, BUT NO TREES CONSISTING OF THE FOLLOWING SPECIES: ANY TREE ON THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES INVASIVE SPECIES LIST, ASH, OR ELM.

CONIFEROUS TREE: A WOOD PLANT WHICH, AT MATURITY, IS AT LEAST TWELVE FEET (12') OR MORE IN HEIGHT, AND WHICH RETAINS ITS GREEN COLOR YEAR–ROUND AND DOES NOT DROP ITS FRONDS OR NEEDLES IN THE WINTER.

HARDWOOD DECIDUOUS TREE: A TREE OF ONE (1) OF THE FOLLOWING SPECIES: IRONWOOD, OAK, MAPLE (HARD), WALNUT, HICKORY, BIRCH, BLACK CHERRY, HACKBERRY, OR LOCUST.

SOFTWOOD DECIDUOUS TREE: A TREE OF ONE (1) OF THE FOLLOWING SPECIES: COTTONWOOD, POPLAR, ASPEN, SILVER MAPLE, BASSWOOD, OR WILLOW.

PERMITTED REMOVAL:

Land Use	Permitted removal threshold (percent of existing qualifying inches)
Residential <10 units/acre	25%
Residential >10 units/acre, Business/Commercial	40%

QUALIFYING TREE INCHES REMOVED BEYOND THE PERMITTED THRESHOLDS SHALL BE REPLACED AT A RATE OF FIFTY PERCENT (50%), EQUALING ONE (1) REPLACEMENT CALIPER INCH FOR TWO (2) REMOVED DIAMETER INCHES.

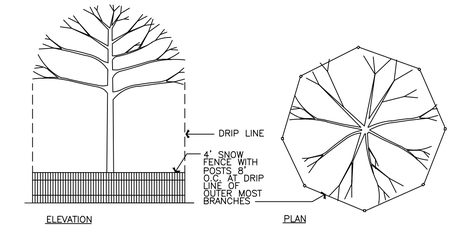
LANDSCAPING CREDIT. REPLACEMENT TREES PLANTED IN ACCORDANCE WITH A TREE PRESERVATION PLAN AND RELATED MITIGATION SHALL BE CREDITED AGAINST CITY LANDSCAPING REQUIREMENTS.

TREE INVENTORY & REMOVAL CALCULATION

Total Significant Inches				
3,907				
Inches in >10 Units/ac	**Permitted Removal (40%)**	**Significant Inches Removed**	**Removal Beyond Allowed**	**Replacement at Required Rate (50%)**
1,564	626	1,564	938	469
Inches in <10 Units/ac	**Permitted Removal (25%)**	**Significant Inches Removed**	**Removal Beyond Allowed**	**Replacement at Required Rate (50%)**
2,343	586	1,851	1,265	633
				Total Replacement Required
				1,102

TREE PRESERVATION NOTES:

1. BEFORE ANY CONSTRUCTION OR GRADING OF DEVELOPMENT PROJECT IS TO OCCUR, A TREE PROTECTION FENCE SHALL BE INSTALLED PER THE TREE REMOVAL LINE. THIS FENCE MUST REMAIN IN PLACE UNTIL ALL GRADING AND CONSTRUCTION ACTIVITY IS TERMINATED.
2. NO ENCROACHMENT, LAND DISTURBANCE, GRADE CHANGE, TRENCHING, FILLING, COMPACTION OF CHANGE IN SOIL CHEMISTRY SHALL OCCUR WITHIN FENCED AREAS PROTECTING SIGNIFICANT TREES.
3. CONTRACTOR TO PREVENT THE CHANGE IN SOIL CHEMISTRY DUE TO CONCRETE WASHOUT AND LEAKAGE OR SPILLAGE OF TOXIC MATERIALS, SUCH AS FUELS OR PAINTS.
4. ONLY TREES DEFINED AS "QUALIFYING" PER CITY CODE WERE INCLUDED IN THE EXISTING TREE INVENTORY.
5. NO TREES SHALL BE REMOVED UNTIL THIS TREE PRESERVATION PLAN IS APPROVED BY THE CITY OF COTTAGE GROVE.
6. TREES OUTSIDE OF THE DEVELOPMENT BOUNDARY ARE NOT SHOWN OR LISTED IN INVENTORY.
7. TREES WITHIN KEATS AVE. RIGHT–OF–WAY DEDICATION ARE EXEMPTED FROM CALCULATIONS.



NOTE: TREE PROTECTION SHALL BE PROVIDED BY CONTRACTOR AS REQUIRED TO ENSURE SURVIVABILITY OF EXISTING TREES TO REMAIN. NO HEAVY EQUIPMENT SHALL BE STORED WITHIN THE TREE DRIP LINE AS DESIGNATED ABOVE.

TREE PROTECTION FENCE
NOT TO SCALE

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www.alliant-inc.com

TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
TREE PRESERVATION PLAN - OVERVIEW

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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 Landscape Architect under the laws of the State of MINNESOTA

PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

John Gronhovd — 59233
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

69

Sheet 69 of 91

File Location: X:\4000570-000\01\40 Design\00 Sheets - Preliminary\TREE - PRES.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:21 PM



DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Landscape Architect under the laws of the State of Minnesota.

Signature

Joni Giesfeldt

Date

License no. 59233

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT TEAM DATA

Designed By:

Drafted By:

Project No.: 40305763-00

QA/QC CHECK

By

Date

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

TREE PRESERVATION PLAN - VIEW A

TC LD TWIN CITIES LAND DEVELOPMENT

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Sheet 70 of 91

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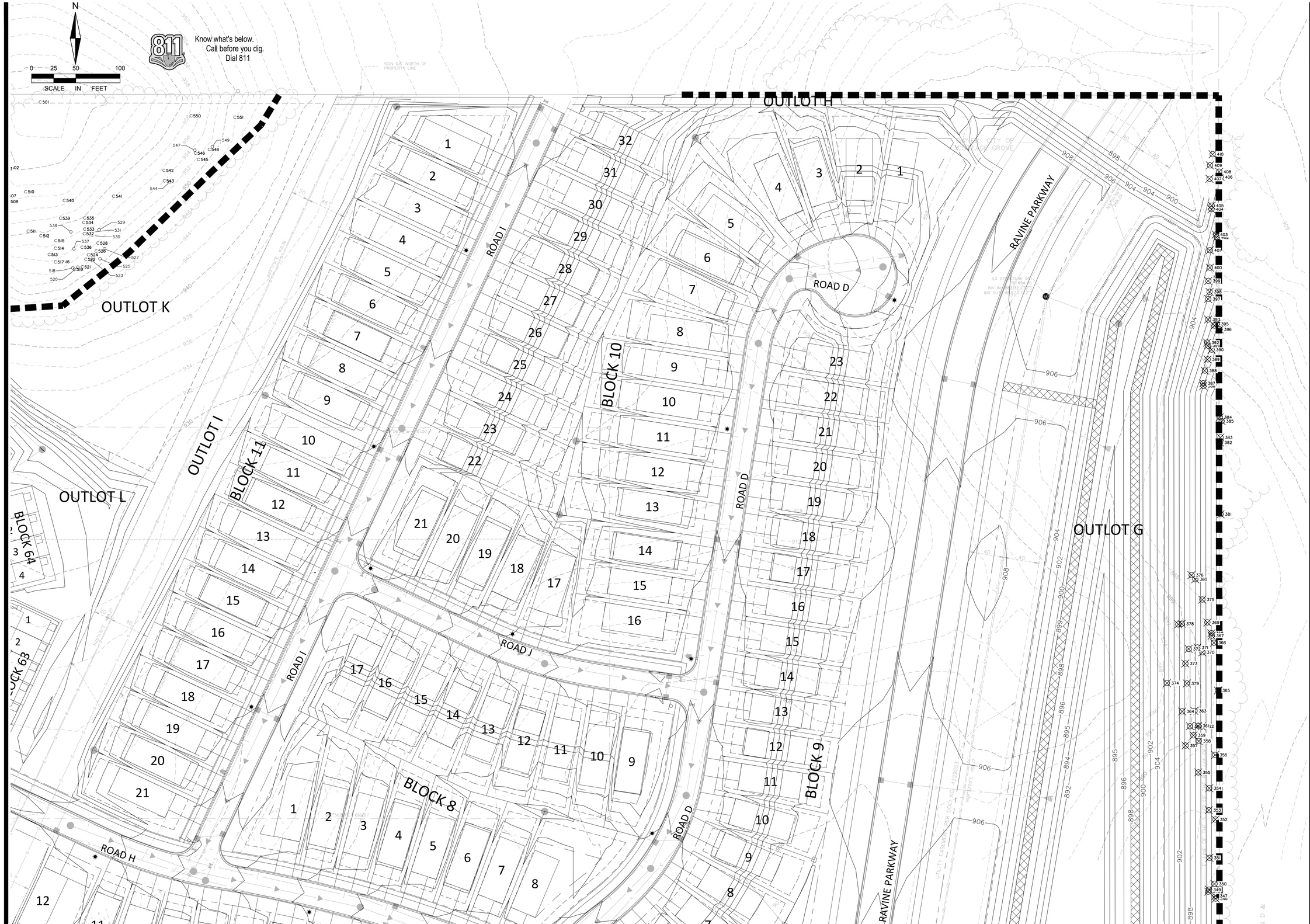

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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
TREE PRESERVATION PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

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PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

John Glorhood
Date 59233 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

TREE PRESERVATION PLAN - VIEW C

DESCRIPTION	DATE
City Submittal	2025-12-31

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PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

72

Sheet 72 of 91

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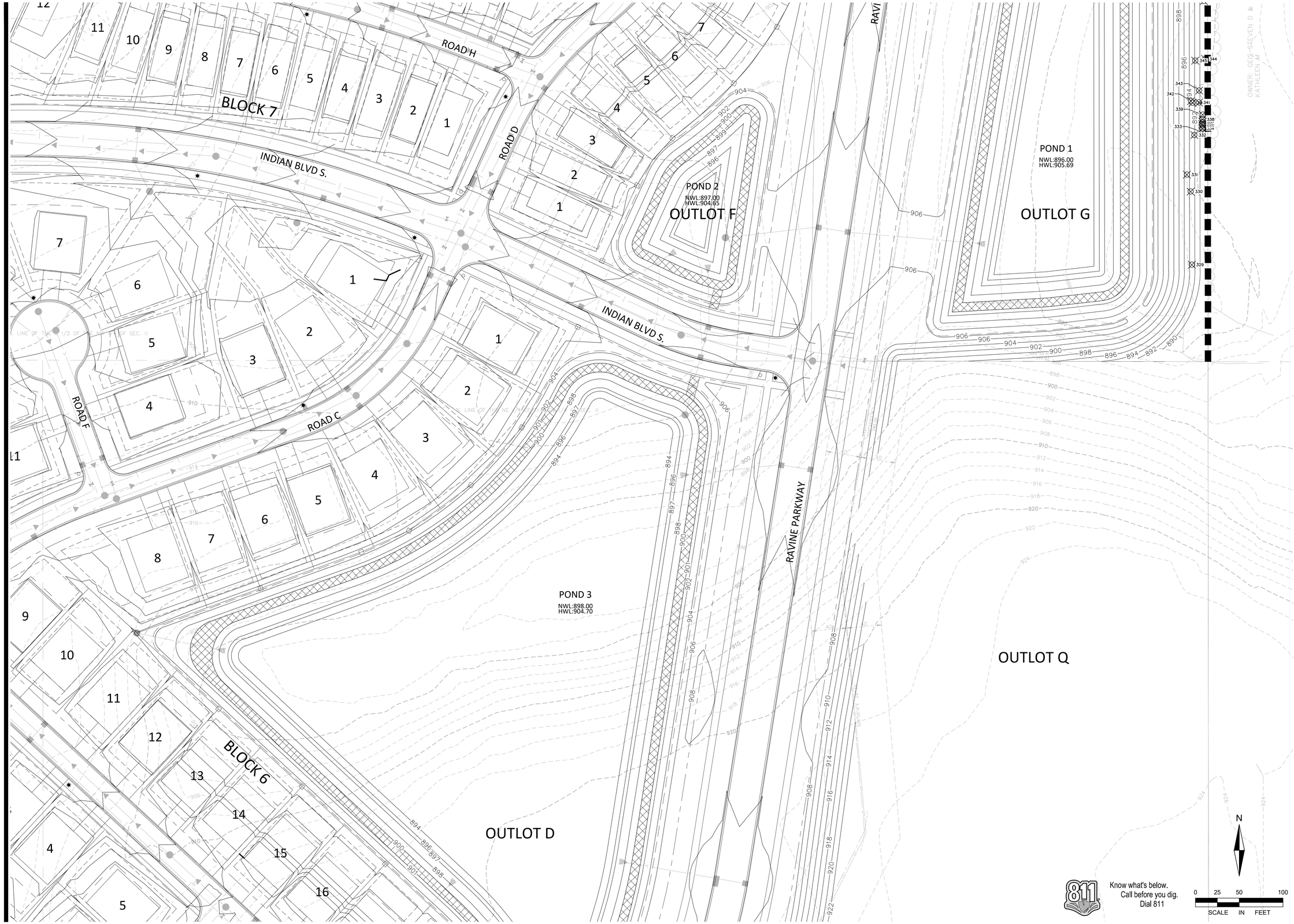

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

TREE PRESERVATION PLAN - VIEW D

DATE	DESCRIPTION
2025-12-31	City Submittal

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John Gronhovd
Date 59233 License no.

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By Date

PROJECT TEAM DATA

Designed By:

Drafted By:

Project No.: 4000570-00

73

Sheet 73 of 91

File Location: X:\4000570-00\001\40 Design\00 Sheets - Preliminary\TREE - PRES.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:21:43 PM



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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

TREE PRESERVATION PLAN - VIEW E

DESCRIPTION	DATE
City Submittal	2026-12-31

CERTIFICATION

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By — Date

PROJECT TEAM DATA

Designed By:

Drafted By;

Project No.: 4000570-00

74

Sheet 74 of 91

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0 25 50 100
SCALE IN FEET

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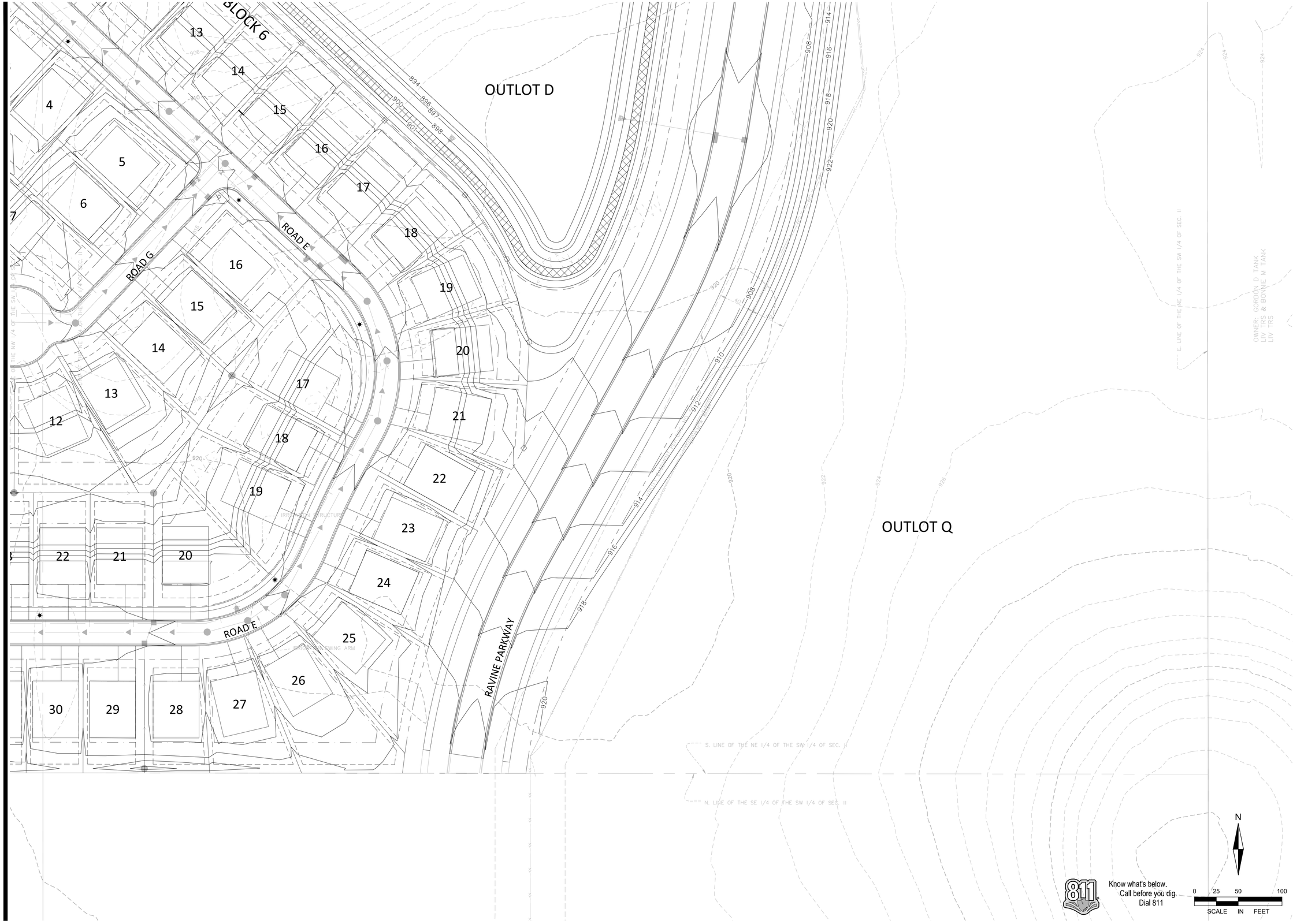

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

TREE PRESERVATION PLAN - VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

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Date

59233
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By Date

PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

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File Location: X:\4000570-00\01\40 Design\03 Sheets - Preliminary\TREE - PRES.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:53 PM

TAG	DBH	NAME_COMMON	STATUS	REMOVE	LOCATION
8	8	Boxelder	SIGNIFICANT	X	10+
20	20	Norway Maple	SIGNIFICANT	X	10+
201	24	Eastern Red Cedar	EXEMPT	X	
202	24	Boxelder	EXEMPT	X	
203	20	Boxelder	EXEMPT	X	
204	14	Boxelder	EXEMPT	X	
205	12	Red Pine	EXEMPT	X	
206	14	Boxelder	EXEMPT	X	
207	16	Boxelder	EXEMPT	X	
208	9	Boxelder	EXEMPT	X	
209	16	Boxelder	EXEMPT	X	
210	16	Boxelder	EXEMPT	X	
211	10	Boxelder	EXEMPT	X	
212	31	Silver Maple	EXEMPT	X	
213	13	Black Cherry	SIGNIFICANT	X	10+
214	24	Boxelder	SIGNIFICANT	X	10+
215	10	Colorado Blue Spruce	SIGNIFICANT	X	10+
216	12	Colorado Blue Spruce	SIGNIFICANT	X	10+
217	18	Flowering Crab	SIGNIFICANT	X	10+
218	11	White Spruce	SIGNIFICANT	X	10+
219	22	Boxelder	SIGNIFICANT	X	10+
220	16	Boxelder	SIGNIFICANT	X	10+
221	11	Boxelder	SIGNIFICANT	X	10+
222	13	Boxelder	SIGNIFICANT	X	10+
223	12	Boxelder	SIGNIFICANT	X	10+
224	7	Black Cherry	SIGNIFICANT	X	10+
225	8	Hackberry	SIGNIFICANT	X	10+
226	18	Sugar Maple	SIGNIFICANT	X	10+
227	24	Boxelder	SIGNIFICANT	X	10+
228	13	Boxelder	SIGNIFICANT	X	10+
229	21	Sugar Maple	SIGNIFICANT	X	10+
230	18	Colorado Blue Spruce	SIGNIFICANT	X	10+
231	23	Northern Red Oak	SIGNIFICANT	X	10+
232	19	Norway Maple	SIGNIFICANT	X	10+
233	14	Colorado Blue Spruce	SIGNIFICANT	X	10+
234	15	Colorado Blue Spruce	SIGNIFICANT	X	10+
235	6	Balsam Fir	SIGNIFICANT	X	10+
236	8	Balsam Fir	SIGNIFICANT	X	10+
237	6	Balsam Fir	SIGNIFICANT	X	10+
238	13	Basswood	SIGNIFICANT	X	10+
239	14	Sugar Maple	SIGNIFICANT	X	10+
240	16	Boxelder	SIGNIFICANT	X	10+
241	11	Boxelder	SIGNIFICANT	X	10+
242	14	Boxelder	SIGNIFICANT	X	10+
243	15	Boxelder	SIGNIFICANT	X	10+
244	8	Boxelder	SIGNIFICANT	X	10+
245	12	Boxelder	SIGNIFICANT	X	10+
246	10	Boxelder	SIGNIFICANT	X	10+
247	15	Boxelder	SIGNIFICANT	X	10+
248	24	Scotch Pine	SIGNIFICANT	X	10+
249	8	Boxelder	SIGNIFICANT	X	10+
250	21	Boxelder	SIGNIFICANT	X	10+
251	16	Boxelder	SIGNIFICANT	X	10+
252	27	Boxelder	SIGNIFICANT	X	10+
253	8	Boxelder	SIGNIFICANT	X	10+
254	15	Colorado Blue Spruce	SIGNIFICANT	X	10+
255	15	Colorado Blue Spruce	SIGNIFICANT	X	10+
256	10	Colorado Blue Spruce	SIGNIFICANT	X	10+
257	23	Colorado Blue Spruce	SIGNIFICANT	X	10+
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263	8	Boxelder	SIGNIFICANT	X	10+
264	9	Boxelder	SIGNIFICANT	X	10+
265	19	White Spruce	SIGNIFICANT	X	10+
266	16	White Spruce	SIGNIFICANT	X	10+
267	17	Boxelder	SIGNIFICANT	X	10+
268	24	Boxelder	SIGNIFICANT	X	10+
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274	9	Boxelder	SIGNIFICANT	X	10+
275	16	Boxelder	SIGNIFICANT	X	10+
276	35	Boxelder	SIGNIFICANT	X	10+
277	17	Boxelder	SIGNIFICANT	X	10+
278	12	Boxelder	SIGNIFICANT	X	10+
279	18	Boxelder	SIGNIFICANT	X	10+
280	12	Boxelder	SIGNIFICANT	X	10+
281	12	Boxelder	SIGNIFICANT	X	10+
282	26	Boxelder	SIGNIFICANT	X	10+
283	24	Boxelder	SIGNIFICANT	X	10+
284	21	Boxelder	SIGNIFICANT	X	10+
285	12	Boxelder	SIGNIFICANT	X	10+
286	5	White Spruce	SIGNIFICANT	X	10+
287	15	White Spruce	SIGNIFICANT	X	10+
288	36	Silver Maple	SIGNIFICANT	X	10+

TAG	DBH	NAME_COMMON	STATUS	REMOVE	LOCATION
289	22	Silver Maple	SIGNIFICANT	X	10+
290	22	Silver Maple	SIGNIFICANT	X	10+
291	26	Silver Maple	SIGNIFICANT	X	10+
292	12	Boxelder	EXEMPT	X	
293	16	Hackberry	EXEMPT	X	
294	31	Basswood	EXEMPT	X	
295	48	Basswood	EXEMPT	X	
296	19	Basswood	EXEMPT	X	
297	21	Silver Maple	EXEMPT	X	
298	13	Black Cherry	EXEMPT	X	
299	17	Hackberry	EXEMPT	X	
300	17	Black Cherry	EXEMPT	X	
320	13	Scotch Pine	EXEMPT	X	
321	9	Silver Maple	EXEMPT	X	
322	32	Silver Maple	SIGNIFICANT	X	10+
323	30	Silver Maple	SIGNIFICANT	X	10+
324	24	Basswood	SIGNIFICANT	X	10+
325	22	Basswood	SIGNIFICANT	X	10+
326	36	Silver Maple	SIGNIFICANT	X	10+
327	28	Silver Maple	SIGNIFICANT	X	10+
328	84	Silver Maple	SIGNIFICANT	X	10+
329	35	Boxelder	SIGNIFICANT	X	
330	10	Hackberry	SIGNIFICANT	X	
331	6	Black Cherry	SIGNIFICANT	X	
332	12	Black Cherry	SIGNIFICANT	X	
333	8	Black Cherry	SIGNIFICANT	X	
334	19	Boxelder	SIGNIFICANT	X	
335	10	Black Cherry	SIGNIFICANT	X	
336	8	Black Cherry	SIGNIFICANT	X	
337	6	Black Cherry	SIGNIFICANT	X	
338	8	Black Cherry	SIGNIFICANT	X	
339	6	Black Cherry	SIGNIFICANT	X	
340	8	Black Cherry	SIGNIFICANT	X	
341	8	Black Cherry	SIGNIFICANT	X	
342	9	Black Cherry	SIGNIFICANT	X	
343	14	Black Cherry	SIGNIFICANT	X	
344	10	Boxelder	SIGNIFICANT	X	
345	31	Black Cherry	SIGNIFICANT	X	
346	10	Boxelder	SIGNIFICANT	X	
347	16	Black Cherry	SIGNIFICANT	X	
348	15	Boxelder	SIGNIFICANT	X	
349	15	Boxelder	SIGNIFICANT	X	
350	18	Boxelder	SIGNIFICANT	X	
351	31	Boxelder	SIGNIFICANT	X	
352	16	Boxelder	SIGNIFICANT	X	
353	22	Boxelder	SIGNIFICANT	X	
354	7	Black Cherry	SIGNIFICANT	X	
355	35	Boxelder	SIGNIFICANT	X	
356	22	Boxelder	SIGNIFICANT	X	
357	13	Boxelder	SIGNIFICANT	X	
358	10	Boxelder	SIGNIFICANT	X	
359	14	Boxelder	SIGNIFICANT	X	
360	14	Boxelder	SIGNIFICANT	X	
361	9	Boxelder	SIGNIFICANT	X	
362	9	Boxelder	SIGNIFICANT	X	
363	8	Boxelder	SIGNIFICANT	X	
364	6	Boxelder	SIGNIFICANT	X	
365	26	Black Cherry	SIGNIFICANT	X	
366	11	Boxelder	SIGNIFICANT	X	
367	14	Boxelder	SIGNIFICANT	X	
368	14	Boxelder	SIGNIFICANT	X	
369	10	Boxelder	SIGNIFICANT	X	
370	20	Boxelder	SIGNIFICANT	X	
371	13	Boxelder	SIGNIFICANT	X	
372	58	Boxelder	SIGNIFICANT	X	
373	10	Boxelder	SIGNIFICANT	X	
374	8	Black Cherry	SIGNIFICANT	X	
375	35	Eastern Cottonwood	SIGNIFICANT	X	
376	20	Eastern Cottonwood	SIGNIFICANT	X	
377	20	Boxelder	SIGNIFICANT	X	
378	21	Boxelder	SIGNIFICANT	X	
379	14	Boxelder	SIGNIFICANT	X	
380	17	Eastern Cottonwood	SIGNIFICANT	X	
381	8	Boxelder	SIGNIFICANT	X	
382	25	Boxelder	SIGNIFICANT	X	
383	15	Boxelder	SIGNIFICANT	X	
384	16	Boxelder	SIGNIFICANT	X	
385	23	Boxelder	SIGNIFICANT	X	
386	13	Boxelder	SIGNIFICANT	X	
387	8	Boxelder	SIGNIFICANT	X	
388	34	Boxelder	SIGNIFICANT	X	
389	22	Boxelder	SIGNIFICANT	X	
390	11	Boxelder	SIGNIFICANT	X	
391	13	Boxelder	SIGNIFICANT	X	
392	29	Boxelder	SIGNIFICANT	X	
393	25	Black Cherry	SIGNIFICANT	X	
394	10	Boxelder	SIGNIFICANT	X	
395	11	Boxelder	SIGNIFICANT	X	
396	13	Boxelder	SIGNIFICANT	X	
397	16	Black Cherry	SIGNIFICANT	X	

TAG	DBH	NAME_COMMON	STATUS	REMOVE	LOCATION
398	9	Boxelder	SIGNIFICANT	X	
399	6	Black Cherry	SIGNIFICANT	X	
400	11	Boxelder	SIGNIFICANT	X	
401	14	Black Cherry	SIGNIFICANT	X	
402	18	Boxelder	SIGNIFICANT	X	
403	8	Boxelder	SIGNIFICANT	X	
404	12	Boxelder	SIGNIFICANT	X	
405	12	Boxelder	SIGNIFICANT	X	
406	42	Boxelder	SIGNIFICANT	X	
407	31	Boxelder	SIGNIFICANT	X	
408	29	Boxelder	SIGNIFICANT	X	
409	8	Boxelder	SIGNIFICANT	X	
410	12	Boxelder	SIGNIFICANT	X	
411	10	Colorado Blue Spruce	SIGNIFICANT	X	
412	10	Colorado Blue Spruce	SIGNIFICANT	X	
413	10	Colorado Blue Spruce	SIGNIFICANT	X	
414	10	Colorado Blue Spruce	SIGNIFICANT	X	
415	37	Silver Maple	SIGNIFICANT	X	
416	27	Silver Maple	SIGNIFICANT	X	
417	33	Silver Maple	SIGNIFICANT	X	
418	10	Flowering Crab	SIGNIFICANT	X	
419	13	Colorado Blue Spruce	SIGNIFICANT	X	
420	10	Colorado Blue Spruce	SIGNIFICANT	X	
421	10	Colorado Blue Spruce	SIGNIFICANT	X	
422	10	Colorado Blue Spruce	SIGNIFICANT	X	
423	8	Colorado Blue Spruce	SIGNIFICANT	X	
424	10	Colorado Blue Spruce	SIGNIFICANT	X	
425	14	Colorado Blue Spruce	SIGNIFICANT	X	
426	10	Colorado Blue Spruce	SIGNIFICANT	X	
427	10	Colorado Blue Spruce	SIGNIFICANT	X	
428	8	Colorado Blue Spruce	SIGNIFICANT	X	
429	9	Colorado Blue Spruce	SIGNIFICANT	X	
430	8	Colorado Blue Spruce	SIGNIFICANT	X	
431	12	Colorado Blue Spruce	SIGNIFICANT	X	
432	12	Colorado Blue Spruce	SIGNIFICANT	X	
433	9	Colorado Blue Spruce	SIGNIFICANT	X	
434	20	Northern Red Oak	SIGNIFICANT	X	
435	13	Colorado Blue Spruce	SIGNIFICANT	X	
436	12	Colorado Blue Spruce	SIGNIFICANT	X	
437	10	Colorado Blue Spruce	SIGNIFICANT	X	
438	15	Colorado Blue Spruce	SIGNIFICANT	X	
439	15	Colorado Blue Spruce	SIGNIFICANT	X	
440	27	Flowering Crab	SIGNIFICANT	X	
441	35	Basswood	SIGNIFICANT	X	
442	38	Basswood	SIGNIFICANT	X	
443	10	Northern Red Oak	SIGNIFICANT	X	
445	7	Northern Red Oak	SIGNIFICANT	X	
446	20	Sugar Maple	SIGNIFICANT	X	
447	10	Northern Red Oak	SIGNIFICANT	X	
448	6	White Spruce	SIGNIFICANT	X	
500	6	Hackberry	SIGNIFICANT		
501	9	Boxelder	SIGNIFICANT		
502	11	Black Cherry	SIGNIFICANT		
503	6	Black Cherry	SIGNIFICANT		
504	6	Black Cherry	SIGNIFICANT		
505	6	Black Cherry	SIGNIFICANT		
506	10	Black Cherry	SIGNIFICANT		
507	9	Hackberry	SIGNIFICANT		
508	9	Hackberry	SIGNIFICANT		
509	7	Hackberry	SIGNIFICANT		
510	9	Boxelder	SIGNIFICANT		
511	11	Boxelder	SIGNIFICANT		
512	8	Hackberry	SIGNIFICANT		
513	7	Hackberry	SIGNIFICANT		
514	6	Hackberry	SIGNIFICANT		
515	8	Hackberry	SIGNIFICANT		
516	9	Hackberry	SIGNIFICANT		
517	6	Hackberry	SIGNIFICANT		
518	6	Hackberry	SIGNIFICANT		
519	12	Black Cherry	SIGNIFICANT		
520	10	Hackberry	SIGNIFICANT		
521	8	Hackberry	SIGNIFICANT		
522	7	Hackberry	SIGNIFICANT		
523	9	Hackberry	SIGNIFICANT		
524	6	Hackberry	SIGNIFICANT		
525	6	Black Cherry	SIGNIFICANT		
526	13	Hackberry	SIGNIFICANT		
527	12	Black Cherry	SIGNIFICANT		
528	12	Hackberry	SIGNIFICANT		
529	11	Black Cherry	SIGNIFICANT		
530	9	Hackberry	SIGNIFICANT		
531	10	Hackberry	SIGNIFICANT		
532	8	Hackberry	SIGNIFICANT		
533	9	Hackberry	SIGNIFICANT		
534	10	Hackberry	SIGNIFICANT		
535	6	Hackberry	SIGNIFICANT		
536	6	Hackberry	SIGNIFICANT		
537	9	Hackberry	SIGNIFICANT		
538	18	Hackberry	SIGNIFICANT		
539	8	Hackberry	SIGNIFICANT		

TAG	DBH	NAME_COMMON	STATUS	REMOVE	LOCATION
540	12	Hackberry	SIGNIFICANT		
541	7	Hackberry	SIGNIFICANT		
542	11	Hackberry	SIGNIFICANT		
543	6	Hackberry	SIGNIFICANT		
544	7	Black Cherry	SIGNIFICANT		
545	7	Hackberry	SIGNIFICANT		
546	36	Hackberry	SIGNIFICANT		
547	8	Hackberry	SIGNIFICANT		
548	13	Hackberry	SIGNIFICANT		
549	9	Hackberry	SIGNIFICANT		
550	14	Hackberry	SIGNIFICANT		
551	14	Black Cherry	SIGNIFICANT		

INVENTORY LEGEND

SIGNIFICANT	TREE TO BE PRESERVED
SIGNIFICANT	TREE TO BE REMOVED
EXEMPT	TREE EXEMPT FROM CALCULATIONS (WITHIN KEATS AVE. RIGHT-OF-WAY DEDICATION)
10+	TREE WITHIN >10 UNITS PER ACRE AREA

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

TREE INVENTORY

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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PRELIMINARY NOT FOR CONSTRUCTION

John Gronhovd — 59233
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

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LEGEND

- DECIDUOUS OVERSTORY TREES
- CONIFEROUS TREES
- SIDE SLOPE SEED MIX
  MN STATE SEED MIX 33-261
- MESIC PRAIRIE GENERAL
  MN STATE SEED MIX 35-241

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
LANDSCAPE PLAN - OVERALL

DESCRIPTION	DATE
City Submittal	2025-12-31

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By — Date

PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

77

Sheet 77 of 91

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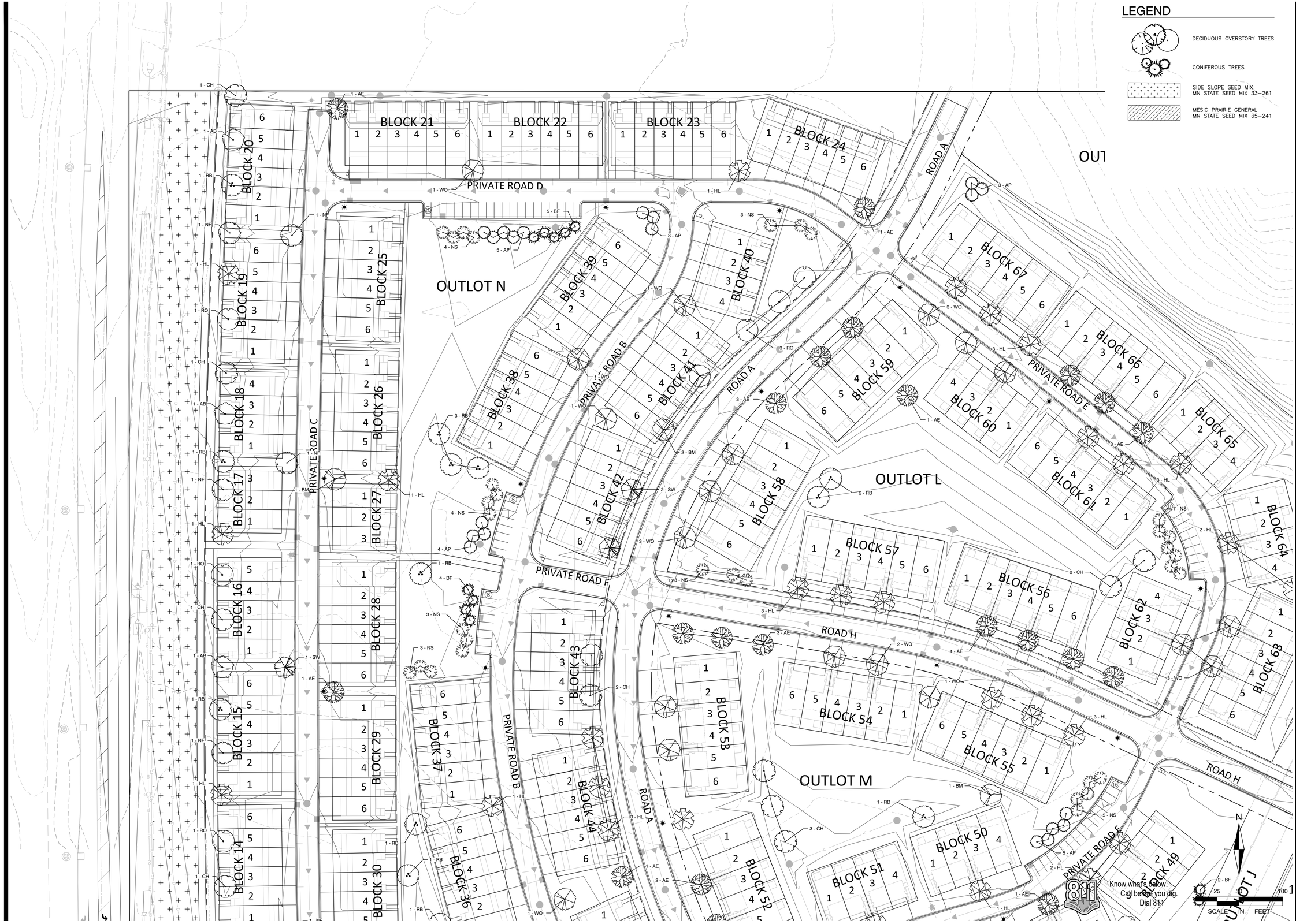

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL
LANDSCAPE PLAN - VIEW A

DATE	DESCRIPTION
2025-12-31	City Submittal

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Date
59233
License no.

QA/QC CHECK

By
Date

PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

78

Sheet 78 of 91

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OUTLOT K

OUTLOT H

OUTLOT L

OUTLOT G

ROAD I

ROAD J

ROAD D

ROAD H

BLOCK 10

BLOCK 11

BLOCK 8

BLOCK 9

BLOCK 64

BLOCK 63

RAVINE PARKWAY

LEGEND

DECIDUOUS OVERSTORY TREES

CONIFEROUS TREES

SIDE SLOPE SEED MIX
MN STATE SEED MIX 33–261

MESIC PRAIRIE GENERAL
MN STATE SEED MIX 35–241

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LANDSCAPE PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

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Drafted By:

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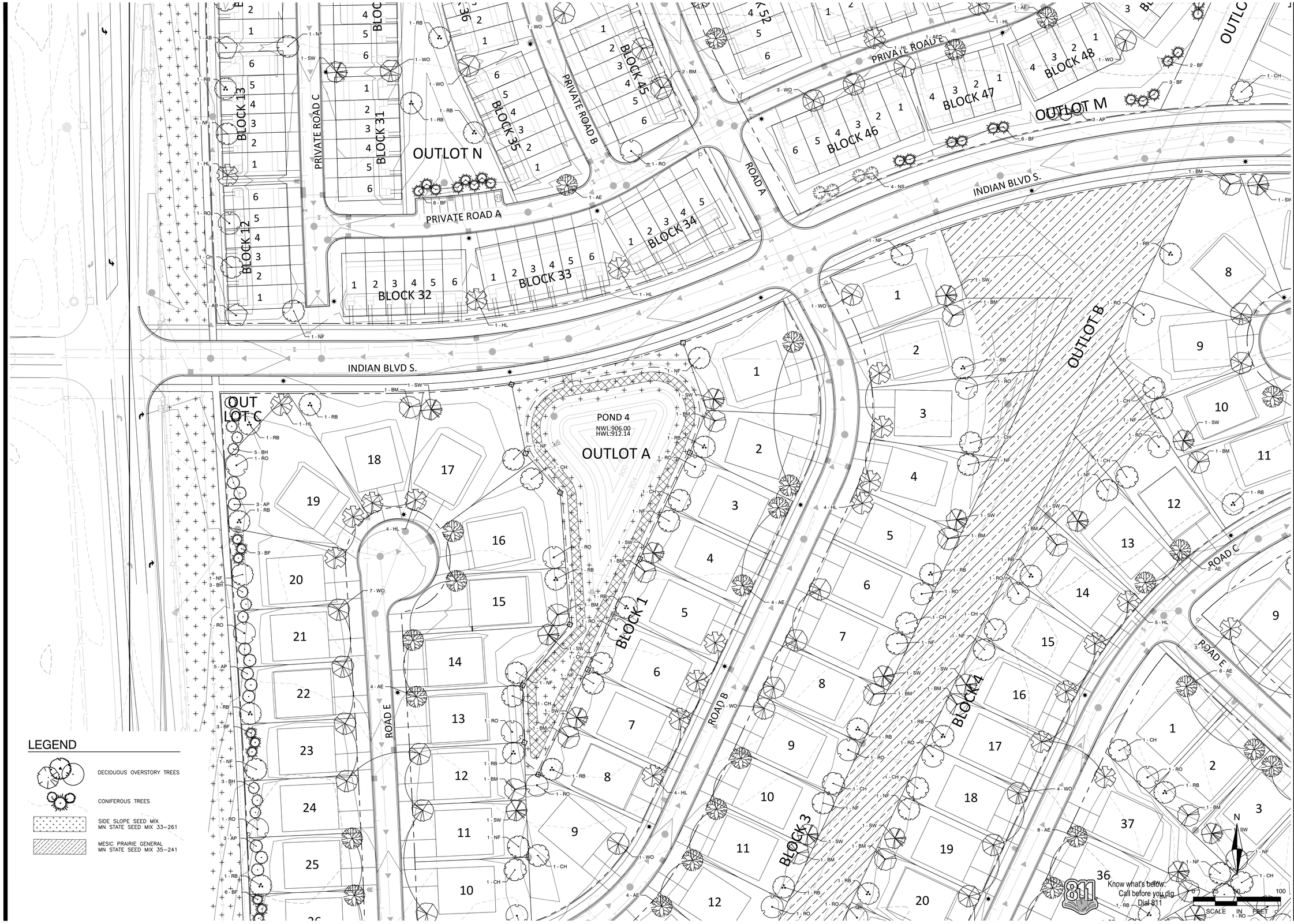

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LANDSCAPE PLAN - VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

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80

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LEGEND

- DECIDUOUS OVERSTORY TREES
- CONIFEROUS TREES
- SIDE SLOPE SEED MIX MN STATE SEED MIX 33-261
- MESIC PRAIRIE GENERAL MN STATE SEED MIX 35-241

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PRELIMINARY PLAT SUBMITTAL
LANDSCAPE PLAN - VIEW D

DATE	DESCRIPTION
2025.12.31	City Submittal

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Drafted By:
Project No.: 4000570-00

81

Sheet 81 of 91

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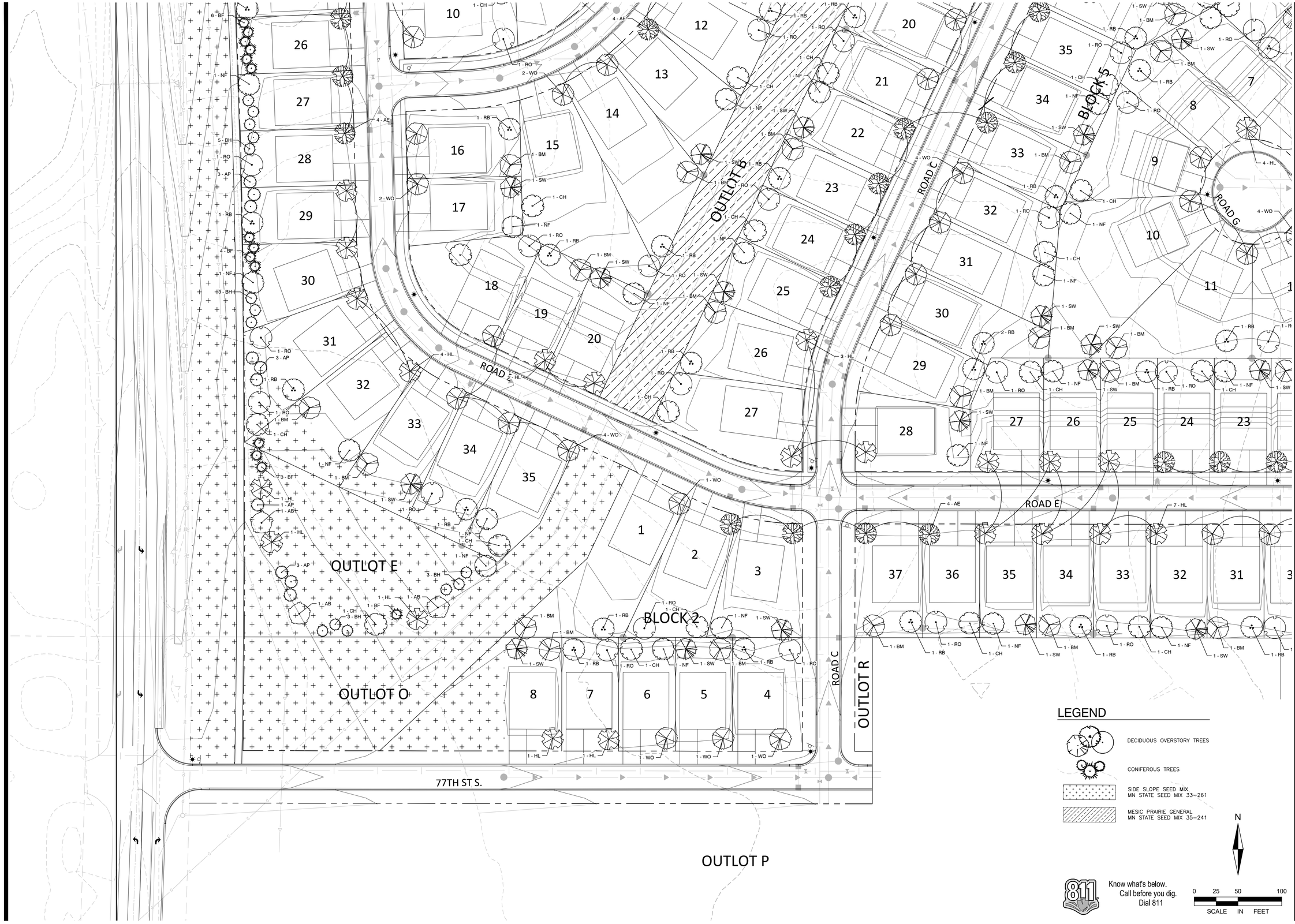

LEGEND

- DECIDUOUS OVERSTORY TREES
- CONIFEROUS TREES
- SIDE SLOPE SEED MIX
  MN STATE SEED MIX 33-261
- MESIC PRAIRIE GENERAL
  MN STATE SEED MIX 35-241

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COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LANDSCAPE PLAN - VIEW E

DATE	DESCRIPTION
2025-12-31	City Submittal

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Drafted By:
Project No.: 4000570-00

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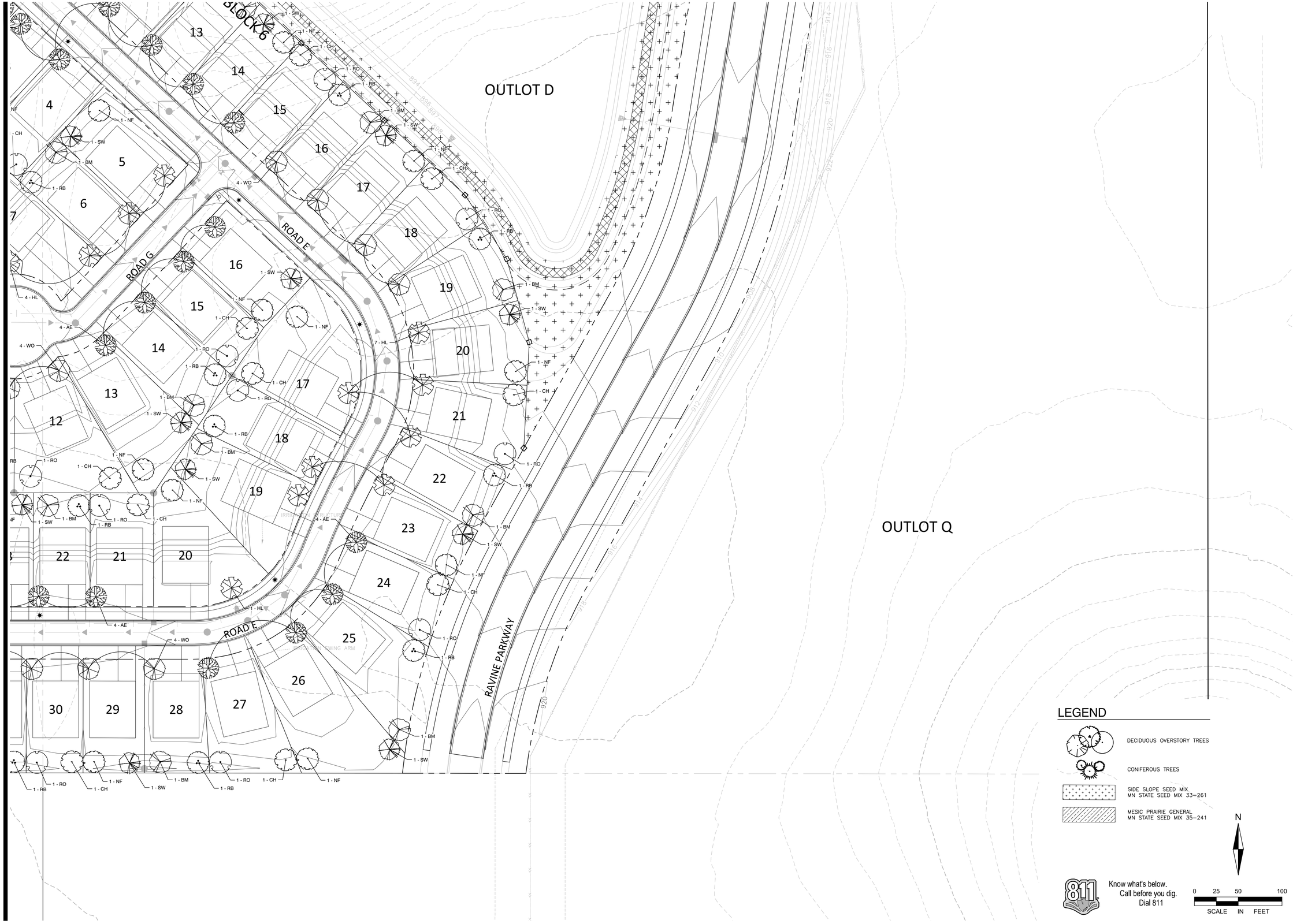
BLOCK 6
OUTLOT D
OUTLOT Q
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ROAD E
ROAD E
RAVINE PARKWAY
IRRIGATION SWING ARM
IRRIGATION SWING ARM
4 - AE
4 - WO
4 - HL
7 - HL
1 - HL
1 - NF
1 - CH
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4 - NF
4 - CH
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TREE MITIGATION REQUIREMENTS:

MITIGATED INCHES TO BE REPLACED:	1,102 INCHES (/2.5 INCH CALIPER) = 441 TREES
MITIGATION INCHES PROVIDED:	2,485 INCHES (/2.5 INCHES CALIPER = 994 TREES)

(LANDSCAPE TREES PROVIDED ARE COUNTED TOWARD MITIGATION REQUIREMENT, SEE TREE PRESERVATION PLAN, PAGE 69.)

OVERALL LANDSCAPE REQUIREMENTS:

TOWNHOME LOTS MUST HAVE ONE OVERSTORY DECIDUOUS TREE PLANTED IN THE FRONT YARD BETWEEN EACH BUILDING GROUP WITH 1 OVERSTORY TREE/40' LF SITE PERIMETER OVERALL. 5 SHRUBS PER UNIT TO BE PROVIDED WITH CONSTRUCTION.

LOTS LESS THAN 60 FEET WIDE MUST HAVE 2 TREES PER LOT. ONE TREE IN THE FRONT YARD. THE FRONT YARD TREE SHALL HAVE A MAXIMUM CANOPY SPREAD OF 30 FEET AND MAXIMUM HEIGHT OF 30 FEET. 10 SHRUBS PER UNIT TO BE PROVIDED WITH CONSTRUCTION

LOTS 60 FEET WIDE OR GREATER MUST HAVE 3 TREES PER LOT. ONE TREE IN THE FRONT YARD. THE FRONT YARD TREE MAY BE A TRADITIONAL OVERSTORY DECIDUOUS TREES. 10 SHRUBS PER UNIT TO BE PROVIDED WITH CONSTRUCTION.

50' AVERAGE, 30' MINIMUM YEAR-ROUND BUFFER OF 50% OPACITY REQUIRED IN REAR YARDS OF LOTS AND TOWNHOUSES ADJACENT TO KEATS AVE S. / CSAH 19. (BLOCK 1, LOTS 19-35 AND BLOCKS 12-20.)

LOT TYPE:	OVERALL:
TOWNHOME (1/40 LF)	208 TREES REQUIRED (8,296 LF) 227 TREES PROVIDED
40' LOTS (2/LOT)	210 TREES REQUIRED (105 LOTS) 210 TREES PROVIDED
65' LOTS (3/LOT)	492 TREES REQUIRED (164 LOTS) 492 TREES PROVIDED
KEATS AVE BUFFER TREES PROVIDED:	65 TREES
TOTAL REQUIRED TOTAL PROVIDED	910 TREES 994 TREES

SEEDING NOTES

MESIC PRAIRIE MIX: MN STATE 35-241 MESIC PRAIRIE GENERAL.
SEEDING RATE TO BE 36.5 LBS/ACRE (PURE LIVE SEED).

SIDE-SLOPE SEED MIX: MN STATE 33-261 STORMWATER SOUTH & WEST.
SEEDING RATE TO BE 44 LBS/ACRE (PURE LIVE SEED).

APPLY SEED PER THE FOLLOWING: MULCH SEEDED AREAS WITH Mn/DOT TYPE 3 (MCIA CERTIFIED WEED FREE) MULCH AT A RATE OF 1 TON PER ACRE WITHIN 48 HOURS OF SEEDING. MULCH SHOULD THEN BE DISC ANCHORED TO KEEP IT FROM BLOWING AWAY.

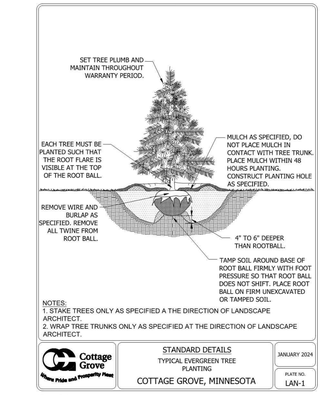
SEEDING SHALL BE APPLIED FROM APRIL 15 – JULY 20 OR SEPTEMBER 20 – FREEZE UP. IF HYDROSEEDING UTILIZE APPROXIMATELY 500 GALLONS OF WATER PER ACRE. REFER TO MN/DOT SPEC 3884 FOR PROPER INSTALLATION OF HYDRO-SEED. ALL NATIVE SEEDS USED ON THIS PROJECT SHALL BE CERTIFIED TO BE OF MINNESOTA ORIGIN BY THE MINNESOTA CROP IMPROVEMENT ASSOCIATION (MCIA). SITE TO BE PREPARED BY LOOSENING TOPSOIL TO A MINIMUM DEPTH OF 3 INCHES. THE SITE TO BE HARROWED OR RAKED FOLLOWING SEEDING, AND THEN PACKED USING A CULTI-PACKER OR EQUIVALENT. SEE MNDOT SEEDING MANUAL FOR REFERENCE.

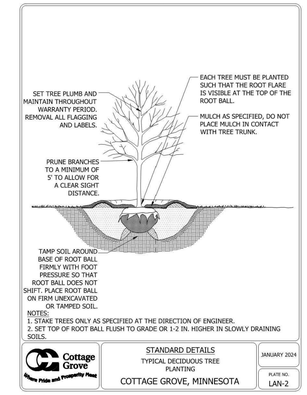
MAINTAIN SEEDED AREAS BY WATERING, REMULCHING AND REPLANTING AS NECESSARY TO ESTABLISH A UNIFORMLY DENSE STAND OF THE SPECIFIED GRASSES UNTIL ACCEPTED. ANY AREAS FAILING TO ESTABLISH A STAND SHALL BE RESEEDED, REFERTILIZED AND REMULCHED WHENEVER 70% VEGETATIVE COVER IS NOT ACHIEVED. RESEEDING SHALL CONFORM IN ALL RESPECTS TO THESE SPECIFICATIONS. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO THE WORK AREAS RESULTING FROM EROSION AND/OR EQUIPMENT. THE CONTRACTOR SHALL REPAIR DAMAGE, INCLUDING REGRADING, RESEEDING, ETC. AS NECESSARY, BEFORE SIGNIFICANT DAMAGE OCCURS.

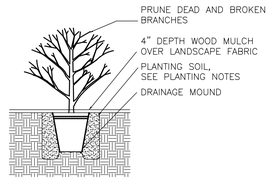
LANDSCAPE NOTES:

1. DECIDUOUS TREES SHOULD BE LOCATED A MINIMUM OF 5 FT OFF ANY UTILITY PIPE.
2. CONIFEROUS TREES SHOULD BE LOCATED A MINIMUM OF 15 FT OFF ANY UTILITY PIPE.
3. NO TREE SHOULD BE LOCATED WITHIN 10 FT OF A HYDRANT OR 15 FT FROM A STREETLIGHT.
4. NO TREES SHOULD BE LOCATED WITHIN A STORM POND HIGH WATER LEVEL (HWL).
5. NO TREES SHOULD BE LOCATED WITHIN A STORM POND'S 20 FT ACCESS ROUTE, AND NO CONIFEROUS TREES WITHIN 5 FT OF THE 20 FT POND ACCESS ROUTE.
6. NO CONIFEROUS TREES WITHIN 20 FT OF A PROPOSED SIDEWALK/TRAIL.
7. NO DECIDUOUS TREES WITHIN 5 FT OF SIDEWALK/TRAIL/DRIVEWAYS.
8. TREES SHOULD NOT BE PLANTED WITHIN DRAINAGE AND UTILITY EASEMENTS
9. TREES WITHIN CITY OUTLOTS SHOULD CONFORM TO THE APPROVED SPECIES LIST.
10. INSTALL 4" MIN TOP SOIL TO SOD, SEED AND SHRUB AREAS. FINE GRADE ALL SOD AND SEED AREAS. INSTALL 12" TOP SOIL TO PERENNIAL AND ANNUAL FLOWER AREAS.
11. STAKE OR MARK ALL PLANT MATERIAL LOCATIONS PRIOR TO INSTALLATION. OWNERS REPRESENTATIVE TO APPROVE ALL STAKING PRIOR TO INSTALLATION.
12. ALL SHRUB AREAS UNLESS SPECIFIED AS OTHER, TO BE BED MULCHED DOUBLE SHREDDED HARDWOOD MULCH OVER FILTER FABRIC, NATURAL COLOR, UNLESS SPECIFIED AS OTHER. POLY-EDGER TO BE VALLEY VIEW BLACK DIAMOND OR APPROVED EQUAL.
13. INSTALL 4-6" DEPTH SHREDDED HARDWOOD MULCH AROUND ROOT SAUCER OF ALL TREES ISOLATED FROM PLANT BEDS. DO NOT PILE MULCH AGAINST THE BASE OF A PLANT OR TREE TRUNK; PULL THE MULCH FOUR INCHES AWAY FROM ROOT FLARE.
14. PLANT SOIL SHALL CONSIST OF 1:1:1, SELECT LOAMY TOPSOIL, PEAT MOSS, PIT RUN SAND.
15. COMPLETELY GUARANTEE ALL WORK FOR A PERIOD OF TWO YEARS BEGINNING AT THE DATE OF ACCEPTANCE. MAKE ALL REPLACEMENTS PROMPTLY (AS PER DIRECTION OF OWNER).
16. ALL MATERIAL SHALL COMPLY WITH THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, AMERICAN ASSOCIATION OF NURSERYMEN.
17. ALL TREE TRUNKS SHALL BE WRAPPED WITH BROWN CREPE TREE WRAP. APPLY WRAP IN NOVEMBER AND REMOVE IN APRIL.
18. CALL GOPHER STATE ONE CALL AT 651-454-0002 FOR LOCATING ALL UNDERGROUND UTILITIES AND AVOID DAMAGE TO UTILITIES DURING THE COURSE OF THE WORK.
19. MAINTAIN ALL PLANT MATERIALS, INCLUDING WATERING, UNTIL THE TIME OF ACCEPTANCE.
20. COORDINATE INSTALLATION WITH GENERAL CONTRACTOR.
21. STAKING AND GUYING OF TREES OPTIONAL: MAINTAIN PLUMBNESS OF TREES FOR DURATION OF WARRANTY PERIOD.
22. SWEEP AND WASH ALL PAVED SURFACES AND REMOVE ALL DEBRIS RESULTING FROM LANDSCAPE OPERATIONS.
23. LANDSCAPE CONTRACTOR SHALL INSTALL KENTUCKY BLUE GRASS SOD IN DENOTED AREAS INCLUDING ALL R.O.W. PER LOCAL INDUSTRY STANDARDS. SOD SHALL BE LAID PARALLEL TO THE CONTOURS AND HAVE STAGGERED JOINTS.
24. IRRIGATION TO BE PROVIDED FOR SOD IN RAVINE PARKWAY BOULEVARD. IRRIGATION SYSTEM TO BE OWNED AND MAINTAINED BY HOA.
25. SUPPLY DESIGN AND INSTALLATION FOR NEW WATER EFFICIENT IRRIGATION SYSTEM. DESIGN SYSTEM INCLUDING CONTROLS, ELECTRICAL AND WATER SERVICE CONNECTIONS WITH 100% COVERAGE OF NEW SOD, LANDSCAPE ISLANDS AND PLANTING AREAS. SOD, SEED AND SHRUB AREAS TO BE ON SEPARATE ZONES. EXCESS WATER SHALL NOT COME IN CONTACT WITH BUILDINGS OR SIDEWALKS. THE IRRIGATION SYSTEM SHALL HAVE A RAIN/FREEZE SENSOR SHUTOFF. USE RAINBIRD OR APPROVED EQUAL COORDINATE WITH G.C. AND WORK OF OTHER SECTION.
26. CITY STANDARD SPECIFICATION SHALL GOVERN FOR ALL IMPROVEMENTS ON PUBLIC RIGHT-OF-WAY OR PUBLIC PROPERTY.
27. LOTS LESS THAN 60 FEET WIDE MUST HAVE 2 TREES PER LOT. ONE TREE IN THE FRONT YARD. THE FRONT YARD TREE SHALL HAVE A MAXIMUM CANOPY SPREAD OF 30 FEET AND MAXIMUM HEIGHT OF 30 FEET.

LANDSCAPE DETAILS:







1 SHRUB PLANTING DETAIL
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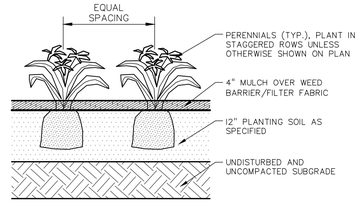

2 PERENNIAL PLANTING DETAIL
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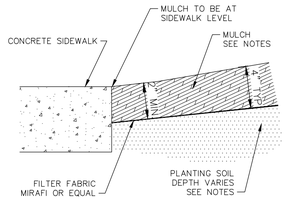

3 MULCH AT SIDEWALK DETAIL
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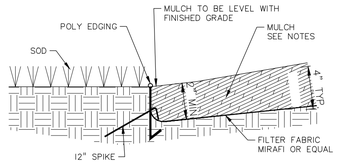

4 MULCH AT SOD DETAIL
NOT TO SCALE

PLANT SCHEDULE

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	SIZE	CONTAINER
CONIFEROUS TREES						
	AP	44	Austrian Pine	Pinus nigra	8` Ht.	B&B
	BF	50	Balsam Fir	Abies balsamea	8` Ht.	B&B
	BH	25	Black Hills Spruce	Picea glauca densata	8` Ht.	B&B
	NS	36	Norway Spruce	Picea abies	8` Ht.	B&B
DECIDUOUS TREES						
	AB	8	Autumn Blaze® Freeman Maple	Acer x freemanii 'Jeffersred'	2.5" Cal.	B&B
	AE	114	Accolade Elm	Ulmus japonica x wilsoniana 'Morton' TM	2.5" Cal.	B&B
	BM	76	Burgundy Belle® Red Maple	Acer rubrum 'Magnificent Magenta'	2.5" Cal.	B&B
	CH	77	Common Hackberry	Celtis occidentalis	2.5" Cal.	B&B
	HL	124	Skyline® Honey Locust	Gleditsia triacanthos inermis 'Skycole'	2.5" Cal.	B&B
	NF	84	Northern Flare® Sugar Maple	Acer saccharum 'Sisseton'	2.5" Cal.	B&B
	RB	90	River Birch Multi-Trunk	Betula nigra	8` Ht.	B&B
	RO	78	Red Oak	Quercus rubra	2.5" Cal.	B&B
	SW	74	Swamp White Oak	Quercus bicolor	2.5" Cal.	B&B
	WO	114	White Oak	Quercus alba	2.5" Cal.	B&B

N

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SCALE IN FEET

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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LANDSCAPE PLAN - DETAILS

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Landscape Architect under the laws of the State of MINNESOTA.

PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

John T Gorham — 59233
Date — License no.

QA/QC CHECK

By — Date

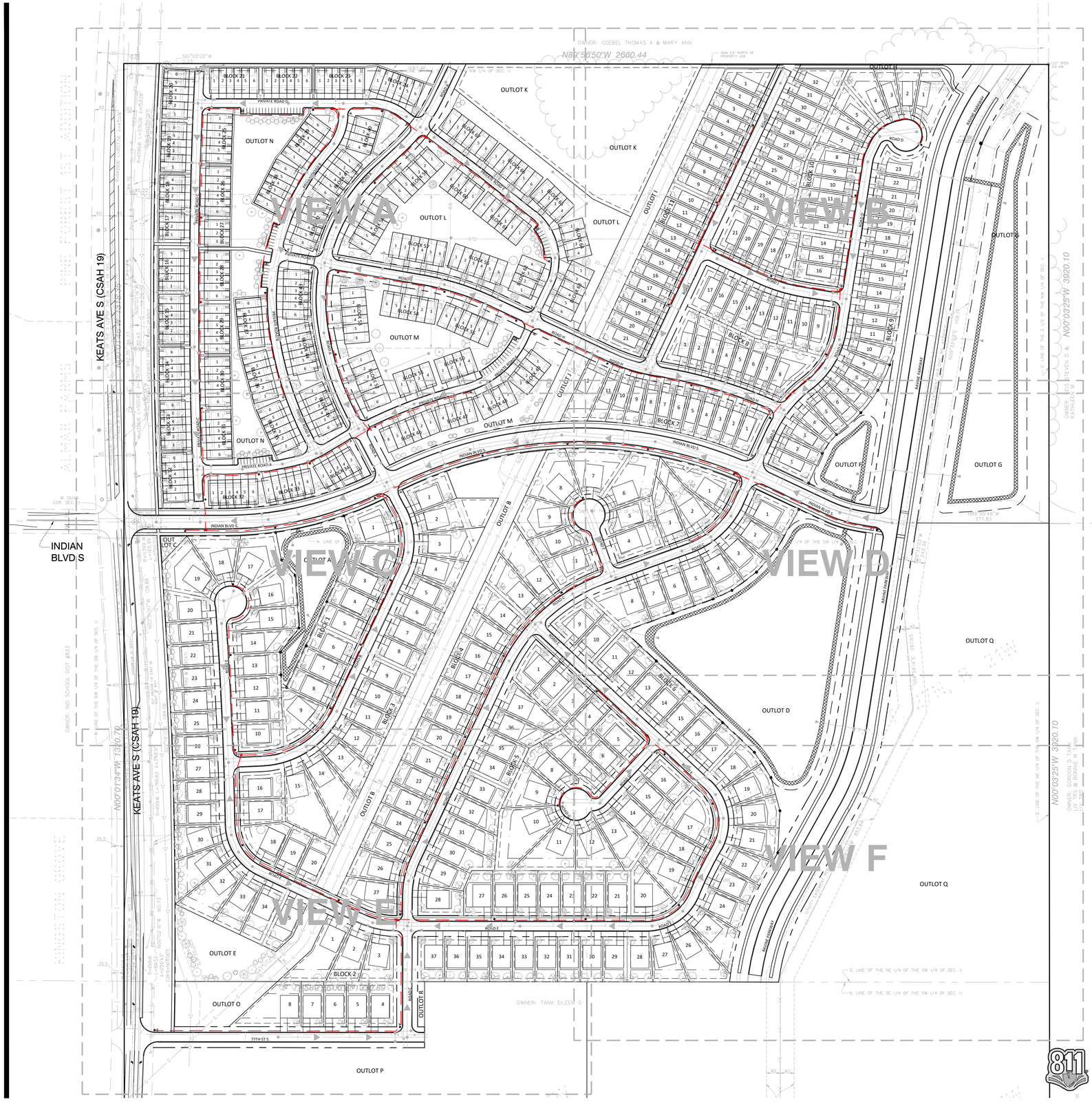
PROJECT TEAM DATA

Designed By:
Drafted By:
Project No.: 4000570-00

84

Sheet 84 of 91

File Location: X:\4000570-00\00104\Design\00-Sheets - Preliminary\LANDSCAPE.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:23:28 PM


KEATS AVE S (CSAH 19)
INDIAN BLVD S
PINE FOREST 1ST ADDITION
ALMAR FARMS
KINGSTON GROVE
OWNER: GOEBEL THOMAS A & MARY ANN
N89°56'50"W 2660.44
N00°03'25"W 3920.10
N00°01'34"W 1330.70
OWNER: GORDON D ZIMMERMAN
OWNER: TANK EILEEN G
OWNER: IND SCHOOL DIST #833
OUTLOT K
OUTLOT L
OUTLOT M
OUTLOT N
OUTLOT O
OUTLOT P
OUTLOT Q
OUTLOT D
OUTLOT E
OUTLOT F
OUTLOT G
OUTLOT I
OUTLOT J
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OUTLOT B
OUTLOT C
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SCALE IN FEET

KEATS AVE S (CSAH 19)

PRIVATE ROAD C

PRIVATE ROAD D

PRIVATE ROAD B

PRIVATE ROAD F

ROAD A

ROAD H

PRIVATE ROAD E

OUTLOT K

OUTLOT L

OUTLOT M

OUTLOT N

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BLOCK 66
BLOCK 67

HANDHOLE HH7 (LGT–1)
HANDHOLE HH8 (LGT–1)

LIGHTING UNIT L33 (LGT–7)
LIGHTING UNIT L34 (LGT–7)
LIGHTING UNIT L35 (LGT–7)
LIGHTING UNIT L36 (LGT–7)
LIGHTING UNIT L37 (LGT–7)
LIGHTING UNIT L39 (LGT–7)
LIGHTING UNIT L40 (LGT–7)
LIGHTING UNIT L41 (LGT–7)
LIGHTING UNIT L42 (LGT–7)
LIGHTING UNIT L43 (LGT–7)
LIGHTING UNIT L47 (LGT–7)
LIGHTING UNIT L48 (LGT–7)
LIGHTING UNIT L49 (LGT–7)
LIGHTING UNIT L50 (LGT–7)
LIGHTING UNIT L51 (LGT–7)

3–1/C #6 LIGHTING CABLE IN 1.5" NMC

OWNER: GOEBEL THOMAS A & MARY ANN

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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LIGHTING PLAN - VIEW A

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Victorlund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

86

Sheet 86 of 91

File Location: X:\4000570-00\100140 Design\00 Sheets - Preliminary\LIGHTING.dwg Plotted By: Logan Josephson on December 31, 2025 at 2:23:49 PM

OUTLOT K

OUTLOT L

OUTLOT H

OUTLOT G

N89°56'50"W 2660.44

SIGN 0.6' NORTH OF PROPERTY LINE

1/2" OPEN 0.6 NW

N00°03'25"W 3920.10

BLOCK 10

BLOCK 11

BLOCK 8

BLOCK 9

BLOCK 64

BLOCK 63

ROAD D

ROAD I

ROAD J

ROAD H

RAVINE PARKWAY

LIGHTING UNIT L63 (LGT-7)

LIGHTING UNIT L62 (LGT-7)

LIGHTING UNIT L61 (LGT-7)

LIGHTING UNIT L58 (LGT-7)

LIGHTING UNIT L57 (LGT-7)

LIGHTING UNIT L56 (LGT-7)

LIGHTING UNIT L59 (LGT-7)

LIGHTING UNIT L60 (LGT-7)

LIGHTING UNIT L55 (LGT-7)

LIGHTING UNIT L52 (LGT-7)

3-1/C #6 LIGHTING CABLE IN 1.5" NMC

HANDHOLE HH11 (LGT-1)

HANDHOLE HH10 (LGT-1)

EX STRUCTURE SCH TO-INV IN=881.22 INV OUT=881.32

EX STRUCTURE SCH TO-INV IN=883.23

UTILITY EASEMENT PER DOC. NO. 4308015

E. LINE OF THE S 1/2 OF THE NW 1/4 OF SEC. 11

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0 25 50 100

SCALE IN FEET

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LIGHTING PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA

PRELIMINARY FOR REVIEW NOT FOR CONSTRUCTION

Clark Wicklund — 40922

Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW

Drafted By: LRJ

Project No.: 4000570-00

87

Sheet 87 of 91

File Location: X:\4000570-000001\40 Design\03 Sheets - Preliminary\LIGHTING.dwg Plotted By: Logan Josephson on December 31, 2025 at 2:35:54 PM



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LIGHTING PLAN - VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

FOR REVIEW PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund

Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW

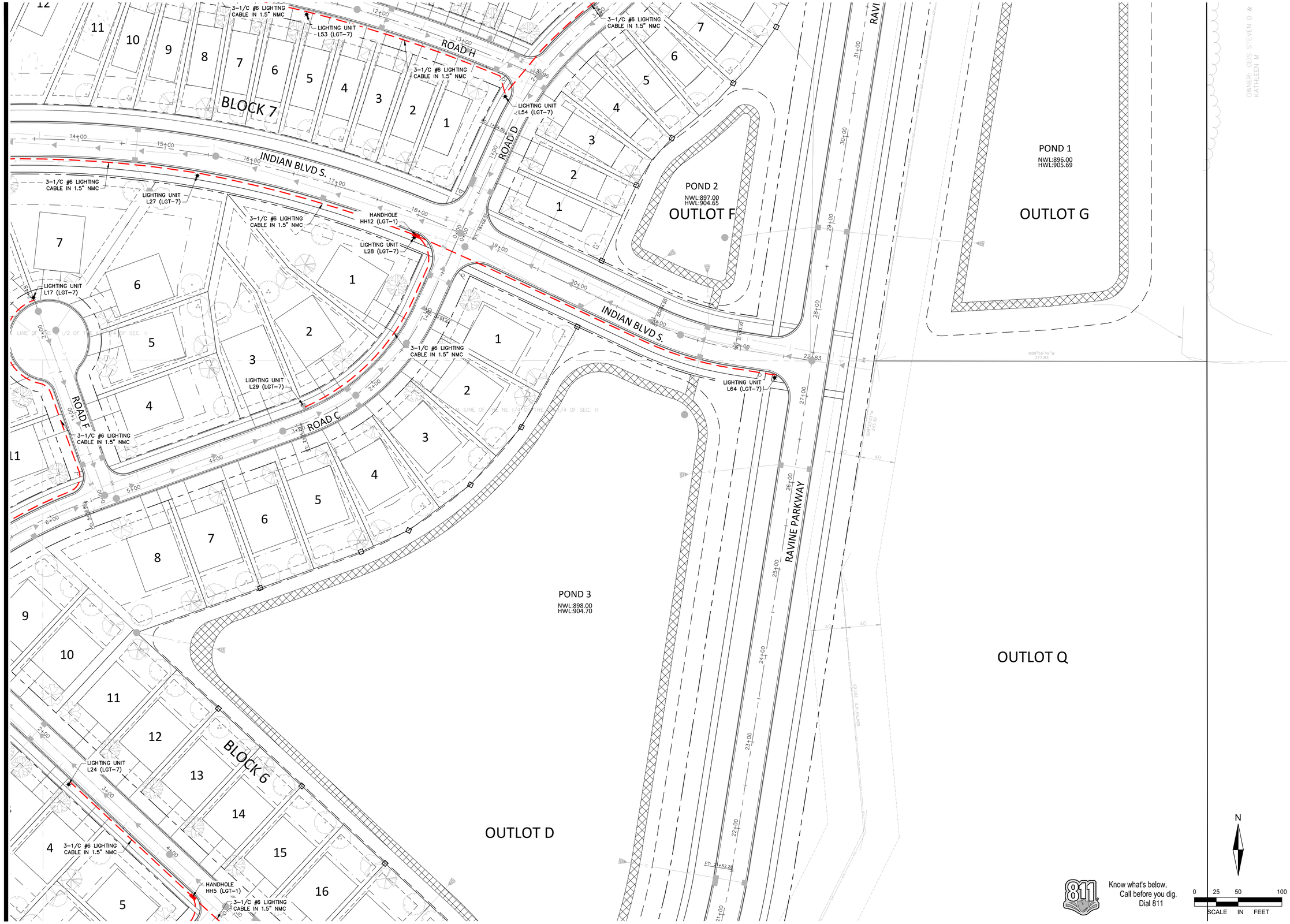
Drafted By: LRJ

Project No.: 4000570-00

88

Sheet 88 of 91

File Location: X:\4000570-00\001\40 Design\00 Sheets - Preliminary\LIGHTING.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:23:59 PM



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LIGHTING PLAN - VIEW D

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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PRELIMINARY NOT FOR CONSTRUCTION FOR REVIEW

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

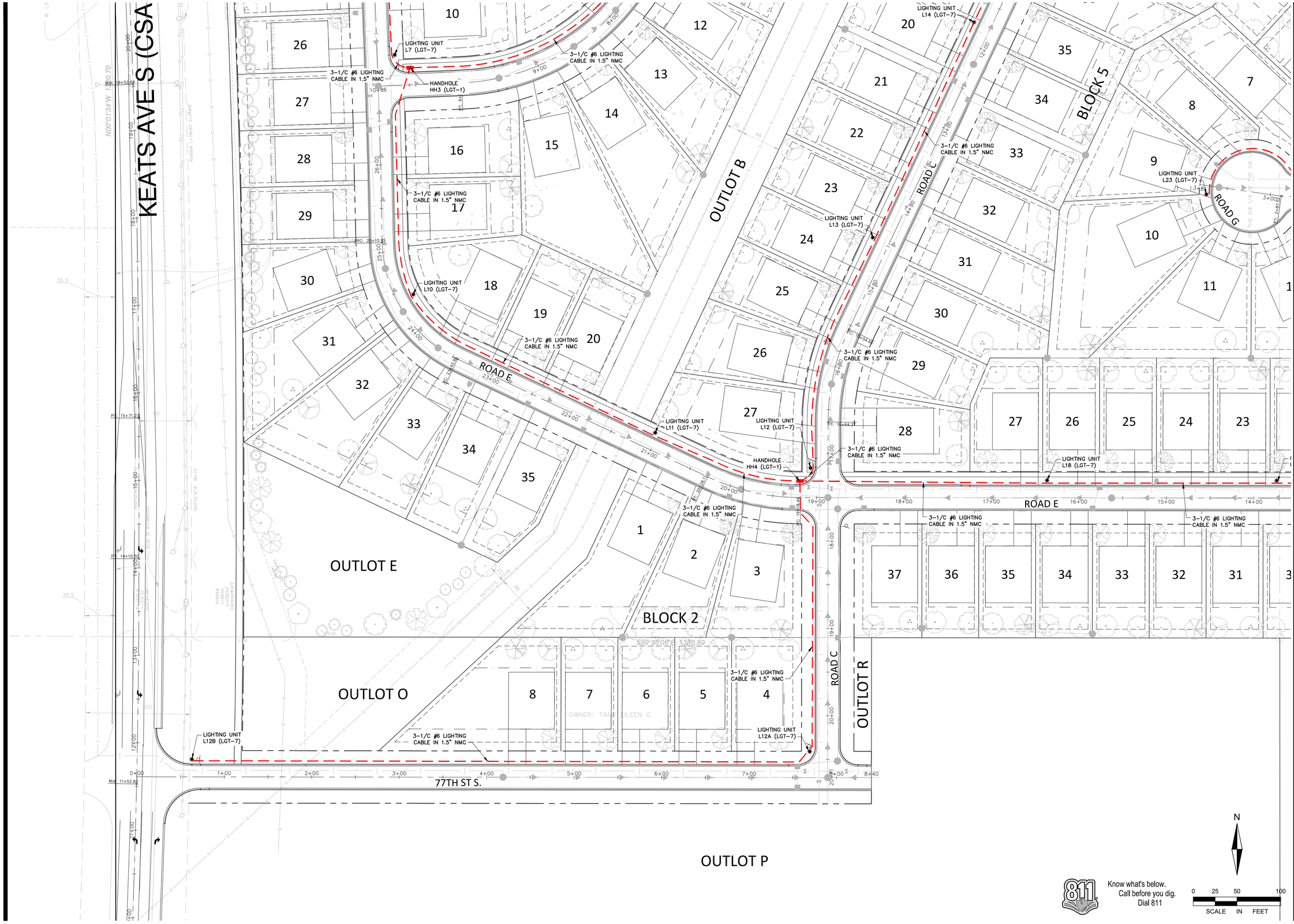
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

89

Sheet 89 of 91

File Location: X:\4000570-00\001\40 Design\00 Sheets - Preliminary\LIGHTING.dwg Plotted By: Logan Josephson on December 31, 2025 at 2:24:45 PM



Know what's below.
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SCALE IN FEET
0 25 50 100

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LIGHTING PLAN - VIEW E

DESCRIPTION	DATE
City Submittal	2026-12-31

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

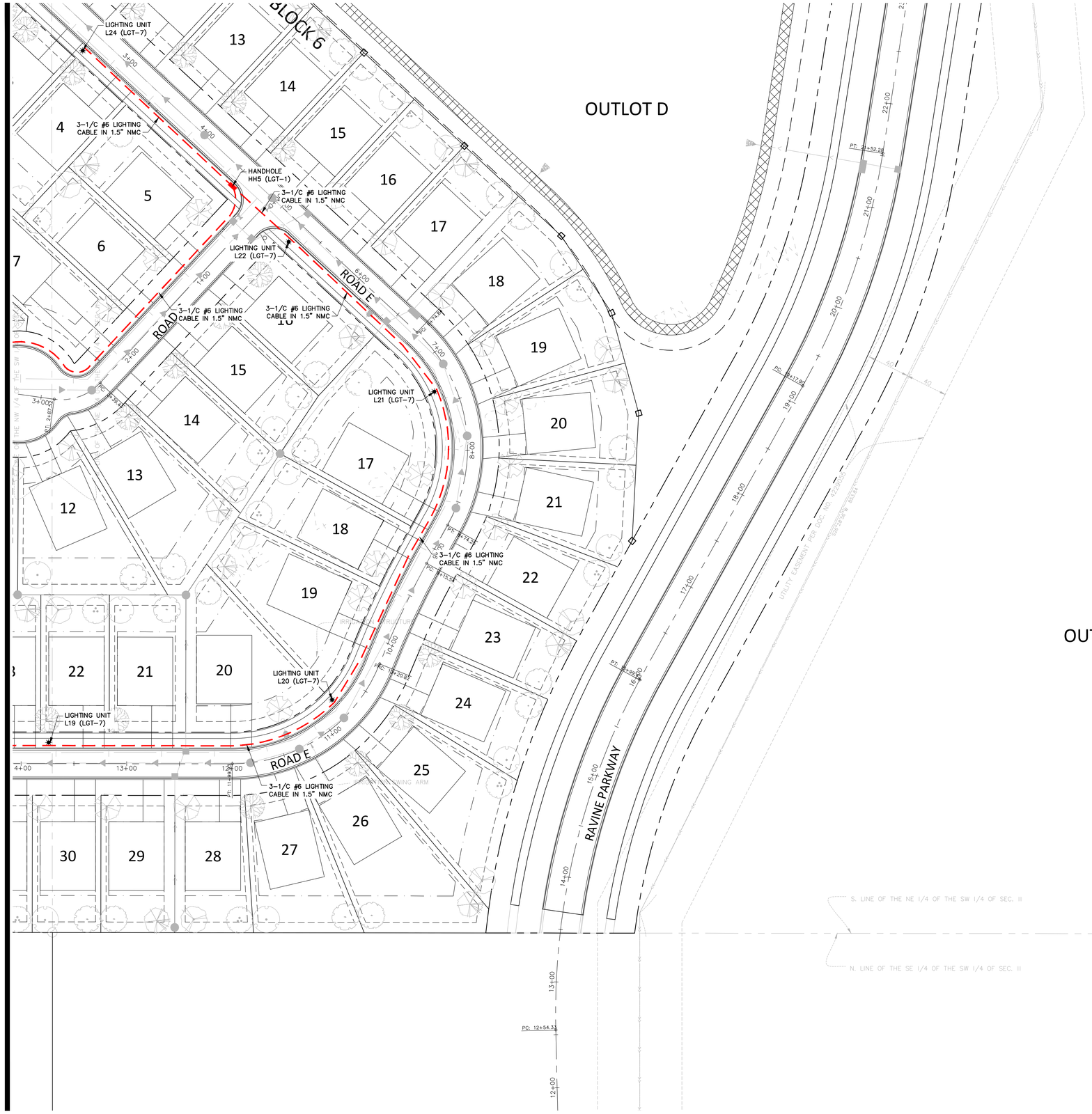
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

90

Sheet 90 of 91

File Location: X:\4000\570-00\00140 Design\90 Sheets - Preliminary\LIGHTING.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:24:09 PM



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

LIGHTING PLAN - VIEW F

DESCRIPTION	DATE
City Submittal	2025-12-31

CERTIFICATION

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PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

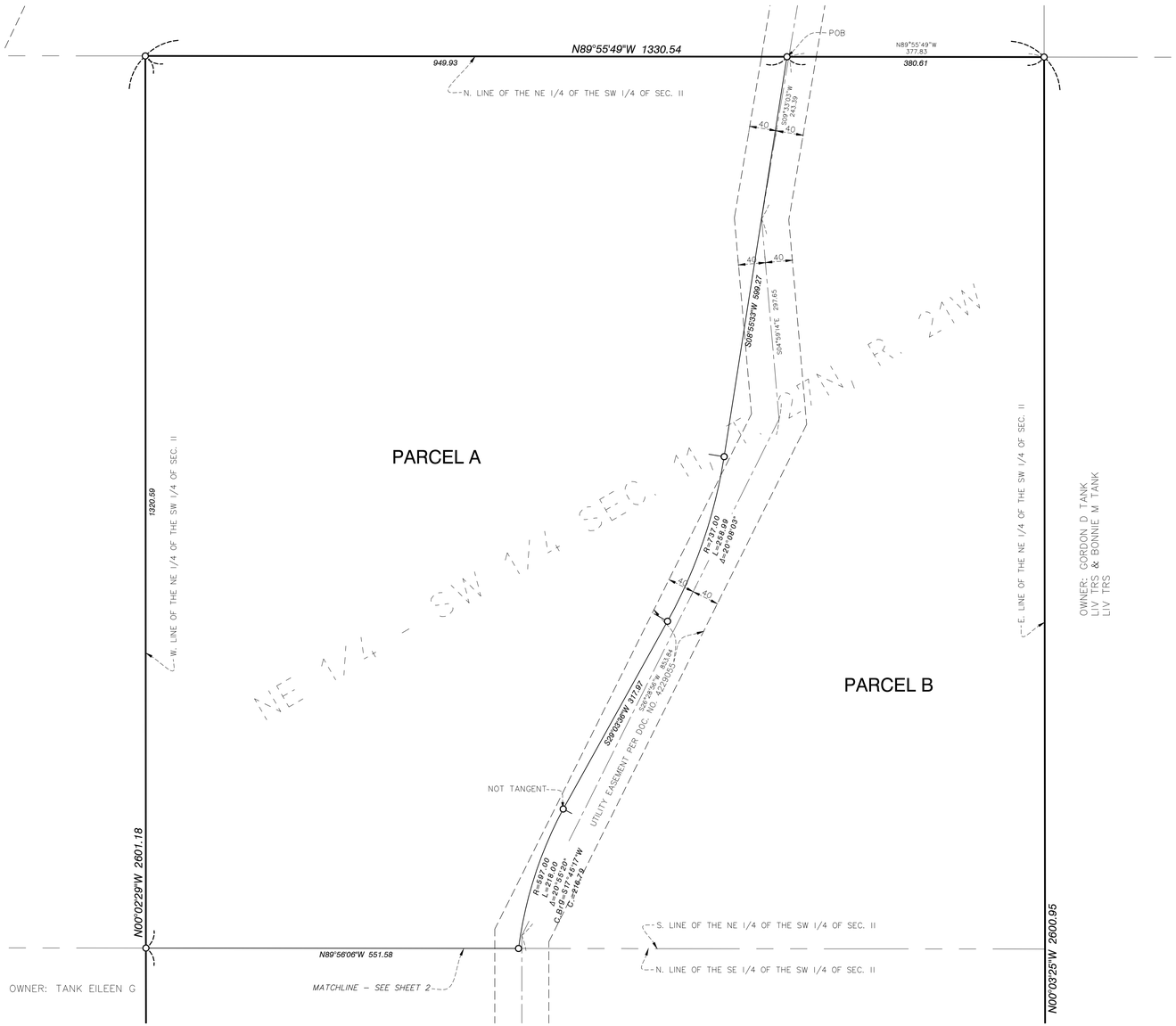
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

91

Sheet 91 of 91

File Location: X:\4000570-00\00140 Design\00 Sheets - Preliminary\LIGHTING.dwg Plotted By: Logan Josephson on December 31, 2025 at 12:24:14 PM



EXISTING LEGAL DESCRIPTION

Part of the East one-half of the Southwest Quarter (NW ¼ of SW ¼) of Section 11, Township 27 North, Range 21 West, except the South 40 feet thereof, Washington County, Minnesota.

Abstract Property

PROPOSED LEGAL DESCRIPTION - PARCEL A

That part of the East one-half of the Southwest Quarter (NW ¼ of SW ¼) of Section 11, Township 27 North, Range 21 West, Washington County, Minnesota, described as follows:

Commencing at the southeast corner of said Southwest Quarter of Section 11; thence North 00 degrees 03 minutes 25 seconds West, assumed bearing along the east line of said Southwest Quarter, a distance of 2640.95 feet to the north line of said East one-half of the Southwest Quarter; thence North 89 degrees 55 minutes 49 seconds West, along said north line, a distance of 380.61 feet to the point of beginning; thence South 08 degrees 55 minutes 33 seconds West 599.27 feet; thence southwesterly 258.99 feet along a tangential curve concave to the northwest, having a radius of 737.00 feet and a central angle of 20 degrees 08 minutes 03 seconds; thence South 29 degrees 03 minutes 36 seconds West, tangent to said curve, a distance of 317.97 feet; thence southwesterly 218.00 feet along a non-tangential curve concave to the southeast, having a radius of 597.00 feet, a central angle of 20 degrees 55 minutes 20 seconds, and a chord bearing of South 17 degrees 45 minutes 17 seconds West, to the south line of the Northeast Quarter of said Southwest Quarter of Section 11; thence North 89 degrees 56 minutes 06 seconds West, along said south line, a distance of 551.58 feet to the west line of said Northeast Quarter of the Southwest Quarter; thence North 00 degrees 02 minutes 29 seconds West, along said west line, a distance of 1320.59 feet to said north line; thence South 89 degrees 55 minutes 49 seconds East 949.93 feet to the point of beginning.

PROPOSED LEGAL DESCRIPTION - PARCEL B

Part of the East one-half of the Southwest Quarter (NW ¼ of SW ¼) of Section 11, Township 27 North, Range 21 West, except the South 40 feet thereof, Washington County, Minnesota.

ALSO EXCEPT that part of said East one-half of the Southwest Quarter of Section 11 described as follows:

Commencing at the southeast corner of said Southwest Quarter of Section 11; thence North 00 degrees 03 minutes 25 seconds West, assumed bearing along the east line of said Southwest Quarter, a distance of 2640.95 feet to the north line of said East one-half of the Southwest Quarter; thence North 89 degrees 55 minutes 49 seconds West, along said north line, a distance of 380.61 feet to the point of beginning; thence South 08 degrees 55 minutes 33 seconds West 599.27 feet; thence southwesterly 258.99 feet along a tangential curve concave to the northwest, having a radius of 737.00 feet and a central angle of 20 degrees 08 minutes 03 seconds; thence South 29 degrees 03 minutes 36 seconds West, tangent to said curve, a distance of 317.97 feet; thence southwesterly 218.00 feet along a non-tangential curve concave to the southeast, having a radius of 597.00 feet, a central angle of 20 degrees 55 minutes 20 seconds, and a chord bearing of South 17 degrees 45 minutes 17 seconds West, to the south line of the Northeast Quarter of said Southwest Quarter of Section 11; thence North 89 degrees 56 minutes 06 seconds West, along said south line, a distance of 551.58 feet to the west line of said Northeast Quarter of the Southwest Quarter; thence North 00 degrees 02 minutes 29 seconds West, along said west line, a distance of 1320.59 feet to said north line; thence South 89 degrees 55 minutes 49 seconds East 949.93 feet to the point of beginning.

NOTES

1) The east line of the Southwest Quarter of Section 11, Township 27 North, Range 21 West, Washington County, Minnesota, is assumed to have a bearing of N00°03'25"W.
2) All distances are in feet.
3) Existing Area: 3,461,712 sq ft / 79.47 acres
   Proposed Parcel A Area: 1,047,986 sq ft / 24.06 acres
   Proposed Parcel B Area: 2,413,726 sq ft / 55.41 acres

LEGEND

- ⊙ Denotes Washington County Cast Iron Monument found
- ○ Denotes 1/2 inch x 18 inch iron monument set marked by license no. 57366 unless otherwise shown

ALLIANT ENGINEERING
733 Marquette Ave, Ste 700
Minneapolis, MN 55402
612.758.3080 MAIN
612.758.3099 FAX
www.alliant-inc.com

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the state of Minnesota.

DANIEL EKREM
Print Name

Signature
02/05/2026 — Date
57366 — License Number

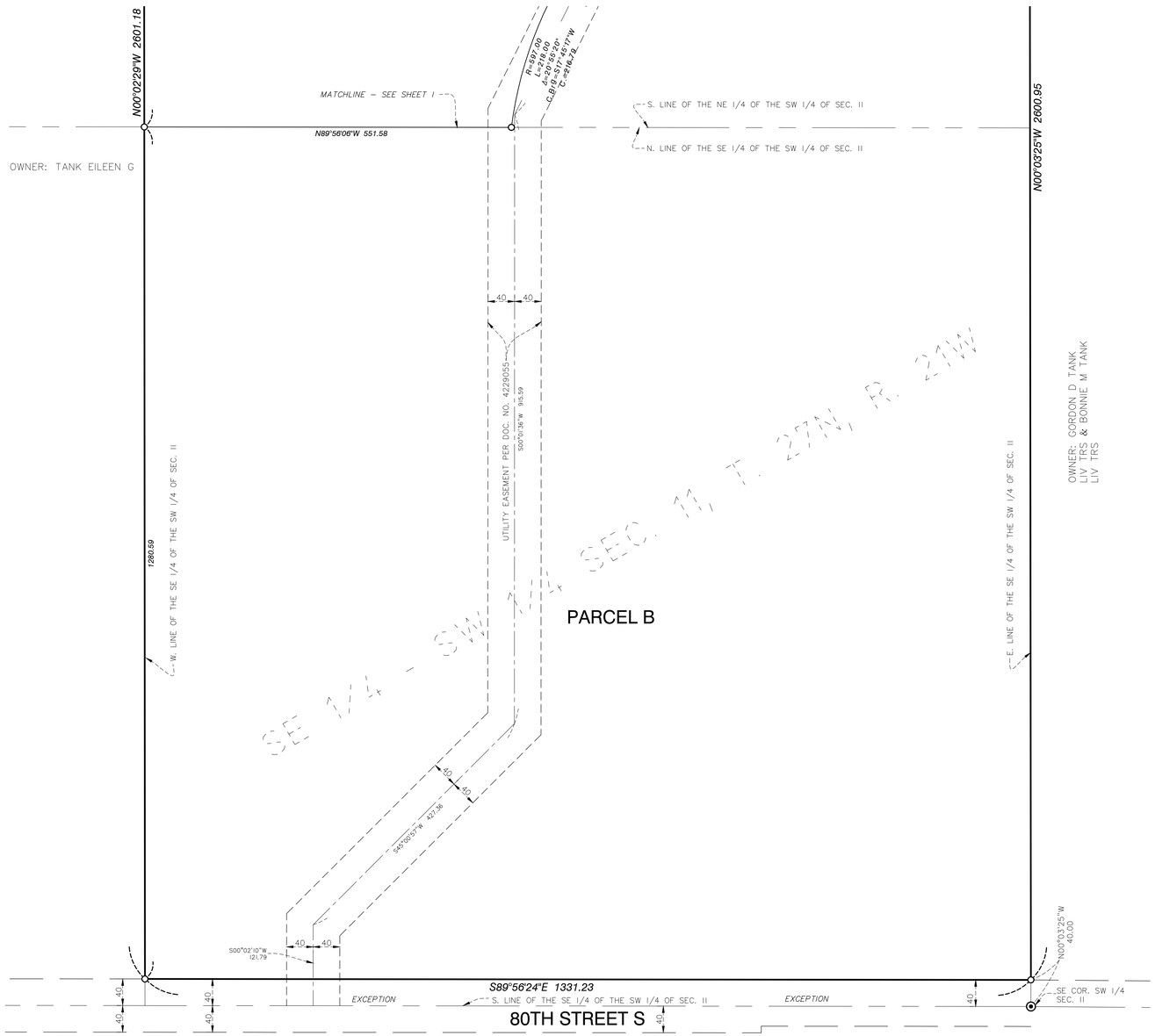
TANK TRUST PROPERTY

SIMPLE LOT DIVISION

10478 80TH STREET S
COTTAGE GROVE, MINNESOTA

DRAWN BY	DE
CHECKED BY	DE
DATE ISSUED	2/5/26
SCALE	1"=100'
JOB NO.	4000570-00
FIELD BY	RS, MN, EL

Drawing name: X:\4000570-00\001\40 Design\000 Source - Survey\SURVEY_LOT SPLIT_East.dwg Feb 05, 2026 - 1:35pm



LEGEND

- ⊙ Denotes Washington County Cast Iron Monument found
- ○ Denotes 1/2 inch x 18 inch iron monument set marked by license no. 57366 unless otherwise shown

N

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SCALE IN FEET

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Minneapolis, MN 55402
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612.758.3099 FAX
www.alliant-inc.com

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the state of Minnesota.

DANIEL EKREM
Print Name

Signature
02/05/2026 57366
Date License Number

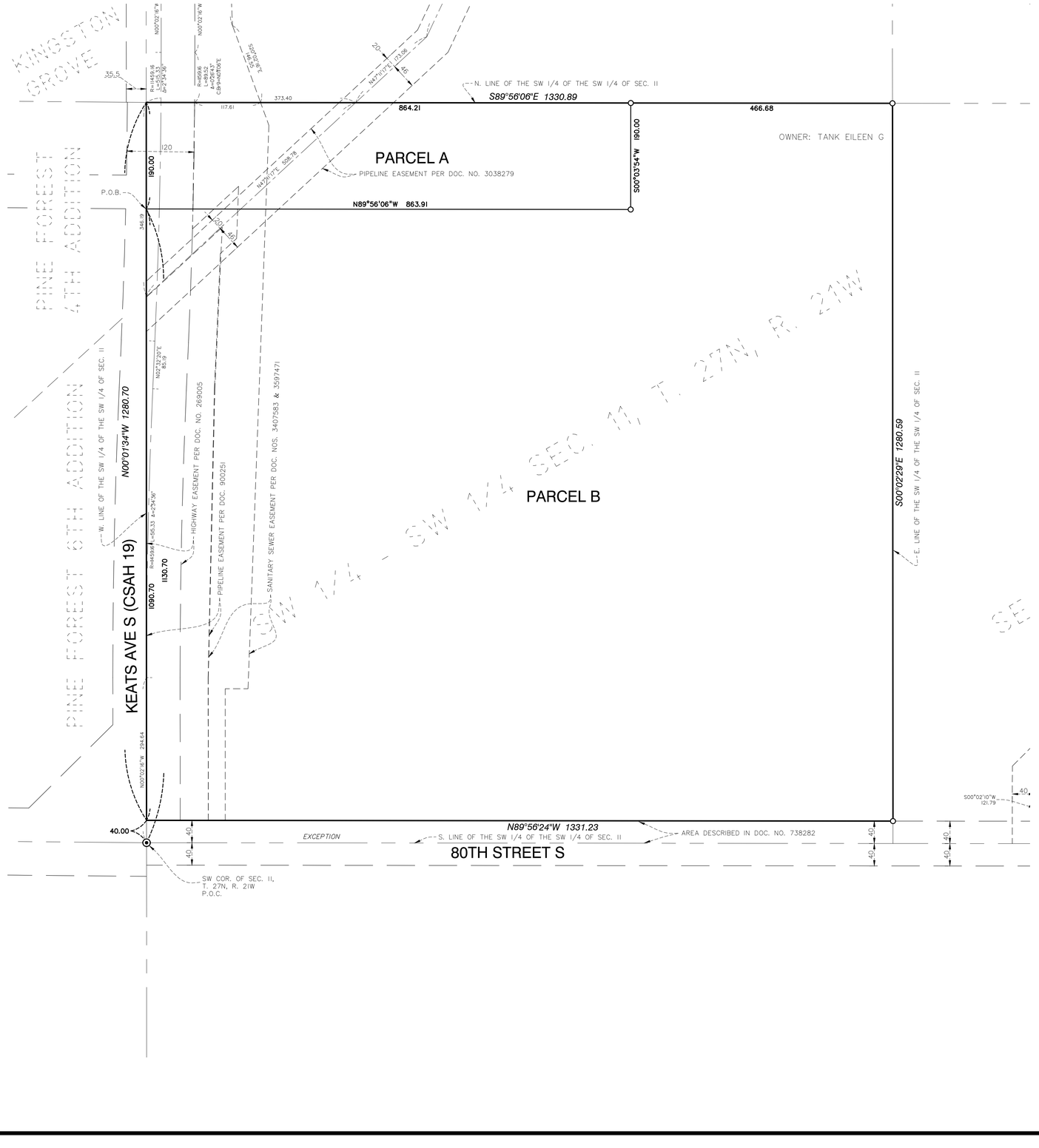
TANK TRUST PROPERTY

SIMPLE LOT DIVISION

10478 8TH STREET S
COTTAGE GROVE, MINNESOTA

DRAWN BY	DE
CHECKED BY	DE
DATE ISSUED	2/5/26
SCALE	1"=100'
JOB NO.	4000570-00
FIELD BY	RS, MN, EL

Drawing name: X:\4000570-00\001\40 Design\000 Source - Survey\SURVEY_LOT SPLIT_East.dwg Feb 05, 2026 - 1:35pm



EXISTING LEGAL DESCRIPTION

The Southwest Quarter of the Southwest Quarter, Except the South 40 feet of Section 11, Township 27 North, Range 21 West , Washington County, Minnesota.

PROPOSED LEGAL DESCRIPTION - PARCEL A

That part of the Southwest Quarter of the Southwest Quarter of Section 11, Township 27 North, Range 21 West, Washington County, Minnesota, described as follows:

Commencing at the southwest corner of said Section 11; thence North 00 degrees 01 minutes 34 seconds West, assumed bearing along the west line of said Southwest Quarter of the Southwest Quarter of Section 11, a distance of 1130.70 feet to the point of beginning; thence continuing North 00 degrees 01 minutes 34 seconds West, along said west line, a distance of 190.00 feet to the north line of said Southwest Quarter of the Southwest Quarter of Section 11; thence South 89 degrees 56 minutes 06 seconds East, along said north line, a distance of 864.21 feet; thence South 00 degrees 03 minutes 54 seconds West 190.00 feet; thence North 89 degrees 56 minutes 06 seconds West 863.91 feet to the point of beginning.

PROPOSED LEGAL DESCRIPTION - PARCEL B

The Southwest Quarter of the Southwest Quarter, Except the South 40 feet of Section 11, Township 27 North, Range 21 West , Washington County, Minnesota.

ALSO EXCEPT that part of said Southwest Quarter of the Southwest Quarter of Section 11 described as follows:

Commencing at the southwest corner of said Section 11; thence North 00 degrees 01 minutes 34 seconds West, assumed bearing along the west line of said Southwest Quarter of the Southwest Quarter of Section 11, a distance of 1130.70 feet to the point of beginning; thence continuing North 00 degrees 01 minutes 34 seconds West, along said west line, a distance of 190.00 feet to the north line of said Southwest Quarter of the Southwest Quarter of Section 11; thence South 89 degrees 56 minutes 06 seconds East, along said north line, a distance of 864.21 feet; thence South 00 degrees 03 minutes 54 seconds West 190.00 feet; thence North 89 degrees 56 minutes 06 seconds West 863.91 feet to the point of beginning.

NOTES

1) The west line of the Southwest Quarter of the Southwest Quarter of Section 11, Township 27 North, Range 21 West, Washington County, Minnesota, is assumed to have a bearing of N00°01'34"W.
2) All distances are in feet.
3) Existing Area: 1,704,614 sq ft / 39.13 acres
   Proposed Parcel A Area: 164,172 sq ft / 3.77 acres
   Proposed Parcel B Area: 1,540,442 sq ft / 35.36 acres

LEGEND

- ⊙ Denotes Washington County Cast Iron Monument found
- ○ Denotes 1/2 inch x 18 inch iron monument set marked by license no. 57366 unless otherwise shown

ALLIANT ENGINEERING
733 Marquette Ave, Ste 700
Minneapolis, MN 55402
612.758.3080 MAIN
612.758.3099 FAX
www.alliant-inc.com

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the state of Minnesota.

DANIEL EKREM
Print Name

Signature
02/05/2026 — Date
57366 — License Number

EILEEN TANK PROPERTY

SIMPLE LOT DIVISION

10052 80TH STREET S
COTTAGE GROVE, MINNESOTA

DRAWN BY	DE
CHECKED BY	DE
DATE ISSUED	2/5/26
SCALE	1"=100'
JOB NO.	4000570-00
FIELD BY	RS, MN, EL

Drawing name: X:\4000570-00\001\40 Design\000 Source - Survey\SURVEY_LOT SPLIT_West.dwg Feb 05, 2026 - 1:22pm

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Bldg. 1 Suite E130
Oakdale, MN 55128

Ph: (651) 704-9970
Bolton-Menk.com

MEMORANDUM

Date: 02/17/2026

To: Paul Sponholz, PE

From: Mike Boex, PE

Subject: Ravara Trails Plan Review
City of Cottage Grove, MN
Project No.: 26X.142116.000

This memo summarizes the review of the Ravara Trails Preliminary Plat Submittal, submitted by Alliant, dated 12/31/2025 (received 01/06/2026).

Preliminary Plat Plans

Sheet 1:

1. On the final plans, identify the horizontal and vertical datums used on the project.
2. On the final plans, please add a note on the cover sheet that the City of Cottage Grove's Standard Specifications for Street and Utility Construction shall govern for all improvements within the public right-of-way, public easement, or public property.

Sheet 2:

3. On future submittals, depict the existing manholes along the MCES interceptor. Record plans can be provided, but manholes should be located for final design.
    a. Existing sewer stubs from the interceptor should also be depicted when connecting.

Sheet 3:

4. The existing condition sheets don't appear to extend into the property where Lots 4-8 Block 2, and 77th Street are located.

Sheet 5:

5. Revise note #8 to also state that no abandonment is allowed in public outlot or public easement, in addition to public right-of-way.

Sheet 6:

6. Add a note to provide well sealing records to the City once complete.

Sheet 15:

7. Outlot C: drainage and utility easement should be provided on the west and north sides to match the proposed easements along Indian Boulevard and CSAH 19.

Sheet 20:

8. Road A sidewalk: When north of Private Road D, the Road A sidewalk should be located on the east side of the road to be adjacent to the future city park. A pedestrian ramp for a crossing should be placed in the northwest quadrant of the Road A/Private Road D intersection.

Bolton & Menk is an equal opportunity employer.

9. Trail connections:
    a. Where bituminous trails intersect, provide 10-ft radii for snow removal operations.
    b. Provide a paved trail from the north plat line down to 77th Street along the gas pipeline over Outlots I, J, B, E, & O. A stub section of trail towards Outlot K (park) is not needed at this time and will occur when the park is developed.
        i. When approaching 77th Street from the north, the trail will turn west in the 77th Street right-of-way and tie into the proposed CSAH 19 trail. Sidewalk along the north side of 77th Street will then connect and terminate into this trail. The intent is to avoid a sidewalk section between the pipeline trail and CSAH 19 trail, as it should be a continuous trail for plowing equipment.
        ii. Midblock Trail Crossings:
            1. Signs: Trail crossing signs (W11-2 & W16-7P) should be placed on the back side of the pedestrian ramp as vehicles approach the crossing; signs should be placed on both sides of the sign post and visible from both directions.
            2. Markings:
                a. Painted 12” crosswalk markings shall be placed at the mid-block crossing of Indian Boulevard since it’s a collector roadway.
                b. Mid-block crossings of typical residential streets do not require markings.
        iii. There are various mid-block trail and sidewalk connections to private streets such as Private Road C. On private streets, the City will defer to the developer and their engineer as to whether crossings will receive signage or other treatments.
    c. The County is studying the potential for a pedestrian crossing between Indian Boulevard and 77th Street. To that end, consider enlarging Outlot E behind Lots 31-32 Block 1 to allow for some additional flexibility for future pedestrian facilities.
    d. Trail should be provided at the Road D cul-de-sac to the Ravine Parkway trail. The trail connection should be as straight as possible and contained within a 20-ft wide city-owned outlot.
        i. Due to this, a sidewalk connection on one side of Road D should be provided.
            1. Streetlights shall be on the sidewalk side of the road.
            2. A preliminary concept was submitted by the developer depicting sidewalk on the east side of Road D. On the south side of the cul-de-sac, the sidewalk should make a 90-degree or more gradual turn so snow removal equipment can make the maneuver. Consider revising right-of-way at Lot 23 Block 10 accordingly, if sidewalk is proposed in this location.
        ii. In addition to the sidewalk, a pedestrian ramp to the cul-de-sac should be provided in-line with the trail for plowing access.

e. Road E to Ravine utloway trail: a 20-ft outlot should be provided through Block 6 for a trail corridor.

10. Provide sidewalk along 77th Street within the development, on the north side of the street.
    a. Extend the sidewalk on the west side of Road C from Road E to 77th St.
    b. Sidewalk should be extended with this project along 77th Street on the west side of CSAH 19, from 78th Street to CSAH 19 on the south side of the street. The city will reimburse the developer for this work.
11. Temporary cul-de-sac:
    a. Due to the number of units, a temporary cul-de-sac will be needed at the end of Road I.
12. Similar to Lot 2 Block 3, extend Lot 1 Block 3 to the gas pipeline easement.
13. Outlots:
    a. Outlots B, J, I, E, O shall be deeded to the City.
    b. Outlot H: this outlot can be removed from the plat, along with the east/west trail connection.
    c. Outlots R & Q: It is anticipated these will be removed from the plat in future submittals.
14. Open space marker locations have been provided by the City's park department; see locations attached to this memo.
15. Indian Boulevard is anticipated to extend east of Ravine Parkway, provide curb radii accordingly for a future extension.
    a. Right-of-way should be dedicated accordingly, thereby modifying Outlot G. A right-of-way easement should be obtained over what is currently depicted as Outlot Q, understanding Outlot Q will not be part of the plat in future submittals.
16. The layout for the site should include the following proposed turn lanes:
    a. Keats Ave/77th St: WB approach needs a shared left/thru lane and a right turn lane.
    b. Keats Ave/Indian Blvd:
        i. Opening Day: WB shared left/thru lane and a right turn lane (construct the curb lines and pavement width for the future lane configuration, including accounting for turning movements).
            1. Maintain EB as signed and striped today (shared left/thru lane, right turn lane)
        ii. Future Lane Configuration: WB approach with left, thru, and right lanes. EB approach restriped, widened, and signed for left, thru, and right turn lanes. See sketch attached to this memo.
            1. Widen Indian Blvd at the intersection with Keats Ave for the future condition to a minimum of 48 feet (2-11' thru lanes (1 EB/ 1WB) + 11' left turn lane (WB) + 11' right turn lane (WB) + 2' curb reaction WB + adequate curb reaction/shoulder EB to help with truck turns off Keats Ave – confirm truck turning movements do not conflict with waiting WB left turning vehicles). Note that the EB shoulder width would be a

minimum 2’ but will likely be wider to accommodate the truck turning (SBL and NBR) to not conflict with vehicles stopped for the WB left.

c. Indian Blvd/Ravine Pkwy: EB approach needs a shared left/thru lane and a right turn lane.

17. Provide truck turning movement verification for all intersections.

18. Provide pedestrian ramps on the east side of Keats Ave at Indian Blvd and the east side of Keats Ave at 77th St

    a. Trail crossing across Indian Blvd on the east side of Keats Ave.

    b. Trail crossing across 77th St on the east side of Keats Ave.

19. No marked or signed pedestrian crossing across Keats Ave; confirm with Washington County.

    a. The traffic study mentions a marked and signed pedestrian crossing with RRFBs or signalized crossing in accordance with Washington County approval.

    b. The signal warrant analysis identified in the traffic study will assist in defining signal needs.

20. Trail connection from Block 1 to the CSAH 19 Trail:

    a. Provide a 20-ft city owned outlot between Lots 26 and 27 Block 1 for a bituminous trail connection to the CSAH 19 trail.

    b. Alternatively, provide a 20-ft city owned outlot between Lots 19 and 20 Block 1 for a bituminous trail connection to the CSAH 19 trail. This would also require a sidewalk extension along Road E north of Road B. With that change, the sidewalk on Road E should be moved to the opposite side of the street.

21. According to the Design of Turn Lane Guidelines and in accordance with Washington County, left and right turn lanes (including tapers) on Keats Ave (55 mph) should be a minimum of 480 feet (300 foot turn lane + 180’ taper).

    a. The speed limit along Indian Blvd and 77th St is anticipated to be 30 mph, matching the sections to the west of Keats Avenue. According to the design of Turn Lane Guidelines, since the approaches to Keats Ave and Ravine Pkwy are stop controlled, the left and right turn lanes should be a minimum of 160 feet + the queue length for a full stop condition with no deceleration in the thru lane.

22. Based on the traffic analysis, the following are recommended for design considerations, alignment shifts, and minimum turn lane lengths (measure from the crossing sidewalk/trail location).

    a. Keats Ave/Indian Blvd

        i. SB left: current design is acceptable (585 feet)

        ii. NB right: current length is acceptable (480 feet) but right turn lane taper should be 180 feet, not 195 feet. Shorten the taper, lengthen the full turn lane.

        iii. Stripe the westbound approach for the opening day configuration (WB shared left/thru and right turn lane) but design and construct the roadway width for the future configuration (left turn, thru, and right turn lanes) – assume 11’ lanes for all movements.

iv. Future WB left: 160’ + 140’ = 300 feet, design for a minimum of 300 feet including taper (1:10 taper appropriate on Indian Blvd) – 190’ turn lane + 110’ taper.

v. WB right: 160’ + 90’ = 250 feet, design for a minimum of 250 feet including taper (1:10 taper appropriate on Indian Blvd) – 140’ turn lane + 110’ taper.

vi. Align the crown of Indian Blvd to match into the current west side crown/centerline.

b. Keats Ave/77th St

i. Alignment for Keats Ave should be down the current alignment/crown which is between the existing centerline (between the NB and SB through lanes).

ii. SB left: current design is 470 feet, extend the southbound left turn lane to 480 feet (300 full lane width plus 180’ taper).

iii. NB right: current length is acceptable (480 feet) but right turn lane taper should be 180 feet, not 195 feet.

iv. WB right: 160’ + 40’ = 200 feet, design for a minimum of 200 feet including taper (1:10 taper appropriate on Indian Blvd) – 90’ turn lane + 110’ taper. Striping for WB approach to be a shared left/thru lane and a right turn lane.

1. East leg will have to be widened minimally at Keats Ave (11’ EB lane with 2’ curb reaction, 11’ WB shared left/thru lane, 11’ WB right turn lane with 2’ curb reaction)

c. Ravine Parkway/Indian Blvd

i. EB right: Design for a minimum of 200 feet including taper (1:10 taper appropriate on Indian Blvd) – 90’ turn lane + 110’ taper. Striping for EB approach to be a shared left/thru lane and a right turn lane.

1. West leg: (11’ WB lane with 2’ curb reaction, 11’ EB shared left/thru lane, 11’ EB right turn lane with 2’ curb reaction)

ii. It is anticipated that the east leg (WB approach) will be striped with a shared left/thru lane and a right turn lane.

<u>Sheet 21:</u>

23. Greenspace grades within right-of-way shall be 2% minimum (revise Ravine Parkway section).

24. Indian Boulevard shall be a 36-ft (face to face) typical section.

a. Indian Boulevard shall have 8-ft bituminous trail o both sides of the road.

b. A pavement section will need to be determined for Indian Boulevard.

25. All residential streets will need to be constructed with a temporary bituminous wedge (city detail STR-26) to protect the curb until the final wear course is placed per the conditions outlined in the development agreement.

a. Indian Boulevard and Ravine Parkway shall receive the final wear course as soon as the project schedule will allow. If late year construction prevents final wear course paving, the wedge shall be utilized until wear can be placed the following spring.

26. Cross sections should depict 6-ft sidewalk, where present.

27. It is understood that all private streets in the next submittal will be 26-ft in width, and that no-parking signage will be provided on both sides of the private streets.

    a. Final plans will need to clearly identify private infrastructure. Private streets will contain private storm sewer and private street lighting.

28. Road A should be signed for no-parking on the east side of the street south of Private Road D, due to the anticipated traffic volumes in the area.

29. Permitting:

    a. Northern Natural Gas: Public street and utility crossings will need to be permitted, as will trail encroachments. Copy the City on all correspondence and provide documentation of approvals. Research utility crossing requirements and perform potholes to verify pipeline elevations at each utility or street crossing. The City may require casings across the easement during final design for certain utility crossings. Proposed grading appears place fill over the pipelines in some areas (up to 4-ft), confirm pipeline requirements related to cover (both min. and max.).

    b. MCES: Similarly, permitting and approvals will need to be obtained from MCES.

Sheet 22:

30. The urban townhomes (clusters of 6): there is no distinct linework for driveways depicted other than lines extended from each lot line. Previous discussions with the developer indicate there may be rock mulch areas between driveways – please depict this on future plan submittals.

31. Public residential roads, such as Road A, shall use D428 curb per the city standard detail plate.

    a. Indian Boulevard should remain B618 curb.

Sheet 23:

32. Per city policy, stop signs shall not be placed at residential t-intersections (e.g. Road J to Road I). Please adjust all accordingly.

33. Barricades and future street extension signs per city standard details STR-31 and 32 shall be placed at the end of streets to be extended. Place a barricade at the end of any trail or sidewalk to be extended in the future as well.

Sheet 24:

34. All sidewalks within the development shall be noted 6-ft in width.

35. As depicted, the trail crossing across Indian Blvd is set back over 75 feet from Keats Ave. A gradual s-curve should pull the trail closer to the CSAH 19 intersection as the trail approaches Indian Boulevard.

Sheet 26:

36. As depicted, the CSAH 19 trail crossing across 77th St is set back over 75 feet from Keats Ave. A gradual s-curve should pull the trail closer to the CSAH 19 intersection as the trail approaches 77th Street.

Sheets 28-29:

37. One of the existing poles identified for relocation is an outdoor warning siren; coordination with Cottage Grove public safety will be required.

38. Label Indian Blvd. and 77th St. in plan view.
39. Location of the centerline/crown does not appear to be accurate with existing lanes. Verify. Should be located at or near the lane lines.
40. Indian Blvd. milling or full depth removal may not be necessary in the northbound left turn lane when just adding a northbound right turn lane.
41. Coordinate work with the planned Keats Ave/80th St roundabout as this may affect the tapers and tie-ins on Keats Ave south of 77th St. Obtain CAD information from Washington County.

Sheet 30:

42. Do not include the "Washington County Guidance Document" in the plans.

Sheet 31:

43. Retaining wall notes are present; clarify if there are any intended on this project.

Sheet 32:

44. Ensure 2% minimum grade in all greenspaces.
45. Provide 3(H):1(V) maximum slopes in all areas; review slopes behind Blocks 65-67.
46. The future City park that will be constructed on the north side of the development will require grading to prepare for future park areas. The Developer shall rough grade and remove material from this area using plans reviewed and approved by the City Engineer and Parks Director.

Sheet 33:

47. Label all street high and low points; for example Road I near Station 7+50.
48. Lot 32 Block 10 cannot be built as shown; the proposed street must be extended further for the driveway and a temporary turnaround must be provided on Road I.
49. Rear-yard storm sewer:
    a. Per the City's engineering standards, there should only be a maximum overland drainage distance of 3-4 lots before providing a catch basin. See Lots 17-11 Block 8; check rest of project for conformance).
    b. Rear yard storm sewer should be limited to 300-lf maximum lengths as straight as possible, from the street for jetting.
50. Review drainage at the end of Road I such that it doesn't impact the adjacent property. Identify a temporary EOF route.
51. Freeboard/EOF standards:
    a. For backyard and side-yard conveyance and temporary ponding areas, there must be at least 1 foot between the overland overflow elevation and the low adjacent grade elevation of the adjacent structure. The Lot 13 Block 8 low adjacent grade (912.9) does not meet this standard to the rear-yard EOF (912.22).
52. Profiles should be provided depicting the grading impacts over the existing SWWD storm pipe. Provide a submittal documenting the proposed bury depths are compatible with the pipe class. Depict all existing structures as some do not appear on the submitted plans.

53. Drainage and utility easement should be provided when drainage from one lot crosses another. Provide additional easement or center drainage swales within the provided easement (e.g. Lot 4 Block 6).

Sheet 34:

54. Driveway grades shall not exceed 10%; please review Private Road E and the rest of the project for conformance.

Sheet 35:

55. Freeboard/EOF standards:

    a. For stormwater facilities with emergency overflows, the low adjacent grade elevation for all new structures must be a minimum of 3 feet above both the peak surface water elevation for the 100-year precipitation event and 2 feet above the emergency overflow elevation of any immediately adjacent new stormwater basin.

        i. The Lot 8 Block 9 low adjacent grade (907.2) does not meet this standard to the pond HWL (904.65), nor the EOF (905.83). Lots 4 and 9 should also be adjusted relative to the EOF.

        ii. Lot 17 Block 5 on Sheet 37 should also be modified.

56. Update the EOF paths on the plan to clarify the intended overflow routes around the ponds (Pond 3 to Pond 2 to Pond 1). If correct, the Pond 2 EOF will control freeboard to Block 6 around Pond 3. Please revise Lots 13, 14, 16.

57. All pond access routes: Provide a maximum longitudinal slope of 6(H):1(V) for accessibility.

58. Due to the needed right-of-way for a future Indian Boulevard extension, the depicted pond grading should be reevaluated. The pond HWL shall be completely encompassed within the revised Outlot G. Rough grading of the new right-of-way should also be provided.

59. Provide a 5-ft minimum horizontal distance at a 6(H):1(V) maximum slope immediately adjacent to a pedestrian facility (trail) if the adjacent slopes are steeper than 4(H):1(V).

60. The Pond 1 HWL is above the catch basin low point of Ravine Parkway. Provide 1-ft of freeboard from catch basin rim elevations to all pond HWLs. Check entire plan for conformance, including Pond 2.

Sheet 36:

61. Each lot shall provide a minimum 20-lf backyard at a maximum 10(H):1(V) slope. Check all lots for conformance (e.g. Lot 17 Block 3).

Sheet 39:

62. Ravine Parkway must be designed and built to State Aid Standards. All requirements are outlined in the MnDOT State Aid Manual (https://www.dot.state.mn.us/stateaid/manual.html). Crest and sag curves should be designed for 40-mph on Ravine Parkway.

63. Indian Boulevard shall also be designed and built to State Aid Standards (30 mph).

64. Maximum intersection approach grade (all streets): provide a 2% maximum grade for the first 100-ft approaching an intersection (at a yield or stop condition), as measured from the intersecting street's curb line. Please ensure conformance.

65. Road Profiles: confirm labeling on intersecting streets in profile. It appears that Private Road A intersects Road A at station 0+00, however the profile labels an intersection of Road D.

66. Final plans shall include intersection details to clarify drainage patterns and grades for all street intersections (e.g. grades around radii, where crown of street will be carried through or warped, etc.). The need for valley gutters will be reviewed once intersection details and drainage areas are provided, but typically valley gutters are placed when longitudinal grades are less than 2%.

Sheet 43:

67. Pond Notes #2: a 12" minimum layer of topsoil shall be placed over the 12" clay liner (24" minimum subcut). The pond section view should also be updated. These comments apply to all subsequent sheets and notes.

68. Confirm pond grading is in accordance with city standard detail STO-15; slopes should be 4(H):1(V) maximum above the NWL. It appears the slopes between 906-909 may be greater. Labeling additional contours for clarity on Sheet 34 may help.

69. All ponds: revisit outlet structure rim elevations and ensure they can be accessed given the surrounding pond grading. For example, the Pond 2 rim (906) is 2-vf above the proposed HWL and 9-vf above the contour depicted. Structure grates should be accessible to public works staff.

    a. The city will allow submerged outlet pipes on this project to better fit structures into pond slopes. The top of submerged pipe should be 1-vf (min.) below the NWL, and the invert should be 2-vf (min.) above the bottom of the pond. A minimum adverse grade of 1% from submerged invert to outlet structure should be provided.

Sheet 54:

70. Redundant portions of watermain on Indian Boulevard shall be removed from the plan. Refer to the sketch attached to this memo for the 12" watermain routes through the development.

71. Sanitary Sewer: additional coordination will occur during final design to ensure sewer depths can adequately serve future development.

    a. Similar to watermain, sewer will likely need to extend beyond the Road D cul-de-sac to provide service to the parcel to the east, as it's anticipated to develop from 70th Street to the south.

    b. Road A sewer is anticipated to serve the property to the north.

72. Hydrant spacing:

    a. Obtain the following coverage per the City's Engineering Guidelines document:

        i. 300-ft radius: covers entire single-family lot

        ii. 250-ft radius: covers entire multi-family lot

73. Valves: provide valves such that 20-25 maximum homes are isolated at a time.

74. Where needed, irrigation services shall conform to city standard detail SER-12 (4" DIP and gate valve).

Sheet 55:

75. Review hydrant and streetlight conflicts throughout the project (e.g. between Lot 1 Block 60 & Lot 6 Block 61, between Lots 5/6 Block 1).

a. A conflict also appears on Sheet 64 between Lot 5 & Lot 6 Block 1.

76. Watermain and sewer should be sufficiently extended beyond a permanent street section such that the permanent street (curb and gutter) is not disturbed once utilities are connected to. Review the end of Road A and consider obtaining easement from the landowner to the north to extend utilities, or shorten the proposed permanent road section.

Sheet 56:

77. Provide a temporary hydrant, and label it as such, for flushing at the north side of Road I.

Sheet 57:

78. All 12" water main shall receive butterfly valves per city standard detail WAT-4 and the city standard specifications.

Sheet 58:

79. Provide a temporary hydrant, and label it as such, for flushing at the east side of Indian Boulevard and Ravine Parkway.

Sheet 59:

80. The watermain stub at 77th/Road C in the easterly direction shall conform to city standard detail WAT-8.

a. The sewer and water stubs to the south of the intersection should be removed at this time due to the unknown configuration of the development to the south.

i. A 12" cross should be placed at the intersection of Road C and 77th Street to provide flexibility in the future should a southerly extension be desired.

81. Since 77th Street will be fully constructed with utilities, a ghost plat should be submitted for the south side of the road, and services provided during final design.

82. The 12" watermain on 77th Street is not needed and can be an 8".

Sheet 61:

83. Easement widths will be confirmed when plan and profiles are provided for the proposed utilities. Generally, a minimum easement width should be twice the pipe depth centered over the pipe, or 10' (min.) on each side of the pipe, whichever is greater.

a. Review all areas and provide easement between Lot 6 Block 22 and Lot 1 Block 23, similar to the area between Blocks 64 & 65.

b. Ensure storm pipes are centered in easements (CB-536 to CBMH 535).

c. Areas along the north and south plat lines are a concern.

i. Accounting for structure diameter, a few feet of clearance are provided to the north property line from MH-444A. Obtain additional permanent easement to the north as outlined above.

ii. Additional permanent easement is needed in the area of Lots 34-37 Block 6.

84. Avoid placing storm pipe behind the curb as that location typically conflicts with streetlight bases, signs, and potential boulevard tree plantings. This may require structures to be moved or additional structures to be added; storm manholes can be used as necessary if catch basins aren't needed for drainage. This comment applies to all sheets.

a. For example: on Indian Boulevard station 13+00 the storm pipe is in conflict with the light pole foundation, and at the Road G/Road E intersection the storm pipe could be in conflict with the street name sign post. Please adjust all locations.

b. Address the storm pipe behind curb on road A.

85. Limit rear yard storm sewer to a 300-ft maximum length of run from the street for jetting purposes, keeping them as straight as possible. For example, the section behind Block 5 is approximately 750-lf.

Sheet 64:

86. Evaluate options to reduce potential short-circuiting of treatment in Pond 4 by creating more separation between FES-700 and OCS-451. This may also help the orientation of the skimmer opening relative to the pond slope given the outlet pipe and weir wall orientation.

a. Pond 2 should also be evaluated; OCS-203 should be shifted to the north.

b. Pond 3 could also be improved; FES 900 located only about 70 feet from OCS 1103.

Sheet 68:

87. 27" diameter structures are not allowed and are not part of the Cottage Grove standard details. City standard detail STO-9 requires a 48" (minimum) diameter structure; please revise the structure schedule.

88. The storm sewer structure schedule provided with the final plans shall identify the applicable City Detail Plate number and special notes such as sump depth if applicable.

a. The first storm structure upstream of a stormwater basin within the street shall be a sump structure. See applicable city detail plates.

Sheet 69:

89. Clear all trees within Outlot K as a part of this project.

Sheet 77:

90. Boulevard trees should be provided on Indian Boulevard, similar to Ravine Parkway.

91. A vegetative/berm/fence buffer is also required for lots that back up to Ravine Parkway. Additional trees should be added here to create a buffer that is 50% opaque at maturity.

a. Create a vegetative buffer easement that the HOA has rights to, ensuring landscaping does not get removed.

92. Ensure there is a tree between every townhome group.

93. Outlots B, J, I, E, O shall be restored with MnDOT Seed Mix Mesic Inslope (MI), formerly 25-141.

Sheet 85:

94. Street lighting within the neighborhood shall conform to the east ravine standard pole (city detail LGT-8).

95. A cobrahead light per city detail LGT-13 shall be provided at street connections to CSAH 19 (Indian Boulevard and 77th Street).

96. Indian Boulevard:

a. Streetlights (LGT-8) shall be provided on both sides on Indian Blvd due to trail being on both sides of the street. Provide 250 to 300-ft spacing each side of road in a staggered fashion.

97. Provide streetlights at intersections and any mid-block pedestrian crossings. Re-space lights as necessary.

a. Some residential lights are spaced greater than 300-lf. Try to space 200-250-lf at lot lines to the greatest extent possible, with 300-lf maximum spacing used sparingly.

98. Service cabinet and conduit locations will be reviewed in more detail when final plans depicting phasing are submitted.

Traffic Study:

99. Provide a 10-year after Build analysis (approximately 2040).

a. This will help to identify when a signal or roundabout may be necessary at Keats Ave and Indian Blvd.

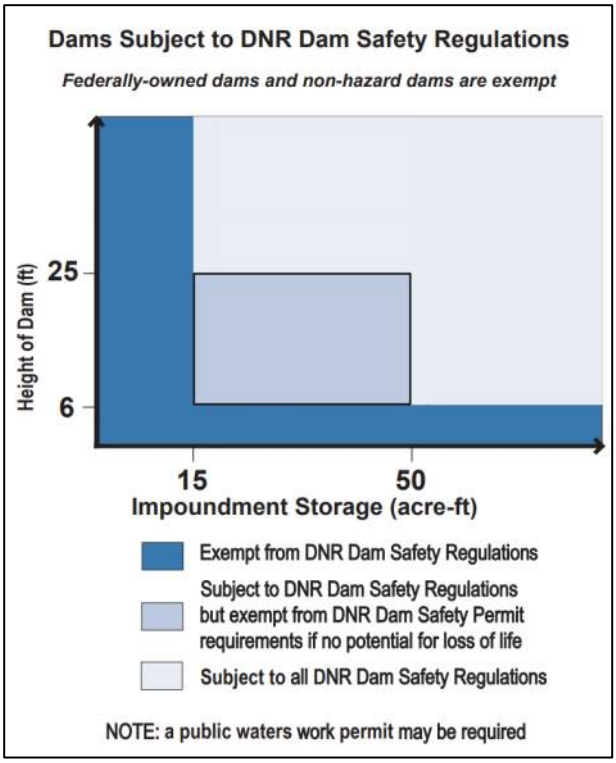
100. Provide an existing crash analysis at the analyzed intersections to understand existing safety concerns, to identify where they may be concerns with an increase in traffic volume from the development, and identify existing concerns that could be alleviated with development improvements. Add the safety analysis data to the Appendix to support the content shown in the report.

101. Provide review of signal warrants at Keats Ave and Indian Blvd with and without the development to understand whether a signal is warranted or not today (or how close to meeting a warrant) and due to the development

Stormwater:

102. As submitted, outflow from Pond 1 (366 cfs) is routed to the 72" Central Draw storm drain; the Central Draw pipe has capacity for about 190 cfs without surcharging, but the full pipe capacity is not available for use by Ravara Trails. Pond 1 outflow to the Central Draw storm drain needs to be limited to the unit peak outflow rates of 0.09 cfs/acre and 0.56 cfs/acre for Subwatershed ER-A3 and ER-A5.4, respectively. Some of the existing surface storage should be utilized as it is today, with consideration to adjacent properties and existing HWLs.

103. Dam Safety: Pond 1 includes an embankment 16 feet high (906 – 890). The pond volume is 36 acre-feet at elevation 906. The height and volume of the dam indicate that it is: "*Subject to DNR Dam Safety Regulations but exempt from DNR Dam Safety Permit requirements if no potential for loss of life*." Please work with the DNR Dam Safety Unit to determine the permit requirements; potential low hazard determination and exempt from permit requirements.



104. HydroCAD:

    a. The proposed condition model (PDRN) simulates the OFF-1 100-year flow as 370 cfs and 4.95" runoff. The existing condition model (EDRN) simulates the OFF-1 100-year flow as 439 cfs and 4.61" of runoff. Clarify why the peak flows and runoff volumes differ when the drainage area and curve number do not.

    b. HWL of Pond 1 is higher than Ponds 2 & 3. Please verify that the HydroCAD modeling has included consideration of variable tailwater and/or reverse flows.

    c. The outlet structures for Ponds 1, 2, 3 and 4 (nodes 5P, 12P, 2P and 17P) simulate the OCS weir wall with a breadth of 4 or 5 feet. Please correct this breadth dimension to 0.5 feet or explain your reasoning.

    d. Ponds 1, 2 and 3 OCS weirs are simulated with 4:1 sideslopes. Please simulate the OCS weirs as rectangular or explain your reasoning.

    e. The EOF elevation for Pond 2 (Sheet 43) 905.83 does not match the EOF Elevation in HydroCAD of 905.5 feet. Please be consistent.

    f. EOF Elevation for Pond 4 (Sheet 43) 912.75 does not match the EOF Elevation in HydroCAD of 912.65 feet. Please be consistent.

105. Curve Numbers: Subwatersheds A1, A2, A3, and A4 include pervious areas with curve numbers (CN) set to 69 (50-75% Grass, Fair Condition, HSGB) and 79 (<50% Grass, Poor, HSG B). As per Section 6.1.4 of the Surface Water Management Plan please consider modeling the future condition grass/open space areas of HSGB soils with a CN of 61.

106. The Storm Water Management Plan report on page 5 of 6 explains that the Proposed TP Load of 23.4 lbs. exceeds the SWWD TP Load Limit of 10.87 lbs. Additional BMPs or purchase of mitigation credits will be required.
    a. The proposed condition MIDS model results indicate that the TP Load is 37 lbs./year. Please revise the proposed TP load to 37 lbs. within the stormwater narrative report. Additional BMPs and/or purchase of mitigation credits of (26.13 lbs. = 37-10.87) will be required to achieve compliance.
    b. Since the Northeast corner of the development site lies outside of the 10-year GW Capture Zone, please consider use of infiltration for volume control and water quality treatment in this area.
107. Ponds:
    a. Please correct Table 4 on Page 4 of 6 in the Stormwater Management Plan. The Table appears to be jumbled with columns 2 and 3 having NWL and Watershed areas matching BMPs in downstream order and remaining columns possibly arranged by Pond number. Please correct the table and the NURP 2.5" Rainfall HydroCAD results.
    b. The Permanent pool volume within Pond 4 of 49,152 cu. ft. (0.72 " of runoff) is less than the runoff computed in HydroCAD for a 2.5" rainfall of 69,086 cu. ft. (1.01" of runoff). Please increase the permanent pool storage within Pond 4 or explain why this is not feasible.
108. Rational Storm Design:
    a. The Storm Sewer Schedule on Sheet 68 indicates pipe sizes and elevations but doesn't include the Rational Design Flows & Velocities. Please provide the additional design details.
        i. On-site storm sewer should be sized to a 5-year rational method design. Submit design calculations for the storm sewer system and a drainage area map showing each catchment with manholes and catch basins labeled. Include individual pipe segment velocities with calculations for review. Trunk facilities should be analyzed and designed to accommodate the 100-year ponded discharges plus 5-year rational flows from areas that enter the trunk to be carried to the next storage area downstream.
            1. Pipe sizes and slopes should be selected to provide a minimum open channel velocity of 3 feet per second.
            2. Maximum storm sewer velocities should be kept at 10 feet per second or less.
            3. When changing pipe sizes in structure, match crown of pipe elevations instead of inverts.
            4. Please show storm catch basin IDs, pipe sizes, grades, elevations, and drainage areas on the plans consistent with the rational design tables.
            5. Pipe outlets to wet ponds should be placed at the NWL and have design velocities of 6 fps or less. Pipe outlets into filtration basins or other overland discharge should have design velocities of 4 fps or less.
109. The SWPPP might be improved by addressing the following:

a. Tabulate quantities of all erosion prevention and sediment control BMPs.

110. Models and CAD Files: Please note that digital copies of the final version stormwater models (HydroCAD and P8) and shapefiles or CAD drawings of existing and proposed drainage areas are to be submitted to the city once the review and revision process is complete.



SITE PLAN DATA:

PIDS: 11.027.21.24.0001	60.54 AC
11.027.21.23.0001	20.01 AC
11.027.21.32.0001	40.34 AC
11.027.21.31.0001	79.47 AC
11.027.21.33.0001	39.13 AC
TOTAL GROSS AREA	239.49 AC
OUTLOT P	35.36 AC
OUTLOT Q	55.41 AC
TOTAL PROJECT AREA AREA	148.72 AC
OUTLOT K (PARK DEDICATION)	4.15 AC
EXISTING ROW (KEATS AVE S)	3.55 AC
PROPOSED ROW DEDICATION (KEATS AVE S)	3.89 AC
NET TOTAL PRODUCT AREA	137.13 AC
PROPOSED ROW (FUTURE RAVINE PKWY)	8.89 AC
PROPOSED ROW (FUTURE INDIAN BLVD S)	3.90 AC
PROPOSED ROW (INTERIOR NORTH)	7.19 AC
PROPOSED ROW (INTERIOR SOUTH)	10.53 AC

SITE PLAN OUTLOT DATA:

OUTLOT	OWNER
OUTLOT WITH PONDS: A, D, F, G	CITY
OUTLOT: K (CITY PARK)	CITY
OUTLOT WITH PIPELINE: B, E, I, J, P, O	HOA/DEVELOPER
OUTLOT: C, H, L, M, N, O	HOA/DEVELOPER

SITE PLAN LOT DATA:

URBAN TOWNHOME:

LOT WIDTH MINIMUM:	22 FT
LOT DEPTH MINIMUM:	72.5 FT
END LOT WIDTH:	27 FT
FRONT DOOR SETBACK:	15 FT
KEATS AVE FRONT DOOR SETBACK:	25 FT
GARAGE SETBACK:	25 FT
CORNER SETBACK:	20 FT
BUILDING SEPARATION:	20 FT

SUBURBAN TOWNHOME:

LOT WIDTH MINIMUM:	25 FT
LOT DEPTH MINIMUM:	72 FT
END LOT WIDTH:	30 FT
FRONT SETBACK:	25 FT
CORNER SETBACK:	20 FT
BUILDING SEPARATION:	15 FT

VILLA SINGLE FAMILY LOTS:

LOT WIDTH MINIMUM:	40 FT
LOT DEPTH MINIMUM:	130 FT
SIDE YARD SETBACK:	5 FT
SIDE YARD SETBACK:	5 FT

65' SINGLE FAMILY LOTS:

LOT WIDTH MINIMUM:	65 FT
LOT DEPTH MINIMUM:	130 FT
SIDE YARD SETBACK:	5 FT (GARAGE SIDE)
	7.5 FT (NON-GARAGE SIDE)

LOT TYPE:	UNITS	AREA (AC)	DENSITY (UNITS/AC)
URBAN TOWNHOMES	192	17.83	10.77
SUBURBAN TOWNHOMES	114	15.31	7.45
VILLA SINGLE FAMILY LOTS	105	34.42	3.05
65' SINGLE FAMILY LOTS	164	69.56	2.36
TOTAL UNITS	575	137.12	4.19

GUEST PARKING STALLS: 73

IMPERVIOUS SURFACES:

MAX. IMPERVIOUS SURFACE ALLOWED:

VILLA SINGLE FAMILY LOTS = 50% MAX. PER LOT

65' SINGLE FAMILY LOTS = 40% MAX PER LOT

ATTACHED DWELLINGS = 40% OF TOTAL AREA

SITE NOTES:

1. SEE SHEET 21 FOR TYPICAL LOT DETAILS AND TYPICAL ROAD SECTIONS.
2. ALL CURB RETURNS ARE MEASURED FROM BACK OF CURB UNLESS OTHERWISE NOTED.

LEGEND:

- EASEMENT LINE
- BUILDING SETBACK
- PROPERTY LINE
- LOT LINE
- ROW
- STOP/STREET SIGN
- STREET LIGHT
- POND MAINTENANCE ACCESS (TURF)
- CITY OPEN/PARK MARKER SIGN

N

0 75 150 300

SCALE IN FEET

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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 Civil Engineer under the laws of the State of MINNESOTA.

Clark Wickland — 40922 — License no.

Date

PRELIMINARY FOR REVIEW ONLY NOT FOR CONSTRUCTION

QA/QC CHECK

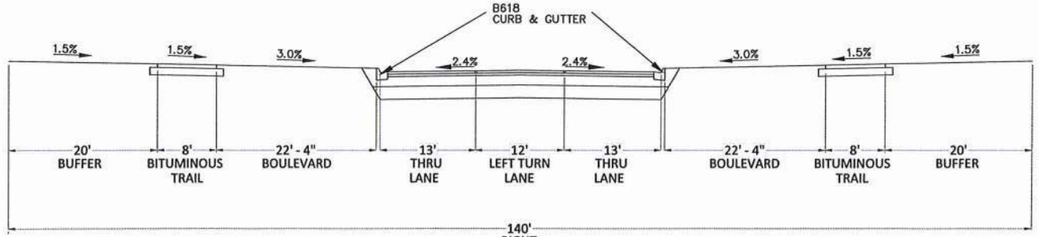
By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

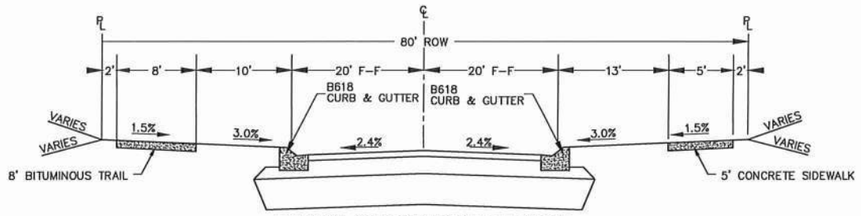
File Location: X:\4000\570-00\00-ref Design\00 Sheets - Preliminary\00Title.dwg Plotted By: Logan Johnstone on December 31, 2025 By: Clark Pfe

TYPICAL ROAD SECTIONS



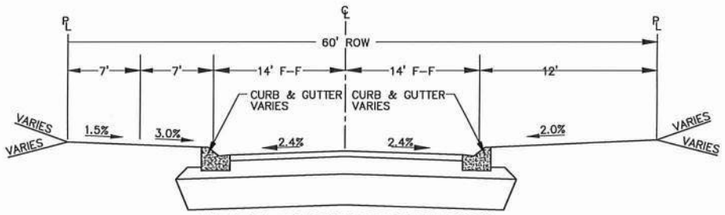
RAVINE PARKWAY S (BY OTHERS) 140' ROW ROAD SECTION

NOT TO SCALE



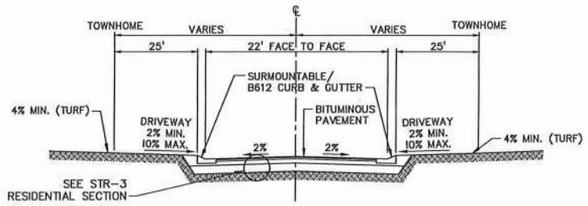
TYPICAL 80' ROW ROAD SECTION

NOT TO SCALE



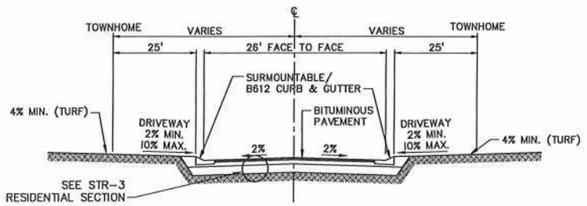
TYPICAL 60' ROW ROAD SECTION

NOT TO SCALE



SUBURBAN TH PRIVATE ROAD SECTION (22' F-F)

NOT TO SCALE

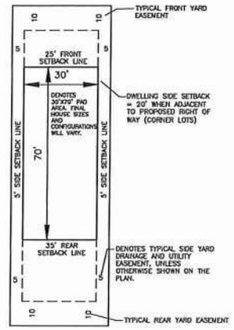


URBAN TH PRIVATE ROAD SECTION (26' F-F)

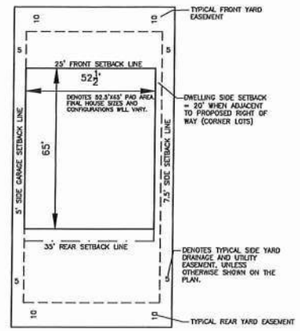
NOT TO SCALE

DEVELOPMENT LOT DETAILS

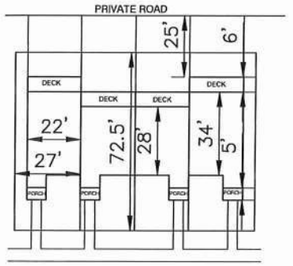
40'x130' SINGLE FAMILY



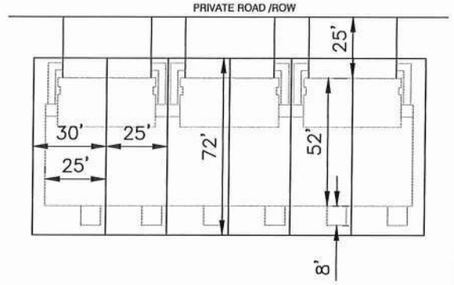
65'x130' SINGLE FAMILY



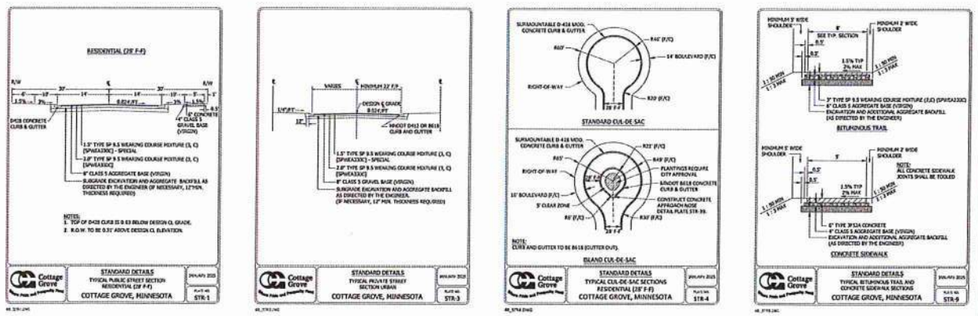
URBAN TOWNHOME
FRONT FACE/REAR LOAD



SUBURBAN TOWNHOME
PATIO/FRONT LOAD



CITY OF COTTAGE GROVE STANDARD DETAILS



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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN NOTES AND DETAILS

DATE	DESCRIPTION
2025-12-31	City Submittal

CERTIFICATION

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PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

21

Sheet 21 of 91

File Location: X:\4000570-000\01-Civil Design\02-Drawings - Preliminary\PDF\Dwg - Plotted By: Logan Josephson on December 31, 2025 at 12:47:02 PM

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OWNER: COEBEL THOMAS A & MARY ANN

N

0 25 50 100
SCALE IN FEET

OUTLOT K

OUTLOT N

OUTLOT L

OUTLOT M

KEATS AVE S (CSAH 19)

PRIVATE ROAD D

PRIVATE ROAD B

PRIVATE ROAD C

PRIVATE ROAD E

PRIVATE ROAD F

ROAD A

ROAD H

5' CONCRETE SIDEWALK PER STR-9

PED RAMP

B618 CURB AND GUTTER

STREET/STOP SIGN

STREET LIGHT (TYP)

TRANSITION FROM B618 TO D-412

TRANSITION FROM B618 TO D-428

8' BITUMINOUS TRAIL PER STR-9

BLOCK 14
BLOCK 15
BLOCK 16
BLOCK 17
BLOCK 18
BLOCK 19
BLOCK 20
BLOCK 21
BLOCK 22
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BLOCK 28
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BLOCK 67

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS
COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW A

DATE	DESCRIPTION
2025-12-31	City Submittal

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PRELIMINARY
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Clark Yackmut — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

22

Sheet 22 of 91

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW B

DATE	DESCRIPTION
2025-12-31	City Submittal

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FOR REVIEW PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund
Date 40922
License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW C

DATE	DESCRIPTION
2025-12-31	City Submittal

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Clark Wicklund
Date 40922
License no.

QA/QC CHECK

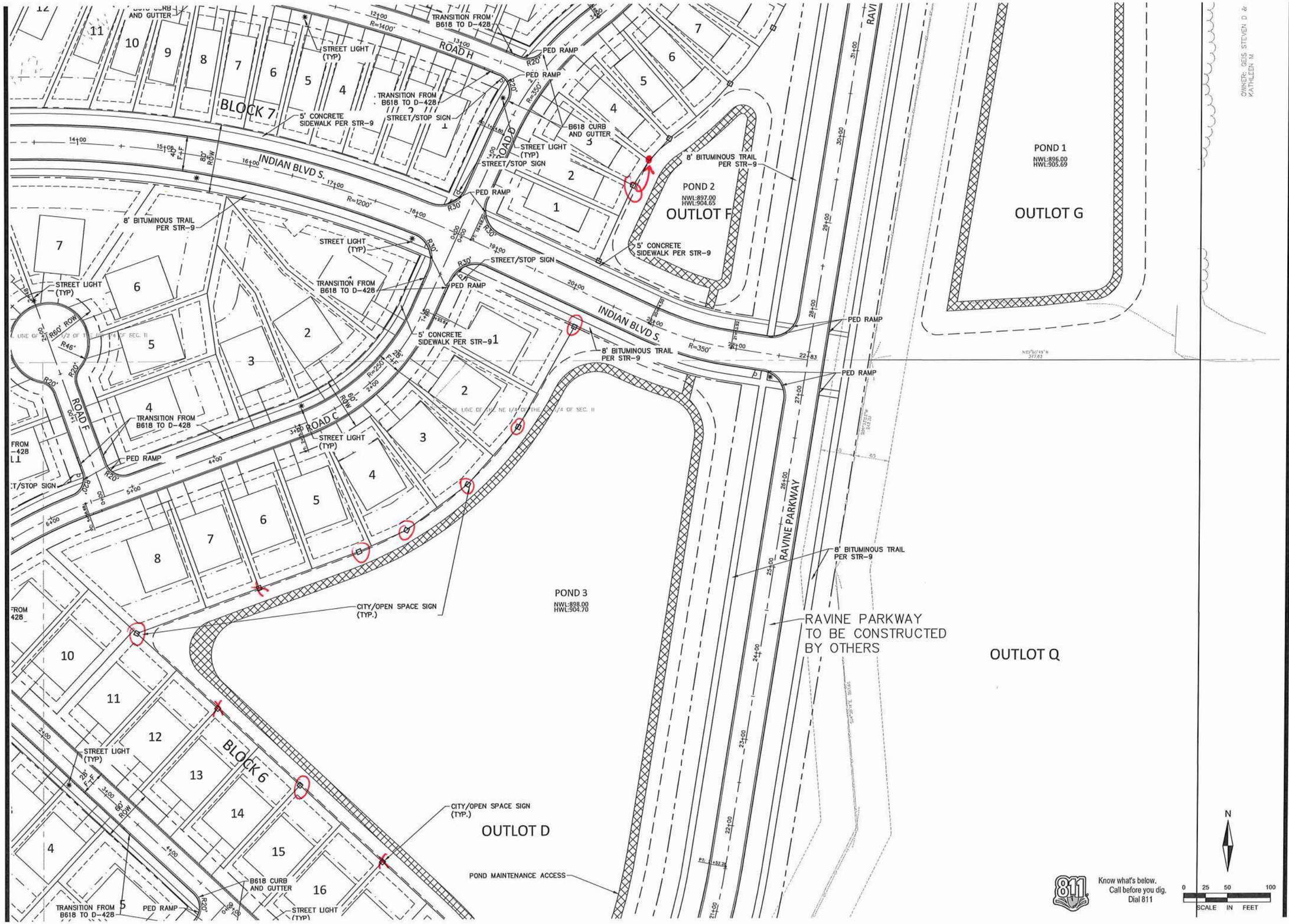
By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

24

Sheet 24 of 91



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW D

DATE	DESCRIPTION
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Date 40922
License no.

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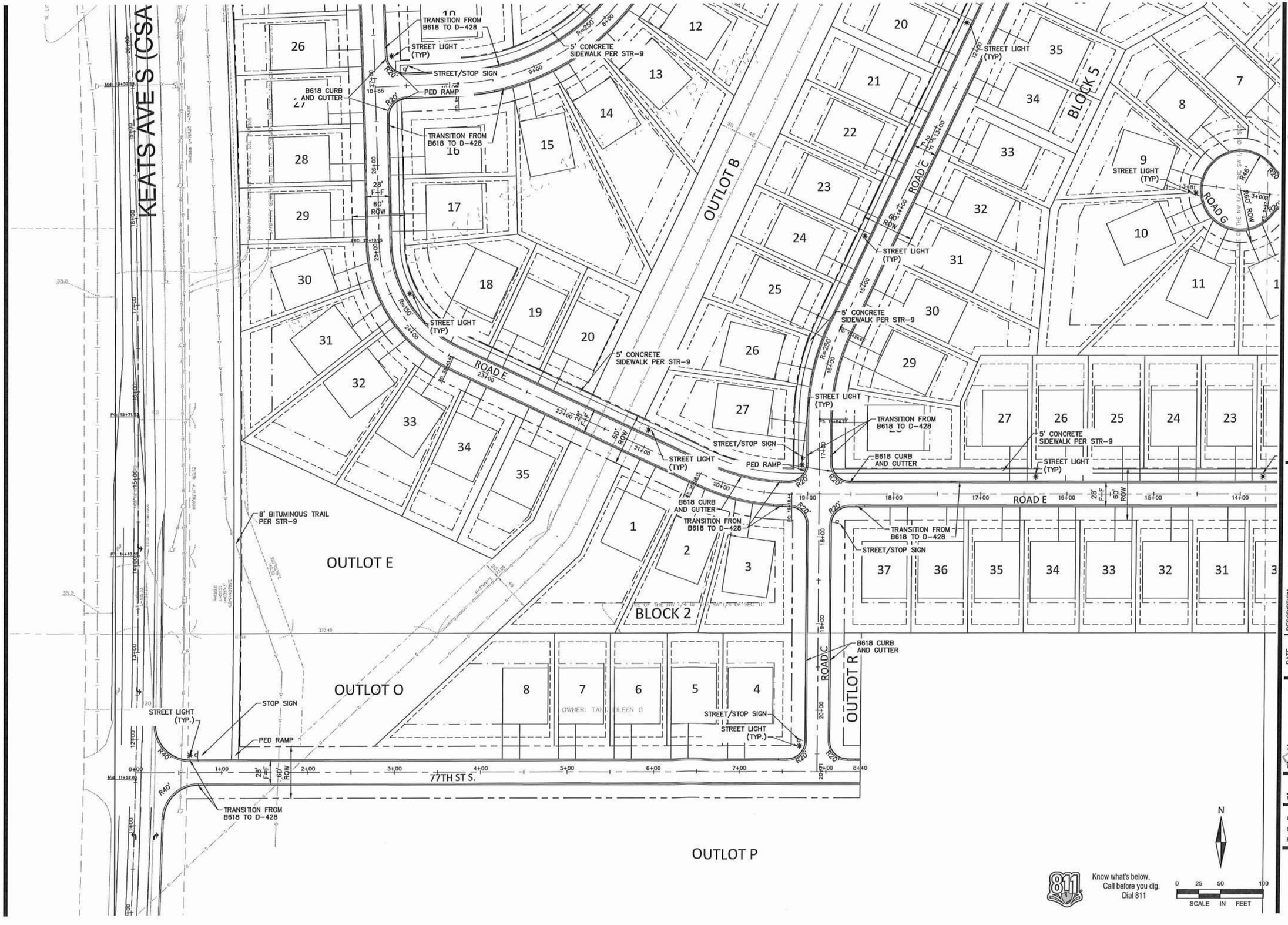
By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

25

Sheet 25 of 91



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW E

DATE	DESCRIPTION
2025-12-31	City Submittal

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Date 40922 License no.

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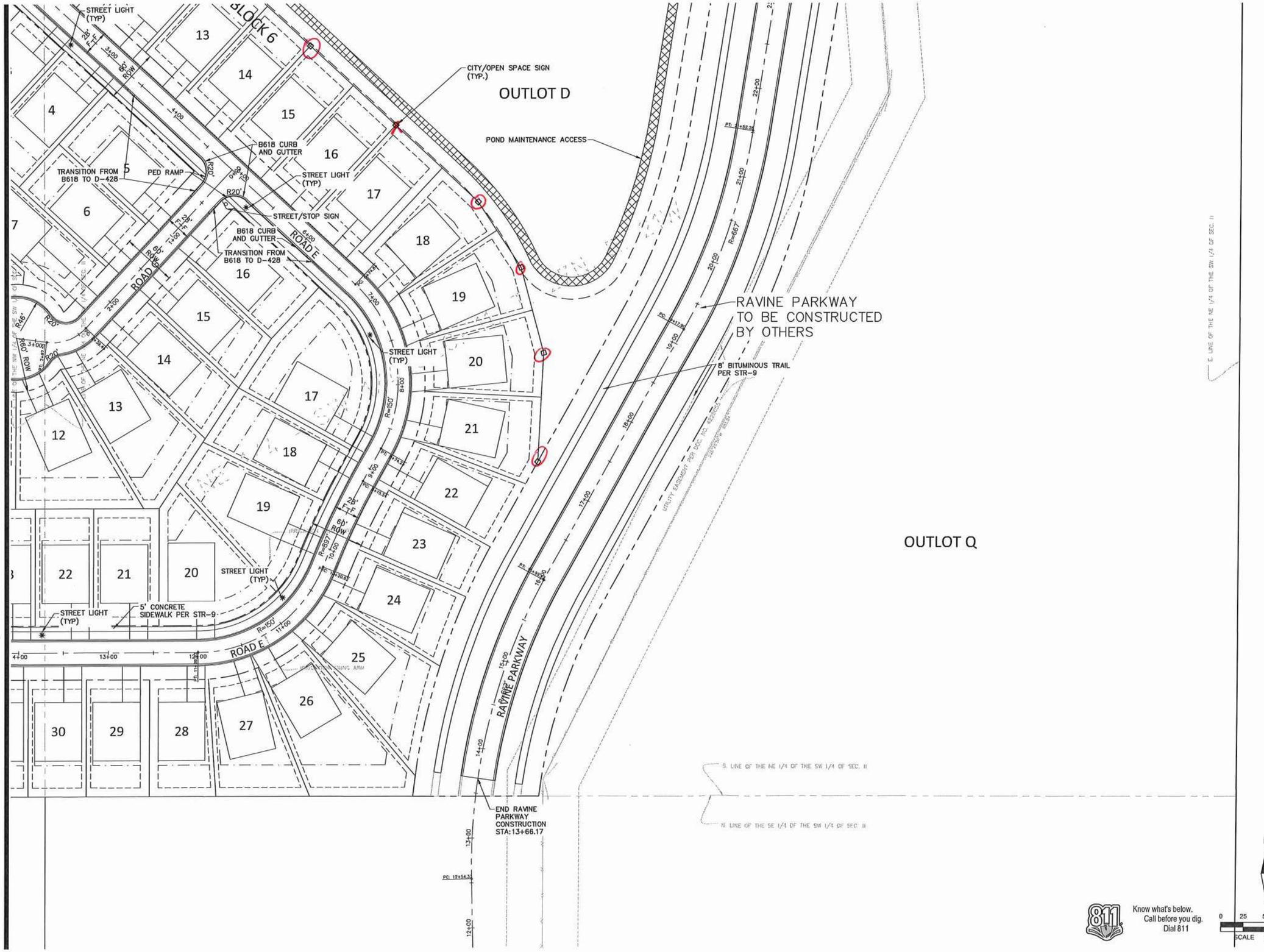
By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

26

Sheet 26 of 91



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW F

DATE	DESCRIPTION
2025-12-31	City Submittal

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FOR REVIEW PRELIMINARY NOT FOR CONSTRUCTION

Clark Wicklund
Date 40922 License no.

QA/QC CHECK

By Date

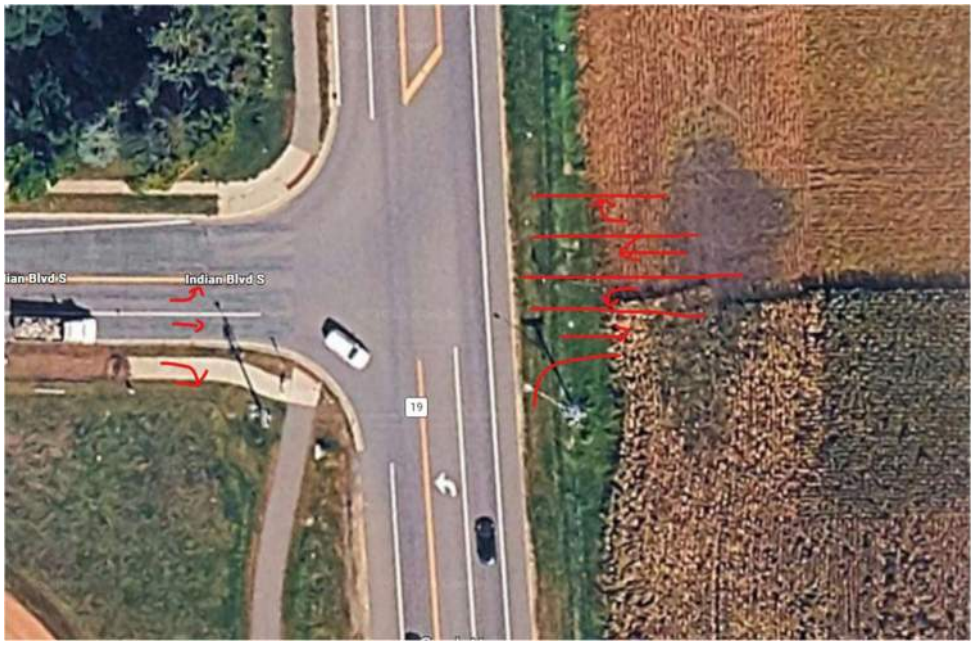
PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

27

Sheet 27 of 91

CSAH 19 / Indian Boulevard Future Lane Configuration



RAVARA TRAILS - SITE PLAN

COTTAGE GROVE, MINNESOTA

N

1"
0' 75' 150'

DATE: 2-10-26
DRAWN BY: LRJ

ALLIANT ENGINEERING

12"
8"

KEATS AVE S (CSAH 19)

INDIAN BLVD S

80TH STREET S

RAVINE PARKWAY

OUTLOT A
OUTLOT B
OUTLOT C
OUTLOT D
OUTLOT E
OUTLOT F
OUTLOT G
OUTLOT H
OUTLOT I
OUTLOT K
OUTLOT L
OUTLOT M
OUTLOT N
OUTLOT O
OUTLOT R

POND 1 NWL 898.00 HWL 905.69
POND 2 NWL 892.00 HWL 904.00
POND 3 NWL 898.00 HWL 905.70
POND 4 NWL 899.00 HWL 910.14

BLOCK 1 BLOCK 2 BLOCK 3 BLOCK 4 BLOCK 5 BLOCK 6 BLOCK 7 BLOCK 8 BLOCK 9 BLOCK 10 BLOCK 11 BLOCK 12 BLOCK 13 BLOCK 14 BLOCK 15 BLOCK 16 BLOCK 17 BLOCK 18 BLOCK 19 BLOCK 20 BLOCK 21 BLOCK 22 BLOCK 23 BLOCK 24 BLOCK 25 BLOCK 26 BLOCK 27 BLOCK 28 BLOCK 29 BLOCK 30 BLOCK 31 BLOCK 32 BLOCK 33 BLOCK 34 BLOCK 35 BLOCK 36 BLOCK 37 BLOCK 38 BLOCK 39 BLOCK 40 BLOCK 41 BLOCK 42 BLOCK 43 BLOCK 44 BLOCK 45 BLOCK 46 BLOCK 47 BLOCK 48 BLOCK 49 BLOCK 50 BLOCK 51 BLOCK 52 BLOCK 53 BLOCK 54 BLOCK 55 BLOCK 56 BLOCK 57 BLOCK 58 BLOCK 59 BLOCK 60 BLOCK 61 BLOCK 62 BLOCK 63 BLOCK 64 BLOCK 65 BLOCK 66 BLOCK 67

ROAD A ROAD B ROAD C ROAD D ROAD E ROAD F ROAD G ROAD H ROAD I ROAD J ROAD K

PRIVATE ROAD B PRIVATE ROAD C PRIVATE ROAD D PRIVATE ROAD F

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RAVARA TRAILS - SITE PLAN

COTTAGE GROVE, MINNESOTA

N

0' 75' 150'

1"

DATE: 2-17-26
DRAWN BY: LRJ

ALLIANT ENGINEERING

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4800 Olson Memorial Hwy, Suite 100
Golden Valley, MN 55422
www.TCLandDev.com

RAVARA TRAILS

RESIDENTIAL DEVELOPMENT PRELIMINARY PLAT/PUD SUBMITTAL

Twin Cities Land Development (TCLD) is pleased to submit the Preliminary Plat, Planned Unit Development (PUD), Rezoning, and Minor Subdivision for the proposed Ravara Trails Development. This development is located along Keats Ave South, between 77th Street South and 80th Street South. We respectfully request Preliminary Plat, PUD, Rezoning, and Minor Subdivision approval from the Planning Commission and City Council to advance this thoughtfully designed community that aligns with the city's comprehensive plan and supports long-term growth objectives.

PROPERTY / DEVELOPMENT SITE INFORMATION

EXISTING SITE DESCRIPTION

Address:	Unassigned
PIDs:	1102721240001, 1102721320001, 1102721310001, 1102721230001, 1102721330001
Total Acres:	148.72 acres
Existing Zoning:	Agricultural
Existing Guide Plan:	Low Density Residential, Med Density Residential, High Density Residential

The site is located along Keats Avenue South, north of 80th Street South and south of 70th Street South within Cottage Grove. The development encompasses five existing parcels totaling approximately 148.72 acres. The land includes an existing farmstead and is predominantly active farmland, offering a diverse and adaptable landscape for residential development.

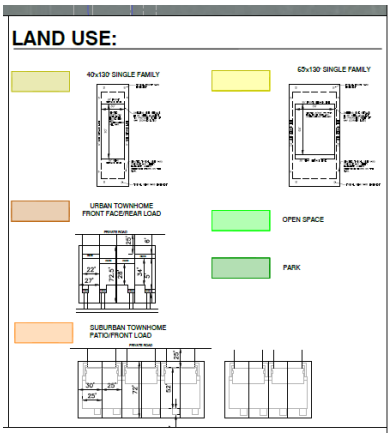
The site's topography ranges from an elevation of approximately 884 feet on the east side to 972 feet on the north side, indicating a gradual rise across the property. A regional low point is located on the eastern portion of the site, which presently serves as a natural drainage basin for much of the relatively flat surrounding terrain.

The site is currently served by a sanitary sewer stub connected to the Metropolitan Council Environmental Services (MCES) trunk line, which runs parallel to Keats Avenue South along the western boundary. Watermain stubs are also available within Keats Avenue, providing convenient access for the proposed development. Additionally, a South Washington Watershed stormwater trunkline runs along the eastern edge of the site, offering a direct connection point for the planned onsite stormwater management system.

SITE PLAN



Single Family 65’ x 140 lots	164
Single Family 40’ X 130’ lots	105
Urban Townhomes	192
Suburban Townhomes	114
TOTAL Units:	**575**



GENERAL DESCRIPTION

The Ravara Trail development site plan includes a total of 575 residential units, featuring a diverse mix of townhome and single-family housing types. This composition aligns with the vision outlined in the East Ravine Master Plan Area's comprehensive plan. The unit breakdown consists of 3, 4, 5, and 6-unit urban row townhomes, 4 and 6-unit suburban row townhomes; as well as single-family homes on 40-foot and 65-foot-wide lots. The proposed location is particularly well-suited for this variety of housing due to several key factors, including:

1. Alignment with the Comprehensive Plan
   The proposed housing mix directly supports the vision outlined in the East Ravine Master Plan, which calls for a balanced blend of low, medium and high-density residential options. This ensures consistency with long-term city planning goals by providing a desirable place to live.

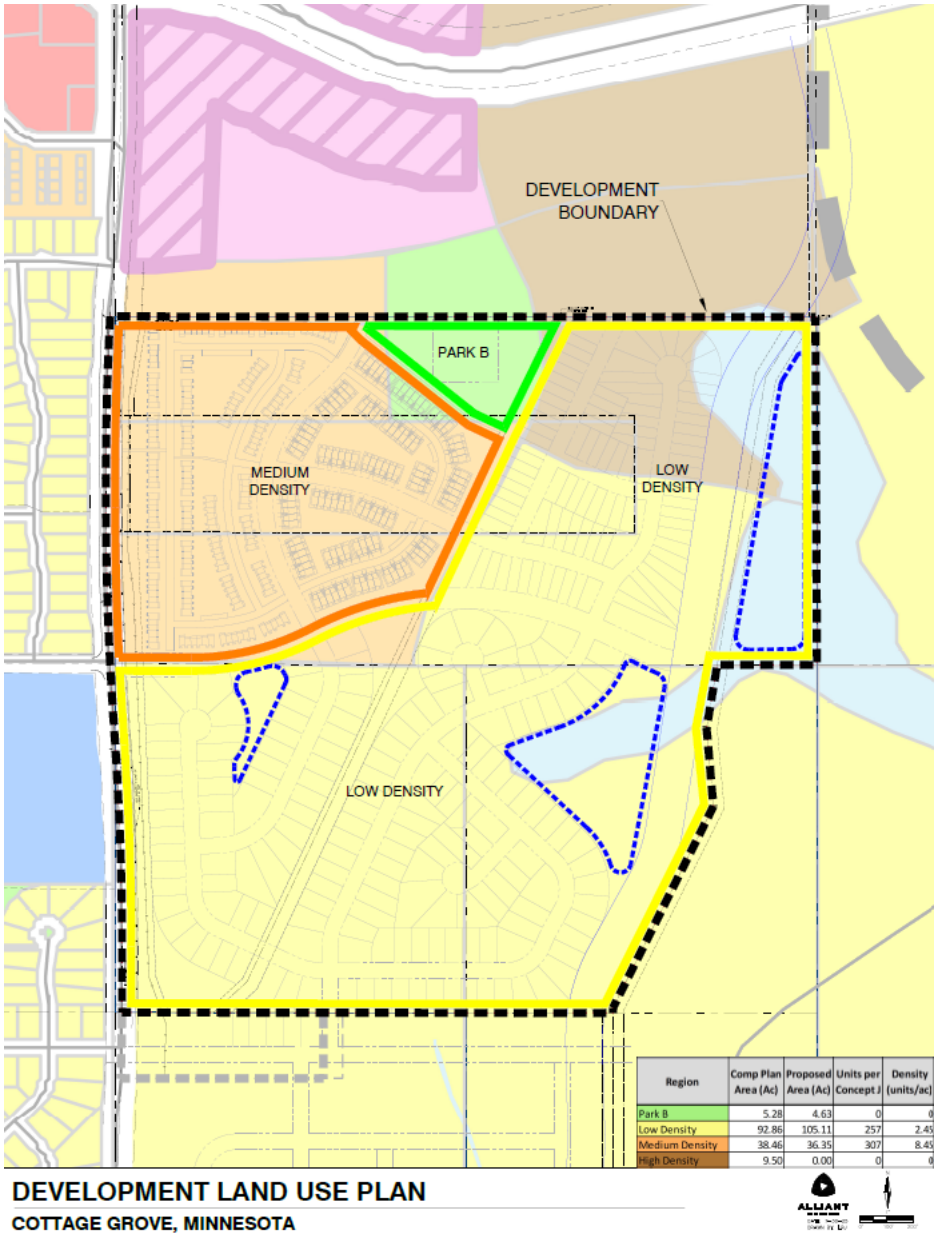
2. Strong Market Demand
   A recent housing market analysis identified a significant unmet need for higher-value, move-up housing in Cottage Grove. Ravara Trails is designed to meet this need by offering a diverse mix of homes that appeal to first-time homebuyers, growing families who want to stay in the community, and empty nesters looking to downsize while remaining in the community.

3. Preserves and Provides Access to Natural Resources
   The development plan incorporates green space and natural drainage features, supporting the City's goal to protect natural resources and environmental systems. Located adjacent to the planned East Ravine Park and Trail, as well as near the existing 500-acre Cottage Grove Ravine Regional Park, the site offers residents immediate access to scenic trails, wooded ravines, and numerous recreational opportunities. This natural setting enhances quality of life and adds long-term appeal to the neighborhood. In addition, the community's trail network will ultimately connect to the surrounding trail system, creating seamless access for residents and promoting walkability.

4. Infrastructure and Connectivity
   This development will provide direct access to Ravine Parkway and Keats Avenue, allowing residents and the community convenient access to major transportation corridors, including Interstate 494, Highway 61 and Highway 95, as well as express transit routes to downtown Saint Paul and Minneapolis. This makes it an attractive location for commuters and enhances regional accessibility.

5. Proximity to schools
   Centrally located in Cottage Grove, the proposed development offers families convenient access to the assigned schools within the South Washington School District (SoWashCo Schools). Grey Cloud Elementary and Cottage Grove Middle School, both located just west of the neighborhood, are easily reachable by foot or bike, making daily commutes simple and safe for students. Park Senior High School provides a wide range of academic and extracurricular opportunities to support student development.

LAND USE AND ZONING REGULATIONS



The property is guided as a mix of Low Density Residential, Med Density Residential and High Density Residential. The development of the property will rezone the parcel to Low Density Residential and Med Density Residential, generally keeping overall density.

Land uses for the properties adjacent to the site are guided with:

- To North: Commercial and High Density Residential
- To West: Low Density Residential and School
- To South: Low Density Residential
- To East: Low Density Residential and Park/Open Space

DIMENSIONAL STANDARDS

The following is a summary of the proposed development lot standards and setbacks:

Urban Townhome Dimensions
Width – 3 Unit, 4 Unit, 5 Unit, 6 Unit
Depth – 45 feet
Suburban Townhome Dimensions
Width – 4 Unit, 6 Unit
Depth – 57 feet
40' Single Family Pad Dimensions
Width – 30 feet
Depth – 70 feet
65' Single Family Pad Dimension
Width – 52.5 feet
Depth – 65 feet

Urban Townhome Setbacks
Front Door – 15 feet
Front Door along Keats Ave – 25 feet
Garage Door – 25 feet
Perimeter – 30 feet
Townhome Corner – 20 feet
Between townhome Buildings – 20 feet

Suburban Townhome Setbacks
Front – 25 feet
Perimeter – 30 feet
Townhome Corner – 20 feet
Between townhome Buildings – 15 feet

Single Family Setbacks
Front – 25 feet
Rear – 35 feet
Corner Side Yard – 20 feet
Side Yard (40' wide) – 5'/5'
Side Yard (65' wide) – 7.5'/5' (garage)

Townhome Parking:

Garage:	306 stalls
Driveway:	306 stalls
Guest:	73 stalls
Total:	685 stalls

Proposed ROW
Internal ROW – 60 feet
Indian Blvd ROW – 80 feet
Ravine Parkway – 140 feet

Proposed Development Area/Calculations:

Total Development Gross Site Area:	148.72 acres
Keats Ave ROW:	7.44 acres

Easements:

SWWD Stormsewer Easement Area:	3.16 acres
Met Council Easement:	3.43 acres
Northern Gas Easement:	4.48 acres

PLANNED UNIT DEVELOPMENT FLEXIBILITY AND BENEFITS

The project is requesting flexibility from zoning standards for Villa single family homes and Urban townhomes. The Villa single family homes are requesting flexibility for 2 of 9 R-4 dimensional standards. The townhomes are requesting flexibility for 1 of 9 R-5 dimensional standards. Dimensional flexibility being requested for each is as follows:

Villa Single Family	Required	Proposed
lot width	45 feet	40 feet
Sideyard setback	7.5 feet	5 feet

Urban Townhomes	Required	Proposed
Front Setback	25 feet	15 feet

The project is also requesting flexibility from a 50-foot landscape buffer to Keats Avenue of 25 feet for the Urban Townhomes and 35 feet for the single family lots south of Indian Boulevard. A landscape buffer reduction for these areas was not presented as part of the concept plan submittal as the plan was based on anticipated Keats Avenue right-of-way of 120 feet. Since that time, Washington county has requested a total right-of-way width of 180 feet, which requires an additional 60 feet east of Keats Avenue to total 120 feet east of the Keats Avenue centerline. It should be noted that 30 feet of the requested 120 feet of right-of-way comes as a result of additional right-of-way no longer being available west of Keats Avenue due to homes in that area. Had 30 feet of additional right-of-way been available to the west the project would not require flexibility for the 50-foot landscape buffer zoning standards. It should be noted that a Landscape Buffer of 85 feet for the Urban Townhomes and 95 feet for the single-family homes will appear to exist until Washington County reconstructs Keats Avenue and occupies the additional right-of-way being requested.

The applicant respectfully requests consideration of the following project elements in exchange for flexibility to the 4 zoning standards previously identified:

1. Ravine Parkway realignment through the entire site of which approximately half is located off site and to the east per the Comprehensive plan.
2. Keats Avenue right-of-way dedication and additional 30 feet no longer available to the west.
3. City Park & water tower dedication.
4. A variety of life cycle housing products and pricing options, which is consistent with the Cities Comprehensive Plan.
5. Public and private open spaces
6. A network of trails extending through the site and connecting to existing trails.

PARK AND OPEN SPACE

The site plan includes 4.15 acres of open space on the north end of the site, which will be dedicated to the City of Cottage Grove. Just southeast of the development lies the future East Ravine Park, a key component of the city's long-term recreational vision. A pedestrian trail along Ravine Parkway will connect the proposed neighborhood to nearby parks, enhancing walkability and outdoor access. Thoughtfully integrated throughout the plan are multiple green spaces, designed to encourage community interaction, support neighborhood gatherings, and create inclusive, accessible environments that strengthen social cohesion.

STREET DESIGN AND ACCESS

The development will have two access points from Keats Ave. One access point at Indian Blvd, which will be extended east through the site and the other access point at 77th St. S. The roadways within the development will be public roads that are 32 feet face to face within a 60-foot right-of-way and private roads that are 22 and 26 feet face to face. Ravine Parkway will not be constructed with the development.

MASS GRADING

The site is anticipated to be mass graded in one phase, in accordance with the City of Cottage Grove's specifications and guidelines. The proposed grading will maintain the current drainage patterns.

SANITARY SEWER AND WATERMAIN

Adequate sanitary sewer is available for connection into the existing MCES Gravity Sewer on the west side of the site. A stub is provided in the northeast corner of the Indian Blvd S and Keats Ave S intersection. Watermain for the site will be served by two connections on the west side of the site. One connection will be in the Keats Ave S and Indian Blvd S intersection and the other will be in the 77th St S and Keats Ave S intersection.

STORMWATER MANAGEMENT

The site will comply with all applicable requirements of the City of Cottage Grove stormwater management plan. The stormwater plan is to have four stormwater management basins on site with the ultimate discharge to SWWD storm line running through the site.

WETLANDS

A Wetland Report completed by Kjolhaug, dated January 24th, 2025, identified no Wetlands on the site.

TREE PRESERVATION AND LANDSCAPING

Trees are generally located near the existing home, in a small woodland area near the future water tower and along the north end of the east property boundary, which amounts to 3,907 caliper inches. Trees surrounding the

existing home and east boundary will be impacted as a result of site grading and total 2,805 caliper inches, which will require 1,102 caliper inches of tree replacement. The current landscape plan proposes 2,485 caliper inches of tree replacement, which complies with the City of Cottage Grove Tree Preservation code.

HOMEOWNERS ASSOCIATION AND ARCHITECTURAL GUIDELINES

To ensure a visually appealing neighborhood, Ravara Trails will establish a Master Homeowners Association (HOA) that will enforce architectural guidelines promoting diversity and visual interest among homes. These guidelines include tracking mechanisms to prevent monotony and ensure varied styles, materials, and colors.

The HOA will also ensure the long-term upkeep of common community amenities to preserve their superior quality and attractiveness. This includes overseeing the proposed entrance monument and cluster mailbox units.

The HOA will oversee a review and approval process for all designs, aiming to maintain a vibrant streetscape and uphold high aesthetic standards. We believe this approach will enhance our community and contribute positively to Cottage Grove's architectural landscape.

BUILDER INFORMATION

Twin Cities Land Development anticipates partnering with multiple builders for this community including Creative Homes and Robert Thomas Homes. Townhome construction will likely be divided among builders based on product type. One to three builders are expected to handle the single-family homes.

CONCEPTUAL, ARCHITECTURAL ELEVATIONS

The architectural renderings we are sharing below serve as representative examples to illustrate the general dimensions and massing of the homes that could potentially be constructed on the proposed lot sizes. These renderings are intended to provide a visual reference to help stakeholders understand the possible spatial characteristics of the homes within the Ravara Trails community.

It's important to note that specific architectural designed tailored for Ravara Trails will be developed and submitted for city review and approval as part of the final application process. Future final designs will ensure compliance with the City's regulations and reflect the unique character envisioned for this community.

CONCEPTUAL DESIGN PRECEDENTS – 22’ URBAN TOWNHOMES – HOME ENTRANCE ON ONE SIDE, GARAGE ON OTHER SIDE



CONCEPTUAL DESIGN PRECEDENTS – SUBURBAN TOWNHOME – HOME ENTRANCE AND GARAGE ENTRANCE ON THE SAME SIDE.





CONCEPTUAL DESIGN PRECEDENTS – 40’ LOTS, SINGLE FAMILY





CONCEPTUAL DESIGN PRECEDENTS – 65’ LOTS, SINGLE FAMILY





CONCLUSION

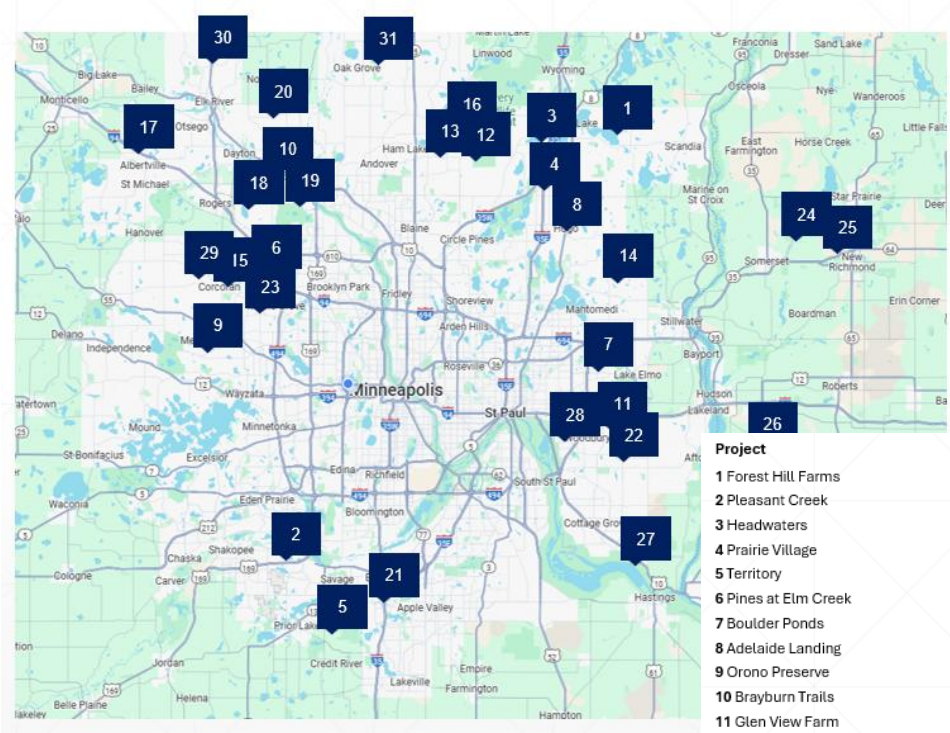
Twin Cities Land Development is pleased to submit the Preliminary Plat, Planned Unit Development (PUD), Rezoning, and Minor Subdivision application for the Ravara Trails project. We believe the proposed site plan is consistent with the goals and long-term vision of the City of Cottage Grove. We look forward to delivering a high-quality residential development and respectfully request approval of these applications to advance Ravara Trails to the mass grading stage.

ABOUT US

The TCLD team has experience in every facet of Twin Cities real estate development, investment, and management. The project team has developed thousands of single-family and multi-family lots, establishing itself as the most prominent local lot developer in the Twin Cities.

As a trusted residential developer, our track record speaks for itself. Over the years, we have successfully brought numerous projects to life, earning a reputation for integrity, reliability, and exceptional results. Our diverse portfolio showcases our ability to adapt to evolving market trends and deliver projects that stand the test of time.

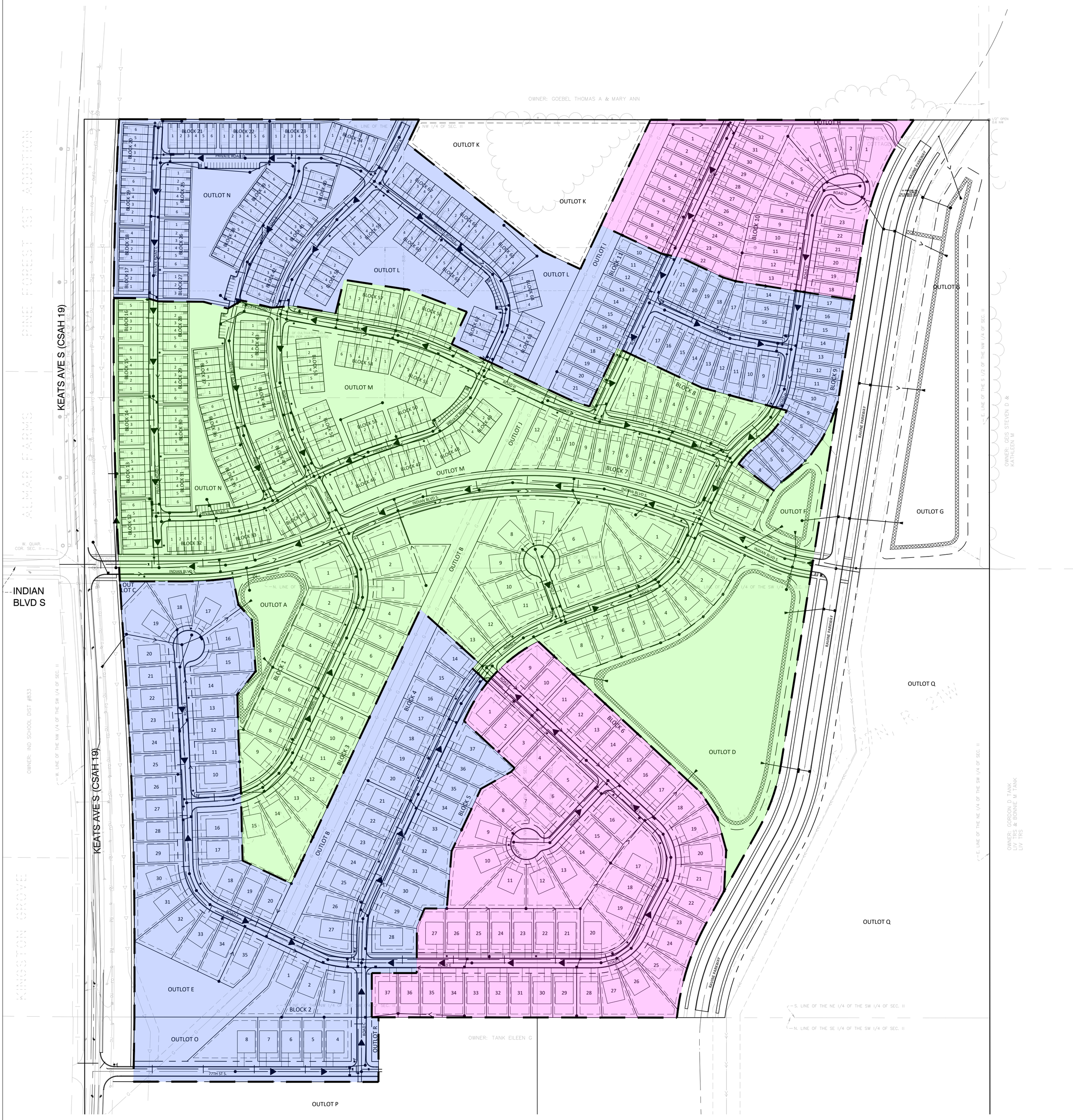
LOCAL DEVELOPMENT EXPERIENCE



Project	Lots	City	Status
1 Forest Hill Farms	35	Forest Lake	Completed
2 Pleasant Creek	44	Prior Lake	Completed
3 Headwaters	54	Forest Lake	Completed
4 Prairie Village	70	Hugo	Completed
5 Territory	25	Prior Lake	Completed
6 Pines at Elm Creek	58	Plymouth	Completed
7 Boulder Ponds	99	Lake Elmo	Completed
8 Adelaide Landing	331	Hugo	Completed
9 Orono Preserve	39	Orono	Completed
10 Brayburn Trails	256	Dayton	Completed
11 Glen View Farm	141	Woodbury	Completed
12 Oakwood Ponds	210	Blaine	Active
13 Mill Pond	93	Blaine	Active
14 Gateway	16	Grant	Completed
15 Woods of Medina	16	Medina	Completed
16 Lexington Waters	272	Blaine	Active
17 Anton Village	335	St. Michael	Active
18 Evanswood	365	Maple Grove	Active
19 Brayburn Trails East	146	Dayton	Active
20 Trott Brook Crossing	275	Ramsey	Active
21 Ritter Meadows	255	Lakeville	Active
22 Aster Landing	25	Woodbury	Completed
23 Edgewater	59	Maple Grove	Completed
24 Gloverdale	600	New Richmond, WI	Active
25 Meadow Crossing	94	New Richmond, WI	Active
26 Oak Hill	110	River Falls, WI	Active
27 Heritage Ridge	40	Hastings	Active
28 Cherrywood/Meadow	144	Newport/Woodbury	Active
29 Brindle Path	35	Medina	Active
30 Meadowsweet Bend	104	Elk River	Active
31 Aspen Glenn	39	Oak Grove	Active

DEVELOPMENT TEAM

Developer/Contract Buyer:	TCLD Land Holdings, LLC 4800 Olson Memorial Highway, Suite 100 Golden Valley, MN 55422 Ben Schmidt, President Ben@TCLandDev.com (612)-716-3047 Ashley D'Alessandro, Development Manager Ashley@TClandDev.com (651) 587-7983 Tracey Rust, Vice President Tracey@TClandDev.com (952) 221-2566
Civil Engineer/Surveyor:	Alliant Engineering, Inc. 733 Marquette Ave, Ste 700 Minneapolis, MN 55402 Clark Wicklund, Vice President cwicklund@alliant-inc.com (612) 490-2431 Logan Josephson, Engineer ljosephson@alliant-inc.com (612) 767-9306 Dan Ekrem, Surveyor dekrem@alliant-inc.com (612) 767-9326
Legal:	Mark Radke mradke@felhaber.com



LEGEND:

- EASEMENT LINE
- BUILDING SETBACK
- PROPERTY LINE
- LOT LINE
- ROW
- PHASE 1
- PHASE 2
- PHASE 3

PHASE 1:

LOT TYPE BREAKDOWN	
VILLA LOTS	23
65' LOTS	45
SUBURBAN TOWNHOMES	62
URBAN TOWNHOMES	106
TOTAL:	236

PHASE 2:

LOT TYPE BREAKDOWN	
VILLA LOTS	43
65' LOTS	63
SUBURBAN TOWNHOMES	52
URBAN TOWNHOMES	86
TOTAL:	244

PHASE 3:

LOT TYPE BREAKDOWN	
VILLA LOTS	39
65' LOTS	56
SUBURBAN TOWNHOMES	0
URBAN TOWNHOMES	0
TOTAL:	95

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RAVARA TRAILS - PHASING PLAN

COTTAGE GROVE, MINNESOTA

N

1" = 0' 75' 150'

DATE: 1-6-26
DRAWN BY: LRJ

ALLIANT ENGINEERING

Traffic Impact Study

RAVARA TRAILS (COTTAGE GROVE, MN)

DRAFT DOCUMENT
December 31st, 2025

Prepared By:
Nick Grage, PE, PTOE, RSP_1

ALLIANT ENGINEERING, INC. | 733 Marquette Avenue, Suite 700, Minneapolis, MN 55402

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1. Introduction

Alliant Engineering has completed a traffic impact study for the proposed Ravara Trails residential development located along CSAH 19 (Keats Avenue) in Cottage Grove, MN (see **Figure 1**). The development, located on a 148.72-acre parcel, consists of various residential land uses including 269 single-family homes, 192 urban townhomes, and 114 suburban townhomes for a total of 575 dwelling units. The objectives of this study are to evaluate existing traffic operations within the study area, identify any potential traffic impacts to the adjacent roadway network due to the proposed development trips, and recommend improvements to address issues if necessary. The following provides the assumptions, analysis, and study conclusions offered for consideration.

2. Existing Year 2025 Conditions

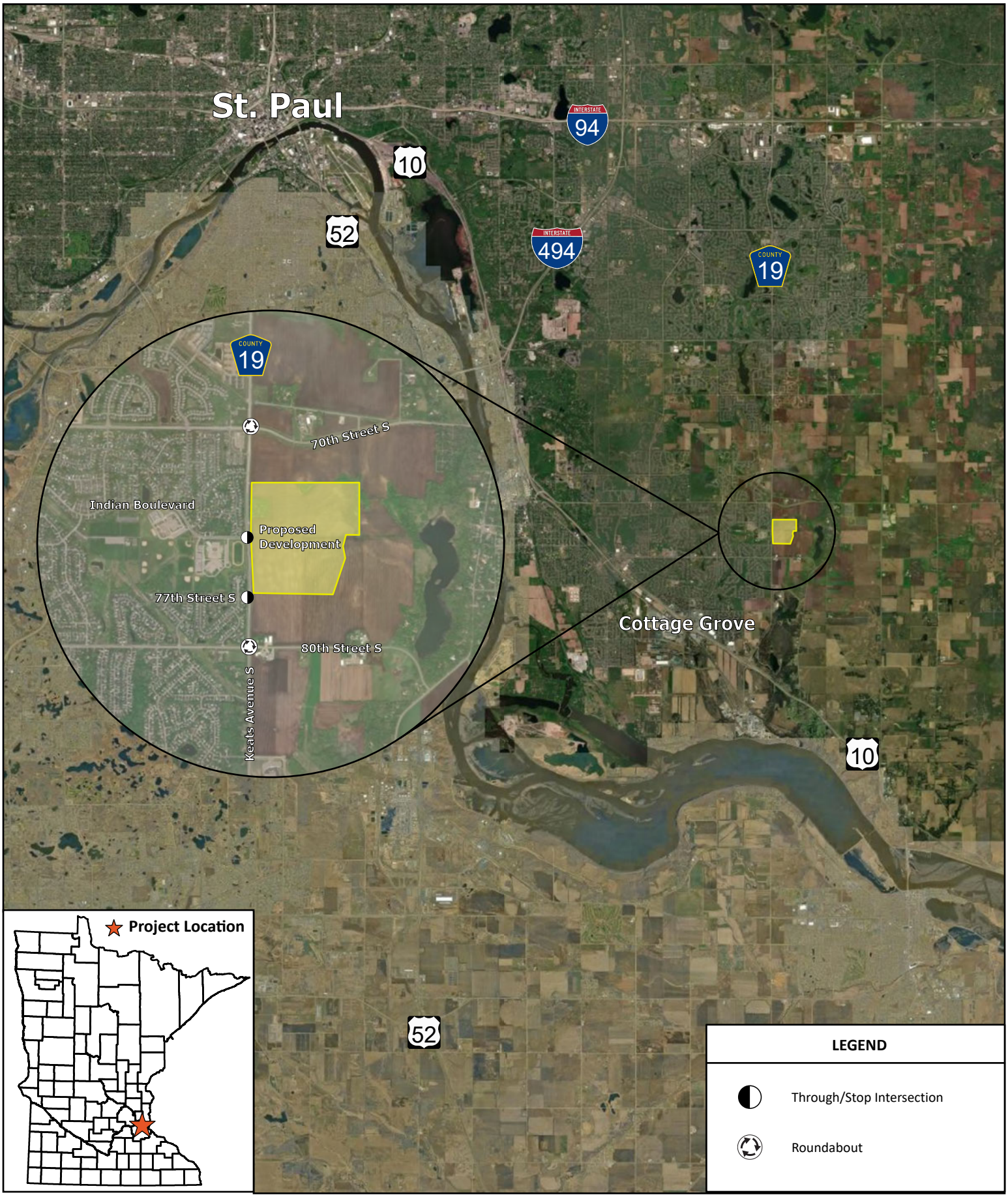
The existing conditions were reviewed to establish a baseline for identifying any future impacts associated with the proposed development. The evaluation of existing conditions includes various field observations and research, turning movement counts, and an intersection capacity analysis.

2.1 STUDY AREA INTERSECTIONS

The following study intersections were identified:

- Keats Avenue & 70th Street
- Keats Avenue & Indian Boulevard (Primary Site Access)
- Keats Avenue & 77th Street (Secondary Site Access)
- Keats Avenue & 80th Street

It should be noted that in addition to the two proposed development accesses along Keats Avenue, a north-south roadway (Ravine Parkway) is also anticipated along the east side of the development running parallel to Keats Avenue and connecting to both 70th Street to the north and 80th Street to the south. This would result in two additional three-legged intersections providing additional access to the east side of the development.



Ravara Trails

Figure 1

Project Location

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2.2 DATA COLLECTION

2.2.1 Existing Traffic Volumes

To document existing conditions, 13-hour (6:00 a.m. to 7:00 p.m.) intersection turning movement counts (TMCs) were collected at the study intersections of 70th Street, Indian Boulevard, and 77th Street by Alliant on Thursday, May 29th, 2025. Washington County provided a 24-hour count for the 80th Street intersection, which was collected on Thursday, February 24th, 2024. The a.m. peak was found to be 7:15 to 8:15 a.m. and the p.m. peak was found to be 4:00 to 5:00 p.m. with volumes along Keats Avenue being comparable across both data sets.

2.2.2 Roadway / Intersection Characteristics

In addition to traffic volume data collection, observations were completed to identify roadway / intersection characteristics within the study area (i.e. geometry, posted speed limits, and traffic control), which are summarized in **Table 1** and **Table 2**. Existing traffic volumes within the study area are shown in **Figure 2**.

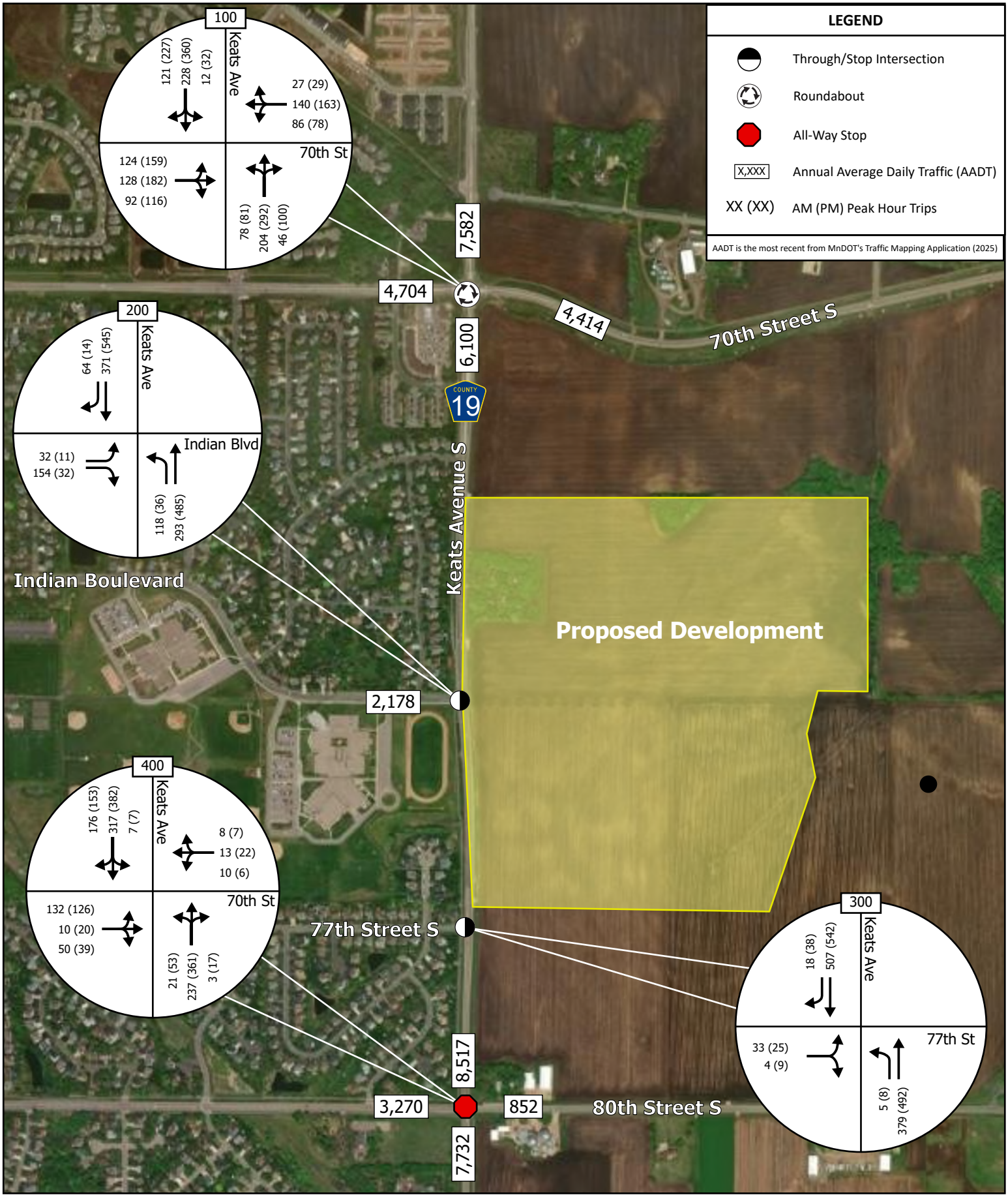
Table 1. Roadway Characteristics

Roadway	Cross-Section	Speed Limit	Functional Classification
Keats Avenue	2-Lane Undivided	55 mph	Minor Arterial
70th Street	2-Lane Undivided	55 mph	Minor Arterial
Indian Boulevard	2-Lane Undivided	30 mph	Major Collector
77th Street	2-Lane Undivided	30 mph	Local
80th Street	4-Lane Undivided	45 mph	Minor Arterial

Table 2. Existing Conditions Intersection Characteristics

Intersection	Traffic Control	Lane Designations by Approach[1, 2]			
		NB	SB	EB	WB
Keats Avenue & 70th Street	Roundabout	LTR	LTR	LTR	LTR
Keats Avenue & Indian Boulevard	Through / Stop	L / T	T / R	L / R	-
Keats Avenue & 77th Street	Through / Stop	LT*	T / R	LR	-
Keats Avenue & 80th Street	All-Way Stop[3]	LT / R	LT / R	LT / T / R	LT / TR

*[1]L=Left-Turn, T=Through, R=Right-Turn, *=Bypass Lane*
[2]Separate Lanes are Denoted by /
[3]AWS will be replaced with RAB prior to forecast year 2030



Ravara Trails

Figure 2

2025 Existing Conditions Volumes

ALLIANT

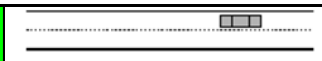
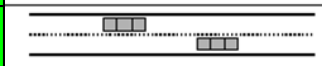
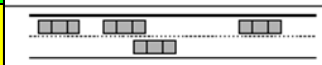
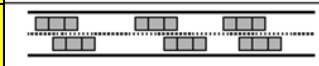
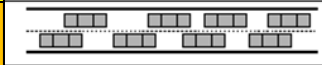
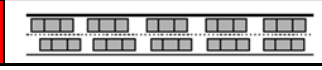
N

0 0.15 0.3 Miles

2.3 INTERSECTION CAPACITY ANALYSIS

The intersection capacity analyses were completed using Synchro/SimTraffic software to establish a baseline condition to which future traffic operations could be compared. HCS 2024 was also used to analyze the roundabout at Keats Avenue & 70th Street as well as the future roundabout at Keats Avenue & 80th Street. Capacity analysis results identify a Level of Service (LOS), which indicates the quality of traffic flow through an intersection. Intersections are given a ranking from LOS A through LOS F. The LOS results are based on average delay per vehicle, which corresponds to the delay threshold values shown in **Table 3**. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS F indicates an intersection where demand exceeds capacity, or a breakdown of traffic flow. For side-street stop-controlled intersections, a key measure of operational effectiveness is the side-street LOS. Lengthy delays and poor LOS can occur on side-street approaches even if the overall intersection is functioning well, making side-street LOS a valuable design criterion.

Table 3. Level of Service Criteria

Level of Service		Description	Delay per Vehicle (seconds)	
			Signalized Intersection	Unsignalized Intersection
A		**Free Flow:** Low volumes and no delays.	0 - 10	0 - 10
B		**Stable Flow:** Speeds restricted by travel conditions, minor delays.	> 10 - 20	> 10 - 15
C		**Stable Flow:** Speeds and maneuverability closely controlled due to higher volumes.	> 20 - 35	> 15 - 25
D		**Stable Flow:** Speeds considerably affected by change in operating conditions. High density traffic restricts maneuverability, volume near capacity.	> 35 - 55	> 25 - 35
E		**Unstable Flow:** Low speeds, considerable delay, volume at or slightly over capacity.	> 55 - 80	> 35 - 50
F		**Forced Flow:** Very low speeds, volume exceed capacity, long delays with stop and go traffic.	> 80	> 50

Source: Highway Capacity Manual, 2010 Edition, Transportation Research Board, Exhibits 18-4 & 19-1.

After LOS, the second component of the capacity analysis is a study of vehicular queuing, or the lineup of vehicles waiting to pass through an intersection. An intersection can operate with an acceptable LOS, but if queues from the intersection block entrances to turn lanes or adjacent driveways, unsafe operating conditions could result. The 95th percentile queue, or the length of queue with only a five percent probability of being exceeded during an analysis period, is considered the standard for design purposes.

2.3.1 2025 Existing Conditions Intersection Capacity Analysis

The existing year 2025 intersection capacity analysis was performed for the study intersections during the weekday a.m. and p.m. peak hours as observed by Alliant as noted previously. Results of the existing year 2025 intersection capacity analysis presented in **Table 4** indicate that all study intersections currently operate at overall LOS A during the a.m. and p.m. peak hours under existing year 2025 traffic volumes except for Keats Avenue & 70th Street which operates at overall LOS B during the p.m. peak hour. The only notable side-street delay observed in the traffic simulations was at the Keats Avenue & 70th Street intersection where the southbound approach performs at a high-performing LOS C with some queuing during the p.m. peak hour. Detailed operations and queuing analysis results are presented in the appendix.

Table 4. 2025 Existing Conditions Intersection Capacity Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	A / A	7.7 / 8.6	B / C	13.0 / 15.1
CSAH 19 (Keats Avenue) & Indian Boulevard	A / A	3.5 / 8.7	A / A	2.1 / 6.8
CSAH 19 (Keats Avenue) & 77th Street	A / A	1.7 / 9.8	A / B	1.4 / 10.9
CSAH 19 (Keats Avenue) & 80th Street	A / A	5.9 / 7.3	A / A	7.2 / 9.1

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

3. Forecast Year 2030 No Build Conditions

3.1 2030 NO BUILD TRAFFIC VOLUMES

The timeline for complete buildout of the site is unknown at this time, with grading expected to take place in 2026. As a result, a forecast year of 2030 was selected for an analysis of future conditions. Based on the Minnesota State Aid Equivalent Single Axel Load (MnESAL) calculator and the historical AADT values along Keats Avenue, 70th Street, and 80th Street, an annual growth rate of one percent per year was used to generate forecast year 2030 volumes shown in **Figure 3**.

3.2 2030 NO BUILD ROADWAY / INTERSECTION CHARACTERISTICS

The roadway network from 70th Street to 77th Street is projected to remain unchanged between 2025 and 2030. However, the intersection of Keats Avenue & 80th Street is programmed for reconstruction within this time frame. The existing all-way stop will be replaced with a single-lane roundabout, similar to that at 70th Street.

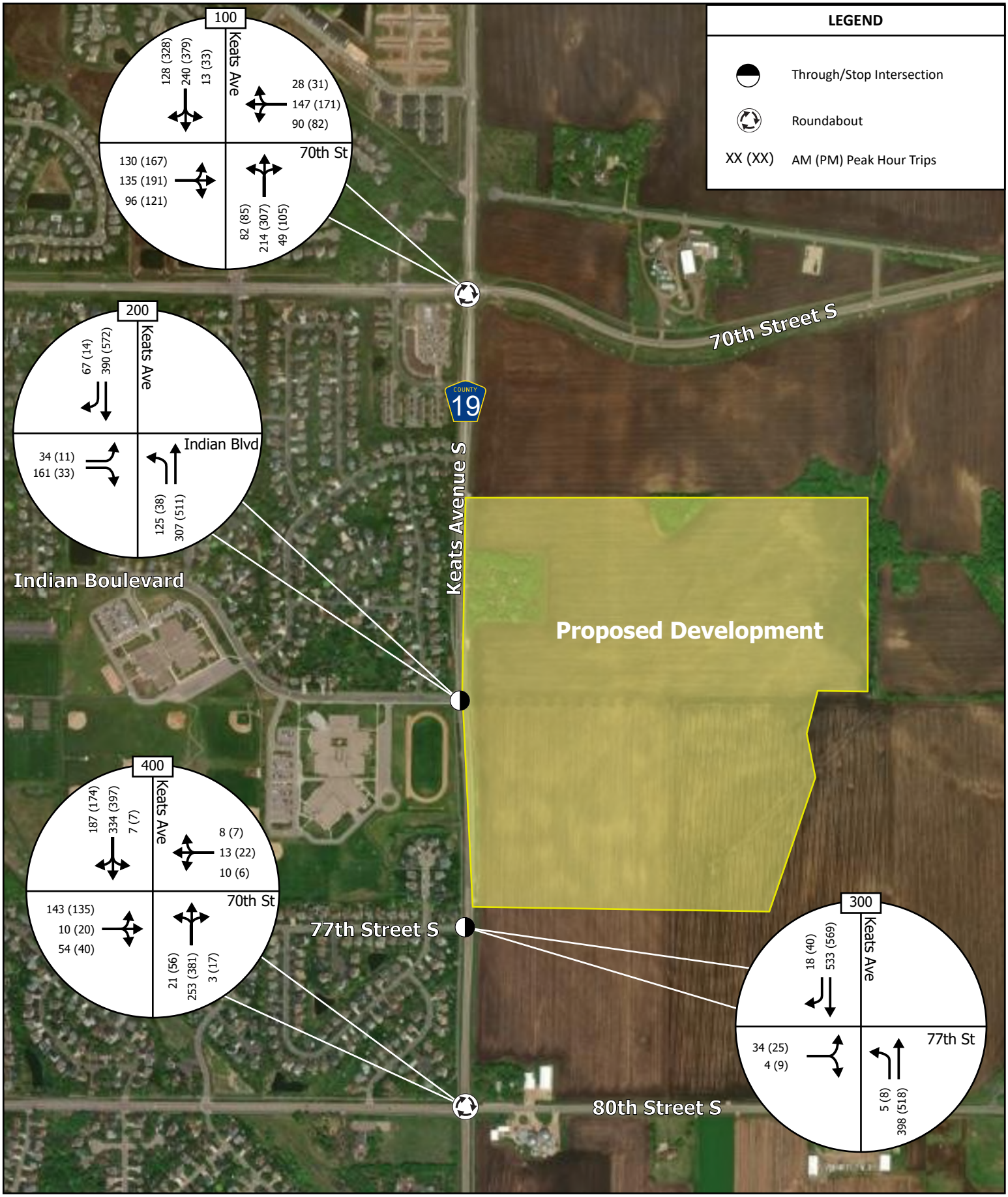
3.3 2030 NO BUILD CONDITIONS INTERSECTION CAPACITY ANALYSIS

The forecast year 2030 No Build intersection capacity analysis was performed for the study intersections during the weekday a.m. and p.m. peak hours as observed by Alliant as noted previously. Results of the forecast year 2030 No Build intersection capacity analysis presented in **Table 5** indicate that all study intersections will continue to operate at overall LOS A during the a.m. and p.m. peak hours under forecast year 2030 traffic volumes except for Keats Avenue & 70th Street which operates at overall LOS B during the p.m. peak hour. Side-street delays increase slightly at all intersections, but they are minor and mostly do not result in a change to the LOS. The only notable change is the eastbound approach at Keats Avenue & 77th Street, which increases an average of 0.6 seconds to LOS B. Detailed operations and queuing analysis results are presented in the appendix.

Table 5. 2030 No Build Conditions Intersection Capacity Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	A / A	8.1 / 9.1	B / C	14.7 / 17.4
CSAH 19 (Keats Avenue) & Indian Boulevard	A / A	3.8 / 9.1	A / A	2.3 / 6.4
CSAH 19 (Keats Avenue) & 77th Street	A / B	1.7 / 10.4	A / B	1.4 / 11.4
CSAH 19 (Keats Avenue) & 80th Street	A / A	6.2 / 7.6	A / A	7.4 / 9.3

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay



Ravara Trails

Figure 3

Forecast 2030 No Build Conditions Volumes

ALLIANT

N

0 0.15 0.3 Miles

4. Forecast Year 2030 Build Conditions

The proposed Ravara Trails residential development is located on a 148.72-acre parcel in Cottage Grove, MN. The development consists of 269 single-family homes, 192 urban townhomes, and 114 suburban townhomes for a total of 575 dwelling units. The site plan is still undergoing reviews by various agencies and will be subject to change, including unit counts, until a final plat is approved. The proposed site plan is shown in **Figure 4**.

4.1 PROPOSED ACCESS

Access to the proposed development along the study corridor is available at the following two locations:

- Keats Avenue & Indian Boulevard
    - An expansion of the existing three-leg intersection to add a westbound leg for access to the north and center parts of the development. New dedicated turn lanes would be added along Keats Avenue to prevent vehicles turning to the development from blocking through vehicles. The new intersection would be expected to through-stop controlled.
- Keats Avenue & 77th Street
    - An expansion of the existing three-leg intersection to add a westbound leg for access to the south side of the development. New dedicated turn lanes would be added along Keats Avenue to prevent vehicles turning to the development from blocking through vehicles. The new intersection would be expected to through-stop controlled.

In addition to the two accesses along Keats Avenue, a north-south roadway (Ravine Parkway) is also anticipated along the east side of the development running parallel to Keats Avenue and connecting to both 70th Street to the north and 80th Street to the south. This would result in two additional three-legged intersections providing additional access to the east side of the development. Proposed geometry and traffic control initially considered for the study intersection accesses are summarized in **Table 6**.

Table 6. Proposed Development Intersection Characteristics

Intersection	Traffic Control	Lane Designations by Approach[1]			
		NB	SB	EB	WB
Keats Avenue & Indian Boulevard	Through / Stop	L / T / R	L / T / R	LT / R	LTR
Keats Avenue & 77th Street	Through / Stop	L / T / R	L / T / R	LTR	LTR

[1]*L=Left-Turn, T=Through, R=Right-Turn*
[2]*Separate Lanes are Denoted by /*



Ravara Trails

Figure 4

Proposed Site Plan

ALLIANT

N 0 0.08 0.16 Miles

4.2 TRIP GENERATION

To account for traffic impacts associated with the proposed development, trip generation estimates were developed for the weekday a.m. and p.m. peak hours. The trip generation estimates were developed utilizing trip generation rates for similar land uses as documented in the *ITE Trip Generation Manual, 12th Edition*. The ITE Trip Generation Manual provides peak hour and daily trip generation rates based on studies of similar land uses. Estimated site generated traffic based on the ITE Trip Generation Manual is detailed in **Table 7**. Results of the trip generation estimates indicate the current development plan is expected to generate approximately 332 a.m. peak hour, 406 p.m. peak hour, and 4,456 daily trips. To provide a conservative estimate of the impact of the current development plan, pass-by trips and multi-use reductions were not applicable.

4.2.1 Trip Distribution & Assignment

The distribution of site-generated traffic was estimated based on a review of historical traffic volumes, collected TMCs, know traffic patterns, and engineering judgment. The estimated proposed development directional distribution is shown in **Figure 5**. This proposed distribution assumes a small portion of traffic will use the new north-south roadway (Ravine Parkway). This trip distribution was applied to the respective estimated site-generated traffic volumes to generate forecast year 2030 Build scenario traffic volumes shown in **Figure 6**.

Table 7. Proposed Development Trip Generation Estimate

Land Use (ITE Code)	Units	Size	AM Peak Hour Trips[1]			PM Peak Hour Trips[1]			Daily Trips
			Trips In	Trips Out	Total Trips	Trips In	Trips Out	Total Trips	
Single-Family Detached Housing (210)	Dwelling Units	269	51	137	188	155	95	250	2,446
	Internal Capture (N/A)[2]		*Not Applied*						
	Land Use Gross Trips		**51**	**137**	**188**	**155**	**95**	**250**	**2,446**
	Pass-By Trips (N/A)[2]		*Not Applicable*						
	Land Use Net Trips		**51**	**137**	**188**	**155**	**95**	**250**	**2,446**
Single-Family Attatched Housing (215)	Dwelling Units	306	36	108	144	89	67	156	2,010
	Internal Capture (N/A)[2]		*Not Applied*						
	Land Use Gross Trips		**36**	**108**	**144**	**89**	**67**	**156**	**2,010**
	Pass-By Trips (N/A)[2]		*Not Applicable*						
	Land Use Net Trips		**36**	**108**	**144**	**89**	**67**	**156**	**2,010**
Subtotal ITE Trips			87	245	332	244	162	406	4,456
Internal Capture[2]			*Not Applied*						
Subtotal Gross Trips			**87**	**245**	**332**	**244**	**162**	**406**	**4,456**
Pass-By Trips[2]			*Not Applicable*						
Project Net New Trips			**87**	**245**	**332**	**244**	**162**	**406**	**4,456**

Source: Institute of Transportation Engineers (ITE) Trip Generation Manual, 12th Edition.

1: Trips generated for the a.m. and p.m. peak hour of the adjacent roadway network.

2: Internal capture rates and pass-by trips not applied or not applicable.



Ravara Trails

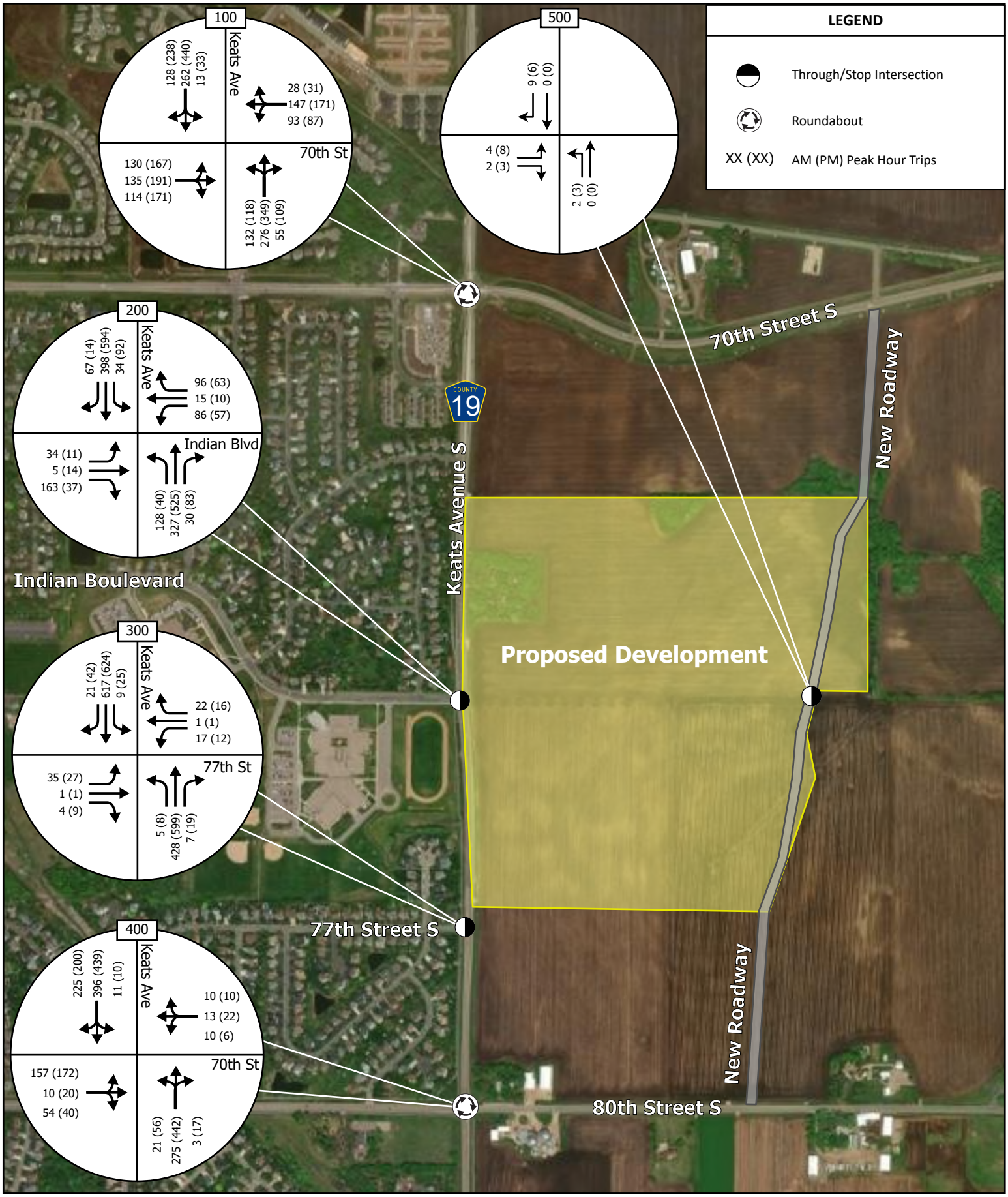
ALLIANT

Figure 5

Proposed Development Trips Directional Distribution

N

0 0.1 0.2 Miles



Ravara Trails

Figure 6

Forecast 2030 Build Conditions Volume

ALLIANT

N

0 0.15 0.3 Miles

4.3 2030 BUILD CONDTIONS INTERSECTION CAPACITY ANALYSIS

To understand the extent to which the proposed development impacts the study area roadway network, the forecast year 2026 Build conditions were analyzed. Results, presented below in **Table 8**, indicate that all study intersections are expected to operate at overall LOS B or better during the a.m. and p.m. peak hours except for Keats Avenue & 70th Street which operates at overall LOS C during the p.m. peak hour. The most significant increases in delay and LOS occur along the side-street approaches of Keats Avenue & Indian Boulevard, where the new westbound approach was initially modeled without a dedicated right-turn lane. During the a.m. peak hour this approach would perform at LOS E with left-turn and through movements blocking right-turns. Detailed operations and queuing analysis results are presented in the appendix.

Table 8. 2030 Build Conditions Traffic Operations Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	B / B	11.1 / 11.5	C / D	20.5 / 25.9
CSAH 19 (Keats Avenue) & Indian Boulevard	B / E	12.2 / 44.1	A / D	6.0 / 25.9
CSAH 19 (Keats Avenue) & 77th Street	A / C	2.5 / 15.7	A / C	2.4 / 15.6
CSAH 19 (Keats Avenue) & 80th Street	A / B	8.8 / 10.0	A / A	9.4 / 9.8

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

4.4 2030 BUILD CONDTIONS W/ IMPROVEMENTS INTERSECTION CAPACITY ANALYSIS

Although a dedicated right-turn lane is not provided for the new westbound approach at Indian Boulevard, the face-to-face width of is 40 feet which whould provide enough room for right-turning vehicles to bypass left-turning and through vehicles. Results of the forecast year 2030 Build with Improvements analysis, presented below in **Table 9**, indicate that all study intersections are expected to operate at overall LOS B or better during the a.m. and p.m. peak hours except for Keats Avenue & 70th Street which operates at overall LOS C during the p.m. peak hour. However, with the modified right-turn assumptions the side-street approaches of Keats Avenue & Indian Boulevard operate at LOS C during both the a.m. and p.m. peak hours. Dedicated side-street right-turn lanes at 77th Street provided very little improvement, as the existing eastbound left-turns dictate the worst-approach LOS. Detailed operations and queuing analysis results are presented in the appendix.

Table 9. 2030 Build Conditions Traffic Operations Analysis Results

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	B / B	11.1 / 11.5	C / D	20.5 / 25.9
CSAH 19 (Keats Avenue) & Indian Boulevard	A / C	9.0 / 23.1	A / C	5.6 / 19.3
CSAH 19 (Keats Avenue) & 77th Street	A / C	2.4 / 15.1	A / C	2.6 / 20.2
CSAH 19 (Keats Avenue) & 80th Street	A / B	8.8 / 10.0	A / A	9.4 / 9.8

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

5. Site Plan Review

A review of the proposed site plan was completed to identify any issues and recommend potential improvements regarding vehicle ingress / egress and internal circulation. The following should be considered:

- The proposed internal roadways, cul-de-sacs, and parking layouts appear to adequately accommodate typical passenger vehicles. However, truck turning movements should be reviewed to ensure that delivery, garbage trucks, and plows have adequate accommodations to negotiate internal roadways.
    - Appropriate traffic control and signing should be considered for internal roadways to ensure motorists understand which roadways have the right of way to reduce crash risks.
- Sidewalk is currently shown throughout the site plan with internal connections to a variety of parcels and external connections to both existing and proposed facilities along Keats Avenue.
    - Coordination with City and County staff should occur regarding external connections to regional trail networks and the design of pedestrian ramps and crossings.
    - With Grey Cloud Elementary and Cottage Grove Middle School located along Indian Boulevard on the opposite side of Keats Avenue, increased visibility (striping, signing, flashers, etc.) for pedestrians and bicyclists crossing Keats Avenue at Indian Boulevard would likely be needed.
        - Although crosswalk or tunnel alternatives could be considered short-term, finalizing design or constructing these with the initial phases of the development would be premature and unlikely to capture the true demand for these facilities. Based on pedestrian and bicycle counts from existing TMCs at 70th Street, there is little existing east-west demand as the area is largely undeveloped east of Keats Avenue. However, this would obviously change with the construction of 575 dwelling units.

6. Conclusions & Recommendations

The following study conclusions / recommendations are offered for consideration:

- The proposed Ravara Trails residential development consists of 269 single-family homes, 192 urban townhomes, and 114 suburban townhomes for a total of 575 dwelling units.
    - In addition to the two accesses along Keats Avenue, a north-south roadway (Ravine Parkway) is also anticipated along the east side of the development running parallel to Keats Avenue and connecting to both 70th Street to the north and 80th Street to the south.
- The proposed development would be expected to generate approximately 332 a.m. peak hour, 406 p.m. peak hour, and 4,456 daily trips for the current development plan.
- Results of the existing year 2025 and forecast year 2030 No Build analyses indicate that all study intersections are expected to operate at overall LOS B or better during the a.m. and p.m. peak hours.
- Results of the forecast year 2030 Build analysis indicates that all study intersections are expected to operate at overall LOS C or better during the weekday a.m. and p.m. peak hours. However, with a single approach lane the westbound approach at Indian Boulevard operates at LOS E during the a.m. peak.
    - Only Keats Avenue & 70th Street operates at overall LOS C and side-street LOS D, doing so in the p.m. peak hour. All other intersections operate at overall LOS B or better in both peak hours.
    - Although a dedicated right-turn lane is not provided for the new westbound approach at Indian Boulevard, the face-to-face width of is 40 feet which would provide enough room for right-turning vehicles to bypass left-turning and through vehicles.
    - Although not modeled, it is expected that all Ravine Parkway intersections would perform at LOS A due to low overall volumes.
- Results of the forecast year 2030 Build with Improvements analysis indicates that all study intersections are expected to operate at overall LOS C or better during the a.m. and p.m. peak hours.
    - Only Keats Avenue & 70th Street operates at overall LOS C and side-street LOS D, doing so in the p.m. peak hour. All other intersections operate at overall LOS B or better in both peak hours.
    - With the modified right-turn assumptions the side-street approaches of Keats Avenue & Indian Boulevard operate at LOS C during both the a.m. and p.m. peak hours.
    - Dedicated side-street right-turn lanes at 77th Street provided very little improvement, as the existing eastbound left-turns dictate the worst-approach LOS.

A review of the proposed site plan was completed to identify any issues and recommend potential improvements regarding vehicle ingress / egress, internal circulation, and pedestrian / bicycle connectivity. A summary is provided in **Section 5.0: Site Plan Review**.

Appendix

RAVARA TRAILS – TRAFFIC IMPACT STUDY

Measures of Effectiveness - Synchro/SimTraffic

Tank Brier Development Traffic Impact Study - Measures of Effectiveness Summary

Existing Year 2025 Conditions

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	A / A	7.7 / 8.6	B / C	13.0 / 15.1
CSAH 19 (Keats Avenue) & Indian Boulevard	A / A	3.5 / 8.7	A / A	2.1 / 6.8
CSAH 19 (Keats Avenue) & 77th Street	A / A	1.7 / 9.8	A / B	1.4 / 10.9
CSAH 19 (Keats Avenue) & 80th Street	A / A	5.9 / 7.3	A / A	7.2 / 9.1

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

Year 2030 No Build Conditions

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	A / A	8.1 / 9.1	B / C	14.7 / 17.4
CSAH 19 (Keats Avenue) & Indian Boulevard	A / A	3.8 / 9.1	A / A	2.3 / 6.4
CSAH 19 (Keats Avenue) & 77th Street	A / B	1.7 / 10.4	A / B	1.4 / 11.4
CSAH 19 (Keats Avenue) & 80th Street	A / A	6.2 / 7.6	A / A	7.4 / 9.3

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

Year 2030 Build Conditions

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	B / B	11.1 / 11.5	C / D	20.5 / 25.9
CSAH 19 (Keats Avenue) & Indian Boulevard	B / E	12.2 / 44.1	A / D	6.0 / 25.9
CSAH 19 (Keats Avenue) & 77th Street	A / C	2.5 / 15.7	A / C	2.4 / 15.6
CSAH 19 (Keats Avenue) & 80th Street	A / B	8.8 / 10.0	A / A	9.4 / 9.8

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

Year 2030 Build Conditions w/ Improvements

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)
CSAH 19 (Keats Avenue) & 70th Street	B / B	11.1 / 11.5	C / D	20.5 / 25.9
CSAH 19 (Keats Avenue) & Indian Boulevard	A / C	9.0 / 23.1	A / C	5.6 / 19.3
CSAH 19 (Keats Avenue) & 77th Street	A / C	2.4 / 15.1	A / C	2.6 / 20.2
CSAH 19 (Keats Avenue) & 80th Street	A / B	8.8 / 10.0	A / A	9.4 / 9.8

Overall Intersection LOS / Worst Approach LOS
Overall Intersection Delay / Worst Approach Delay

Existing Year 2025 Conditions - AM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 70th Street	Movement Delay (sec/veh)	6.0	9.4	5.7	5.5	9.4	5.4	4.7	8.7	4.7	5.4	10.2	6.0	7.7
	Total Delay (hr)	0.2	0.3	0.2	0.1	0.3	0.0	0.1	0.5	0.1	0.0	0.6	0.2	2.6
	Movement LOS	A	A	A	A	A	A	A	A	A	A	B	A	A
	Movement Volume	125	124	95	91	133	31	76	213	43	10	225	124	1290
	Movement 95th Queue (ft)	93	93	93	74	74	74	65	65	65	88	88	88	
	Storage Bay Distance (ft)	0	0	0	0	0	0	0	0	0	0	0	0	
	Approach Delay (sec/veh)	7.1			7.5			7.3			8.6			
	Approach LOS	A			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	15.0	0.0	7.3	0.0	0.0	0.0	4.9	1.0	0.0	0.0	2.8	1.9	3.5
	Total Delay (hr)	0.1	0.0	0.3	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.3	0.0	1.0
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	33	0	154	0	0	0	115	292	0	0	374	66	1034
	Movement 95th Queue (ft)	49	0	99	0	0	0	66	0	0	0	0	12	
	Storage Bay Distance (ft)	0	0	170	0	0	0	300	0	0	0	0	335	
	Approach Delay (sec/veh)	8.7			0.0			2.1			2.7			
	Approach LOS	A			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	10.4	0.0	4.4	0.0	0.0	0.0	2.6	0.9	0.0	0.0	1.7	0.9	1.7
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.4
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	34	0	4	0	0	0	4	374	0	0	511	17	944
	Movement 95th Queue (ft)	42	0	42	0	0	0	12	0	0	0	0	0	
	Storage Bay Distance (ft)	0	0	0	0	0	0	50	0	0	0	0	0	
	Approach Delay (sec/veh)	9.8			0.0			0.9			1.7			
	Approach LOS	A			A			A			A			

Existing Year 2025 Conditions - PM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	13.2	0.0	4.4	0.0	0.0	0.0	3.1	0.9	0.0	0.0	2.7	2.2	2.1
	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.0	0.5
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	12	0	32	0	0	0	36	477	0	0	550	14	1121
	Movement 95th Queue (ft)	33	0	34	0	0	0	35	0	0	0	0	0	
	Storage Bay Distance (ft)	0	0	170	0	0	0	300	0	0	0	0	0	
	Approach Delay (sec/veh)	6.8			0.0			1.1			2.7			
	Approach LOS	A			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	12.9	0.0	4.6	0.0	0.0	0.0	2.5	1.0	0.0	0.0	1.2	0.7	1.4
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.4
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	26	0	8	0	0	0	8	482	0	0	546	40	1110
	Movement 95th Queue (ft)	39	0	39	0	0	0	17	0	0	0	0	0	
	Storage Bay Distance (ft)	0	0	0	0	0	0	50	0	0	0	0	0	
	Approach Delay (sec/veh)	10.9			0.0			1.0			1.2			
	Approach LOS	B			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 80th Street	Movement Delay (sec/veh)	3.8	6.4	2.6	2.6	5.6	2.9	5.3	9.9	3.9	4.9	8.4	3.8	7.2
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	1.0	0.0	0.0	0.9	0.2	2.3
	Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	124	20	38	5	22	8	53	352	17	5	394	150	1188
	Movement 95th Queue (ft)	48	48	20	29	29	13	67	67	10	45	45	28	
	Storage Bay Distance (ft)	0	0	220	0	0	230	0	0	245	0	0	280	
	Approach Delay (sec/veh)	3.8			4.6			9.1			7.1			
	Approach LOS	A			A			A			A			

Year 2030 No Build Conditions - AM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 70th Street	Movement Delay (sec/veh)	6.2	9.8	6.2	6.1	9.7	5.9	5.4	9.4	5.0	6.6	10.9	6.2	8.1
	Total Delay (hr)	0.2	0.3	0.2	0.2	0.4	0.0	0.1	0.6	0.1	0.0	0.7	0.2	3.0
	Movement LOS	A	A	A	A	A	A	A	A	A	A	B	A	A
	Movement Volume	131	126	101	90	146	28	84	219	50	12	233	132	1352
	Movement 95th Queue (ft)	92	92	92	83	83	83	77	77	77	96	96	96	
	Storage Bay Distance (ft)	0	0	0	0	0	0	0	0	0	0	0	0	
	Approach Delay (sec/veh)	7.5			8.1			7.8			9.1			
	Approach LOS	A			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	18.9	0.0	7.1	0.0	0.0	0.0	5.8	1.0	0.0	0.0	3.1	2.1	3.8
	Total Delay (hr)	0.2	0.0	0.3	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.3	0.0	1.1
	Movement LOS	C	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	32	0	160	0	0	0	128	311	0	0	383	69	1083
	Movement 95th Queue (ft)	52	0	87	0	0	0	75	0	0	0	0	12	
	Storage Bay Distance (ft)	0	0	170	0	0	0	300	0	0	0	0	335	
	Approach Delay (sec/veh)	9.1			0.0			2.4			2.9			
	Approach LOS	A			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	11.0	0.0	5.1	0.0	0.0	0.0	2.3	1.0	0.0	0.0	1.6	1.0	1.7
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.4
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	36	0	4	0	0	0	5	406	0	0	525	16	992
	Movement 95th Queue (ft)	44	0	44	0	0	0	11	0	0	0	0	0	
	Storage Bay Distance (ft)	0	0	0	0	0	0	50	0	0	0	0	0	
	Approach Delay (sec/veh)	10.4			0.0			1.0			1.6			
	Approach LOS	B			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 80th Street	Movement Delay (sec/veh)	3.9	6.5	2.6	2.1	4.3	2.1	3.9	8.0	2.4	3.8	8.1	3.8	6.2
	Total Delay (hr)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.8	0.2	1.8
	Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	142	9	54	8	14	8	22	259	4	6	342	178	1046
	Movement 95th Queue (ft)	53	53	24	27	27	15	45	45	6	38	38	26	
	Storage Bay Distance (ft)	0	0	220	0	0	230	0	0	245	0	0	280	
	Approach Delay (sec/veh)	3.7			3.1			7.6			6.6			
	Approach LOS	A			A			A			A			

Year 2030 No Build Conditions - PM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	12.7	0.0	4.6	0.0	0.0	0.0	3.2	0.9	0.0	0.0	3.1	2.6	2.3
	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.6
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	10	0	36	0	0	0	36	512	0	0	561	12	1167
	Movement 95th Queue (ft)	28	0	37	0	0	0	35	0	0	0	0	0	
	Storage Bay Distance (ft)	0	0	170	0	0	0	300	0	0	0	0	0	
	Approach Delay (sec/veh)	6.4			0.0			1.1			3.1			
	Approach LOS	A			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	13.8	0.0	4.1	0.0	0.0	0.0	2.5	1.0	0.0	0.0	1.3	0.6	1.4
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.4
	Movement LOS	B	A	A	A	A	A	A	A	A	A	A	A	A
	Movement Volume	24	0	8	0	0	0	6	515	0	0	564	38	1155
	Movement 95th Queue (ft)	43	0	43	0	0	0	14	0	0	0	0	0	
	Storage Bay Distance (ft)	0	0	0	0	0	0	50	0	0	0	0	0	
	Approach Delay (sec/veh)	11.4			0.0			1.0			1.3			
	Approach LOS	B			A			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 80th Street	Movement Delay (sec/veh)	3.8	6.4	2.5	3.0	5.7	3.1	5.6	10.1	4.0	4.8	8.8	4.1	7.4
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	1.0	0.2	2.5
	Movement LOS	A	A	A	A	A	A	A	B	A	A	A	A	A
	Movement Volume	135	20	39	4	22	9	59	372	16	5	393	169	1243
	Movement 95th Queue (ft)	46	46	18	28	28	15	64	64	10	50	50	33	
	Storage Bay Distance (ft)	0	0	220	0	0	230	0	0	245	0	0	280	
	Approach Delay (sec/veh)	3.8			4.7			9.3			7.4			
	Approach LOS	A			A			A			A			

Year 2030 Build Conditions - AM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	26.4	15.9	24.7	48.0	46.3	39.9	6.5	2.2	1.0	3.9	3.9	2.3	12.2
	Total Delay (hr)	0.2	0.0	1.1	1.2	0.2	1.0	0.2	0.2	0.0	0.0	0.4	0.0	4.5
	Movement LOS	D	C	C	E	E	E	A	A	A	A	A	A	B
	Movement Volume	32	6	159	87	17	91	129	332	28	34	396	74	1385
	Movement 95th Queue (ft)	132	132	175	254	254	254	72	0	0	31	4	14	
	Storage Bay Distance (ft)	0	0	170	0	0	0	300	0	0	300	0	335	
	Approach Delay (sec/veh)	24.7			44.1			3.3			3.7			
	Approach LOS	C			E			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	16.6	7.8	10.2	13.1	0.0	4.4	2.9	1.3	0.5	2.6	2.2	1.6	2.5
	Total Delay (hr)	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.9
	Movement LOS	C	A	B	B	A	A	A	A	A	A	A	A	A
	Movement Volume	33	1	4	15	0	22	3	436	8	8	613	20	1163
	Movement 95th Queue (ft)	53	53	53	47	47	47	11	0	0	12	0	0	
	Storage Bay Distance (ft)	0	0	0	0	0	0	240	0	0	250	0	0	
	Approach Delay (sec/veh)	15.7			7.9			1.3			2.2			
	Approach LOS	C			A			A			A			

Year 2030 Build Conditions - PM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	23.9	24.6	6.2	31.3	34.1	20.1	3.4	1.9	3.2	12.1	4.2	2.9	6.0
	Total Delay (hr)	0.1	0.1	0.1	0.5	0.1	0.4	0.0	0.3	0.1	0.3	0.7	0.0	2.7
	Movement LOS	C	C	A	D	D	C	A	A	A	B	A	A	A
	Movement Volume	10	13	37	58	8	66	38	515	79	82	575	11	1492
	Movement 95th Queue (ft)	43	43	44	121	121	121	32	2	0	52	0	0	
	Storage Bay Distance (ft)	0	0	170	0	0	0	300	0	0	300	0	0	
	Approach Delay (sec/veh)	13.1			25.9			2.2			5.1			
	Approach LOS	B			D			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	19.2	16.5	5.9	12.6	36.9	8.1	3.2	1.3	2.4	9.8	2.1	1.3	2.4
	Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.0	0.7
	Movement LOS	C	C	A	B	E	A	A	A	A	A	A	A	A
	Movement Volume	24	1	9	10	1	15	7	586	20	25	605	43	1346
	Movement 95th Queue (ft)	42	42	42	38	38	38	17	0	0	31	0	0	
	Storage Bay Distance (ft)	0	0	0	0	0	0	240	0	0	250	0	0	
	Approach Delay (sec/veh)	15.6			10.9			1.4			2.3			
	Approach LOS	C			B			A			A			

Year 2030 Build Conditions w/ Improvements - AM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	30.3	26.1	21.7	43.1	33.9	6.3	6.0	2.2	0.7	3.4	3.8	2.2	9.0
	Total Delay (hr)	0.3	0.0	1.0	0.9	0.1	0.2	0.2	0.2	0.0	0.0	0.4	0.0	3.3
	Movement LOS	D	D	C	E	D	A	A	A	A	A	A	A	A
	Movement Volume	30	6	165	77	14	109	129	326	28	33	386	71	1374
	Movement 95th Queue (ft)	131	131	160	138	138	89	69	0	1	26	1	4	
	Storage Bay Distance (ft)	0	0	170	0	0	100	300	0	300	300	0	335	
	Approach Delay (sec/veh)	23.1			22.4			3.1			3.5			
	Approach LOS	C			C			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	16.9	9.2	3.9	16.8	11.1	4.5	3.7	1.2	0.7	3.3	2.1	1.5	2.4
	Total Delay (hr)	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.7
	Movement LOS	C	A	A	C	B	A	A	A	A	A	A	A	A
	Movement Volume	35	1	5	12	1	23	5	426	8	8	599	21	1144
	Movement 95th Queue (ft)	53	53	14	33	33	37	12	0	0	12	2	0	
	Storage Bay Distance (ft)	0	0	50	0	0	50	50	0	0	250	0	0	
	Approach Delay (sec/veh)	15.1			8.8			1.2			2.1			
	Approach LOS	C			A			A			A			

Year 2030 Build Conditions w/ Improvements - PM Peak Hour

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & Indian Boulevard	Movement Delay (sec/veh)	34.3	29.2	5.9	32.2	27.3	9.1	3.9	1.9	3.1	12.0	4.2	3.2	5.6
	Total Delay (hr)	0.1	0.1	0.1	0.4	0.1	0.2	0.0	0.3	0.1	0.3	0.7	0.0	2.4
	Movement LOS	D	D	A	D	D	A	A	A	A	B	A	A	A
	Movement Volume	11	11	38	49	9	69	39	518	76	95	561	13	1489
	Movement 95th Queue (ft)	47	47	40	74	74	48	33	2	0	48	0	0	
	Storage Bay Distance (ft)	0	0	170	0	0	100	300	0	0	300	0	0	
	Approach Delay (sec/veh)	15.4			19.3			2.2			5.3			
	Approach LOS	C			C			A			A			

Intersection	MOE	Eastbound Approach			Westbound Approach			Northbound Approach			Southbound Approach			Intersection Total
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
CSAH 19 (Keats Avenue) & 77th Street	Movement Delay (sec/veh)	27.2	18.2	4.7	19.5	12.2	8.9	4.2	1.3	2.5	9.2	1.9	1.4	2.6
	Total Delay (hr)	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.0	0.9
	Movement LOS	D	C	A	C	B	A	A	A	A	A	A	A	A
	Movement Volume	25	2	11	13	1	19	8	585	17	27	582	41	1331
	Movement 95th Queue (ft)	47	47	20	33	33	33	15	0	0	30	0	0	
	Storage Bay Distance (ft)	0	0	50	0	0	50	50	0	0	250	0	0	
	Approach Delay (sec/veh)	20.2			13.2			1.4			2.2			
	Approach LOS	C			B			A			A			

Appendix

RAVARA TRAILS – TRAFFIC IMPACT STUDY

Measures of Effectiveness - HCS 2024

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2025
Time Analyzed	AM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 70th...
E/W Street Name	70th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.90
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	124	128	92	0	86	140	27	0	78	204	46	0	12	228	121
Percent Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flow Rate (v_{PCE}), pc/h	0	146	151	108	0	101	165	32	0	92	240	54	0	14	269	143
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		405			298			386			426	
Entry Volume, veh/h		382			281			364			402	
Circulating Flow (v_c), pc/h	384			478			311			358		
Exiting Flow (v_{ex}), pc/h	219			400			418			478		
Capacity (c_{pce}), pc/h		933			847			1005			958	
Capacity (c), veh/h		880			800			948			904	
v/c Ratio (x)		0.43			0.35			0.38			0.44	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.4			8.7			8.1			9.4	
Lane LOS		A			A			A			A	
95% Queue Length, Q_{95} (veh)		2.3			1.6			1.9			2.4	
95% Queue Length, Q_{95} (ft)		60.3			41.9			49.8			62.9	
Approach Delay, s/veh | LOS	9.4	A		8.7	A		8.1	A		9.4	A	
Intersection Delay, s/veh | LOS	8.9						A					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2025
Time Analyzed	PM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 70th...
E/W Street Name	70th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.98
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	159	182	116	0	78	163	29	0	81	292	100	0	32	360	227
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	169	193	123	0	83	173	31	0	86	310	106	0	34	382	241
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		485			287			502			657	
Entry Volume, veh/h		466			276			483			632	
Circulating Flow (v_c), pc/h	499			565			396			342		
Exiting Flow (v_{ex}), pc/h	333			500			510			588		
Capacity (c_{pce}), pc/h		830			776			921			974	
Capacity (c), veh/h		798			746			886			936	
v/c Ratio (x)		0.58			0.37			0.54			0.67	

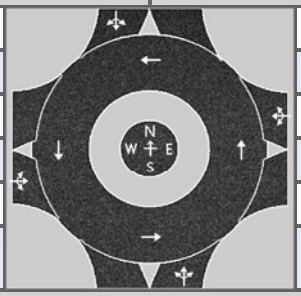
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		13.7			9.5			11.6			15.1	
Lane LOS		B			A			B			C	
95% Queue Length, Q_{95} (veh)		4.1			1.7			3.5			6.0	
95% Queue Length, Q_{95} (ft)		105.8			43.9			90.3			154.8	
Approach Delay, s/veh | LOS	13.7	B		9.5	A		11.6	B		15.1	C	
Intersection Delay, s/veh | LOS	13.0						B					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	AM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 70th...
E/W Street Name	70th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.90
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	130	135	96	0	90	147	28	0	82	214	49	0	13	240	128
Percent Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flow Rate (v_{PCE}), pc/h	0	153	159	113	0	106	173	33	0	97	252	58	0	15	283	151
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		425			312			407			449	
Entry Volume, veh/h		401			294			384			424	
Circulating Flow (v_c), pc/h	404			502			327			376		
Exiting Flow (v_{ex}), pc/h	232			421			438			502		
Capacity (c_{pce}), pc/h		914			827			989			940	
Capacity (c), veh/h		862			780			933			887	
v/c Ratio (x)		0.47			0.38			0.41			0.48	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		10.1			9.3			8.6			10.1	
Lane LOS		B			A			A			B	
95% Queue Length, Q_{95} (veh)		2.6			1.8			2.1			2.7	
95% Queue Length, Q_{95} (ft)		68.1			47.2			55.0			70.7	
Approach Delay, s/veh | LOS	10.1	B		9.3	A		8.6	A		10.1	B	
Intersection Delay, s/veh | LOS	9.6						A					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	PM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 70th...
E/W Street Name	70th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.98
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	167	191	121	0	82	171	31	0	85	307	105	0	33	379	238
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	177	203	128	0	87	181	33	0	90	326	111	0	35	402	253
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		508			301			527			690	
Entry Volume, veh/h		488			289			507			663	
Circulating Flow (v_c), pc/h	524			593			415			358		
Exiting Flow (v_{ex}), pc/h	349			524			536			617		
Capacity (c_{pce}), pc/h		809			754			904			958	
Capacity (c), veh/h		778			725			869			921	
v/c Ratio (x)		0.63			0.40			0.58			0.72	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		15.5			10.3			12.8			17.4	
Lane LOS		C			B			B			C	
95% Queue Length, Q_{95} (veh)		4.9			2.0			4.1			7.3	
95% Queue Length, Q_{95} (ft)		126.4			51.6			105.8			188.3	
Approach Delay, s/veh | LOS	15.5	C		10.3	B		12.8	B		17.4	C	
Intersection Delay, s/veh | LOS	14.7						B					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	AM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 70th...
E/W Street Name	70th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.92
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	130	135	114	0	93	147	28	0	132	276	55	0	13	262	128
Percent Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flow Rate (v_{PCE}), pc/h	0	150	156	131	0	107	169	32	0	152	318	63	0	15	302	147
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		437			308			533			464	
Entry Volume, veh/h		412			291			503			438	
Circulating Flow (v_c), pc/h	424			620			321			428		
Exiting Flow (v_{ex}), pc/h	234			468			500			540		
Capacity (c_{pce}), pc/h		895			733			995			892	
Capacity (c), veh/h		845			692			938			841	
v/c Ratio (x)		0.49			0.42			0.54			0.52	

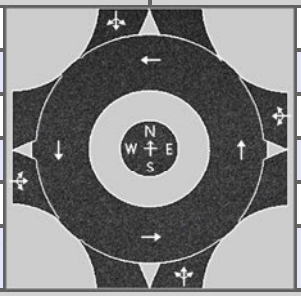
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		10.7			11.1			10.9			11.5	
Lane LOS		B			B			B			B	
95% Queue Length, Q_{95} (veh)		2.8			2.1			3.4			3.2	
95% Queue Length, Q_{95} (ft)		73.4			55.0			89.1			83.8	
Approach Delay, s/veh | LOS	10.7	B		11.1	B		10.9	B		11.5	B	
Intersection Delay, s/veh | LOS	11.1						B					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	PM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 70th...
E/W Street Name	70th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.98
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	167	191	171	0	87	171	31	0	118	349	109	0	33	440	238
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	177	203	181	0	92	181	33	0	125	370	116	0	35	467	253
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		561			306			611			755	
Entry Volume, veh/h		539			294			588			726	
Circulating Flow (v_c), pc/h	594			672			415			398		
Exiting Flow (v_{ex}), pc/h	354			559			580			740		
Capacity (c_{pce}), pc/h		753			695			904			920	
Capacity (c), veh/h		724			669			869			884	
v/c Ratio (x)		0.75			0.44			0.68			0.82	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		22.8			11.8			16.0			25.9	
Lane LOS		C			B			C			D	
95% Queue Length, Q_{95} (veh)		8.1			2.3			6.0			12.0	
95% Queue Length, Q_{95} (ft)		209.0			59.3			154.8			309.6	
Approach Delay, s/veh | LOS	22.8	C		11.8	B		16.0	C		25.9	D	
Intersection Delay, s/veh | LOS	20.5						C					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	AM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 80th...
E/W Street Name	80th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.86
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	143	10	54	0	10	13	8	0	21	253	3	0	7	334	187
Percent Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flow Rate (v_{PCE}), pc/h	0	176	12	67	0	12	16	10	0	26	312	4	0	9	412	230
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		255			38			342			651	
Entry Volume, veh/h		241			36			323			614	
Circulating Flow (v_c), pc/h	433			514			197			54		
Exiting Flow (v_{ex}), pc/h	25			272			498			491		
Capacity (c_{pce}), pc/h		887			817			1129			1306	
Capacity (c), veh/h		837			771			1065			1232	
v/c Ratio (x)		0.29			0.05			0.30			0.50	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.5			5.1			6.4			8.3	
Lane LOS		A			A			A			A	
95% Queue Length, Q_{95} (veh)		1.2			0.1			1.3			3.0	
95% Queue Length, Q_{95} (ft)		31.4			2.6			34.1			78.6	
Approach Delay, s/veh | LOS	7.5	A		5.1	A		6.4	A		8.3	A	
Intersection Delay, s/veh | LOS	7.5						A					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	PM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 80th...
E/W Street Name	80th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.94
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	135	20	40	0	6	22	7	0	56	381	17	0	7	397	174
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	149	22	44	0	7	24	8	0	62	422	19	0	8	439	193
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		215			39			503			640	
Entry Volume, veh/h		207			38			484			615	
Circulating Flow (v_c), pc/h	454			633			179			93		
Exiting Flow (v_{ex}), pc/h	49			279			579			490		
Capacity (c_{pce}), pc/h		868			724			1150			1255	
Capacity (c), veh/h		835			696			1105			1207	
v/c Ratio (x)		0.25			0.05			0.44			0.51	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.0			5.7			8.0			8.6	
Lane LOS		A			A			A			A	
95% Queue Length, Q_{95} (veh)		1.0			0.2			2.3			3.1	
95% Queue Length, Q_{95} (ft)		25.8			5.2			59.3			80.0	
Approach Delay, s/veh | LOS	7.0	A		5.7	A		8.0	A		8.6	A	
Intersection Delay, s/veh | LOS	8.1						A					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	AM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 80th...
E/W Street Name	80th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.87
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	157	10	54	0	10	13	10	0	21	275	3	0	11	396	225
Percent Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flow Rate (v_{PCE}), pc/h	0	191	12	66	0	12	16	12	0	26	335	4	0	13	482	274
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		269			40			365			769	
Entry Volume, veh/h		254			38			344			725	
Circulating Flow (v_c), pc/h	507			552			216			54		
Exiting Flow (v_{ex}), pc/h	29			316			538			560		
Capacity (c_{pce}), pc/h		823			786			1107			1306	
Capacity (c), veh/h		776			741			1044			1232	
v/c Ratio (x)		0.33			0.05			0.33			0.59	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.5			5.4			6.8			10.0	
Lane LOS		A			A			A			B	
95% Queue Length, Q_{95} (veh)		1.4			0.2			1.5			4.2	
95% Queue Length, Q_{95} (ft)		36.7			5.2			39.3			110.0	
Approach Delay, s/veh | LOS	8.5	A		5.4	A		6.8	A		10.0	B	
Intersection Delay, s/veh | LOS	8.8						A					

HCS Roundabouts Report

General Information

Analyst	CJV
Agency or Co.	Alliant Engineering Inc.
Date Performed	10/27/2025
Analysis Year	2030
Time Analyzed	PM Peak
Project Description	Tank Brier Development Study



Site Information

Intersection	CSAH 19 (Keats Ave) & 80th...
E/W Street Name	80th Street
N/S Street Name	CSAH 19 (Keats Avenue)
Analysis Time Period, hrs	1.00
Peak Hour Factor	0.94
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	172	20	40	0	6	22	10	0	56	442	17	0	10	439	200
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	190	22	44	0	7	24	11	0	62	489	19	0	11	486	221
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs, %	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		256			42			570			718	
Entry Volume, veh/h		246			40			548			690	
Circulating Flow (v_c), pc/h	504			741			223			93		
Exiting Flow (v_{ex}), pc/h	52			307			690			537		
Capacity (c_{pce}), pc/h		825			648			1099			1255	
Capacity (c), veh/h		794			623			1057			1207	
v/c Ratio (x)		0.31			0.06			0.52			0.57	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.1			6.5			9.7			9.8	
Lane LOS		A			A			A			A	
95% Queue Length, Q_{95} (veh)		1.3			0.2			3.2			3.9	
95% Queue Length, Q_{95} (ft)		33.5			5.2			82.6			100.6	
Approach Delay, s/veh | LOS	8.1	A		6.5	A		9.7	A		9.8	A	
Intersection Delay, s/veh | LOS	9.4						A					

Appendix

RAVARA TRAILS – TRAFFIC IMPACT STUDY

Turning Movement Counts

ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & 70th Street
Date: 5/29/2025
Duration: 0600-1900

Site Code 100
Ref Pt: N/A
Page No: 1 of 4

All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						70th Street Westbound						Keats Avenue Northbound						70th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
6:00	--	--	11	7	**18**	--	--	7	21	3	**31**	--	--	6	17	18	**41**	--	--	8	13	4	**25**	1	115	1
6:15	--	1	25	11	**37**	--	--	15	26	3	**44**	--	--	11	22	13	**46**	--	--	10	7	14	**31**	1	158	1
6:30	--	3	37	16	**56**	--	--	20	24	3	**47**	--	1	12	45	16	**74**	--	--	13	25	16	**54**	--	231	--
6:45	--	1	33	24	**58**	--	--	16	17	2	**35**	--	--	11	46	10	**67**	--	--	18	15	18	**51**	--	211	--
Hour Total	--	5	106	58	**169**	--	--	58	88	11	**157**	--	1	40	130	57	**228**	--	--	49	60	52	**161**	2	715	2
7:00	--	3	40	26	**69**	2	--	12	31	4	**47**	--	--	14	37	19	**70**	--	--	21	20	14	**55**	--	241	2
7:15	--	1	73	32	**106**	--	--	27	46	5	**78**	--	--	16	55	9	**80**	--	--	34	32	28	**94**	--	358	--
7:30	--	1	52	33	**86**	--	--	13	25	10	**48**	--	--	26	60	12	**98**	--	--	26	28	29	**83**	--	315	--
7:45	--	10	45	25	**80**	--	--	22	35	9	**66**	--	--	16	45	13	**74**	--	--	38	33	21	**92**	--	312	--
Hour Total	--	15	210	116	**341**	2	--	74	137	28	**239**	--	--	72	197	53	**322**	--	--	119	113	92	**324**	--	1226	2
8:00	--	--	58	31	**89**	1	--	24	34	3	**61**	--	--	20	44	12	**76**	--	--	26	35	14	**75**	--	301	1
8:15	--	3	43	28	**74**	1	--	15	21	6	**42**	--	--	8	48	6	**62**	--	--	40	23	15	**78**	--	256	1
8:30	--	4	43	24	**71**	1	--	8	20	8	**36**	--	--	15	54	14	**83**	--	--	36	31	27	**94**	--	284	1
8:45	1	4	43	21	**69**	--	--	9	19	6	**34**	--	--	11	50	8	**69**	--	--	31	20	15	**66**	--	238	--
Hour Total	1	11	187	104	**303**	3	--	56	94	23	**173**	--	--	54	196	40	**290**	--	--	133	109	71	**313**	--	1079	3
9:00	--	5	48	27	**80**	1	--	6	24	9	**39**	--	--	8	37	6	**51**	--	1	19	21	9	**50**	--	220	1
9:15	--	3	40	29	**72**	1	--	8	17	6	**31**	--	--	12	40	11	**63**	--	1	27	20	21	**69**	--	235	1
9:30	--	5	31	27	**63**	--	--	6	19	4	**29**	--	--	12	38	10	**60**	--	--	25	23	9	**57**	--	209	--
9:45	--	4	38	22	**64**	--	--	7	14	7	**28**	--	--	10	41	7	**58**	--	--	17	25	14	**56**	--	206	--
Hour Total	--	17	157	105	**279**	2	--	27	74	26	**127**	--	--	42	156	34	**232**	--	2	88	89	53	**232**	--	870	2
10:00	--	4	36	18	**58**	--	1	8	25	7	**41**	--	--	11	38	5	**54**	--	--	30	18	19	**67**	--	220	--
10:15	--	3	45	18	**66**	1	--	11	21	5	**37**	--	1	15	54	10	**80**	--	--	14	14	14	**42**	--	225	1
10:30	--	7	37	16	**60**	--	--	7	20	8	**35**	--	--	11	45	7	**63**	--	--	15	22	16	**53**	--	211	--
10:45	--	5	55	28	**88**	--	--	10	19	6	**35**	--	--	11	41	10	**62**	--	--	13	22	9	**44**	--	229	--
Hour Total	--	19	173	80	**272**	1	1	36	85	26	**148**	--	1	48	178	32	**259**	--	--	72	76	58	**206**	--	885	1
11:00	--	9	57	40	**106**	--	--	4	23	2	**29**	1	--	8	33	12	**53**	1	1	26	19	12	**58**	--	246	2
11:15	--	7	48	29	**84**	--	--	8	22	6	**36**	--	--	9	46	9	**64**	--	--	24	25	17	**66**	3	250	3
11:30	1	1	47	23	**72**	--	1	12	19	8	**40**	--	--	17	55	11	**83**	--	--	19	27	13	**59**	--	254	--
11:45	--	7	39	22	**68**	--	1	6	24	2	**33**	--	--	13	43	10	**66**	--	--	23	38	17	**78**	--	245	--
Hour Total	1	24	191	114	**330**	--	2	30	88	18	**138**	1	--	47	177	42	**266**	1	1	92	109	59	**261**	3	995	5
12:00	--	9	44	33	**86**	1	--	8	28	4	**40**	--	--	13	36	9	**58**	--	2	18	18	16	**54**	1	238	2
12:15	--	9	50	27	**86**	--	--	14	18	9	**41**	--	--	18	42	13	**73**	--	--	21	24	15	**60**	2	260	2
12:30	--	2	55	23	**80**	--	--	5	28	3	**36**	--	--	11	36	11	**58**	--	1	28	30	13	**72**	2	246	2
12:45	--	6	60	46	**112**	--	--	13	19	3	**35**	--	--	10	56	8	**74**	--	--	22	19	16	**57**	--	278	--
Hour Total	--	26	209	129	**364**	1	--	40	93	19	**152**	--	--	52	170	41	**263**	--	3	89	91	60	**243**	5	1022	6
13:00	1	6	40	27	**74**	--	--	9	19	8	**36**	--	--	6	46	9	**61**	--	--	22	26	18	**66**	3	237	3
13:15	--	4	55	31	**90**	1	--	17	25	10	**52**	--	--	9	35	15	**59**	--	--	24	27	5	**56**	2	257	3
13:30	--	4	39	29	**72**	--	--	16	25	2	**43**	--	--	15	44	9	**68**	--	--	24	21	11	**56**	--	239	--
13:45	--	8	54	31	**93**	1	--	9	34	5	**48**	--	--	9	50	14	**73**	--	1	22	32	17	**72**	--	286	1
Hour Total	1	22	188	118	**329**	2	--	51	103	25	**179**	--	--	39	175	47	**261**	--	1	92	106	51	**250**	5	1019	7
14:00	--	--	45	30	**75**	--	--	6	27	3	**36**	1	--	15	56	19	**90**	1	--	20	33	27	**80**	1	281	3
14:15	--	6	65	39	**110**	--	--	12	36	6	**54**	--	--	12	46	24	**82**	--	--	23	32	20	**75**	3	321	3
14:30	--	9	54	30	**93**	--	--	19	28	5	**52**	--	--	21	56	19	**96**	--	2	27	30	12	**71**	2	312	2
14:45	--	10	60	40	**110**	--	1	13	39	5	**58**	--	--	11	56	9	**76**	--	1	39	28	18	**86**	2	330	2
Hour Total	--	25	224	139	**388**	--	1	50	130	19	**200**	1	--	59	214	71	**344**	1	3	109	123	77	**312**	8	1244	10
15:00	--	5	73	39	**117**	--	--	10	28	7	**45**	--	--	11	55	27	**93**	--	--	35	23	15	**73**	2	328	2
15:15	--	10	58	40	**108**	--	--	25	34	8	**67**	--	--	20	80	24	**124**	--	--	37	49	32	**118**	3	417	3
15:30	--	8	64	39	**111**	--	--	13	43	12	**68**	--	--	17	89	27	**133**	--	--	54	43	34	**131**	3	443	3
15:45	--	5	77	46	**128**	--	--	27	32	4	**63**	--	--	15	59	22	**96**	--	--	41	42	17	**100**	3	387	3
Hour Total	--	28	272	164	**464**	--	--	75	137	31	**243**	--	--	63	283	100	**446**	--	--	167	157	98	**422**	11	1575	11
16:00	--	7	103	46	**156**	--	--	15	26	6	**47**	--	--	18	78	33	**129**	--	--	47	40	28	**115**	9	447	9
16:15	--	10	73	62	**145**	--	--	20	43	10	**73**	--	--	21	65	29	**115**	--	1	32	54	33	**120**	7	453	7
16:30	--	9	95	54	**158**	1	--	14	44	10	**68**	--	--	23	74	21	**118**	--	--	47	46	27	**120**	3	464	4
16:45	--	6	89	65	**160**	--	--	29	50	3	**82**	--	--	19	75	17	**111**	--	1	31	42	28	**102**	7	455	7
Hour Total	--	32	360	227	**619**	1	--	78	163	29	**270**	--	--	81	292	100	**473**	--	2	157	182	116	**457**	26	1819	27
17:00	1	4	72	36	**113**	--	--	27	42	12	**81**	--	--	20	81	25	**126**	--	--	31	27	29	**87**	16	407	16
17:15	--	8	84	57	**149**	--	--	17	45	3	**65**	--	--	21	54	14	**89**	--	2	35	39	28	**104**	--	407	--
17:30	--	7	66	55	**128**	--	--	11	42	3	**56**	--	--	15	59	20	**94**	--	--	18	50	30	**98**	--	376	--
17:45	--	9	75	43	**127**	--	--	17	46	2	**65**	--	--	13	69	14	**96**	--	--	31	39	32	**102**	1	390	1
Hour Total	1	28	297	191	**517**	--	--	72	175	20	**267**	--	--	69	263	73	**405**	--	2	115	155	119	**391**	17	1580	17
18:00	--	3	64	35	**102**	--	--	13	27	7	**47**	--	--	12	37	19	**68**	--	--	33	27	27	**87**	--	304	--
18:15	--	7	67	32	**106**	2	--	11	17	1	**29**	--	--	22	49	20	**91**	--	--	31	21	19	**71**	2	297	4
18:30	--	5	52	29	**86**	--	--	11	26	2	**39**	--	--	7	44	5	**56**	1	--	23	12	18	**53**	--	234	1
18:45	--	2	41	32	**75**	--	--	7	23	1	**31**	--	--	8	45	4	**57**	--	--	21	15	13	**49**	2	212	2
Hour Total	--	17	224	128	**369**	2	--	42	93	11	**146**	--	--	49	175	48	**272**	1	--	108	75	77	**260**	4	1047	7
Grand Total	4	269	2798	1673	**4744**	14	4	689	1460	286	**2439**	2	2	715	2606	738	**4061**	3	14	1390	1445	983	**3832**	81	15076	100
% of App.	0.1%	5.7%	59.0%	35.3%			0.2%	28.2%	59.9%	11.7%			0.0%	17.6%	64.2%	18.2%			0.4%	36.3%	37.7%	25.7%				
% of Total	0.0%	1.8%	18.6%	11.1%	31.5%	14.0%	0.0%	4.6%	9.7%	1.9%	16.2%	2.0%	0.0%	4.7%	17.3%	4.9%	26.9%	3.0%	0.1%	9.2%	9.6%	6.5%	25.4%	81.0%		
Cars Total	4	201	2625	1643	**4473**	7	4	657	1364	222	**2247**	--	2	672	2475	712	**3861**	1	13	1349	1349	943	**3654**	42	14235	50
Cars % of Movement	100%	74.7%	93.8%	98.2%	94.3%	14.0%	100%	95.4%	93.4%	77.6%	92.1%	0.0%	100%	94.0%	95.0%	96.5%	95.1%	2.0%	92.9%	97.1%	93.4%	95.9%	95.4%	84.0%	94.4%	
Trucks Total	--	68	173	30	**271**	7	--	32	96	64	**192**	2	--	43	131	26	**200**	2	1	41	96	40	**178**	39	841	50
Trucks % of Movement	0.0%	25.3%	6.2%	1.8%	5.7%	14.0%	0.0%	4.6%	6.6%	22.4%	7.9%	4.0%	0.0%	6.0%	5.0%	3.5%	4.9%	4.0%	7.1%	2.9%	6.6%	4.1%	4.6%	78.0%	5.6%	

ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & 70th Street
Date: 5/29/2025
Duration: 0600-1900

Site Code 100
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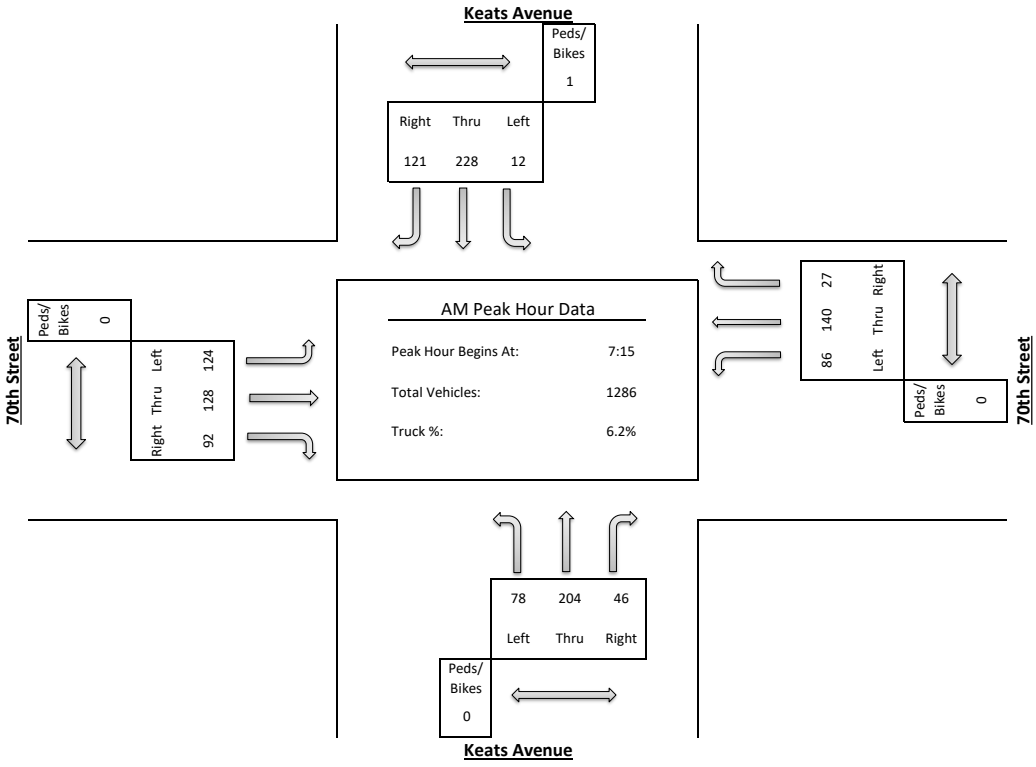
All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						70th Street Westbound						Keats Avenue Northbound						70th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
7:15	--	1	73	32	**106**	--	--	27	46	5	**78**	--	--	16	55	9	**80**	--	--	34	32	28	**94**	--	358	--
7:30	--	1	52	33	**86**	--	--	13	25	10	**48**	--	--	26	60	12	**98**	--	--	26	28	29	**83**	--	315	--
7:45	--	10	45	25	**80**	--	--	22	35	9	**66**	--	--	16	45	13	**74**	--	--	38	33	21	**92**	--	312	--
8:00	--	--	58	31	**89**	1	--	24	34	3	**61**	--	--	20	44	12	**76**	--	--	26	35	14	**75**	--	301	1
Hour Total	--	12	228	121	**361**	1	--	86	140	27	**253**	--	--	78	204	46	**328**	--	--	124	128	92	**344**	--	1286	1
% of App.	0.0%	3.3%	63.2%	33.5%			0.0%	34.0%	55.3%	10.7%			0.0%	23.8%	62.2%	14.0%			0.0%	36.0%	37.2%	26.7%				
% of Total	0.0%	0.9%	17.7%	9.4%	28.1%	100.0%	0.0%	6.7%	10.9%	2.1%	19.7%	0.0%	0.0%	6.1%	15.9%	3.6%	25.5%	0.0%	0.0%	9.6%	10.0%	7.2%	26.7%	0.0%		
Cars Total	--	4	216	119	**339**	--	--	85	129	21	**235**	--	--	67	194	46	**307**	--	--	121	118	86	**325**	--	1206	--
Cars % of Movement	0.0%	33.3%	94.7%	98.3%	93.9%	--	0.0%	98.8%	92.1%	77.8%	92.9%	--	0.0%	85.9%	95.1%	100%	93.6%	--	0.0%	97.6%	92.2%	93.5%	94.5%	--	93.8%	
Trucks Total	--	8	12	2	**22**	1	--	1	11	6	**18**	--	--	11	10	--	**21**	--	--	3	10	6	**19**	--	80	1
Trucks % of Movement	0.0%	66.7%	5.3%	1.7%	6.1%	100.0%	0.0%	1.2%	7.9%	22.2%	7.1%	0.0%	0.0%	14.1%	4.9%	0.0%	6.4%	0.0%	0.0%	2.4%	7.8%	6.5%	5.5%	0.0%	6.2%	



ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & 70th Street
Date: 5/29/2025
Duration: 0600-1900

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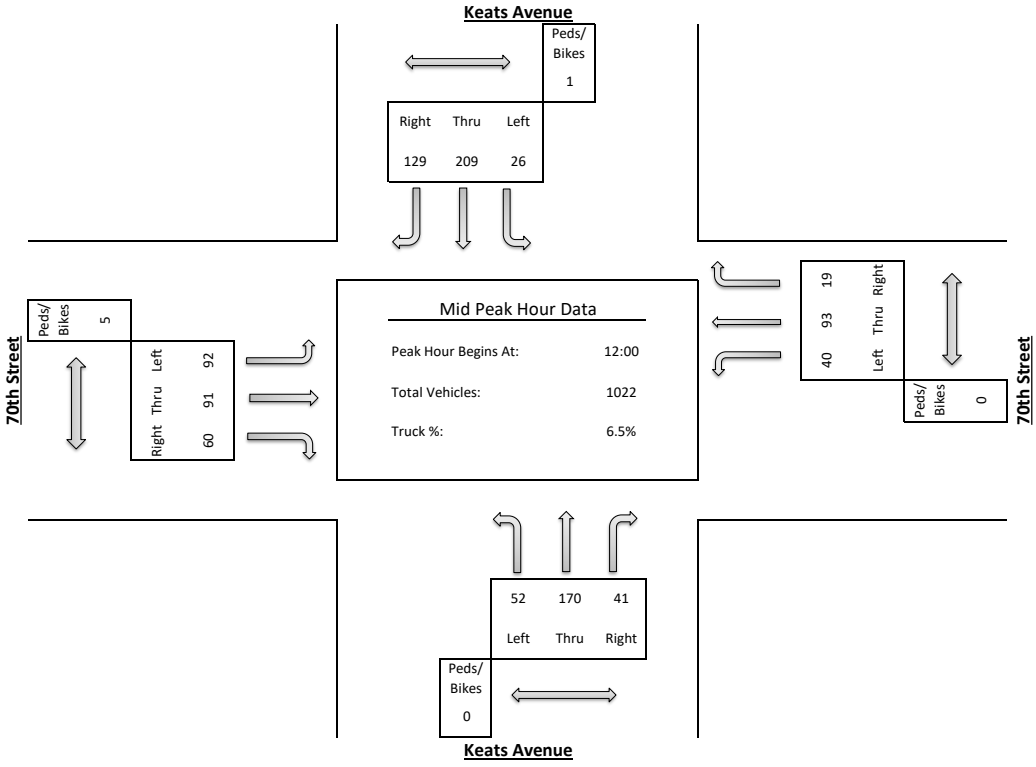
All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						70th Street Westbound						Keats Avenue Northbound						70th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
12:00	--	9	44	33	**86**	1	--	8	28	4	**40**	--	--	13	36	9	**58**	--	2	18	18	16	**54**	1	238	2
12:15	--	9	50	27	**86**	--	--	14	18	9	**41**	--	--	18	42	13	**73**	--	--	21	24	15	**60**	2	260	2
12:30	--	2	55	23	**80**	--	--	5	28	3	**36**	--	--	11	36	11	**58**	--	1	28	30	13	**72**	2	246	2
12:45	--	6	60	46	**112**	--	--	13	19	3	**35**	--	--	10	56	8	**74**	--	--	22	19	16	**57**	--	278	--
Hour Total	--	26	209	129	**364**	1	--	40	93	19	**152**	--	--	52	170	41	**263**	--	3	89	91	60	**243**	5	1022	6
% of App.	0.0%	7.1%	57.4%	35.4%			0.0%	26.3%	61.2%	12.5%			0.0%	19.8%	64.6%	15.6%			1.2%	36.6%	37.4%	24.7%				
% of Total	0.0%	2.5%	20.5%	12.6%	35.6%	16.7%	0.0%	3.9%	9.1%	1.9%	14.9%	0.0%	0.0%	5.1%	16.6%	4.0%	25.7%	0.0%	0.3%	8.7%	8.9%	5.9%	23.8%	83.3%		
Cars Total	--	19	199	127	**345**	1	--	35	81	12	**128**	--	--	51	166	37	**254**	--	3	86	81	59	**229**	3	956	4
Cars % of Movement	0.0%	73.1%	95.2%	98.4%	94.8%	25.0%	0.0%	87.5%	87.1%	63.2%	84.2%	0.0%	0.0%	98.1%	97.6%	90.2%	96.6%	0.0%	100%	96.6%	89.0%	98.3%	94.2%	75.0%	93.5%	
Trucks Total	--	7	10	2	**19**	--	--	5	12	7	**24**	--	--	1	4	4	**9**	--	--	3	10	1	**14**	2	66	2
Trucks % of Movement	0.0%	26.9%	4.8%	1.6%	5.2%	0.0%	0.0%	12.5%	12.9%	36.8%	15.8%	0.0%	0.0%	1.9%	2.4%	9.8%	3.4%	0.0%	0.0%	3.4%	11.0%	1.7%	5.8%	100.0%	6.5%	



ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & 70th Street
Date: 5/29/2025
Duration: 0600-1900

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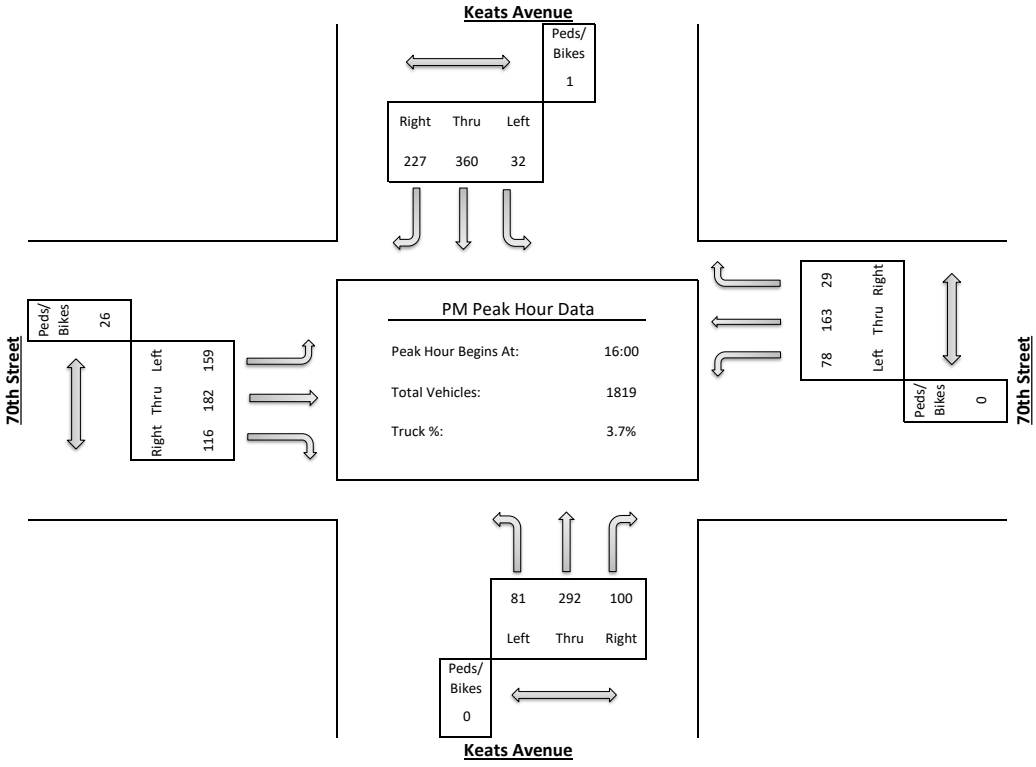
All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						70th Street Westbound						Keats Avenue Northbound						70th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
16:00	--	7	103	46	**156**	--	--	15	26	6	**47**	--	--	18	78	33	**129**	--	--	47	40	28	**115**	9	447	9
16:15	--	10	73	62	**145**	--	--	20	43	10	**73**	--	--	21	65	29	**115**	--	1	32	54	33	**120**	7	453	7
16:30	--	9	95	54	**158**	1	--	14	44	10	**68**	--	--	23	74	21	**118**	--	--	47	46	27	**120**	3	464	4
16:45	--	6	89	65	**160**	--	--	29	50	3	**82**	--	--	19	75	17	**111**	--	1	31	42	28	**102**	7	455	7
Hour Total	--	32	360	227	**619**	1	--	78	163	29	**270**	--	--	81	292	100	**473**	--	2	157	182	116	**457**	26	1819	27
% of App.	0.0%	5.2%	58.2%	36.7%			0.0%	28.9%	60.4%	10.7%			0.0%	17.1%	61.7%	21.1%			0.4%	34.4%	39.8%	25.4%				
% of Total	0.0%	1.8%	19.8%	12.5%	34.0%	3.7%	0.0%	4.3%	9.0%	1.6%	14.8%	0.0%	0.0%	4.5%	16.1%	5.5%	26.0%	0.0%	0.1%	8.6%	10.0%	6.4%	25.1%	96.3%		
Cars Total	--	29	324	222	**575**	1	--	72	159	26	**257**	--	--	80	289	97	**466**	--	2	157	179	116	**454**	7	1752	8
Cars % of Movement	0.0%	90.6%	90.0%	97.8%	92.9%	12.5%	0.0%	92.3%	97.5%	89.7%	95.2%	0.0%	0.0%	98.8%	99.0%	97.0%	98.5%	0.0%	100%	100%	98.4%	100%	99.3%	87.5%	96.3%	
Trucks Total	--	3	36	5	**44**	--	--	6	4	3	**13**	--	--	1	3	3	**7**	--	--	--	3	--	**3**	19	67	19
Trucks % of Movement	0.0%	9.4%	10.0%	2.2%	7.1%	0.0%	0.0%	7.7%	2.5%	10.3%	4.8%	0.0%	0.0%	1.2%	1.0%	3.0%	1.5%	0.0%	0.0%	0.0%	1.6%	0.0%	0.7%	100.0%	3.7%	



ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & - Indian Boulevard
Date: 5/29/2025
Duration: 0600-1900

Site Code 200
Ref Pt: N/A

All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						0 Westbound						Keats Avenue Northbound						Indian Boulevard Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
6:00	--	--	29	1	**30**	--	--	--	--	--	**0**	--	--	--	35	--	**35**	--	--	2	--	2	**4**	1	69	1
6:15	--	--	55	--	**55**	--	--	--	--	--	**0**	--	--	2	46	--	**48**	--	--	3	--	3	**6**	1	109	1
6:30	--	--	69	5	**74**	--	--	--	--	--	**0**	--	--	1	74	--	**75**	--	--	4	--	1	**5**	1	154	1
6:45	--	--	66	5	**71**	--	--	--	--	--	**0**	--	--	3	60	--	**63**	--	--	3	--	5	**8**	--	142	--
Hour Total	--	--	219	11	**230**	--	--	--	--	--	--	--	--	6	215	--	**221**	--	--	12	--	11	**23**	3	474	3
7:00	--	--	57	9	**66**	--	--	--	--	--	**0**	--	--	13	78	--	**91**	--	--	--	--	4	**4**	--	161	--
7:15	--	--	95	35	**130**	--	--	--	--	--	**0**	--	--	53	66	--	**119**	--	--	4	--	45	**49**	--	298	--
7:30	--	--	85	17	**102**	--	--	--	--	--	**0**	--	--	38	83	--	**121**	--	--	15	--	75	**90**	--	313	--
7:45	--	--	93	8	**101**	--	--	--	--	--	**0**	--	--	14	67	--	**81**	--	--	10	--	26	**36**	2	218	2
Hour Total	--	--	330	69	**399**	--	--	--	--	--	--	--	--	118	294	--	**412**	--	--	29	--	150	**179**	2	990	2
8:00	--	--	98	4	**102**	--	--	--	--	--	**0**	--	--	13	77	--	**90**	--	--	3	--	8	**11**	--	203	--
8:15	--	--	69	10	**79**	--	--	--	--	--	**0**	--	--	13	55	--	**68**	--	--	9	--	15	**24**	--	171	--
8:30	--	--	70	8	**78**	--	--	--	--	--	**0**	--	--	14	75	--	**89**	--	--	12	--	17	**29**	--	196	--
8:45	--	--	73	2	**75**	--	--	--	--	--	**0**	--	--	7	73	--	**80**	--	--	3	--	8	**11**	1	166	1
Hour Total	--	--	310	24	**334**	--	--	--	--	--	--	--	--	47	280	--	**327**	--	--	27	--	48	**75**	1	736	1
9:00	--	--	63	1	**64**	--	--	--	--	--	**0**	--	--	3	47	--	**50**	--	--	2	--	3	**5**	2	119	2
9:15	--	--	72	1	**73**	--	--	--	--	--	**0**	--	--	8	60	--	**68**	--	--	1	--	3	**4**	--	145	--
9:30	--	--	40	3	**43**	--	--	--	--	--	**0**	--	--	3	59	--	**62**	--	--	--	--	2	**2**	--	107	--
9:45	--	--	67	4	**71**	--	--	--	--	--	**0**	--	--	4	61	--	**65**	--	--	1	--	1	**2**	--	138	--
Hour Total	--	--	242	9	**251**	--	--	--	--	--	--	--	--	18	227	--	**245**	--	--	4	--	9	**13**	2	509	2
10:00	--	--	61	3	**64**	--	--	--	--	--	**0**	--	--	4	58	--	**62**	--	--	--	--	8	**8**	--	134	--
10:15	--	--	69	1	**70**	--	--	--	--	--	**0**	--	--	2	77	--	**79**	--	--	1	--	7	**8**	--	157	--
10:30	--	--	65	2	**67**	--	--	--	--	--	**0**	--	--	3	64	--	**67**	--	--	3	--	4	**7**	--	141	--
10:45	--	--	78	3	**81**	--	--	--	--	--	**0**	--	--	6	65	--	**71**	--	--	--	--	4	**4**	5	156	5
Hour Total	--	--	273	9	**282**	--	--	--	--	--	--	--	--	15	264	--	**279**	--	--	4	--	23	**27**	5	588	5
11:00	--	--	80	2	**82**	--	--	--	--	--	**0**	--	--	6	62	--	**68**	--	--	2	--	10	**12**	--	162	--
11:15	--	--	78	3	**81**	--	--	--	--	--	**0**	--	--	2	74	--	**76**	--	--	--	--	7	**7**	--	164	--
11:30	--	--	83	1	**84**	--	--	--	--	--	**0**	--	--	5	81	--	**86**	--	--	3	--	3	**6**	--	176	--
11:45	--	--	59	2	**61**	--	--	--	--	--	**0**	--	--	5	68	--	**73**	--	--	1	--	2	**3**	--	137	--
Hour Total	--	--	300	8	**308**	--	--	--	--	--	--	--	--	18	285	--	**303**	--	--	6	--	22	**28**	--	639	--
12:00	--	--	67	--	**67**	--	--	--	--	--	**0**	--	--	5	58	--	**63**	--	--	3	--	6	**9**	1	139	1
12:15	--	--	86	1	**87**	--	--	--	--	--	**0**	--	--	9	77	--	**86**	--	--	1	--	7	**8**	2	181	2
12:30	--	--	74	1	**75**	--	--	--	--	--	**0**	--	--	2	62	--	**64**	--	--	2	--	5	**7**	1	146	1
12:45	--	--	89	--	**89**	--	--	--	--	--	**0**	--	--	5	73	--	**78**	--	--	3	--	3	**6**	2	173	2
Hour Total	--	--	316	2	**318**	--	--	--	--	--	--	--	--	21	270	--	**291**	--	--	9	--	21	**30**	6	639	6
13:00	--	--	64	5	**69**	--	--	--	--	--	**0**	--	--	7	64	--	**71**	--	--	1	--	2	**3**	1	143	1
13:15	--	--	75	5	**80**	--	--	--	--	--	**0**	--	--	6	67	--	**73**	--	--	2	--	12	**14**	2	167	2
13:30	--	--	68	5	**73**	--	--	--	--	--	**0**	--	--	6	62	--	**68**	--	--	4	--	4	**8**	--	149	--
13:45	--	--	83	2	**85**	--	--	--	--	--	**0**	--	--	11	74	--	**85**	--	--	4	--	10	**14**	2	184	2
Hour Total	--	--	290	17	**307**	--	--	--	--	--	--	--	--	30	267	--	**297**	--	--	11	--	28	**39**	5	643	5
14:00	--	--	69	11	**80**	--	--	--	--	--	**0**	--	--	25	94	--	**119**	--	--	3	--	7	**10**	--	209	--
14:15	--	--	81	12	**93**	--	--	--	--	--	**0**	--	--	27	80	--	**107**	--	--	4	--	12	**16**	1	216	1
14:30	--	--	80	4	**84**	--	--	--	--	--	**0**	--	--	18	75	--	**93**	--	--	25	--	58	**83**	4	260	4
14:45	--	--	83	8	**91**	--	--	--	--	--	**0**	--	--	10	74	--	**84**	--	--	5	--	10	**15**	--	190	--
Hour Total	--	--	313	35	**348**	--	--	--	--	--	--	--	--	80	323	--	**403**	--	--	37	--	87	**124**	5	875	5
15:00	--	--	89	8	**97**	--	--	--	--	--	**0**	--	--	14	100	--	**114**	--	--	8	--	15	**23**	3	234	3
15:15	--	--	102	10	**112**	--	--	--	--	--	**0**	--	--	6	124	--	**130**	--	--	9	--	23	**32**	2	274	2
15:30	--	--	106	1	**107**	--	--	--	--	--	**0**	--	--	3	127	--	**130**	--	--	15	--	19	**34**	1	271	1
15:45	--	--	123	1	**124**	--	--	--	--	--	**0**	--	--	10	102	--	**112**	--	--	6	--	5	**11**	--	247	--
Hour Total	--	--	420	20	**440**	--	--	--	--	--	--	--	--	33	453	--	**486**	--	--	38	--	62	**100**	6	1026	6
16:00	--	--	140	3	**143**	--	--	--	--	--	**0**	--	--	6	129	--	**135**	--	--	4	--	5	**9**	3	287	3
16:15	--	--	124	3	**127**	--	--	--	--	--	**0**	--	--	8	110	--	**118**	--	--	3	--	8	**11**	2	256	2
16:30	--	--	135	4	**139**	--	--	--	--	--	**0**	--	--	10	133	--	**143**	--	--	1	--	13	**14**	3	296	3
16:45	--	--	146	4	**150**	--	--	--	--	--	**0**	--	--	12	113	--	**125**	--	--	3	--	6	**9**	1	284	1
Hour Total	--	--	545	14	**559**	--	--	--	--	--	--	--	--	36	485	--	**521**	--	--	11	--	32	**43**	9	1123	9
17:00	--	--	125	3	**128**	--	--	--	--	--	**0**	--	--	7	125	--	**132**	--	--	6	--	10	**16**	4	276	4
17:15	--	--	130	7	**137**	--	--	--	--	--	**0**	--	--	15	106	--	**121**	--	--	5	--	7	**12**	1	270	1
17:30	--	--	106	12	**118**	--	--	--	--	--	**0**	--	--	18	98	--	**116**	--	--	4	--	15	**19**	--	253	--
17:45	--	--	127	15	**142**	--	--	--	--	--	**0**	--	--	42	115	--	**157**	--	--	5	--	13	**18**	1	317	1
Hour Total	--	--	488	37	**525**	--	--	--	--	--	--	--	--	82	444	--	**526**	--	--	20	--	45	**65**	6	1116	6
18:00	--	--	85	33	**118**	--	--	--	--	--	**0**	--	--	24	70	--	**94**	--	--	6	--	7	**13**	--	225	--
18:15	--	--	84	16	**100**	--	--	--	--	--	**0**	--	--	20	76	--	**96**	--	--	1	--	4	**5**	2	201	2
18:30	--	--	90	6	**96**	--	--	--	--	--	**0**	--	--	7	59	--	**66**	--	--	4	--	12	**16**	--	178	--
18:45	--	--	61	1	**62**	--	--	--	--	--	**0**	--	--	3	63	--	**66**	--	--	2	--	9	**11**	--	139	--
Hour Total	--	--	320	56	**376**	--	--	--	--	--	--	--	--	54	268	--	**322**	--	--	13	--	32	**45**	2	743	2
Grand Total	--	--	4366	311	**4677**	--	--	--	--	--	**0**	--	--	558	4075	--	**4633**	--	--	221	--	570	**791**	52	10101	52
% of App. Total	0.0%	0.0%	93.4%	6.6%			0.0%	0.0%	0.0%	0.0%			0.0%	12.0%	88.0%	0.0%			0.0%	27.9%	0.0%	72.1%				
% of Total	0.0%	0.0%	43.2%	3.1%	46.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	40.3%	0.0%	45.9%	0.0%	0.0%	2.2%	0.0%	5.6%	7.8%	100.0%		
Cars Total	--	--	4140	299	**4439**	--	--	--	--	--	**0**	--	--	527	3891	--	**4418**	--	--	207	--	536	**743**	32	9600	32
Cars % of Movement	0.0%	0.0%	94.8%	96.1%	94.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	94.4%	95.5%	0.0%	95.4%	0.0%	0.0%	93.7%	0.0%	94.0%	93.9%	100.0%	95.0%	
Trucks Total	--	--	226	12	**238**	--	--	--	--	--	**0**	--	--	31	184	--	**215**	--	--	14	--	34	**48**	20	501	20
Trucks % of Movement	0.0%	0.0%	5.2%	3.9%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	4.5%	0.0%	4.6%	0.0%	0.0%	6.3%	0.0%	6.0%	6.1%	100.0%	5.0%	

ALLIANT ENGINEERING, INC.

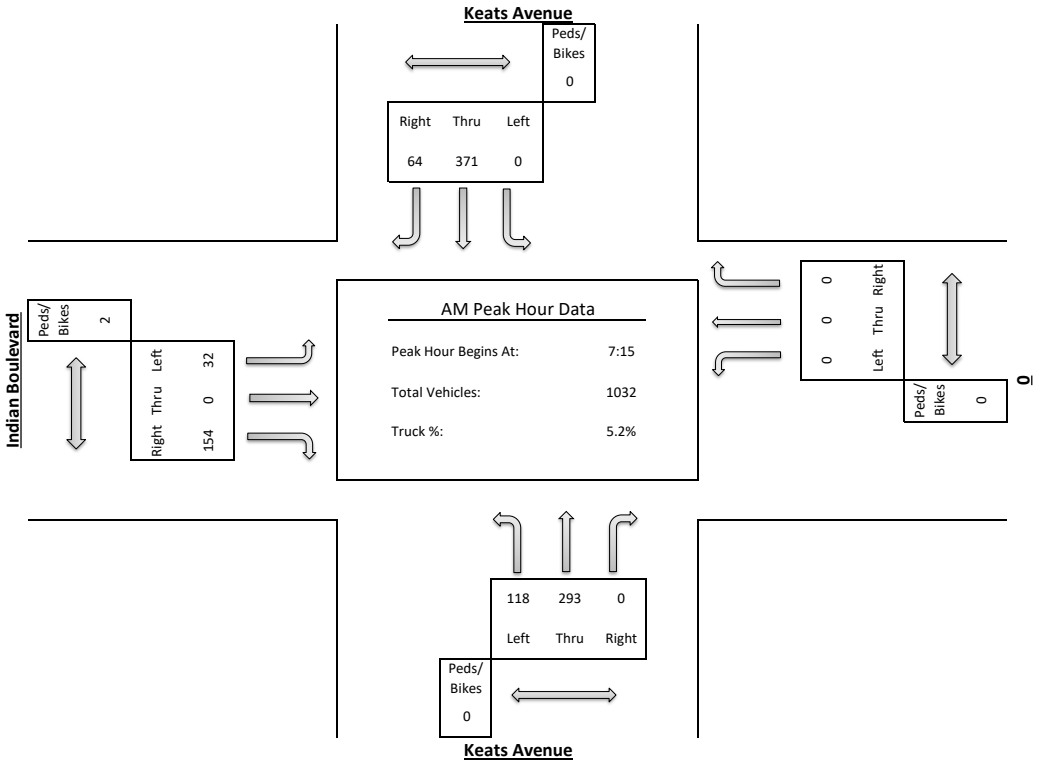
733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & - Indian Boulevard
Date: 5/29/2025
Duration: 0600-1900

Site Code 200
Ref Pt: N/A
Page No: 2 of 4

All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						0 Westbound						Keats Avenue Northbound						Indian Boulevard Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
7:15	--	--	95	35	**130**	--	--	--	--	--	**0**	--	--	53	66	--	**119**	--	--	4	--	45	**49**	--	298	--
7:30	--	--	85	17	**102**	--	--	--	--	--	**0**	--	--	38	83	--	**121**	--	--	15	--	75	**90**	--	313	--
7:45	--	--	93	8	**101**	--	--	--	--	--	**0**	--	--	14	67	--	**81**	--	--	10	--	26	**36**	2	218	2
8:00	--	--	98	4	**102**	--	--	--	--	--	**0**	--	--	13	77	--	**90**	--	--	3	--	8	**11**	--	203	--
Hour Total	--	--	371	64	**435**	--	--	--	--	--	**--**	--	--	118	293	--	**411**	--	--	32	--	154	**186**	2	1032	2
% of App.	0.0%	0.0%	85.3%	14.7%			0.0%	0.0%	0.0%	0.0%			0.0%	28.7%	71.3%	0.0%			0.0%	17.2%	0.0%	82.8%				
% of Total	0.0%	0.0%	35.9%	6.2%	42.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.4%	28.4%	0.0%	39.8%	0.0%	0.0%	3.1%	0.0%	14.9%	18.0%	100.0%		
Cars Total	--	--	358	59	**417**	--	--	--	--	--	**0**	--	--	110	276	--	**386**	--	--	31	--	144	**175**	--	978	--
Cars % of Movement	0.0%	0.0%	96.5%	92.2%	95.9%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	0.0%	93.2%	94.2%	0.0%	93.9%	--	0.0%	96.9%	0.0%	93.5%	94.1%	--	94.8%	
Trucks Total	--	--	13	5	**18**	--	--	--	--	--	**0**	--	--	8	17	--	**25**	--	--	1	--	10	**11**	2	54	2
Trucks % of Movement	0.0%	0.0%	3.5%	7.8%	4.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.8%	5.8%	0.0%	6.1%	0.0%	0.0%	3.1%	0.0%	6.5%	5.9%	100.0%	5.2%	



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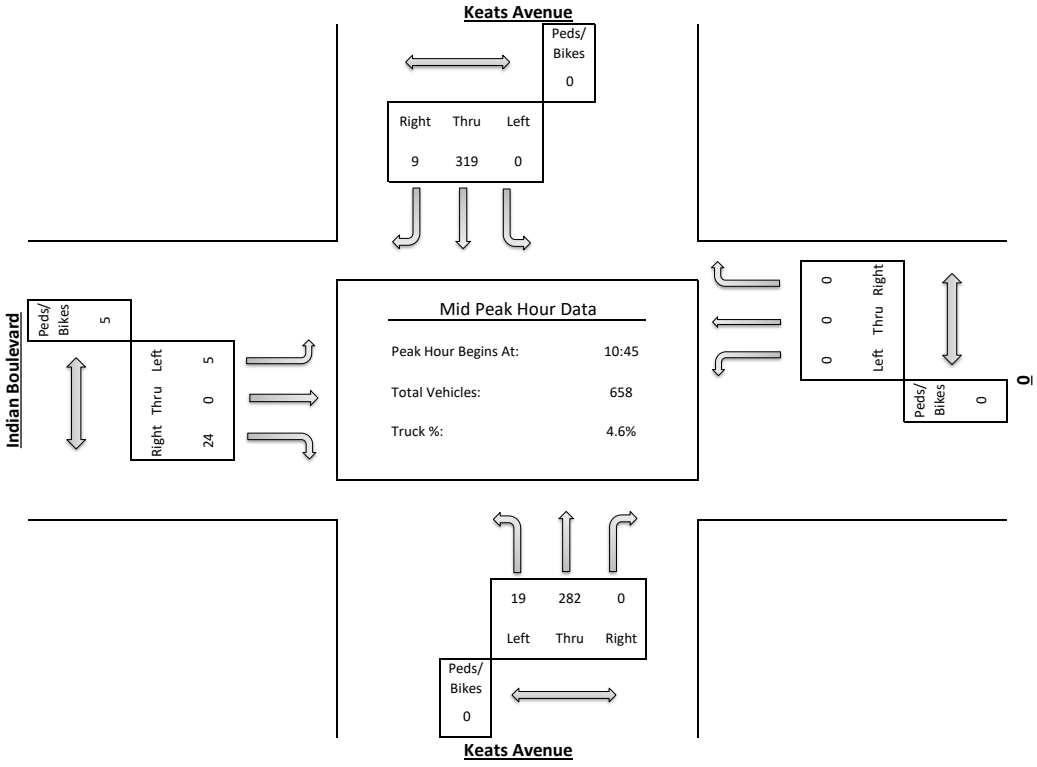
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
10:45	--	--	78	3	**81**	--	--	--	--	--	**0**	--	--	6	65	--	**71**	--	--	--	--	4	**4**	5	156	5
11:00	--	--	80	2	**82**	--	--	--	--	--	**0**	--	--	6	62	--	**68**	--	--	2	--	10	**12**	--	162	--
11:15	--	--	78	3	**81**	--	--	--	--	--	**0**	--	--	2	74	--	**76**	--	--	--	--	7	**7**	--	164	--
11:30	--	--	83	1	**84**	--	--	--	--	--	**0**	--	--	5	81	--	**86**	--	--	3	--	3	**6**	--	176	--
Hour Total	--	--	319	9	**328**	--	--	--	--	--	**--**	--	--	19	282	--	**301**	--	--	5	--	24	**29**	5	658	5
% of App.	0.0%	0.0%	97.3%	2.7%			0.0%	0.0%	0.0%	0.0%			0.0%	6.3%	93.7%	0.0%			0.0%	17.2%	0.0%	82.8%				
% of Total	0.0%	0.0%	48.5%	1.4%	49.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	42.9%	0.0%	45.7%	0.0%	0.0%	0.8%	0.0%	3.6%	4.4%	100.0%		
Cars Total	--	--	302	8	**310**	--	--	--	--	--	**0**	--	--	19	271	--	**290**	--	--	5	--	23	**28**	3	628	3
Cars % of Movement	0.0%	0.0%	94.7%	88.9%	94.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	96.1%	0.0%	96.3%	0.0%	0.0%	100%	0.0%	95.8%	96.6%	100.0%	95.4%	
Trucks Total	--	--	17	1	**18**	--	--	--	--	--	**0**	--	--	--	11	--	**11**	--	--	--	--	1	**1**	2	30	2
Trucks % of Movement	0.0%	0.0%	5.3%	11.1%	5.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%	3.7%	0.0%	0.0%	0.0%	0.0%	4.2%	3.4%	100.0%	4.6%	



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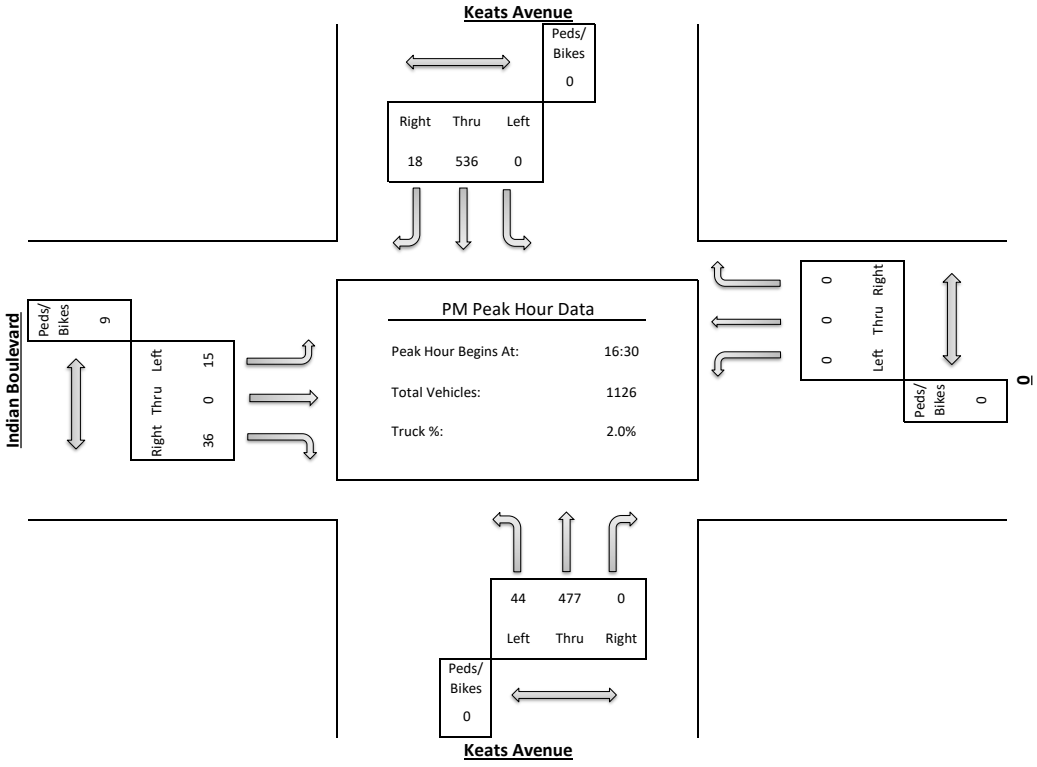
All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						0 Westbound						Keats Avenue Northbound						Indian Boulevard Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
16:30	--	--	135	4	**139**	--	--	--	--	--	**0**	--	--	10	133	--	**143**	--	--	1	--	13	**14**	3	296	3
16:45	--	--	146	4	**150**	--	--	--	--	--	**0**	--	--	12	113	--	**125**	--	--	3	--	6	**9**	1	284	1
17:00	--	--	125	3	**128**	--	--	--	--	--	**0**	--	--	7	125	--	**132**	--	--	6	--	10	**16**	4	276	4
17:15	--	--	130	7	**137**	--	--	--	--	--	**0**	--	--	15	106	--	**121**	--	--	5	--	7	**12**	1	270	1
Hour Total	--	--	536	18	**554**	--	--	--	--	--	**--**	--	--	44	477	--	**521**	--	--	15	--	36	**51**	9	1126	9
% of App.	0.0%	0.0%	96.8%	3.2%			0.0%	0.0%	0.0%	0.0%			0.0%	8.4%	91.6%	0.0%			0.0%	29.4%	0.0%	70.6%				
% of Total	0.0%	0.0%	47.6%	1.6%	49.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	42.4%	0.0%	46.3%	0.0%	0.0%	1.3%	0.0%	3.2%	4.5%	100.0%		
Cars Total	--	--	516	18	**534**	--	--	--	--	--	**0**	--	--	44	476	--	**520**	--	--	15	--	35	**50**	4	1104	4
Cars % of Movement	0.0%	0.0%	96.3%	100%	96.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	99.8%	0.0%	99.8%	0.0%	0.0%	100%	0.0%	97.2%	98.0%	100.0%	98.0%	
Trucks Total	--	--	20	--	**20**	--	--	--	--	--	**0**	--	--	--	1	--	**1**	--	--	--	--	1	**1**	5	22	5
Trucks % of Movement	0.0%	0.0%	3.7%	0.0%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	2.8%	2.0%	100.0%	2.0%	



ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & - 77th Street
Date: 5/29/2025
Duration: 0600-1900

Site Code 300
Ref Pt: N/A
Page No: 1 of 4

All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						0 Westbound						Keats Avenue Northbound						77th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
6:00	--	--	30	1	**31**	--	--	--	--	--	**0**	--	--	--	34	--	**34**	--	--	2	--	--	**2**	--	67	--
6:15	--	--	58	--	**58**	--	--	--	--	--	**0**	--	--	1	46	--	**47**	--	--	3	--	1	**4**	2	109	2
6:30	--	--	69	--	**69**	--	--	--	--	--	**0**	--	--	--	73	--	**73**	--	--	3	--	1	**4**	1	146	1
6:45	--	--	69	2	**71**	--	--	--	--	--	**0**	--	--	1	52	--	**53**	--	--	10	--	3	**13**	--	137	--
Hour Total	--	--	226	3	**229**	--	--	--	--	--	**--**	--	--	2	205	--	**207**	--	--	18	--	5	**23**	3	459	3
7:00	--	--	60	--	**60**	--	--	--	--	--	**0**	--	--	--	86	--	**86**	--	--	3	--	--	**3**	--	149	--
7:15	1	--	136	3	**140**	--	--	--	--	--	**0**	--	--	2	107	--	**109**	--	--	12	--	2	**14**	--	263	--
7:30	--	--	153	7	**160**	--	--	--	--	--	**0**	--	--	1	114	--	**115**	--	--	6	--	1	**7**	--	282	--
7:45	--	--	118	3	**121**	--	--	--	--	--	**0**	--	--	1	74	--	**75**	--	--	8	--	1	**9**	1	205	1
Hour Total	1	--	467	13	**481**	--	--	--	--	--	**--**	--	--	4	381	--	**385**	--	--	29	--	4	**33**	1	899	1
8:00	--	--	100	5	**105**	--	--	--	--	--	**0**	--	--	1	84	--	**85**	--	--	7	--	--	**7**	1	197	1
8:15	--	--	77	6	**83**	--	--	--	--	--	**0**	--	--	--	64	--	**64**	--	--	5	--	1	**6**	--	153	--
8:30	--	--	77	8	**85**	--	--	--	--	--	**0**	--	--	--	78	--	**78**	--	--	9	--	4	**13**	1	176	1
8:45	--	--	81	3	**84**	--	--	--	--	--	**0**	--	--	2	74	--	**76**	--	--	3	--	2	**5**	--	165	--
Hour Total	--	--	335	22	**357**	--	--	--	--	--	**--**	--	--	3	300	--	**303**	--	--	24	--	7	**31**	2	691	2
9:00	--	--	62	4	**66**	--	--	--	--	--	**0**	--	--	--	48	--	**48**	--	--	4	--	2	**6**	--	120	--
9:15	--	--	74	2	**76**	--	--	--	--	--	**0**	--	--	--	65	--	**65**	--	--	3	--	1	**4**	1	145	1
9:30	--	--	39	3	**42**	--	--	--	--	--	**0**	--	--	--	58	--	**58**	--	--	2	--	--	**2**	--	102	--
9:45	--	--	67	1	**68**	--	--	--	--	--	**0**	--	--	--	64	--	**64**	--	--	2	--	1	**3**	--	135	--
Hour Total	--	--	242	10	**252**	--	--	--	--	--	**--**	--	--	--	235	--	**235**	--	--	11	--	4	**15**	1	502	1
10:00	--	--	66	3	**69**	--	--	--	--	--	**0**	--	--	1	64	--	**65**	--	--	1	--	--	**1**	1	135	1
10:15	--	--	74	2	**76**	--	--	--	--	--	**0**	--	--	1	76	--	**77**	--	--	2	--	--	**2**	1	155	1
10:30	--	--	64	3	**67**	--	--	--	--	--	**0**	--	--	--	64	--	**64**	--	--	2	--	1	**3**	5	134	5
10:45	--	--	80	2	**82**	--	--	--	--	--	**0**	--	--	--	69	--	**69**	--	--	2	--	1	**3**	--	154	--
Hour Total	--	--	284	10	**294**	--	--	--	--	--	**--**	--	--	2	273	--	**275**	--	--	7	--	2	**9**	7	578	7
11:00	--	--	87	5	**92**	--	--	--	--	--	**0**	--	--	1	67	--	**68**	--	--	--	--	--	**0**	--	160	--
11:15	--	--	84	2	**86**	--	--	--	--	--	**0**	--	--	2	76	--	**78**	--	--	2	--	2	**4**	--	168	--
11:30	--	--	79	3	**82**	--	--	--	--	--	**0**	--	--	1	79	--	**80**	--	--	9	--	1	**10**	--	172	--
11:45	--	--	63	4	**67**	--	--	--	--	--	**0**	--	--	3	71	--	**74**	--	--	--	--	3	**3**	1	144	1
Hour Total	--	--	313	14	**327**	--	--	--	--	--	**--**	--	--	7	293	--	**300**	--	--	11	--	6	**17**	1	644	1
12:00	--	--	70	2	**72**	--	--	--	--	--	**0**	--	--	2	60	--	**62**	--	--	3	--	2	**5**	2	139	2
12:15	--	--	89	6	**95**	--	--	--	--	--	**0**	--	--	3	82	--	**85**	--	--	3	--	--	**3**	--	183	--
12:30	--	--	73	2	**75**	--	--	--	--	--	**0**	--	--	--	65	--	**65**	--	--	--	--	1	**1**	1	141	1
12:45	--	--	93	2	**95**	--	--	--	--	--	**0**	--	--	3	74	--	**77**	--	--	5	--	1	**6**	2	178	2
Hour Total	--	--	325	12	**337**	--	--	--	--	--	**--**	--	--	8	281	--	**289**	--	--	11	--	4	**15**	5	641	5
13:00	--	--	67	1	**68**	--	--	--	--	--	**0**	--	--	--	68	--	**68**	--	--	1	--	2	**3**	1	139	1
13:15	--	--	84	2	**86**	--	--	--	--	--	**0**	--	--	1	69	--	**70**	--	--	4	--	--	**4**	1	160	1
13:30	--	--	68	4	**72**	--	--	--	--	--	**0**	--	--	1	62	--	**63**	--	--	6	--	1	**7**	2	142	2
13:45	--	--	91	2	**93**	--	--	--	--	--	**0**	--	--	1	83	--	**84**	--	--	3	--	--	**3**	2	180	2
Hour Total	--	--	310	9	**319**	--	--	--	--	--	**--**	--	--	3	282	--	**285**	--	--	14	--	3	**17**	6	621	6
14:00	--	--	72	4	**76**	--	--	--	--	--	**0**	--	--	2	120	--	**122**	--	--	2	--	1	**3**	--	201	--
14:15	--	--	92	2	**94**	--	--	--	--	--	**0**	--	--	2	100	--	**102**	--	--	4	--	1	**5**	1	201	1
14:30	--	--	136	4	**140**	--	--	--	--	--	**0**	--	--	1	88	--	**89**	--	--	5	--	--	**5**	--	234	--
14:45	--	--	88	2	**90**	--	--	--	--	--	**0**	--	--	--	81	--	**81**	--	--	4	--	3	**7**	--	178	--
Hour Total	--	--	388	12	**400**	--	--	--	--	--	**--**	--	--	5	389	--	**394**	--	--	15	--	5	**20**	1	814	1
15:00	--	--	101	4	**105**	--	--	--	--	--	**0**	--	--	1	103	--	**104**	--	--	7	--	3	**10**	3	219	3
15:15	--	--	115	11	**126**	--	--	--	--	--	**0**	--	--	1	127	--	**128**	--	--	2	--	2	**4**	1	258	1
15:30	--	--	111	16	**127**	--	--	--	--	--	**0**	--	--	3	126	--	**129**	--	--	3	--	3	**6**	3	262	3
15:45	--	--	116	8	**124**	--	--	--	--	--	**0**	--	--	3	106	--	**109**	--	--	--	--	1	**1**	--	234	--
Hour Total	--	--	443	39	**482**	--	--	--	--	--	**--**	--	--	8	462	--	**470**	--	--	12	--	9	**21**	7	973	7
16:00	--	--	140	8	**148**	--	--	--	--	--	**0**	--	--	4	132	--	**136**	--	--	4	--	3	**7**	4	291	4
16:15	--	--	121	12	**133**	--	--	--	--	--	**0**	--	--	--	111	--	**111**	--	--	6	--	3	**9**	3	253	3
16:30	--	--	139	6	**145**	--	--	--	--	--	**0**	--	--	2	136	--	**138**	--	--	7	--	--	**7**	3	290	3
16:45	--	--	142	12	**154**	--	--	--	--	--	**0**	--	--	2	113	--	**115**	--	--	8	--	3	**11**	2	280	2
Hour Total	--	--	542	38	**580**	--	--	--	--	--	**--**	--	--	8	492	--	**500**	--	--	25	--	9	**34**	12	1114	12
17:00	--	--	129	8	**137**	--	--	--	--	--	**0**	--	--	4	121	--	**125**	--	--	6	--	5	**11**	4	273	4
17:15	--	--	130	7	**137**	--	--	--	--	--	**0**	--	--	4	115	--	**119**	--	--	6	--	1	**7**	1	263	1
17:30	--	--	119	--	**119**	--	--	--	--	--	**0**	--	--	3	111	--	**114**	--	--	6	--	5	**11**	--	244	--
17:45	1	--	127	9	**137**	--	--	--	--	--	**0**	--	--	1	149	--	**150**	--	--	9	--	1	**10**	--	297	--
Hour Total	1	--	505	24	**530**	--	--	--	--	--	**--**	--	--	12	496	--	**508**	--	--	27	--	12	**39**	5	1077	5
18:00	--	--	88	10	**98**	--	--	--	--	--	**0**	--	--	2	91	--	**93**	--	--	3	--	1	**4**	1	195	1
18:15	--	--	78	9	**87**	--	--	--	--	--	**0**	--	--	2	89	--	**91**	--	--	3	--	--	**3**	--	181	--
18:30	--	--	95	8	**103**	--	--	--	--	--	**0**	--	--	1	67	--	**68**	--	--	1	--	2	**3**	2	174	2
18:45	--	--	65	2	**67**	--	--	--	--	--	**0**	--	--	--	64	--	**64**	--	--	2	--	--	**2**	--	133	--
Hour Total	--	--	326	29	**355**	--	--	--	--	--	**--**	--	--	5	311	--	**316**	--	--	9	--	3	**12**	3	683	3
Grand Total	2	--	4706	235	**4943**	--	--	--	--	--	**0**	--	--	67	4400	--	**4467**	--	--	213	--	73	**286**	54	9696	54
% of App.	0.0%	0.0%	95.2%	4.8%			0.0%	0.0%	0.0%	0.0%			0.0%	1.5%	98.5%	0.0%			0.0%	74.5%	0.0%	25.5%				
% of Total	0.0%	0.0%	48.5%	2.4%	51.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	45.4%	0.0%	46.1%	0.0%	0.0%	2.2%	0.0%	0.8%	2.9%	100.0%		
Cars Total	2	--	4449	228	**4679**	--	--	--	--	--	**0**	--	--	66	4186	--	**4252**	--	--	210	--	70	**280**	27	9211	27
Cars % of Movement	100%	0.0%	94.5%	97.0%	94.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	98.5%	95.1%	0.0%	95.2%	0.0%	0.0%	98.6%	0.0%	95.9%	97.9%	100.0%	95.0%	
Trucks Total	--	--	257	7	**264**	--	--	--	--	--	**0**	--	--	1	214	--	**215**	--	--	3	--	3	**6**	27	485	27
Trucks % of Movement	0.0%	0.0%	5.5%	3.0%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	4.9%	0.0%	4.8%	0.0%	0.0%	1.4%	0.0%	4.1%	2.1%	100.0%	5.0%	

ALLIANT ENGINEERING, INC.

733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & - 77th Street
Date: 5/29/2025
Duration: 0600-1900

Site Code 300
Ref Pt: N/A

All Vehicles (Cars & Trucks) Printed

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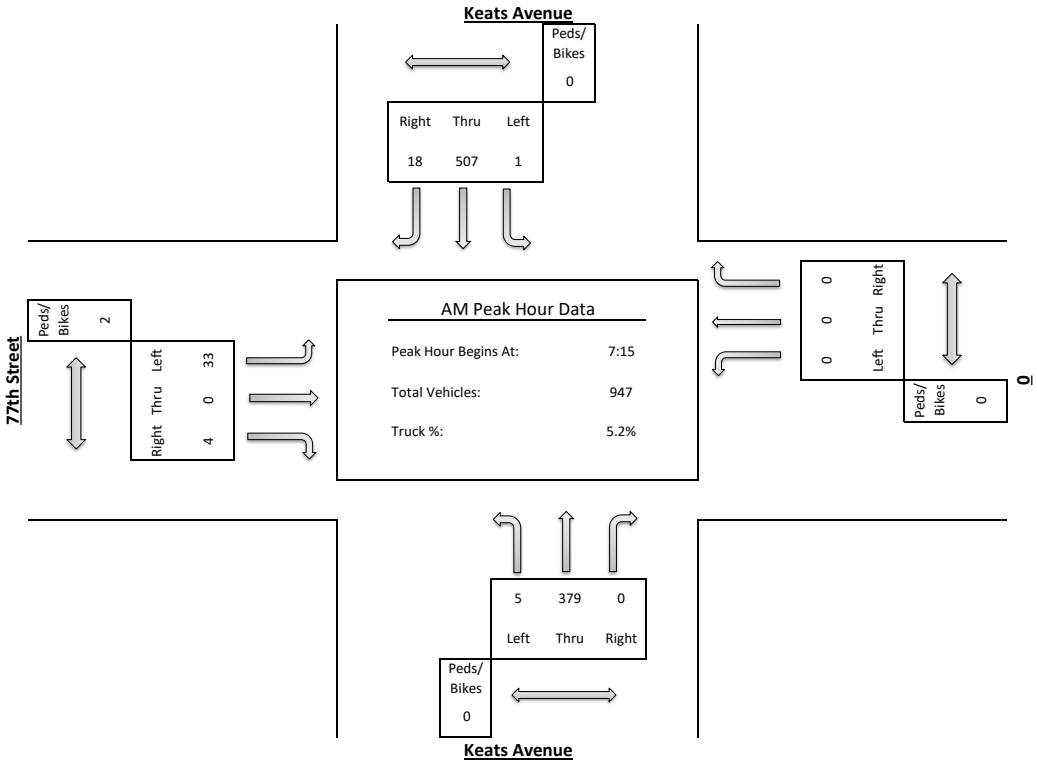
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
7:15	1	--	136	3	**140**	--	--	--	--	--	**0**	--	--	2	107	--	**109**	--	--	12	--	2	**14**	--	263	--
7:30	--	--	153	7	**160**	--	--	--	--	--	**0**	--	--	1	114	--	**115**	--	--	6	--	1	**7**	--	282	--
7:45	--	--	118	3	**121**	--	--	--	--	--	**0**	--	--	1	74	--	**75**	--	--	8	--	1	**9**	1	205	1
8:00	--	--	100	5	**105**	--	--	--	--	--	**0**	--	--	1	84	--	**85**	--	--	7	--	--	**7**	1	197	1
Hour Total	1	--	507	18	**526**	--	--	--	--	--	**--**	--	--	5	379	--	**384**	--	--	33	--	4	**37**	2	947	2
% of App.	0.2%	0.0%	96.4%	3.4%			0.0%	0.0%	0.0%	0.0%			0.0%	1.3%	98.7%	0.0%			0.0%	89.2%	0.0%	10.8%				
% of Total	0.1%	0.0%	53.5%	1.9%	55.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	40.0%	0.0%	40.5%	0.0%	0.0%	3.5%	0.0%	0.4%	3.9%	100.0%		
Cars Total	1	--	485	17	**503**	--	--	--	--	--	**0**	--	--	4	354	--	**358**	--	--	33	--	4	**37**	2	898	2
Cars % of Movement	100%	0.0%	95.7%	94.4%	95.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	80.0%	93.4%	0.0%	93.2%	0.0%	0.0%	100%	0.0%	100%	100%	100.0%	94.8%	
Trucks Total	--	--	22	1	**23**	--	--	--	--	--	**0**	--	--	1	25	--	**26**	--	--	--	--	--	**0**	--	49	--
Trucks % of Movement	0.0%	0.0%	4.3%	5.6%	4.4%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	0.0%	20.0%	6.6%	0.0%	6.8%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	5.2%	



ALLIANT ENGINEERING, INC.

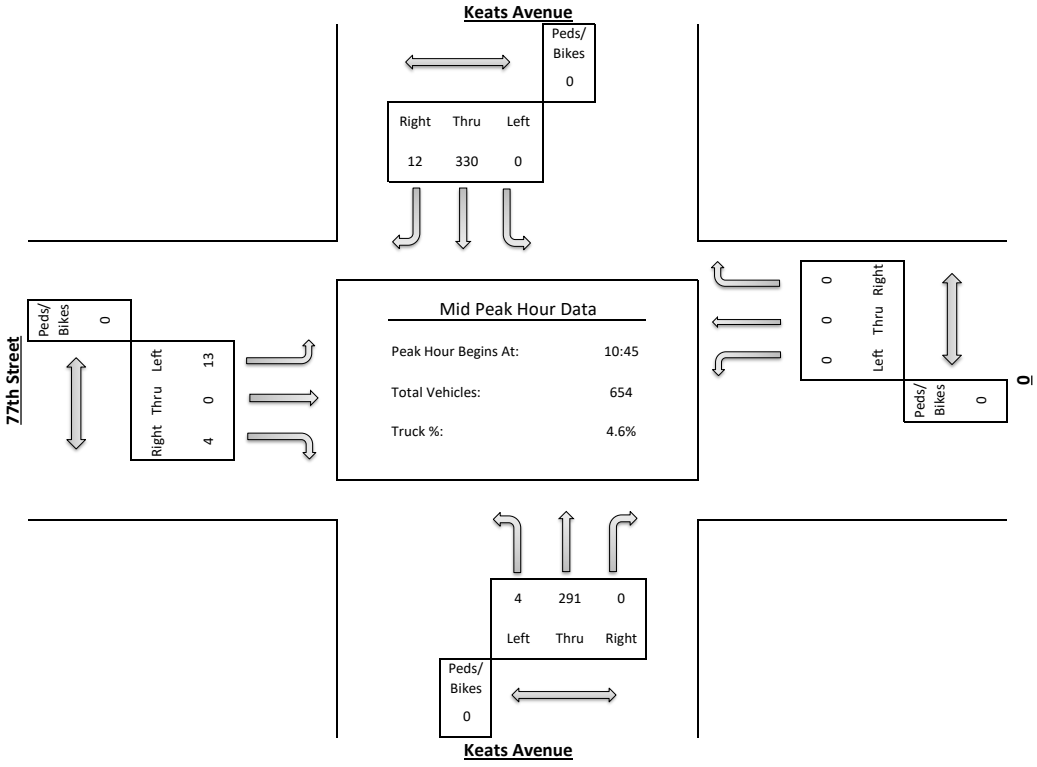
733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & - 77th Street
Date: 5/29/2025
Duration: 0600-1900

Site Code 300
Ref Pt: N/A
Page No: 3 of 4

All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						0 Westbound						Keats Avenue Northbound						77th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
10:45	--	--	80	2	**82**	--	--	--	--	--	**0**	--	--	--	69	--	**69**	--	--	2	--	1	**3**	--	154	--
11:00	--	--	87	5	**92**	--	--	--	--	--	**0**	--	--	1	67	--	**68**	--	--	--	--	--	**0**	--	160	--
11:15	--	--	84	2	**86**	--	--	--	--	--	**0**	--	--	2	76	--	**78**	--	--	2	--	2	**4**	--	168	--
11:30	--	--	79	3	**82**	--	--	--	--	--	**0**	--	--	1	79	--	**80**	--	--	9	--	1	**10**	--	172	--
Hour Total	--	--	330	12	**342**	--	--	--	--	--	**--**	--	--	4	291	--	**295**	--	--	13	--	4	**17**	--	654	--
% of App.	0.0%	0.0%	96.5%	3.5%			0.0%	0.0%	0.0%	0.0%			0.0%	1.4%	98.6%	0.0%			0.0%	76.5%	0.0%	23.5%				
% of Total	0.0%	0.0%	50.5%	1.8%	52.3%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	0.0%	0.6%	44.5%	0.0%	45.1%	--	0.0%	2.0%	0.0%	0.6%	2.6%	--		
Cars Total	--	--	312	12	**324**	--	--	--	--	--	**0**	--	--	4	279	--	**283**	--	--	13	--	4	**17**	--	624	--
Cars % of Movement	0.0%	0.0%	94.5%	100%	94.7%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	0.0%	100%	95.9%	0.0%	95.9%	--	0.0%	100%	0.0%	100%	100%	--	95.4%	
Trucks Total	--	--	18	--	**18**	--	--	--	--	--	**0**	--	--	--	12	--	**12**	--	--	--	--	--	**0**	--	30	--
Trucks % of Movement	0.0%	0.0%	5.5%	0.0%	5.3%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	0.0%	0.0%	4.1%	0.0%	4.1%	--	0.0%	0.0%	0.0%	0.0%	0.0%	--	4.6%	



ALLIANT ENGINEERING, INC.

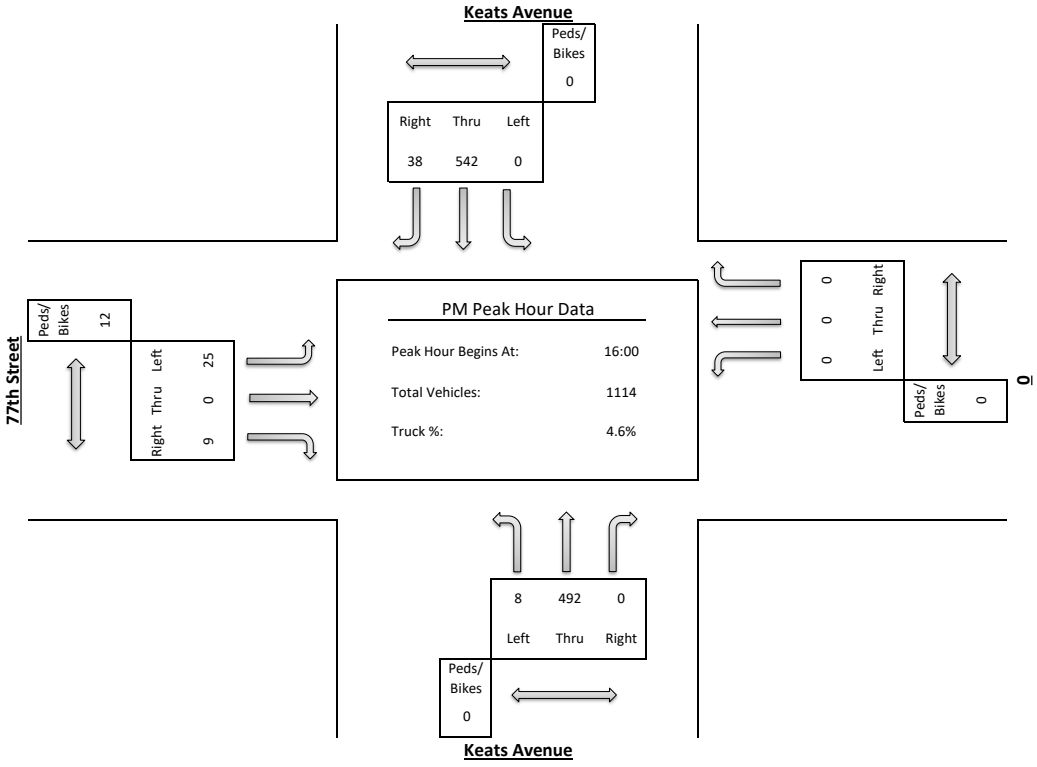
733 S Marquette Ave #700, Minneapolis, MN 55402

Intersection: Keats Avenue & - 77th Street
Date: 5/29/2025
Duration: 0600-1900

Site Code 300
Ref Pt: N/A
Page No: 4 of 4

All Vehicles (Cars & Trucks) Printed

	Keats Avenue Southbound						0 Westbound						Keats Avenue Northbound						77th Street Eastbound						Int. Veh. Total	Int. Ped/ Bike Total
Start Time	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes	U-Turn	Left	Thru	Right	App. Total	Peds/ Bikes		
16:00	--	--	140	8	**148**	--	--	--	--	--	**0**	--	--	4	132	--	**136**	--	--	4	--	3	**7**	4	291	4
16:15	--	--	121	12	**133**	--	--	--	--	--	**0**	--	--	--	111	--	**111**	--	--	6	--	3	**9**	3	253	3
16:30	--	--	139	6	**145**	--	--	--	--	--	**0**	--	--	2	136	--	**138**	--	--	7	--	--	**7**	3	290	3
16:45	--	--	142	12	**154**	--	--	--	--	--	**0**	--	--	2	113	--	**115**	--	--	8	--	3	**11**	2	280	2
Hour Total	--	--	542	38	**580**	--	--	--	--	--	**--**	--	--	8	492	--	**500**	--	--	25	--	9	**34**	12	1114	12
% of App.	0.0%	0.0%	93.4%	6.6%			0.0%	0.0%	0.0%	0.0%			0.0%	1.6%	98.4%	0.0%			0.0%	73.5%	0.0%	26.5%				
% of Total	0.0%	0.0%	48.7%	3.4%	52.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	44.2%	0.0%	44.9%	0.0%	0.0%	2.2%	0.0%	0.8%	3.1%	100.0%		
Cars Total	--	--	499	36	**535**	--	--	--	--	--	**0**	--	--	8	486	--	**494**	--	--	25	--	9	**34**	3	1063	3
Cars % of Movement	0.0%	0.0%	92.1%	94.7%	92.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	98.8%	0.0%	98.8%	0.0%	0.0%	100%	0.0%	100%	100%	100.0%	95.4%	
Trucks Total	--	--	43	2	**45**	--	--	--	--	--	**0**	--	--	--	6	--	**6**	--	--	--	--	--	**0**	9	51	9
Trucks % of Movement	0.0%	0.0%	7.9%	5.3%	7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	4.6%	



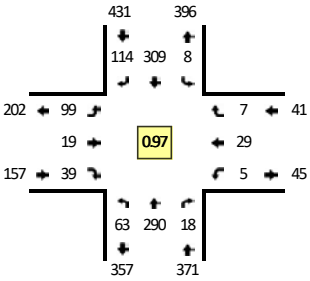
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

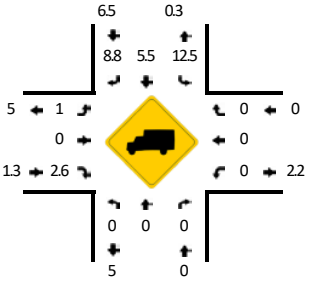
LOCATION: CSAH 19 (Keats Ave) -- 80th St S
CITY/STATE: Cottage Grove, MN

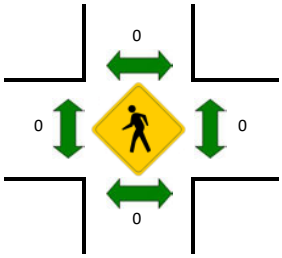
QC JOB #: 16495901
DATE: Thu, Feb 29 2024

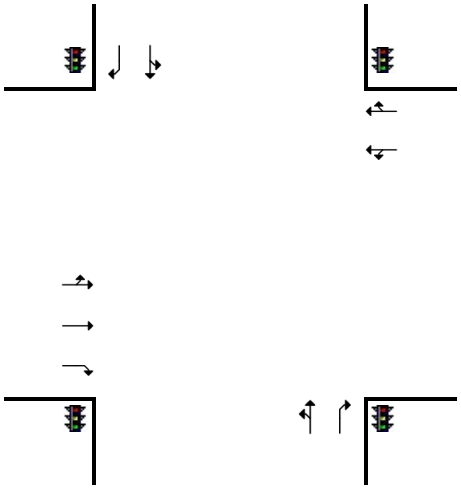
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

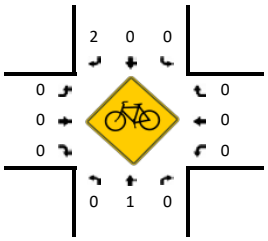


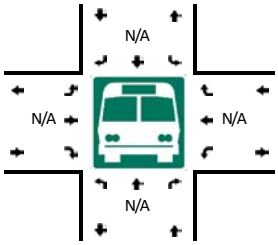
TRUE DATA TO IMPROVE MOBILITY

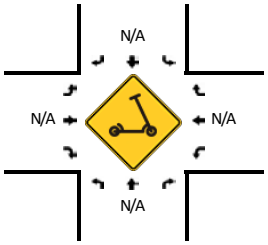












15-Min Count Period Beginning At	CSAH 19 (Keats Ave) (Northbound)				CSAH 19 (Keats Ave) (Southbound)				80th St S (Eastbound)				80th St S (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:00 AM	1	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	11	
12:15 AM	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	
12:30 AM	0	1	0	0	0	1	3	0	0	0	1	0	0	0	0	0	6	
12:45 AM	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3	23
1:00 AM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	14
1:15 AM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	16
1:30 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	12
1:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	10
2:00 AM	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	11
2:15 AM	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	3	9
2:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
3:00 AM	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	4	9
3:15 AM	0	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	4	10
3:30 AM	0	6	0	0	0	0	2	0	1	0	0	0	1	0	0	0	10	18
3:45 AM	0	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	5	23
4:00 AM	0	3	0	0	0	3	1	0	1	0	1	0	0	1	0	0	10	29
4:15 AM	0	2	0	0	0	5	1	0	1	1	1	0	1	1	0	0	13	38
4:30 AM	0	5	1	0	0	8	2	0	3	1	1	0	0	1	0	0	22	50
4:45 AM	1	1	0	0	0	4	3	0	3	0	1	0	0	0	0	0	13	58
5:00 AM	0	3	1	0	1	8	0	0	2	0	1	0	0	0	1	0	17	65
5:15 AM	0	7	0	0	1	13	2	0	5	0	0	0	1	1	1	0	31	83
5:30 AM	1	6	0	0	0	20	3	0	1	1	3	0	2	1	1	0	39	100
5:45 AM	0	11	0	0	0	20	2	0	6	1	4	0	0	1	1	0	46	133
6:00 AM	3	17	0	0	0	16	2	0	12	0	6	0	1	1	1	0	59	175
6:15 AM	0	21	0	0	0	33	3	0	8	1	5	0	0	2	0	0	73	217
6:30 AM	2	33	2	2	0	46	10	0	12	1	10	0	0	2	0	0	120	298
6:45 AM	3	44	3	2	1	52	5	0	17	0	7	0	1	1	2	0	138	390
7:00 AM	1	60	4	1	0	41	15	0	15	1	6	0	2	2	2	0	150	481
7:15 AM	6	61	0	1	2	49	47	1	37	3	13	0	3	1	5	0	229	637
7:30 AM	2	56	1	0	0	80	44	0	33	0	15	0	1	3	1	0	236	753
7:45 AM	3	52	2	1	2	73	26	1	24	7	12	0	3	5	1	0	212	827
8:00 AM	8	33	0	0	1	45	19	0	18	0	10	0	3	4	1	0	142	819
8:15 AM	7	38	1	0	1	43	14	0	16	5	11	0	0	2	2	0	140	730
8:30 AM	6	41	1	0	4	50	22	0	21	4	6	0	1	5	5	0	166	660
8:45 AM	5	36	5	0	0	33	10	0	19	0	8	0	3	3	0	0	122	570
9:00 AM	2	32	2	0	0	41	17	0	12	0	6	0	4	2	0	0	118	546
9:15 AM	1	26	3	1	0	68	17	0	11	1	6	0	1	2	0	0	137	543

15-Min Count Period Beginning At	CSAH 19 (Keats Ave) (Northbound)				CSAH 19 (Keats Ave) (Southbound)				80th St S (Eastbound)				80th St S (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
9:30 AM	5	29	2	1	2	34	13	0	5	2	5	0	4	1	0	0	103	480
9:45 AM	2	46	4	0	2	34	6	0	9	2	9	0	1	3	1	0	119	477
10:00 AM	5	33	1	1	1	39	12	0	11	6	6	0	2	6	1	0	124	483
10:15 AM	6	36	2	1	0	37	13	0	12	1	8	0	2	2	4	0	124	470
10:30 AM	5	35	3	0	0	47	12	0	19	1	6	0	1	2	2	0	133	500
10:45 AM	8	26	1	1	1	31	12	0	11	1	3	0	3	1	0	0	99	480
11:00 AM	9	27	4	1	1	35	11	0	6	5	8	0	0	1	1	0	109	465
11:15 AM	5	32	2	1	1	26	10	0	14	2	7	0	3	0	0	0	103	444
11:30 AM	8	31	1	0	0	30	13	0	7	1	12	0	0	1	0	0	104	415
11:45 AM	6	29	6	1	1	42	14	0	18	2	11	0	0	6	0	0	136	452
12:00 PM	10	31	2	0	0	42	19	0	14	2	8	0	0	9	0	0	137	480
12:15 PM	6	26	3	0	1	32	13	0	5	2	6	0	0	3	1	0	98	475
12:30 PM	5	38	0	0	0	39	11	0	13	2	5	0	0	0	0	0	113	484
12:45 PM	19	26	1	1	1	48	20	0	10	4	8	0	2	3	0	0	143	491
1:00 PM	4	23	2	0	2	34	14	0	16	4	8	0	1	2	1	0	111	465
1:15 PM	7	43	1	2	1	39	18	0	10	7	7	0	0	2	0	0	137	504
1:30 PM	12	32	1	0	1	41	9	0	8	7	17	0	3	2	1	0	134	525
1:45 PM	11	39	3	1	0	43	8	0	13	3	8	0	2	4	0	0	135	517
2:00 PM	11	68	6	1	0	31	23	0	22	2	11	0	0	1	1	0	177	583
2:15 PM	8	62	4	0	1	48	13	0	25	4	9	0	1	3	2	0	180	626
2:30 PM	11	43	6	1	2	79	43	0	19	1	9	0	2	3	2	0	221	713
2:45 PM	13	61	4	2	2	45	20	0	13	3	9	0	1	2	0	0	175	753
3:00 PM	17	67	0	0	1	54	22	0	29	4	8	0	1	3	1	0	207	783
3:15 PM	11	70	2	2	3	78	23	0	44	8	16	0	2	2	0	0	261	864
3:30 PM	11	80	7	2	2	64	18	0	37	2	12	1	1	0	1	0	238	881
3:45 PM	13	53	3	0	1	79	26	0	22	2	12	0	1	2	4	0	218	924
4:00 PM	6	77	5	0	1	63	32	0	25	4	7	0	3	2	1	0	226	943
4:15 PM	16	61	2	1	1	80	29	0	22	6	9	0	1	8	3	0	239	921
4:30 PM	17	82	2	1	0	84	31	0	16	4	14	0	0	6	2	0	259	942
4:45 PM	12	71	8	0	5	75	26	0	28	6	9	0	2	6	1	0	249	973
5:00 PM	14	76	6	2	2	70	28	0	33	3	7	0	2	9	1	0	253	1000
5:15 PM	16	55	2	1	4	58	27	0	19	8	9	0	0	4	1	0	204	965
5:30 PM	13	71	3	1	9	52	25	0	24	4	6	0	4	3	2	0	217	923
5:45 PM	16	52	5	6	1	72	19	0	27	4	5	0	1	4	1	0	213	887
6:00 PM	11	51	2	1	1	53	14	0	19	2	11	0	3	0	1	0	169	803
6:15 PM	6	39	1	1	2	54	15	0	13	2	6	0	3	5	0	0	147	746
6:30 PM	10	44	3	0	1	38	20	0	15	2	8	0	1	3	2	0	147	676
6:45 PM	3	36	2	0	1	34	14	1	11	5	7	0	1	5	2	0	122	585
7:00 PM	12	33	0	1	1	32	10	0	10	4	6	0	0	2	0	0	111	527
7:15 PM	5	22	2	0	2	30	19	0	13	0	1	0	0	1	0	0	95	475
7:30 PM	3	10	2	1	0	34	15	1	6	0	4	0	0	2	1	0	79	407
7:45 PM	3	27	3	1	1	27	11	0	16	4	11	0	0	2	0	0	106	391
8:00 PM	3	25	0	0	1	13	12	1	9	3	7	0	0	3	1	0	78	358
8:15 PM	5	25	1	0	0	19	9	0	11	2	2	0	0	2	1	0	77	340
8:30 PM	9	21	1	0	1	21	12	0	5	1	5	0	0	1	1	0	78	339
8:45 PM	6	24	1	0	1	21	8	0	6	1	5	0	1	1	0	0	75	308
9:00 PM	2	17	1	0	0	17	11	1	9	3	2	0	1	1	0	0	65	295
9:15 PM	4	17	0	0	0	15	3	0	4	1	0	0	0	0	1	0	45	263
9:30 PM	1	11	0	0	0	21	4	0	5	1	4	0	0	0	1	0	48	233
9:45 PM	4	11	4	0	0	15	4	0	3	0	5	0	0	0	0	0	46	204
10:00 PM	2	14	0	0	0	17	5	1	3	3	3	0	0	0	0	0	48	187
10:15 PM	5	15	0	1	0	6	4	1	0	0	0	0	0	1	0	0	33	175
10:30 PM	3	6	0	0	1	5	3	0	4	0	0	0	0	1	1	0	24	151
10:45 PM	2	5	0	0	0	10	5	0	2	1	1	0	0	0	0	0	26	131
11:00 PM	4	6	0	0	0	3	2	0	2	0	2	0	1	0	0	0	20	103
11:15 PM	2	8	0	0	0	2	2	0	0	0	0	0	0	0	0	0	14	84
11:30 PM	3	2	0	0	2	3	1	0	4	2	1	0	0	0	0	0	18	78
11:45 PM	1	3	0	0	0	4	5	0	1	0	0	0	0	0	0	0	14	66

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	68	328	8	4	0	336	124	0	64	16	56	0	0	24	8	0	1036
Heavy Trucks	0	0	0		0	28	8		0	0	4		0	0	0		40
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	4	0		0	0	8		0	0	0		0	0	0		12
Scooters																	

Comments:

Report generated on 3/11/2024 8:26 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix

RAVARA TRAILS – TRAFFIC IMPACT STUDY

Current Site Plan



SITE PLAN DATA:

PIDS: 11.027.21.24.0001	60.54 AC
11.027.21.23.0001	20.01 AC
11.027.21.32.0001	40.34 AC
11.027.21.31.0001	79.47 AC
11.027.21.33.0001	39.13 AC
TOTAL GROSS AREA	239.49 AC
OUTLOT P	35.36 AC
OUTLOT Q	55.41 AC
TOTAL PROJECT AREA AREA	148.72 AC
OUTLOT K (PARK DEDICATION)	4.15 AC
EXISTING ROW (KEATS AVE S)	3.55 AC
PROPOSED ROW DEDICATION (KEATS AVE S)	3.89 AC
NET TOTAL PRODUCT AREA	137.13 AC
PROPOSED ROW (FUTURE RAVINE PKWY)	8.89 AC
PROPOSED ROW (FUTURE INDIAN BLVD S)	3.90 AC
PROPOSED ROW (INTERIOR NORTH)	7.19 AC
PROPOSED ROW (INTERIOR SOUTH)	10.53 AC

SITE PLAN OUTLOT DATA:

OUTLOT	OWNER
OUTLOT WITH PONDS: A, D, F, G	CITY
OUTLOT: K (CITY PARK)	CITY
OUTLOT WITH PIPELINE: B, E, I, J, P, O	HOA/DEVELOPER
OUTLOT: C, H, L, M, N, O	HOA/DEVELOPER

SITE PLAN LOT DATA:

URBAN TOWNHOME:

LOT WIDTH MINIMUM:	22 FT
LOT DEPTH MINIMUM:	72.5 FT
END LOT WIDTH:	27 FT
FRONT DOOR SETBACK:	15 FT
KEATS AVE FRONT DOOR SETBACK:	25 FT
GARAGE SETBACK:	25 FT
CORNER SETBACK:	20 FT
BUILDING SEPARATION:	20 FT

SUBURBAN TOWNHOME:

LOT WIDTH MINIMUM:	25 FT
LOT DEPTH MINIMUM:	72 FT
END LOT WIDTH:	30 FT
FRONT SETBACK:	25 FT
CORNER SETBACK:	20 FT
BUILDING SEPARATION:	15 FT

VILLA SINGLE FAMILY LOTS:

LOT WIDTH MINIMUM:	40 FT
LOT DEPTH MINIMUM:	130 FT
SIDE YARD SETBACK:	5 FT
SIDE YARD SETBACK:	5 FT

65' SINGLE FAMILY LOTS:

LOT WIDTH MINIMUM:	65 FT
LOT DEPTH MINIMUM:	130 FT
SIDE YARD SETBACK:	5 FT (GARAGE SIDE)
	7.5 FT (NON-GARAGE SIDE)

LOT TYPE:	UNITS	AREA (AC)	DENSITY (UNITS/AC)
URBAN TOWNHOMES	192	17.83	10.77
SUBURBAN TOWNHOMES	114	15.31	7.45
VILLA SINGLE FAMILY LOTS	105	34.42	3.05
65' SINGLE FAMILY LOTS	164	69.56	2.36
TOTAL UNITS	575	137.12	4.19

GUEST PARKING STALLS: 73

IMPERVIOUS SURFACES:

MAX. IMPERVIOUS SURFACE ALLOWED:

VILLA SINGLE FAMILY LOTS = 50% MAX. PER LOT

65' SINGLE FAMILY LOTS = 40% MAX PER LOT

ATTACHED DWELLINGS = 40% OF TOTAL AREA

SITE NOTES:

1. SEE SHEET 21 FOR TYPICAL LOT DETAILS AND TYPICAL ROAD SECTIONS.
2. ALL CURB RETURNS ARE MEASURED FROM BACK OF CURB UNLESS OTHERWISE NOTED.

LEGEND:

- EASEMENT LINE
- BUILDING SETBACK
- PROPERTY LINE
- LOT LINE
- ROW
- STOP/STREET SIGN
- STREET LIGHT
- POND MAINTENANCE ACCESS (TURF)
- CITY OPEN/PARK MARKER SIGN

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

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PRELIMINARY
FOR REVIEW
NOT FOR CONSTRUCTION

Clark Wicklund — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

20

Sheet 20 of 91

File Location: X:\4000570-00\1140 Design\00 Sheets - Preliminary\SITE.dwg Plotted By: Logan.Josephson on December 31, 2025 at 10:09 AM

SOUTH WASHINGTON COUNTY SCHOOLS
Independent School District 833
7362 East Point Douglas Rd S.
Cottage Grove, MN 55016
super@sowashco.org | 651-425-6201

Dear Members of the Cottage Grove City Council and Planning Commission,

I am writing to formally express the school district's concerns regarding the proposed Tank Farm/Ravara Trails development and access to Cottage Grove Middle School (CGMS) and Grey Cloud Elementary School (GCES), which is scheduled for discussion on February 23.

South Washington County Schools met with City and County representatives on September 29, 2025 to outline those concerns. To date, we have not received further clarification regarding how student safety and traffic impacts will be addressed.

The developer's plat submittal promotes the development's proximity to CGMS and GCES, describing the schools as easily reachable by foot or bike. While the proximity of the proposed development is close to our schools, students would be required to cross Keats Avenue at Indian Boulevard. The proposed plan includes an at-grade, signalized crossing. Under current district hazard guidelines, elementary students would not be permitted to cross Keats Avenue, even with a traffic-control device. If students from this development are deemed within walking distance to the school and therefore ineligible for school bus transportation, one of two outcomes is likely:

- South Washington County Schools (SoWashCo Schools) will incur additional busing costs to meet safety standards; or
- Families will default to parent drop-off and pick-up.

Based on current trends, increased parent drop-off is highly probable.

CGMS already experiences significant vehicle stacking on Indian Boulevard during arrival and dismissal. Adding approximately 575 homes will materially increase traffic volumes. We anticipate:

- Extended traffic stacking onto Indian Boulevard;
- Greater difficulty exiting CGMS, particularly left turns;
- Increased conflict between bus and parent traffic; and
- Additional congestion caused by a stoplight at Keats and Indian.

We have seen similar patterns at other schools (Pine Hill Elementary in Cottage Grove among them), where roadway congestion resulting from approved development ultimately becomes a safety concern for community members as well as an operational burden for SoWashCo Schools.

SOUTH WASHINGTON COUNTY SCHOOLS
Independent School District 833
7362 East Point Douglas Rd S.
Cottage Grove, MN 55016
super@sowashco.org | 651-425-6201

We request serious consideration of a grade-separated pedestrian underpass at Keats Avenue connected to the City and County trail systems. The Traffic Impact Study suggests such infrastructure would be premature due to limited current east-west pedestrian demand. However, the area east of Keats is currently undeveloped. With 575 new units, the population in that area will change significantly. Waiting to evaluate demand after build-out places students at risk during interim years and may increase long-term costs.

Before approval, we respectfully request that the City and Planning Commission:

1. Reevaluate the safety assumptions related to students crossing Keats Avenue.
2. Require a school-specific traffic impact analysis focused on arrival and dismissal conditions.
3. Consider incorporating a grade-separated pedestrian crossing in the initial infrastructure plan.
4. Clarify coordination responsibilities between the Developer, the City, County, and School District regarding transportation and traffic mitigation.

Student safety and predictable traffic impacts must be a central consideration as Cottage Grove expands to the east. We welcome continued collaboration to ensure infrastructure planning is proactive and aligns with safe, functional school operations.

Sincerely,
Julie Nielsen

Julie Nielsen, Superintendent
South Washington County Schools



SITE PLAN DATA:

PIDS: 11.027.21.24.0001	60.54 AC
11.027.21.23.0001	20.01 AC
11.027.21.32.0001	40.34 AC
11.027.21.31.0001	79.47 AC
11.027.21.33.0001	39.13 AC
TOTAL GROSS AREA	239.49 AC
OUTLOT P	35.36 AC
OUTLOT Q	55.41 AC
TOTAL PROJECT AREA AREA	148.72 AC
OUTLOT K (PARK DEDICATION)	4.15 AC
EXISTING ROW (KEATS AVE S)	3.55 AC
PROPOSED ROW DEDICATION (KEATS AVE S)	3.89 AC
NET TOTAL PRODUCT AREA	137.13 AC
PROPOSED ROW (FUTURE RAVINE PKWY)	8.89 AC
PROPOSED ROW (FUTURE INDIAN BLVD S)	3.90 AC
PROPOSED ROW (INTERIOR NORTH)	7.19 AC
PROPOSED ROW (INTERIOR SOUTH)	10.53 AC

SITE PLAN OUTLOT DATA:

OUTLOT	OWNER
OUTLOT WITH PONDS: A, D, F, G	CITY
OUTLOT: K (CITY PARK)	CITY
OUTLOT WITH PIPELINE: B, E, I, J, P, O	HOA/DEVELOPER
OUTLOT: C, H, L, M, N, O	HOA/DEVELOPER

SITE PLAN LOT DATA:

URBAN TOWNHOME:
- LOT WIDTH MINIMUM: 22 FT
- LOT DEPTH MINIMUM: 72.5 FT
- END LOT WIDTH: 27 FT
- FRONT DOOR SETBACK: 15 FT
- KEATS AVE FRONT DOOR SETBACK: 25 FT
- GARAGE SETBACK: 25 FT
- CORNER SETBACK: 20 FT
- BUILDING SEPARATION: 20 FT

SUBURBAN TOWNHOME:
- LOT WIDTH MINIMUM: 25 FT
- LOT DEPTH MINIMUM: 72 FT
- END LOT WIDTH: 30 FT
- FRONT SETBACK: 25 FT
- CORNER SETBACK: 20 FT
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- LOT WIDTH MINIMUM: 40 FT
- LOT DEPTH MINIMUM: 130 FT
- SIDE YARD SETBACK: 5 FT
- SIDE YARD SETBACK: 5 FT

65' SINGLE FAMILY LOTS:
- LOT WIDTH MINIMUM: 65 FT
- LOT DEPTH MINIMUM: 130 FT
- SIDE YARD SETBACK: 5 FT (GARAGE SIDE)
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LOT TYPE:	UNITS	AREA (AC)	DENSITY (UNITS/AC)
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TOTAL UNITS	575	137.12	4.19

GUEST PARKING STALLS: 73

IMPERVIOUS SURFACES:

MAX. IMPERVIOUS SURFACE ALLOWED:

VILLA SINGLE FAMILY LOTS = 50% MAX. PER LOT

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ATTACHED DWELLINGS = 40% OF TOTAL AREA

SITE NOTES:

1. SEE SHEET 21 FOR TYPICAL LOT DETAILS AND TYPICAL ROAD SECTIONS.
2. ALL CURB RETURNS ARE MEASURED FROM BACK OF CURB UNLESS OTHERWISE NOTED.

LEGEND:

- EASEMENT LINE
- BUILDING SETBACK
- PROPERTY LINE
- LOT LINE
- ROW
- STOP/STREET SIGN
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- POND MAINTENANCE ACCESS (TURF)
- CITY OPEN/PARK MARKER SIGN

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - OVERALL

DATE	DESCRIPTION
2025-12-31	City Submittal

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Clark Vreeland — 40922 — Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

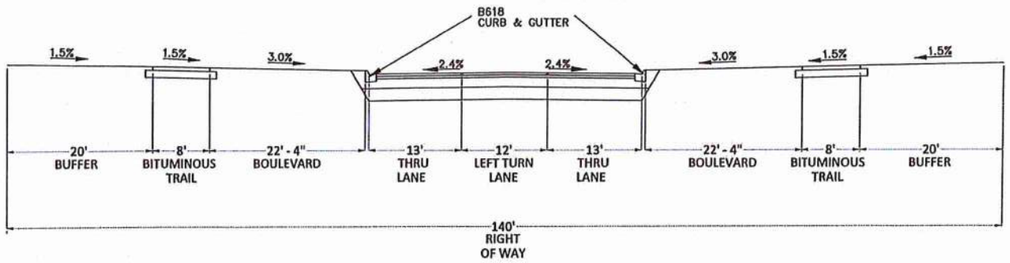
Designed By: CJV
Drafted By: LIU
Project No.: 4000570-00

20

Sheet 20 of 91

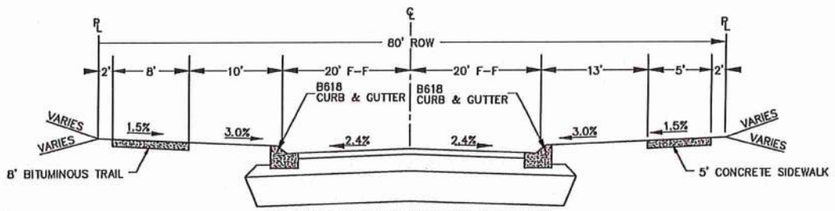
File location: N:\4000570-RAVARA Trail\Civil\Design\Plat Sheets - Preliminary\PSTS.mxd Plotted By: Logan Jorgenson on December 31, 2025 at 3:45:17 PM

TYPICAL ROAD SECTIONS



RAVINE PARKWAY S (BY OTHERS) 140' ROW ROAD SECTION

NOT TO SCALE



TYPICAL 80' ROW ROAD SECTION

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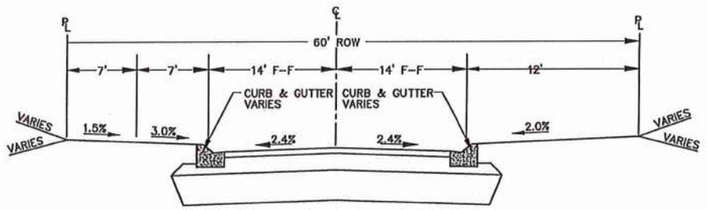

TYPICAL 60' ROW ROAD SECTION

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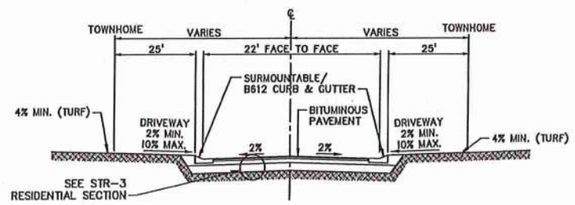

SUBURBAN TH PRIVATE ROAD SECTION (22' F-F)

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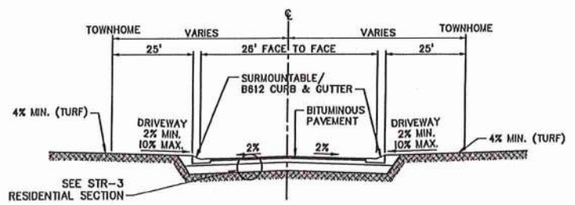
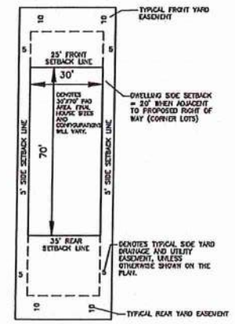


URBAN TH PRIVATE ROAD SECTION (26' F-F)

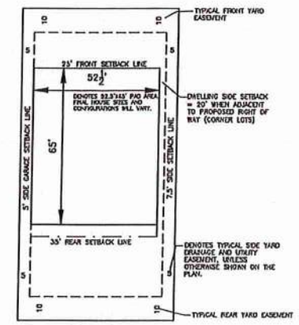
NOT TO SCALE

DEVELOPMENT LOT DETAILS

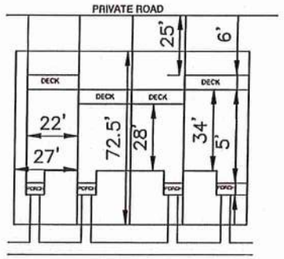
40'x130' SINGLE FAMILY



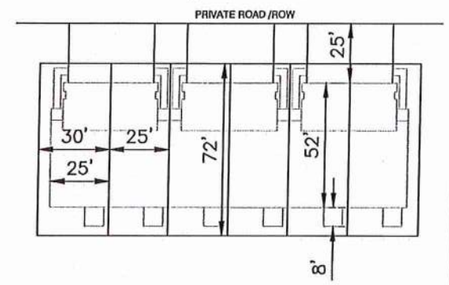
65'x130' SINGLE FAMILY



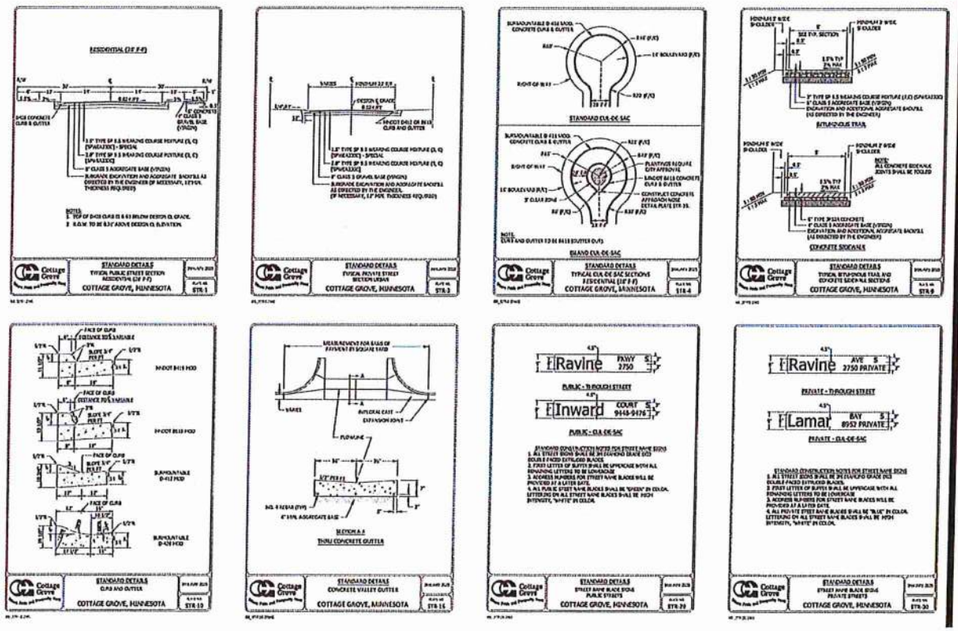
URBAN TOWNHOME
FRONT FACE/REAR LOAD



SUBURBAN TOWNHOME
PATIO/FRONT LOAD



CITY OF COTTAGE GROVE STANDARD DETAILS



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN NOTES AND DETAILS

DATE	DESCRIPTION
2025-12-31	City Submittal

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FOR REVIEW ONLY
PRELIMINARY
NOT FOR CONSTRUCTION

Clark Weyland — 40922
Date — License no.

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CAY
Drafted By: LRJ
Project No.: 4000570.00

21

Sheet 21 of 91

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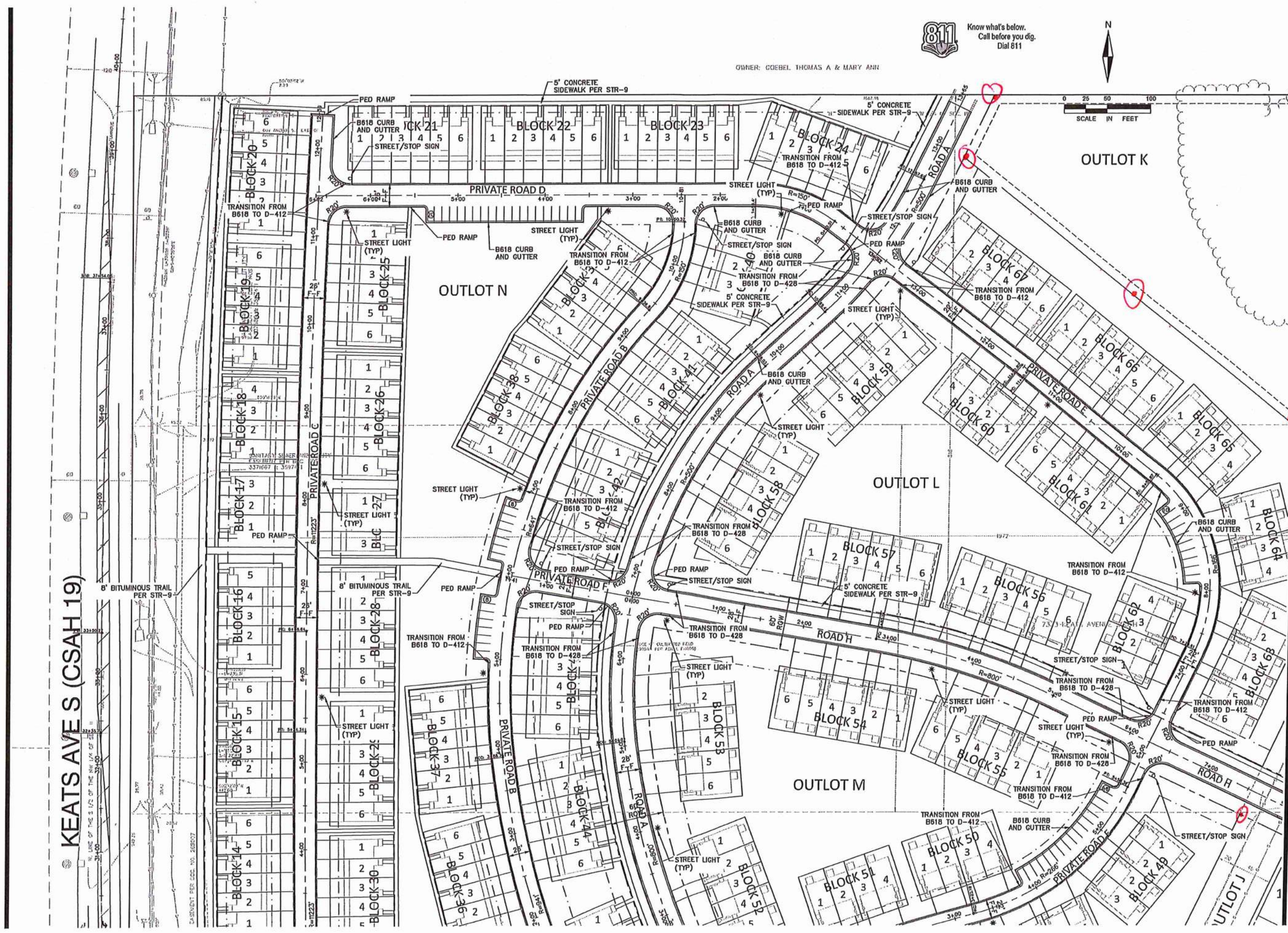

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RAVARA TRAILS

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PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW A

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Clark Wickland
Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CNW
Drafted By: LRU
Project No.: 4000570-00

22

Sheet 22 of 91



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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW B

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Clark Wickland
Date 40922 License no.

QA/QC CHECK

By Date

PROJECT TEAM DATA

Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

23

Sheet 23 of 91

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TWIN CITIES LAND DEVELOPMENT

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW C

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PRELIMINARY PLAT NOT FOR CONSTRUCTION

QA/QC CHECK

By — Date

PROJECT TEAM DATA

Designed By: CWI
Drafted By: LRI
Project No.: 4000570.00

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Sheet 24 of 91

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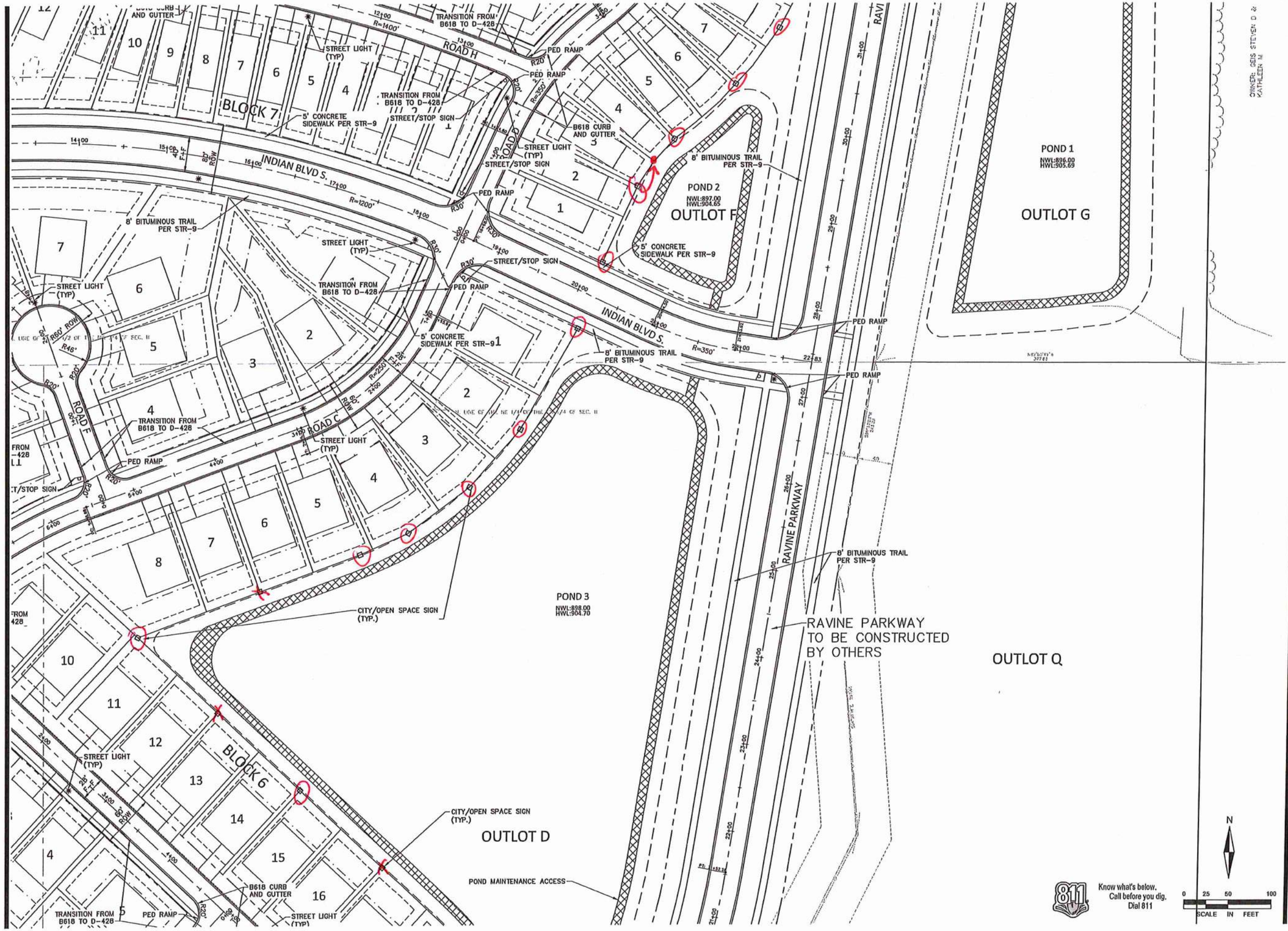

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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570-00

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Sheet 25 of 91

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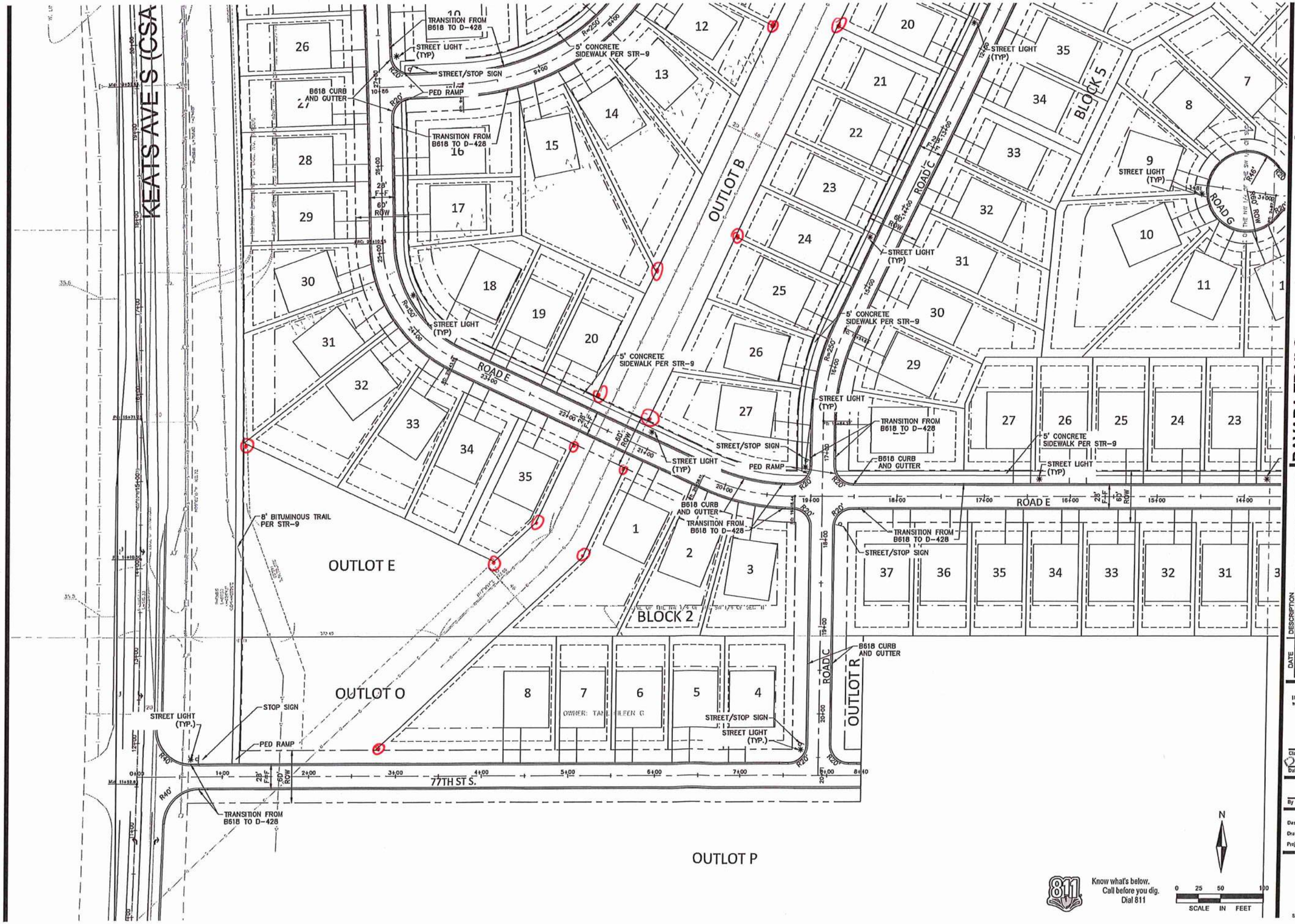

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RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

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Designed By: CJW
Drafted By: LRJ
Project No.: 4000570.00

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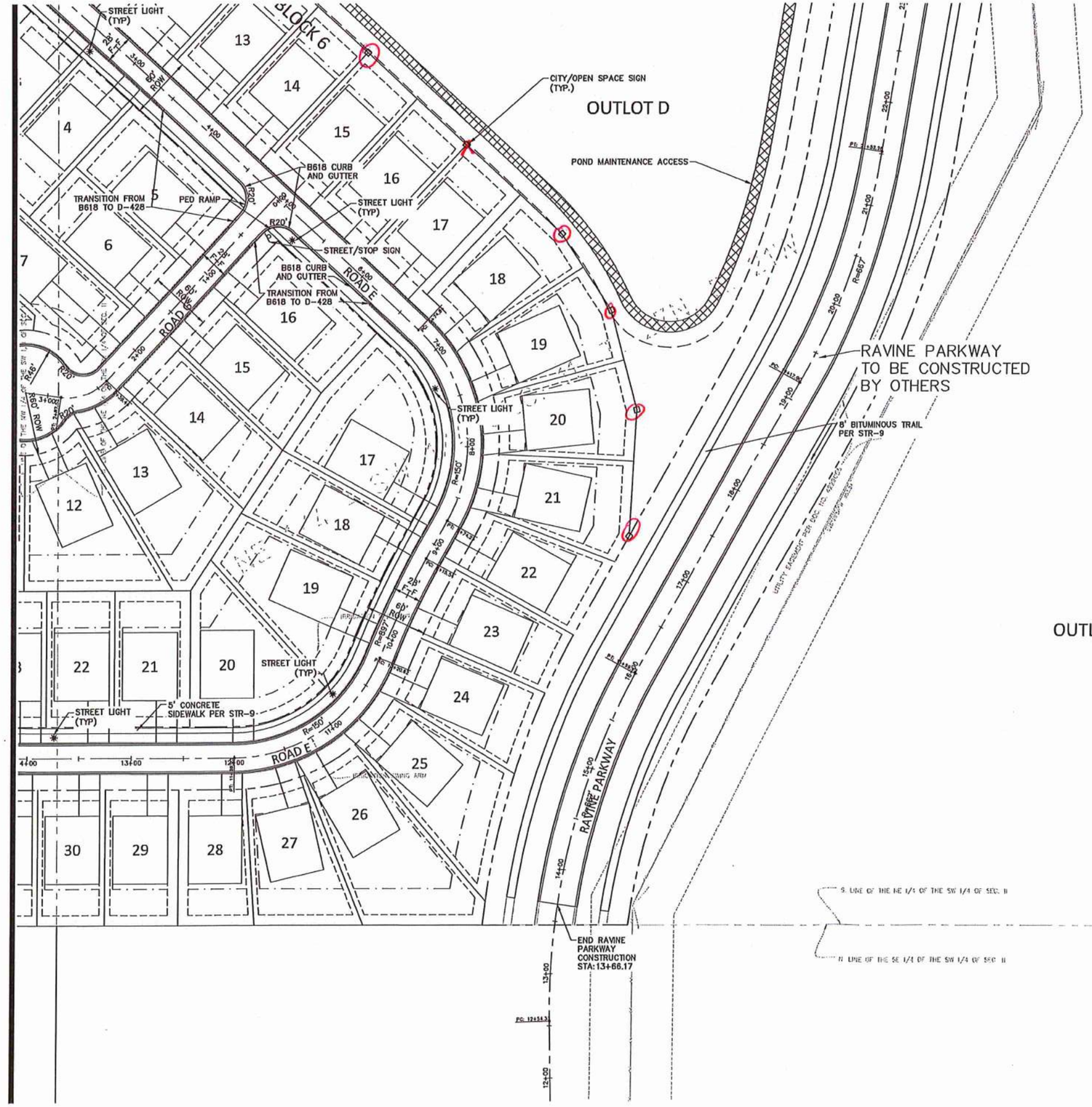
Sheet 26 of 91



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TWIN CITIES LAND DEVELOPMENT TC LD

RAVARA TRAILS

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT SUBMITTAL

SITE PLAN - VIEW F

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By — Date

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Designed By: CJV
Drafted By: LRJ
Project No.: 4000570.00

27

Sheet 27 of 91

STAFF REPORT CASE: ZA/PP2026-005

ITEM: 6.4

PUBLIC MEETING DATE: 2/23/26 TENTATIVE COUNCIL REVIEW DATE: 3/18/26

APPLICATION

APPLICANT: US Home, LLC, dba Lennar

REQUEST: A Zoning Amendment and Preliminary Plat for a subdivision to be called Talcott Glen with the primary access via an extension of 95th Street. The Zoning Amendment will rezone the property from AG-2, Agricultural, to R-4, Transitional Residential. The proposed single-family community will consist of 177 homes with a mix of 50- and 65-foot wide lots.

SITE DATA

LOCATION: West of the Summer's Landing Development and 95th Street

ZONING: AG-2, Agricultural

GUIDED LAND USE: Low Density Residential

LAND USE OF ADJACENT PROPERTIES:	CURRENT	GUIDED
NORTH:	Agricultural	Low Density Residential
EAST:	Residential	Low Density Residential
SOUTH:	Agricultural	Low Density Residential
WEST:	Agricultural	Industrial

SIZE: 69.5 Acres

DENSITY: 2.95 Units Per Acre

RECOMMENDATION

Approval, subject to the conditions stipulated in this staff report.

COTTAGE GROVE PLANNING DIVISION

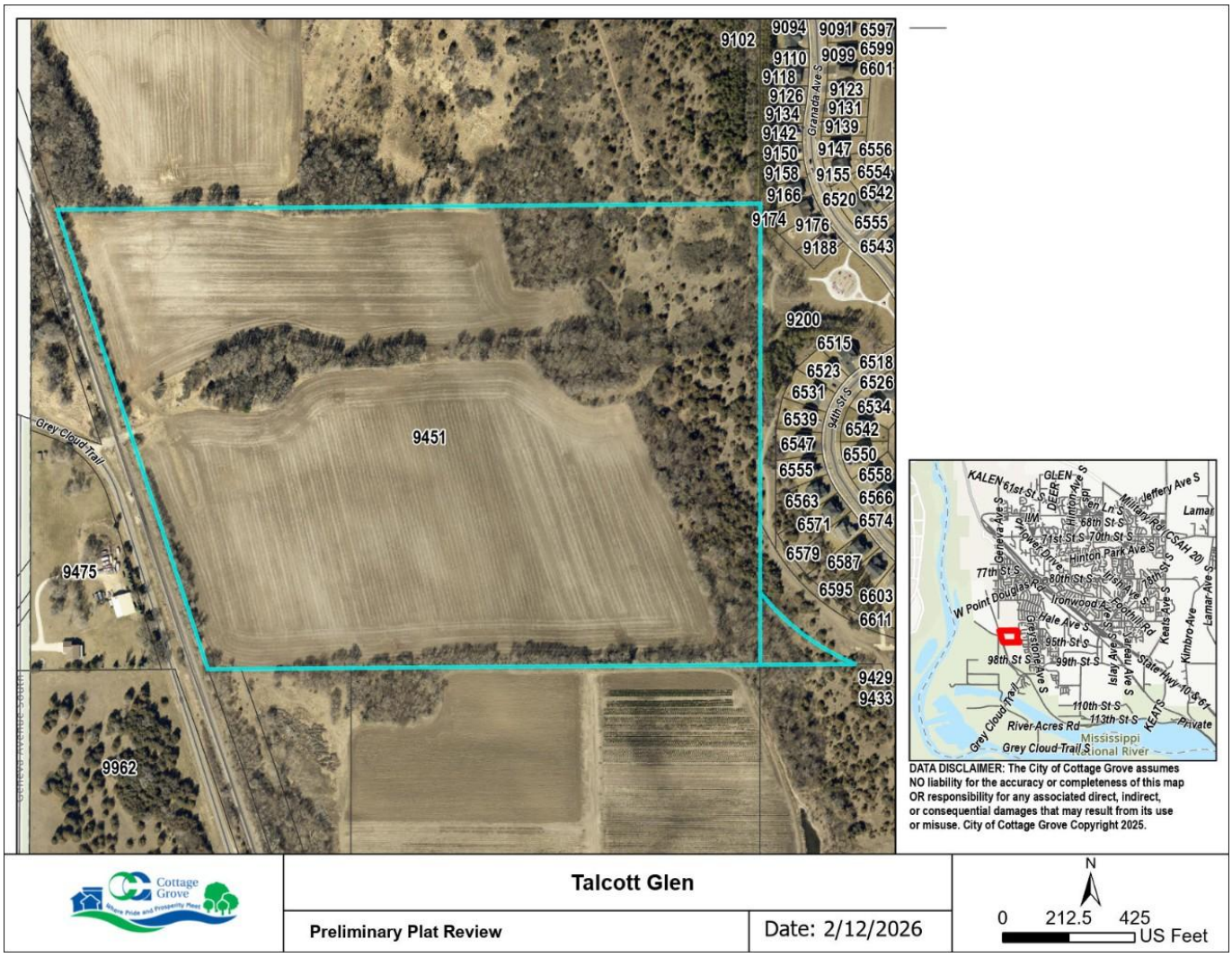
Planning Staff Contact: Max Erickson, Planner; 651-458-2868; merickson@cottagegrovemn.gov

Application Accepted: 1/26/2026 60-Day Review Deadline: 3/27/2026

Planning Staff Report
Talcott Glen
Planning Case Nos. ZA/PP2026-005
February 23, 2026

Proposal

Lennar (Applicant and Developer) is requesting approval of a Zoning Amendment and Preliminary Plat on one parcel totaling 69.5 acres of land zoned AG-2, Agriculture, located west of the Summer's Landing Development and 95th Street. The Developer is proposing to rezone the subject site to R-4, Transitional Residential District, and a Preliminary Plat to create 177 single family lots.

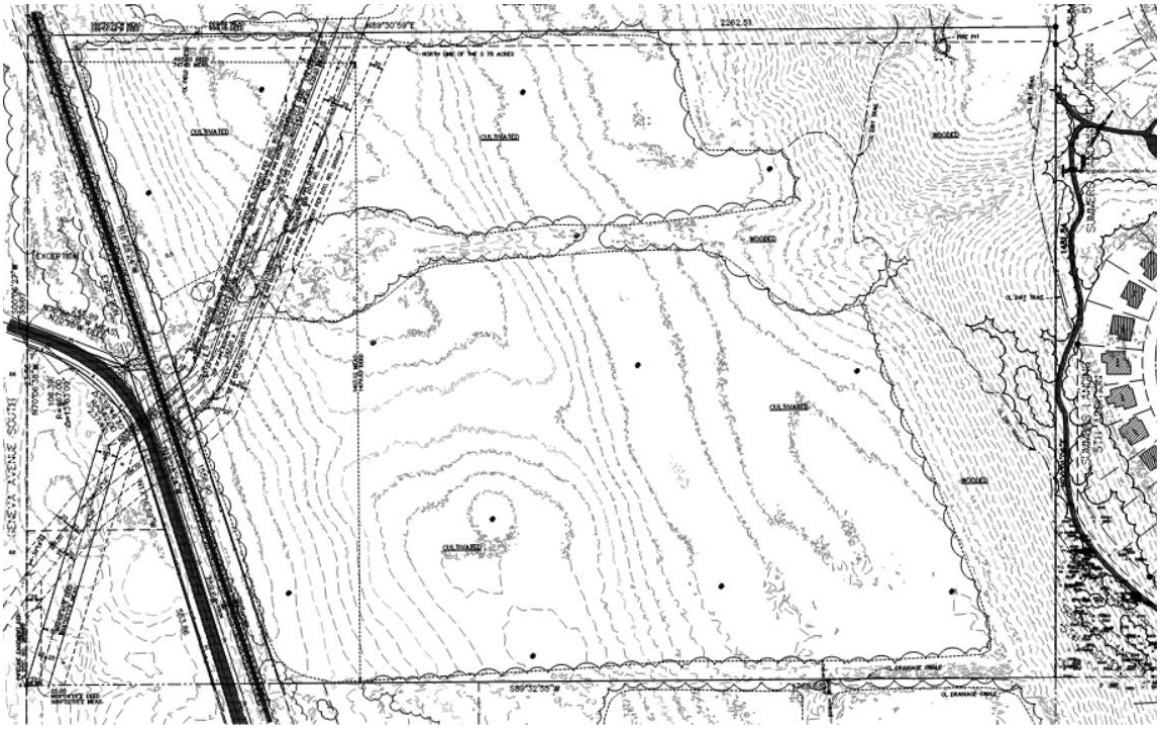


Review Schedule
Application Received: January 26, 2026
Application Accepted: January 26, 2026
Planning Commission Meeting: February 23, 2026
Tentative City Council Meeting: March 18, 2026
60-Day Review Deadline: March 27, 2026

Background

Site Conditions

The existing parcel is 69.5 acres and is primarily used as tilled cropland with a windrow of trees through the center of the parcel. The eastern portion of the parcel is sloped and generally wooded. A BNSF Railway runs along the western edge of the property which includes a small rail crossing currently used to access the site. This crossing will be required to be removed by the Developer as part of this project. The southern property boundary borders Bailey's Nursery. A gas pipeline easement extends from the northern property line through the property to the western property line.



Existing Site Conditions

Neighborhood Meeting

The Developer held a neighborhood meeting on February 10, 2026. Notice of the neighborhood meeting was sent to surrounding property owners within 500 feet of the project area. The intent of the meeting was to give neighboring property owners the opportunity to ask questions and present concerns they might have to the Developer in the early planning stages of the proposed project.

Nine property owners from neighboring subdivisions, Summer's Landing and Mississippi Dunes Estates, attended the meeting and one resident emailed the city after the neighborhood meeting, which is included in the packet.

The general concern of those in attendance was focused on the extension of 95th Street. The residents inquired about additional screening being provided by the Developer for the lots adjacent to the extended 95th Street segment to the west of Mississippi Dunes Boulevard. The residents in attendance also asked the Developer about timing of tree removal and project timeline.

Since the neighborhood meeting, staff have reviewed the background and history of 95th Street and the surrounding developments. Additional details related to the existing screening along 95th Street to the north and on the south side east of Mississippi Dunes Boulevard and why additional screening was not provided to the west of Mississippi Dunes Boulevard has been included in the traffic section of this report.

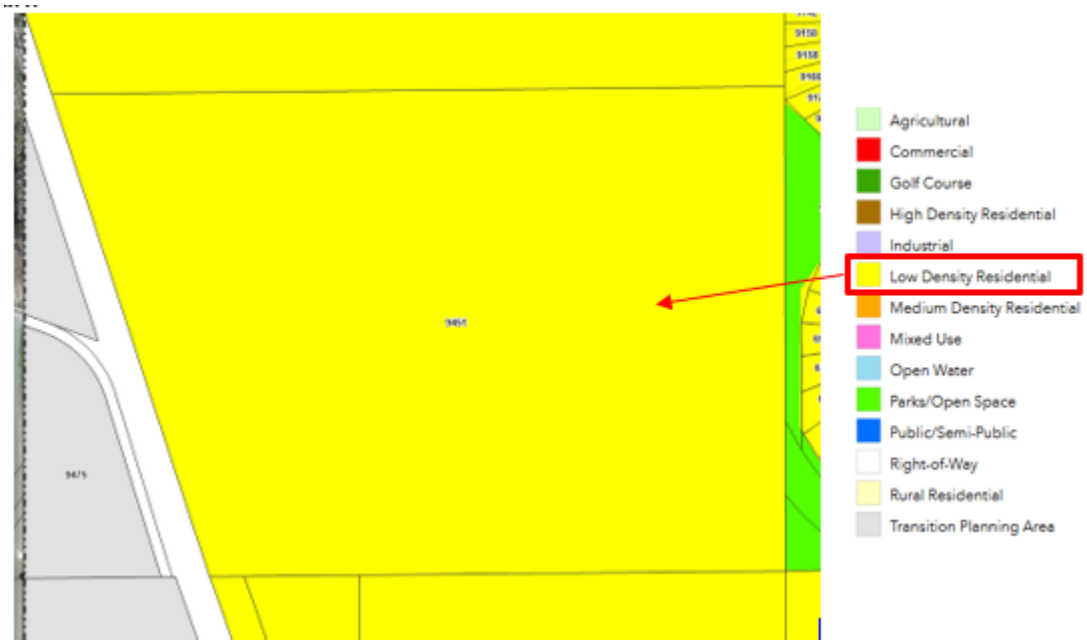
Planning Considerations

Plan Review

The dates of the plan set utilized for this review were submitted by Pioneer Engineering and are dated 1/16/26. The city's engineering consultant, Stantec, reviewed the plans and provided comments in a memo dated 2/18/26. Both the plan set and review memo are attached.

Zoning and Comprehensive Plan

The subject property is currently zoned as AG-2, Agriculture, and is guided as Low Density Residential in the 2040 Comprehensive Plan. The Comprehensive Plan guides the actions of the community by presenting a vision for the future by identifying policies, strategies, and investments the community will undertake while providing a repository of information. All land use decisions must be consistent with the adopted Comprehensive Plan. Zoning regulations specifically define how land can be used. Zoning divides jurisdictions into multiple districts and the Zoning Ordinance provides regulations which guide community development and growth within each district. The zoning regulations are the primary tool used to implement the City's vision found in the Comprehensive Plan.



2040 Comprehensive Plan Future Use

The Developer is requesting to rezone the subject property from AG-2, Agriculture, to R-4, Transitional Residential, which would be in accordance with the long-term growth plan for the parcel. Low Density Residential as defined in the Comprehensive Plan allows for 2 to 4 units per acre density. The purpose of the R-4 District is to provide transitional areas that will allow a mixing of single-family detached and single family attached dwellings on smaller lots where property is

adjacent to a minor or major collector street and/or where property is adjacent to higher intensity development or land use.



Proposed Zoning to R-4

The Developer is proposing a combination of 50-foot lots and 65-foot lots. Minimum lot width within the R-4 zoning district is 45 feet; therefore, the proposed lot sizes would align with the R-4 standards in City Code.

The Developer is proposing approximately 2.95 units per net acre. Net density is defined as, "The total number of units divided by the total land area less major right of ways (arterials and collectors) and less wetland protected by the Wetland Conservation Act, provided that right of way (including major roads) shall not be deducted if dedicated to the City at no cost."

The Talcott Glen density calculation is shown below:

Gross Acreage of Development: 69.5 acres
Subtract proposed areas below pond high-water levels: 7.34 acres
Area of 95th St (Collector) Right-of-Way: 2.34 acres

Equals Net Acreage: 59.82 acres

Divide 177 total housing units by net acreage to get units per acre of 2.95. At 2.95 units per acre the Talcott Glen development complies with the definition of Low Density residential of 2 to 4 units per acre.

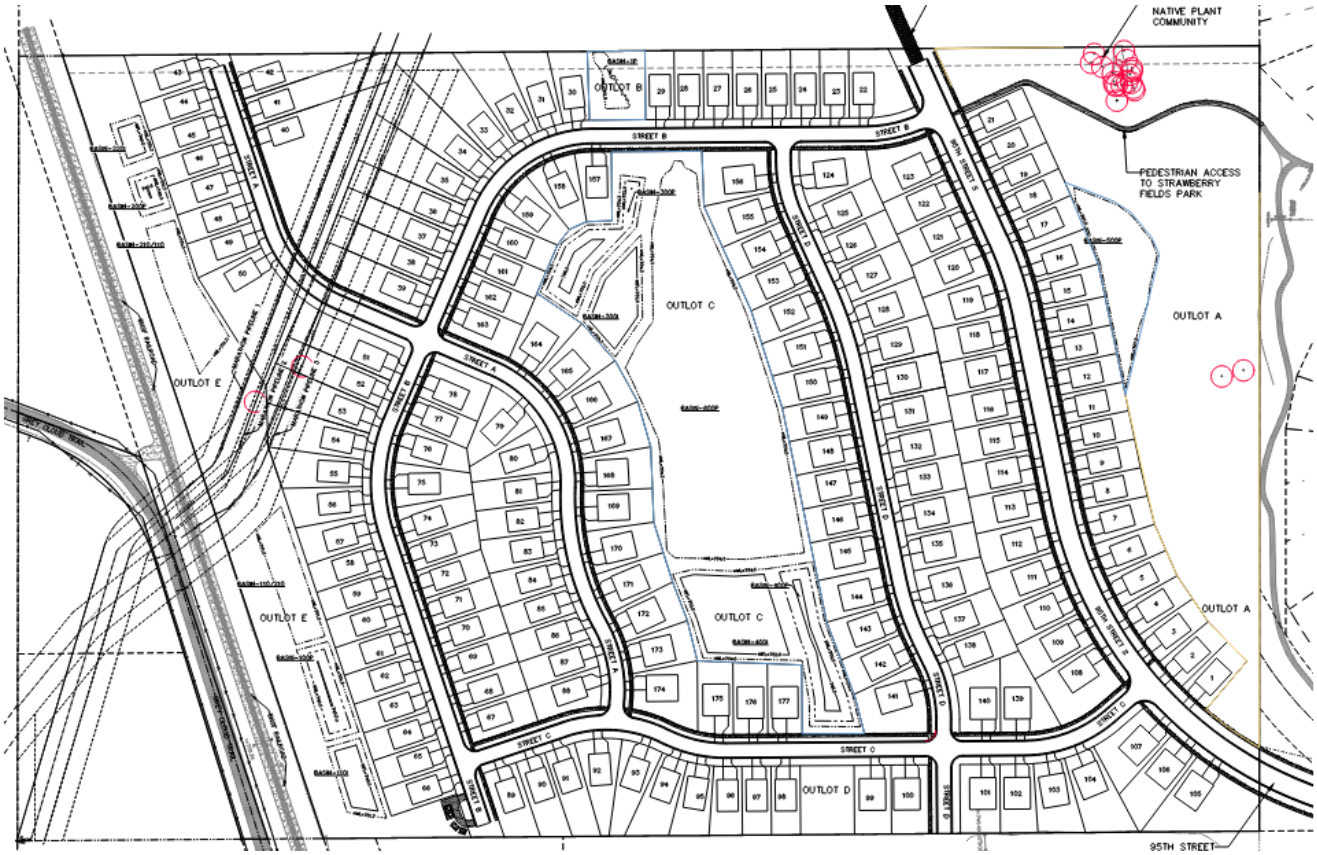
The proposed preliminary plat and the land use map from the 2040 Comprehensive Plan are consistent in the following ways:

- The Land Use Map in the 2040 Comprehensive Plan identifies the future land use development of the subject property as low density residential land uses. The Developer is proposing single-family lots for the subject property, which is consistent with the 2040 Comprehensive Plan.

- The proposed density of 2.95 units per acre is consistent with the 2040 Comprehensive Plan.
- The proposed rezoning to the R-4 District is consistent with the planned low-density outline in the 2040 Comp Plan for this property.
- Proposed Lot widths are consistent with the R-4 Zoning District standards
- The proposed development helps provide the city with varied housing types that are needed to serve varying income levels and stages in the life cycle.
- The proposed preliminary plat and grading plan are consistent with the low-density residential land use designation for this area.

Preliminary Plat

The preliminary plat, as proposed, depicts a logical development of a viable property given the adopted performance standards of the zoning district. The proposed plat consists of 177 single family lots. Five outlots are proposed which include areas designed to manage stormwater.



Preliminary Plat

Zoning Development Standards

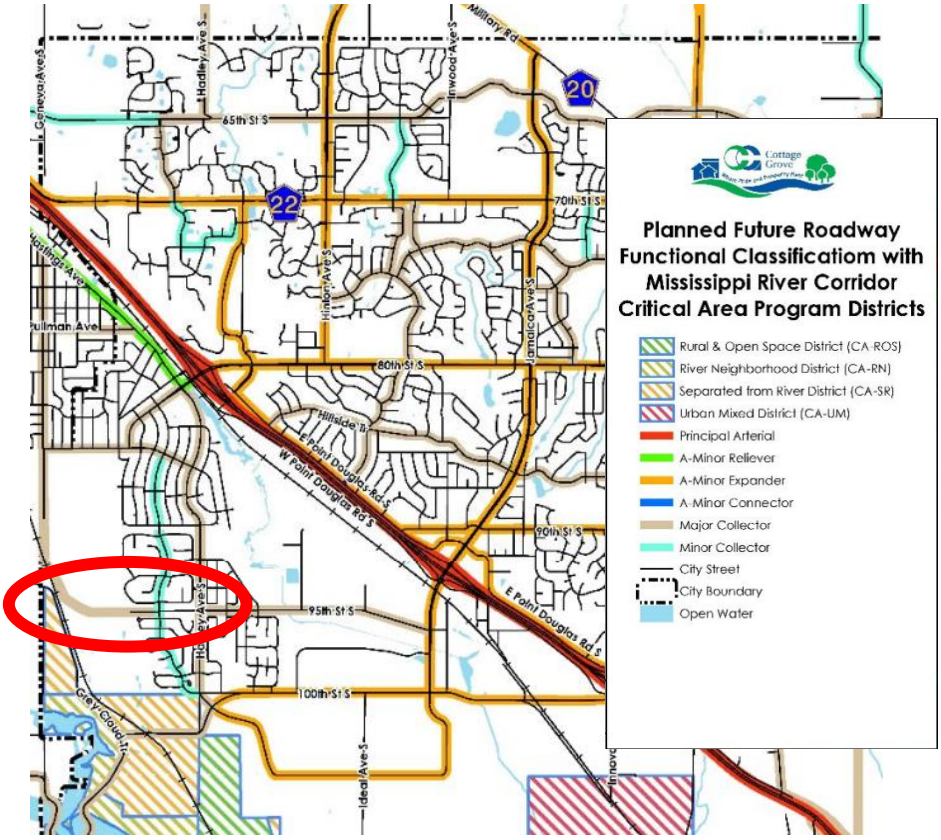
The development performance standards of the requested zoning district classifications and those requested as part of the development are detailed below. The Developer meets or exceeds the performance standards of the R-4, Transitional Residential zoning district.

Lot Development Performance Standards		
Single Family Standards	Proposed	R-4 Single Family Residential
Lot depth	120 feet	120 feet
Lot width	65 and 50 feet	45 feet
Front yard setback	25 feet	25 feet
Rear yard setback	30 feet	30 feet
Side yard setback	7.5 feet	7.5 feet
Side yard, garage setback	5 feet	5 feet
Maximum impervious surface coverage		50%

Transportation

95th Street Background

The proposed access to Talcott Glen is from an extension of 95th Street as indicated on the city's future road map. 95th Street currently ends at Mississippi Dunes Boulevard. In 2003, approval of the Mississippi Dunes Estates development required construction of the east segment of 95th Street between Hadley Avenue and Mississippi Dunes Boulevard; however, further discussions regarding alignment were needed for the segment of 95th Street west of Mississippi Dunes Boulevard.



Future Road Classification 2040 Comp Plan

In 2005, the city conducted a roadway scoping study for 95th Street to evaluate the options to serve further development west of Mississippi Dunes Boulevard and potential extension to the

west over the BNSF Railroad track. Three options were considered within the study as generally shown below. All options would require either the dedication of right-of-way and/or development to trigger the construction of the 95th Street extension.



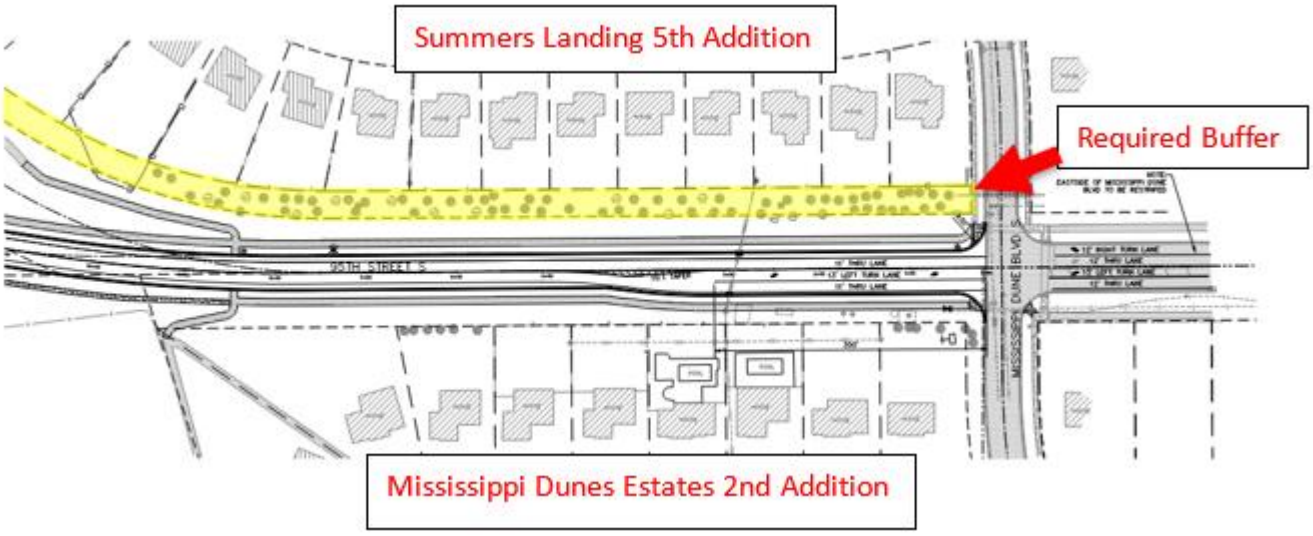
2005 Scoping Study Options

At about the same time as the 95th Street analysis was occurring, Mississippi Dunes Estates 2nd Addition (west side of Mississippi Dunes Boulevard) was approved. The development agreement for Mississippi Dunes Estates 2nd Addition required that Lots 5 through 12 of Block 3 (properties which border the future westward extension of 95th Street) to be restricted from being built until 95th Street alignment was determined and constructed between Mississippi Dunes Boulevard and the western property boundary. This was done to give the city time to decide on the final alignment and ensure that grading would not impact these lots. Following the evaluation of the 95th Street alignments and determination that future development would need to drive the alignment and construction of 95th Street west of Mississippi Dunes Boulevard, the Developer of Mississippi Dunes Estates 2nd Addition approached the city regarding the removal of the restriction placed on Lots 5 through 12. In 2009, a temporary construction easement was established over those lots allowing for them to be built on while also preserving area for grading at such time 95th Street were to be constructed to the west. Additional buffering trees were not planted on these lots anticipating they would be removed at such time 95th Street was constructed west of Mississippi Dunes Boulevard.

In 2016 the Summers Landing development was approved to the north of 95th Street. The Developer completed improvements to Hadley Ave S and widened 95th Street S between Hadley Ave and Mississippi Dunes Boulevard. Summers Landing also added an access to 95th Street via Mississippi Dunes Boulevard. The Summers Landing Development dedicated the 95th Street right-of-way west of Mississippi Dunes Boulevard for future construction of the road.

A buffer was also created with an outlot owned and maintained by the Summers Landing HOA adjacent to the lots abutting 95th Street on both the east and west sides of Mississippi Dunes Boulevard. The buffer was required to be landscaping, fencing or berming aligning with code

standards. The Developer chose to install a fence on the east side of Mississippi Dunes Boulevard and landscaping on the west side which aligned with the code standards.



95th Street Western Leg

The 95th Street alignment was adjusted as part of the Summers Landing Development to follow Option 3, which would not impact the existing lots within the Mississippi Dunes Estates development as initially anticipated with the other options. The construction easement over these lots will not be needed.

The City will work with lots 5 through 12 of Block 3 Mississippi Dunes Estates 2nd Addition for the planting of buffer trees on their private lots to align with required code standards for buffering along major roadways.

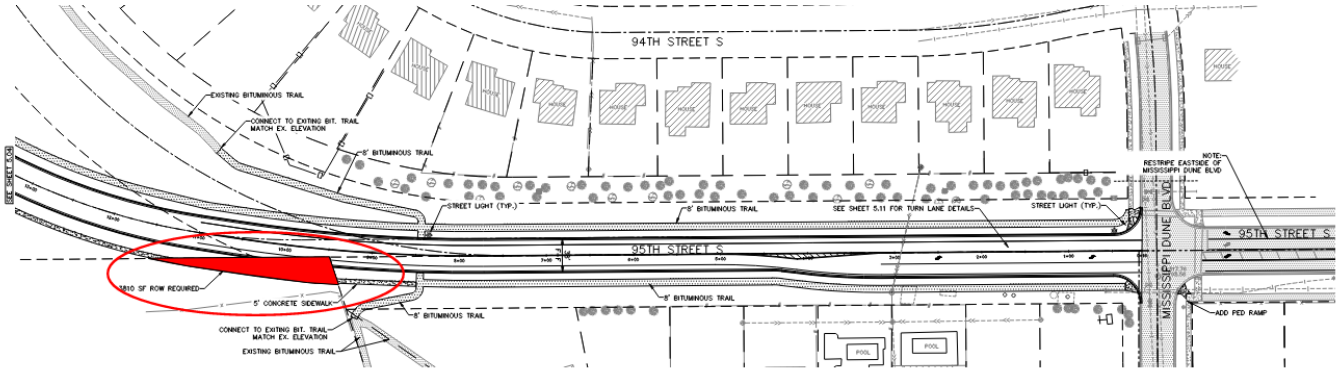
Traffic generation information was prepared during the studies in the early 2000s for the 95th Street extension report and for the roundabout at 95th Street and Hadley Avenue. The studies did a good job of analyzing the potential development of the area parcels including the Marathon Ashland, Summer's Landing, Nesvig, Bailey's, Mississippi Dunes and the anticipated developments within St. Paul Park at the time. The anticipated traffic generation does not warrant any additional traffic control given the 95th Street is designed to support the proposed traffic counts and will be monitored as development continues.

Development Access

Access to the proposed Talcott Glen development will be from the extension of 95th Street. The 95th Street right-of-way is currently 120 feet wide; however, the right-of-way will be narrowed to 66 feet wide within the development which will support a collector road width of 36 feet. It was originally planned for 95th Street to be a four lane roadway at this time it was planned to support additional development in St Paul Park however, given 95th Street will no longer support that development, 66 feet of right-of-way is sufficient to support the two lane collector roadway.

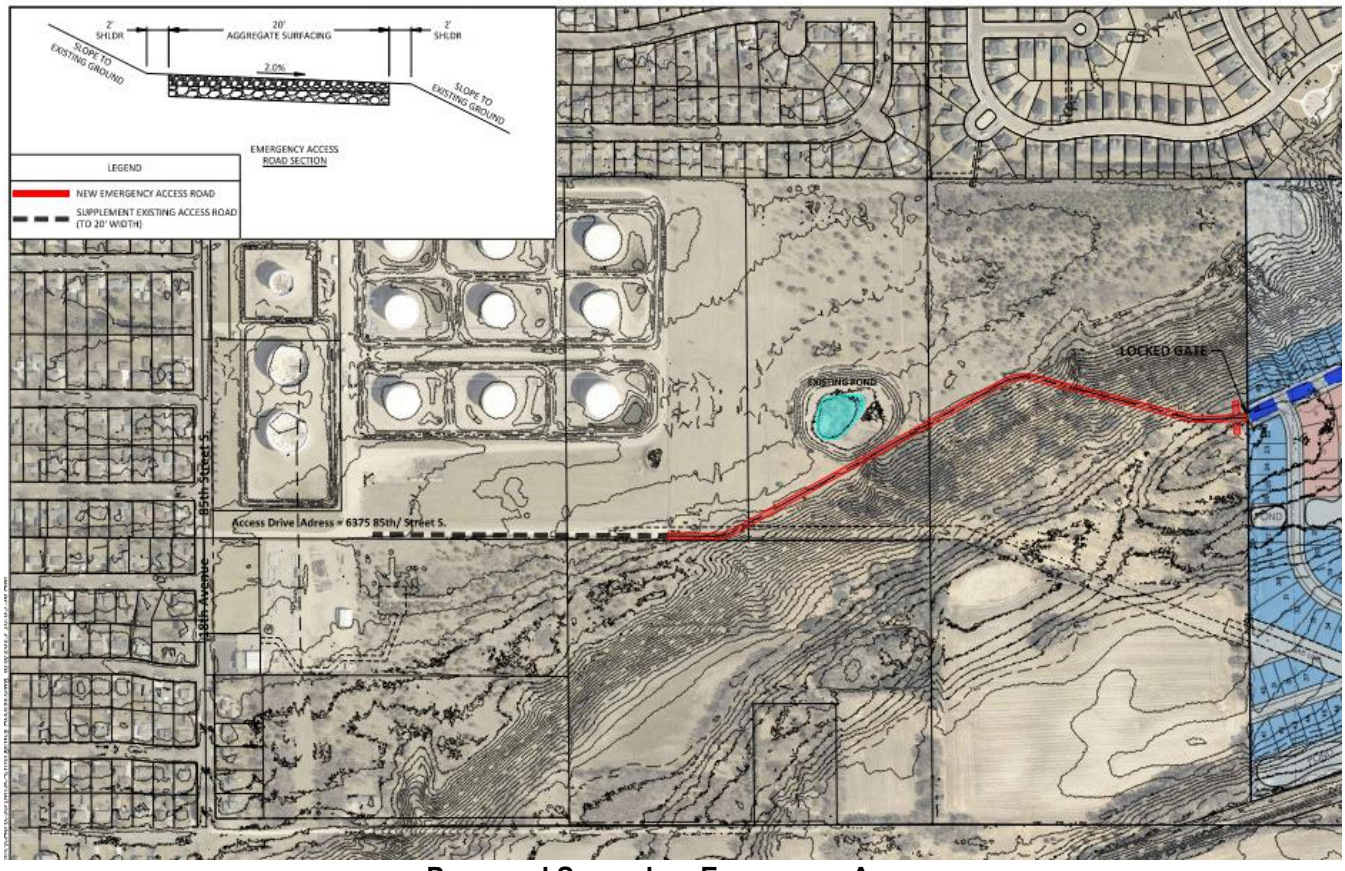
At the intersection with Mississippi Dunes Boulevard, eastbound 95th Street will be striped for left and right turn lanes as well as through-lanes. The striping on westbound 95th Street will be changed to reflect the extension.

The final alignment of 95th Street requires the Developer to acquire a portion of the Bailey property for right-of-way purposes. The Developer will be required to complete a lot split prior to the recording of the plat. A registered survey and legal description of the area required to complete the lot split for the required right-of-way will be required.



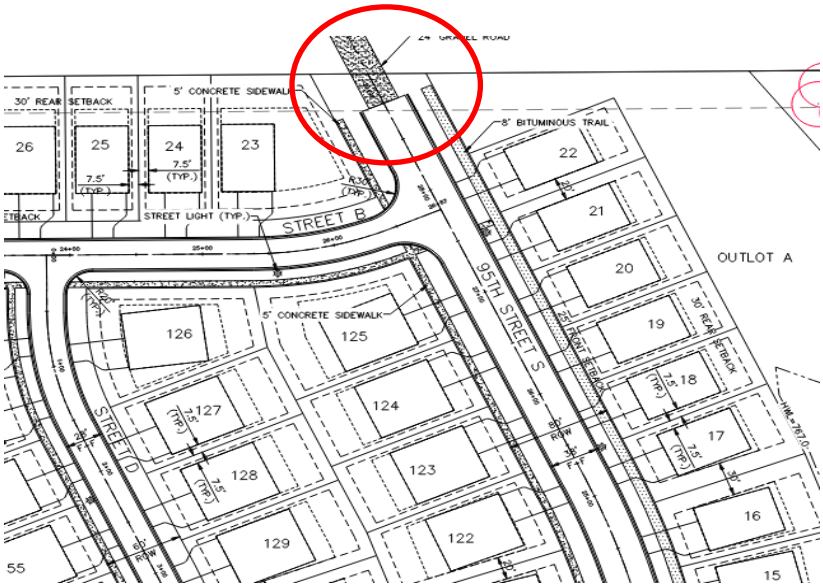
Required Lot Split/Right-Of-Way Dedication

A second access is required for all developments with greater than 30 lots for emergency access purposes per fire code. The Developer will work with the adjacent property owner to the north, Marathon, to construct a temporary access for emergency access use only. Developer will be responsible for any improvements to the access required to meet the emergency access standards.



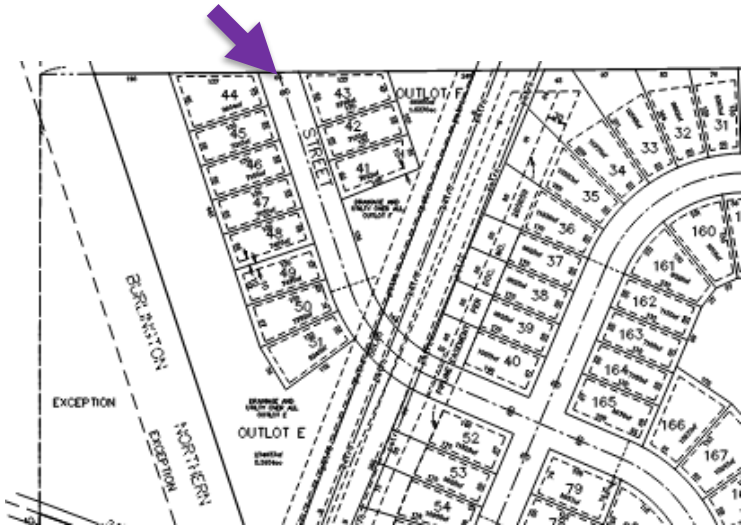
Proposed Secondary Emergency Access

The proposed access would connect the development to 85th Street to the north to be used in an emergency situation where 95th Street was not accessible by emergency vehicles. The Class 5 access road would not be accessible by the public and would be gated at the development. The Developer is responsible for installation of the security gate. An access agreement between the city and the property owner (Marathon) will be required to ensure emergency access is permitted on the temporary road. At such time permanent access is constructed with further development on the parcels to the north of this development site, the temporary access would not be maintained.



Gated Emergency Access at the Development

As with all development, it is imperative for Developers to extend future road connections across property lines as well as utilities to allow for future development to efficiently connect at such time of development. The road stubbed in the northwest corner requires a temporary turnaround to be provided on the adjacent parcel. This allows for snowplow turn around and minimal impact at such time the street and utilities are extended and connected to future development. A temporary easement in favor of the city with the property owner is required for the turn around and utility extension.



Required Turn Around

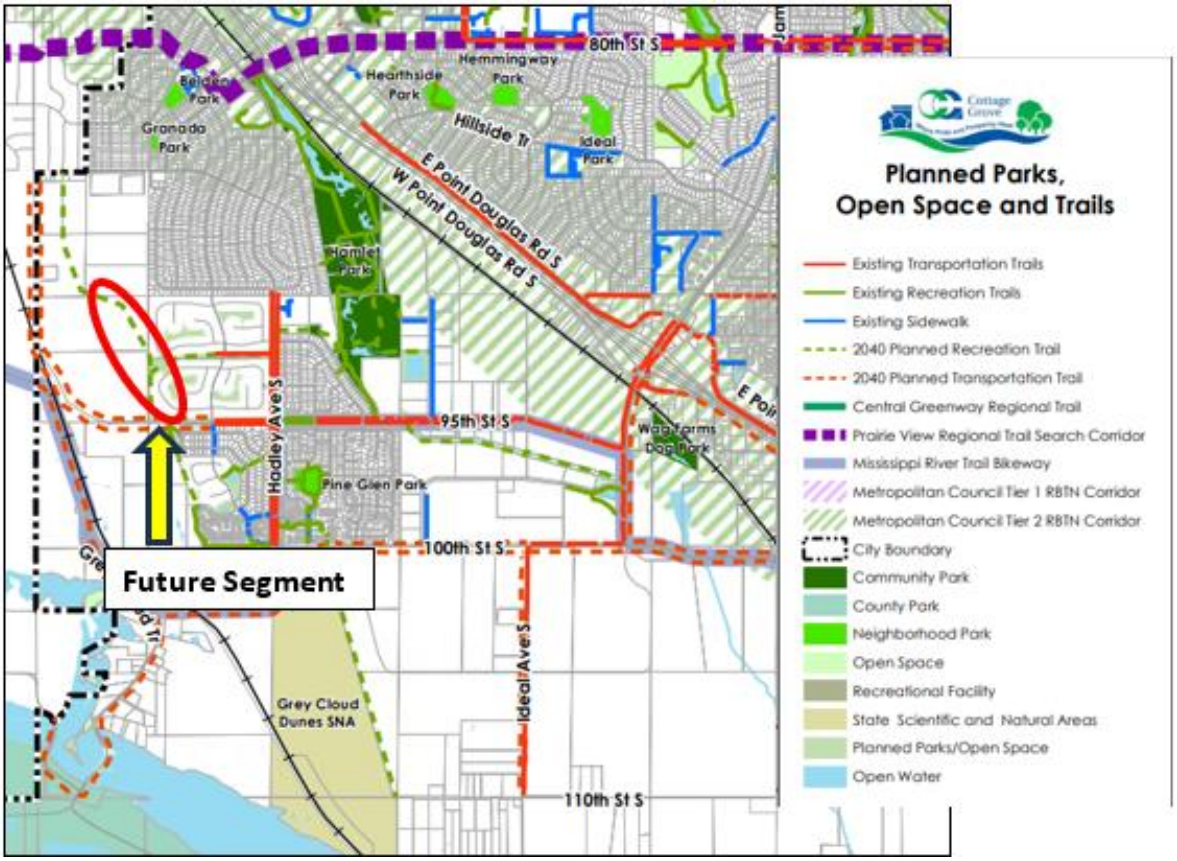
The two future road connections on the south side of the development do not require turnarounds given there are no lots fronting on those road stubs. The proposed stub adjacent to the temporary lift station will used as the turnaround.



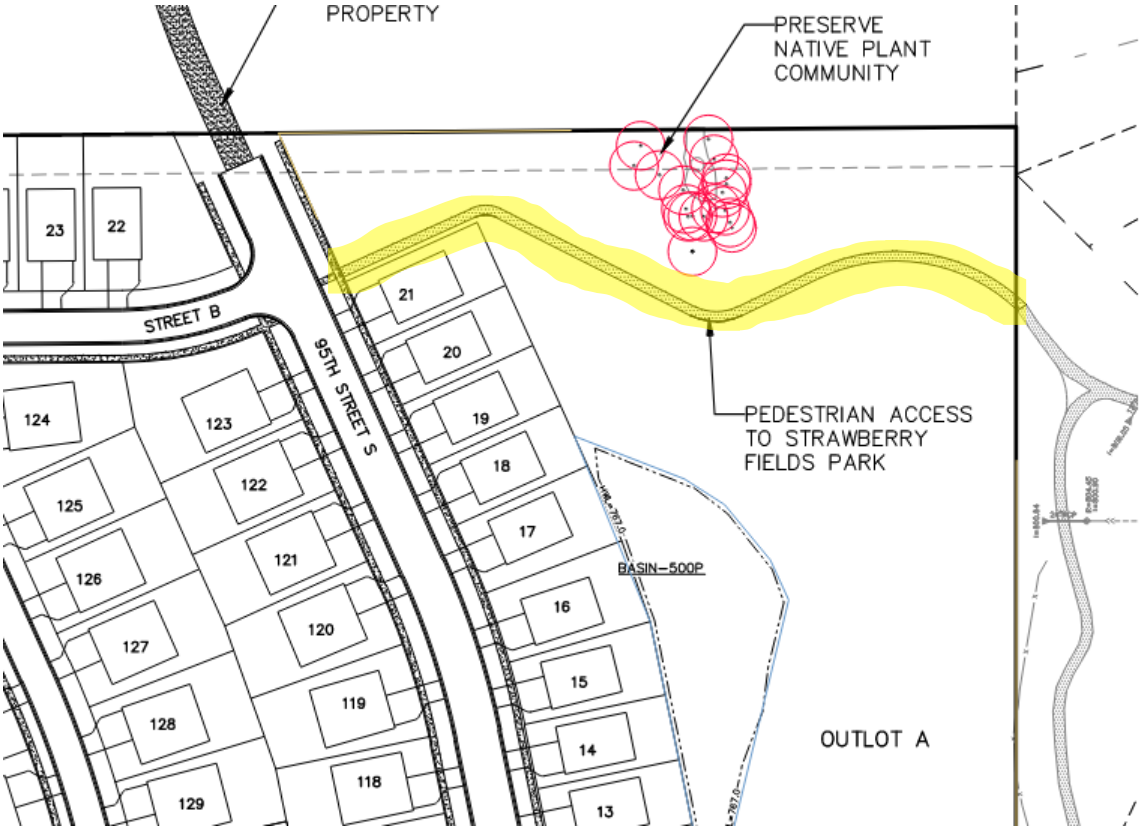
Southern Future Road Connections

Sidewalks and Trails

The trail stub at Strawberry Fields Park was constructed for anticipated development to extend the trail to the west and northwest outlined in the 2040 Planned Recreation Trail in the 2040 Comp Plan. The Developer will provide a trail connection to this trail in Strawberry Fields Park to 95th Street within Outlot A. The city will credit the Developer for the 20 foot wide trail section towards park dedication. This trail connection will provide a more direct connection for the Talcott Glen neighborhood to Strawberry Fields Park.

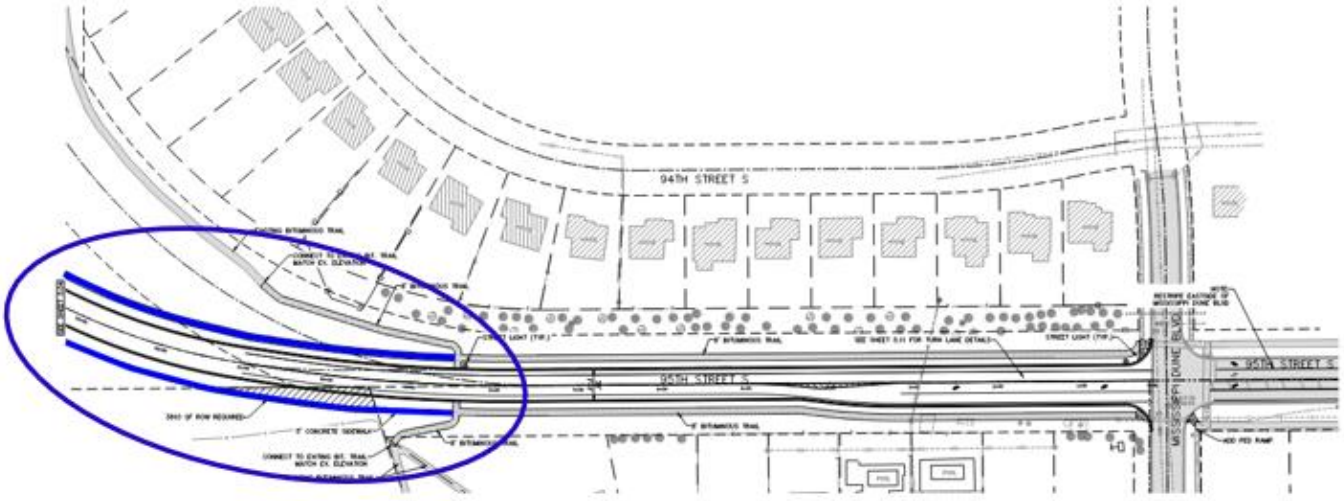


Planned Trail Segment Per 2040 Comp Plan



Possible Trail Connection to Strawberry Fields Park

Trails exist on both the north and south sides of 95th Street east of Mississippi Dunes Boulevard. Given lots will be fronting 95th Street within the development, the trail will transition to a 5-foot sidewalk after the trail crossing/connection to Strawberry Fields Park. The sidewalk will connect to the required sidewalk on one side of each street within the Talcott Glen Neighborhood.



Proposed Trail/Sidewalk Transition

Park Land and Open Space

A minimum of 10 percent of developable area shall be required to provide residents with public recreation facilities including parks and open spaces as a part of development projects per City Code Title 10-4-3. 6.95 acres of park dedication is required for the Talcott Glen development. Outlot A is not identified on the parks or trails map as a future park. As a condition of the city accepting Outlot A, the Developer will work with the Parks and Recreation Director to create a Forest Editing Plan to clarify removal of non-qualifying trees, identify trees to preserve, brush removal and a seeding mix approved by the Parks and Recreation Director. The Forest Editing Plan shall be created and accepted prior to the 20-foot-wide trail segment prior to the issuance of a grading permit.

The city will provide credit for the construction of the trail connection in the northeast corner of the site from 95th Street to Strawberry Fields Park. At such time the trail corridor is reviewed and approved, the Developer shall receive credit for a 20-foot-wide corridor of the extent of the trail as part of the final plat and outlined in the development agreement.

Area Charges and Development Fees

Area charges and related development fees for this project will be based on the acreages shown on the final plat. These fees and charges will be accurately adjusted based on the final plat layout and be provided in the development agreement. Payment to the City will be required at the time the development agreement is fully executed by the City and Developer.

Tree Preservation

The tree inventory has identified 11,421 existing qualifying inches of trees within the development property and 95th Street access. Qualifying Trees are defined as: A healthy tree meeting 1 of the following definitions: a hardwood deciduous tree at least 6 inches Diameter at Breast Height (DBH), a softwood deciduous tree at least 8 inches DBH, or a coniferous tree at least 10 feet in height. Trees that are considered non-qualifying include Elm, Ash, any DNR defined invasive species, or trees that are dead, mostly dead, or hazardous to public safety. For residential uses less than 10 units per acre, City Code Title 11-3-13 allows 25 percent of the qualifying inches identified on the site to be removed (2,856 inches).

The current tree inventory provided by the Developer proposes to remove 8,372 qualifying inches, an excess of 5,516 inches. The excess inches removed must be replaced at a rate of 50 percent; therefore, the Developer is required to mitigate 2,758 inches.

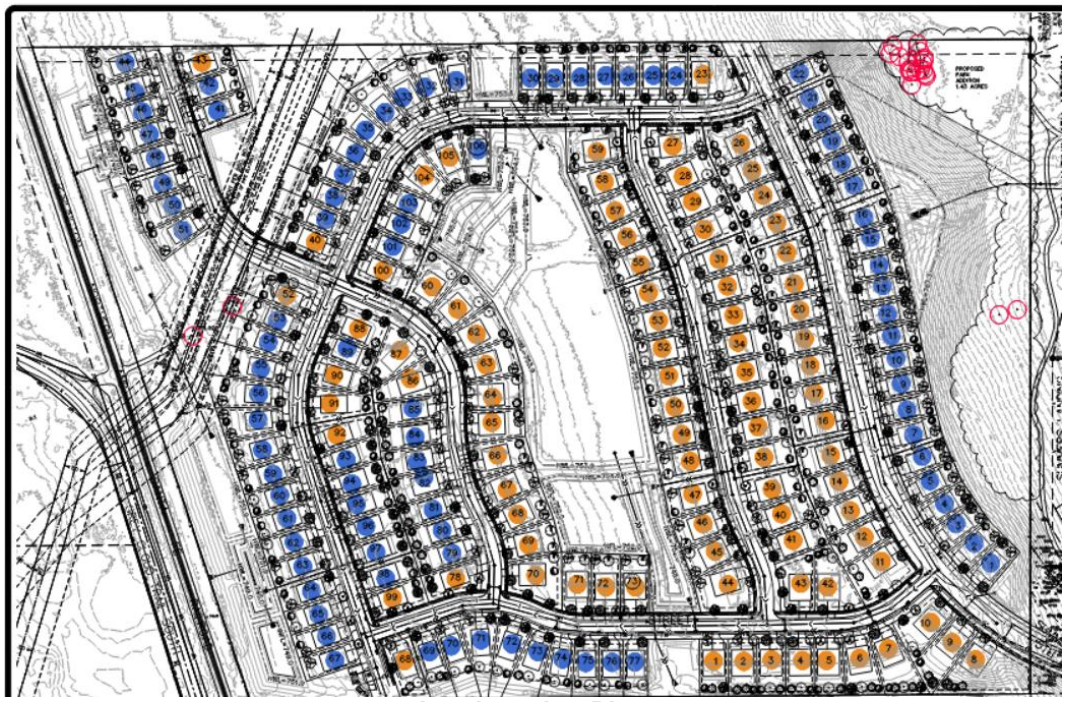
Tree Mitigation Requirements	
Total Qualifying Inches Identified On site	11,421 inches
Proposed number of qualifying inches to be removed	8,372 Inches
Allowable qualifying Inches without Mitigation (25%)	2,856 Inches
Remaining Qualifying Inches (Proposed – Allowable 25%)	5,516 Inches
50% of qualifying Inches required to be mitigated	2,758 Inches

The Developer's preliminary landscape plans show 2,099 inches being mitigated with landscape plantings. The remainder of the mitigation inches shall be mitigated with additional plantings within the development site or via cash paid in lieu of planting. The final tree mitigation will be outlined in the final plat and development agreement given the alignment of the trail in the northeast corner of the site may impact the required mitigation.

Landscaping

City Code Title 11-6-5 requires a minimum amount of landscape plantings to be installed as a part of development projects within the City. These required plantings include yard trees, building perimeter plantings, and landscape requirements. Lots less than 60 feet wide must have two yard trees, one of which must be a front yard tree. These smaller lots may have a small statured tree (maximum canopy spread of 30 feet) in the front yard. Lots over 60 feet wide must have three yard trees one of which must be a front yard tree. On wider lots the front yard tree must be an overstory species (maximum canopy spread over 30 feet). The Developer's landscape plan demonstrates adequate required trees per lot. In addition, each single-family lot is required to have 10 understory shrubs.

Boulevard trees are required to be included along 95th Street up to the proposed development. No boulevard trees will be required on 95th Street past the easterly property line. A revised landscaping plan including the required landscape Boulevard Trees along 95th Street between Mississippi Dunes Boulevard and the east property line. will be required to be submitted prior to City Council review.



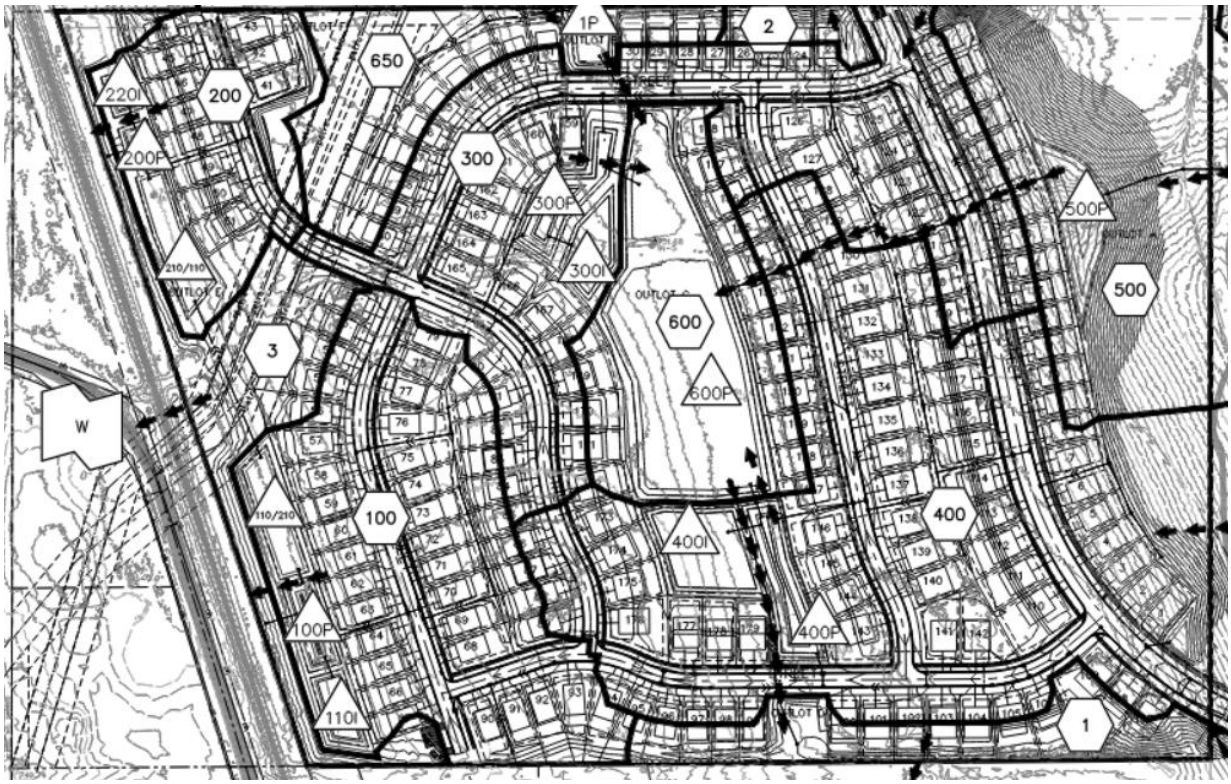
Landscaping Plan

Stormwater Management Plan

The Developer's engineer submitted a stormwater management plan that has been reviewed by the city. Comments on the plan are included in the review memo dated February 18, 2026. City engineering staff will continue to work with the Developer's engineer to ensure the site meets water quality standards as well as rate and volume control rules. The Developer will be required to deed Outlots B, C, D, and E to the city for ownership and maintenance of stormwater infrastructure.

The development site is currently designed with stormwater ponding and treatment in three areas. Stormwater discharged from the Summers Landing neighborhood is routed to a pond on the bottom of the slope on the east side of Talcott Glen. A system of wet and dry basins is located in

the middle of the development which will treat runoff from the central areas. On the west side, another system of wet and dry basins will treat runoff from the side of the proposed site.



Stormwater Site Flow

Grading

As with all new development projects, site grading is necessary to build the streets, provide proper drainage and ponding, and to create building pads, among other things. City staff will review grading plans to ensure the plans meet city, state, and watershed district requirements for flood control, erosion control, and drainage. The preliminary grading plan was reviewed by the City's engineering staff, and their review comments are included in the February 18, 2026, plan review memo. Additional grading review will be required upon submittal of final grading and utility plans for the site.

Utilities

The engineering plan review memo dated February 18, 2026, contains comments from that will be required to be addressed by the Developer prior to approval of final plans.

Sanitary sewer at Talcott Glen will gravity flow to the southwest corner of the parcel where a temporary lift station will be installed. The lift station will connect via 4-inch DIP forcemain to an existing sanitary manhole at 95th Street and Mississippi Dunes Boulevard. The lift station will be designed to accommodate the homes in this development as well as potential future devleopment of parcels to the north. The existing sanitary infrastructure beyond 95th Street and Mississippi Dunes Boulevard have capacity to support flow from Talcott Glen and any future development to the north.

At such time as the land currently owned by Bailey Nursery, just south of the proposed development, is developed, the temporary lift station would be removed. Wastewater would then gravity flow south to the recently completed permanent lift station at Mississippi Landing.

Water will be brought to Talcott Glen via two mains: the extension of a 12-inch main down 95th Street and the extention of an 8-inch main from Strawberry Fields Park. Utiltiies will be stubbed along proposed road connections to the north and south of the proeprty for future developments.

Public Hearing Notices
Public hearing notices were mailed to 76 property owners who are within 500 feet of the proposed subdivision and extension of 95th Street S and published in the *St. Paul Pioneer Press* on February 11, 2026.

Recommendation

That the Planning Commission recommend that the City Council approve the following applications, subject to the conditions of approval.

A. Zoning Amendment to change the zoning of the subject property from AG-2, Agriculture, to R-4, Transitional Residential.

B. Preliminary Plat for a residential subdivision to be called Talcott Glen, which will consist of 177 Single-Family Lots.

Conditions of Approval:

General Development

1. The Developer and builders must comply with all city ordinances and policies except as may be modified by agreement of the Developer and City staff.

2. The Applicant must obtain appropriate building permits from the City, and permits or approvals from other regulatory agencies including, but not limited to: South Washington Watershed District, Minnesota Department of Health, Minnesota Department of Natural Resources, Northern Natural Gas, Met Council, Washington County, and Minnesota Pollution Control Agency.

3. The Developer shall enter into a development agreement with the City. The development agreement shall be executed by the Developer prior to City Council approval of the Final Plat.

4. The Developer shall incorporate into the final plat the recommendations, requirements, and evaluations noted in the Stantec memorandum dated February 18, 2026, subject to modifications that are agreed to by the Developer and City Engineer. All comments shall be adopted herein by reference.

Platting, Land Dedication, and Easements

5. The project shall be completed in accordance with the plans submitted and as amended by the conditions of approval and as approved by the City Engineer. Any significant

changes to the plans, as determined by Planning staff, shall require review and approval by the Planning Commission and City Council.

6. Outlots A, B, C, D, and E shall be deeded to the City at the time of recording of the final plat.

7. 6.95 acres of park dedication via accepted land dedication aligning with the future park plan or cash in lieu of is required as part of the proposed development.

8. A 20-foot-wide trail corridor for the stairs and paved trail from 95th Street to Strawberry Fields Park will be credited towards required park dedication as outlined in the development agreement. The final alignment of the trail connection will be determined prior to final plat.

9. A Forest Editing Plan (tree removal, trees to be saves, brush clearing, required establishment) is required to be reviewed and approved by the Parks and Recreation Director prior to issuance of a grading permit for Outlot A.

10. The gas easement shall be incorporated, were feasible, into future lots.

11. No retaining walls shall be permitted within public right-of-way or future city owned outlots.

Construction and Grading

12. A grading permit, application fee, and financial guarantee are required prior to beginning any site work.

13. An as-built grading survey that meets city standards is required after mass site grading.

14. Upon completing the installation of sanitary, water, and storm utilities, an as-built survey of these utilities must be submitted to the city. Electronic copies of site utilities must be submitted to the city.

15. A 5-foot sidewalk is required to be constructed on both sides of 95th Street South within the development.

16. The Developer shall submit an updated stormwater management and site plan that is consistent with City stormwater management code requirements prior to the approval of the final plat.

17. The Developer shall be responsible for constructing the pedestrian connection from 95th Street to Strawberry Fields Park.

18. The Developer is responsible for working with property owners and ensuring all personal property encroachments are removed from the 95th Street South Right-Of-Way between Mississippi Dunes Boulevard and the western property line of the Right-Of-Way.

19. The Developer is responsible for designing and constructing the extension of 95th Street from Mississippi Dunes Boulevard to the eastern property line of the subject development

parcel. The trails along the north and south sides of 95th Street must be connected with a viable safe trail crossing to preserve functionality of the trail.

20. The Developer is responsible for obtaining the approximate 3,800 square foot area from the Bailey Nursery for the required 95th Street right-of-way. This area must be deeded to the City as right-of-way.

Lot Performance Standards

21. The architectural standards of the homes shall be consistent with the following:

    a. Architectural design is required on all four sides of the principal structure.
    b. Architectural materials must be varying on the front façade of the principal structure (shakes, board and batten, accent siding, shutters, window boxes, etc.).

22. Once a house plan is approved for a given lot, no identical house plan may be constructed on the five lots surrounding it, i.e., the lots adjacent on either side, the lot most directly across the street, and the lots adjacent to the lot most directly across the street.

Utilities

23. The Developer is responsible for providing the necessary easements and for building the road and utility improvements serving the site. All drainage and utility easements, as recommended by the City Engineer, must be shown on the Final Plat and dedicated to the City for public purposes.

24. The Developer is responsible for obtaining drainage and utility easements from the Property Owners of the property to south and North for the extension of utilities.

25. The Developer is responsible for designing and constructing the sanitary lift station and the forcemain that will serve Talcott Glen as approved by the City Engineer.

Streets

26. Future road extension signs shall be provided at the future road access points.

27. The secondary emergency access shall be designed and constructed from 95th Street to 85th Street by the Developer to specifications approved by the City's Fire Chief. The Developer shall install a gate for access by only emergency services. The Developer shall work with the property owners for construction easement access.

28. 95th Street shall be designed as a 36-foot roadway within a 66-foot right-of-way.

29. The Developer is responsible for removing the access crossing the BNSF owned Railroad. This crossing shall not be used as a construction access.

Landscaping and Irrigation

30. Irrigation systems installed within City right-of-way are solely the responsibility and risk of the Developers, or individual. The City is not responsible or liable for any damage or costs related to installation, damage, or replacement of lawn irrigation systems placed in the boulevard as a result of City use of or future changes in the right of way.

31. The Developer is responsible for establishing the final grades, topsoil, and sodding from front lot line to rear lot line of all the lots, outlots, and boulevards within the subdivision.

32. Street trees shall be planted where practical along future city owned outlots without impact to pond access routes as approved by the City Engineer.

33. Boulevard trees shall be planted along 95th Street as determined by the City Forester from Mississippi Dunes Boulevard to the eastern edge of the property.

34. Two yard trees and ten shrubs shall be installed within each lot less than 60 feet wide. One yard tree shall be located in the front yard. The front yard tree may be an understory tree.

35. Three yard trees (no less than two different species), and ten shrubs shall be installed within each lot greater than 60 feet wide. One yard tree shall be located in the front yard. The front yard tree shall be an overstory tree.

36. Prior to releasing the Final Plat for recording, a final landscaping plan shall be approved by planning staff in writing.

37. Required tree mitigation shall be met by providing required landscaping and/or a combination of plantings and cash in lieu of planting to be calculated prior to the approval of the Final Plat.

Onsite Infrastructure Improvements

38. A street lighting plan must be submitted by the Developer and approved by the City Engineer.

39. The Developer must place iron monuments at all lot and block corners and at all other angle points on property lines. Iron monuments must be placed after all site and right-of-way grading has been completed in order to preserve the lot markers for future property owners.

40. The Developer shall contact the electric, telephone, gas, and cable companies that are authorized to provide service to the property to ascertain whether any of those utility providers intend to install underground lines within the development.

41. The existing Gas Pipeline Easement shall be located and marked accordingly by the Developer to prevent encroachment onto easement. The Developer shall secure agreements with the pipeline companies to allow final approved roads and utilities to cross the existing pipeline easement. It is the responsibility of the Developer to notify property owners of the requirements of the responsibilities for applicable lots.

42. The Developer is responsible for all street maintenance; upkeep and repair of curbs, boulevards, and sod; and street sweeping until the project is complete. All streets must be maintained free of debris and soil until the subdivision is completed. The Developer hereby agrees to indemnify and hold the City harmless from any and all claims for damages of any

nature whatsoever arising out of Developer's acts or omissions in performing the obligations imposed upon Developer by this paragraph.

43. The Developer will provide to the City copies of test results, suppliers, subcontractors, etc., relating to the work to be performed by the Developer. The Developer agrees to furnish to the City a list of contractors being considered for retention by the Developer for the performance of the work described in the development agreement.

44. The Developer is responsible for the control of grass and weeds in excess of eight inches on vacant lots or boulevards within their development. Failure to control grass and weeds will be considered a Developer's default, and the City may, at its option, perform the work and the Developer shall promptly reimburse the City for any expense incurred by the City.

45. The Developer will be required to conduct all major activities to construct the public improvements during the following hours of operation:

Monday through Friday	7:00 A.M. to 7:00 P.M.
Saturday	9:00 A.M. to 7:00 P.M. (with prior approval from the City Engineer)
Sunday/City Holidays	Not Allowed

This does not apply to activities that are required on a 24-hour basis such as dewatering or bi-pass pumping, etc. Any deviations from the above hours are subject to approval of the City Engineer.

46. All debris, including brush, vegetation, trees, and demolition materials, shall be properly disposed of off-site; burying construction debris, trees, and other vegetation is prohibited. Burning of trees and structures is prohibited, except for fire training only.

47. The Developer grants the City, its agents, employees, officers, and contractors permission to enter the site to perform all necessary work and/or inspections during grading and the installation of public improvements by the Developer.

48. The Developer is responsible for completing the final grade on all lots and ensuring all boulevards and yards have a minimum of four inches of organic topsoil or black dirt on them. Placement of organic topsoil or black dirt, sod, and shrubs must not be transferred to homeowners.

49. Notwithstanding any other provision of this resolution to the contrary, the City will issue building permits for model homes as noted in the Developer's agreement to be approved with the final plat. An unobstructed gravel surface road extension from a paved street surface to the proposed model home's driveway is required.

50. The Developer is responsible to require each builder to provide an on-site dumpster to contain all construction debris, thereby preventing it from being blown off-site. It is the responsibility of the Developer to ensure no debris blows on or off site.

51. Adequate portable toilets must be on-site at all times during construction of utilities, roadways, and houses. At no time shall any house under construction be more than 250 feet away from any portable toilet. Toilets must be regularly emptied.

52. At all times during construction, the approved SWPPP must be followed. The City may impose additional erosion control requirements if it is determined that the methods implemented are insufficient to properly control erosion.

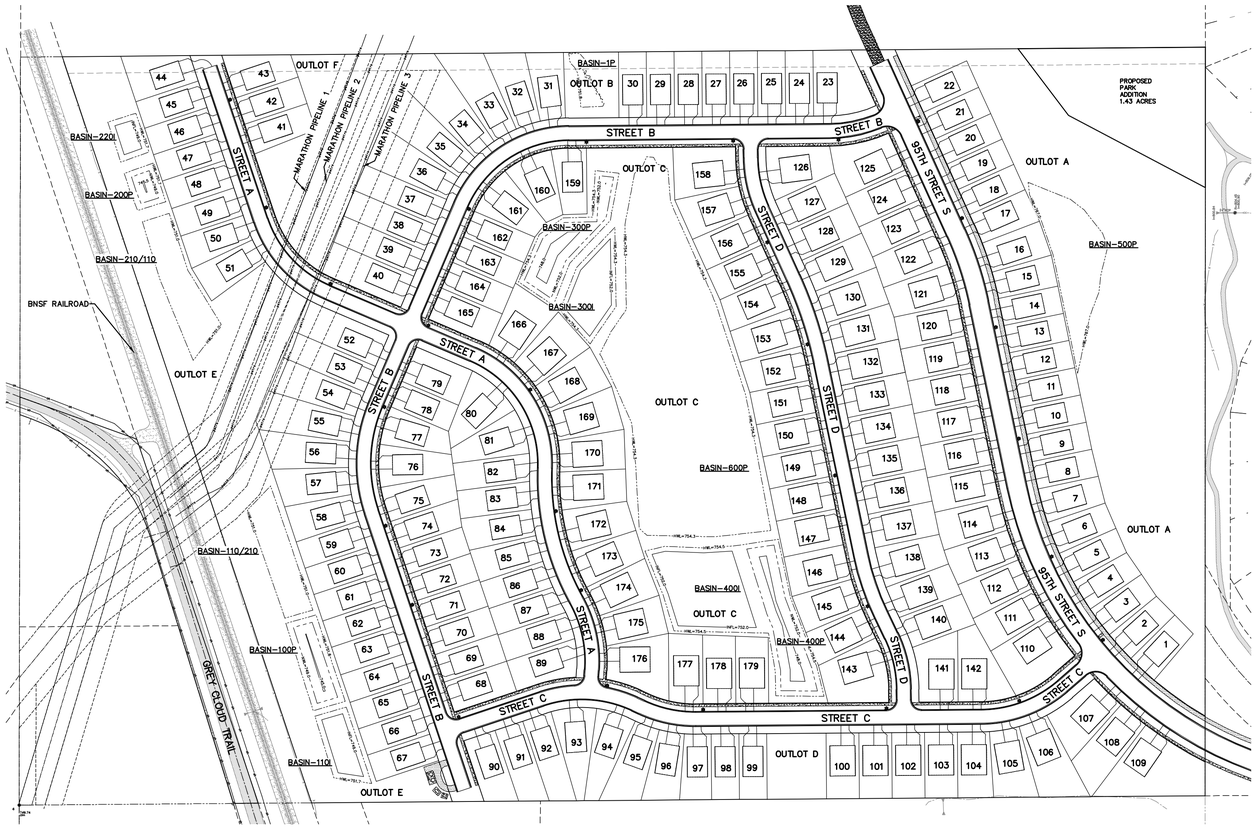
53. The Developer is responsible for erosion control inspection fees at the current rates. If the Developer does not reimburse the City for the costs the City incurred for such work within thirty (30) days, the City may draw down the letter of credit to pay such costs.

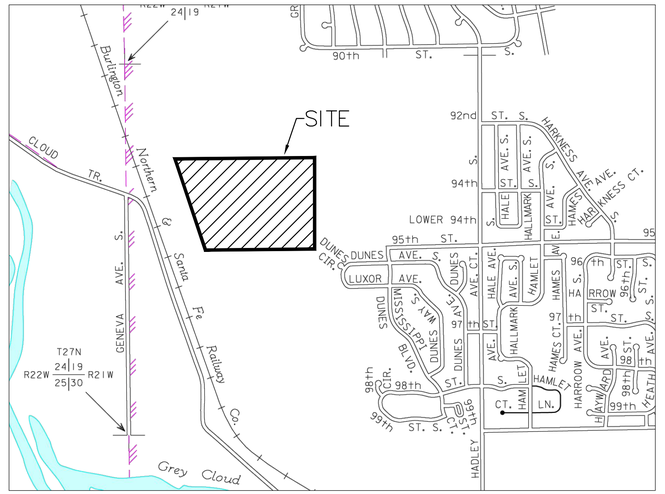
54. Temporary parking during construction shall be permitted on only one side of the street and shall not be permitted on Grey Cloud Trail or 95th Street west of Mississippi Dunes Boulevard.

Prepared by:
Max Erickson
Planner

Attachments
A. Preliminary Civil Plan Set Dated: 1/16/26
B. Preliminary Plat Dated 2/19/26
C. Stormwater Plans
D. Engineering Review Memorandum Dated 2/18/26
E. Comments from Neighbor Emailed 2/10/26

TALCOTT GLEN
PRELIMINARY DEVELOPMENT PLANS
COTTAGE GROVE, MINNESOTA





LOCATION MAP

WARNING
HIGH-PRESSURE PIPELINE(S)
Excavation and/or Construction Prohibited
Without compliance with **STATE ONE-CALL**, AND
Without Written Permission From
MARATHON PIPELINE INC. L.L.C.
CALL BRIAN PHILIPS 419-379-8506
PRIOR TO ANY WORK IN MARATHON EASEMENT

SHEET INDEX

1.00	COVER SHEET
1.01	LEGEND
2.01	EXISTING CONDITIONS
3.01	PRELIMINARY PLAT
4.01-4.02	PRELIMINARY REMOVALS PLAN
5.00	PRELIMINARY OVERALL SITE PLAN
5.01-5.05	PRELIMINARY SITE PLAN
5.11	95TH STREET TURN LANES
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S3	MPCA MAP
S4	EXISTING HYDROLOGY MAP
S5	PROPOSED HYDROLOGY MAP
L1	LANDSCAPE PLAN
T1-T8	TREE PRESERVATION PLAN
T1	95TH STREET TREE PRESERVATION PLAN

Know what's **below.**
Call before you dig.

N

0 75 150 200
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-COVR

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(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan 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
Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

COVER

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

1.00 OF 47

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LEGEND

UTILITY LINES

EXISTING	PROPOSED	FUTURE	DESCRIPTION
			SANITARY MANHOLE
			SANITARY SEWER (SANITARY & WATERMAIN PLANS)
			SANITARY SEWER (STORM SEWER PLANS)
FM	FM	FM	FORCE MAIN
			HYDRANT
			GATE VALVE
			REDUCER
			CURB STOP
			WATERMAIN (SANITARY & WATERMAIN PLANS)
			WATERMAIN (STORM SEWER PLANS)
			CATCH BASIN
			BEEHIVE
			STORM MANHOLE
			FLARED END SECTION
			CONTROL STRUCTURE
			STORM SEWER (SANITARY & WATERMAIN PLANS)
			STORM SEWER (STORM SEWER PLANS)
			CULVERT
PERF	PERF	PERF	PERFORATED DRAINTILE
DT	DT	DT	SOLID DRAINTILE SERVICE
			CASING
e	e	e	UNDERGROUND ELECTRIC LINE
fo	fo	fo	UNDERGROUND FIBER OPTIC LINE
g	g	g	UNDERGROUND GAS PIPELINE
petro	petro	petro	UNDERGROUND PETROLEUM PIPELINE
t	t	t	UNDERGROUND TELEPHONE LINES
tv	tv	tv	UNDERGROUND TELEVISION LINE
oh	oh	oh	OVERHEAD UTILITY LINES

SITE LINES

EXISTING	PROPOSED	FUTURE	DESCRIPTION
			SURMOUNTABLE CURB & GUTTER
			B-STYLE CURB & GUTTER
			RIBBON CURB & GUTTER
			EDGE OF BITUMINOUS
			YELLOW PAVEMENT STRIPING (SINGLE/DOUBLE)
			WHITE PAVEMENT STRIPING (SINGLE/DOUBLE)
			PHASE LINE
			CENTERLINE
902	902	902	2' CONTOUR LINE
900	900	900	10' CONTOUR LINE
	OUTLET=987.0	OUTLET=987.0	BASIN OUTLET LINE
	HWL=900.2	HWL=900.2	BASIN HIGH WATER LINE
	84.3		PROPOSED SPOT ELEVATION
			EMERGENCY OVERFLOW
			DRAINAGE FLOW ARROW
			DELINEATED / PROPOSED WETLAND LINE
BUFFER	BUFFER	BUFFER	WETLAND BUFFER
			TREE LINE
FEMA	FEMA	FEMA	FEMA FLOODPLAIN BOUNDARY
			RETAINING WALL
X	X	X	FENCE (BARBED WIRE)
#	#	#	FENCE (CHAIN LINK)
[]	[]	[]	FENCE (WOOD)
	C		CONSERVATION AREA SIGN
	W		WETLAND BUFFER SIGN
			TYPE III BARRICADE
			LIGHT POLE
			STREET SIGNS
			PEDESTRIAN RAMP

SURVEY LINES

EXISTING	PROPOSED	FUTURE	DESCRIPTION
			BOUNDARY
			RIGHT OF WAY
			LOT LINE
			EASEMENT
			SET BACK LINE
			SECTION LINE
			RESTRICTED ACCESS

HATCH PATTERNS

- GRAVEL SURFACE
- BITUMINOUS SURFACE
- CONCRETE SURFACE

TOPOGRAPHIC SYMBOLS

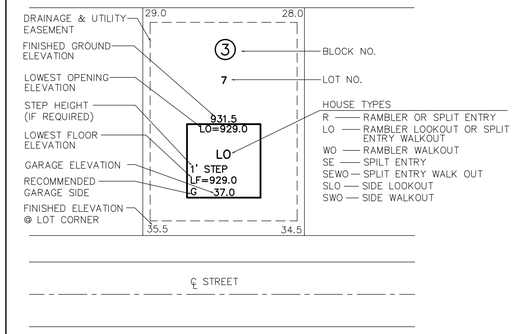
- CATCH BASIN
- CATCH BASIN BEEHIVE
- FLARED END SECTION
- GATE VALVE
- HYDRANT
- WATER SERVICE
- WATER WELL
- MONITORING WELL
- CLEANOUT
- HAND HOLE
- MANHOLE OTHER THAN SANITARY OR STORM
- SANITARY OR STORM MANHOLE
- LAWN SPRINKLER VALVE
- LAWN SPRINKLER HEAD
- UTILITY POLE
- TRANSFORMER BOX
- FIBER OPTIC BOX
- ELECTRIC BOX
- NATURAL GAS METER
- LIGHT POLE
- SEMAPHORE
- TELEPHONE BOX
- CABLE BOX
- CAST IRON MONUMENT
- FOUND IRON PIPE
- JUDICIAL LAND MARK
- PK NAIL
- CONTROL POINT
- SPIKE
- FLAG POLE
- TEST HOLE
- MAILBOX
- SIGN
- BOLLARD
- CONSERVATION POST
- DECIDUOUS TREE
- CONIFEROUS TREE
- SHRUB / BUSH

ABBREVIATIONS

A	ALGEBRAIC DIFFERENCE
B-B	BACK TO BACK
BV	BUTTERFLY VALVE
BOC	BACK OF CURB
BFE	BASE FLOOD ELEVATION
BMP	BEST MANAGEMENT PRACTICE
℄	CENTER LINE
CB	CATCHBASIN
CBMH	CATCHBASIN MANHOLE
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
CS	CURB STOP
DIP	DUCTILE IRON PIPE
DT	DRAINTILE
EL/ELEV	ELEVATION
EX	EXISTING
FES	FLARED END SECTION
F-F	FACE TO FACE
FM	FORCEMAIN
GB	GRADE BREAK
GND	GROUND
GV	GATE VALVE
HP	HIGH POINT
HYD	HYDRANT
HWL	HIGH WATER LEVEL
INV	INVERT
K	CURVE COEFFICIENT
L	LENGTH
LF	LOWEST FLOOR
LO	LOOKOUT
LO	LOWEST OPENING
LP	LIQUID PETROLEUM
LP	LOW POINT
MH	MANHOLE
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PI	POINT OF INTERSECTION
P℄	PROPERTY LINE
PRC	POINT OF REVERSE CURVATURE
PVT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVC	POLYVINYL CHLORIDE PIPE
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS
R	RAMBLER
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT OF WAY
SSWR	SANITARY SEWER
STA	STATION
STRM	STORM SEWER
SWPPP	STORM WATER POLLUTION PROTECTION PLAN
TNH	TOP NUT HYDRANT
TYP	TYPICAL
WM	WATER MAIN
WO	WALKOUT

LOT INFORMATION

(TYPICAL SECTION NOT TO SCALE)



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I hereby certify that this plan 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

Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

00-ENG-123105-SHEET-LGND

LEGEND

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

1.01 OF 47

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EXCEPTION

N89°30'59"E 2262.51

NORTH LINE OF THE S 78 ACRES

S89°30'59"W MEAS.
S89°01'44"W DEED

669.39 MEAS.
699.18 DEED

693.00 DEED
747.21 MEAS.

CL FIELD

CULTIVATED

WOODED

FIRE PIT

CL DIRT TRAIL

SUMMERS ADDITION

SUMMERS 5TH ADDITION

1481.84

N00°01'06"E

EXCEPTION

N18°28'24"W

S00°06'27"W
355.07

N70°06'38"W
245.99 MEAS.
N70°15'W DEED

23.58

106.39
R=467.00'
Δ=13°03'09"

Δ=39°36'50"
R=342.00'
237.42'

N18°28'24"W
1556.90

N17°16'59"W
591.00

759.64

553.86

PIPELINE EASEMENT PER DOC. NO. 2656569

PIPELINE EASEMENT PER DOC. NO. 835534

PIPELINE EASEMENT PER DOC. NO. 3566078

TOP OF PIPE EL=+/-901.6

TOP OF PIPE EL=+/-901.8

TOP OF PIPE EL=+/-902.0

TOP OF PIPE EL=+/-902.2

TOP OF PIPE EL=+/-902.4

TOP OF PIPE EL=+/-902.6

TOP OF PIPE EL=+/-902.8

TOP OF PIPE EL=+/-903.0

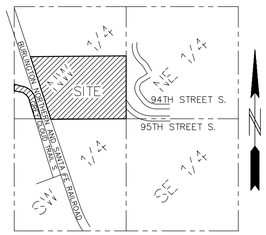
TOP OF PIPE EL=+/-903.2

TOP OF PIPE EL=+/-903.4

TOP OF PIPE

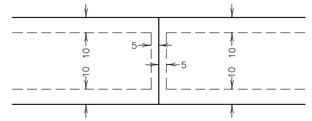


VICINITY MAP
NO SCALE



SECTION 19, TWP. 27, RGE. 21
WASHINGTON, MINNESOTA
LOCATION MAP
NO SCALE

DRAINAGE AND UTILITY EASEMENTS ARE SHOWN THUS:



being 5 feet in width, and adjoining lot lines unless otherwise indicated, and 10 feet in width and adjoining street lines and rear lot lines unless otherwise indicated on the plat.

TOTAL GROSS AREA	69.50	ACRES
TOTAL LOT AREA	35.6373	ACRES
NUMBER OF LOTS	179	
NUMBER OF OUTLOTS	6	
TOTAL OUTLOT AREA	21.6507	ACRES
TOTAL PROPSED RIGHT OF WAY AREA–LOCAL STREETS	11.2508	ACRES
TOTAL EXISTING RIGHT OF WAY AREA GREY CLOUD TRAIL SOUTH	0.9612	ACRES

Property Description per Commitment for title insurance Commitment No. NCS–1210403–MPLS, issuing Office File No. NCS–1210403–MPLS, Commitment Date: February 26th, 2024. AT 7:30 A.M. issued by First American Title Insurance Company National Commercial Service.

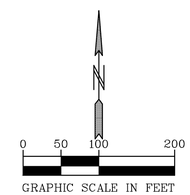
The Northwest Quarter of Section 19 in Township 27 North of Range 21 West, Washington County, Minnesota, excepting thereform the north 70 rods thereof, and also excepting therefrom the railroad right of way, as now liad out and traveled across said tract, according to the United States Government Survey.

Minus the following legal descripion:

Tract A: That part of the Northwest Quarter of Section 19 in Township 27 North of Range 21 West, lying southerly and westerly of a line 33 feet southerly and westerly of the center line of Grey Cloud Trail as now established, except the South 352.64 feet, according to the United States Government Survey thereof and situated in Washington County, Minnesota.

Tract B: The South 352.64 feet of the Northwest Quarter of Section 19 in Township 27 North of Range 21 West, lying 33 feet westerly of the center line of Grey Cloud Trail as now established, according to the United States Government Survey thereof and situated in Washington County, Minnesota.

ALSO LESS AND EXCEPT All That part of the Northwest Quarter of Section 19 in Township 27 North of Range 21 West, lying west of the Chicago, Burlington & Quincy Railroad right of way and north of the center line of the existing public highway, described as follows: Commence at the northwest corner of Section 19, Township 27 North, Range 21 West; thence south along the west line of said Section 19 a distance of 1218.5 feet to the intersection with the west line of the Chicago, Burlington & Quincy Railroad right of way and the point of beginning of the description of the tract of land to be hereby described; thence South 18 degrees 52 minutes East, along said right of way line a distance of 733.7 feet to the center line of the present county highway extended; thence North 70 degrees 15 mintes West, along said center line extended and the center line of said county highway to the intersection thereof with the west line of said Section 19; thenc north on the west line of said Section 19 to the point of beginning.



GRAPHIC SCALE IN FEET

00-SURV-123105-BASE.DWG

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

Name Peter J. Hawkinson
Reg. No. 42299 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY PLAT

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

3.01 OF 47

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CLEAR & GRUB 19.9 AC VEGETATION/TREES

MARATHON PIPELINE 1

MARATHON PIPELINE 2

MARATHON PIPELINE 3

BNSF RAILROAD

REMOVE FOUNDATION REMNANT

REMOVE GRAVEL PATH

REMOVE EXISTING COLLAPSED BARN

REMOVE EXISTING DEBRIS

REMOVE EXISTING TANK AND PUMP HOUSE

REMOVE EXISTING BLOCK FOUNDATION

PROTECT EXISTING FAUNA DURING CONSTRUCTION

CLEAR & GRUB 19.9 AC VEGETATION/TREES

PROTECT EXISTING FAUNA DURING CONSTRUCTION

EXTENT OF CLEARING

GRANADA AVENUE S

REMOVE EXISTING FES

REMOVE & REPLACE EX. TRAIL FOR WATERMAIN CROSSING

PROTECT EXISTING FAUNA DURING CONSTRUCTION

EXTENT OF CLEARING

94TH STREET S

GREY CLOUD TRAIL

PIPELINE EASEMENT PER DOC. NO. 265660

CLEAR & GRUB 19.9 AC VEGETATION/TREES

EXTENT OF CLEARING

SEE SHEET 4.02

REMOVE EXIST FES (2) & PIF

DEMO 261 SY EX. BITUMINOUS TRAIL

WARNING
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Excavation and/or Construction Prohibited
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Without Written Permission From
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CALL BRIAN PHILIPS 419-379-8506
PRIOR TO ANY WORK IN MARATHON EASEMENT

0 50 100 200
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF MISSISSIPPI DUNES BOULEVARD AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-DEMO

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Name: Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

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Drawn	SHA

PRELIMINARY REMOVALS PLAN

LENNAR
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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

4.01 OF 47

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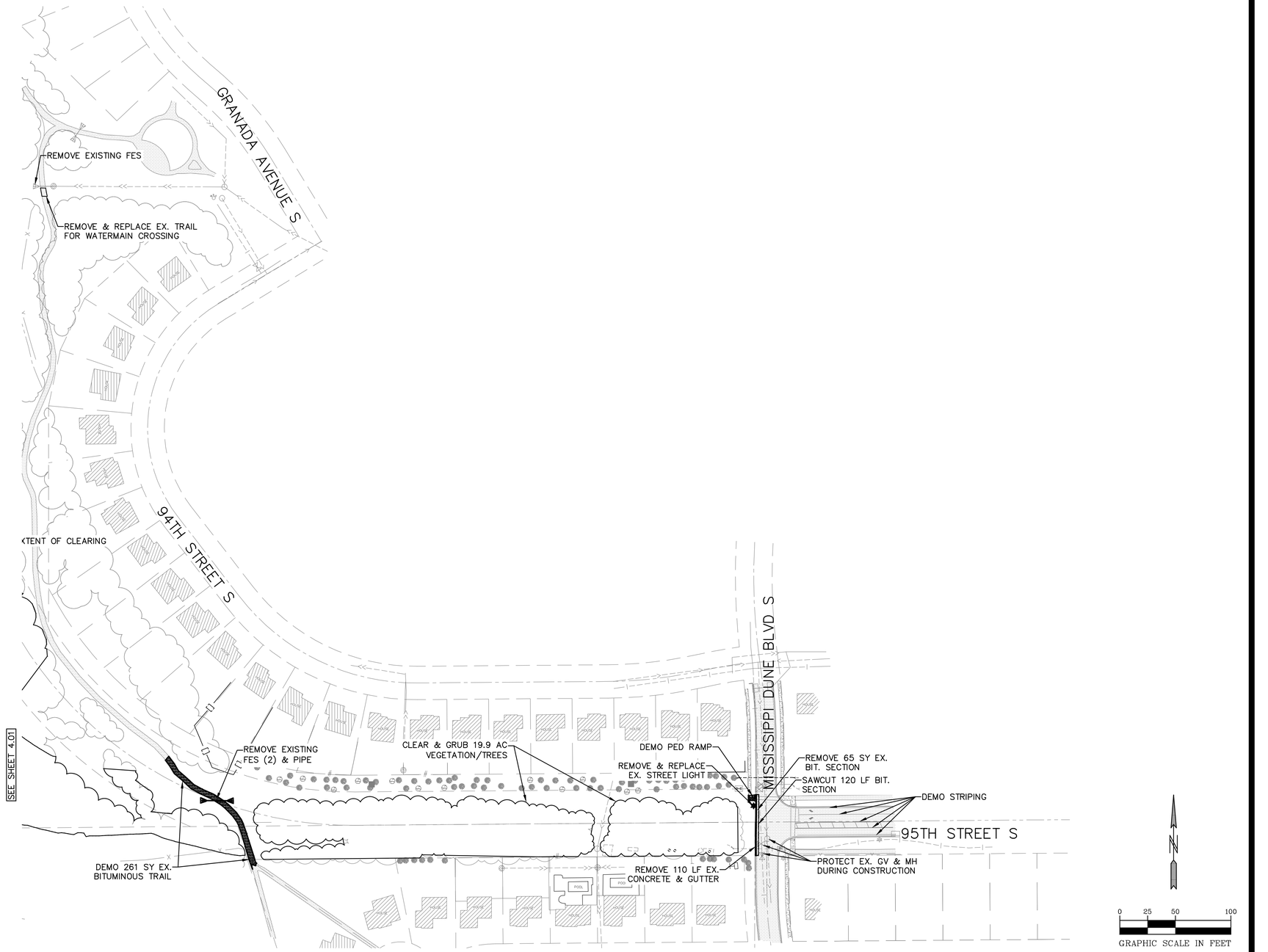

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-DEMO

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Drawn	SHA

PRELIMINARY REMOVALS PLAN

LENNAR
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TALCOTT GLEN
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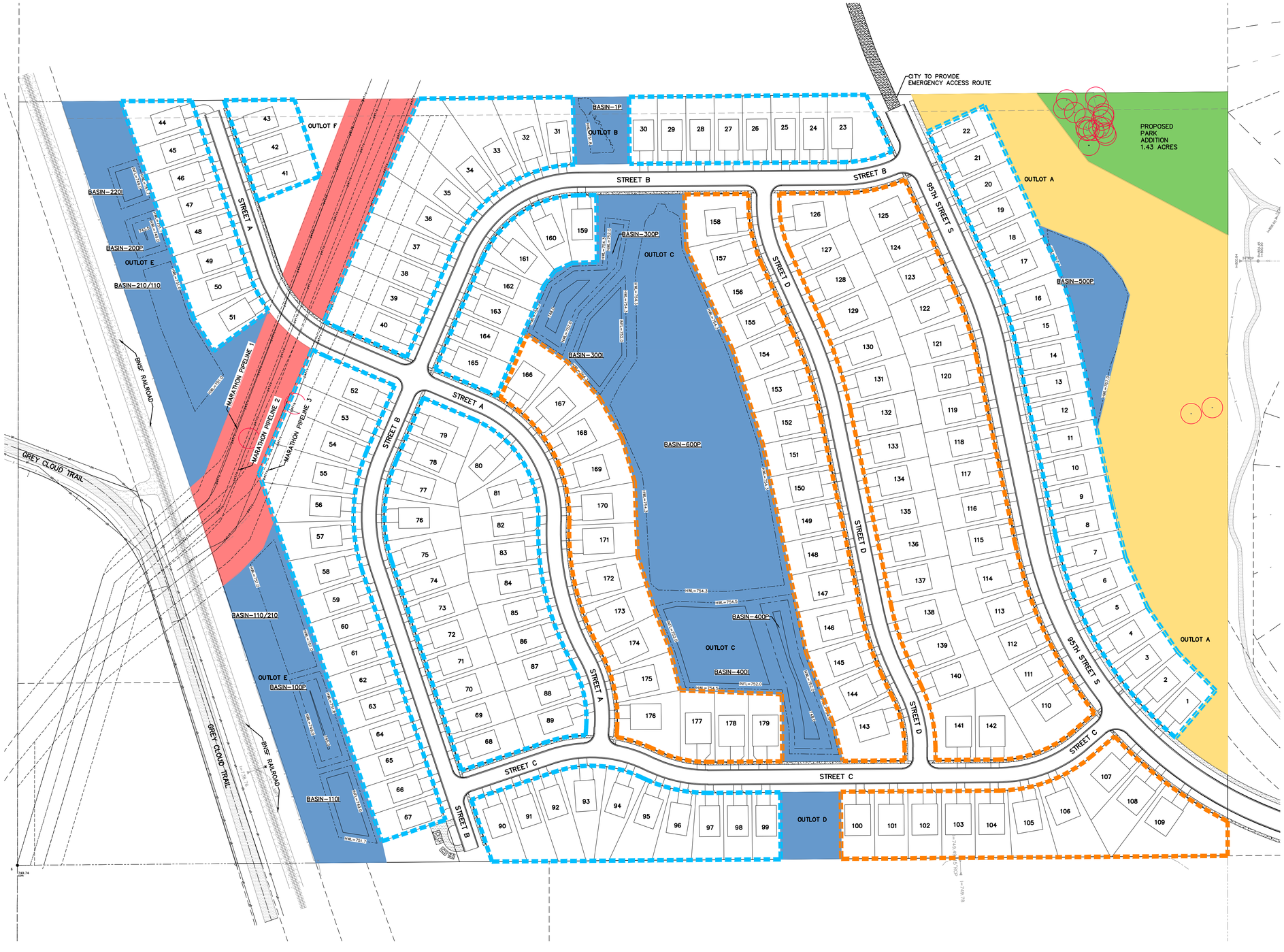

SITE DATA:

2040 LAND USE
LOW DENISTY (246 UNITS/ACRE)

EXISTING ZONING: AG1 (AGRICULTURE)
PROPOSED ZONING: R-4

73 – 65' LOTS
106 – 55' LOTS

179 TOTAL HOMESITES

DENSITY CALCULATION

TOTAL GROSS AREA	69.50 ACRES
PARK AREA:	1.43 ACRES
OPEN/SLOPES:	5.57 ACRES
GREY CLOUD TRAIL:	0.96 ACRES
PIPELINE:	2.34 ACRES
STORM WATER:	11.72 ACRES
NET DEVELOPABLE AREA	47.48 ACRES
NET DENSITY = 179/47.48 :	3.77 UNITS/ACRE

R-4 STANDARDS:
WIDTH: 45'
DEPTH: 120'
FRONT SETBACK: 25'
REAR YARD SETBACK: 30'
SIDE SETBACK: 7.5' INTERIOR, 5' GARAGE
IMPERVIOUS MAX: 50%

65' LOTS
PROPOSED LOTS: 73

50' LOTS
PROPOSED LOTS: 106

PROTECT FAUNA DURING CONSTRUCTION

WARNING
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Excavation and/or Construction Prohibited
Without compliance with **STATE ONE-CALL**, AND
Without Written Permission From
MARATHON PIPELINE INC. L.L.C.
CALL BRIAN PHILIPS 419-379-8506
PRIOR TO ANY WORK IN MARATHON EASEMENT

0 50 100 200
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-SITE-OVR

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2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan 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
Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date 01-16-26
Designed NAP
Drawn SHA

PRELIMINARY OVERALL SITE PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

5.00 OF 47

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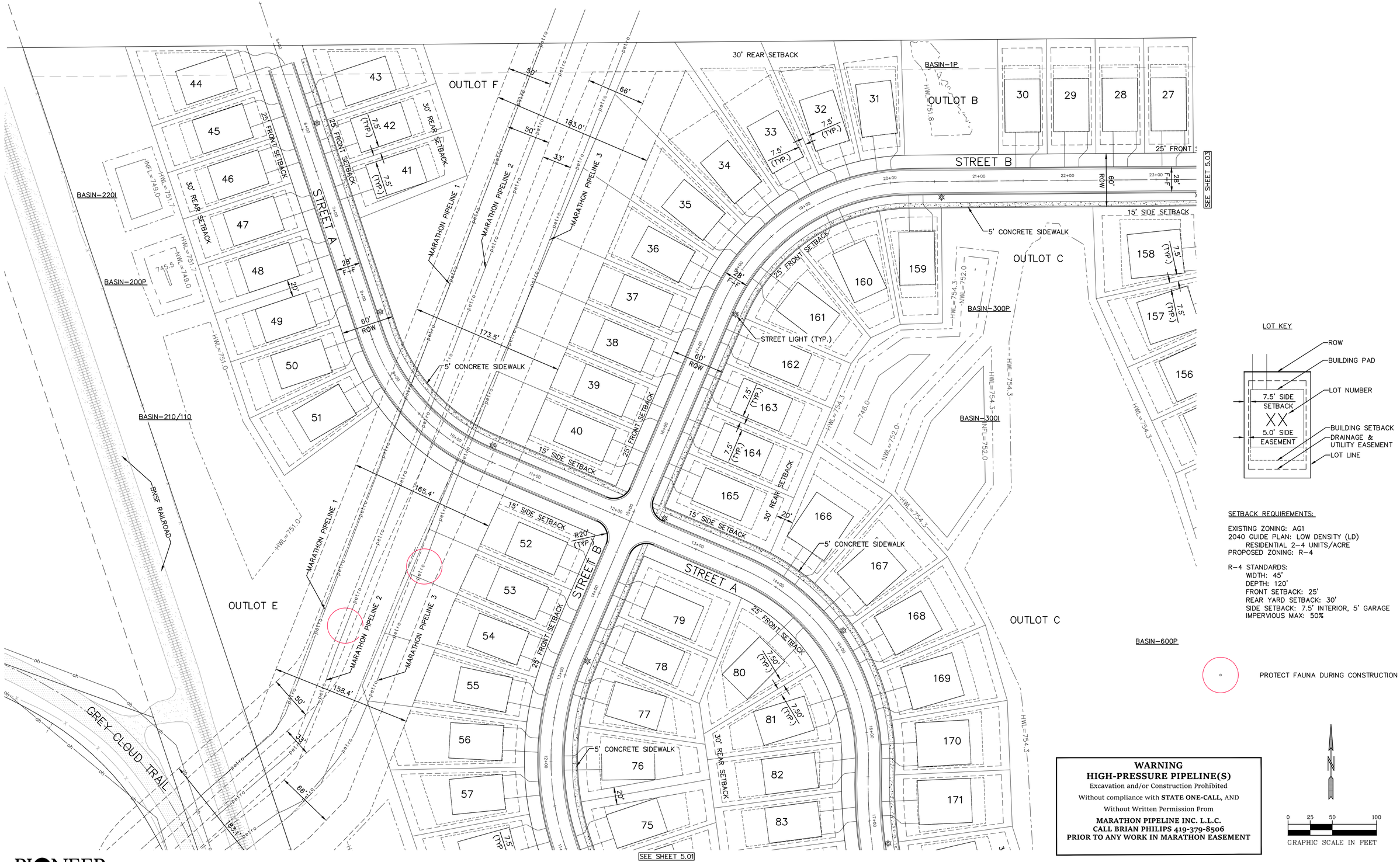

LOT KEY

SETBACK REQUIREMENTS:

EXISTING ZONING: AG1
2040 GUIDE PLAN: LOW DENSITY (LD)
RESIDENTIAL 2-4 UNITS/ACRE
PROPOSED ZONING: R-4

R-4 STANDARDS:
WIDTH: 45'
DEPTH: 120'
FRONT SETBACK: 25'
REAR YARD SETBACK: 30'
SIDE SETBACK: 7.5' INTERIOR, 5' GARAGE
IMPERVIOUS MAX: 50%

WARNING
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0 25 50 100
GRAPHIC SCALE IN FEET

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PRELIMINARY SITE PLAN

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

5.01 OF 47

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SEE SHEET 5.01

SEE SHEET 5.03

SEE SHEET 5.04

SETBACK REQUIREMENTS:

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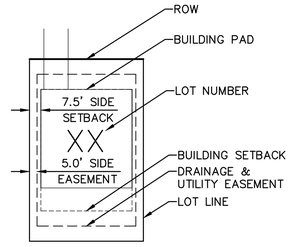
PROTECT FAUNA DURING CONSTRUCTION

LOT KEY



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GRAPHIC SCALE IN FEET
0 25 50 100

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PRELIMINARY SITE PLAN

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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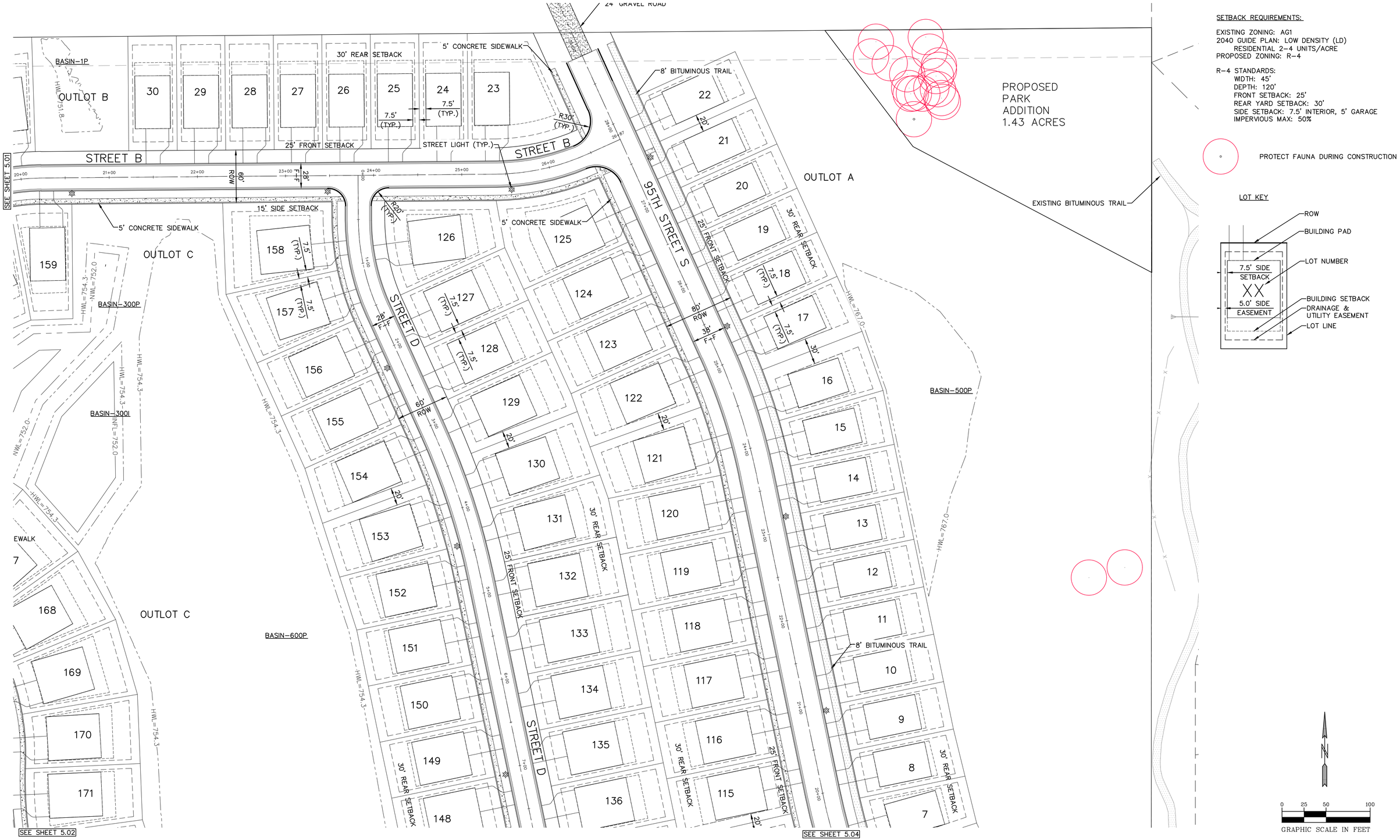

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PRELIMINARY SITE PLAN

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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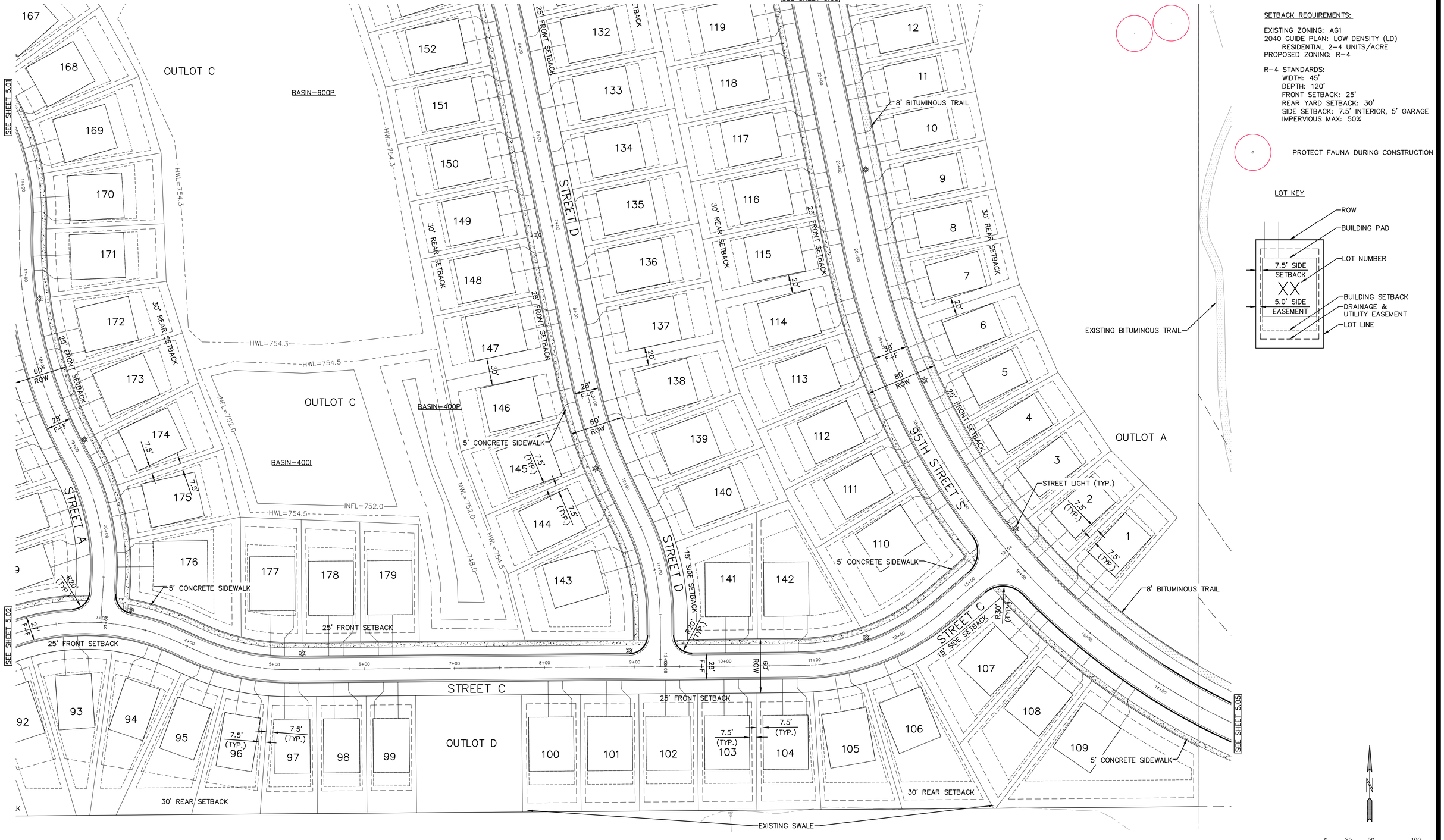

SETBACK REQUIREMENTS:

EXISTING ZONING: AG1
2040 GUIDE PLAN: LOW DENSITY (LD)
RESIDENTIAL 2-4 UNITS/ACRE
PROPOSED ZONING: R-4

R-4 STANDARDS:
WIDTH: 45'
DEPTH: 120'
FRONT SETBACK: 25'
REAR YARD SETBACK: 30'
SIDE SETBACK: 7.5' INTERIOR, 5' GARAGE
IMPERVIOUS MAX: 50%

PROTECT FAUNA DURING CONSTRUCTION

LOT KEY

N

0 25 50 100
GRAPHIC SCALE IN FEET

00-ENG-123105-SHEET-SITE

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Drawn	SHA

PRELIMINARY SITE PLAN

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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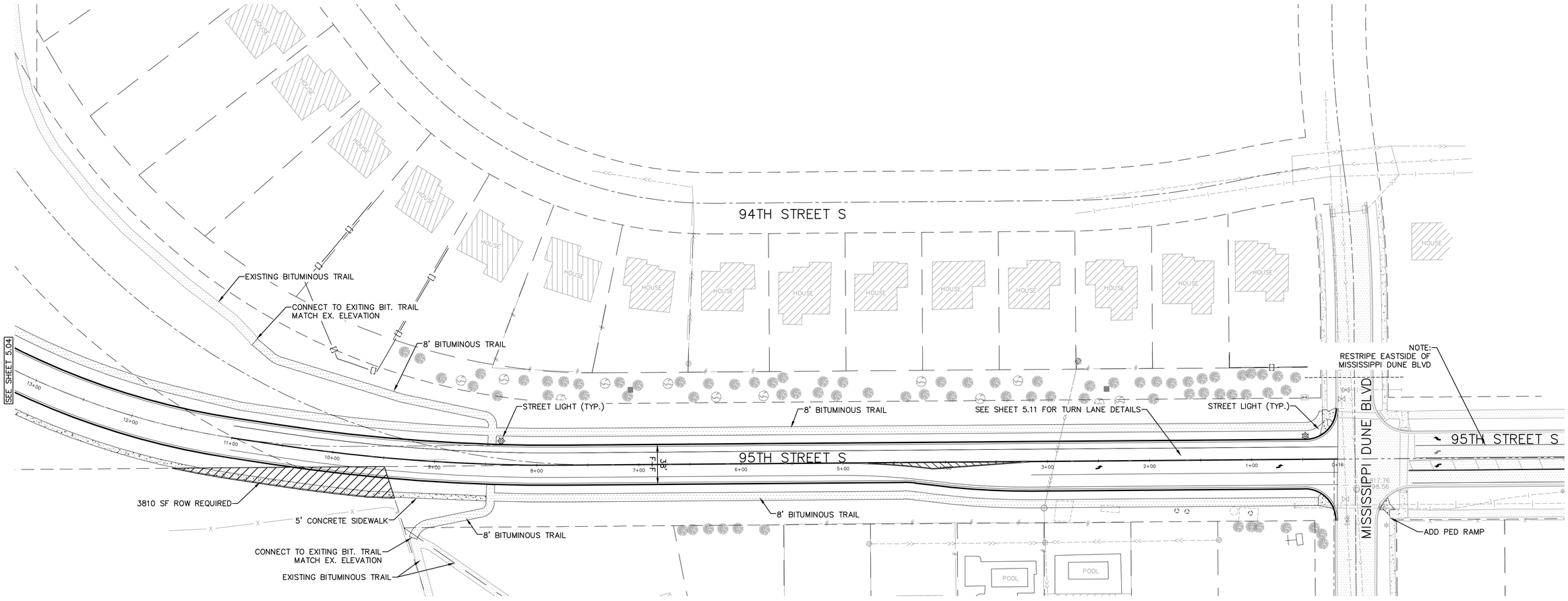
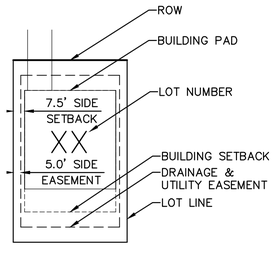


PROTECT FAUNA DURING CONSTRUCTION

LOT KEY



SETBACK REQUIREMENTS:

EXISTING ZONING: AG1
2040 GUIDE PLAN: LOW DENSITY (LD)
RESIDENTIAL 2-4 UNITS/ACRE
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R-4 STANDARDS:
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SIDE SETBACK: 7.5' INTERIOR, 5' GARAGE
IMPERVIOUS MAX: 50%

N

0 25 50 100
GRAPHIC SCALE IN FEET

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PRELIMINARY SITE PLAN

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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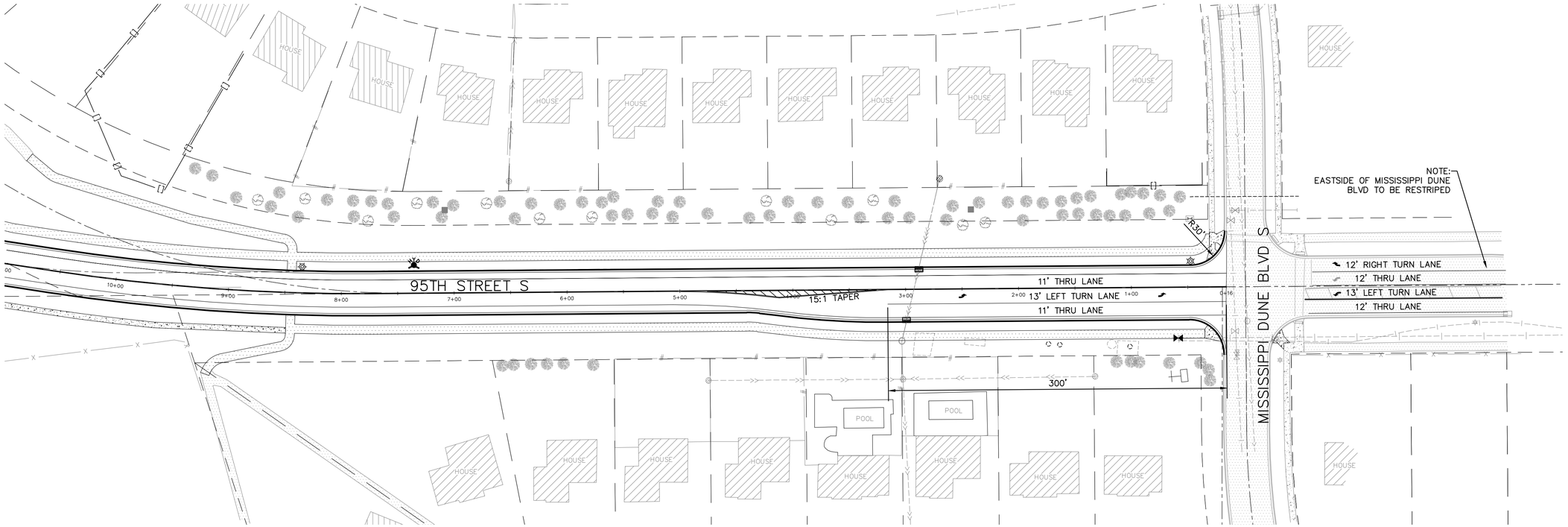

N

0 25 50 100

GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-TURN-LANE

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95TH STREET TURN LANES

LENNAR
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ST-1 — ST-1 TO ST-7: DENOTES STANDARD PENETRATION TEST BORING

TP-15 — TP-15 TO TP-22: DENOTES 2023 BRAUN INTERTECT TEST PIT

1 — 1 TO 13: DENOTES 2022 HAUGO GEOTECHNICAL TEST PIT

197 — 197 TO 218: DENOTES 2005 CONSULTANTS SOIL BORING

NOTE: ALL LOCATIONS ARE APPROXIMATE

SETBACK REQUIREMENTS:

EXISTING ZONING: AG1
2040 GUIDE PLAN: LOW DENSITY (LD)
RESIDENTIAL 2-4 UNITS/ACRE
PROPOSED ZONING: R-4

R-4 STANDARDS:
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DEPTH: 120'
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REAR YARD SETBACK: 30'
SIDE SETBACK: 7.5' INTERIOR, 5' GARAGE
IMPERVIOUS MAX: 50%

BUILDING REQUIREMENTS

POND ADJACENT LOTS:	
LOW ADJACENT GROUND	3'+HWL
	2'+EOF
LOCAL LOWPOINTS:	
LOW ADJACENT GROUND	1'+EOF

BASIN ACCESS 7% SLOPE MAX.

FLEXAMAT OVERFLOW

0 25 50 100
GRAPHIC SCALE IN FEET

00-ENG-123105-SHEET-GRAD

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PRELIMINARY GRADING PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

6.01 OF 47

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SEE SHEET 6.01

SEE SHEET 6.03

SEE SHEET 6.04

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FLEXAMAT OVERFLOW

0 25 50 100
GRAPHIC SCALE IN FEET

00-ENG-123105-SHEET-GRAD

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PRELIMINARY GRADING PLAN

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

6.02 OF 47

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ST-1 ST-1 TO ST-7: DENOTES STANDARD PENETRATION TEST BORING

TP-15 TP-15 TO TP-22: DENOTES 2023 BRAUN INTERTECT TEST PIT

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FLEXAMAT OVERFLOW

GRAPHIC SCALE IN FEET
0 25 50 100

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PRELIMINARY GRADING PLAN

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

6.03 OF 47

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BASIN ACCESS 7% SLOPE MAX.

FLEXAMAT OVERFLOW

N

0 25 50 100
GRAPHIC SCALE IN FEET

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PRELIMINARY GRADING PLAN

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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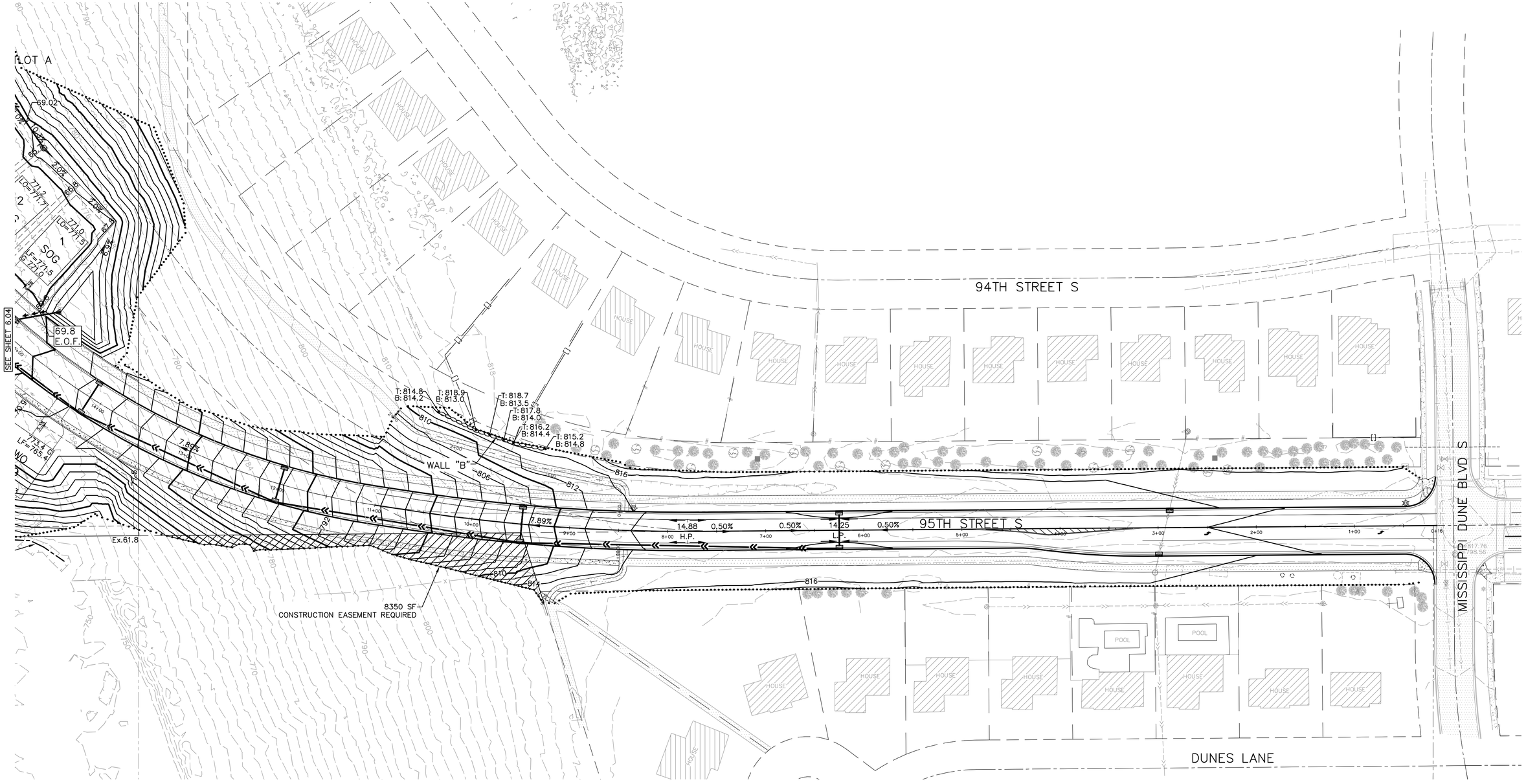

ST-1 ST-1 TO ST-7: DENOTES STANDARD PENETRATION TEST BORING

TP-15 TP-15 TO TP-22: DENOTES 2023 BRAUN INTERTECT TEST PIT

1 1 TO 13: DENOTES 2022 HAUGO GEOTECHNICAL TEST PIT

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NOTE: ALL LOCATIONS ARE APPROXIMATE

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GRAPHIC SCALE IN FEET

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6.05 OF 47

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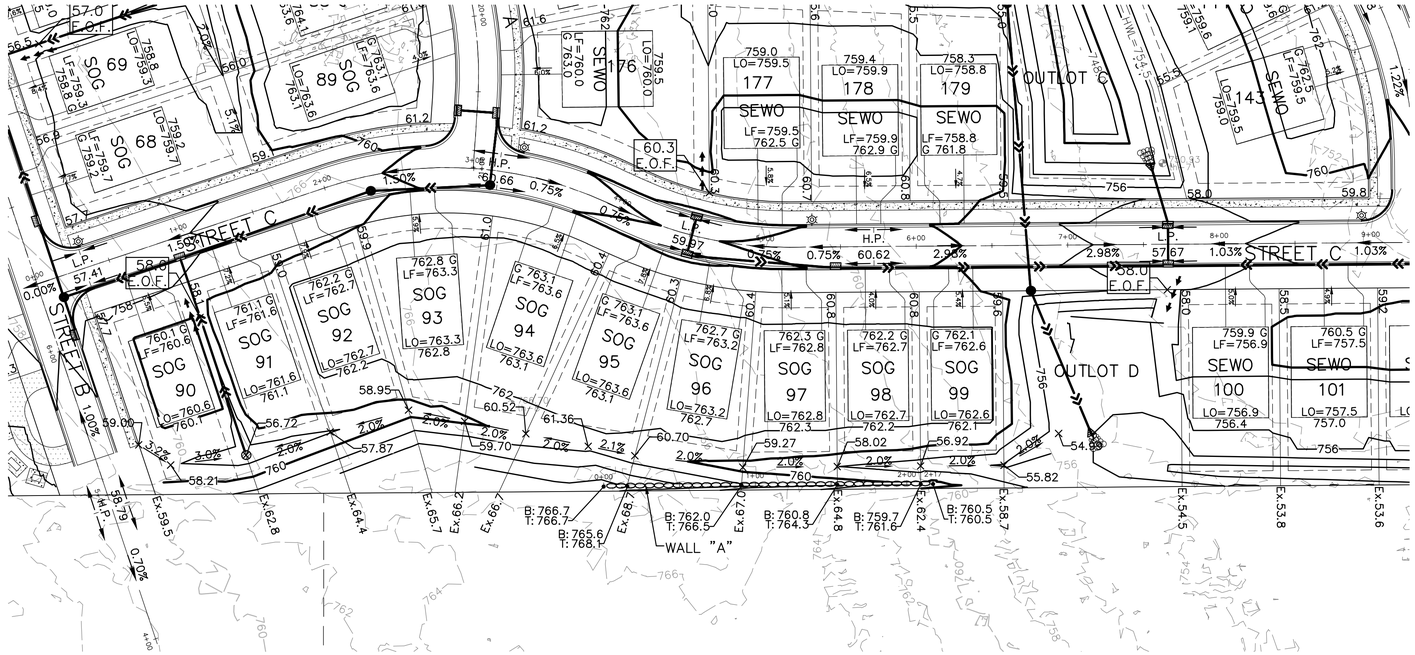
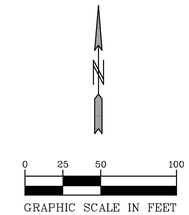
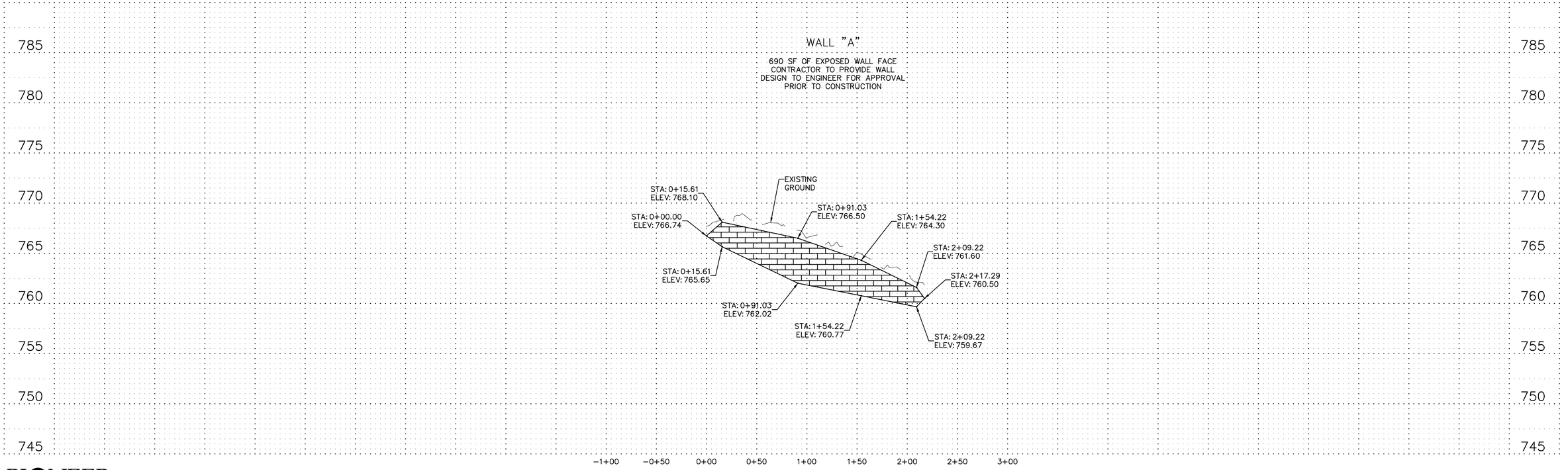




BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

WALL "A"



00-ENG-123105-SHEET-WALL

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PRELIMINARY WALL PLAN

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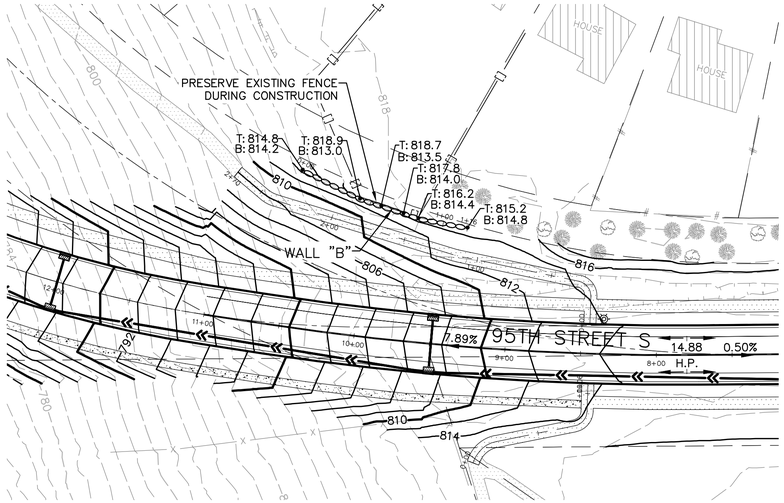
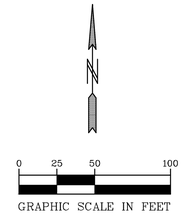
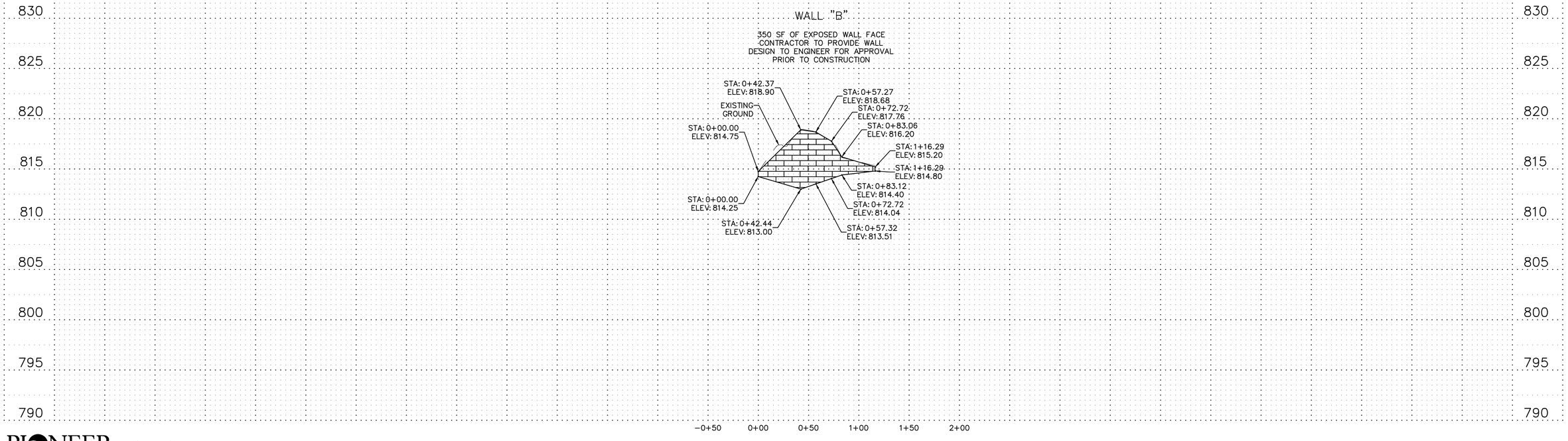




BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

WALL "B"



00-ENG-123105-SHEET-WALL

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Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY WALL PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

6.12 OF 47

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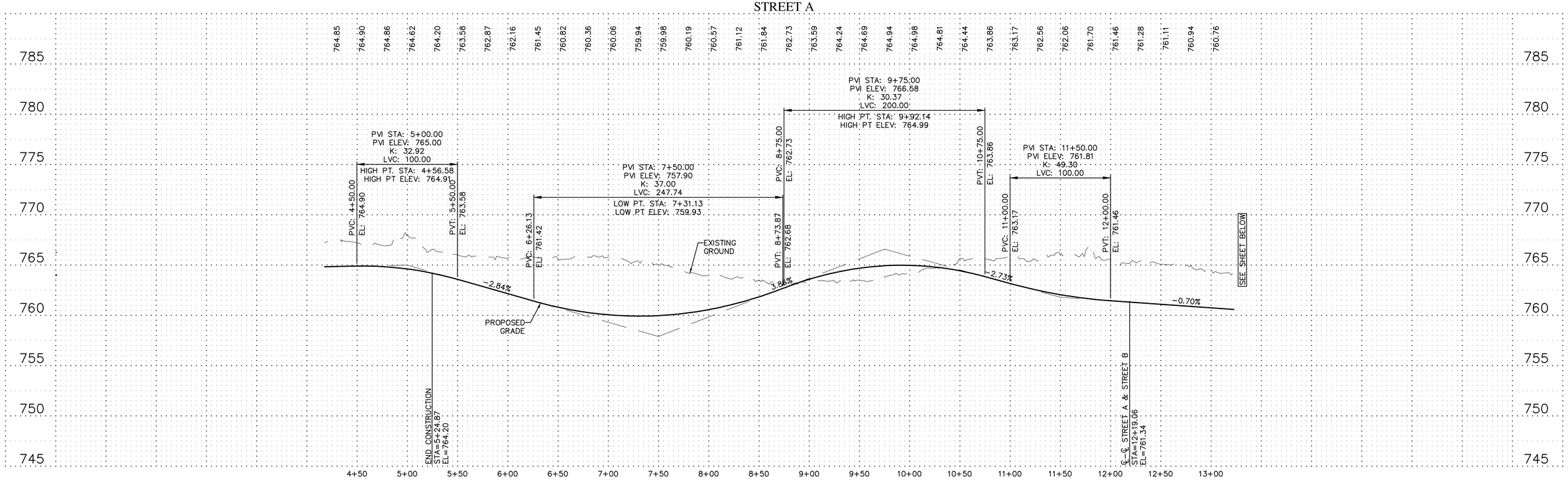
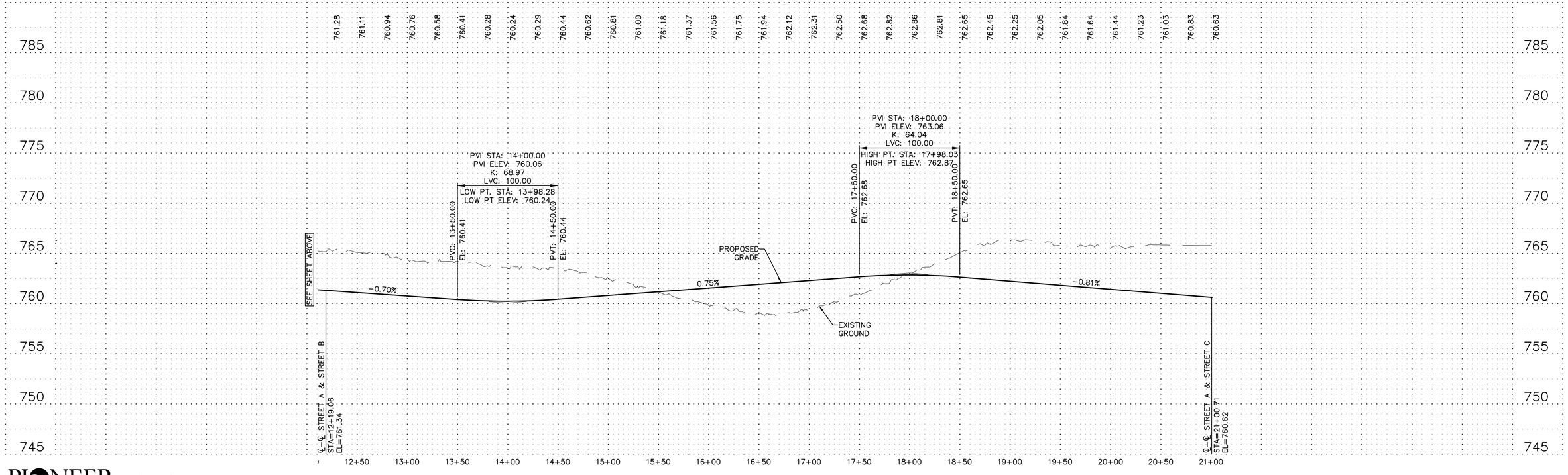
STREET A



STREET A



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PRELIMINARY ROAD PROFILE

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

00-ENG-123105-SHEET-ROAD-PROF

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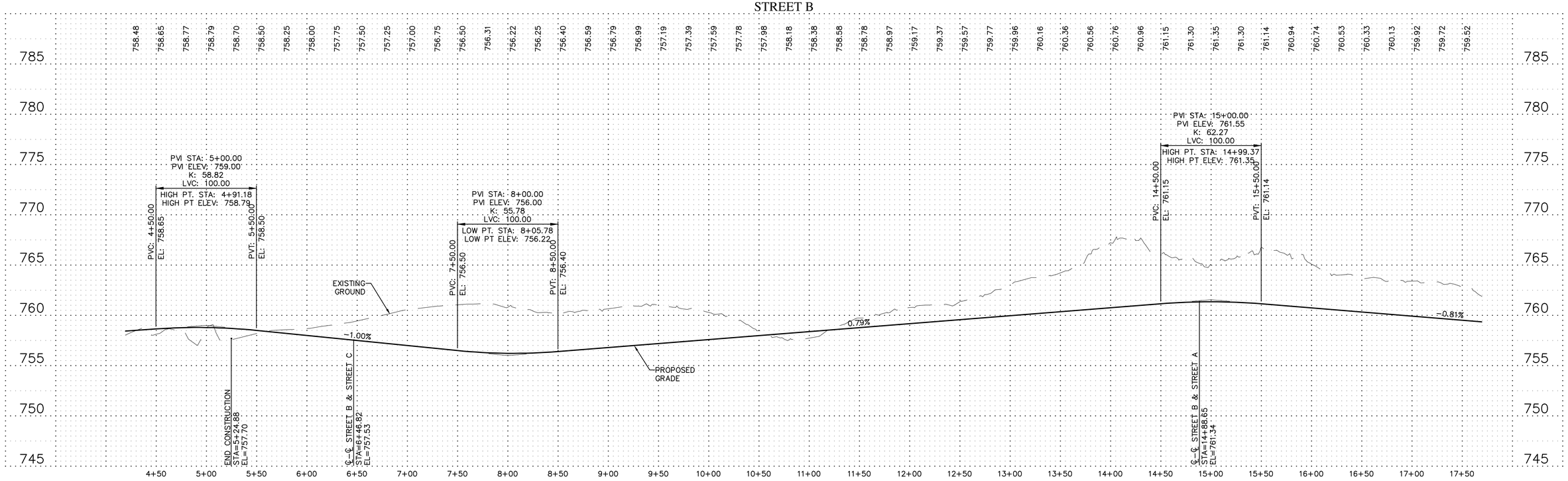
STREET B



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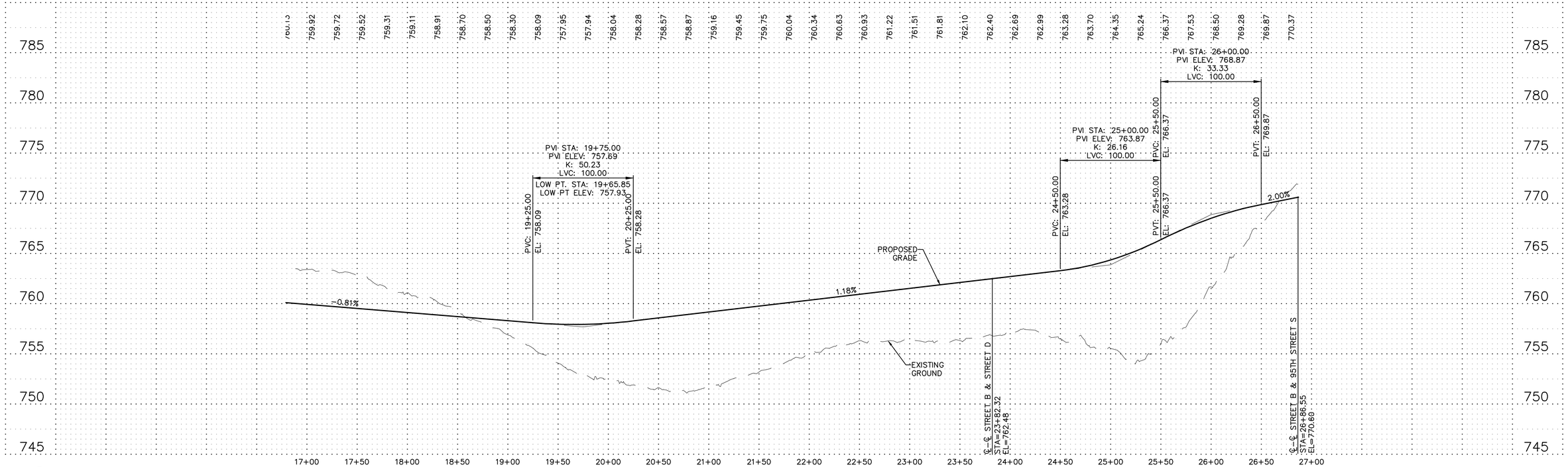

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PRELIMINARY ROAD PROFILE

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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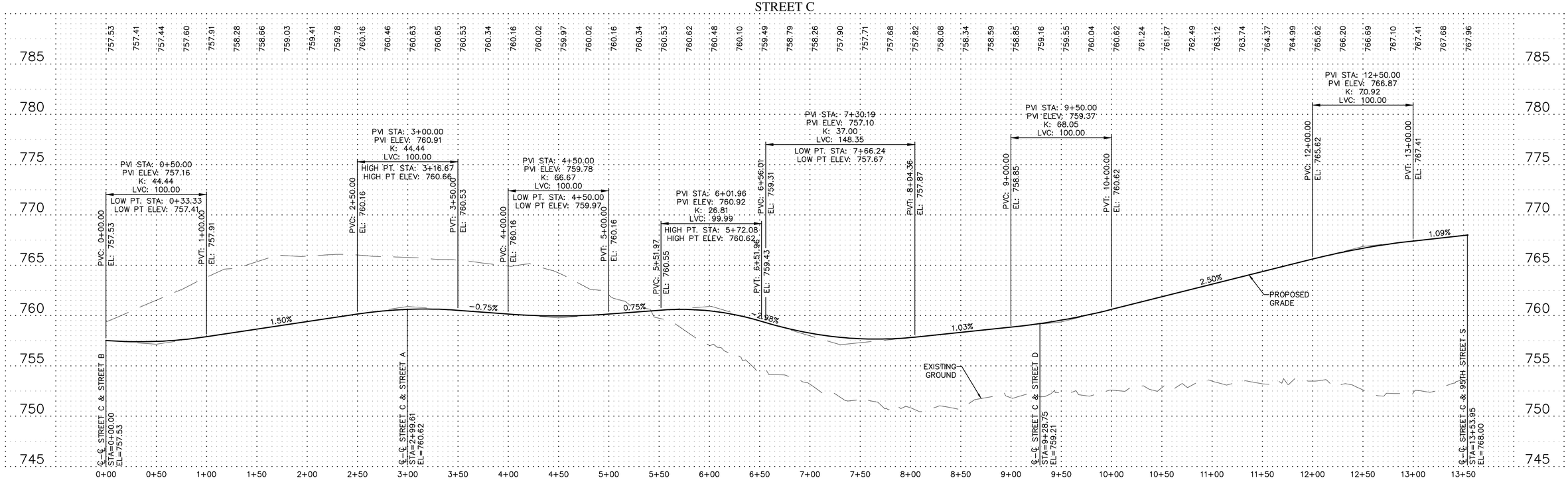
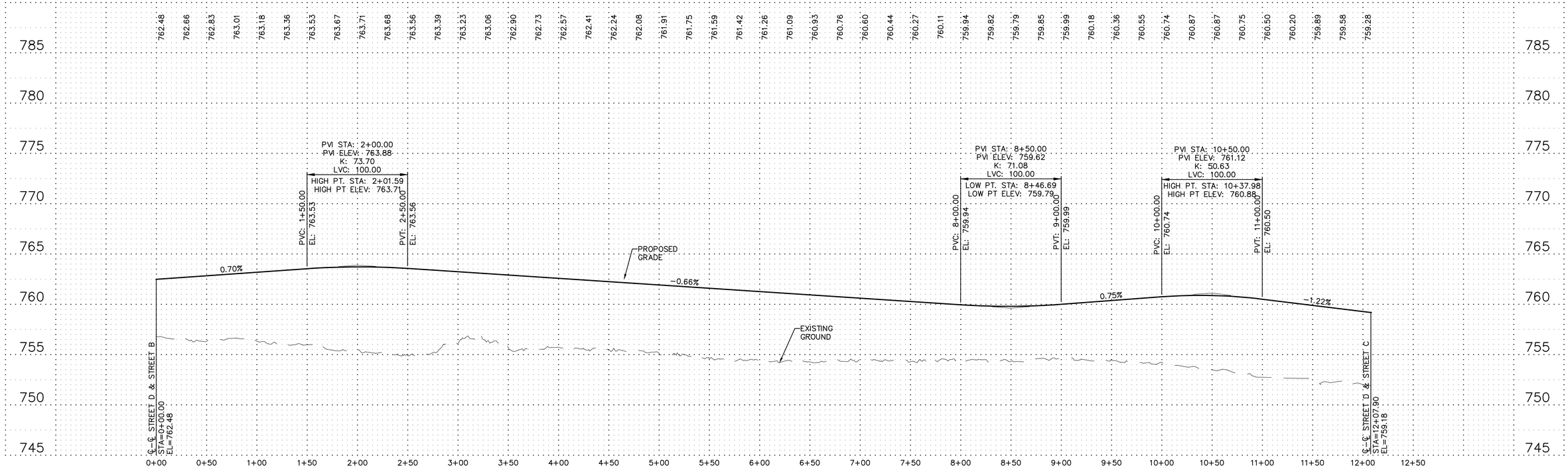
STREET C



STREET D



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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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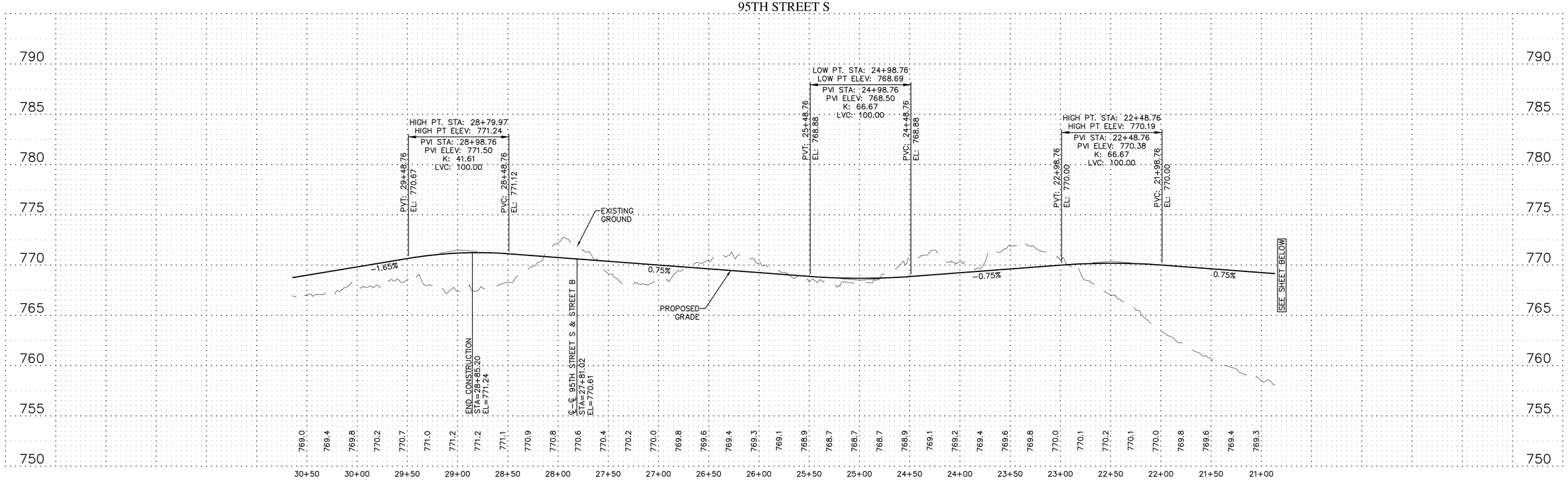
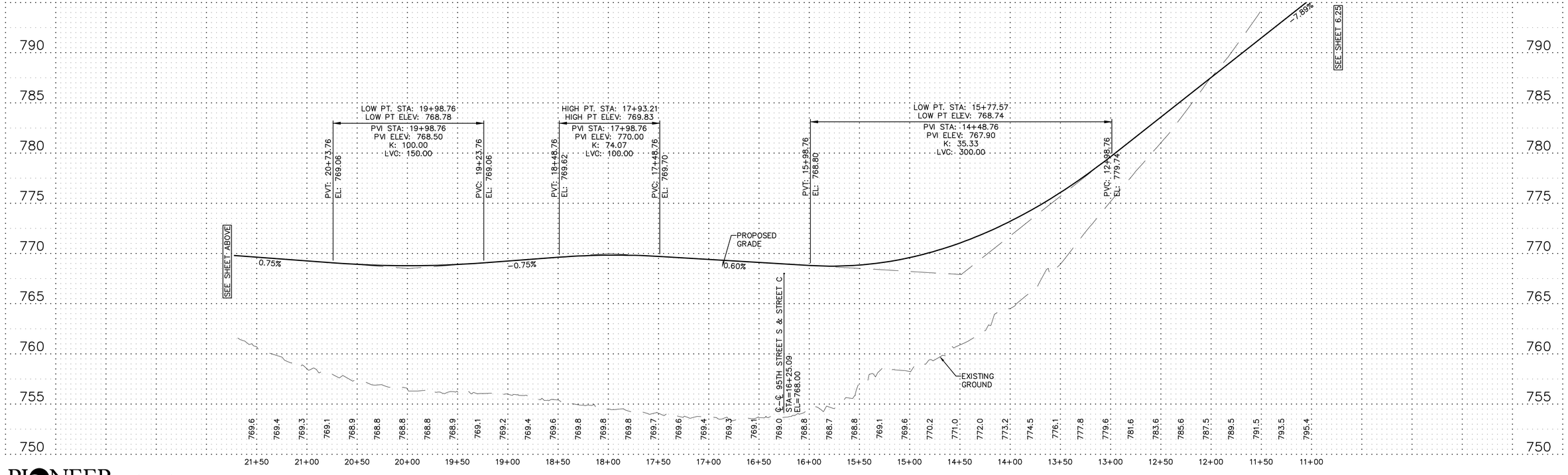
95TH STREET S



95TH STREET S



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PRELIMINARY ROAD PROFILE

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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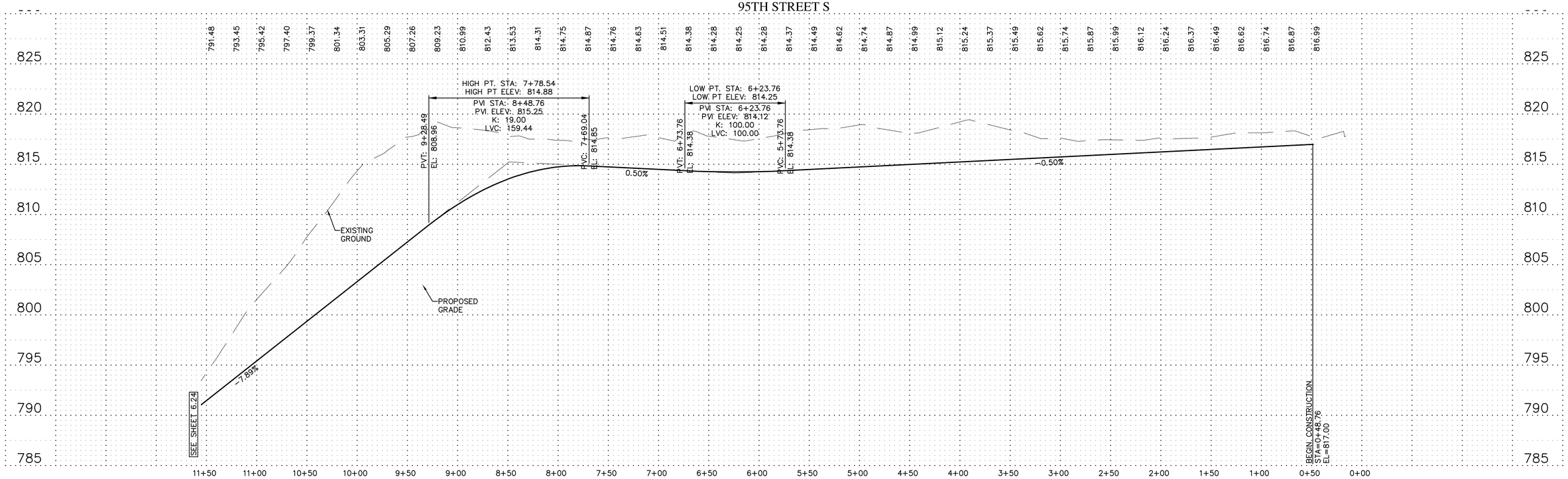

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PRELIMINARY ROAD PROFILE

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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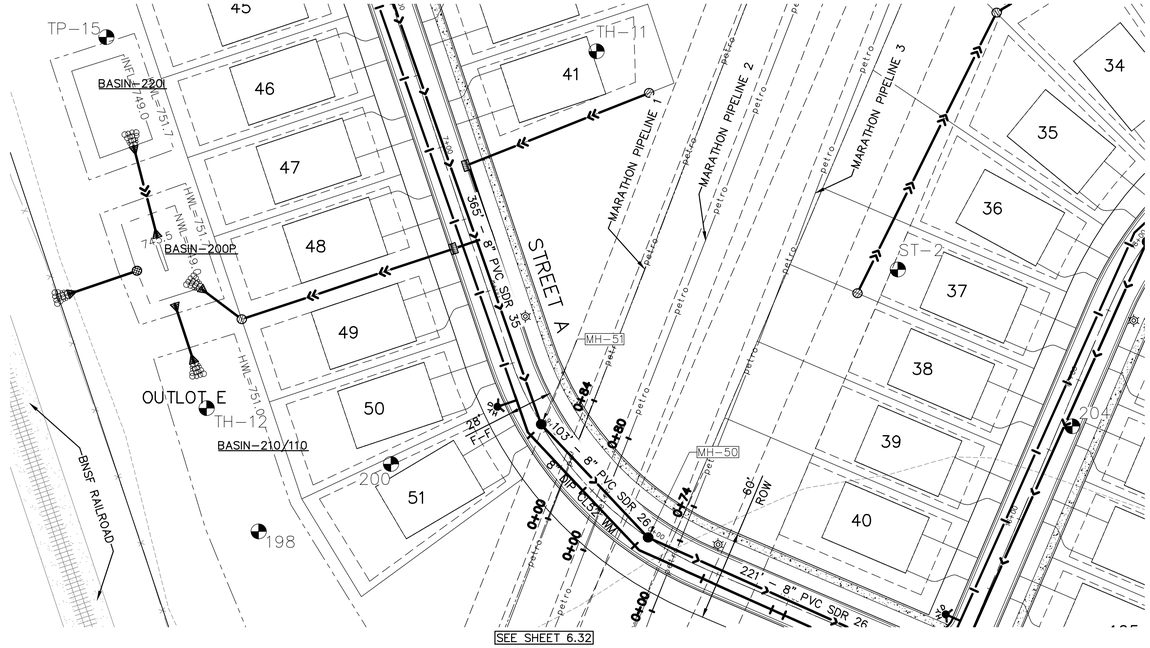
ST-1 ST-1 TO ST-7: DENOTES STANDARD PENETRATION TEST BORING

TP-15 TP-15 TO TP-22: DENOTES 2023 BRAUN INTERTECT TEST PIT

1 1 TO 13: DENOTES 2022 HAUGO GEOTECHNICAL TEST PIT

197 197 TO 218: DENOTES 2005 CONSULTANTS SOIL BORING

NOTE: ALL LOCATIONS ARE APPROXIMATE



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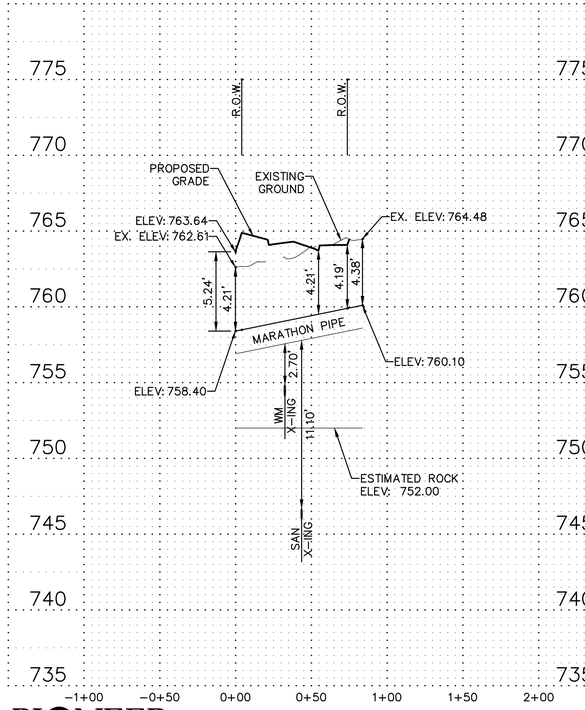
N

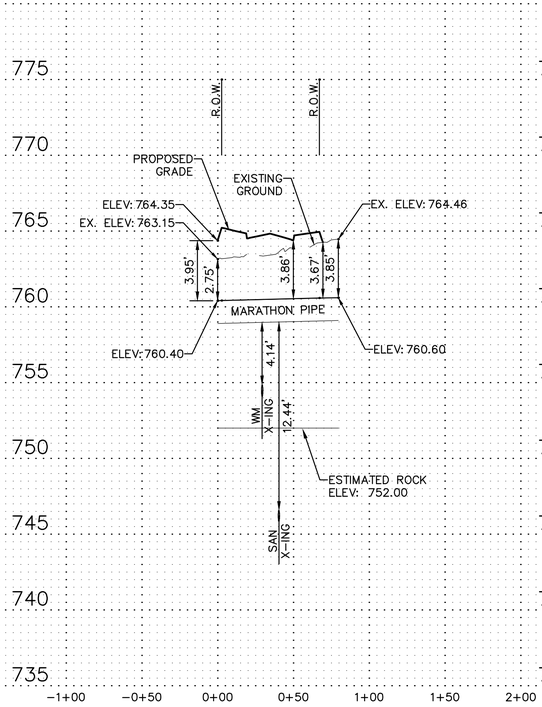
0 25 50 100
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

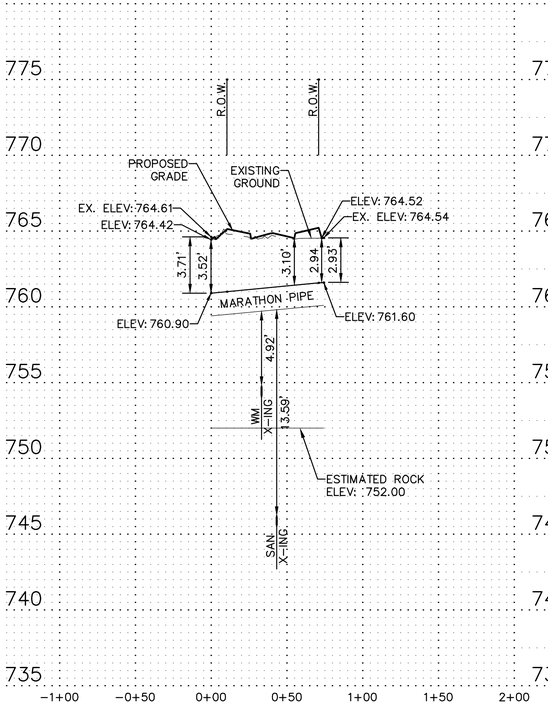
MARATHON PIPELINE 1



MARATHON PIPELINE 2



MARATHON PIPELINE 3



00-ENG-123105-SHEET-GAS

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Designed	NAP
Drawn	SHA

PRELIMINARY GAS CROSSING DETAILS

LENNAR
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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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ST-1 ST-1 TO ST-7: DENOTES STANDARD PENETRATION TEST BORING

TP-15 TP-15 TO TP-22: DENOTES 2023 BRAUN INTERTECT TEST PIT

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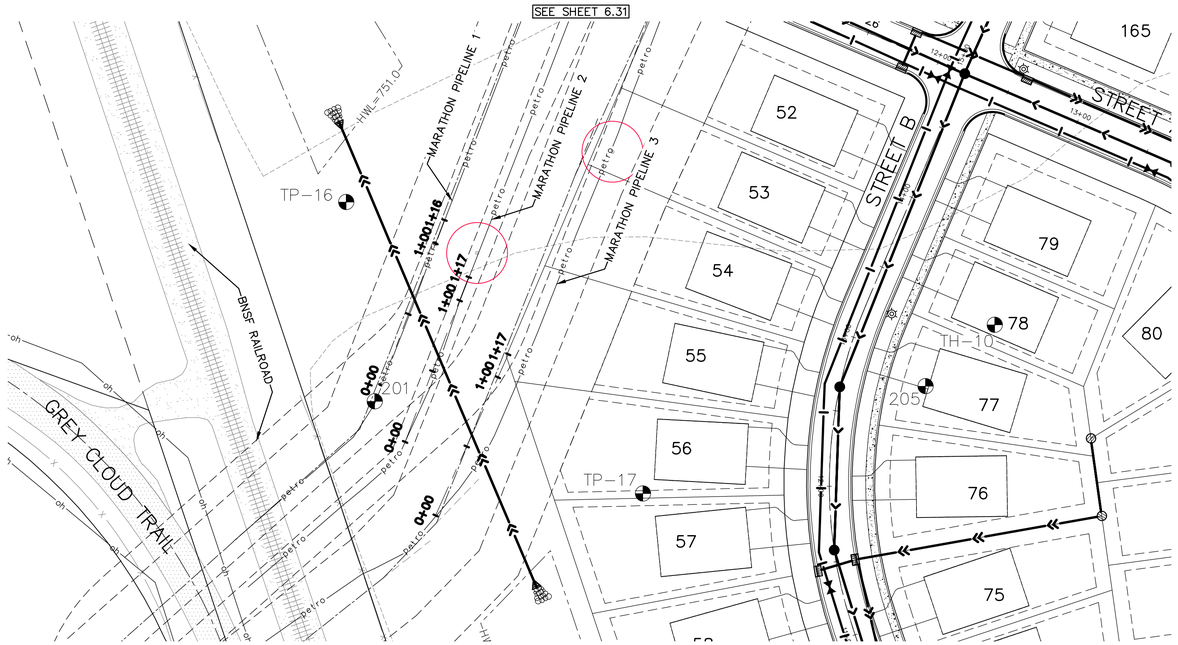
NOTE: ALL LOCATIONS ARE APPROXIMATE



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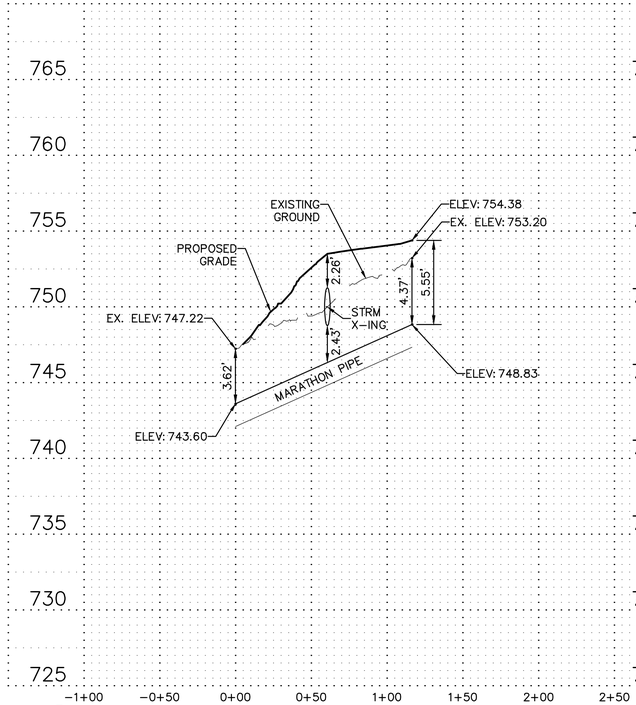
N

0 25 50 100
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

MARATHON PIPELINE 1 SOUTH



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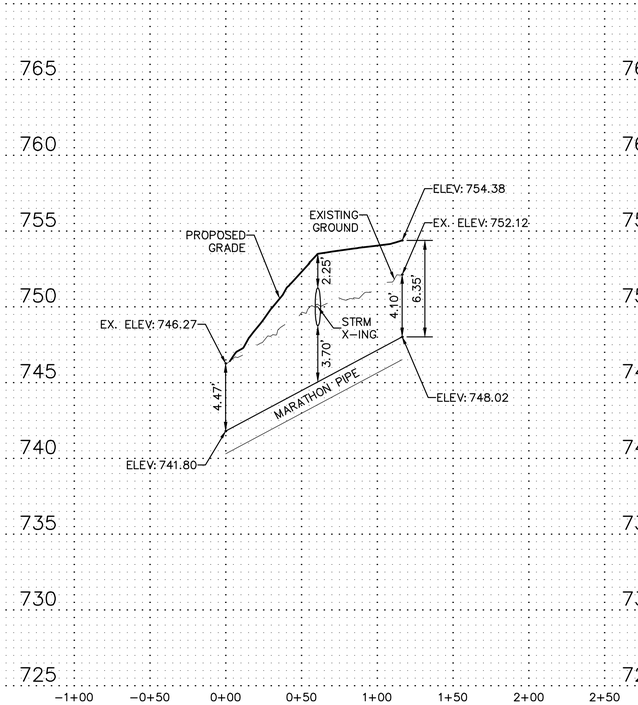
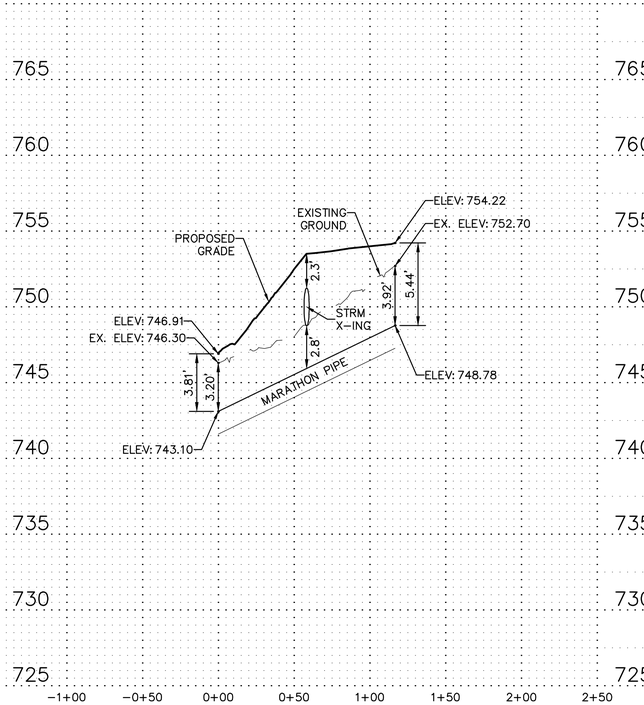


MARATHON PIPELINE 3 SOUTH



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Designed	NAP
Drawn	SHA

PRELIMINARY GAS CROSSING DETAILS

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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LEGEND

- ROCK CONSTRUCTION ENTRANCE INSTALL BEFORE START OF GRADING
- PERIMETER EROSION CONTROL FENCE. INSTALL BEFORE START OF GRADING
- HEAVY DUTY SECONDARY EROSION CONTROL FENCE TO BE INSTALLED 48 HOURS AFTER COMPLETION OF GRADING.
- CAT 20 BLANKET FROM BACK OF CURB TO ROW TO BE INSTALLED AFTER COMPLETION OF SIDEWALK CONSTRUCTION.
- BASIN ACCESS 7% SLOPE MAX.
- SUMPED RIP RAP PERMANENT ENERGY DISSIPATER, INSTALL WITHIN 24 HOURS AFTER CONNECTION TO A SURFACE WATER.
- CATCH BASIN INLET PROTECTION TO BE INSTALLED AFTER 1ST LIFT OF BITUMINOUS.
- CATCH BASIN INLET PROTECTION TO BE INSTALLED WITH CATCH BASIN GRATE.
- STRAW BIO ROLLS. INSTALL WITHIN 7 DAYS OF GRADING COMPLETION OR BEFORE 1ST RAINFALL EVENT WHICHEVER IS FIRST
- ROCK BERM. INSTALL WITHIN 7 DAYS OF GRADING COMPLETION OR BEFORE 1ST RAINFALL EVENT WHICHEVER IS FIRST
- MNDOT CAT 20 EROSION CONTROL BLANKET. INSTALL WITHIN 7 DAYS OF GRADING COMPLETION
- STABILIZED EMERGENCY OVERFLOW
- FLEXAMAT OVERFLOW

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GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

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PRELIMINARY EROSION CONTROL PLAN

LENNAR
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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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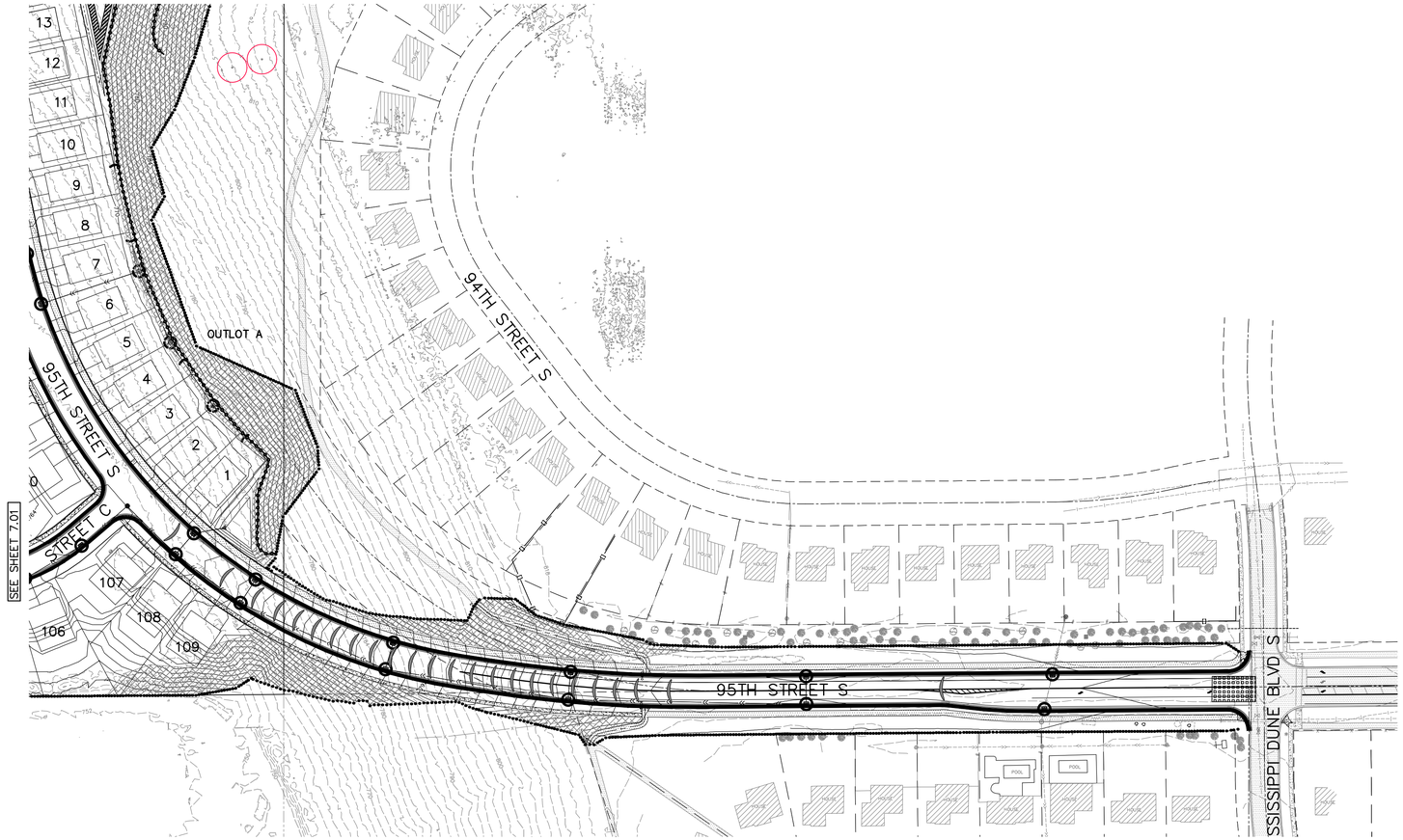

LEGEND

- ROCK CONSTRUCTION ENTRANCE INSTALL BEFORE START OF GRADING
- PERIMETER EROSION CONTROL FENCE. INSTALL BEFORE START OF GRADING
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- CAT 20 BLANKET FROM BACK OF CURB TO ROW TO BE INSTALLED AFTER COMPLETION OF SIDEWALK CONSTRUCTION.
- BASIN ACCESS 7% SLOPE MAX.
- SUMPED RIP RAP PERMANENT ENERGY DISSIPATER, INSTALL WITHIN 24 HOURS AFTER CONNECTION TO A SURFACE WATER.
- CATCH BASIN INLET PROTECTION TO BE INSTALLED AFTER 1ST LIFT OF BITUMINOUS.
- CATCH BASIN INLET PROTECTION TO BE INSTALLED WITH CATCH BASIN GRATE.
- STRAW BIO ROLLS. INSTALL WITHIN 7 DAYS OF GRADING COMPLETION OR BEFORE 1ST RAINFALL EVENT WHICHEVER IS FIRST
- ROCK BERM. INSTALL WITHIN 7 DAYS OF GRADING COMPLETION OR BEFORE 1ST RAINFALL EVENT WHICHEVER IS FIRST
- MNDOT CAT 20 EROSION CONTROL BLANKET. INSTALL WITHIN 7 DAYS OF GRADING COMPLETION
- STABILIZED EMERGENCY OVERFLOW
- FLEXAMAT OVERFLOW
- PROTECT FAUNA DURING CONSTRUCTION

N

0 50 100 200

GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF MISSISSIPPI DUNES BOULEVARD AND 94TH STREET S.
NAVD 88 ELEV=819.06

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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TEMPORARY SEED SHALL BE DONE IN ACCORDANCE TO MNDOT 2575 & 3876; CONSISTING OF:

- MAY 1 – AUGUST 1: MINNESOTA STATE SEED MIXTURE O (OATS) @ 100.0 LBS. PER ACRE OR APPROVED EQUAL.
- AUGUST 1 – OCTOBER 1: MINNESOTA STATE SEED MIXTURE WW (WINTER WHEAT) @ 100.0 LBS. PER ACRE OR APPROVED EQUAL.
- MULCH SHALL BE MNDOT 3882, TYPE 1 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL, INSTALLED TO MINIMUM 90% COVERAGE OF THE SURFACE AREA DISTURBED.
- MNDOT 3881, TYPE 1 COMMERCIAL FERTILIZER, 10–10–20 @ 200 LBS. PER ACRE

PERMANENT BASIN SEEDING SHALL BE DONE IN ACCORDANCE WITH MNDOT 2575 & 3876 CONSISTING OF:

- WET BASIN BENCH/(IN)FILTRATION BASIN: MINNESOTA STATE SEED MIXTURE WD (WET DITCH) AT 20 POUNDS PER ACRE.
- ABOVE BASIN BENCH TO HIGH WATER LEVEL: MINNESOTA STATE SEED MIXTURE STR (SOUTHERN TALLGRASS ROADSIDE) AT 26 POUNDS PER ACRE.
- MULCH SHALL BE MNDOT 3882, TYPE 3 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL.
- MNDOT 3881, TYPE 4 NATURAL–BASED FERTILIZER, 18–1–8 FOR LOAM & CLAY LOAM OR 17–10–7 FOR SANDY SOILS @ 120 LBS PER ACRE EACH

UPLAND/NATURAL AREA SEEDING SHALL BE DONE IN ACCORDANCE TO MNDOT 2575 & 3876; CONSISTING OF:

- MINNESOTA STATE SEED MIXTURE STR (SOUTHERN TALLGRASS ROADSIDE) AT 26 POUNDS PER ACRE.
- MULCH SHALL BE MNDOT 3882, TYPE 3 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL,
- MNDOT 3881, TYPE 4 NATURAL–BASED FERTILIZER, 18–1–8 FOR LOAM & CLAY LOAM OR 17–10–7 FOR SANDY SOILS @ 120 LBS PER ACRE EACH

UPLAND/NATURAL AREA BLUFF SEEDING SHALL BE DONE IN ACCORDANCE TO MNDOT 2575 & 3876; CONSISTING OF:

- MINNESOTA STATE SEED MIXTURE STR (SOUTHERN TALLGRASS ROADSIDE) AT 26 POUNDS PER ACRE.

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0 50 100 200
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT LOCATED AT SW QUADRANT OF MISSISSIPPI DUNES BOULEVARD AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-SEED

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I hereby certify that this plan 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
Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY SEEDING PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

7.11 OF 47

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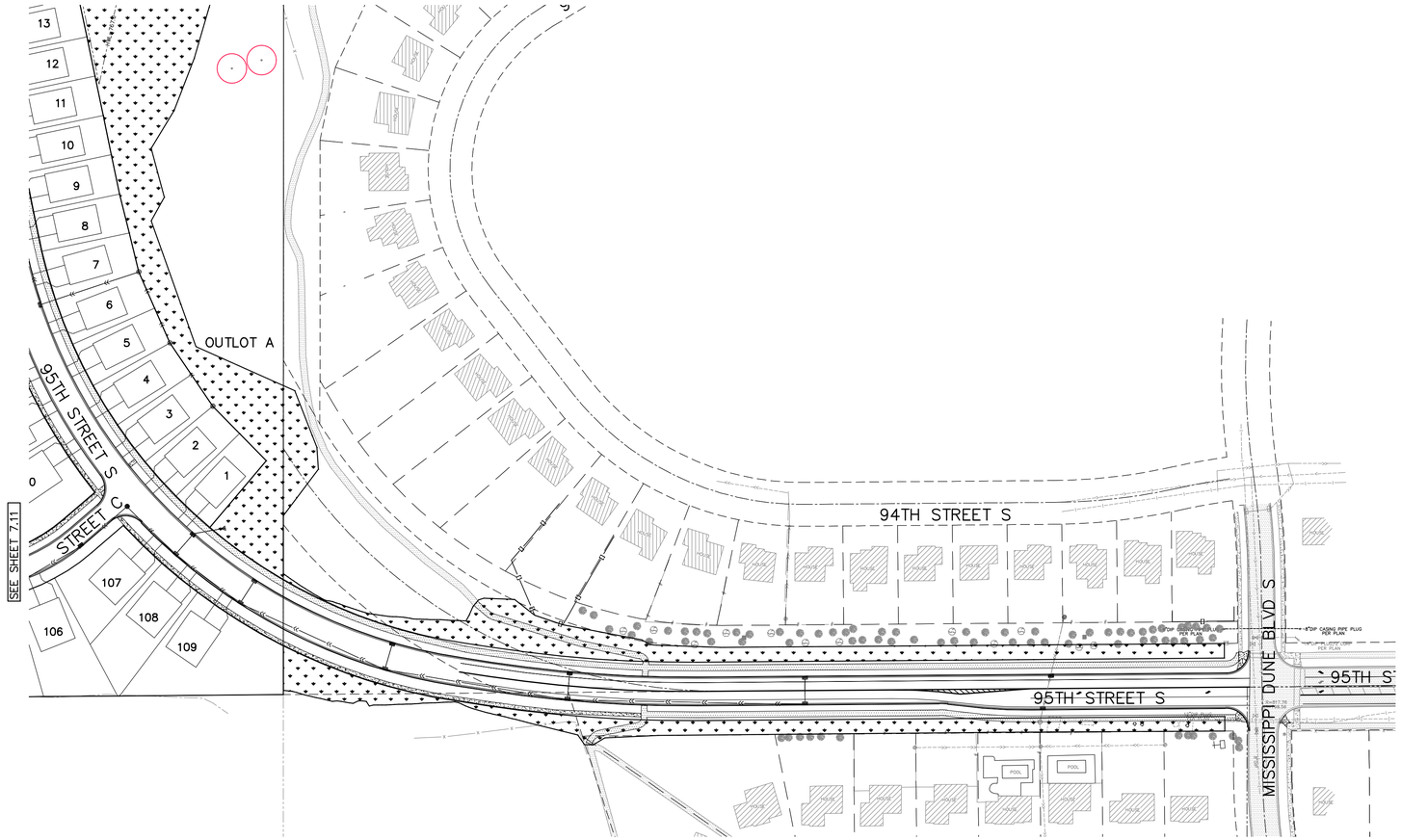

TEMPORARY SEED SHALL BE DONE IN ACCORDANCE TO MNDOT 2575 & 3876; CONSISTING OF:

- MAY 1 – AUGUST 1: MINNESOTA STATE SEED MIXTURE O (OATS) @ 100.0 LBS. PER ACRE OR APPROVED EQUAL.
- AUGUST 1 – OCTOBER 1: MINNESOTA STATE SEED MIXTURE WW (WINTER WHEAT) @ 100.0 LBS. PER ACRE OR APPROVED EQUAL.
- MULCH SHALL BE MNDOT 3882, TYPE 1 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL, INSTALLED TO MINIMUM 90% COVERAGE OF THE SURFACE AREA DISTURBED.
- MNDOT 3881, TYPE 1 COMMERCIAL FERTILIZER, 10–10–20 @ 200 LBS. PER ACRE

PERMANENT BASIN SEEDING SHALL BE DONE IN ACCORDANCE WITH MNDOT 2575 & 3876 CONSISTING OF:

- WET BASIN BENCH/(IN)FILTRATION BASIN: MINNESOTA STATE SEED MIXTURE WD (WET DITCH) AT 20 POUNDS PER ACRE.
- ABOVE BASIN BENCH TO HIGH WATER LEVEL: MINNESOTA STATE SEED MIXTURE STR (SOUTHERN TALLGRASS ROADSIDE) AT 26 POUNDS PER ACRE.
- MULCH SHALL BE MNDOT 3882, TYPE 3 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL.
- MNDOT 3881, TYPE 4 NATURAL–BASED FERTILIZER, 18–1–8 FOR LOAM & CLAY LOAM OR 17–10–7 FOR SANDY SOILS @ 120 LBS PER ACRE EACH

UPLAND/NATURAL AREA SEEDING SHALL BE DONE IN ACCORDANCE TO MNDOT 2575 & 3876; CONSISTING OF:

- MINNESOTA STATE SEED MIXTURE STR (SOUTHERN TALLGRASS ROADSIDE) AT 26 POUNDS PER ACRE.
- MULCH SHALL BE MNDOT 3882, TYPE 3 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL,
- MNDOT 3881, TYPE 4 NATURAL–BASED FERTILIZER, 18–1–8 FOR LOAM & CLAY LOAM OR 17–10–7 FOR SANDY SOILS @ 120 LBS PER ACRE EACH

UPLAND/NATURAL AREA BLUFF SEEDING SHALL BE DONE IN ACCORDANCE TO MNDOT 2575 & 3876; CONSISTING OF:

- MINNESOTA STATE SEED MIXTURE STR (SOUTHERN TALLGRASS ROADSIDE) AT 26 POUNDS PER ACRE.
- MULCH SHALL BE MNDOT 3882, TYPE 3 @ 2 TONS PER ACRE OR APPROVED EQUAL AND DISK ANCHORED IN PLACE OR APPROVED EQUAL,
- MNDOT 3881, TYPE 4 NATURAL–BASED FERTILIZER, 18–1–8 FOR LOAM & CLAY LOAM OR 17–10–7 FOR SANDY SOILS @ 120 LBS PER ACRE EACH

PROTECT FAUNA DURING CONSTRUCTION

0 50 100 200

GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

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TALCOTT GLEN
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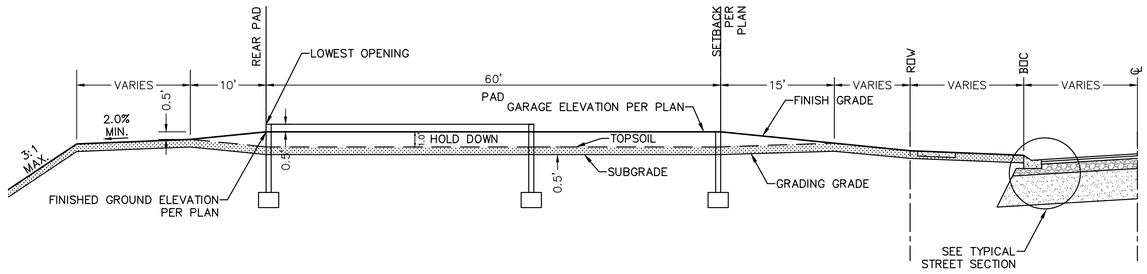

SLAB-ON-GRADE

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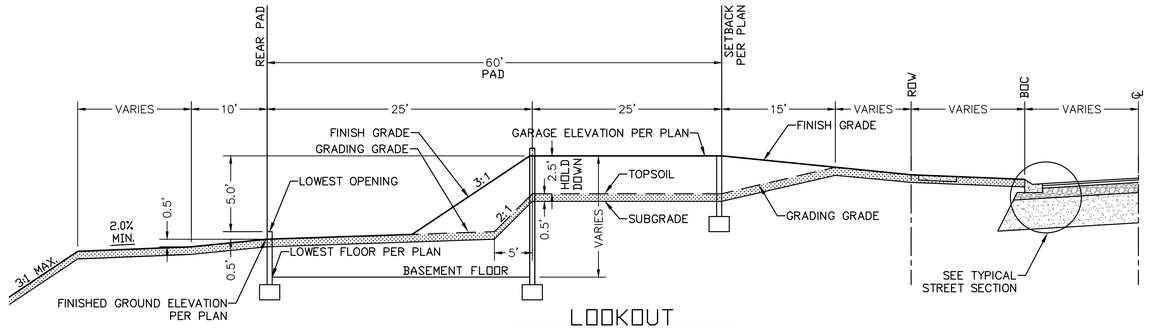

LOOKOUT

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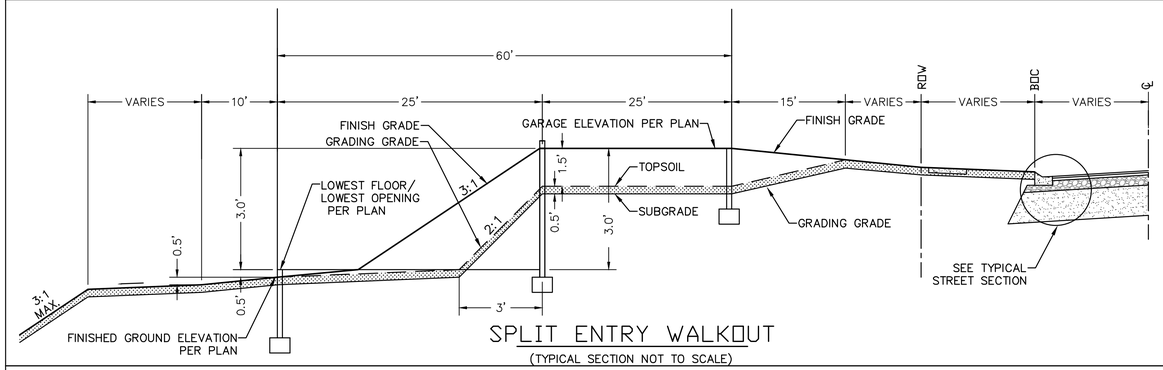

SPLIT ENTRY WALKOUT

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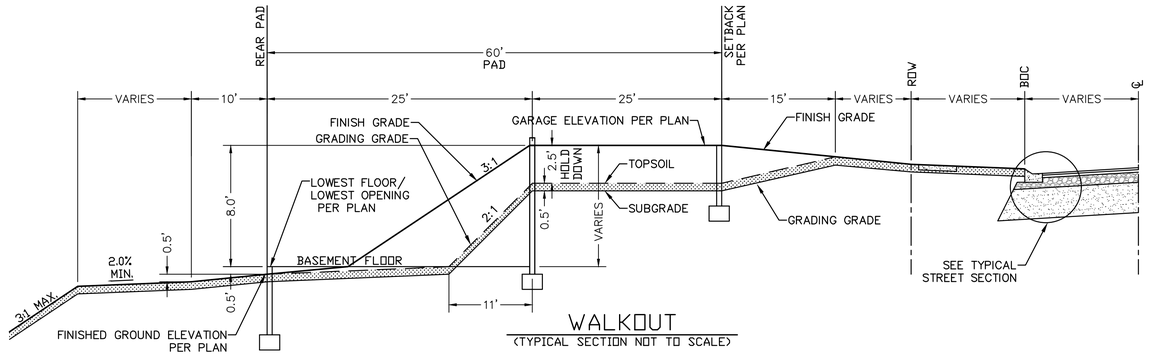

WALKOUT

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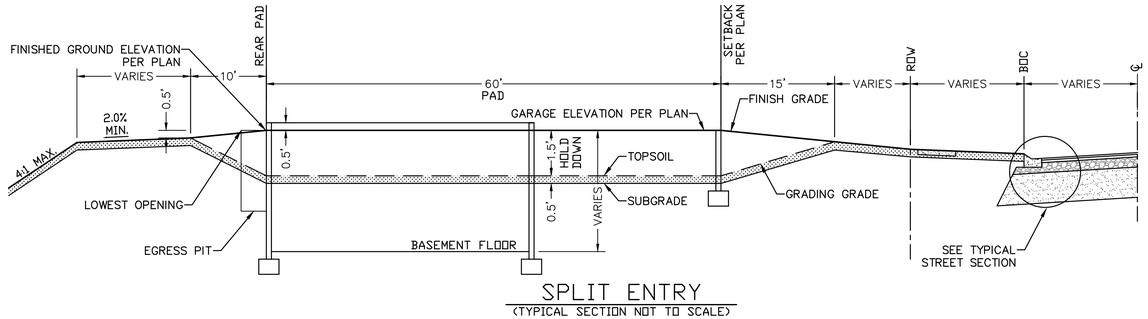

SPLIT ENTRY

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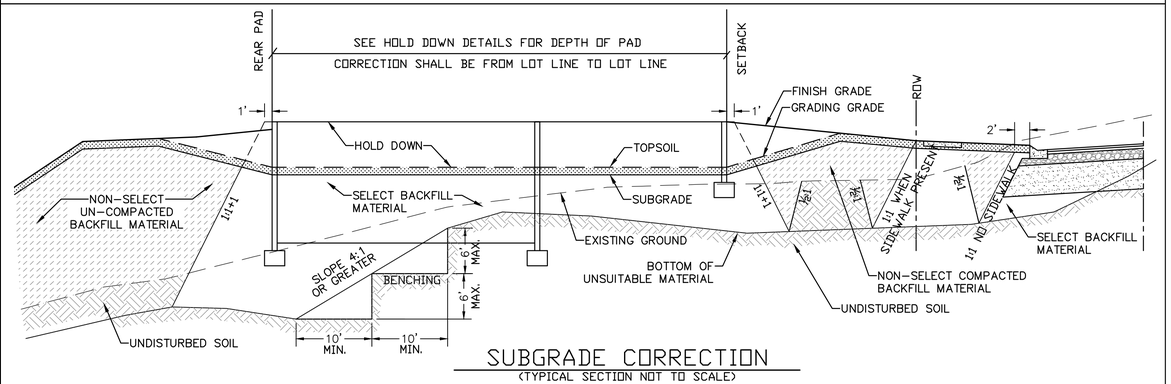

SUBGRADE CORRECTION

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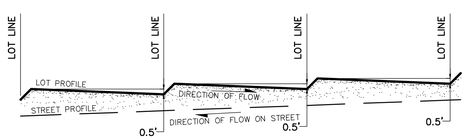

LOT BENCHING DETAIL

NO SCALE

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COTTAGE GROVE, MINNESOTA

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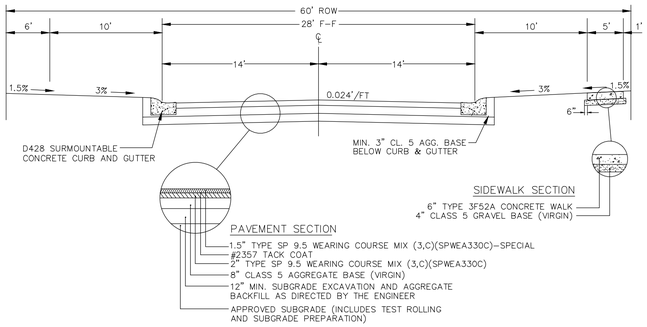
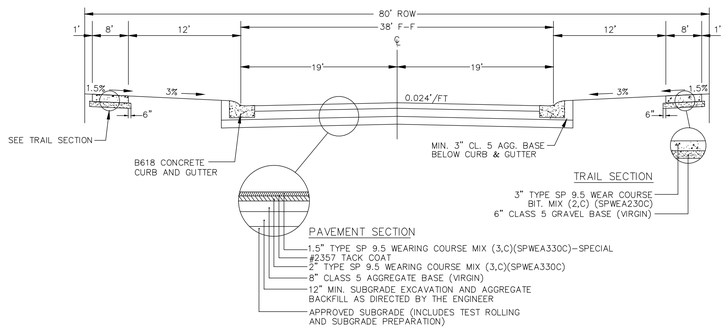


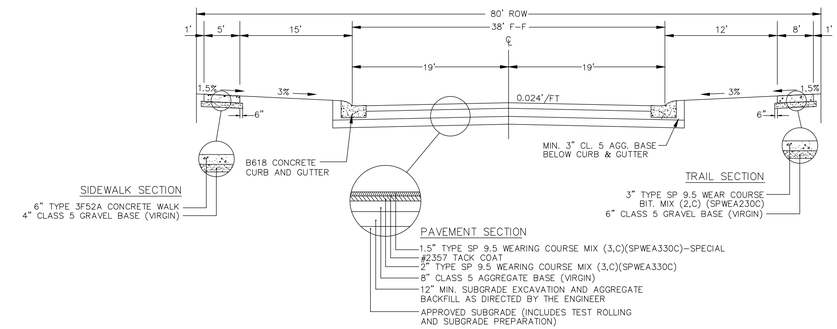
RESIDENTIAL STREET SECTION (TYP.)

TYPICAL SECTION (N.T.S.)



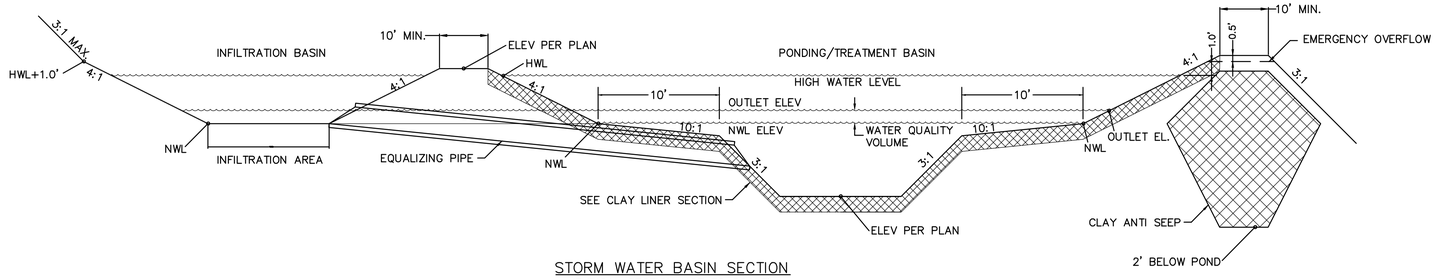
COLLECTOR STREET SECTION (STA: 0+00 TO 8+50)

TYPICAL SECTION (N.T.S.)



COLLECTOR STREET SECTION (STA: 8+50 TO 30+00)

TYPICAL SECTION (N.T.S.)



STORM WATER BASIN SECTION

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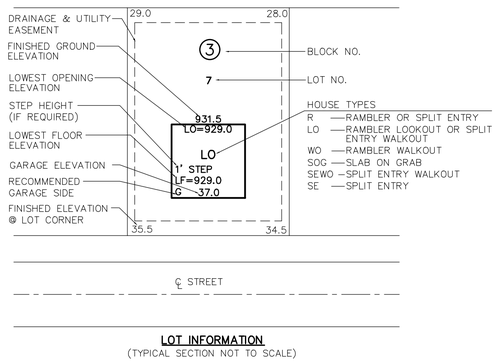

LOT INFORMATION

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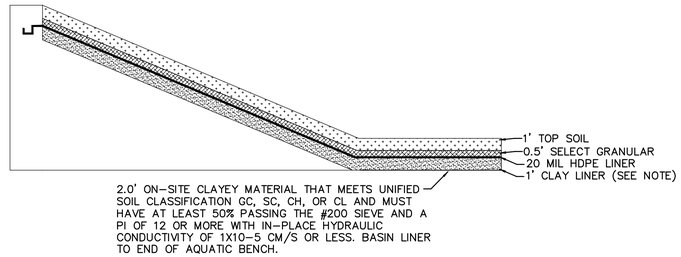

CLAY LINER SECTION

(TYPICAL SECTION NOT TO SCALE)

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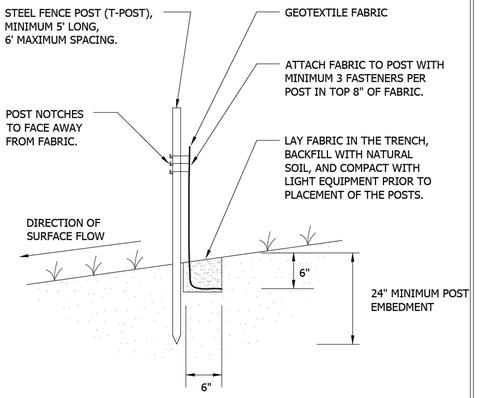


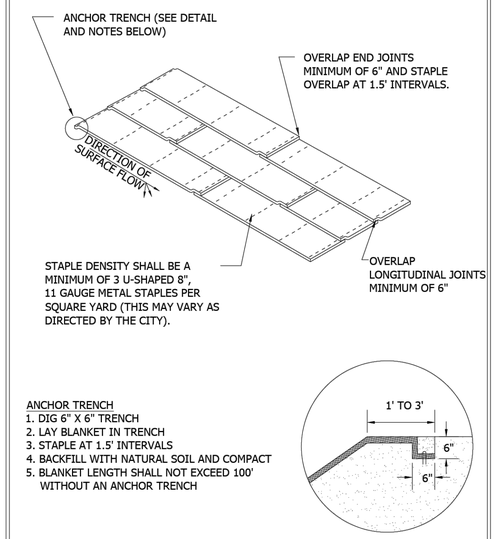
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
HAND INSTALLED SILT FENCE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-2

48_ERO2.DWG



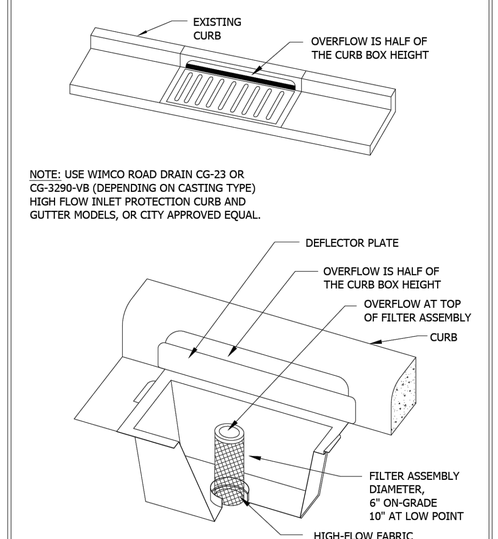
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
ROLLED EROSION PREVENTION PRODUCTS INSTALLATION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-5

48_ERO5.DWG



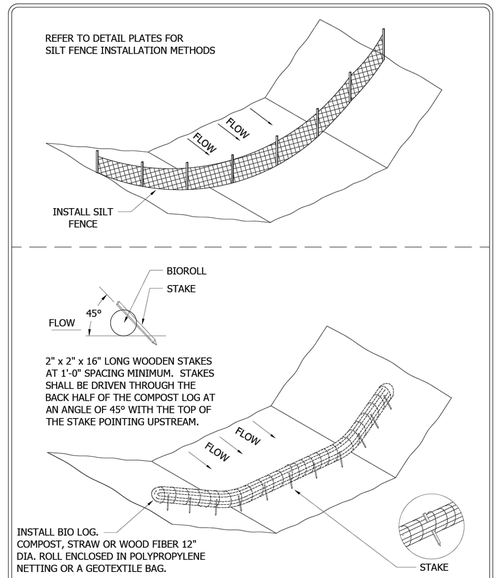
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
INLET PROTECTION CATCH BASIN INSERT
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-9

48_ERO9.DWG



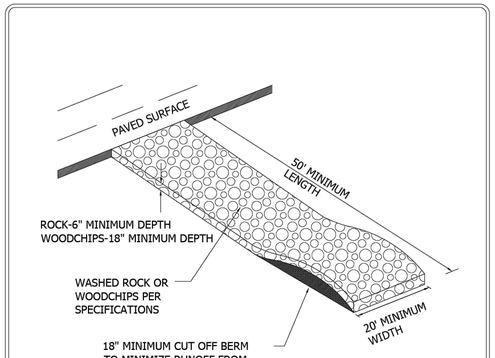
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
FILTER BERMS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-11

48_ERO11.DWG



NOTES:
1. FILTER FABRIC SHALL BE PLACED UNDER ROCK OR WOODCHIPS TO STOP MUD MIGRATION THROUGH ROCK.
2. ENTRANCE MUST BE MAINTAINED REGULARLY TO PREVENT SEDIMENTATION TRACKING.

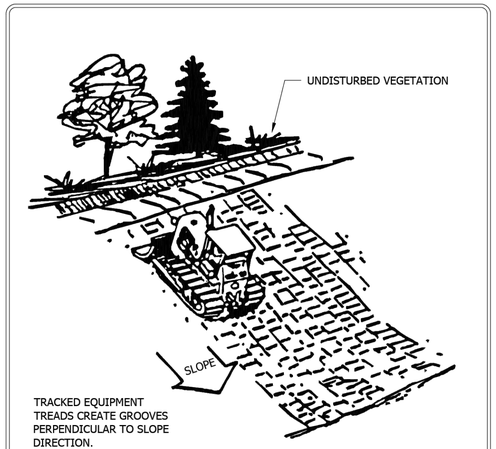
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONSTRUCTION ENTRANCE ROCK AND WOODCHIP
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-12

48_ERO12.DWG



TRACKED EQUIPMENT TREADS CREATE GROOVES PERPENDICULAR TO SLOPE DIRECTION.

NOTE:
ALL SLOPES WITH A GRADE EQUAL TO OR STEEPER THAN 3:1 REQUIRE SLOPE TRACKING. SLOPES WITH A GRADE MORE GRADUAL THAN 3:1 REQUIRE SLOPE TRACKING IF THE STABILIZATION METHOD IS EROSION CONTROL BLANKET OR HYDROMULCH.

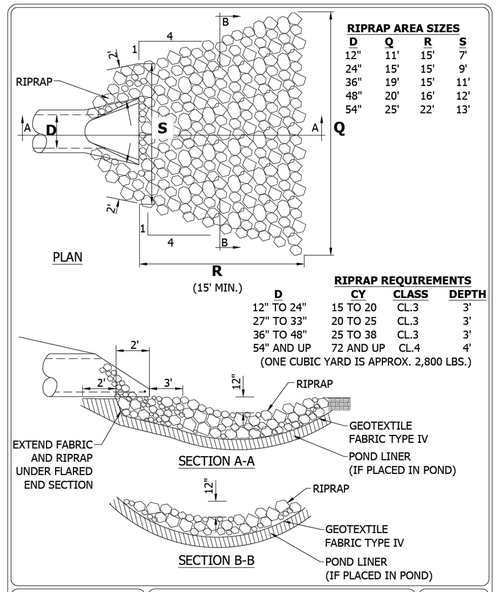
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SLOPE TRACKING
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-13

48_ERO13.DWG



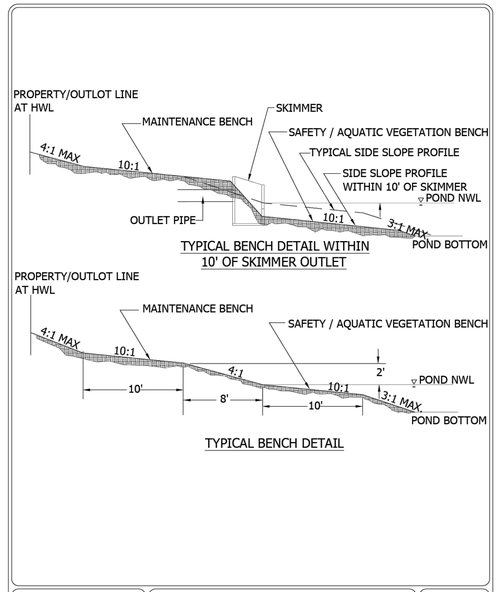
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
RIPRAP AT FLARED END SECTION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-12

48_STO12.DWG



Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL BENCH DETAIL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-15

48_STO15.DWG

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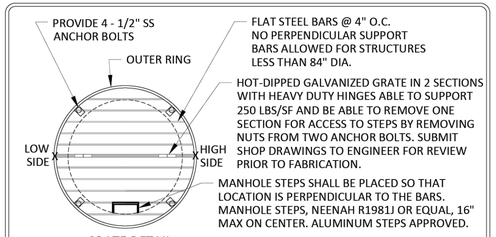
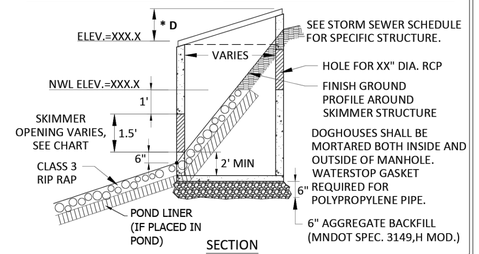


GRATE DETAIL

MANHOLE DIAMETER	SKIMMER OPENING
4'	3'x1.5'
5'	4.5'x1.5'
6'	6'x1.5'

DIAMETER	* D (TOP OF STRUCTURE SLOPE)
48" DIA	9" OR 18"
>48" DIA	12" OR 24"



SECTION

Cottage Grove — Where Pride and Prosperity Meet

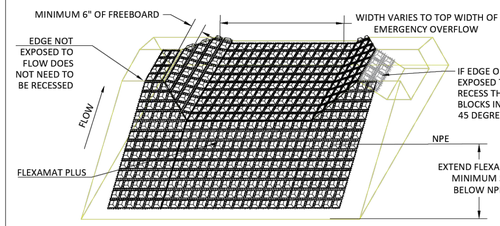
STANDARD DETAILS
STANDARD SKIMMER STRUCTURE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

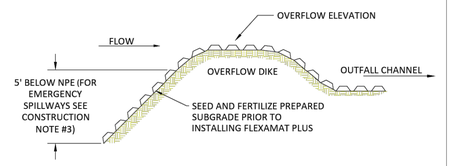
PLATE NO. STO-16

48_STO16.DWG

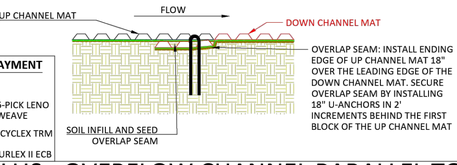
EMERGENCY SPILLWAY - ISOMETRIC VIEW



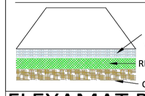
OVERFLOW DIKE - PROFILE VIEW



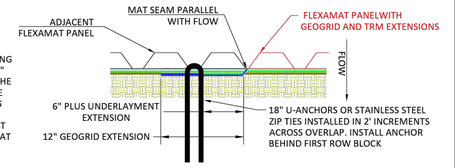
1. OVERLAP METHOD FOR SEAMS PERPENDICULAR TO FLOW



FLEXAMAT PLUS UNDERLAYMENT



2. OVERLAP METHOD FOR SEAMS PARALLEL TO FLOW



FLEXAMAT PLUS - OVERFLOW CHANNEL PARALLEL TO FLOW

CONSTRUCTION NOTES:

1. AN ENGINEER OR MANUFACTURERS REPRESENTATIVE SHALL BE ONSITE FOR THE START OF THE INSTALLATION.
2. ALL SUBGRADE SURFACES PREPARED FOR PLACEMENT OF MATS SHALL BE SMOOTH AND FREE OF ALL ROCKS, STICKS, ROOTS, OTHER PROTRUSIONS, OR DEBRIS OF ANY KIND. THE PREPARED SURFACE SHALL PROVIDE A FIRM UNYIELDING SUBGRADE FOR THE MATS.
3. PRIOR TO THE FLEXAMAT PLUS INSTALLATION SEED AND FERTILIZE SUBGRADE WITH SITE SPECIFIC SEED MIX IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
4. MAT SHALL EXTEND 5' BELOW NORMAL POND ELEVATION. (FOR EMERGENCY OVERFLOW INSTALLATIONS EXTEND THE MAT 3' DOWN THE INSIDE FACE OF THE OVERFLOW DIKE.)
5. INSTALL FLEXAMAT PLUS ROLLS. MANUFACTURER RECOMMENDS INSTALLING THE WIDEST MAT POSSIBLE FOR SPILLWAY APPLICATIONS.
   - 5.1. FOR WIDTHS WIDER THAN 16', INSTALL 15.5' WIDE MATS WITH GEOGRID AND TRM UNDERLAYMENT EXTENSIONS. INSTALL ADJACENT MAT OVER THE 12" GEOGRID AND 6" TRM UNDERLAYMENT EXTENSIONS OF THE ADJACENT MATS. ENSURE THE GEOGRID AND TRM UNDERLAYMENT EXTENSIONS ARE LAYING FLAT ON THE SUBGRADE BEFORE INSTALLING ADJACENT MAT OVER THE EXTENSIONS. INSTALL #3 REBAR 18" U-ANCHORS IN 2' INCREMENTS ACROSS THE GEOGRID AND TRM EXTENSION OVERLAP. INSTALL ANCHORS PERPENDICULAR TO THE FLOW DIRECTLY BEHIND FIRST ROW OF BLOCKS ON THE ADJACENT MAT.
   - 5.2. FOR ADDITIONAL SECTIONS OF MAT, OVERLAP THE DOWNSTREAM SECTION 18" WITH UPSTREAM SECTION OF MAT. PRIOR TO INSTALLING OVERLAP, FLIP UPSTREAM MAT BACK 24". EXCAVATE 2.25" OF SOIL 18" FROM THE END OF THE UPSTREAM MAT. DOWNSTREAM SECTION IS THEN LAID IN THE SHALLOW TRENCH. RETURN AND TAMP SOIL OVER INITIAL EDGE AND SEED AREA. FLIP END OF UPSTREAM MAT OVER THE SOIL COVERED INITIAL LEADING EDGE. SEED AND FERTILIZE SOIL INFILL PRIOR TO FLIPPING END OF UPSTREAM MAT OVER THE SOIL COVERED INITIAL LEADING EDGE OF DOWNSTREAM MAT. SECURE PERPENDICULAR OVERLAP SEAMS BY INSTALLING #3 REBAR - 18" U ANCHORS PERPENDICULAR TO FLOW IN 2' INCREMENTS.
6. AT THE END OF THE ARMORED SPILLWAY, EMBED THE MAT 18" IN A TERMINATION TRENCH. FILL AND COMPACT TERMINATION TRENCH WITH SUITABLE FILL. (AS SPECIFIED BY EOR.)

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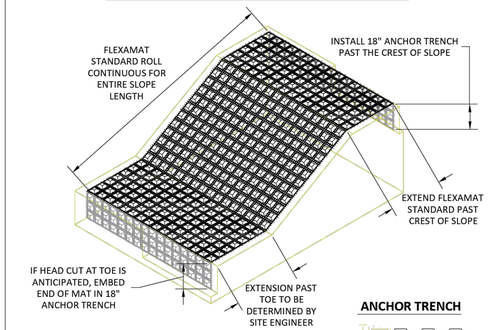
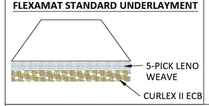
REV - 1

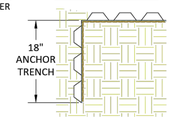
ISOMETRIC VIEW OF SLOPE AND ANCHOR TRENCHES



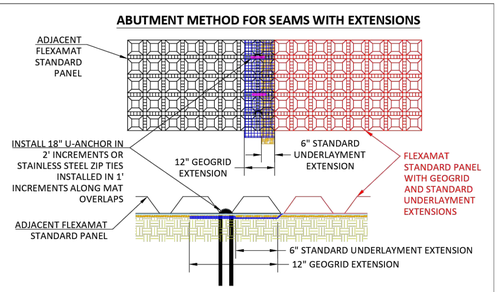
FLEXAMAT STANDARD UNDERLAYMENT



ANCHOR TRENCH



ABUTMENT METHOD FOR SEAMS WITH EXTENSIONS



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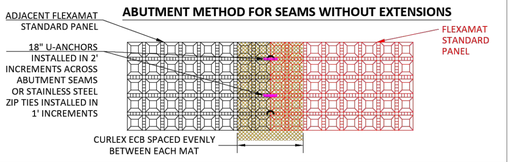

FLEXAMAT STANDARD - SLOPE ARMORING

CONSTRUCTION NOTES:

1. AN ENGINEER OR MANUFACTURERS REPRESENTATIVE SHALL BE ONSITE FOR THE START OF THE INSTALLATION.
2. ALL SUBGRADE SURFACES PREPARED FOR PLACEMENT OF MATS SHALL BE SMOOTH AND FREE OF ALL ROCKS, STICKS, ROOTS, OTHER PROTRUSIONS, OR DEBRIS OF ANY KIND.
3. PRIOR TO FLEXAMAT STANDARD INSTALLATION SEED AND FERTILIZE SUBGRADE WITH SITE SPECIFIC SEED MIX IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
4. INSTALL FLEXAMAT STANDARD ROLLS THAT ARE CONTINUOUS FOR ENTIRE SLOPE LENGTH. FOR SLOPES LONGER THAN 16', USE MATS WITH EXTENSIONS CUT TO THE LENGTH OF THE SLOPE. INSTALL MATS TO THAT THE MATTING EXTENDS PAST THE CREST OF SLOPE AND INTO AN 18" ANCHOR TRENCH.
   - 4.1. FOR ARMORED SLOPE LENGTHS 16' OR LESS, INSTALL CURLEX ECB EQUALLY UNDER ADJACENT MATS. SECURE SEAM WITH #3 REBAR 18" U-ANCHORS IN 2' INCREMENTS THE LENGTH OF THE ABUTMENT.
   - 4.2. ARMORED SLOPE LENGTHS LONGER THAN 16', INSTALL NEXT MAT OVER EXTENSIONS.
5. INSTALL SUBSEQUENT MATS OVER THE GEOGRID EXTENSION AND STANDARD UNDERLAYMENT EXTENSION OF THE PREVIOUSLY INSTALLED MAT. ENSURE THE GEOGRID AND STANDARD UNDERLAYMENT EXTENSIONS ARE LAYING FLAT ON THE SUBGRADE BEFORE INSTALLING ADJACENT MAT OVER THE EXTENSIONS.
6. INSTALL #3 REBAR 18" U-ANCHORS IN 2' INCREMENTS ACROSS THE GEOGRID AND STANDARD EXTENSION ABUTMENT. INSTALL ANCHORS PERPENDICULAR TO THE SLOPE DIRECTLY BEHIND FIRST ROW OF BLOCKS ON THE ADJACENT MAT.
7. AT THE END OF THE ARMORED SLOPE, IF HEAD CUT IS ANTICIPATED, EMBED THE MAT 18" IN A TERMINATION TRENCH. FILL AND COMPACT TERMINATION TRENCH WITH SUITABLE FILL.

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Name: Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

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Designed	NAP
Drawn	SHA

PRELIMINARY GRADING DETAILS

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COTTAGE GROVE, MINNESOTA

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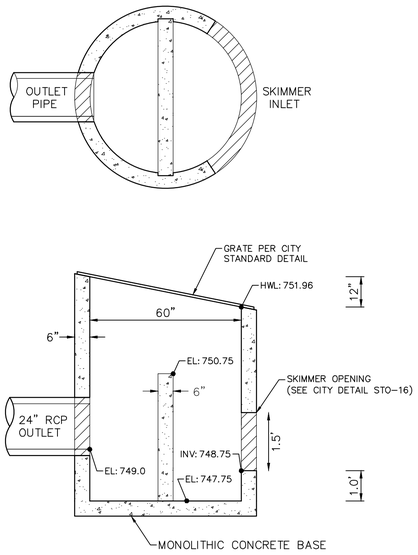

POND OUTLET CONTROL STRUCTURE OCS-100
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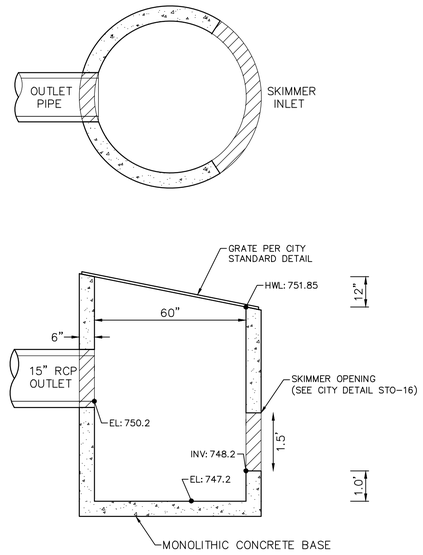

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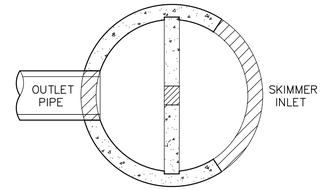

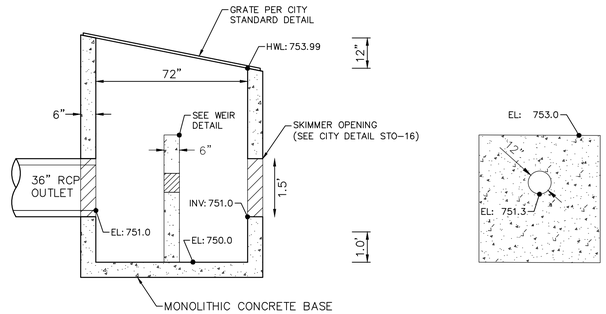

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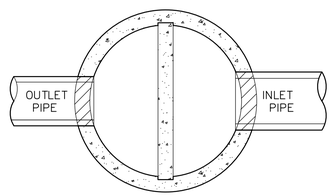

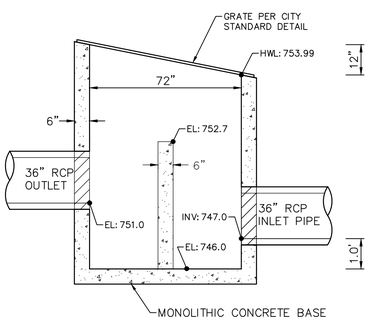

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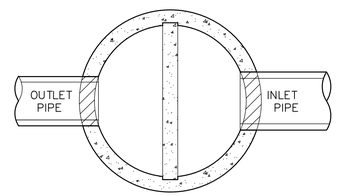

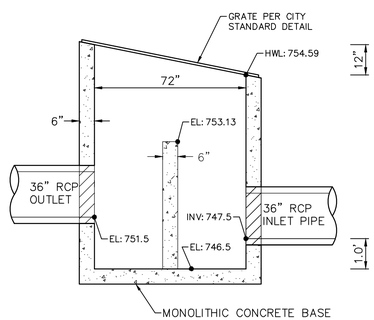

POND OUTLET CONTROL STRUCTURE OCS-400
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Name: Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY OCS DETAILS

LENNAR
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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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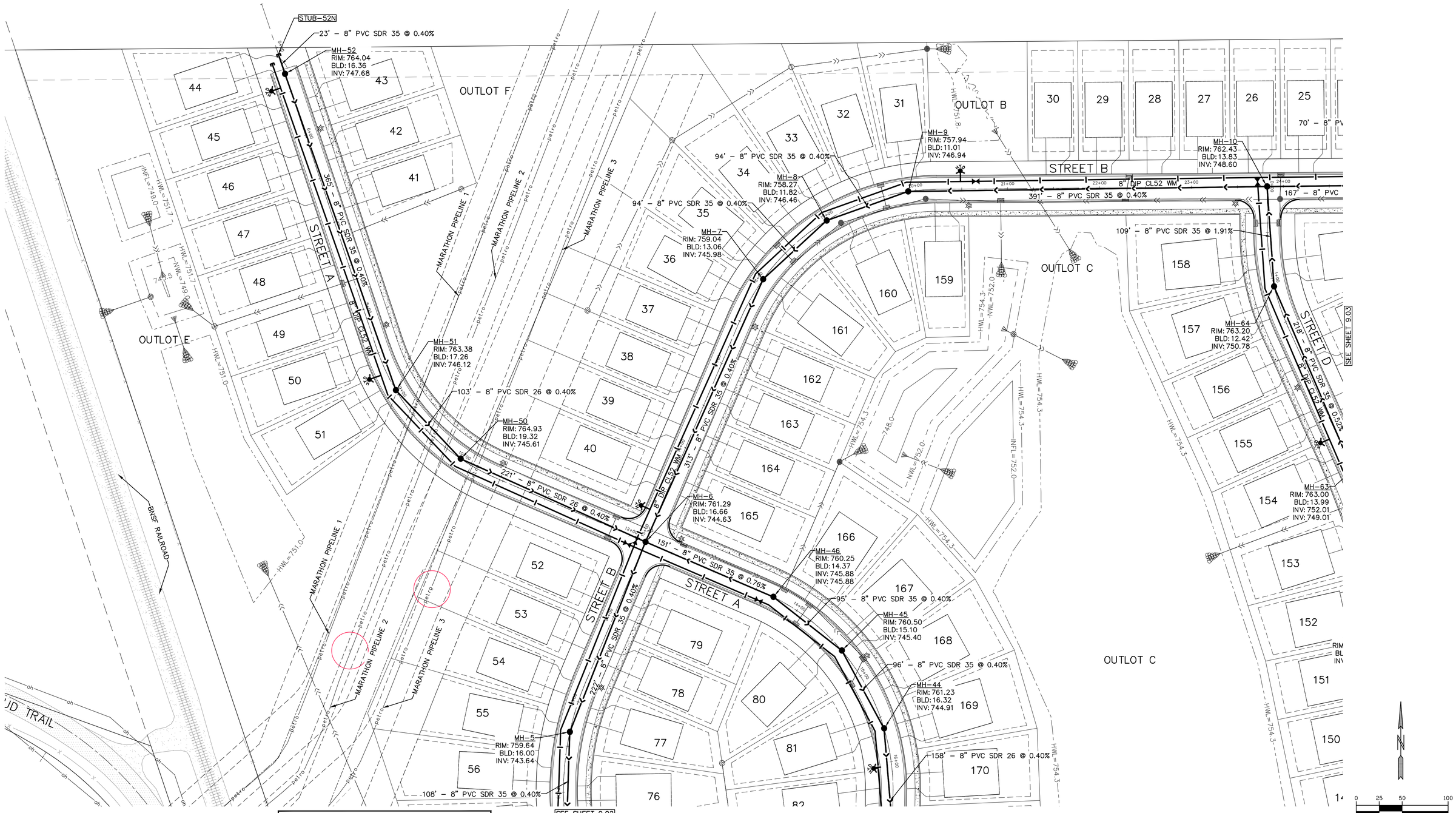

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CALL BRIAN PHILIPS 419-379-8506
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SANITARY SEWER & WATERMAIN NOTES:
1. ALL SANITARY SEWER SHALL ADHERE TO THE FOLLOWING:
   –LESS THAN 18' DEPTH = 8" PVC SDR 35
   –18' TO 28' DEPTH = 8" PVC SDR 26
   –GREATER THAN 28' DEPTH = DETERMINED BY ENGINEER
2. ALL WATERMAIN PIPE SHALL BE 8" DIP UNLESS NOTED OTHERWISE, EXCEPT HYDRANT LEADS WHICH SHALL BE 6"

PROTECT FAUNA DURING CONSTRUCTION

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

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PRELIMINARY SANITARY SEWER & WATERMAIN PLAN

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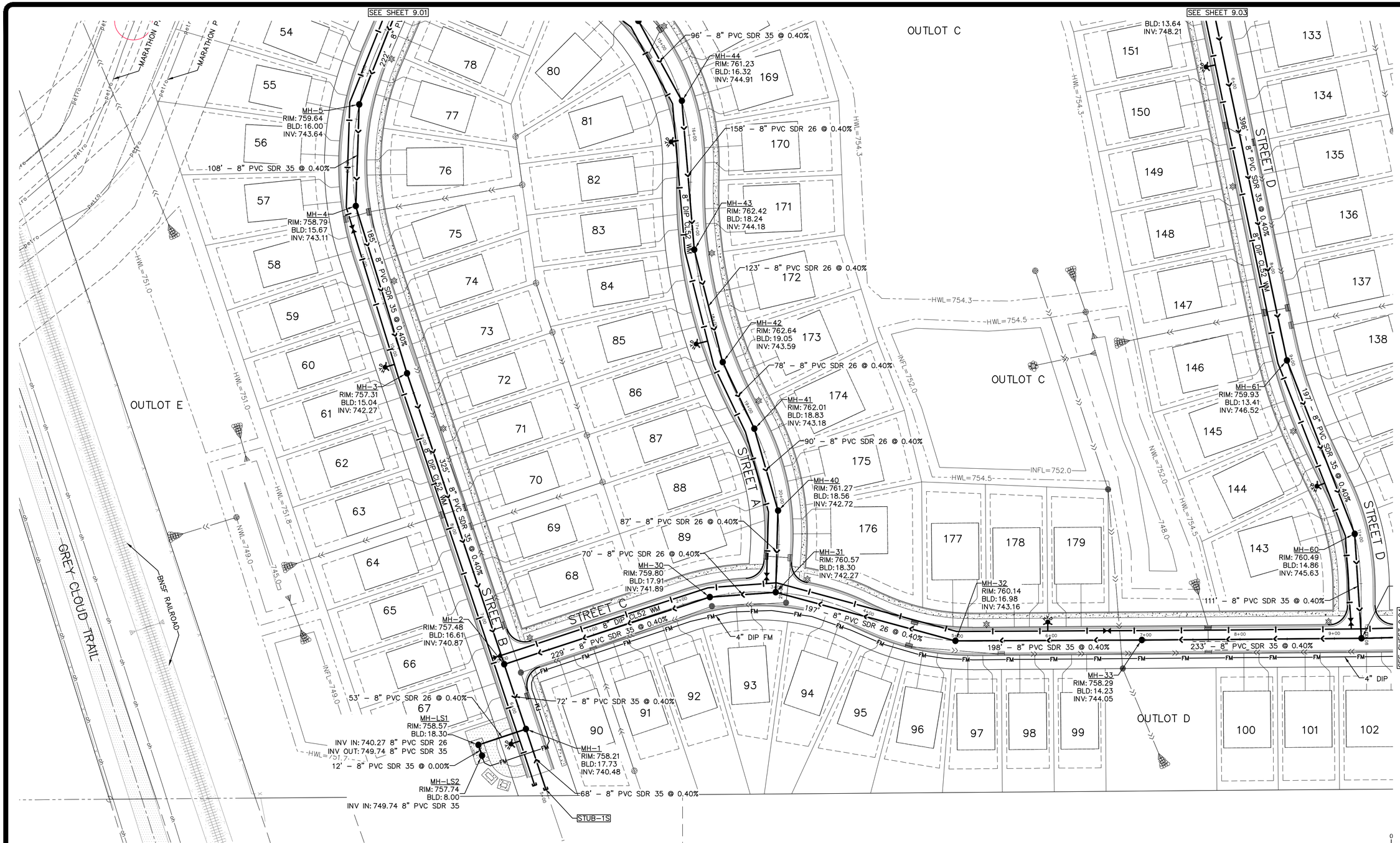

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PROTECT FAUNA DURING CONSTRUCTION

0 25 50 100
GRAPHIC SCALE IN FEET

BENCH MARK
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Drawn	SHA

PRELIMINARY SANITARY SEWER & WATERMAIN PLAN

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COTTAGE GROVE, MINNESOTA

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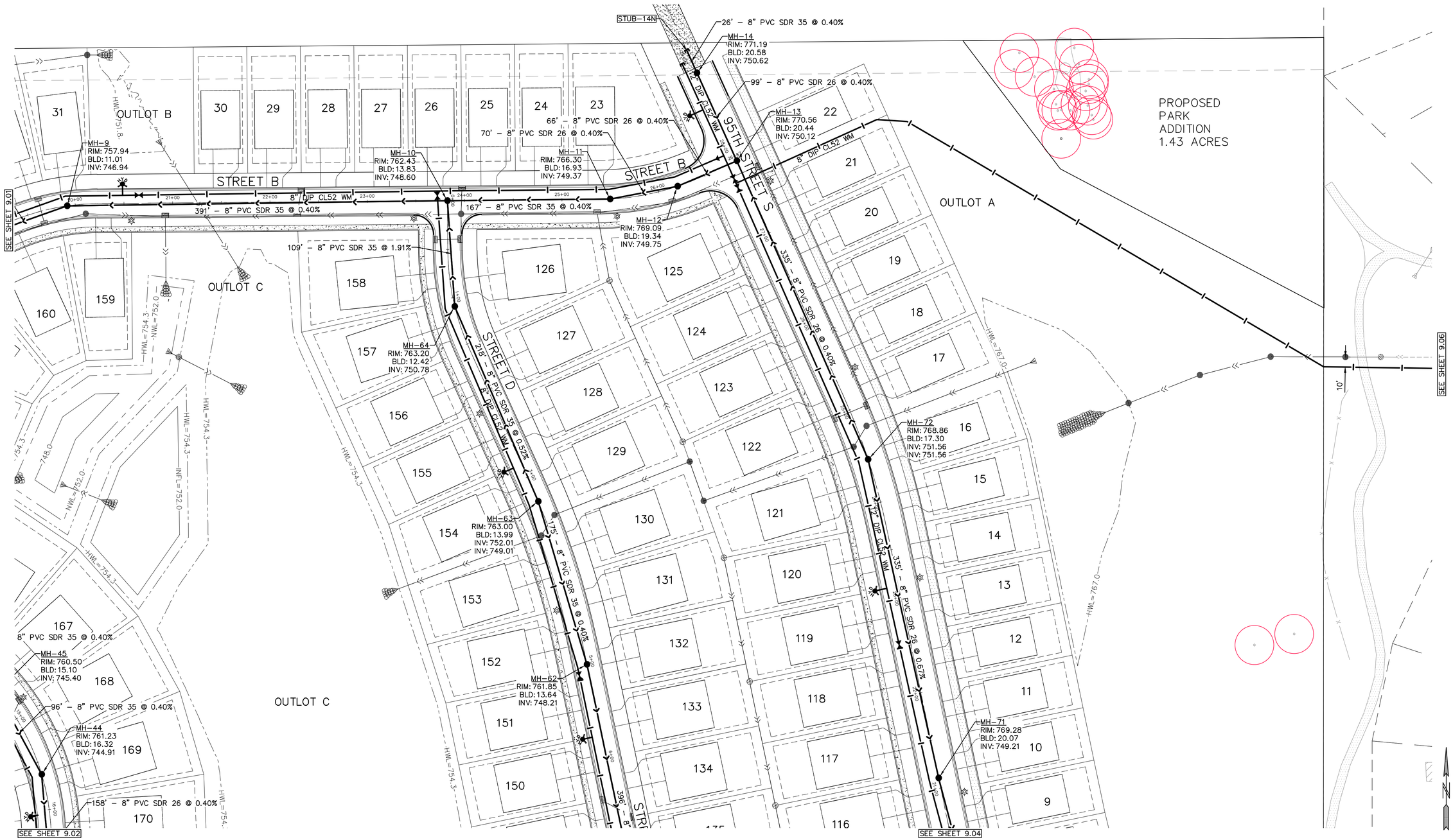

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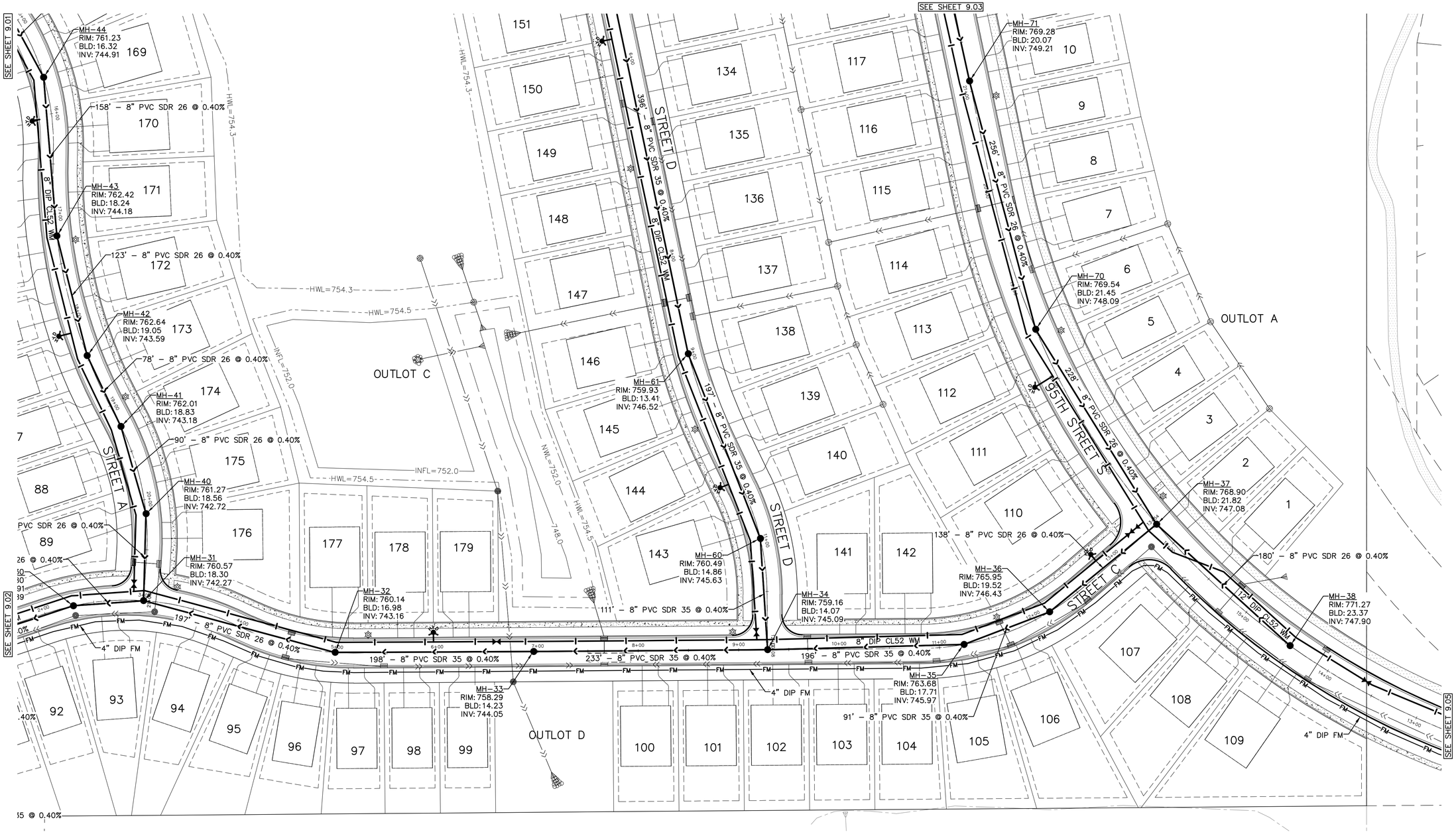

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GRAPHIC SCALE IN FEET
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94TH STREET S

SEE SHEET 9.04

SDR 26 @ 0.40%

MH–38
RIM: 771.27
BLD: 23.37
INV: 747.90

DIP FM

14+00 13+00 12+00 11+00 10+00 9+00 8+00 7+00 6+00 5+00 4+00 3+00 2+00 1+00 0+00

MH–22
RIM: 814.55
BLD: 13.05
INV: 801.50

12" DIP CL52 WM

95TH STREET S

399' – 8" DIP CL52 @ 0.40%

4" DIP FM

MH–21
RIM: 815.70
BLD: 15.90
INV: 799.80

314' – 8" DIP CL52 @ 0.40%

12" DIP CL52 WM

8"DIP CASING PIPE PLUG PER PLAN

MH–20
RIM: 817.56
BLD: 19.02

817.76
798.56

MISSISSIPPI DUNE BLVD S

NOTE:
CONNECT TO EXISTING 12"DIP WATERMAIN. CONTRACTOR TO FIELD VERIFY LOCATION & ELEVATION.

NOTE:
CONNECT TO EXISTING SANITARY SEWER. CONTRACTOR TO FIELD VERIFY LOCATION & ELEVATION.

DUNES LANE

HOUSE POOL

N

SANITARY SEWER & WATERMAIN NOTES:

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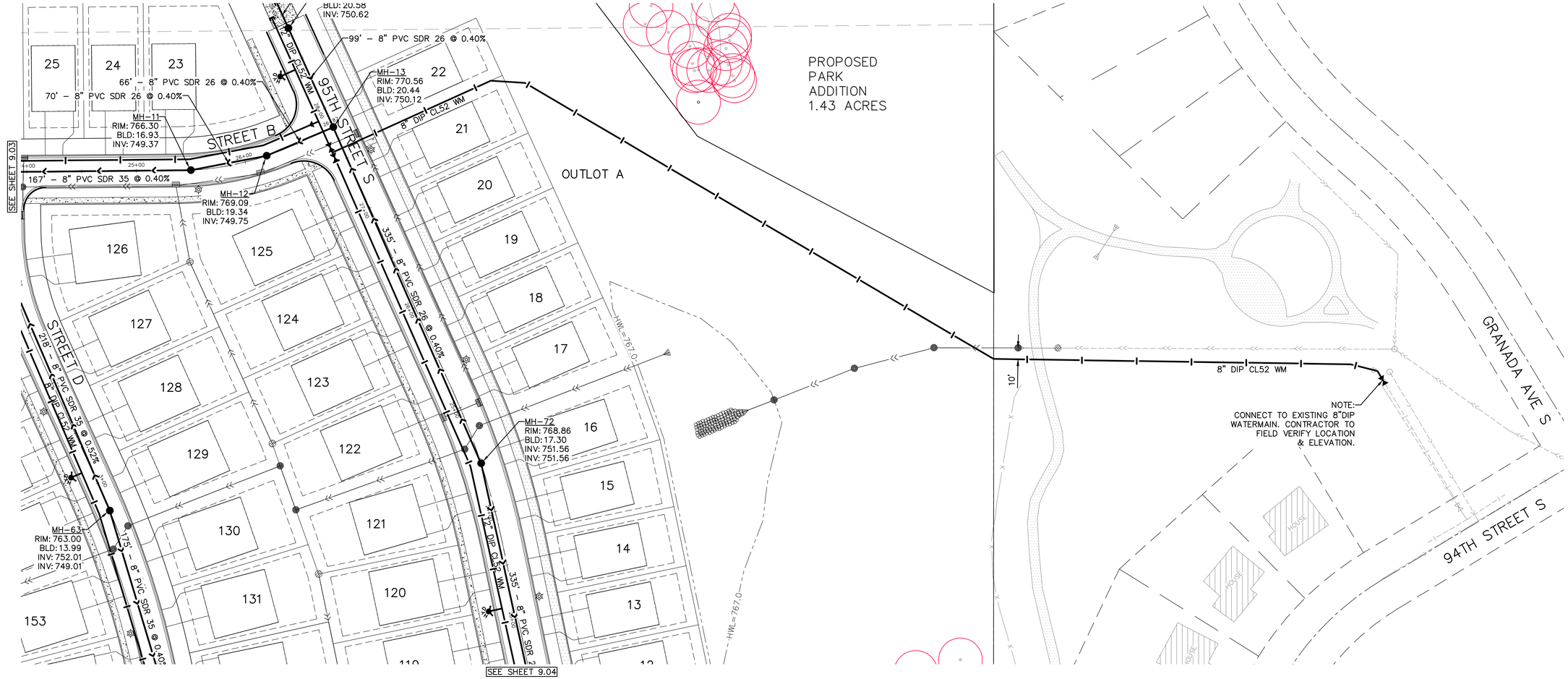

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PROTECT FAUNA DURING CONSTRUCTION

N

0 25 50 100

GRAPHIC SCALE IN FEET

BENCH MARK

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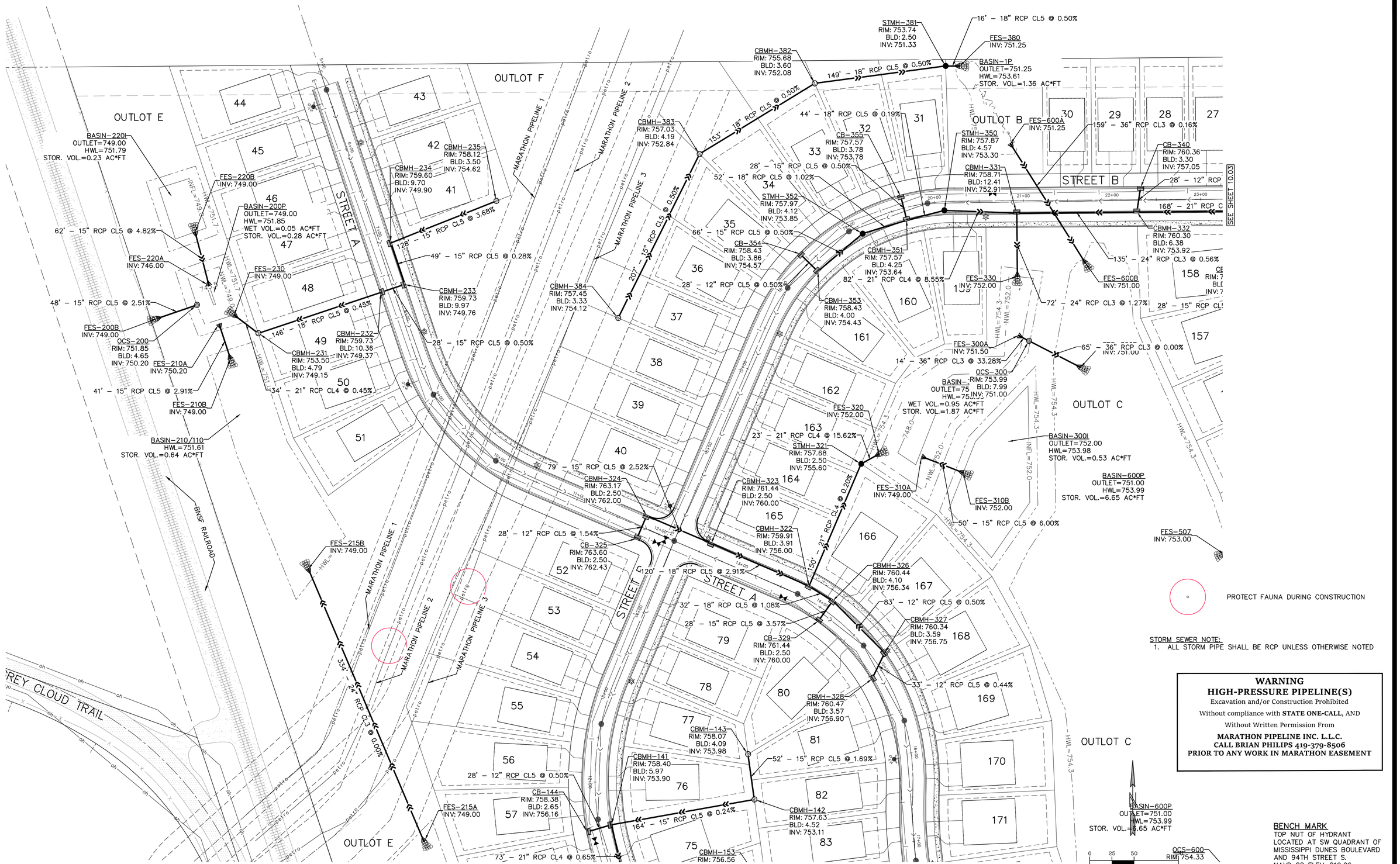
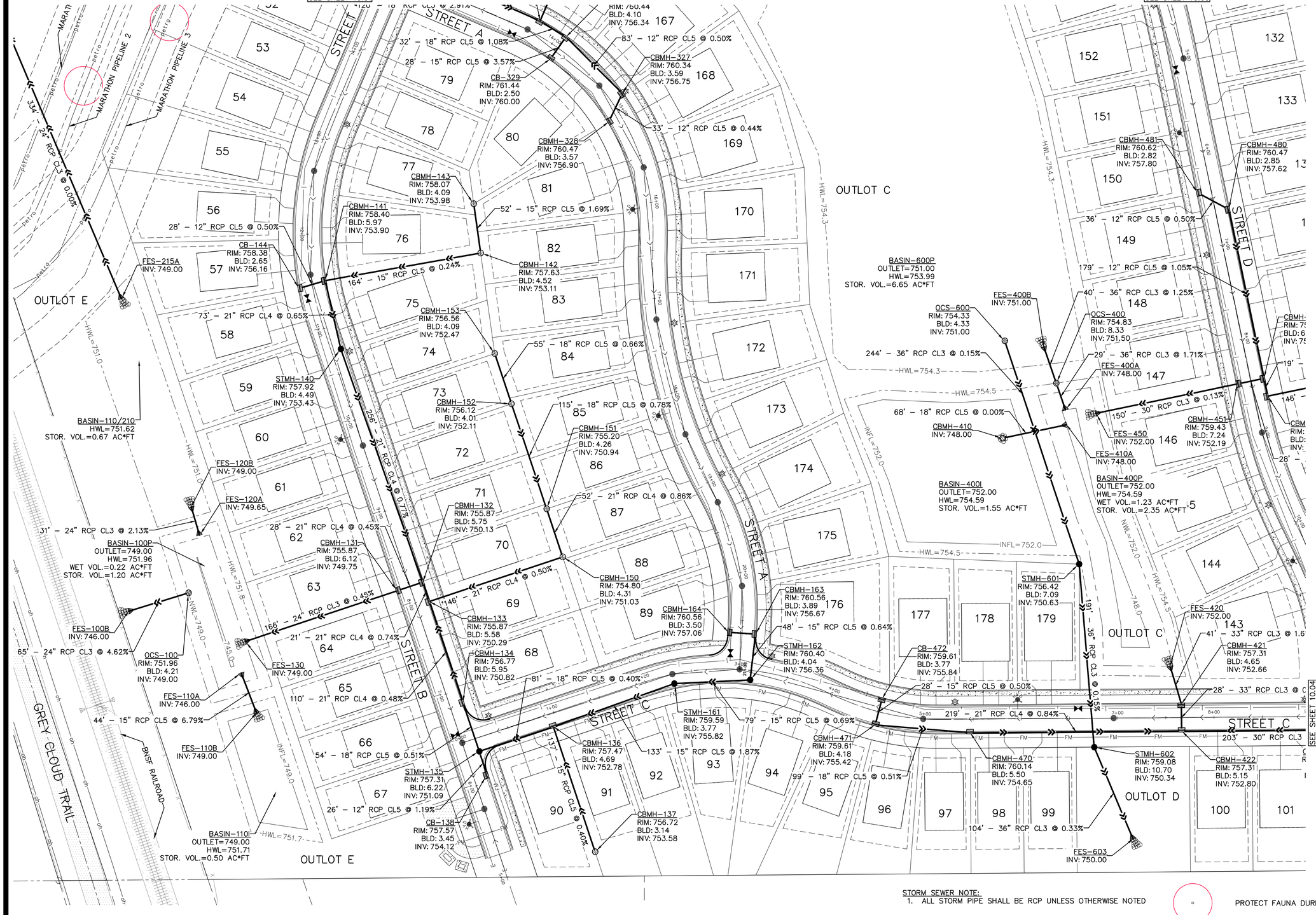

OUTLOT E
OUTLOT F
OUTLOT B
OUTLOT C
STREET A
STREET B
BASIN-220I
OUTLET=749.00
HWL=751.79
STOR. VOL.=0.23 AC*FT
FES-220B
INV: 749.00
BASIN-200P
OUTLET=749.00
HWL=751.85
WET VOL.=0.05 AC*FT
STOR. VOL.=0.28 AC*FT
62' - 15" RCP CL5 @ 4.82%
FES-220A
INV: 746.00
FES-230
INV: 749.00
48' - 15" RCP CL5 @ 2.51%
FES-200B
INV: 749.00
OCS-200
RIM: 751.85
BLD: 4.65
INV: 750.20
FES-210A
INV: 750.20
41' - 15" RCP CL5 @ 2.91%
FES-210B
INV: 749.00
BASIN-210/110
HWL=751.61
STOR. VOL.=0.64 AC*FT
128' - 15" RCP CL5 @ 3.68%
49' - 15" RCP CL5 @ 0.28%
146' - 18" RCP CL5 @ 0.45%
CBMH-233
RIM: 759.73
BLD: 9.97
INV: 749.76
CBMH-232
RIM: 759.73
BLD: 10.36
INV: 749.37
CBMH-231
RIM: 753.50
BLD: 4.79
INV: 749.15
28' - 15" RCP CL5 @ 0.50%
34' - 21" RCP CL4 @ 0.45%
CBMH-235
RIM: 758.12
BLD: 3.50
INV: 754.62
CBMH-234
RIM: 759.60
BLD: 9.70
INV: 749.90
MARATHON PIPELINE 1
MARATHON PIPELINE 2
MARATHON PIPELINE 3
BNSF RAILROAD
FES-215B
INV: 749.00
334' - 24" RCP CL3 @ 0.00%
FES-215A
INV: 749.00
CB-144
RIM: 758.38
BLD: 2.65
INV: 756.16
28' - 12" RCP CL5 @ 0.50%
CBMH-141
RIM: 758.40
BLD: 5.97
INV: 753.90
164' - 15" RCP CL5 @ 0.24%
73' - 21" RCP CL4 @ 0.65%
CBMH-153
RIM: 756.56
SEE SHEET 10.02
CBMH-142
RIM: 757.63
BLD: 4.52
INV: 753.11
52' - 15" RCP CL5 @ 1.69%
CBMH-143
RIM: 758.07
BLD: 4.09
INV: 753.98
CBMH-328
RIM: 760.47
BLD: 3.57
INV: 756.90
33' - 12" RCP CL5 @ 0.44%
CBMH-327
RIM: 760.34
BLD: 3.59
INV: 756.75
83' - 12" RCP CL5 @ 0.50%
CB-329
RIM: 761.44
BLD: 2.50
INV: 760.00
32' - 18" RCP CL5 @ 1.08%
28' - 15" RCP CL5 @ 3.57%
CBMH-326
RIM: 760.44
BLD: 4.10
INV: 756.34
120' - 18" RCP CL5 @ 2.91%
150' - 21" RCP CL4 @ 0.20%
CBMH-322
RIM: 759.91
BLD: 3.91
INV: 756.00
CB-325
RIM: 763.60
BLD: 2.50
INV: 762.43
28' - 12" RCP CL5 @ 1.54%
CBMH-324
RIM: 763.17
BLD: 2.50
INV: 762.00
79' - 15" RCP CL5 @ 2.52%
CBMH-323
RIM: 761.44
BLD: 2.50
INV: 760.00
FES-310A
INV: 749.00
FES-310B
INV: 752.00
50' - 15" RCP CL5 @ 6.00%
STMH-321
RIM: 757.68
BLD: 2.50
INV: 755.60
FES-320
INV: 752.00
23' - 21" RCP CL4 @ 15.62%
CBMH-384
RIM: 757.45
BLD: 3.33
INV: 754.12
207' - 15" RCP CL5 @ 0.50%
CBMH-383
RIM: 757.03
BLD: 4.19
INV: 752.84
153' - 18" RCP CL5 @ 0.50%
CBMH-382
RIM: 755.68
BLD: 3.60
INV: 752.08
149' - 18" RCP CL5 @ 0.50%
STMH-381
RIM: 753.74
BLD: 2.50
INV: 751.33
16' - 18" RCP CL5 @ 0.50%
FES-380
INV: 751.25
BASIN-1P
OUTLET=751.25
HWL=753.61
STOR. VOL.=1.36 AC*FT
44' - 18" RCP CL5 @ 0.19%
STMH-350
RIM: 757.87
BLD: 4.57
INV: 753.30
FES-600A
INV: 751.25
159' - 36" RCP CL3 @ 0.16%
CB-355
RIM: 757.57
BLD: 3.78
INV: 753.78
28' - 15" RCP CL5 @ 0.50%
52' - 18" RCP CL5 @ 1.02%
STMH-352
RIM: 757.97
BLD: 4.12
INV: 753.85
66' - 15" RCP CL5 @ 0.50%
CB-354
RIM: 758.43
BLD: 3.86
INV: 754.57
28' - 12" RCP CL5 @ 0.50%
CBMH-351
RIM: 757.57
BLD: 4.25
INV: 753.64
82' - 21" RCP CL4 @ 8.55%
CBMH-353
RIM: 758.43
BLD: 4.00
INV: 754.43
CBMH-331
RIM: 758.71
BLD: 12.41
INV: 752.91
28' - 12" RCP
168' - 21" RCP C
CB-340
RIM: 760.36
BLD: 3.30
INV: 757.05
CBMH-332
RIM: 760.30
BLD: 6.38
INV: 753.92
135' - 24" RCP CL3 @ 0.56%
FES-330
INV: 752.00
FES-600B
INV: 751.00
72' - 24" RCP CL3 @ 1.27%
28' - 15" RCP CL
FES-300A
INV: 751.50
14' - 36" RCP CL3 @ 33.28%
65' - 36" RCP CL3 @ 0.00%
INV: 751.00
OCS-300
RIM: 753.99
BLD: 7.99
INV: 751.00
BASIN-
OUTLET=75
HWL=75
WET VOL.=0.95 AC*FT
STOR. VOL.=1.87 AC*FT
BASIN-300I
OUTLET=752.00
HWL=753.98
STOR. VOL.=0.53 AC*FT
BASIN-600P
OUTLET=751.00
HWL=753.99
STOR. VOL.=6.65 AC*FT
FES-507
INV: 753.00
BASIN-600P
OUTLET=751.00
HWL=753.99
STOR. VOL.=6.65 AC*FT
OCS-600
RIM: 754.33
INV: 751.00
SEE SHEET 10.03
PROTECT FAUNA DURING CONSTRUCTION
HWL=754.3
HWL=752.0
HWL=748.0
INFL=752.0
INFL=749.0
HWL=751.7
HWL=749.0
HWL=751.7
HWL=751.7
HWL=754.3
HWL=754.3
HWL=754.3



WARNING
HIGH-PRESSURE PIPELINE(S)
Excavation and/or Construction Prohibited
Without compliance with **STATE ONE-CALL**, AND
Without Written Permission From
MARATHON PIPELINE INC. L.L.C.
CALL BRIAN PHILIPS 419-379-8506
PRIOR TO ANY WORK IN MARATHON EASEMENT

0 25 50 100
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

STORM SEWER NOTE:
1. ALL STORM PIPE SHALL BE RCP UNLESS OTHERWISE NOTED

PROTECT FAUNA DURING CONSTRUCTION

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I hereby certify that this plan 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
Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY STORM SEWER PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

00-ENG-123105-SHEET-STRM

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STORM SEWER NOTE:
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PROTECT FAUNA DURING CONSTRUCTION

PROPOSED PARK ADDITION 1.43 ACRES

OUTLOT A

OUTLOT B

OUTLOT C

STREET B

STREET D

65TH STREET S

BASIN-1P
OUTLET=751.25
HWL=753.61
STOR. VOL.=1.36 AC*FT

BASIN-300I
OUTLET=752.00
HWL=753.98
STOR. VOL.=0.53 AC*FT

BASIN-600P
OUTLET=751.00
HWL=753.99
STOR. VOL.=6.65 AC*FT

BASIN-300P
OUTLET=751.00
HWL=753.99
STOR. VOL.=6.65 AC*FT

BASIN-500P
OUTLET=762.00
HWL=767.33
STOR. VOL.=2.33 AC*FT

BASIN-
OUTLET=75
HWL=75
WET VOL.=0.95 AC*FT
STOR. VOL.=1.87 AC*FT

CB-355
IM: 757.57
BLD: 3.78
NV: 753.78

STMH-350
RIM: 757.87
BLD: 4.57
INV: 753.30

CBMH-331
RIM: 758.71
BLD: 12.41
INV: 752.91

FES-600A
INV: 751.25

CB-340
RIM: 760.36
BLD: 3.30
INV: 757.05

STMH-333
RIM: 762.28
BLD: 7.64
INV: 754.65

CB-341
RIM: 762.30
BLD: 3.79
INV: 758.51

CBMH-334
RIM: 765.34
BLD: 9.74
INV: 755.61

CBMH-335
RIM: 768.49
BLD: 6.26
INV: 762.23

CBMH-336
RIM: 770.11
BLD: 7.18
INV: 762.92

CBMH-337
RIM: 768.29
BLD: 4.04
INV: 764.25

CB-338
RIM: 768.29
BLD: 3.77
INV: 764.52

CBMH-332
RIM: 760.30
BLD: 6.38
INV: 753.92

CBMH-342
RIM: 762.40
BLD: 5.54
INV: 756.86

CB-343
RIM: 762.40
BLD: 5.40
INV: 757.00

CBMH-351
RIM: 757.57
BLD: 4.25
INV: 753.64

FES-330
INV: 752.00

FES-600B
INV: 751.00

CBMH-360
RIM: 760.00
BLD: 4.04
INV: 755.96

FES-300A
INV: 751.50

OCS-300
RIM: 753.99
BLD: 7.99
INV: 751.00

FES-320
NV: 752.00

FES-310A
INV: 749.00

FES-310B
INV: 752.00

CBMH-326
RIM: 760.44
BLD: 4.10
INV: 756.34

CBMH-327
RIM: 760.34
BLD: 3.59
INV: 756.75

CBMH-481
RIM: 760.62
BLD: 2.82
INV: 757.80

CBMH-480
RIM: 760.47
BLD: 2.85
INV: 757.62

CBMH-361
RIM: 761.50
BLD: 3.77
INV: 757.73

STMH-504
RIM: 761.93
BLD: 4.90
INV: 757.03

STMH-506
RIM: 762.57
BLD: 7.62
INV: 754.95

STMH-505
RIM: 762.67
BLD: 7.42
INV: 755.25

FES-507
INV: 753.00

STMH-501
RIM: 768.52
BLD: 8.73
INV: 759.79

STMH-502
RIM: 768.59
BLD: 9.10
INV: 759.49

STMH-503
RIM: 762.80
BLD: 5.26
INV: 757.54

CBMH-458
RIM: 761.73
BLD: 3.77
INV: 757.96

CBMH-457
RIM: 760.69
BLD: 4.12
INV: 756.57

CBMH-456
RIM: 759.65
BLD: 4.09
INV: 755.56

CBMH-460
RIM: 768.40
BLD: 10.84
INV: 757.55

CBMH-461
RIM: 768.40
BLD: 10.65
INV: 757.75

CBMH-455
RIM: 758.57
BLD: 4.65
INV: 753.92

CBMH-452
RIM: 759.43
BLD: 6.85

FES-400B
INV: 751.00

OCS-600
RIM: 754.33
BLD: 4.33
INV: 751.00

OCS-400
RIM: 754.83
BLD: 8.33
INV: 751.50

FES-500
INV: 762.00

STMH-551
RIM: 767.70
BLD: 4.70
INV: 763.00

STMH-552
RIM: 790.36
BLD: 19.01
INV: 771.35

STMH-553
RIM: 801.14
BLD: 15.90
INV: 785.24

STMH-554
RIM: 803.09
BLD: 2.50
INV: 800.84

FES-550
INV: 762.00

CBMH-463
RIM: 767.25
BLD: 8.22
INV: 759.03

49' – 18" RCP CL5 @ 0.50%
3" RCP CL5 @ 0.19%
97' – 18" RCP CL5 @ 0.46%
159' – 36" RCP CL3 @ 0.16%
78' – 21" RCP CL4 @ 1.53%
28' – 12" RCP CL5 @ 0.49%
28' – 15" RCP CL5 @ 0.50%
168' – 21" RCP CL4 @ 0.43%
140' – 21" RCP CL4 @ 0.51%
26' – 15" RCP CL5 @ 0.50%
71' – 18" RCP CL5 @ 0.50%
210' – 18" RCP CL5 @ 0.45%
135' – 24" RCP CL3 @ 0.56%
82' – 21" RCP CL4 @ 8.55%
72' – 24" RCP CL3 @ 1.27%
28' – 15" RCP CL5 @ 0.50%
38' – 15" RCP CL5 @ 0.50%
182' – 15" RCP CL5 @ 0.92%
65' – 36" RCP CL3 @ 0.00%
14' – 36" RCP CL3 @ 33.28%
186' – 15" RCP CL5 @ 1.19%
43' – 15" RCP CL5 @ 1.19%
164' – 15" RCP CL5 @ 1.19%
25' – 15" RCP CL5 @ 1.19%
15.62%
50' – 15" RCP CL5 @ 6.00%
25' – 15" RCP CL5 @ 1.19%
149' – 15" RCP CL5 @ 1.19%
163' – 15" RCP CL5 @ 1.20%
130' – 15" RCP CL5 @ 0.86%
130' – 18" RCP CL5 @ 0.78%
135' – 18" RCP CL5 @ 0.81%
83' – 12" RCP CL5 @ 0.50%
33' – 12" RCP CL5 @ 0.44%
36' – 12" RCP CL5 @ 0.50%
179' – 12" RCP CL5 @ 1.05%
40' – 36" RCP CL3 @ 1.25%
151' – 21" RCP CL4 @ 2.23%
44' – 24" RCP CL3 @ 0.64%
38' – 21" RCP CL4 @ 0.51%
77' – 24" RCP CL3 @ 7.73%
75' – 24" RCP CL3 @ 7.85%
79' – 24" RCP CL3 @ 7.49%
31' – 24" RCP CL3 @ 3.23%
71' – 18" RCP CL5 @ 0.45%
106' – 15" RCP CL5 @ 0.49%

SEE SHEET 10.01
SEE SHEET 10.02
SEE SHEET 10.04

NOTE:
CONNECT TO EXISTING STORM SEWER. REMOVE EXISTING FES. CONTRACTOR TO FIELD VERIFY LOCATION & ELEVATION.

0 25 50 100
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT LOCATED AT SW QUADRANT OF MISSISSIPPI DUNES BOULEVARD AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-STRM

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Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan 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
Name: Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY STORM SEWER PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

10.03 OF 47

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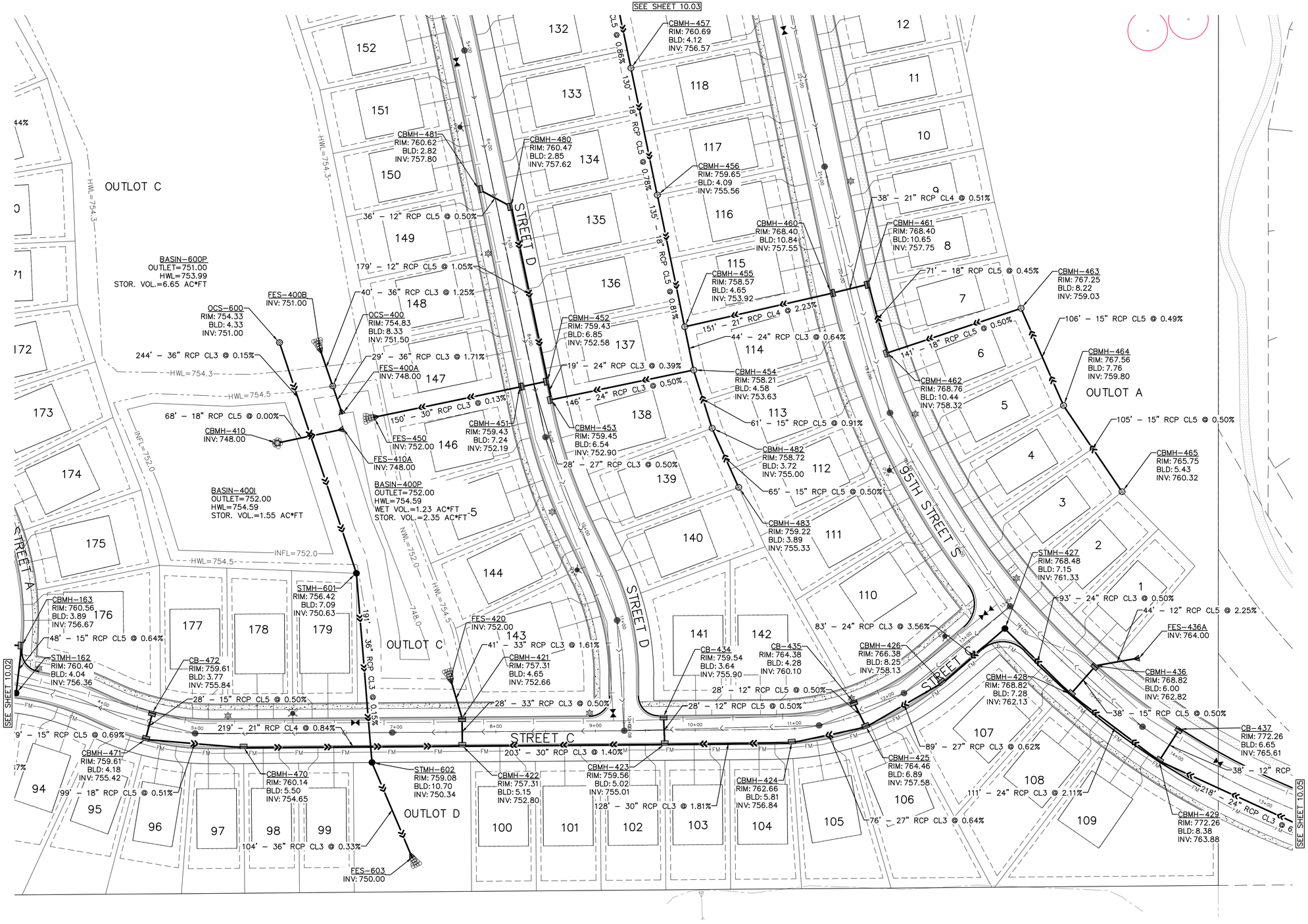

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

STORM SEWER NOTE:
1. ALL STORM PIPE SHALL BE RCP UNLESS OTHERWISE NOTED

PROTECT FAUNA DURING CONSTRUCTION

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Drawn	SHA

PRELIMINARY STORM SEWER PLAN

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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

10.04 OF 47

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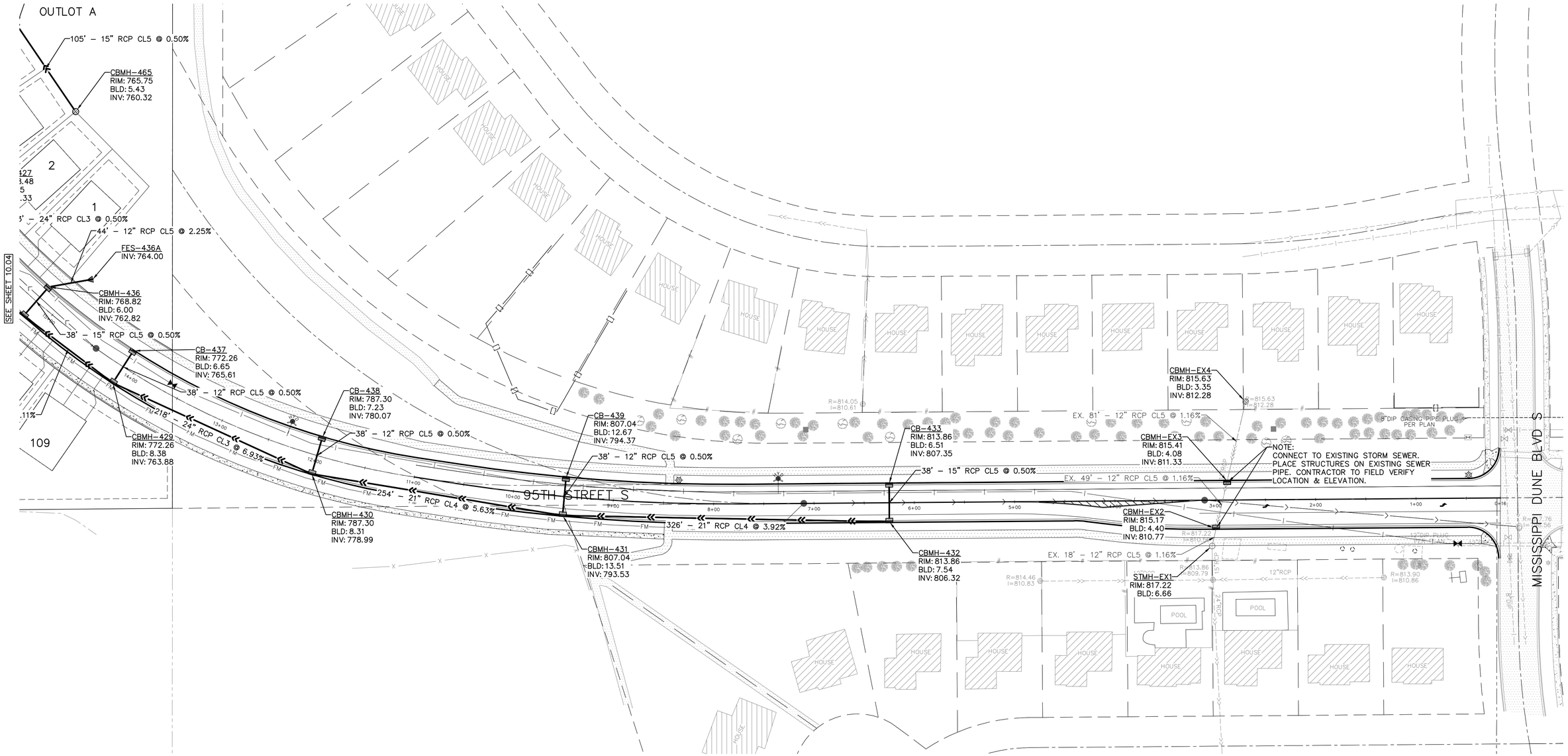

PROTECT FAUNA DURING CONSTRUCTION

STORM SEWER NOTE:
1. ALL STORM PIPE SHALL BE RCP UNLESS OTHERWISE NOTED

N

0 25 50 100
GRAPHIC SCALE IN FEET

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105-SHEET-STRM

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Reg. No. 47504 Date 01-16-26

Revisions

Date	01-16-26
Designed	NAP
Drawn	SHA

PRELIMINARY STORM SEWER PLAN

LENNAR
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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

10.05 OF 47

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STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

TO COMPLY WITH THE GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY

THE FULL STORMWATER MANAGEMENT PLAN IS A SEPARATE DOCUMENT AVAILABLE UPON REQUEST

CONSTRUCTION ACTIVITY INFORMATION

PROJECT NAME: TALCOTT GLEN
PROJECT LOCATION:
95TH STREET SOUTH
COTTAGE GROVE, MINNESOTA 55016
WASHINGTON COUNTY
LATITUDE/LONGITUDE: 44.811780, -92.969636

TOTAL PROJECT AREA DISTURBED: 61.1 ACRES
TOTAL EXISTING IMPERVIOUS AREA: X.X ACRES
TOTAL PROPOSED IMPERVIOUS AREA: 23.7 ACRES

RECEIVING WATERS:
XXXX CREEK

DATES OF CONSTRUCTION:
CONSTRUCTION START DATE: MONTH 1, 202Y EST. COMPLETION DATE: MONTH 1, 202X

CONTACT INFORMATION

PROJECT OWNER
XXCOMPANYXX
FIRST LASTNAME – TITLE
XXX HIGHWAY X
City, State Zip
PHONE XXX-XXX-XXXX
EMAIL: XXX@XXXXXXXXXX.COM

CONTRACTOR:
XXCOMPANYXX
FIRST LASTNAME – TITLE
XXX HIGHWAY
City, State Zip
PHONE XXX-XXX-XXXX
EMAIL: XXX@XXXXXXXXXX.COM

GENERAL CONSTRUCTION PROJECT INFORMATION

THE CONSTRUCTION OF NEW ROADWAYS, 95TH STREET S, STREET A, STREET B, STREET C, AND STREET D, AND 179 LOTS FOR RESIDENTIAL DEVELOPMENT. THIS CONSTRUCTION WILL COMPLETE GRADING, INSTALLATION OF SANITARY SEWER, WATERMAIN, STORM SEWER, CONCRETE CURB AND GUTTER, BITUMINOUS SURFACING, STREET LIGHTING, LANDSCAPING, EROSION CONTROL, AND TURF ESTABLISHMENT.

BASED ON THE SOIL BORINGS THAT WERE RETRIEVED FROM THE SITE, SOILS ENCOUNTERED ON SITE ARE CLAYEY SAND, SILTY SAND, POORLY GRADED SAND, SANDY LEAN CLAY, LEAN CLAY, AND HIGHLY WEATHERED BEDROCK.

GENERAL SITE INFORMATION (III.A)

1. THE PROJECT IS REQUIRED TO MEET THE CONSTRUCTION STORMWATER REQUIREMENTS FOR THE NPDES GENERAL STORMWATER PERMIT AND MNDOT SPEC. 1717, 2573, AND 2575.
2. THE CONTRACTOR SHALL INSTALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES IN ACCORDANCE WITH MNDOT GENERAL CONDITIONS 2573 TO BE INSPECTED BY THE CITY PRIOR TO STARTING ANY CONSTRUCTION OPERATION THAT MAY CAUSE ANY SEDIMENTATION OR SILTATION AT THE SITE.
3. LOCATIONS, TYPE AND QUANTITY OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES CAN BE FOUND WITHIN THE CONSTRUCTION PLANS.
4. THE PROJECT IS NOT LOCATED WITHIN 1 MILE AND FLOWS TO AN IMPAIRED WATER BODY. THEREFORE, THE PROJECT WILL NOT NEED TO STABILIZE ALL EXPOSED SOILS NO LATER THAN 7 DAYS. DITCHES OR RAVINES THROUGHOUT THE PROJECT THAT ARE DISTURBED SHALL BE STABILIZED WITHIN 24 HOURS.
5. THE PROJECT IS NOT LOCATED WITH 1 MILE AND FLOWS TO AN IMPAIRED WATER BODY. THEREFORE, TEMPORARY SEDIMENT BASINS ARE NEEDED FOR DRAINAGE AREAS OF 10 ACRES OR MORE FLOWING TO A COMMON LOCATION.
6. THE CONTRACTOR SHALL INSTALL ADDITIONAL BMP'S AS NECESSARY TO PREVENT SEDIMENT TRANSPORT PER PERMIT REQUIREMENTS
7. INLET PROTECTION, SILT FENCE AND BIOROLLS SHALL BE INSTALLED IN THE FIELD AS SHOWN ON THE PLANS AS DIRECTED BY THE ENGINEER.
8. PERMIT COVERAGE FOR THIS PROJECT CANNOT BE ISSUED UNTIL ALL OF THE REQUIREMENTS OF SECTION 22 OF THE GENERAL STORMWATER PERMIT WITH REGARDS TO WETLAND PERMITTING, DECISIONS, AND MITIGATIVE SEQUENCING HAVE BEEN FINALIZED AND DOCUMENTED.

THE INTENDED SEQUENCING OF MAJOR CONSTRUCTION ACTIVITIES IS AS FOLLOWS:
1. INSTALL STABILIZED ROCK CONSTRUCTION ENTRANCE
2. INSTALLATION OF SILT FENCE AROUND SITE
3. INSTALL DOUBLE SILT FENCE AROUND WETLAND AREAS
4. INSTALL ORANGE CONSTRUCTION FENCING AROUND INFILTRATION AREAS.
5. CLEAR AND GRUB FOR TEMPORARY SEDIMENT BASIN/POND INSTALL.
6. CONSTRUCT TEMP PONDS – CAN USE PROPOSED BASINS AS TEMP PONDS
7. CLEAR AND GRUB REMAINDER OF SITE
8. STRIP AND STOCKPILE TOPSOIL
9. ROUGH GRADING OF SITE
10. STABILIZE DENUDED AREAS AND STOCKPILES
11. INSTALL SANITARY SEWER, WATER MAIN, STORM SEWER AND SERVICES
12. INSTALL SILT FENCE/INLET PROTECTION AROUND CB'S
13. INSTALL STREET SECTION
14. INSTALL CURB AND GUTTER
15. BITUMINOUS ON STREETS
16. INSTALL SMALL UTILITIES (GAS, ELECTRIC, PHONE, CABLE, ETC.)
17. FINAL GRADE BOULEVARD, INSTALL SEED AND MULCH
18. REMOVE ACCUMULATED SEDIMENT FROM BASIN/POND
19. FINAL GRAD POND/INFILTRATION BASINS (DO NOT COMPACT SOILS IN INFILTRATION AREAS.)
20. WHEN ALL CONSTRUCTION ACTIVITY IS COMPLETE AND THE SITE IS STABILIZED BY EITHER SEED OR SOD/LANDSCAPING, REMOVE SILT FENCE AND RESEED AREAS DISTURBED BY THE REMOVAL.

ENVIRONMENTALLY SENSITIVE AREAS:
WETLANDS – THERE ARE NO/IMPACTS TO WETLANDS PER SECTION 22 OF THE PERMIT. SEE ATTACHED WETLAND PLAN FOR IMPACTS AND MITIGATION. THE APPROVED WETLANDS PERMIT IS ON FILE WITH THE OWNER.

SPECIAL AND IMPAIRED WATERS – N/A IMPAIRMENT(S): N/A

TMDL – N/A

SCIENTIFIC OR NATURAL AREAS – THERE ARE NO SNA WITHIN 1 MILE OF THE PROJECT.

KARST AREA – THE PROJECT IS NOT LOCATED WITHIN A KARST AREA.

CALCAREOUS FENS – THE PROJECT DOES NOT DISCHARGE TO A FEN.

TRAINING (21.1)

THE CONTRACTOR SHALL ENSURE THAT THE TRAINING REQUIREMENTS IN PART 21.1 OF THE GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY ARE COMPLIED WITH. THE INDIVIDUALS TRAINED WILL BE RECORDED IN THE SWPPP BEFORE THE START OF CONSTRUCTION OR AS SOON AS PERSONNEL FOR THE PROJECT HAVE BEEN DETERMINED. PROVIDE INFORMATION IN THE SPACE PROVIDED BELOW FOR ADDITIONAL PERSONNEL ON THE PROJECT AS REQUIRED BY THE PERMIT.

SWPPP DESIGNER	COMPANY	CERTIFICATION
SWPPP INSTALLER		
SWPPP INSPECTOR		

PERMANENT STORMWATER MANAGEMENT SYSTEM (15.1)

1. THE PROJECT WILL CREATE A NEW CUMULATIVE IMPERVIOUS SURFACE GREATER THAN OR EQUAL TO ONE ACRE. THE PROJECT PROPOSES TO CONSTRUCT A STORMWATER TREATMENT SYSTEM TO COLLECT RUNOFF TO BE DISCHARGED OFFSITE. TREATMENT FOR THE RUNOFF IS TO BE EXECUTED BY THE PROPOSED STORMWATER MANAGEMENT SYSTEM. CALCULATIONS DETAILING THE BASINS ARE AVAILABLE UPON REQUEST.

BMP SELECTION & STORMWATER MANAGEMENT (7.1)

1. THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE BMPS IDENTIFIED IN THIS PLAN IN AN APPROPRIATE AND FUNCTIONAL MANNER AND IN ACCORDANCE WITH RELEVANT MANUFACTURER SPECIFICATIONS AND ACCEPTED ENGINEERING PRACTICES TO MINIMIZE THE DISCHARGE OF POLLUTANTS IN STORMWATER FROM CONSTRUCTION ACTIVITIES. THESE BMPS SHALL BE INSPECTED BY THE CITY.
2. THE CONTRACTOR SHOULD CONSTRUCT TEMPORARY OR PERMANENT WET SEDIMENTATION BASINS IDENTIFIED IN THIS PLAN (WHEN REQUIRED, SEE SECTION 14 AND 15) AS A FIRST STEP IN CONSTRUCTION AND STORMWATER ROUTED TO THESE.
3. THE CONTRACTOR MUST PHASE CONSTRUCTION SO TO LIMIT DISTURBED LAND TO AREAS THAT CAN BE EFFECTIVELY INSPECTED AND MAINTAINED. PER SECTION 11 OF THE PERMIT.
4. ALL EROSION CONTROL NETTING USED ON THE SITE AS PART OF THE SOIL STABILIZATION TECHNIQUES, ARE ENCOURAGED TO USE PRODUCTS THAT HAVE BEEN SHOWN TO MINIMIZE IMPACTS ON WILDLIFE. THE U.S. FISH & WILDLIFE SERVICE RECOMMENDS USING TYPES OF NETTING PRACTICES THAT ARE CONSIDERED "WILDLIFE FRIENDLY," INCLUDING THOSE THAT USE NATURAL FIBER OR 100 PERCENT BIODEGRADABLE MATERIALS AND THAT USE A LOOSE WEAVE WITH A NON-WELDED, MOVABLE JOINTED NETTING.

EROSION PREVENTION PRACTICES (8.1)

1. THE CONTRACTOR SHALL PHASE THE WORK TO LIMIT THE OVERALL DISTURBANCE OF THE PROJECT AT ANY GIVEN TIME. NATURAL VEGETATIVE BUFFERS SHALL BE MAINTAINED BETWEEN THE WORK LIMITS AND ALL SURFACE WATERS OR WETLANDS THROUGHOUT THE COURSE OF CONSTRUCTION.
2. THE AREAS NOT TO BE DISTURBED WILL BE DELINEATED THROUGH THE USE OF SILT FENCE, BIOROLLS AND CONSTRUCTION STAKING.
3. THE CONTRACTOR SHALL MAINTAIN A NATURAL, VEGETATED BUFFER ADJACENT TO THE WETLANDS WHEREVER POSSIBLE DURING CONSTRUCTION.
4. TEMPORARY COVER SHALL BE PROVIDED USING TEMPORARY SEED WITH EROSION CONTROL BLANKET OR HYDROMULCH.
5. PERMANENT COVER SHALL BE PROVIDED AS DETAILED ON THE CONSTRUCTION PLANS USING SEED WITH EROSION CONTROL BLANKET OR HYDROMULCH. PERMITTEES MUST NOT USE MULCH, HYDROMULCH, TACKIFIER, POLYACRYLAMIDE OR SIMILAR EROSION PREVENTION PRACTICES WITHIN ANY PORTION OF THE NORMAL WETTED PERIMETER OF A TEMPORARY OR PERMANENT DRAINAGE DITCH OR SWALE SECTION WITH A CONTINUOUS SLOPE OF GREATER THAN 2 PERCENT
6. THE CONTRACTOR IS REQUIRED TO PROVIDE ANY ADDITIONAL EROSION PREVENTION MEASURES NECESSARY FOR CONFORMANCE TO THE NPDES CONSTRUCTION PERMIT THROUGHOUT CONSTRUCTION.
7. STABILIZATION TIME FRAMES – INITIATE STABILIZATION IMMEDIATELY WHEN CONSTRUCTION TEMPORARILY OR PERMANENTLY CEASES ON A PORTION OF THE SITE. COMPLETE STABILIZATION WITHIN THE TIME FRAMES LISTED.

7.1.	LAST 200 LINEAL FEET OF DITCH OR SWALE	24 HOURS OF CONNECTION TO SURFACE WATERS
7.2.	REMAINING DITCH OR SWALE	7 DAYS
7.3.	PIPE AND CULVERT OUTLETS	24 HOURS
7.4.	EXPOSED SOIL AND STOCKPILES	7 DAYS

SEDIMENT CONTROL PRACTICES (9.1)

1. SILT FENCE AND ALL OTHER DOWN GRADIENT PERIMETER CONTROL DEVICES SHALL BE INSTALLED AND INSPECTED BY THE CITY PRIOR TO ANY LAND DISTURBANCE ACTIVITY.
2. EROSION CONTROL BLANKET AND BIOROLLS SHALL BE PLACED WITHIN THE DITCH BOTTOMS WITHIN 24 HOURS AFTER FINE GRADING.
3. PRIOR TO STOCKPILING SOIL, SEDIMENT CONTROLS AT THE BASE OF THE STOCKPILE NED TO BE INSTALLED. STOCKPILES LOCATED ON SITE SHALL BE SEEDED, MULCHED OR BLANKETED AND HAVE SILT FENCE OR A BMP APPROVED BY THE ENGINEER IN THE FIELD PLACED AROUND THE BASE OF THE STOCKPILE.
4. MAINTAIN A 50-FOOT NATURAL BUFFER DOWN GRADIENT OF THE SITE OR REDUNDANT SEDIMENT CONTROLS IF BUFFER IS NOT FEASIBLE, WHEN THE CONSTRUCTION IS WITHIN 50 FEET OF A SURFACE WATER.
5. MINIMIZE SOIL COMPACTION BY NOT DISTURBING AREAS OUTSIDE OF THE CONSTRUCTION LIMITS. DELINEATE AREAS NOT TO BE DISTURBED PRIOR TO STARTING GROUND DISTURBING ACTIVITIES. PRESERVE ALL NATURAL BUFFERS SHOWN ON THE PLANS. NO HEAVY CONSTRUCTION EQUIPMENT ALLOWED IN FILTRATION OR INFILTRATION AREAS PER PLANS.
6. CONTRACTOR SHALL USE STREET SWEEPING IN ADDITION TO VEHICLE TRACKING BMPS IF THESE BMPS ALONE ARE NOT ADEQUATE TO PREVENT SEDIMENT TRACKING ONTO THE STREET.
7. ANY SEDIMENT CONTROL PRACTICE USING SOIL IMPLEMENTED BY THE CONTRACTOR SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 24 HOURS OF INSTALLATION.

DEWATERING AND BASIN DRAINING (10.1)

1. DEWATERING IS NOT ANTICIPATED ON THIS PROJECT. HOWEVER, IF DEWATERING IS NECESSARY, THE CONTRACTOR SHALL SUBMIT A PLAN TO THE ENGINEER FOR ACCEPTANCE.
2. IF DEWATERING IS NECESSARY, IT MUST NOT CAUSE NUISANCE CONDITIONS IN SURFACE WATERS FROM DEWATERING AND BASIN DRAINING DISCHARGE.
3. IF THE DEWATERING OR PUMPING PROCESS IS TURBID OR CONTAINS SEDIMENT LADEN WATER, IT MUST BE TREATED THROUGH THE USE OF A SEDIMENT CONTROL (TRAPS, VEGETATIVE FILTER STRIPS, FLOCCULANTS OR OTHER SEDIMENT REDUCING MEASURES) SUCH THAT DISCHARGE DOES NOT VISIBLY CONTAIN MORE TURBIDITY THAN THE RECEIVING WATER.
4. WHEN POSSIBLE, USE WELL VEGETATED (EG. GRASSY OR WOODED) UPLAND AREAS ON THE SITE TO INFILTRATE DEWATERING WATERS BEFORE DISCHARGED OFF SITE.
5. DISCHARGE DIRECTLY INTO A SURFACE WATER OR WETLAND IS NOT PERMITTED. RECEIVING WATERS CANNOT BE USED AS PART OF THE TREATMENT AREA.
6. ALL CONSTRUCTION DEWATERING SHALL BE DISCHARGED TO AN APPROVED LOCATION FOR TREATMENT PRIOR TO DISCHARGE TO THE RECEIVING WATER. THE DEWATERING PLAN SHALL BE DEVELOPED AND SUBMITTED TO THE ENGINEER FOR REVIEW IN ACCORDANCE WITH MNDOT SPEC. 1717.2E.
7. CONDITIONS OF THE SITE MAY REQUIRE A PERMIT TO BE OBTAINED FROM THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES FOR WATER APPROPRIATIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS FOR DEWATERING.
8. THE DISCHARGE POINT OF DEWATERING WATERS SHOULD BE VISUALLY INSPECTED AND PHOTOGRAPHED AT THE BEGINNING OF OPERATION AND AT LEAST ONCE EVERY 24 HOURS OF OPERATION TO ENSURE EXCESS TURBIDITY IS NOT BEING RELEASED TO THE RECEIVING WATERS.'
9. IF NUISANCE CONDITIONS RESULT FROM THE DISCHARGE, PERMITTEES MUST CEASE DEWATERING IMMEDIATELY AND CORRECTIVE ACTIONS MUST OCCUR BEFORE DEWATERING IS RESUMED. NUISANCE CONDITIONS INCLUDES, BUT IS NOT LIMITED TO, A SEDIMENT PLUME IN THE DISCHARGE OR THE DISCHARGE APPEARS CLOUDY, OR OPAQUE, OR HAS A VISIBLE CONTRAST, OR HAS A VISIBLE OIL FILM, OR HAS AQUATIC HABITAT DEGRADATION THAT CAN BE IDENTIFIED BY AN OBSERVER.

INSPECTIONS AND MAINTENANCE (11.1)

1. THE CONTRACTOR SHALL IDENTIFY A CERTIFIED EROSION AND SEDIMENT CONTROL SUPERVISOR TO CONDUCT INSPECTIONS FOR THE PROJECT.
2. THE CONSTRUCTION SITE SHALL BE OBSERVED AT LEAST ONCE EVERY 7 DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS AND 7 DAYS AFTER THAT. PER SECTION 11.11 THE INSPECTION CAN BE ADJUSTED AS FOLLOW.
   - AREAS WITH PERMANENT COVER CAN BE REDUCED TO ONCE A MONTH
   - SITES WITH PERMANENT COVER AND NO CONSTRUCTION ACTIVITY CAN BE REDUCED TO ONCE A MONTH
   - WHERE CONSTRUCTION ACTIVITY HAS BEEN SUSPENDED DUE TO FROZEN GROUND CONDITIONS, INSPECTION MAY BE SUSPENDED AND RESUME WITHIN 24 HOURS OF RUNOFF OCCURRING
3. WHEN SEDIMENT IS OBSERVED UP TO APPROXIMATELY ONE-THIRD OF THE HEIGHT OF SILT FENCE, SEDIMENT SHALL BE REMOVED. SILT FENCE WILL BE REPLACED, OR SUPPLEMENTED IF IT BECOMES NON-FUNCTIONAL.
4. THE CITY OF COTTAGE GROVE IS RESPONSIBLE TO MAINTAIN PERMANENT BMP'S.
5. DURING EACH INSPECTION THE FOLLOWING SHALL BE OBSERVED:
   - ALL EROSION PREVENTION AND SEDIMENT CONTROL BMP'S AND POLLUTION PREVENTION MEASURES.
   - SURFACE WATERS – INCLUDING DITCHES AND CONVEYANCE SYSTEMS NEED TO BE OBSERVED FOR EROSION AND SEDIMENT.
   - CONSTRUCTION SITE VEHICLE EXIT LOCATIONS FOR EVIDENCE OF TRACKING ONTO PAVED SURFACES.
   - INSPECT SURROUNDING PROPERTIES FOR EVIDENCE OF OFF SITE SEDIMENT ACCUMULATION.
   - INFILTRATION AREAS FOR SIGNS OF SEDIMENT DEPOSITION AND COMPACTION (TO ENSURE THAT EQUIPMENT IS NOT BEING DRIVEN ACROSS THE AREA).
7. RECORD ALL INSPECTIONS AND MAINTENANCE ACTIVITIES IN WRITING WITHIN 24 HOURS. SUBMIT INSPECTION REPORTS IN A FORMAT THAT IS ACCEPTABLE TO THE PROJECT ENGINEER. INCLUDE THE FOLLOWING IN THE RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY:
   - DATE AND TIME OF INSPECTIONS
   - NAME OF PERSONS CONDUCTING INSPECTIONS
   - FINDINGS OF INSPECTIONS WITH PHOTOGRAPHS AND RECOMMENDATIONS FOR CORRECTIVE ACTIONS
   - CORRECTIVE ACTIONS TAKEN, INCLUDING DATES, TIMES, AND PARTY COMPLETING MAINTENANCE ACTIVITIES
   - DATE AND AMOUNT OF ALL RAINFALL EVENTS GREATER THAN 0.5 INCH IN 24 HOURS
   - DOCUMENT AND DISCHARGES, DEWATERING OPERATIONS AND NUISANCE CONDITIONS WITH PHOTOGRAPHS.
   - DOCUMENTS AND CHANGES MADE TO THE SWPPP
8. REPLACE, REPAIR OR SUPPLEMENT ALL NONFUNCTIONAL BMPS BY THE END OF THE NEXT BUSINESS DAY FOLLOWING DISCOVERY UNLESS LISTED DIFFERENTLY BELOW:
   - A. REPAIR, REPLACE, OR SUPPLEMENT PERIMETER CONTROL DEVICES WHEN IT BECOMES NONFUNCTIONAL OR SEDIMENT REACHES 1/2 THE HEIGHT OF THE DEVICE. COMPLETE REPAIRS BY THE END OF THE NEXT BUSINESS DAY FOLLOWING DISCOVERY.
   - B. REPAIR OR REPLACE INLET PROTECTION DEVICES WHEN THEY BECOME NONFUNCTIONAL OR SEDIMENT REACHES 1/2 THE HEIGHT AND/OR DEPTH OF THE DEVICE.
   - C. DRAIN AND REMOVE SEDIMENT FROM TEMPORARY AND PERMANENT SEDIMENT BASINS ONCE THE SEDIMENT HAS REACHED 1/2 THE STORAGE VOLUME. COMPLETE WORK WITHIN 72 HOURS OF DISCOVERY.
   - D. REMOVE ALL DELTAS AND SEDIMENT DEPOSITED IN SURFACE WATERS INCLUDING DRAINAGE WAYS, CATCH BASINS, AND OTHER DRAINAGE SYSTEMS. RESTABILIZE ANY AREAS THAT ARE DISTURBED BY SEDIMENT REMOVAL OPERATIONS. SEDIMENT REMOVAL AND STABILIZATION MUST BE COMPLETED WITHIN 7 DAYS OF DISCOVERY. PREPARE AND SUBMIT A SITE MANAGEMENT PLAN FOR WORKING IN SURFACE WATERS. CONTACT ALL APPROPRIATE AUTHORITIES PRIOR TO WORKING IN SURFACE WATERS.
   - E. REMOVE TRACKED SEDIMENT FROM PAVED SURFACES BOTH ON AND OFF SITE WITHIN 24 HOURS OF DISCOVERY. STREET SWEEPING MAY HAVE TO OCCUR MORE OFTEN TO MINIMIZE OFF SITE IMPACTS. LIGHTLY WET THE PAVEMENT PRIOR TO SWEEPING.
   - F. MAINTAIN ALL BMPS UNTIL WORK HAS BEEN COMPLETED, SITE HAS GONE UNDER FINAL STABILIZATION, AND THE NOTICE OF TERMINATION (NOT) HAS BEEN SUBMITTED TO THE MPCA.

POLLUTION PREVENTION MANAGEMENT MEASURES (12.1)

ALL WORK NECESSARY TO PROVIDE PROPER POLLUTION PREVENTION MEASURES SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
1. COLLECTED SEDIMENT, ASPHALT AND CONCRETE MILLINGS, FLOATING DEBRIS, AND OTHER WASTE MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS.
2. CONSTRUCTION MATERIALS NEED TO BE COVERED TO MINIMIZE STORMWATER INTERACTION UNLESS MATERIAL IS NOT A POTENTIAL SOURCE OF STORMWATER CONTAMINATION.
3. OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCES MUST BE PROPERLY STORED, INCLUDING SECONDARY CONTAINMENT TO PREVENT SPILLS, LEAKS OR OTHER DISCHARGES. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE IN COMPLIANCE WITH MPCA REGULATIONS.
4. EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES IS NOT ALLOWED ON SITE. RUNOFF MUST BE CONTAINED AND WASTE PROPERLY DISPOSED OF. NO ENGINE DEGREASING IS ALLOWED ON SITE.
5. ALL LIQUID AND SOLID WASTE GENERATED BY CONCRETE WASHOUT OPERATIONS MUST BE CONTAINED IN A LEAK-PROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER. A COMPACTED CLAY LINER THAT DOES NOT ALLOW WASHOUT LIQUIDS TO ENTER THE GROUND WATER IS CONSIDERED AN IMPERMEABLE LINER. THE LIQUID AND SOLID WASTES MUST NOT CONTACT THE GROUND, AND THERE MUST NOT BE RUNOFF FROM THE CONCRETE WASHOUT OPERATIONS OR AREAS. LIQUID AND SOLID WASTE MUST BE DISPOSED OF PROPERLY AND IN COMPLIANCE WITH MPCA REGULATIONS. A SIGN MUST BE INSTALLED ADJACENT TO EACH WASHOUT FACILITY TO INFORM CONCRETE EQUIPMENT OPERATORS TO UTILIZE THE PROPER FACILITIES.

SEE FOLLOWING SHEET FOR CONTINUED SWPPP NOTES

PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan 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
Name Brian. N. Molinaro
Reg. No. 47504 Date 01-16-25

Revisions

Date	01-16-25
Designed	NAP
Drawn	SHA

STORMWATER POLLUTION PREVENTION PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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5. ANY SPILLS OF HAZARDOUS MATERIALS AND/OR A MINIMUM OF 5-GALLONS PETROLEUM SHALL BE IMMEDIATELY REPORTED TO THE MPCA (STATE DUTY OFFICER: 1.800.422.0798 OR 651.297.8610). ANY SPILLS ABOVE THE REPORTABLE QUANTITIES LIMITS IN THE CODE OF FEDERAL REGULATIONS (CFR) TITLE 40, PART 302 SHALL BE REPORTED TO THE EPA NATIONAL RESPONSE CENTER (1.800.424.8802). IN ORDER TO REDUCE THE RISK OF HAZARDOUS MATERIALS COMING INTO CONTACT WITH STORM WATER, THE FOLLOWING PRACTICES WILL BE FOLLOWED: A) AN EFFORT WILL BE MADE TO STORE ONLY ENOUGH PRODUCTS REQUIRED TO DO THE WORK, B) ALL MATERIALS STORED ON SITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR APPROPRIATE CONTAINERS AND IF POSSIBLE, UNDER COVER, C) PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURER'S LABEL UNLESS THE ORIGINAL CONTAINER CANNOT BE RESEALED, IN WHICH CASE THE ORIGINAL LABEL AND MATERIALS SAFETY DATA SHALL BE RETAINED, D) SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER, E) WHENEVER POSSIBLE, ALL OF A PRODUCT WILL BE USED BEFORE DISPOSING OF THE CONTAINER, F) THE MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED, AND G) THE OPERATOR WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS ON SITE. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.

6. ALL SANITARY WASTE WILL BE COLLECTED BY TEMPORARY SANITARY FACILITIES PROVIDED AT THE SITE BY THE CONTRACTOR THROUGHOUT THE CONSTRUCTION PROJECT. ALL CONSTRUCTION PERSONNEL SHALL UTILIZE TEMPORARY SANITARY FACILITIES, WHICH SHALL BE REGULARLY SERVICE BY A COMMERCIAL OPERATOR. TEMPORARY SANITARY FACILITIES SHALL BE PLACED IN A LOCATION WHERE ACCIDENTAL SPILLAGE OF THE FACILITY SHALL NOT DISCHARGE TO THE STORM SEWER SYSTEM.

TEMPORARY SEDIMENTATION BASINS (14.2)

1. TEMPORARY SEDIMENTATION BASINS ARE REQUIRED WHERE 10 OR MORE ACRES DRAIN TO A COMMON LOCATION TO PROVIDE TREATMENT OF THE RUNOFF BEFORE IT LEAVES THE CONSTRUCTION SITE OR ENTERS SURFACE WATERS. WHEN A CONSTRUCTION SITE DISCHARGES TO AN IMPAIRED WATER BODY, TEMPORARY SEDIMENTATION BASINS ARE REQUIRED WHERE 5 OR MORE ACRES DRAIN TO A COMMON LOCATION. TEMPORARY SEDIMENTATION BASINS CAN BE CONVERTED TO PERMANENT BASINS AFTER CONSTRUCTION IS COMPLETE.

2. THE TEMPORARY BASIN MUST PROVIDE LIVE STORAGE FOR A CALCULATED VOLUME OF RUNOFF FROM A TWO (2)-YEAR, 24-HOUR STORM FROM EACH ACRE DRAINED TO THE BASIN OR 1,800 CUBIC FEET OF LIVE STORAGE PER ACRE DRAINED, WHICHEVER IS GREATER. WHERE PERMITTEES HAVE NOT CALCULATED THE TWO (2)-YEAR, 24-HOUR STORM RUNOFF AMOUNT, THE TEMPORARY BASIN MUST PROVIDE 3,600 CUBIC FEET OF LIVE STORAGE PER ACRE OF THE BASINS DRAINAGE AREA.

3. PERMITTEES MUST DESIGN THE OUTLET STRUCTURE TO WITHDRAW WATER FROM THE SURFACE TO MINIMIZE THE DISCHARGE OF POLLUTANTS. PERMITTEES MAY TEMPORARILY SUSPEND THE USE OF A SURFACE WITHDRAWAL MECHANISM DURING FROZEN CONDITIONS. THE BASIN MUST INCLUDE A STABILIZED EMERGENCY OVERFLOW TO PREVENT FAILURE OF POND INTEGRITY. PROVIDE ENERGY DISSIPATION FOR THE BASIN OUTLET WITHIN 24 HOURS OF CONNECTION TO A SURFACE WATER.

4. WHERE A TEMPORARY SEDIMENT BASIN MEETING THE REQUIREMENTS OF THE ABOVE IS INFEASIBLE, PERMITTEES MUST INSTALL EFFECTIVE SEDIMENT CONTROLS SUCH AS SMALLER SEDIMENT BASINS AND/OR SEDIMENT TRAPS, SILT FENCES, VEGETATIVE BUFFER STRIPS OR ANY APPROPRIATE COMBINATION OF MEASURES AS DICTATED BY INDIVIDUAL SITE CONDITIONS. IN DETERMINING WHETHER INSTALLING A SEDIMENT BASIN IS INFEASIBLE, PERMITTEES MUST CONSIDER PUBLIC SAFETY AND MAY CONSIDER FACTORS SUCH AS SITE SOILS, SLOPE, AND AVAILABLE AREA ON-SITE. PERMITTEES MUST DOCUMENT THIS DETERMINATION OF INFEASIBILITY IN THE SWPPP.

FINAL STABILIZATION (4.1)

1. ALL DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED AS SHOWN ON THE CONSTRUCTION PLANS. METHODS TO ACHIEVE FINAL STABILIZATION INCLUDE: SEED WITH MULCH OR EROSION CONTROL BLANKET AND SOD.

2. ALL AREAS SEEDED BY MEANS OF BROADCAST SEEDING SHALL BE HAND RAKED TO INCORPORATE THE SEEDS INTO THE TOPSOIL.

3. EROSION CONTROL BLANKETS SHALL BE PLACED IN THE DITCH BOTTOM WITHIN 24 HOURS AFTER FINE GRADING. BIOROLLS SHALL BE PLACED IN CONJUNCTION WITH THE BLANKET IN THE DITCH BOTTOMS. THE BIOROLLS ARE INTENDED TO SERVE AS PERMANENT DITCH CHECKS.

4. THE PERMITTEE WILL SUBMIT A NOTICE OF TERMINATION (NOT) WITHIN 30 DAYS AFTER FINAL STABILIZATION. FINAL STABILIZATION SHALL CONSIST OF A UNIFORM PERENNIAL VEGETATIVE COVER OF AT LEAST 70 PERCENT OF THE EXPECTED FINAL VEGETATIVE GROWTH DENSITY OR OTHER PERMANENT COVER HAS BEEN ESTABLISHED OVER THE ENTIRE PERVIOUS SURFACES.

5. PERMIT COVERAGE TERMINATES ON INDIVIDUAL LOTS IF THE STRUCTURES ARE FINISHED AND TEMPORARY EROSION PREVENTION AND DOWNGRADIENT PERIMETER CONTROL IS COMPLETE, THE RESIDENCE SELLS TO THE HOMEOWNER, AND THE PERMITTEE DISTRIBUTES THE MPCA'S "HOMEOWNER FACT SHEET" TO THE HOMEOWNER.

PERMIT TERMINATION CONDITIONS (13.1)

1. PERMITTEES MUST COMPLETE ALL CONSTRUCTION ACTIVITY AND MUST INSTALL PERMANENT COVER OVER ALL AREAS PRIOR TO SUBMITTING THE NOTICE OF TERMINATION (NOT). VEGETATIVE COVER MUST CONSIST OF A UNIFORM PERENNIAL VEGETATION WITH A DENSITY OF 70 PERCENT OF ITS EXPECTED FINAL GROWTH. VEGETATION IS NOT REQUIRED WHERE THE FUNCTION OF A SPECIFIC AREA DICTATES NO VEGETATION, SUCH AS IMPERVIOUS SURFACES OR THE BASE OF A SAND FILTER.

2. FOR RESIDENTIAL CONSTRUCTION ONLY, PERMIT COVERAGE TERMINATES ON INDIVIDUAL LOTS IF THE LOT IS SOLD TO THE HOMEOWNER, STRUCTURES ARE FINISHED, AND PERMANENT COVER HAS BEEN ESTABLISHED. FOR LOTS THAT ARE SOLD TO THE HOMEOWNER WHERE PERMANENT COVER HAS NOT BEEN ESTABLISHED, COVERAGE TERMINATES IF TEMPORARY EROSION PREVENTION AND DOWNGRADIENT PERIMETER CONTROL IS PROPERLY INSTALLED, AND THE PERMITTEE DISTRIBUTES THE MPCA'S "HOMEOWNER FACT SHEET" TO THE HOMEOWNER.

3. WHEN SUBMITTING THE NOT PERMITTEES MUST INCLUDE EITHER GROUND OR AERIAL PHOTOGRAPHS SHOWING THE REQUIREMENTS OF 13.2 HAVE BEEN MET. PERMITTEES ARE NOT REQUIRED TO TAKE PHOTOGRAPHS OF EVERY DISTINCT PART OF THE SITE, HOWEVER THE CONDITIONS PORTRAYED MUST BE SUBSTANTIALLY SIMILAR TO THOSE AREAS THAT ARE NOT PHOTOGRAPHED. PHOTOGRAPHS MUST BE CLEAR AND IN FOCUS AND MUST INCLUDE THE DATE THE PHOTO WAS TAKEN.

RECORDS RETENTION (5.1&6.1)

1. RECORDS MUST BE KEPT ON SITE IN A PHYSICAL OR ELECTRONIC FORMAT DURING NORMAL WORKING HOURS WITH PERSONNEL WHO HAVE OPERATIONAL CONTROL OVER THE APPLICABLE PORTION OF THE SITE. THESE RECORDS MUST INCLUDE:
   A. COPY OF THE SWPPP AND AMENDMENTS
   B. TRAINING DOCUMENTATION
   C. INPSECTION AND MAINTENANCE RECORDS

2. THIS SWPPP WILL BE AMENDED AS NEEDED AND/OR AS REQUIRED BY PROVISIONS OF THE PERMIT. ANY CHANGES TO THE SWPPP SHALL BE NOTED BELOW AND ON THE APPLICABLE PLAN SHEETS. ANY AMENDMENTS TO THE SWPPP MUST BE INCORPORATED WITHIN 7 DAYS TO INCLUDE ADDITIONAL OR MODIFIED BMPS.

3. THE CONTRACTOR WILL RECORD CHANGES TO THE SWPPP AND MAINTAIN DOCUMENTATION OF THESE CHANGES ON SITE AT ALL TIMES. A SUMMARY MAINTENANCE/CONSTRUCTION OBSERVATION REPORT WILL BE RECORDED AFTER EACH SITE INSPECTION/OBSERVATION.

4. THE CONTRACTOR WILL BE RESPONSIBLE TO MAINTAIN AND REPAIR THE EROSION AND SEDIMENT CONTROL BMP'S UNTIL FINAL STABILIZATION IS COMPLETE AND A NOTICE OF TERMINATION (NOT) IS SUBMITTED.

ITEM DESCPRIPTION	UNIT	ESTIMATED QUANTITY
CONSTRUCTION LIMIT STAKING	LF	X
ROCK CONSTRUCTION ENTRANCE	EA	1
ROCK CONSTRUCTION ENTRANCE MAINTENANCE	EA	1
EROSION CONTROL FENCE	LF	XXXX
MAINTENANCE OF PERIMETER EROSION CONTROL	YR	1
BIOROLL DITCH CHECK	EA	XXX
STREET SWEEPING AND VACUUMING	YR	1
STORM DRAIN INLET PROTECTION	EA	XX
TEMPORARY SEED AND MULCH	AC	X.X
PERMANENT SEED AND MULCH	AC	X.X
MAINTAIN SEED AND MULCH	AC	X.X
EROSION CONTROL BLANKET (MNDOT CAT. 20)	SY	XXX
VEHICLE AND EQUIPMENT CLEANING	LS	1
VEHICLE AND EQUIPMENT FUELING	LS	1
VEHICLE AND EQUIPMENT MAINTENANCE	LS	1
SPILL PREVENTION AND CONTROL	LS	1
ROCK BERM EROSION CONTROL	LS	1
RIP RAP ENERGY DISSIPATOR	CY	X.X
INDIVIDUAL LOT HOME CONSTRUCTION EROSION CONTROL	EA	XX

AMENDMENT	BY	DATE

NOTE:
SEE SHEET 8.11 FOR OUTLET CONTROL STRUCTURE DETAILS

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I hereby certify that this plan 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
Name: Brian. N. Molinaro
Reg. No. 47504 Date 01-16-25

Revisions

Date	01-16-25
Designed	NAP
Drawn	SHA

STORMWATER POLLUTION PREVENTION PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

OA-ENG-123105-SHEET-SWPPP

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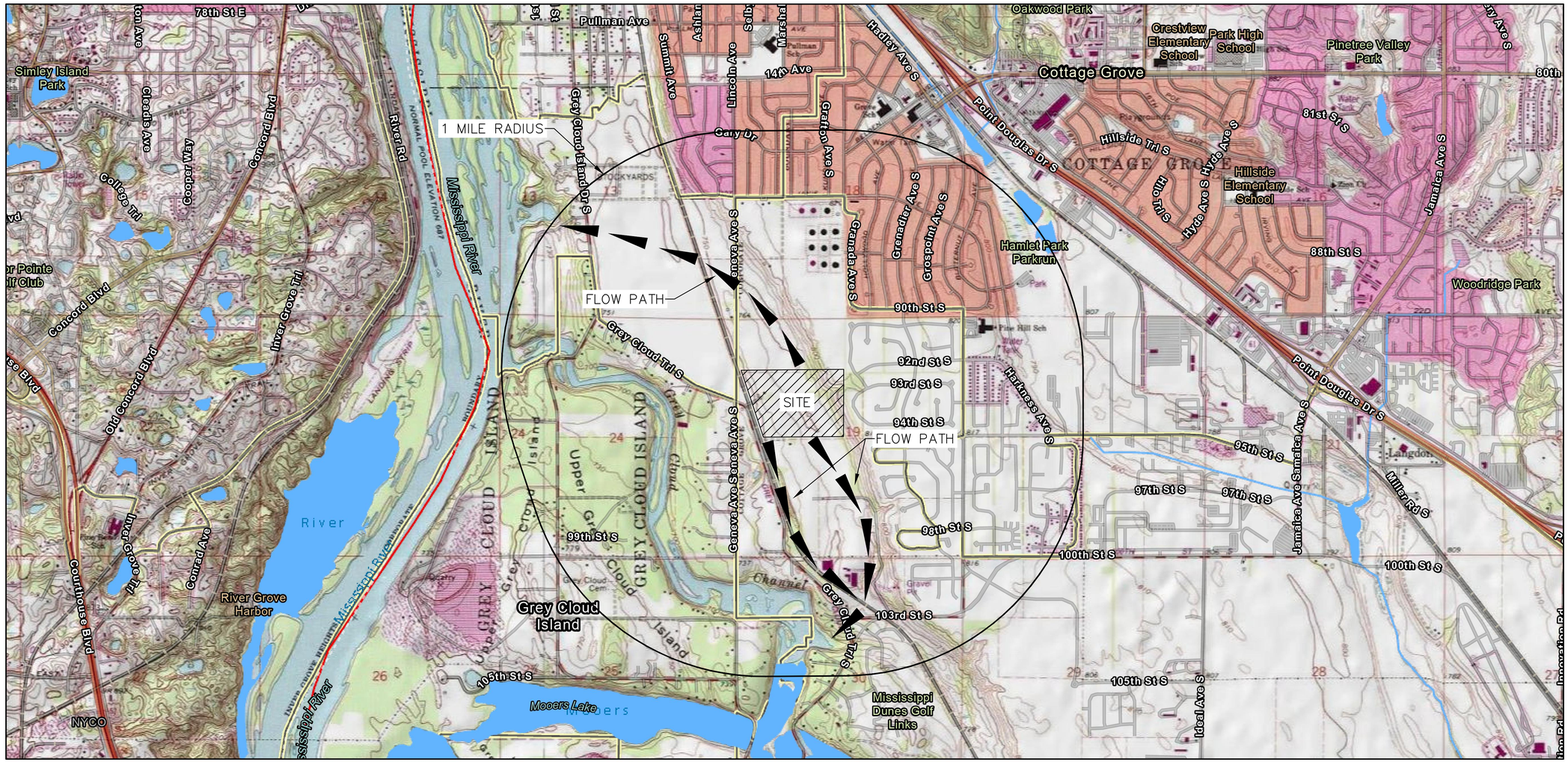
MPCA's Construction Stormwater Special Waters Search



12/17/2025, 2:11:17 PM

- Waterbody Units - Lakes (1)
- Waterbody Units - Streams (1)
- Impaired Streams with additional construction requirements
- MS4 - MNDOT
- MS4 - County
- MS4 - Watershed District
- MS4 - City or Township

1:36,112

0 0.28 0.55 1.1 mi

0 0.47 0.95 1.9 km

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed

Minnesota Pollution Control Agency

MPCA; US Census Bureau; MNDoT; | MDH | Copyright:© 2013 National Geographic Society, i-cubed | Esri Community Maps Contributors, County of Dakota, Metropolitan Council, MetroGIS, MN Dept Natural Resources, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US

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MPCA MAP

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TALCOTT GLEN
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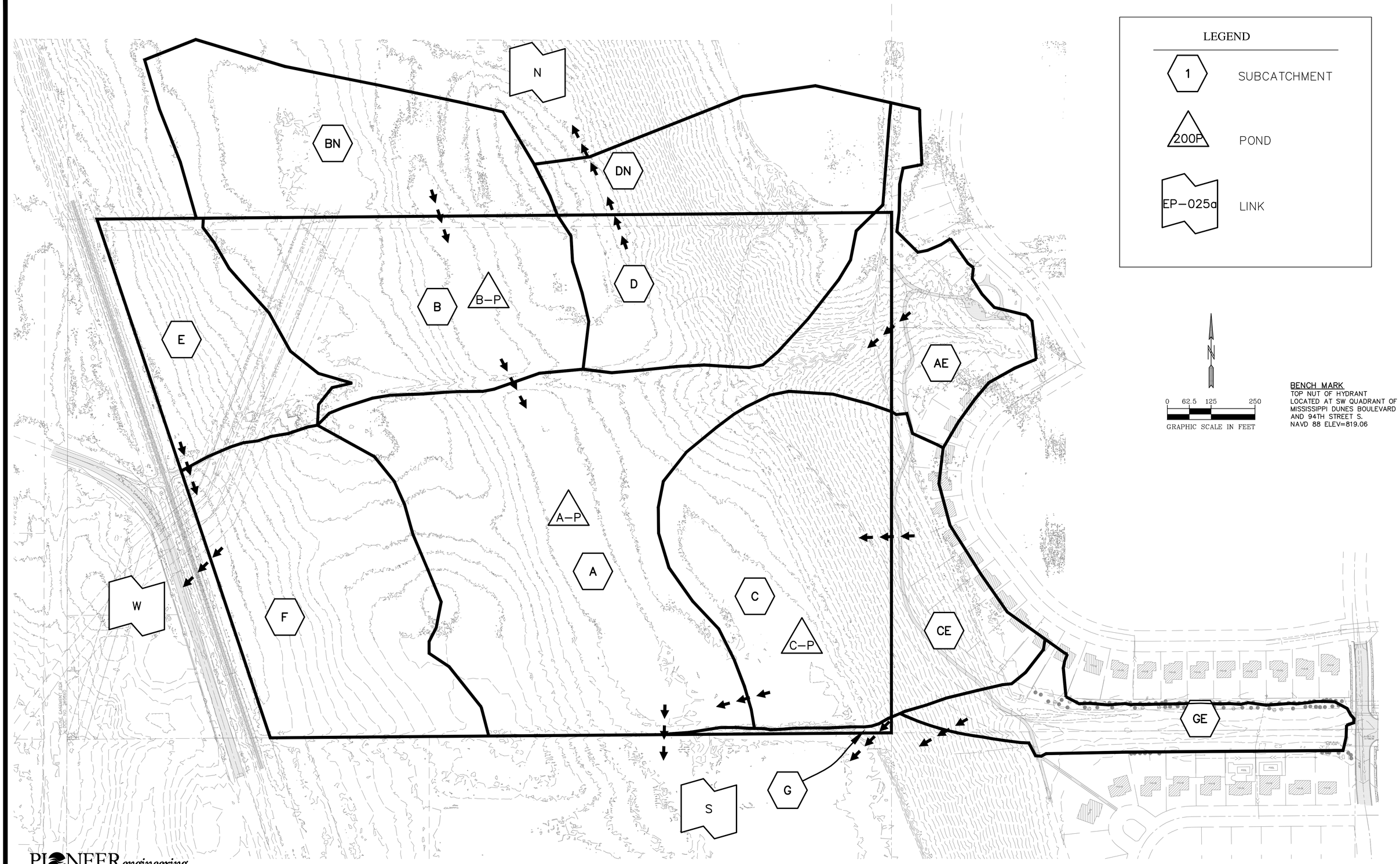

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

OA-ENG-123105-SHEET-HYDR-EXIS

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Drawn	SHA

EXISTING HYDROLOGY

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

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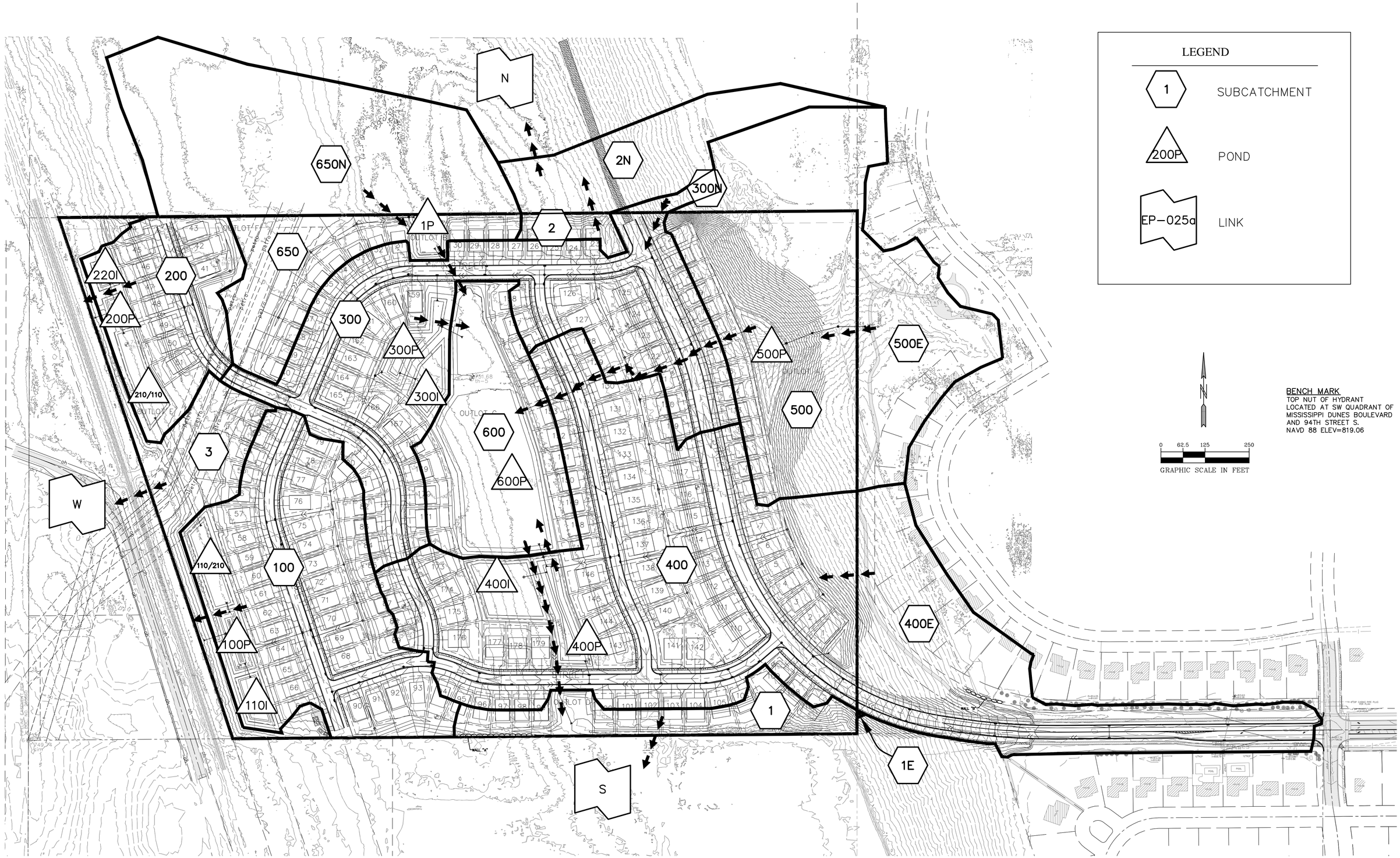

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

OA-ENG-123105-SHEET-HYDR-PROP

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Designed	NAP
Drawn	SHA

PROPOSED HYDROLOGY MAP

LENNAR
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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

S5 OF S5

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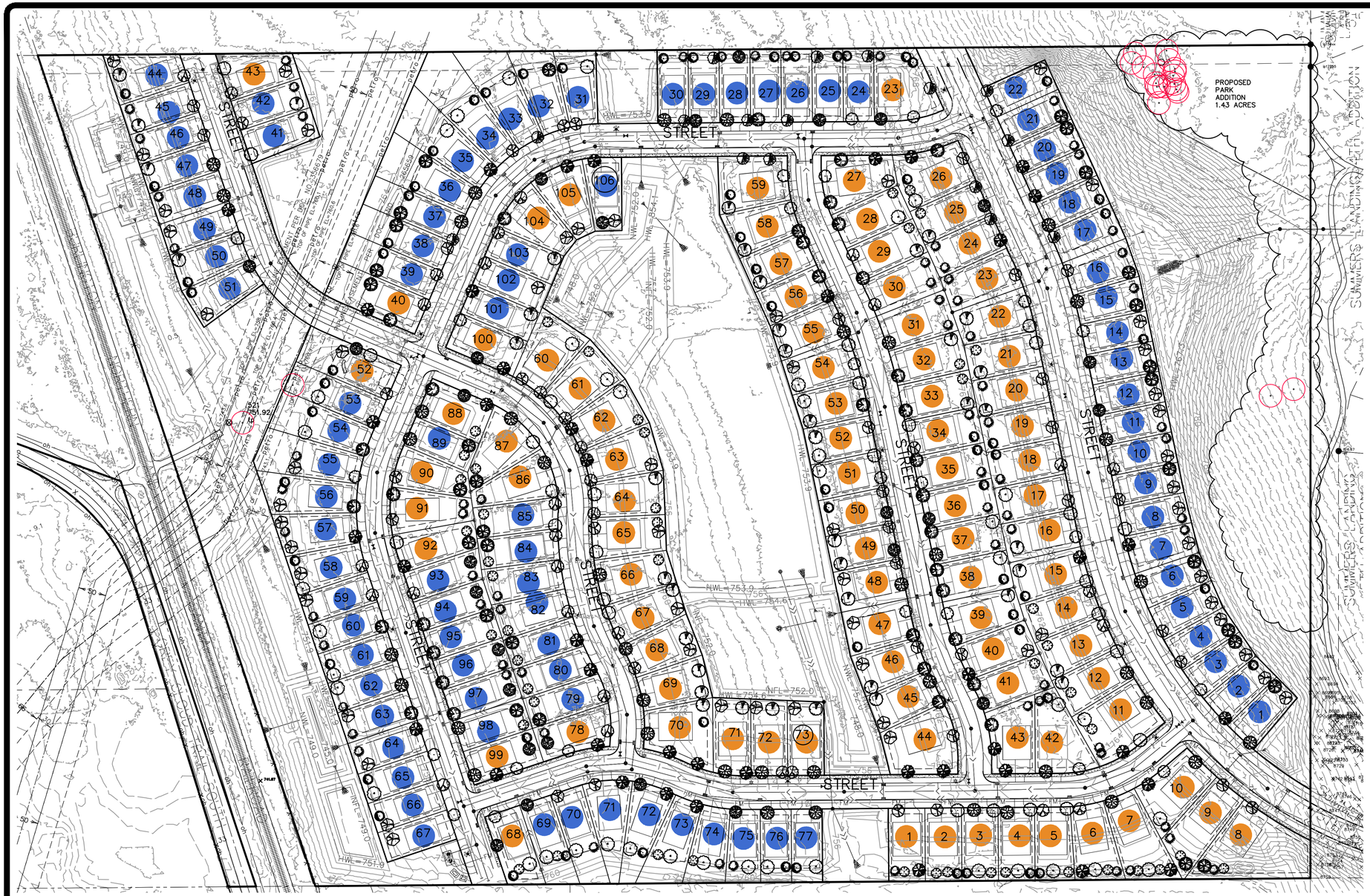


PLANT SCHEDULE

KEY	COMMON NAME/Scentific name	ROOT	QUANTITY
	OVERSTORY TREES		
	NORTHWOOD MAPLE/Acer rubrum 'Northwood'	3" B&B	40
	KENTUCKY COFFEE TREE/Gymnocladus dioicus	3" B&B	27
	COMMON HACKBERRY/Celtis occidentalis	3" B&B	24
	THORNLESS HONEYLOCUST/Gleditsia triacanthos var. inermis	3" B&B	37
	BOULEVARD LINDEN/Tilia americana 'Boulevard'	3" B&B	33
	NORTHERN PIN OAK/Quercus ellipsoidalis	3" B&B	43
	SIENNA GLEN MAPLE/Acer x freemanii 'Sienna Glen'	3" B&B	29
	AUTUMN BLAZE MAPLE/Acer x freemanii 'Jeffersred'	3" B&B	35
	RIVER BIRCH/Betula nigra	10-12' B&B	41
	SWAMP WHITE OAK/Quercus bicolor	3" B&B	56
	SUGAR MAPLE/Acer Saccarum 'Green Mountain'	3" B&B	30
	Princeton Elm/Ulmus americana 'Princeton'	3" B&B	16
	WHITESPIRE BIRCH/Betula platyphylla var. japonica	10-12' B&B	42
	EVERGREEN TREES		
	BLACK HILLS SPRUCE/Picea glauca densata	8' B&B	72
	NORWAY SPRUCE/Picea abies	8' B&B	48
	WHITE PINE/Pinus strobus	8' B&B	65
	TOTAL		638

LANDSCAPE NOTES:

OVERSTORY DECIDUOUS TREES REQUIRED:
LOTS LESS THAN 60' WIDE: 2 TREES/LOT (1 IN FRONT YARD)
LOTS 60' WIDE OR GREATER: 3 TREES/LOT (1 IN FRONT YARD)
CONIFEROUS TREES MAY BE SUBSTITUTED FOR ANY OF THE OVERSTORY DECIDUOUS TREES EXCEPT FOR FRONT YARD TREES.

TOTAL LOTS: 179
LOTS 60' WIDE AND OVER: 89
LOTS LESS THAN 60' WIDE: 90

TOTAL REQUIRED TREES: 447
LOTS 60' WIDE AND OVER: 267
LOTS LESS THAN 60' WIDE: 180

MITIGATION REQUIRED: 2,612" (SEE TREE PRESERVATION PLAN)

PROPOSED TREES: 638; 2,099"
3" OVERSTORY: 453; 1,359"
8' CONIFER (COUNTS AS 4"): 185; 740"

LOCATION OF RARE PLANTS INVENTORIED BY MIDWEST NATURAL RESOURCES FALL 2025

LANDSCAPE NOTES

– THE LANDSCAPE CONTRACTOR SHALL VISIT THE PROJECT SITE TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID.

– THE LANDSCAPE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT OF PROPOSED PHYSICAL START DATE AT LEAST 7 DAYS IN ADVANCE.

– THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL EXISTING UTILITY LOCATIONS ON THE PROJECT SITE WITH GOPHER STATE ONE CALL 1-800-252-1166 PRIOR TO COMMENCING WORK. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND REPAIR OF EXISTING UTILITIES DAMAGED DURING CONSTRUCTION AT NO COST TO THE OWNER. NOTIFY THE LANDSCAPE ARCHITECT OF ANY CONFLICTS TO FACILITATE PLANT RELOCATION.

– GRADING TO BE PERFORMED BY OTHERS.

– NO PLANT MATERIAL SHALL BE INSTALLED UNTIL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.

– ALL PLANT MATERIAL SHALL MEET THE STANDARDS FOUND IN THE AMERICAN ASSOCIATION OF NURSERYMEN–AMERICAN STANDARD FOR NURSERY STOCK.

– ALL CONTAINER MATERIAL TO BE GROWN IN THE CONTAINER A MINIMUM OF SIX (6) MONTHS PRIOR TO PLANTING ON SITE.

– DECIDUOUS AND CONIFEROUS TREES SHALL NOT BE STAKED, BUT THE LANDSCAPE CONTRACTOR MUST GUARANTEE STANDABILITY TO A WIND SPEED OF 60 M.P.H.

– THE LANDSCAPE CONTRACTOR SHALL PROVIDE A MINIMUM GUARANTEE OF ONE YEAR ONE TIME REPLACEMENT ON NEW PLANT MATERIALS. GUARANTEE SHALL BE AGREED UPON BY DEVELOPER/BUILDER AND LANDSCAPE CONTRACTOR.

– THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REJECT ANY PLANTS WHICH ARE DEEMED UNSATISFACTORY BEFORE, DURING OR AFTER INSTALLATION.

– IF THERE IS A DESCREPANCY BETWEEN THE NUMBER OF PLANTS SHOWN ON THE PLAN AND THE NUMBER SHOWN ON THE PLANT LIST, THE NUMBER SHOWN ON THE PLAN WILL TAKE PRECEDENCE.

–THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MULCHES AND PLANTING SOIL QUANTITIES TO COMPLETE WORK SHOWN ON THE PLAN. THE LANDSCAPE CONTRACTOR SHALL VERIFY ALL QUANTITIES SHOWN ON THE PLANT SCHEDULE.

– COMMERCIAL GRADE POLY LAWN EDGING SHALL BE INSTALLED WHERE NOTED.

– THE LANDSCAPE CONTRACTOR SHALL REPAIR ALL DAMAGE TO THE SITE CAUSED BY THE PLANTING OPERATION AT NO COST TO THE OWNER.

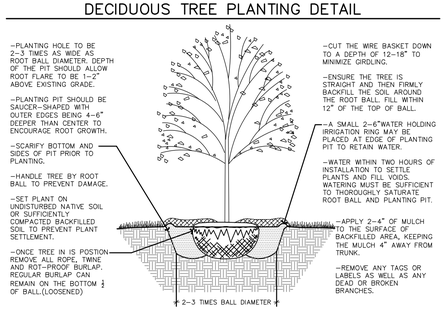
– THE LANDSCAPE CONTRACTOR SHALL KEEP PAVEMENTS CLEAN UNSTAINED. ALL PEDESTRIAN AND VEHICLE ACCESS TO BE MAINTAINED THROUGHOUT CONSTRUCTION PERIOD. ALL WASTES SHALL BE PROMPTLY REMOVED FROM THE SITE. ANY DAMAGE TO EXISTING FACILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

– THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE CODES, REGULATIONS AND PERMITS GOVERNING THE WORK.

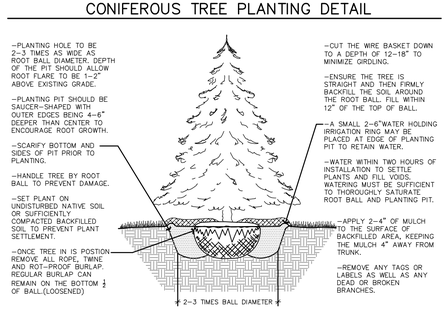
– STORAGE OF MATERIALS OR SUPPLIES ON–SITE WILL NOT BE ALLOWED.

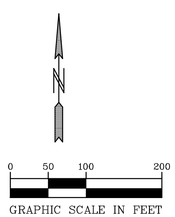
00-PLAN-1231005-SHEET-LAND

DECIDUOUS TREE PLANTING DETAIL



CONIFEROUS TREE PLANTING DETAIL





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Name Jennifer L. Thompson
Reg. No. 44763 Date 1-9-2026

Revisions

Date	01-09-26
Designed	JLT
Drawn	JLT

LANDSCAPE PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

L1 OF 1

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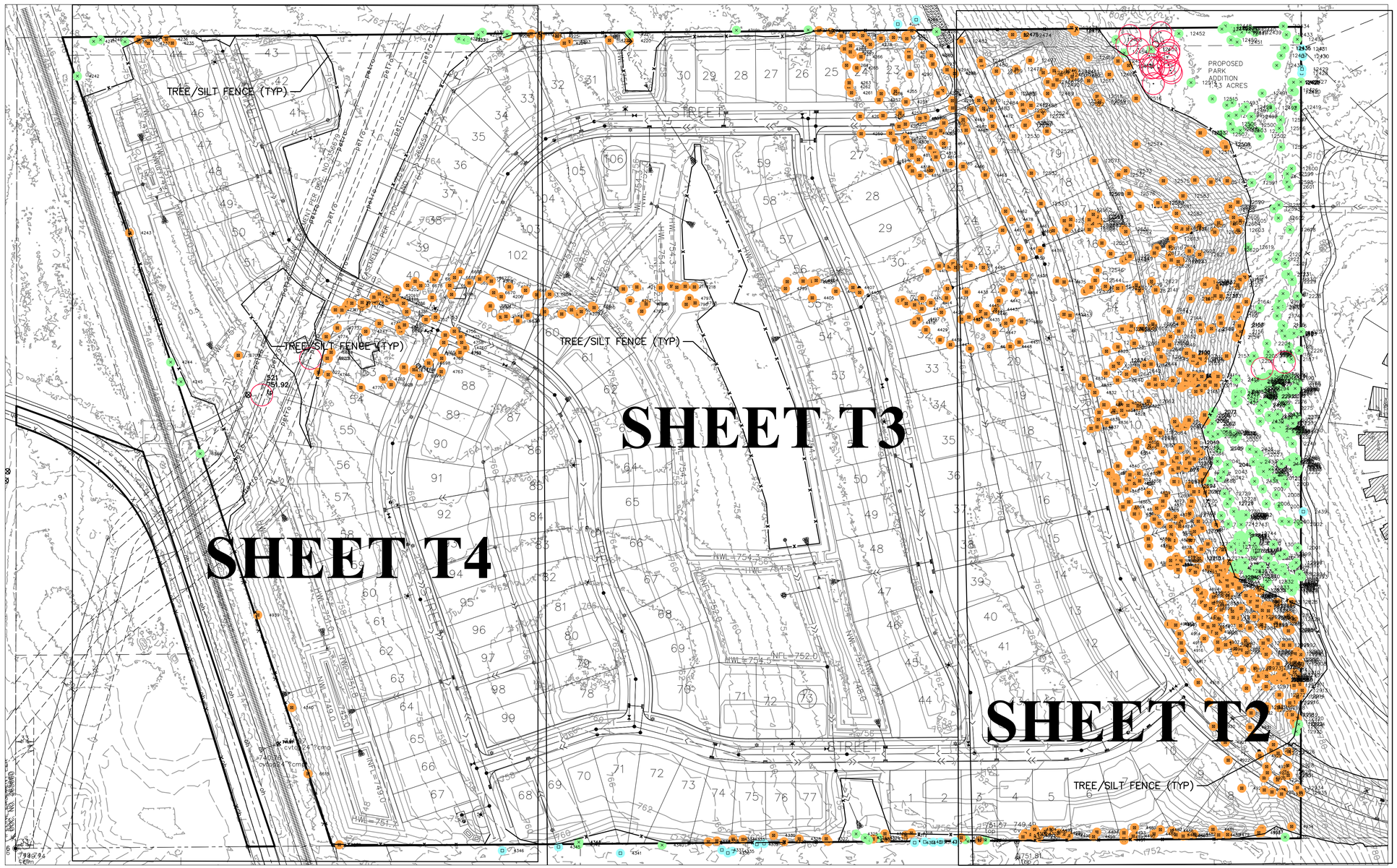
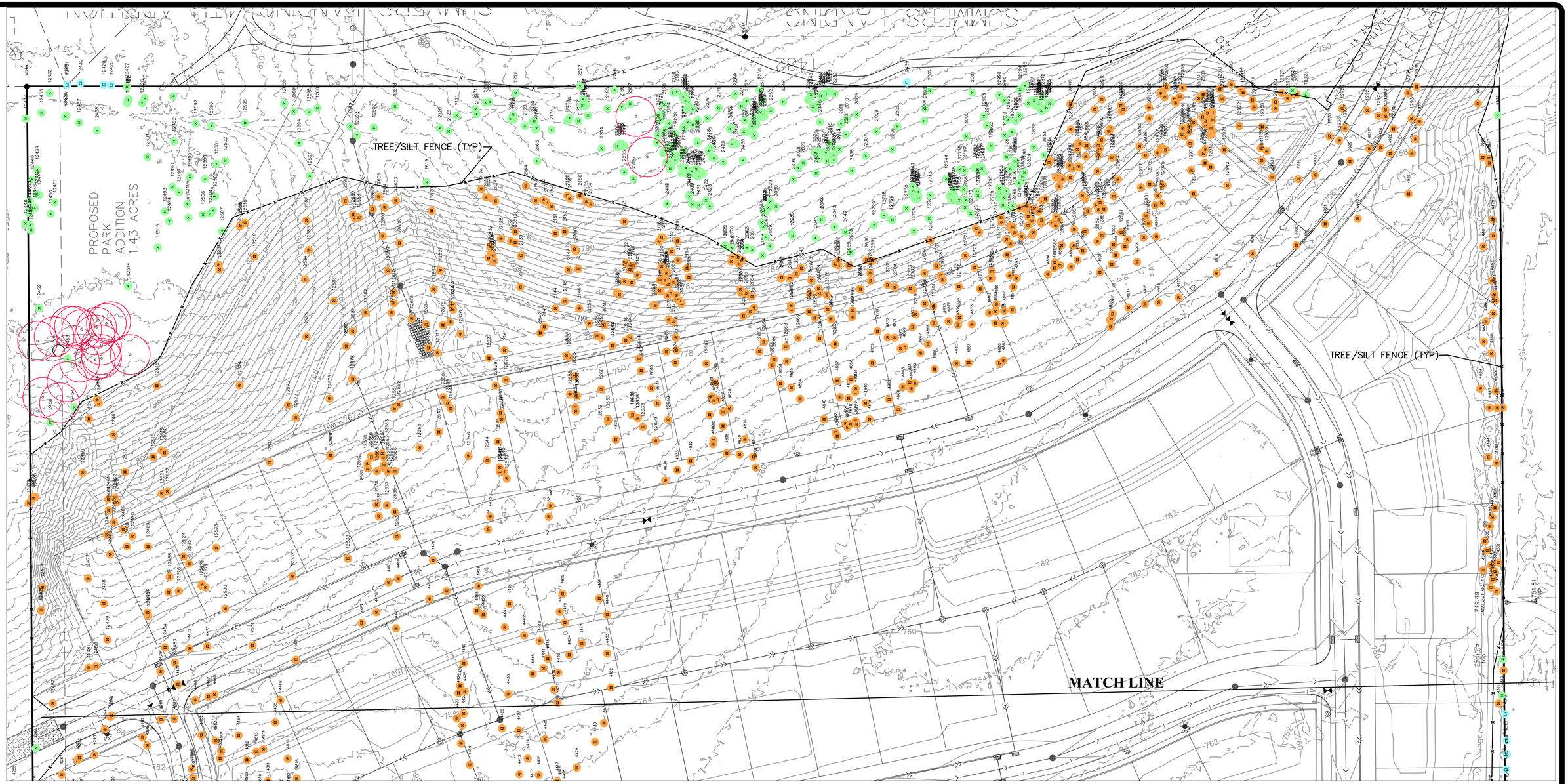

TREE/SILT FENCE (TYP)
TREE/SILT FENCE (TYP)
TREE/SILT FENCE (TYP)
TREE/SILT FENCE (TYP)
PROPOSED PARK ADDITION 1.43 ACRES
SHEET T3
SHEET T4
SHEET T2
STREET
STREET
HWL=754.3
NWL=754.5
NWL=754.5
NWL=754.5



12516 TREE TO BE REMOVED
12514 TREE TO BE SAVED
12429 TREE LOCATED OFF-SITE

LOCATION OF RARE PLANTS INVENTORIED BY MIDWEST NATURAL RESOURCES FALL 2025

0 25 50 100
GRAPHIC SCALE IN FEET

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Reg. No. 44763 Date 1-9-2026

Revisions

Date	01-16-26
Designed	JLT
Drawn	JLT

00-PLAN-1231005-SHEET-TREE

TREE PRESERVATION PLAN

LENNAR
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PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

T2 OF 8

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SHEET T2

MATCH LINE

TREE/SILT FENCE (TYP)

TREE/SILT FENCE (TYP)

MATCH LINE

SHEET T4

12516 TREE TO BE REMOVED
12514 TREE TO BE SAVED
12429 TREE LOCATED OFF-SITE

LOCATION OF RARE PLANTS INVENTORIED BY MIDWEST NATURAL RESOURCES FALL 2025

0 25 50 100
GRAPHIC SCALE IN FEET

00-PLAN-1231005-SHEET-TREE

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Drawn JLT

TREE PRESERVATION PLAN

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SHEET T3

MATCH LINE

TREE/SILT FENCE (TYP)

TREE/SILT FENCE (TYP)

LOCATION OF RARE PLANTS INVENTORIED BY MIDWEST NATURAL RESOURCES FALL 2025

12516 TREE TO BE REMOVED
12514 TREE TO BE SAVED
12429 TREE LOCATED OFF-SITE

0 25 50 100
GRAPHIC SCALE IN FEET

00-PLAN-1231005-SHEET-TREE

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

T4 OF 8

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TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
2001	12,13	Red Cedar	*Juniperus virginiana*	45'height		Save
2002	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2003	11	Red Cedar	*Juniperus virginiana*	30'height		Save
2004	12	Red Cedar	*Juniperus virginiana*	30'height		Save
2005	11	Red Cedar	*Juniperus virginiana*	30'height		Save
2006	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2007	11	Red Cedar	*Juniperus virginiana*	12'height		Save
2008	16	Red Cedar	*Juniperus virginiana*	30'height		Save
2009	7	Red Cedar	*Juniperus virginiana*	30'height		Save
2010	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2011	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2012	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2013	5	Red Cedar	*Juniperus virginiana*	15'height		Save
2014	4	Red Cedar	*Juniperus virginiana*	15'height		Save
2015	10	Red Cedar	*Juniperus virginiana*	30'height		Save
2016	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2017	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2018	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2019	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2020	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2021	9	Red Cedar	*Juniperus virginiana*	30'height		Save
2022	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2023	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2024	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2025	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2026	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2027	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2028	4	Red Cedar	*Juniperus virginiana*	12'height		Save
2029	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2030	9	Red Cedar	*Juniperus virginiana*	30'height		Save
2031	12	Siberian Elm	*Ulmus pumila*		x	Save
2032	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2033	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2034	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2035	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2036	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2037	8	Red Cedar	*Juniperus virginiana*	30'height		Save
2038	11	Red Cedar	*Juniperus virginiana*	30'height		Save
2039	11	Red Cedar	*Juniperus virginiana*	30'height		Save
2040	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2041	24	Red Cedar	*Juniperus virginiana*	30'height		Save
2042	12	Red Cedar	*Juniperus virginiana*	30'height		Save
2043	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2044	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2045	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2046	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2047	6	Black Cherry	*Prunus serotina*			Remove
2048	12	Red Cedar	*Juniperus virginiana*	30'height		Remove
2049	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2050	6	Black Cherry	*Prunus serotina*			Remove
2051	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2052	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2053	10	Red Cedar	*Juniperus virginiana*	30'height		Remove
2054	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2055	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2056	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2057	6	Black Cherry	*Prunus serotina*			Remove
2058	7	Red Cedar	*Juniperus virginiana*	30'height		Save
2059	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2060	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2061	9	Red Cedar	*Juniperus virginiana*	30'height		Save
2062	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2063	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2064	12	Red Cedar	*Juniperus virginiana*	30'height		Remove
2065	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2066	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2067	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2068	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2069	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
2070	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2071	10	Red Cedar	*Juniperus virginiana*	30'height		Save
2072	3	Red Cedar	*Juniperus virginiana*	20'height		Save
2073	15	Red Cedar	*Juniperus virginiana*	45'height		Remove
2074	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2075	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2076	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
2077	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2078	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
2079	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
2080	17	Red Cedar	*Juniperus virginiana*	45'height		Remove
2081	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
2082	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2083	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2084	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
2085	13	Red Pine	*Pinus resinosa*	50'height		Remove
2086	2	Red Cedar	*Juniperus virginiana*	15'height		Remove
2087	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2088	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2089	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2090	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2091	13	Siberian Elm	*Ulmus pumila*		x	Remove
2092	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2093	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2094	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2095	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2096	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2097	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2098	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
2099	5	Red Cedar	*Juniperus virginiana*	30'height		Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
2100	11	Red Cedar	*Juniperus virginiana*	30'height		Remove
2101	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2102	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2103	10	Red Cedar	*Juniperus virginiana*	30'height		Remove
2104	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2105	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
2106	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
2107	3,2	Red Cedar	*Juniperus virginiana*	30'height		Remove
2108	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
2109	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
2110	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2111	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
2112	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2113	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2114	14	Red Cedar	*Juniperus virginiana*	45'height		Remove
2115	4	Red Cedar	*Juniperus virginiana*	45'height		Remove
2116	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
2117	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2118	14,6,6	Red Cedar	*Juniperus virginiana*	45'height		Remove
2119	5	Red Cedar	*Juniperus virginiana*	45'height		Remove
2120	13	Siberian Elm	*Ulmus pumila*		x	Save
2121	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2122	13	Siberian Elm	*Ulmus pumila*		x	Save
2123	7	Red Cedar	*Juniperus virginiana*	30'height		Save
2124	8,6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2125	12	Siberian Elm	*Ulmus pumila*		x	Remove
2126	26	Red Cedar	*Juniperus virginiana*	45'height		Remove
2127	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2128	14	Red Cedar	*Juniperus virginiana*	45'height		Remove
2129	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2130	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2131	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2132	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2133	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
2134	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2135	17	Red Cedar	*Juniperus virginiana*	45'height		Remove
2136	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2137	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
2138	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2139	26	Red Cedar	*Juniperus virginiana*	45'height		Remove
2140	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
2141	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2142	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2143	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2144	8,6,6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2145	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
2146	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
2147	12	Red Cedar	*Juniperus virginiana*	30'height		Remove
2148	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
2149	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2150	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
2151	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2152	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2153	6,5,4,4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2154	5	Red Cedar	*Juniperus virginiana*	20'height		Remove
2155	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2156	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
2157	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
2158	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2159	5	Red Cedar	*Juniperus virginiana*	20'height		Remove
2160	12,9,6,6	Red Cedar	*Juniperus virginiana*	45'height		Remove
2161	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
2162	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
2163	2	Red Cedar	*Juniperus virginiana*	12'height		Remove
2164	3,3,3	Red Cedar	*Juniperus virginiana*	20'height		Remove
2165	12,11	Red Cedar	*Juniperus virginiana*	30'height		Save
2166	6	Black Cherry	*Prunus serotina*			Save
2167	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2168	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2169	9	Red Cedar	*Juniperus virginiana*	30'height		Save
2170	3	Red Cedar	*Juniperus virginiana*	20'height		Save
2171	3	Red Cedar	*Juniperus virginiana*	20'height		Save
2172	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2173	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2174	3,2	Red Cedar	*Juniperus virginiana*	30'height		Save
2175	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2176	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2177	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2178	5,4,4	Red Cedar	*Juniperus virginiana*	30'height		Save
2179	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2180	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2181	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2182	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2183	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2184	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2185	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2186	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2187	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2188	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2189	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2190	6	Black Cherry	*Prunus serotina*			Save
2191	8	Red Cedar	*Juniperus virginiana*	30'height		Save
2192	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2193	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2194	6	Black Cherry	*Prunus serotina*			Save
2195	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2196	3	Red Cedar	*Juniperus virginiana*	20'height		Save
2197	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2198	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2199	4	Red Cedar	*Juniperus virginiana*	30'height		Save

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
2200	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2201	8	Red Cedar	*Juniperus virginiana*	30'height		Save
2202	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2203	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2204	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2205	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2206	10	Red Cedar	*Juniperus virginiana*	30'height		Save
2207	6	Red Cedar	*Juniperus virginiana*	30'height		Save
2208	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2209	12	Red Cedar	*Juniperus virginiana*	30'height		Save
2210	3	Red Cedar	*Juniperus virginiana*	20'height		Save
2211	12	Red Cedar	*Juniperus virginiana*	30'height		Save
2212	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2213	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2214	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2215	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2216	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2217	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2218	5	Red Cedar	*Juniperus virginiana*	30'height		Save
2219	27	Siberian Elm	*Ulmus pumila*		x	Save
2220	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2221	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2222	2	Red Cedar	*Juniperus virginiana*	20'height		Save
2223	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2224	4	Red Cedar	*Juniperus virginiana*	20'height		Save
2225	2	Red Pine	*Pinus resinosa*	20'height		Save
2226	13	Red Cedar	*Juniperus virginiana*	30'height		Save
2227	5	Red Pine	*Pinus resinosa*	30'height		Save
2228	8	Red Pine	*Pinus resinosa*	30'height		Save
2229	4	Red Cedar	*Juniperus virginiana*	30'height		Save
2230	3	Red Cedar	*Juniperus virginiana*	30'height		Save
2231	7	Red Cedar	*Juniperus virginiana*	30'height		Save
2232	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2233	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2234	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2235	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2236	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2237	12	Siberian Elm	*Ulmus pumila*		x	Save
2238	6	Black Cherry	*Prunus serotina*			Save
2239	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2240	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2241	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2242	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2243	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2244	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2245	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2246	7	Red Cedar	*Juniperus virginiana*	25'height		Save
2247	12	Siberian Elm	*Ulmus pumila*		x	Save
2248	8	Red Cedar	*Juniperus virginiana*	25'height		Save
2249	12	Red Cedar	*Juniperus virginiana*	25'height		Save
2250	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2251	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2252	9	Red Cedar	*Juniperus virginiana*	25'height		Save
2253	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2254	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2255	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2256	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2257	16	Siberian Elm	*Ulmus pumila*		x	Save
2258	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2259	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2260	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2261	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2262	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2263	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2264	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2265	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2266	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2267	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2268	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2269	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2270	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2271	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2272	4	Red Cedar	*Juniperus virginiana*	15'height		Save
2273	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2274	12	Siberian Elm	*Ulmus pumila*		x	Save
2275	7	Red Cedar	*Juniperus virginiana*	25'height		Save
2276	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2277	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2278	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2279	8	Red Cedar	*Juniperus virginiana*	25'height		Save
2280	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2281	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2282	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2283	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2284	6	Black Cherry	*Prunus serotina*			Save
2285	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2286	7	Red Cedar	*Juniperus virginiana*	25'height		Save
2287	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2288	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2289	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2290	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2291	18	Siberian Elm	*Ulmus pumila*	leading stem top broken, trun	x	Save
2292	6	Black Cherry	*Prunus serotina*			Save
2293	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2294	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2295	9	Red Cedar	*Juniperus virginiana*	25'height		Save
2296	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2297	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2298	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2299	2	Red Cedar	*Juniperus virginiana*	15'height		Save

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
2300	7	Red Cedar	*Juniperus virginiana*	25'height		Save
2401	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2402	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2403	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2404	18	Siberian Elm	*Ulmus pumila*	40% dead	x	Save
2405	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2406	2	Red Cedar	*Juniperus virginiana*	25'height		Save
2407	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2408	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2409	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2410	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2411	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2412	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2413	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2414	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2415	14	Red Cedar	*Juniperus virginiana*	45'height		Save
2416	14	Red Cedar	*Juniperus virginiana*	45'height		Save
2417	10	Red Cedar	*Juniperus virginiana*	25'height		Save
2418	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2419	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2420	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2421	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2422	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2423	8	Red Cedar	*Juniperus virginiana*	45'height		Save
2424	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2425	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2426	6	Red Cedar	*Juniperus virginiana*	25'height		Save
2427	4	Red Cedar	*Juniperus virginiana*	25'height		Save
2428	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2429	5	Red Cedar	*Juniperus virginiana*	25'height		Save
2430	12	Red Cedar	*Juniperus virginiana*	45'height		Save
2431	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2432	3	Red Cedar	*Juniperus virginiana*	25'height		Save
2433	2	Red Cedar	*Juniperus virginiana*	12'height		Save
2434	17	Red Cedar	*Juniperus virginiana*	45'height		Save
2435	12	Red Cedar	*Juniperus virginiana*	45'height		Save
2436	5	Red Cedar	*Juniperus virginiana*	12'height		Save
2437	2	Red Cedar	*Juniperus virginiana*	15'height		Save
2438	3	Red Cedar	*Juniperus virginiana*	15'height		Save
2439	4	Red Cedar	*Juniperus virginiana*	15'height		Off-Site
2440	2	Red Cedar	*Juniperus virginiana*	12'height		Save
12419	16	Siberian Elm	*Ulmus pumila*		x	Save
12420	18	Siberian Elm	*Ulmus pumila*		x	Save
12421	12	Siberian Elm	*Ulmus pumila*		x	Save
12422	12	Siberian Elm	*Ulmus pumila*		x	Save
12423	13	Siberian Elm	*Ulmus pumila*		x	Save
12424	17	Siberian Elm	*Ulmus pumila*		x	Save
12425	14	Siberian Elm	*Ulmus pumila*		x	Save
12426	7	Hackberry	*Celtis occidentalis*			Save
12427	14	Red Pine	*Pinus resinosa*	60' height		Save
12428	13	Red Pine	*Pinus resinosa*	60' height		Off-Site
12429	17	Red Pine	*Pinus resinosa*	60' height		Off-Site
12430	15	Box Elder	*Acer negundo*			Off-Site
12431	15	Red Pine	*Pinus resinosa*	60' height		Off-Site
12432	3	Red Cedar	*Juniperus virginiana*	15' height		Save
12433	15	Siberian Elm	*Ulmus pumila*	60% dead	x	Save
12434	12	Siberian Elm	*Ulmus pumila*	60% dead	x	Save
12435	6	Black Cherry	*Prunus serotina*			Save
12436	6	Black Cherry	*Prunus serotina*			Save
12437	24	Red Cedar	*Juniperus virginiana*	50' height		Save
12438	12	Siberian Elm	*Ulmus pumila*		x	Save
12439	3	Red Cedar	*Juniperus virginiana*	15' height		Save
12440	6	Red Cedar	*Juniperus virginiana*	25' height		Save
12441	6	Red Cedar	*Juniperus virginiana*	25' height		Save
12442	4	Red Cedar	*Juniperus virginiana*	15' height		Save
12443	11	Red Cedar	*Juniperus virginiana*	25' height		Save
12444	7	Red Cedar	*Juniperus virginiana*	20' height		Save
12445	4	Red Cedar	*Juniperus virginiana*	15' height		Save
12446	3	Red Cedar	*Juniperus virginiana*	15' height		Save
12447	4	Red Cedar	*Juniperus virginiana*	15' height		Save
12448	3	Red Cedar	*Juniperus virginiana*	15' height		Save
12449	4	Red Cedar	*Juniperus virginiana*	15' height		Save
12450	4	Red Cedar	*Juniperus virginiana*	15' height		Save
12451	7	Red Cedar	*Juniperus virginiana*	25' height		Save
12452	12, 7	Black Cherry	*Prunus serotina*	split at trunk		Save
12453	3	Red Cedar	*Juniperus virginiana*	15' height		Save
12454	5	Red Cedar	*Juniperus virginiana*	15' height		Save
12455	5	Red Cedar	*Juniperus virginiana*	20' height		Remove
12456	5	Red Cedar	*Juniperus virginiana*	20' height		Remove
12457	11	Red Cedar	*Juniperus virginiana*	25' height		Remove
12458	3	Red Cedar	*Juniperus virginiana*	15' height		Save
12459	4	Red Cedar	*Juniperus virginiana*	15' height		Remove
12460	7	Red Cedar	*Juniperus virginiana*	25' height		Remove
12461	7	Black Cherry	*Prunus serotina*			Remove
12462	7	Red Cedar	*Juniperus virginiana*	15' height		Remove
12463	12	Siberian Elm	*Ulmus pumila*	80% dead	x	Remove
12464	4	Red Cedar	*Juniperus virginiana*	15' height		Remove
12465	3	Red Cedar	*Juniperus virginiana*	12' height		Remove
12466	3	Red Cedar	*Juniperus virginiana*	15' height		Remove
12467	3	Red Cedar	*Juniperus virginiana*	12' height		Remove
12468	4	Red Cedar	*Juniperus virginiana*	20' height		Remove
12469	3	Red Cedar	*Juniperus virginiana*	15' height		Remove
12470	14	Red Cedar	*Juniperus virginiana*	25' height		Remove
12471	7	Red Cedar	*Juniperus virginiana*	20' height		Remove
12472	6	Red Cedar	*Juniperus virginiana*	20' height		Remove
12473	7	Red Cedar	*Juniperus virginiana*	25' height		Remove
12474	6	Staghorn Sumac	*Rhus typhina*	decay along trunk	x	Remove
12475	4	Red Cedar	*Juniperus virginiana*	15' height		Remove
12476	8	Red Cedar	*Juniperus virginiana*	25' height		Remove
12477	14	Siberian Elm	*Ulmus pumila*	80% dead	x	Remove

00-PLAN-1231005-SHEET-TREE

PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan was prepared by me or

12478	12	Red Cedar	*Juniperus virginiana*	25' height		Remove
12479	8	Red Cedar	*Juniperus virginiana*	20' height		Remove
12480	11	Black Cherry	*Prunus serotina*			Remove
12481	11	Black Cherry	*Prunus serotina*			Remove
12482	14	White Mulberry	*Morus alba*			Remove
12483	7	Black Cherry	*Prunus serotina*			Remove
12484	4	Red Cedar	*Juniperus virginiana*	15' height		Remove
12485	12	Siberian Elm	*Ulmus pumila*		x	Remove
12486	24	Siberian Elm	*Ulmus pumila*		x	Remove
12487	12	Red Cedar	*Juniperus virginiana*	30' height		Remove
12488	6	Black Cherry	*Prunus serotina*			Remove
12489	4	Red Cedar	*Juniperus virginiana*	15' height		Remove
12490	5	Red Cedar	*Juniperus virginiana*	15' height		Remove
12491	18	Siberian Elm	*Ulmus pumila*	80% dead	x	Save
12492	7	Black Cherry	*Prunus serotina*			Save
12493	6	Black Cherry	*Prunus serotina*			Save
12494	3	Red Cedar	*Juniperus virginiana*	25' height		Save
12495	12	Black Cherry	*Prunus serotina*			Save
12496	8	Black Cherry	*Prunus serotina*			Save
12497	6	Black Cherry	*Prunus serotina*			Save
12498	6	Red Cedar	*Juniperus virginiana*	25' height		Save
12499	10	Black Cherry	*Prunus serotina*			Save
12500	14	American Elm	*Ulmus americana*	80% dead	x	Save
12501	12	Siberian Elm	*Ulmus pumila*	80% dead, major woodpecker	x	Save
12502	15	Siberian Elm	*Ulmus pumila*	60% dead	x	Save
12503	7	Black Cherry	*Prunus serotina*			Save
12504	9	Black Cherry	*Prunus serotina*			Save
12505	4	Red Cedar	*Juniperus virginiana*	20' height		Save
12506	7	Black Cherry	*Prunus serotina*			Save
12507	18,14	Siberian Elm	*Ulmus pumila*		x	Save
12508	4	Red Cedar	*Juniperus virginiana*	20' height		Remove
12509	6	Red Cedar	*Juniperus virginiana*	20' height		Remove
12510	5	Red Cedar	*Juniperus virginiana*	20' height		Remove
12511	4	Red Cedar	*Juniperus virginiana*	20' height		Remove
12512	7	Black Cherry	*Prunus serotina*			Remove
12513	5	Red Cedar	*Juniperus virginiana*	20' height		Remove
12514	2	Red Cedar	*Juniperus virginiana*	12' height		Save
12515	6	Black Cherry	*Prunus serotina*			Save
12516	14	Siberian Elm	*Ulmus pumila*		x	Remove
12517	12	Siberian Elm	*Ulmus pumila*		x	Remove
12518	8	Hackberry	*Celtis occidentalis*			Remove
12519	12	Hackberry	*Celtis occidentalis*			Remove
12520	12	Siberian Elm	*Ulmus pumila*		x	Remove
12521	12	Siberian Elm	*Ulmus pumila*		x	Remove
12522	8	Red Cedar	*Juniperus virginiana*	25' height		Remove
12523	11	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12524	8	Red Cedar	*Juniperus virginiana*	20' height		Remove
12525	7	Black Cherry	*Prunus serotina*			Remove
12526	12	Red Cedar	*Juniperus virginiana*	25' height		Remove
12527	12	Black Cherry	*Prunus serotina*			Remove
12528	23	Black Cherry	*Prunus serotina*			Remove
12529	13	Red Cedar	*Juniperus virginiana*	25' height		Remove
12530	6	Crabapple	*Malus* sp.			Remove
12531	12	American Elm	*Ulmus americana*		x	Remove
12532	12	Siberian Elm	*Ulmus pumila*		x	Remove
12533	6	Black Cherry	*Prunus serotina*			Remove
12534	4	Red Cedar	*Juniperus virginiana*	15' height		Remove
12535	15	Red Cedar	*Juniperus virginiana*	35' height		Remove
12536	14	American Elm	*Ulmus americana*		x	Remove
12537	12	Black Cherry	*Prunus serotina*			Remove
12538	13	American Elm	*Ulmus americana*		x	Remove
12539	12	Hackberry	*Celtis occidentalis*			Remove
12540	14	Hackberry	*Celtis occidentalis*			Remove
12541	14	Hackberry	*Celtis occidentalis*			Remove
12542	9	Hackberry	*Celtis occidentalis*			Remove
12543	6	Hackberry	*Celtis occidentalis*			Remove
12544	12	Hackberry	*Celtis occidentalis*			Remove
12545	11	Red Cedar	*Juniperus virginiana*	35' height		Remove
12546	14	Red Cedar	*Juniperus virginiana*	35' height		Remove
12547	10, 6,5,5	Red Cedar	*Juniperus virginiana*	30' height		Remove
12548	28	Siberian Elm	*Ulmus pumila*		x	Remove
12549	7	Red Cedar	*Juniperus virginiana*	30' height		Remove
12550	5	Red Cedar	*Juniperus virginiana*	30' height		Remove
12551	8	Red Cedar	*Juniperus virginiana*	35' height		Remove
12552	12	Red Cedar	*Juniperus virginiana*	35' height		Remove
12553	12	Siberian Elm	*Ulmus pumila*		x	Remove
12554	22	Red Cedar	*Juniperus virginiana*	35' height		Remove
12555	7	Black Cherry	*Prunus serotina*	poor growth form, leaning tov	x	Remove
12556	11	Red Cedar	*Juniperus virginiana*	35' height		Remove
12557	10	Red Cedar	*Juniperus virginiana*	35' height		Remove
12558	11	Red Cedar	*Juniperus virginiana*	35' height		Remove
12559	12	Red Cedar	*Juniperus virginiana*	35' height		Remove
12560	3	Red Cedar	*Juniperus virginiana*	30' height		Remove
12561	7	Red Cedar	*Juniperus virginiana*	30' height		Remove
12562	12	Siberian Elm	*Ulmus pumila*		x	Remove
12563	8	Red Cedar	*Juniperus virginiana*	30' height		Remove
12564	12	Red Cedar	*Juniperus virginiana*	35' height		Remove
12565	14	Red Cedar	*Juniperus virginiana*	35' height		Remove
12566	13	Black Cherry	*Prunus serotina*			Remove
12567	3	Red Cedar	*Juniperus virginiana*	20' height		Remove
12568	2	Red Cedar	*Juniperus virginiana*	20' height		Remove
12569	9	Red Cedar	*Juniperus virginiana*	30' height		Remove
12570	11	Red Cedar	*Juniperus virginiana*	35' height		Remove
12571	4	Red Cedar	*Juniperus virginiana*	12'height		Remove
12572	5	Red Cedar	*Juniperus virginiana*	20'height		Remove
12573	3	Red Cedar	*Juniperus virginiana*	12'height		Remove
12574	7	Red Cedar	*Juniperus virginiana*	20'height		Remove
12575	10,6,5	Red Cedar	*Juniperus virginiana*	20'height		Remove
12576	10	Red Cedar	*Juniperus virginiana*	20'height		Remove
12577	3	Red Cedar	*Juniperus virginiana*	12'height		Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
12578	3	Red Cedar	*Juniperus virginiana*	12'height		Remove
12579	12,14	Siberian Elm	*Ulmus pumila*		x	Remove
12580	2	Red Cedar	*Juniperus virginiana*	12'height		Remove
12581	3	Red Cedar	*Juniperus virginiana*	12'height		Remove
12582	4	Red Cedar	*Juniperus virginiana*	15'height		Remove
12583	7	Red Cedar	*Juniperus virginiana*	15'height		Remove
12584	3	Red Cedar	*Juniperus virginiana*	12'height		Remove
12585	3	Red Cedar	*Juniperus virginiana*	12'height		Remove
12586	12	Red Cedar	*Juniperus virginiana*	35'height		Remove
12587	7	Red Cedar	*Juniperus virginiana*	20'height		Remove
12588	35	Siberian Elm	*Ulmus pumila*		x	Remove
12589	12	Red Cedar	*Juniperus virginiana*	35'height		Remove
12590	5	Red Cedar	*Juniperus virginiana*	20'height		Remove
12591	12	Siberian Elm	*Ulmus pumila*		x	Save
12592	7	Hackberry	*Celtis occidentalis*			Save
12593	7	Hackberry	*Celtis occidentalis*			Save
12594	3	Red Cedar	*Juniperus virginiana*	12'height		Save
12595	8	Red Cedar	*Juniperus virginiana*	20'height		Save
12596	2	Red Cedar	*Juniperus virginiana*	12'height		Save
12597	5	Red Cedar	*Juniperus virginiana*	20'height		Save
12598	12	Siberian Elm	*Ulmus pumila*		x	Save
12599	4	Red Cedar	*Juniperus virginiana*	20'height		Save
12600	5	Red Cedar	*Juniperus virginiana*	20'height		Save
12601	12	Siberian Elm	*Ulmus pumila*		x	Save
12602	7	Hackberry	*Celtis occidentalis*			Save
12603	19	Hackberry	*Celtis occidentalis*			Remove
12604	16	Hackberry	*Celtis occidentalis*			Remove
12605	17	Hackberry	*Celtis occidentalis*			Remove
12606	6	Hackberry	*Celtis occidentalis*			Remove
12607	6	Red Cedar	*Juniperus virginiana*	20'height		Remove
12608	7	Black Cherry	*Prunus serotina*			Remove
12609	6	Black Cherry	*Prunus serotina*			Remove
12610	9	Black Cherry	*Prunus serotina*			Remove
12611	6	Black Cherry	*Prunus serotina*			Remove
12612	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
12613	29	Siberian Elm	*Ulmus pumila*	40% dead	x	Remove
12614	28	Siberian Elm	*Ulmus pumila*		x	Remove
12615	7	Hackberry	*Celtis occidentalis*			Remove
12616	11	Red Cedar	*Juniperus virginiana*	20'height		Remove
12617	18	Siberian Elm	*Ulmus pumila*			Remove
12618	12	Siberian Elm	*Ulmus pumila*			Save
12619	14	Red Cedar	*Juniperus virginiana*	45'height		Save
12620	14	Hackberry	*Celtis occidentalis*			Remove
12621	11	Red Cedar	*Juniperus virginiana*	40'height		Remove
12622	11	Black Cherry	*Prunus serotina*			Remove
12623	3	Red Cedar	*Juniperus virginiana*	40'height		Remove
12624	14	Siberian Elm	*Ulmus pumila*		x	Remove
12625	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12626	6	Hackberry	*Celtis occidentalis*			Remove
12627	15	Siberian Elm	*Ulmus pumila*		x	Remove
12628	8	Red Cedar	*Juniperus virginiana*	40'height		Remove
12629	15	Red Cedar	*Juniperus virginiana*	40'height		Remove
12630	16	Hackberry	*Celtis occidentalis*			Remove
12631	15	Hackberry	*Celtis occidentalis*			Remove
12632	17	Siberian Elm	*Ulmus pumila*		x	Remove
12633	2	Red Cedar	*Juniperus virginiana*	12'height		Remove
12634	4	Red Cedar	*Juniperus virginiana*	35'height		Remove
12635	20	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12636	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
12637	2	Red Cedar	*Juniperus virginiana*	12'height		Remove
12638	8	Black Cherry	*Prunus serotina*			Remove
12639	7	Crabapple	*Malus* sp.	major woodpecker damage	x	Remove
12640	6	Crabapple	*Malus* sp.			Remove
12641	17	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12642	6	Black Cherry	*Prunus serotina*			Remove
12643	15	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12644	6	Black Cherry	*Prunus serotina*			Remove
12645	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12646	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12647	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12648	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12649	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
12650	15	Red Cedar	*Juniperus virginiana*	45'height		Remove
12651	9	Red Cedar	*Juniperus virginiana*	35'height		Remove
12652	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
12653	11	Red Cedar	*Juniperus virginiana*	35'height		Remove
12654	9	Red Cedar	*Juniperus virginiana*	35'height		Remove
12655	14	Red Cedar	*Juniperus virginiana*	45'height		Remove
12656	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12657	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12658	18	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12659	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12660	16	Red Cedar	*Juniperus virginiana*	45'height		Remove
12661	16	Red Cedar	*Juniperus virginiana*	45'height		Remove
12662	17	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12663	7	Black Cherry	*Prunus serotina*			Remove
12664	11	Black Cherry	*Prunus serotina*			Remove
12665	15	Black Cherry	*Prunus serotina*			Remove
12666	2	Red Cedar	*Juniperus virginiana*	12'height		Remove
12667	2	Red Cedar	*Juniperus virginiana*	12'height		Remove
12668	13	Black Cherry	*Prunus serotina*			Remove
12669	10	Black Cherry	*Prunus serotina*			Remove
12670	15	Siberian Elm	*Ulmus pumila*		x	Remove
12671	12	Box Elder	*Acer negundo*			Remove
12672	15	Siberian Elm	*Ulmus pumila*		x	Remove
12673	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12674	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12675	12	Siberian Elm	*Ulmus pumila*		x	Remove
12676	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12677	3	Red Cedar	*Juniperus virginiana*	30'height		Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
12678	7	Black Cherry	*Prunus serotina*			Remove
12679	6	Black Cherry	*Prunus serotina*			Remove
12680	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12681	15	Red Cedar	*Juniperus virginiana*	45'height		Remove
12682	24	Red Cedar	*Juniperus virginiana*	45'height		Remove
12683	6	Black Cherry	*Prunus serotina*			Remove
12684	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12685	10	Red Cedar	*Juniperus virginiana*	30'height		Remove
12686	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12687	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12688	10	Northern Pin Oak	*Quercus ellipsoidalis*			Save
12689	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12690	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12691	13	Black Cherry	*Prunus serotina*			Remove
12692	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12693	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12694	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12695	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12696	12	Siberian Elm	*Ulmus pumila*		x	Remove
12697	14	Siberian Elm	*Ulmus pumila*		x	Remove
12698	9	Black Cherry	*Prunus serotina*			Remove
12699	7	Black Cherry	*Prunus serotina*			Remove
12700	9	Black Cherry	*Prunus serotina*			Remove
12701	11	Black Cherry	*Prunus serotina*			Remove
12702	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12703	14	Red Cedar	*Juniperus virginiana*	45'height		Remove
12704	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12705	13	Siberian Elm	*Ulmus pumila*		x	Remove
12706	8	Black Cherry	*Prunus serotina*			Remove
12707	6	Black Cherry	*Prunus serotina*			Remove
12708	11	Black Cherry	*Prunus serotina*			Remove
12709	14	Black Cherry	*Prunus serotina*			Remove
12710	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12711	7	Black Cherry	*Prunus serotina*			Remove
12712	15	Black Cherry	*Prunus serotina*			Remove
12713	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12714	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12715	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12716	14	Red Cedar	*Juniperus virginiana*	45'height		Remove
12717	17	Northern Pin Oak	*Quercus ellipsoidalis*			Remove
12718	11	Red Cedar	*Juniperus virginiana*	30'height		Remove
12719	5	Red Cedar	*Juniperus virginiana*	45'height		Remove
12720	6	Red Cedar	*Juniperus virginiana*	45'height		Remove
12721	12	American Elm	*Ulmus americana*		x	Remove
12722	15	Black Cherry	*Prunus serotina*			Remove
12723	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12724	3	Red Cedar	*Juniperus virginiana*	30'height		Save
12725	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12726	22	Red Cedar	*Juniperus virginiana*	45'height		Save
12727	8,8	Red Cedar	*Juniperus virginiana*	45'height		Save
12728	18	Siberian Elm	*Ulmus pumila*		x	Save
12729	6	Black Cherry	*Prunus serotina*			Save
12730	7	Red Cedar	*Juniperus virginiana*	30'height		Save
12731	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12732	2	Red Cedar	*Juniperus virginiana*	30'height		Save
12733	3	Red Cedar	*Juniperus virginiana*	30'height		Save
12734	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12735	2	Red Cedar	*Juniperus virginiana*	30'height		Save
12736	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12737	8	Red Cedar	*Juniperus virginiana*	45'height		Save
12738	7	Red Cedar	*Juniperus virginiana*	45'height		Save
12739	10	Red Cedar	*Juniperus virginiana*	45'height		Save
12740	2	Red Cedar	*Juniperus virginiana*	12'height		Save
12741	12	Siberian Elm	*Ulmus pumila*		x	Save
12742	3	Red Cedar	*Juniperus virginiana*	12'height		Save
12743	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12744	14	Red Cedar	*Juniperus virginiana*	45'height		Save
12745	8	Red Cedar	*Juniperus virginiana*	45'height		Save
12746	3	Red Cedar	*Juniperus virginiana*	30'height		Save
12747	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12748	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12749	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12750	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12751	8	Red Cedar	*Juniperus virginiana*	45'height		Save
12752	3	Red Cedar	*Juniperus virginiana*	20'height		Save
12753	2	Siberian Elm	*Ulmus pumila*	20'height	x	Save
12754	10	Red Cedar	*Juniperus virginiana*	45'height		Save
12755	9	Red Cedar	*Juniperus virginiana*	45'height		Save
12756	12	Red Cedar	*Juniperus virginiana*	45'height		Save
12757	9	Red Cedar	*Juniperus virginiana*	45'height		Save
12758	12,7	Red Cedar	*Juniperus virginiana*	45'height		Save
12759	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12760	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12761	10	Red Cedar	*Juniperus virginiana*	45'height		Save
12762	7	Red Cedar	*Juniperus virginiana*	45'height		Save
12763	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12764	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12765	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12766	13	Red Cedar	*Juniperus virginiana*	45'height		Save
12767	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12768	13	Red Cedar	*Juniperus virginiana*	45'height		Save
12769	6	Red Cedar	*Juniperus virginiana*	30'height		Save
12770	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12771	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12772	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12773	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12774	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12775	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12776	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12777	4	Red Cedar	*Juniperus virginiana*	30'height		Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
12778	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12779	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12780	15	Siberian Elm	*Ulmus pumila*		x	Remove
12781	9	Red Cedar	*Juniperus virginiana*	45'height		Remove
12782	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12783	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12784	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12785	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12786	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12787	8	Red Cedar	*Juniperus virginiana*	45'height		Save
12788	12	Red Cedar	*Juniperus virginiana*	45'height		Save
12789	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12790	14	Red Cedar	*Juniperus virginiana*	45'height		Save
12791	9	Red Cedar	*Juniperus virginiana*	45'height		Save
12792	5	Red Cedar	*Juniperus virginiana*	45'height		Save
12793	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12794	10	Red Cedar	*Juniperus virginiana*	45'height		Save
12795	15	Red Cedar	*Juniperus virginiana*	45'height		Save
12796	12	Red Cedar	*Juniperus virginiana*	45'height		Save
12797	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12798	7	Red Cedar	*Juniperus virginiana*	30'height		Save
12799	14	Red Cedar	*Juniperus virginiana*	45'height		Save
12800	17	Red Cedar	*Juniperus virginiana*	45'height		Save
12801	5	Red Cedar	*Juniperus virginiana*	45'height		Save
12802	12	Red Cedar	*Juniperus virginiana*	45'height		Save
12803	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12804	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12805	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12806	6	Red Cedar	*Juniperus virginiana*	45'height		Save
12807	6	Red Cedar	*Juniperus virginiana*	45'height		Save
12808	9	Red Cedar	*Juniperus virginiana*	45'height		Save
12809	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12810	6	Red Cedar	*Juniperus virginiana*	30'height		Save
12811	14	Siberian Elm	*Ulmus pumila*	partial decay at trunk	x	Save
12812	3	Red Cedar	*Juniperus virginiana*	20'height		Save
12813	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12814	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12815	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12816	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12817	4	Red Cedar	*Juniperus virginiana*	20'height		Save
12818	3	Red Cedar	*Juniperus virginiana*	20'height		Save
12819	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12820	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12821	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12822	4	Red Cedar	*Juniperus virginiana*	30'height		Save
12823	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12824	3	Red Cedar	*Juniperus virginiana*	20'height		Save
12825	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12826	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12827	4	Red Cedar	*Juniperus virginiana*	20'height		Save
12828	5	Red Cedar	*Juniperus virginiana*	20'height		Remove
12829	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
12830	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
12831	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12832	15	Red Cedar	*Juniperus virginiana*	45'height		Save
12833	12	Red Cedar	*Juniperus virginiana*	45'height		Save
12834	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12835	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12836	2	Red Cedar	*Juniperus virginiana*	20'height		Save
12837	4	Red Cedar	*Juniperus virginiana*	20'height		Save
12838	3	Red Cedar	*Juniperus virginiana*	20'height		Save
12839	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12840	18	Red Cedar	*Juniperus virginiana*	45'height		Save
12841	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
12842	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12843	6	Red Cedar	*Juniperus virginiana*	45'height		Remove
12844	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12845	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12846	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12847	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12848	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12849	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12850	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12851	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12852	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12853	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12854	12	American Elm	*Ulmus americana*		x	Remove
12855	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12856	15	Red Cedar	*Juniperus virginiana*	45'height		Remove
12857	6	Red Cedar	*Juniperus virginiana*	45'height		Remove
12858	7	Red Cedar	*Juniperus virginiana*	45'height		Remove
12859	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12860	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12861	9	Red Cedar	*Juniperus virginiana*	45'height		Remove
12862	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12863	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12864	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12865	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12866	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12867	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12868	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12869	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12870	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12871	15	Red Cedar	*Juniperus virginiana*	45'height		Remove
12872	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12873	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12874	6	Red Cedar	*Juniperus virginiana*	45'height		Remove
12875	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12876	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12877	3	Red Cedar	*Juniperus virginiana*	30'height		Remove

00-PLAN-1231005-SHEET-TREE

PIONEER*engineering*
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota

Name Jennifer L. Thompson
Reg. No. 44763 Date 1-9-2026

Revisions

Date 01-16-26
Designed JLT
Drawn JLT

TREE PRESERVATION PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

T6 OF 8

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TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
12878	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12879	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12880	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12881	3	Red Cedar	*Juniperus virginiana*	20'height		Remove
12882	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12883	8	Red Cedar	*Juniperus virginiana*	45'height		Remove
12884	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
12885	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12886	8	Red Cedar	*Juniperus virginiana*	45'height		Remove
12887	7	Red Cedar	*Juniperus virginiana*	45'height		Remove
12888	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12889	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12890	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12891	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12892	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12893	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12894	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12895	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12896	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12897	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12898	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12899	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12900	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12901	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12902	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
12903	4	Red Cedar	*Juniperus virginiana*	20'height		Remove
12904	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
12905	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12906	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12907	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12908	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12909	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12910	7	Red Cedar	*Juniperus virginiana*	45'height		Remove
12911	3,3,3	Red Cedar	*Juniperus virginiana*	20'height		Remove
12912	2,3	Red Cedar	*Juniperus virginiana*	20'height		Remove
12913	10	Red Cedar	*Juniperus virginiana*	30'height		Remove
12914	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12915	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12916	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12917	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12918	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12919	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12920	12	Red Cedar	*Juniperus virginiana*	45'height		Remove
12921	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12922	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12923	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12924	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12925	3	Red Cedar	*Juniperus virginiana*	30'height		Save
12926	14	Black Cherry	*Prunus serotina*			Remove
12927	16	American Elm	*Ulmus americana*		x	Remove
12928	15	American Elm	*Ulmus americana*		x	Remove
12929	14	Black Cherry	*Prunus serotina*			Remove
12930	7	Black Cherry	*Prunus serotina*			Remove
12931	14	Black Cherry	*Prunus serotina*			Remove
12932	14	Box Elder	*Acer negundo*			Remove
12933	12	Box Elder	*Acer negundo*			Remove
12934	14	American Elm	*Ulmus americana*		x	Remove
12935	12	American Elm	*Ulmus americana*		x	Remove
12936	15	American Elm	*Ulmus americana*		x	Remove
12937	11	Black Walnut	*Juglans nigra*			Remove
12938	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12939	17	Black Cherry	*Prunus serotina*			Remove
12940	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12941	9	Black Cherry	*Prunus serotina*			Remove
12942	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12943	6	Black Cherry	*Prunus serotina*			Remove
12944	15	American Elm	*Ulmus americana*		x	Remove
12945	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12946	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12947	10	Red Cedar	*Juniperus virginiana*	30'height		Remove
12948	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12949	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12950	7	Red Cedar	*Juniperus virginiana*	45'height		Remove
12951	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12952	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12953	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12954	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12955	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12956	8	Red Cedar	*Juniperus virginiana*	45'height		Remove
12957	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12958	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12959	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12960	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12961	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12962	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12963	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12964	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12965	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12966	8	Red Cedar	*Juniperus virginiana*	30'height		Remove
12967	9	Red Cedar	*Juniperus virginiana*	30'height		Remove
12968	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12969	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12970	4	Red Cedar	*Juniperus virginiana*	30'height		Remove
12971	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12972	5	Red Cedar	*Juniperus virginiana*	45'height		Remove
12973	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12974	7	Red Cedar	*Juniperus virginiana*	30'height		Remove
12975	6	Black Cherry	*Prunus serotina*			Remove
12976	6	Red Cedar	*Juniperus virginiana*	30'height		Remove
12977	5	Red Cedar	*Juniperus virginiana*	30'height		Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
12978	11	Red Cedar	*Juniperus virginiana*	45'height		Remove
12979	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12980	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12981	18	Siberian Elm	*Ulmus pumila*	major decay along base	x	Remove
12982	14	Siberian Elm	*Ulmus pumila*		x	Remove
12983	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12984	13	Red Cedar	*Juniperus virginiana*	45'height		Remove
12985	20	Bur Oak	*Quercus macrocarpa*			Remove
12986	2	Red Cedar	*Juniperus virginiana*	30'height		Remove
12987	10	Red Cedar	*Juniperus virginiana*	45'height		Remove
12988	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12989	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12990	3	Red Cedar	*Juniperus virginiana*	30'height		Remove
12991	5	Red Cedar	*Juniperus virginiana*	30'height		Remove
12992	2	Red Cedar	*Juniperus virginiana*	20'height		Remove
12993	6	Red Cedar	*Juniperus virginiana*	45'height		Save
12994	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12995	5	Red Cedar	*Juniperus virginiana*	30'height		Save
12996	6	Red Cedar	*Juniperus virginiana*	45'height		Save
12997	7	Red Cedar	*Juniperus virginiana*	45'height		Save
12998	11	Red Cedar	*Juniperus virginiana*	45'height		Save
12999	6	Red Cedar	*Juniperus virginiana*	30'height		Save
13000	6	Red Cedar	*Juniperus virginiana*	30'height		Save
4199	16	Siberian Elm	*Ulmus pumila*		x	Remove
4200	13	Siberian Elm	*Ulmus pumila*		x	Remove
4201	12	Siberian Elm	*Ulmus pumila*		x	Remove
4202	23	Siberian Elm	*Ulmus pumila*		x	Remove
4203	11	Siberian Elm	*Ulmus pumila*		x	Remove
4204	14	American Elm	*Ulmus americana*	crown partial broken	x	Remove
4205	14	Siberian Elm	*Ulmus pumila*		x	Remove
4206	20	Siberian Elm	*Ulmus pumila*		x	Remove
4207	13	Siberian Elm	*Ulmus pumila*		x	Remove
4208	13	Siberian Elm	*Ulmus pumila*		x	Remove
4209	16	Siberian Elm	*Ulmus pumila*		x	Remove
4210	30	American Elm	*Ulmus americana*		x	Remove
4211	10,7	Black Cherry	*Prunus serotina*			Remove
4212	14	Box Elder	*Acer negundo*			Remove
4213	9	Black Cherry	*Prunus serotina*			Remove
4214	12,12,12	Box Elder	*Acer negundo*			Remove
4215	12	Siberian Elm	*Ulmus pumila*		x	Remove
4216	13	Box Elder	*Acer negundo*			Remove
4217	11	Box Elder	*Acer negundo*			Remove
4218	14	Box Elder	*Acer negundo*			Remove
4219	24,21,18,16,16	American Elm	*Ulmus americana*		x	Save
4220	19	Box Elder	*Acer negundo*			Remove
4221	19	Box Elder	*Acer negundo*			Save
4222	12,12,11	Box Elder	*Acer negundo*			Remove
4223	11	Box Elder	*Acer negundo*			Remove
4224	12	Box Elder	*Acer negundo*			Remove
4225	13,10,9	Box Elder	*Acer negundo*			Remove
4226	10	Black Cherry	*Prunus serotina*			Remove
4227	8	Black Cherry	*Prunus serotina*			Remove
4228	16	Black Cherry	*Prunus serotina*			Remove
4229	25,18	American Elm	*Ulmus americana*		x	Save
4230	18	Box Elder	*Acer negundo*			Save
4231	25	Box Elder	*Acer negundo*	severe decay at base	x	Save
4232	14	Box Elder	*Acer negundo*			Save
4233	16	Box Elder	*Acer negundo*			Save
4234	22,21,13	Box Elder	*Acer negundo*			Save
4235	17	Siberian Elm	*Ulmus pumila*		x	Remove
4236	18	Siberian Elm	*Ulmus pumila*		x	Remove
4237	13	Siberian Elm	*Ulmus pumila*		x	Remove
4238	15	Siberian Elm	*Ulmus pumila*		x	Remove
4239	16	Siberian Elm	*Ulmus pumila*		x	Save
4240	12	Siberian Elm	*Ulmus pumila*		x	Save
4241	12	Siberian Elm	*Ulmus pumila*		x	Save
4242	16,11	Box Elder	*Acer negundo*			Save
4243	12,10	Box Elder	*Acer negundo*			Remove
4244	18,14	Box Elder	*Acer negundo*			Save
4245	14	Box Elder	*Acer negundo*			Save
4246	11	Black Cherry	*Prunus serotina*			Remove
4247	7	Black Cherry	*Prunus serotina*			Remove
4248	21	Box Elder	*Acer negundo*			Remove
4249	7	Black Cherry	*Prunus serotina*			Remove
4250	8	Hackberry	*Celtis occidentalis*			Remove
4251	8	Black Cherry	*Prunus serotina*			Remove
4252	9	Hackberry	*Celtis occidentalis*			Remove
4253	8	Hackberry	*Celtis occidentalis*			Remove
4254	10	Hackberry	*Celtis occidentalis*			Remove
4255	14,12	Siberian Elm	*Ulmus pumila*		x	Remove
4256	10	Hackberry	*Celtis occidentalis*			Remove
4257	21	Box Elder	*Acer negundo*			Remove
4259	13	Black Cherry	*Prunus serotina*			Remove
4260	14	Siberian Elm	*Ulmus pumila*		x	Remove
4261	14	Siberian Elm	*Ulmus pumila*		x	Remove
4262	14	Siberian Elm	*Ulmus pumila*		x	Remove
4263	14	Siberian Elm	*Ulmus pumila*		x	Remove
4264	14	Black Cherry	*Prunus serotina*			Remove
4265	14,8	Siberian Elm	*Ulmus pumila*		x	Remove
4266	19	Siberian Elm	*Ulmus pumila*		x	Remove
4267	12	Box Elder	*Acer negundo*			Remove
4268	12	Box Elder	*Acer negundo*			Remove
4269	8	Black Cherry	*Prunus serotina*			Remove
4270	15	Siberian Elm	*Ulmus pumila*		x	Remove
4271	19	Siberian Elm	*Ulmus pumila*		x	Remove
4272	11	Black Cherry	*Prunus serotina*			Remove
4273	26,6	Box Elder	*Acer negundo*			Remove
4274	23	Box Elder	*Acer negundo*			Save
4275	9	Black Cherry	*Prunus serotina*			Remove
4276	6	Hackberry	*Celtis occidentalis*			Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
4277	9	Hackberry	*Celtis occidentalis*			Remove
4278	9	Hackberry	*Celtis occidentalis*			Remove
4279	16	Hackberry	*Celtis occidentalis*			Remove
4280	12	Box Elder	*Acer negundo*			Remove
4281	13	Box Elder	*Acer negundo*			Remove
4282	9	Black Cherry	*Prunus serotina*			Remove
4283	16	Box Elder	*Acer negundo*			Remove
4284	7	Black Cherry	*Prunus serotina*			Off-Site
4285	14	Quaking Aspen	*Populus tremuloides*			Off-Site
4286	7	Black Cherry	*Prunus serotina*			Save
4287	19	Quaking Aspen	*Populus tremuloides*			Remove
4288	13	Black Cherry	*Prunus serotina*			Remove
4289	8	Black Cherry	*Prunus serotina*			Remove
4290	9	Hackberry	*Celtis occidentalis*			Remove
4291	8	Black Cherry	*Prunus serotina*			Remove
4292	9	Black Cherry	*Prunus serotina*			Remove
4293	9	Black Cherry	*Prunus serotina*			Remove
4294	18	Siberian Elm	*Ulmus pumila*		x	Remove
4295	19	Siberian Elm	*Ulmus pumila*		x	Remove
4296	13	Siberian Elm	*Ulmus pumila*		x	Remove
4297	13	Siberian Elm	*Ulmus pumila*		x	Remove
4298	9	Black Cherry	*Prunus serotina*			Remove
4299	9	Hackberry	*Celtis occidentalis*			Remove
4301	5	Red Cedar	*Juniperus virginiana*			Remove
4302	12	Norway Spruce	*Picea abies*			Remove
4303	12	Norway Spruce	*Picea abies*			Remove
4304	17	Box Elder	*Acer negundo*			Remove
4305	14	Norway Spruce	*Picea abies*			Remove
4306	12	Norway Spruce	*Picea abies*			Remove
4307	13	Norway Spruce	*Picea abies*			Remove
4308	26	Box Elder	*Acer negundo*			Save
4309	16	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Remove
4310	6	Norway Spruce	*Picea abies*			Save
4311	25	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Remove
4312	16	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Off-Site
4313	18, 21, 14	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Off-Site
4314	16	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Off-Site
4315	21	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Off-Site
4316	29	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Off-Site
4317	12	Box Elder	*Acer negundo*			Remove
4318	13	Box Elder	*Acer negundo*			Remove
4319	22	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Remove
4320	21	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Remove
4321	16	Siberian Elm	*Ulmus pumila*		x	Save
4322	15	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Remove
4323	16	Box Elder	*Acer negundo*			Save
4324	17	Box Elder	*Acer negundo*			Save
4325	12, 6	Box Elder	*Acer negundo*			Save
4326	18,	Box Elder	*Acer negundo*			Remove
4327	16, 11, 12, 12	Box Elder	*Acer negundo*			Remove
4328	16, 17, 13	Box Elder	*Acer negundo*			Remove
4329	17	Box Elder	*Acer negundo*			Remove
4330	13	Box Elder	*Acer negundo*			Remove
4331	17	Box Elder	*Acer negundo*			Off-Site
4332	15	Box Elder	*Acer negundo*			Off-Site
4333	16	Box Elder	*Acer negundo*			Remove
4334	15	Box Elder	*Acer negundo*			Remove
4335	17, 13, 11	Box Elder	*Acer negundo*			Off-Site
4336	17	Box Elder	*Acer negundo*			Off-Site
4337	17, 16	Box Elder	*Acer negundo*			Off-Site
4338	19, 12	Box Elder	*Acer negundo*			Remove
4339	16, 11	Box Elder	*Acer negundo*			Remove
4340	19, 10	Box Elder	*Acer negundo*			Remove
4341	17	Box Elder	*Acer negundo*			Off-Site
4342	17	Siberian Elm	*Ulmus pumila*		x	Save
4343	14	Siberian Elm	*Ulmus pumila*		x	save
4344	12	Box Elder	*Acer negundo*			Save
4345	25	Box Elder	*Acer negundo*			Off-Site
4346	16, 7	Green Ash	*Fraxinus pennsylvanica*	infested with Emeral Ash Bore	x	Off-Site
4401	15, 12	Box Elder	*Acer negundo*			Remove
4402	16	Box Elder	*Acer negundo*			Remove
4403	13	Box Elder	*Acer negundo*			Remove
4404	13, 11	Box Elder	*Acer negundo*			Remove
4405	27, 10	Siberian Elm	*Ulmus pumila*		x	Remove
4406	2, 10, 10, 9, 10,	Box Elder	*Acer negundo*			Remove
4407	12	Box Elder	*Acer negundo*	evidence of decay		Remove
4408	14	American Elm	*Ulmus americana*		x	Remove
4409	17	Siberian Elm	*Ulmus pumila*		x	Remove
4410	14	Siberian Elm	*Ulmus pumila*		x	Remove
4411	21	Siberian Elm	*Ulmus pumila*		x	Remove
4412	14	Box Elder	*Acer negundo*	evidence of decay		Remove
4413	15	Box Elder	*Acer negundo*			Remove
4414	16	Box Elder	*Acer negundo*			Remove
4415	14	Hackberry	*Celtis occidentalis*			Remove
4416	13	Siberian Elm	*Ulmus pumila*		x	Remove
4417	14	Siberian Elm	*Ulmus pumila*		x	Remove
4418	19	Siberian Elm	*Ulmus pumila*		x	Remove
4419	17	Siberian Elm	*Ulmus pumila*		x	Remove
4420	13	Box Elder	*Acer negundo*			Remove
4421	14, 11	Siberian Elm	*Ulmus pumila*		x	Remove
4422	12	Siberian Elm	*Ulmus pumila*		x	Remove
4423	12, 11, 9	Siberian Elm	*Ulmus pumila*	decay at base	x	Remove
4424	15	Siberian Elm	*Ulmus pumila*		x	Remove
4425	15	Siberian Elm	*Ulmus pumila*		x	Remove
4426	19	Box Elder	*Acer negundo*			Remove
4427	19, 9	Hackberry	*Celtis occidentalis*			Remove
4428	15	Hackberry	*Celtis occidentalis*			Remove
4429	19, 19	Siberian Elm	*Ulmus pumila*		x	Remove
4430	17	Siberian Elm	*Ulmus pumila*		x	Remove
4431	20	Siberian Elm	*Ulmus pumila*		x	Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
4432	17	Siberian Elm	*Ulmus pumila*		x	Remove
4433	14, 5, 5	Siberian Elm	*Ulmus pumila*		x	Remove
4434	26	Siberian Elm	*Ulmus pumila*	evidence of decay	x	Remove
4435	13	Hackberry	*Celtis occidentalis*			Remove
4436	12	Hackberry	*Celtis occidentalis*			Remove
4437	20	Hackberry	*Celtis occidentalis*			Remove
4438	15	Siberian Elm	*Ulmus pumila*		x	Remove
4439	15, 11	Siberian Elm	*Ulmus pumila*		x	Remove
4440	15	Siberian Elm	*Ulmus pumila*		x	Remove
4441	22	American Elm	*Ulmus americana*		x	Remove
4442	13	Box Elder	*Acer negundo*	evidence of decay		Remove
4443	15	Hackberry	*Celtis occidentalis*			Remove
4444	20	Hackberry	*Celtis occidentalis*			Remove
4445	13	Box Elder	*Acer negundo*			Remove
4446	12	Hackberry	*Celtis occidentalis*			Remove
4447	15	Siberian Elm	*Ulmus pumila*		x	Remove
4448	21	Siberian Elm	*Ulmus pumila*		x	Remove
4449	13	Black Cherry	*Prunus serotina*			Remove
4450	13	Hackberry	*Celtis occidentalis*			Remove
4451	12	Siberian Elm	*Ulmus pumila*		x	Remove
4452	19	Siberian Elm	*Ulmus pumila*		x	Remove
4453	13	Black Cherry	*Prunus serotina*			Remove
4454	24	Hackberry	*Celtis occidentalis*			Remove
4455	12	Hackberry	*Celtis occidentalis*			Remove
4456	12, 8	Siberian Elm	*Ulmus pumila*		x	Remove
4457	18	Siberian Elm	*Ulmus pumila*		x	Remove
4458	12	Hackberry	*Celtis occidentalis*			Remove
4459	13	Siberian Elm	*Ulmus pumila*		x	Remove
4460	13	Siberian Elm	*Ulmus pumila*		x	Remove
4461	13	Hackberry	*Celtis occidentalis*			Remove
4462	19	Siberian Elm	*Ulmus pumila*		x	Remove
4463	12, 11	Siberian Elm	*Ulmus pumila*		x	Remove
4464	21	Box Elder	*Acer negundo*			Remove
4465	13	Siberian Elm	*Ulmus pumila*	evidence of decay	x	Remove
4466	12	Siberian Elm	*Ulmus pumila*		x	Remove
4467	17	American Elm	*Ulmus americana*		x	Remove
4468	17	Siberian Elm	*Ulmus pumila*		x	Remove
4469	19	Siberian Elm	*Ulmus pumila*		x	Remove
4470	17	Siberian Elm	*Ulmus pumila*		x	Remove
4471	12	American Elm	*Ulmus americana*		x	Remove
4472	15	Black Cherry	*Prunus serotina*			Remove
4473	12	Box Elder	*Acer negundo*	evidence of decay		Remove
4474	16	Siberian Elm	*Ulmus pumila*		x	Remove
4475	22	Siberian Elm	*Ulmus pumila*		x	Remove
4476	9	Red Cedar	*Juniperus virginiana*			Remove
4477	5	Red Cedar	*Juniperus virginiana*			Remove
4478	6	Red Cedar	*Juniperus virginiana*			Remove
4479	20	Box Elder	*Acer negundo*	evidence of decay		Remove
4480	16	Box Elder	*Acer negundo*			Remove
4481	13	Box Elder	*Acer negundo*			Remove
4482	3	Red Cedar	*Juniperus virginiana*			Remove
4483	23	Box Elder	*Acer negundo*			Remove
4484	15, 15	Box Elder	*Acer negundo*	evidence of decay		Remove
4485	20	Box Elder	*Acer negundo*			Remove
4486	12	American Elm	*Ulmus americana*		x	Remove
4487	15	American Elm	*Ulmus americana*		x	Remove
4488	13	American Elm	*Ulmus americana*		x	Remove
4489	13	American Elm	*Ulmus americana*		x	Remove
4490	24	Box Elder	*Acer negundo*			Remove
4491	23	Box Elder	*Acer negundo*			Remove
4492	25	Box Elder	*Acer negundo*			Remove
4493	14	American Elm	*Ulmus americana*		x	Remove
4494	13	Box Elder	*Acer negundo*			Remove
4495	19	Box Elder	*Acer negundo*			Remove
4496	15	Norway Spruce	*Picea abies*			Remove
4497	11	Norway Spruce	*Picea abies*			Remove
4498	12	Norway Spruce	*Picea abies*			Remove
4499	12	Norway Spruce	*Picea abies*			Remove
4500	12	Norway Spruce	*Picea abies*			Remove
4746	25	Siberian Elm	*Ulmus pumila*	decay at base	x	Remove
4747	15	Siberian Elm	*Ulmus pumila*	broken top, decay along base	x	Remove
4748	13	Siberian Elm	*Ulmus pumila*		x	Remove
4749	14	Siberian Elm	*Ulmus pumila*		x	Remove
4750	15,12	Siberian Elm	*Ulmus pumila*		x	Remove
4751	16	Siberian Elm	*Ulmus pumila*		x	Remove
4752	13	Siberian Elm	*Ulmus pumila*		x	Remove
4753	17	Siberian Elm	*Ulmus pumila*		x	Remove
4754	14	Siberian Elm	*Ulmus pumila*		x	Remove
4755	12	Siberian Elm	*Ulmus pumila*		x	Remove
4756	12	Siberian Elm	*Ulmus pumila*		x	Remove
4757	13	Siberian Elm	*Ulmus pumila*		x	Remove
4758	12	Siberian Elm	*Ulmus pumila*		x	Remove
4759	12	Siberian Elm	*Ulmus pumila*		x	Remove
4760	15	Siberian Elm	*Ulmus pumila*		x	Remove
4761	15	Siberian Elm	*Ulmus pumila*		x	Remove
4762	15	Siberian Elm	*Ulmus pumila*		x	Remove
4763	21	Siberian Elm	*Ulmus pumila*		x	Remove
4764	13	Siberian Elm	*Ulmus pumila*		x	Remove
4765	14	Siberian Elm	*Ulmus pumila*		x	Remove
4766	12,8	Siberian Elm	*Ulmus pumila*		x	Remove
4767	13	Siberian Elm	*Ulmus pumila*		x	Remove
4768	12	Siberian Elm	*Ulmus pumila*		x	Remove
4769	32	Siberian Elm	*Ulmus pumila*		x	Remove
4770	16,15,7	American Elm	*Ulmus americana*		x	Remove
4771	20	Siberian Elm	*Ulmus pumila*		x	Remove
4772	13,6	Siberian Elm	*Ulmus pumila*		x	Remove
4773	13	Siberian Elm	*Ulmus pumila*		x	Remove
4774	12	Siberian Elm	*Ulmus pumila*		x	Remove
4775	14	Siberian Elm	*Ulmus pumila*		x	Remove
4776	13	Siberian Elm	*Ulmus pumila*		x	Remove

00-PLAN-1231005-SHEET-TREE

PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota

Name Jennifer L. Thompson
Reg. No. 44763 Date 1-9-2026

Revisions

Date 01-16-26
Designed JLT
Drawn JLT

TREE PRESERVATION PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

T7 OF 8

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TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
4777	13	Siberian Elm	*Ulmus pumila*		x	Remove
4778	15	Siberian Elm	*Ulmus pumila*		x	Remove
4779	16	Siberian Elm	*Ulmus pumila*		x	Remove
4780	13,10	Siberian Elm	*Ulmus pumila*		x	Remove
4781	14	Siberian Elm	*Ulmus pumila*		x	Remove
4782	12	Siberian Elm	*Ulmus pumila*		x	Remove
4783	13	Siberian Elm	*Ulmus pumila*		x	Remove
4784	18,15	Siberian Elm	*Ulmus pumila*		x	Remove
4785	17	Siberian Elm	*Ulmus pumila*		x	Remove
4786	14	Siberian Elm	*Ulmus pumila*		x	Remove
4787	12	Siberian Elm	*Ulmus pumila*		x	Remove
4788	22	Siberian Elm	*Ulmus pumila*		x	Remove
4789	19	Siberian Elm	*Ulmus pumila*		x	Remove
4790	18	Siberian Elm	*Ulmus pumila*		x	Remove
4791	19	Siberian Elm	*Ulmus pumila*		x	Remove
4792	21	Siberian Elm	*Ulmus pumila*		x	Remove
4793	19	Siberian Elm	*Ulmus pumila*		x	Remove
4794	19	Black Cherry	*Prunus serotina*			Remove
4795	,4, 13, 12, 12, 12	Box Elder	*Acer negundo*			Remove
4796	14	Box Elder	*Acer negundo*			Remove
4797	12, 10	Box Elder	*Acer negundo*			Remove
4798	12	Box Elder	*Acer negundo*			Remove
4799	12	Siberian Elm	*Ulmus pumila*		x	Remove
4800	12	Box Elder	*Acer negundo*			Remove
4801	17	Siberian Elm	*Ulmus pumila*		x	Remove
4802	9	Black Cherry	*Prunus serotina*			Remove
4803	13	Hackberry	*Celtis occidentalis*			Remove
4804	9	Hackberry	*Celtis occidentalis*			Remove
4805	9	Hackberry	*Celtis occidentalis*			Remove
4806	10	Hackberry	*Celtis occidentalis*			Remove
4807	6	Black Cherry	*Prunus serotina*			Remove
4808	11	Black Cherry	*Prunus serotina*			Remove
4809	9	Black Cherry	*Prunus serotina*			Remove
4810	8	Black Cherry	*Prunus serotina*			Remove
4811	18	Black Cherry	*Prunus serotina*			Remove
4812	10	Black Cherry	*Prunus serotina*			Remove
4813	13	Hackberry	*Celtis occidentalis*			Remove
4814	14	Black Cherry	*Prunus serotina*			Remove
4815	18,10	Siberian Elm	*Ulmus pumila*		x	Remove
4816	7	Black Cherry	*Prunus serotina*			Remove
4817	17	Black Cherry	*Prunus serotina*			Remove
4818	24	Siberian Elm	*Ulmus pumila*		x	Remove
4819	10	Black Cherry	*Prunus serotina*			Remove
4820	10,9	Red Cedar	*Juniperus virginiana*			Remove
4822	7	Black Cherry	*Prunus serotina*			Remove
4823	9	Red Cedar	*Juniperus virginiana*			Remove
4824	21	Red Cedar	*Juniperus virginiana*			Remove
4825	8	Red Cedar	*Juniperus virginiana*			Remove
4826	11	Red Cedar	*Juniperus virginiana*			Remove
4827	7	Red Cedar	*Juniperus virginiana*			Remove
4828	10	Red Cedar	*Juniperus virginiana*			Remove
4829	17	Black Cherry	*Prunus serotina*			Remove
4830	7	Red Cedar	*Juniperus virginiana*			Remove
4831	5	Red Cedar	*Juniperus virginiana*			Remove
4832	18	Hackberry	*Celtis occidentalis*			Remove
4833	8	Red Cedar	*Juniperus virginiana*			Remove
4834	10	Hackberry	*Celtis occidentalis*			Remove
4835	12	Hackberry	*Celtis occidentalis*			Remove
4836	16	Black Cherry	*Prunus serotina*			Remove
4837	12	Black Cherry	*Prunus serotina*			Remove
4838	8	Black Cherry	*Prunus serotina*			Remove
4839	18,15	Box Elder	*Acer negundo*	major trunk decay, both trunk	x	Remove
4840	10	Black Cherry	*Prunus serotina*			Remove
4841	11	Black Cherry	*Prunus serotina*			Remove
4842	6	Black Cherry	*Prunus serotina*			Remove
4843	8	Black Cherry	*Prunus serotina*			Remove
4844	14	Black Cherry	*Prunus serotina*	hollow trunk section		Remove
4845	9	Black Cherry	*Prunus serotina*			Remove
4846	12	Black Cherry	*Prunus serotina*			Remove
4847	7	Black Cherry	*Prunus serotina*			Remove
4848	11	Black Cherry	*Prunus serotina*			Remove
4849	18	Black Cherry	*Prunus serotina*	decay at base		Remove
4850	14	Black Cherry	*Prunus serotina*			Remove
4851	7	Hackberry	*Celtis occidentalis*			Remove
4852	23	Siberian Elm	*Ulmus pumila*		x	Remove
4853	10	Black Cherry	*Prunus serotina*			Remove
4854	8	Black Cherry	*Prunus serotina*			Remove
4855	13	Black Cherry	*Prunus serotina*			Remove
4856	12	Siberian Elm	*Ulmus pumila*		x	Remove
4857	13,11	Box Elder	*Acer negundo*			Remove
4858	15,11	Box Elder	*Acer negundo*			Remove
4859	16	Black Cherry	*Prunus serotina*			Remove
4860	12	Red Cedar	*Juniperus virginiana*			Remove
4861	8	Red Cedar	*Juniperus virginiana*			Remove
4862	9	Red Cedar	*Juniperus virginiana*			Remove
4863	12,17,12	Siberian Elm	*Ulmus pumila*		x	Remove
4864	9	Black Cherry	*Prunus serotina*			Remove
4865	9	Red Cedar	*Juniperus virginiana*			Remove
4866	17	Siberian Elm	*Ulmus pumila*		x	Remove
4867	17	Siberian Elm	*Ulmus pumila*		x	Remove
4868	7	Red Cedar	*Juniperus virginiana*			Remove
4869	7	Red Cedar	*Juniperus virginiana*			Remove
4870	16	Siberian Elm	*Ulmus pumila*		x	Remove
4871	11	Black Cherry	*Prunus serotina*			Remove
4872	15	Siberian Elm	*Ulmus pumila*		x	Remove
4873	16	Siberian Elm	*Ulmus pumila*		x	Remove
4874	11	Red Cedar	*Juniperus virginiana*			Remove
4875	11	Red Cedar	*Juniperus virginiana*			Remove
4876	11	Red Cedar	*Juniperus virginiana*			Remove
4877	21	Box Elder	*Acer negundo*			Remove

TagID	DBH	Common Name	Scientific Name	Notes	*Non Qualifyin	Status
4878	18	Red Cedar	*Juniperus virginiana*			Remove
4879	9	Hackberry	*Celtis occidentalis*			Remove
4880	17	Siberian Elm	*Ulmus pumila*		x	Remove
4881	11	Siberian Elm	*Ulmus pumila*		x	Remove
4882	17	Siberian Elm	*Ulmus pumila*		x	Remove
4883	6	Red Cedar	*Juniperus virginiana*			Remove
4884	10	Red Cedar	*Juniperus virginiana*			Remove
4885	6	Red Cedar	*Juniperus virginiana*			Remove
4886	7	Red Cedar	*Juniperus virginiana*			Remove
4887	8	Red Cedar	*Juniperus virginiana*			Remove
4888	7	Red Cedar	*Juniperus virginiana*			Remove
4889	6	Red Cedar	*Juniperus virginiana*			Remove
4890	9	Red Cedar	*Juniperus virginiana*			Remove
4891	9	Red Cedar	*Juniperus virginiana*			Remove
4892	15	Box Elder	*Acer negundo*			Remove
4893	20	Siberian Elm	*Ulmus pumila*		x	Remove
4894	6	Red Cedar	*Juniperus virginiana*			Remove
4895	6	Red Cedar	*Juniperus virginiana*			Remove
4896	14,8	Box Elder	*Acer negundo*	major decline, decay at base	x	Remove
4897	7	Red Cedar	*Juniperus virginiana*			Remove
4898	7	Red Cedar	*Juniperus virginiana*			Remove
4899	12	Red Cedar	*Juniperus virginiana*			Remove
4900	18	Siberian Elm	*Ulmus pumila*		x	Remove
4901	16	Red Cedar	*Juniperus virginiana*			Remove
4902	6	Red Cedar	*Juniperus virginiana*			Remove
4903	5	Red Cedar	*Juniperus virginiana*			Remove
4904	6	Red Cedar	*Juniperus virginiana*			Remove
4905	11	Red Cedar	*Juniperus virginiana*			Remove
4906	14,11	Box Elder	*Acer negundo*	decay at base		Remove
4907	8	Black Cherry	*Prunus serotina*			Remove
4908	7	Red Cedar	*Juniperus virginiana*			Remove
4909	13	Black Cherry	*Prunus serotina*			Remove
4910	12,12,10,11	Box Elder	*Acer negundo*	decay along trunk		Remove
4911	9	Black Cherry	*Prunus serotina*			Remove
4912	7	Black Cherry	*Prunus serotina*			Remove
4913	8	Black Cherry	*Prunus serotina*			Remove
4914	21	Siberian Elm	*Ulmus pumila*		x	Remove
4915	15,15	Box Elder	*Acer negundo*			Remove
4916	7,10	Black Cherry	*Prunus serotina*			Remove
4917	16	Siberian Elm	*Ulmus pumila*		x	Remove
4918	22	Box Elder	*Acer negundo*			Remove
4919	21,21	Box Elder	*Acer negundo*			Remove
4920	12	American Elm	*Ulmus americana*		x	Remove
4921	18	Box Elder	*Acer negundo*			Remove
4922	20	Siberian Elm	*Ulmus pumila*		x	Remove
4923	14	Black Cherry	*Prunus serotina*			Remove
4924	18,16	Siberian Elm	*Ulmus pumila*		x	Remove
4925	9	Black Cherry	*Prunus serotina*			Remove
4926	18,17	Box Elder	*Acer negundo*			Remove
4927	19	Box Elder	*Acer negundo*			Remove
4928	12	Box Elder	*Acer negundo*			Remove
4929	13,16	Box Elder	*Acer negundo*			Remove
4930	12	Box Elder	*Acer negundo*			Remove
4931	5,2	Red Cedar	*Juniperus virginiana*			Remove
4932	15	Siberian Elm	*Ulmus pumila*		x	Remove
4933	11	Black Cherry	*Prunus serotina*			Remove
4934	16	Box Elder	*Acer negundo*			Remove
4935	21	Box Elder	*Acer negundo*			Save
4936	22,22	Box Elder	*Acer negundo*			Remove
4937	11	Hackberry	*Celtis occidentalis*			Remove
4938	10	Hackberry	*Celtis occidentalis*			Remove
4939	12	Box Elder	*Acer negundo*			Remove
6566	21,16	Box Elder	*Acer negundo*			Save
6615	,6, 10, 14, 14, 8,	Box Elder	*Acer negundo*			Remove
6620	14, 7, 14, 16	Black Cherry	*Prunus serotina*			Remove
6622	7,6,6	Black Cherry	*Prunus serotina*			Remove
6623	6	Red Cedar	*Juniperus virginiana*			Remove
6624	10	Red Cedar	*Juniperus virginiana*			Remove
6628	19	White Pine	*Pinus strobus*			Remove
6629	11	Red Cedar	*Juniperus virginiana*			Remove
6630	12,14	Box Elder	*Acer negundo*			Remove
6631	19	Box Elder	*Acer negundo*			Remove
6636	14	Black Cherry	*Prunus serotina*			Remove
6650	16	Red Cedar	*Juniperus virginiana*			Remove
6655	15	Box Elder	*Acer negundo*			Remove
6657	9	Black Cherry	*Prunus serotina*			Remove
6659	17	Box Elder	*Acer negundo*			Remove
6663	16,10	Box Elder	*Acer negundo*			Remove
6666	12	Box Elder	*Acer negundo*			Remove
6670	12	Box Elder	*Acer negundo*			Remove
6672	8	Black Cherry	*Prunus serotina*			Remove
6677	13	Box Elder	*Acer negundo*			Remove
6678	16,11,9	Box Elder	*Acer negundo*	decay at base		Remove
6681	12	Box Elder	*Acer negundo*			Remove
6683	14	Box Elder	*Acer negundo*			Remove
6685	12	Hackberry	*Celtis occidentalis*			Remove
6689	16,12	Box Elder	*Acer negundo*			Remove
6690	18	Box Elder	*Acer negundo*			Remove
6692	15	Box Elder	*Acer negundo*			Remove
6698	13,9	Hackberry	*Celtis occidentalis*			Remove
6699	45	Cottonwood	*Populus deltoides*			Remove
6700	17	Black Cherry	*Prunus serotina*	evidence of decay		Remove

PIONEERengineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota

Name Jennifer L. Thompson
Reg. No. 44763 Date 1-9-2026

Revisions

Date	01-16-26
Designed	JLT
Drawn	JLT

TREE PRESERVATION PLAN

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

T8 OF 8

00-PLAN-1231005-SHEET-TREE

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Tag No.	DBH	Common Name	Scientific Name	Notes	Non Qualifying	
8601	13	Siberian Elm	*Ulmus pumila*		x	Remove
8602	21,20	Siberian Elm	*Ulmus pumila*		x	Remove
8603	22	Siberian Elm	*Ulmus pumila*		x	Remove
8604	13	Siberian Elm	*Ulmus pumila*		x	Remove
8605	19	American Elm	*Ulmus americana*		x	Remove
8606	13	American Elm	*Ulmus americana*		x	Remove
8607	10	Hackberry	*Celtis occidentalis*			Remove
8608	27	Siberian Elm	*Ulmus pumila*		x	Remove
8609	30,13	Siberian Elm	*Ulmus pumila*		x	Remove
8610	12	American Elm	*Ulmus americana*	decay along trunk	x	Remove
8611	20,14	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Remove
8612	15	Siberian Elm	*Ulmus pumila*		x	Remove
8613	14	Siberian Elm	*Ulmus pumila*		x	Remove
8614	26	Siberian Elm	*Ulmus pumila*	missing a main branch near base, decay	x	Remove
8615	17	Siberian Elm	*Ulmus pumila*		x	Remove
8616	12	Siberian Elm	*Ulmus pumila*		x	Remove
8617	24	Siberian Elm	*Ulmus pumila*		x	Remove
8618	30,16,14	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Remove
8619	22	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Remove
8620	8	Hackberry	*Celtis occidentalis*			Remove
8625	15	Siberian Elm	*Ulmus pumila*		x	Remove
8622	7	Hackberry	*Celtis occidentalis*			Remove
8623	29	Siberian Elm	*Ulmus pumila*		x	Remove
8624	17	Siberian Elm	*Ulmus pumila*		x	Remove
8625	23,14	Siberian Elm	*Ulmus pumila*		x	Remove
8626	38,25	Siberian Elm	*Ulmus pumila*	decay along trunk, large branches missi	x	Remove
8627	21	Siberian Elm	*Ulmus pumila*		x	Remove
8628	14	Siberian Elm	*Ulmus pumila*		x	Remove
8629	15	Siberian Elm	*Ulmus pumila*		x	Remove
8630	16	Siberian Elm	*Ulmus pumila*		x	Remove
8631	13	Siberian Elm	*Ulmus pumila*		x	Remove
8632	12	Siberian Elm	*Ulmus pumila*		x	Remove
8633	13	Box Elder	*Acer negundo*			Remove
8634	29	Siberian Elm	*Ulmus pumila*		x	Remove
8635	12	Box Elder	*Acer negundo*			Remove
8636	15,14,3	Siberian Elm	*Ulmus pumila*		x	Remove
8637	35	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Remove
8638	13	Siberian Elm	*Ulmus pumila*		x	Remove
8639	15	American Elm	*Ulmus americana*		x	Remove
8640	12,10	Siberian Elm	*Ulmus pumila*		x	Remove
8641	20	Siberian Elm	*Ulmus pumila*		x	Remove
8642	12	Siberian Elm	*Ulmus pumila*		x	Remove
8643	16,6	Siberian Elm	*Ulmus pumila*		x	Remove
8644	12	Hackberry	*Celtis occidentalis*			Remove
8645	12	Siberian Elm	*Ulmus pumila*		x	Remove
8646	12,7	Siberian Elm	*Ulmus pumila*		x	Remove
8647	15	Siberian Elm	*Ulmus pumila*		x	Remove
8648	12	Siberian Elm	*Ulmus pumila*		x	Remove
8649	16	Siberian Elm	*Ulmus pumila*		x	Remove
8650	14	Siberian Elm	*Ulmus pumila*		x	Remove
8651	17	Siberian Elm	*Ulmus pumila*		x	Remove
8652	19	Siberian Elm	*Ulmus pumila*		x	Remove
8653	13,11	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Remove
8654	13	Box Elder	*Acer negundo*			Remove
8655	10,8	Hackberry	*Celtis occidentalis*			Remove
8656	14	Siberian Elm	*Ulmus pumila*		x	Remove
8657	10	Hackberry	*Celtis occidentalis*			Remove
8658	25	Siberian Elm	*Ulmus pumila*		x	Remove
8659	37	Siberian Elm	*Ulmus pumila*		x	Remove
8660	17	Hackberry	*Celtis occidentalis*			Remove
8661	13	Hackberry	*Celtis occidentalis*			Remove
8662	17	Siberian Elm	*Ulmus pumila*		x	Remove
8663	13	Hackberry	*Celtis occidentalis*			Remove
8664	22	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Remove
8665	14,13	Siberian Elm	*Ulmus pumila*		x	Remove
8666	14	Siberian Elm	*Ulmus pumila*		x	Remove
8667	13	Siberian Elm	*Ulmus pumila*		x	Remove
8668	35	Siberian Elm	*Ulmus pumila*		x	Remove
8669	8	Hackberry	*Celtis occidentalis*			Remove
8670	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8671	4	Red Cedar	*Juniperus virginiana*	17' in height		Remove
8672	2	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8673	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8674	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove

Tag No.	DBH	Common Name	Scientific Name	Notes	Non Qualifying	
8675	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8676	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8677	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8678	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8679	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8680	5	Red Cedar	*Juniperus virginiana*	25' in height		Save
8681	2	Red Cedar	*Juniperus virginiana*	15' in height		Save
8682	5,3	Red Cedar	*Juniperus virginiana*	25' in height		Save
8683	6	Red Cedar	*Juniperus virginiana*	25' in height		Save
8684	3,3,2	Red Cedar	*Juniperus virginiana*	15' in height		Save
8685	5	Red Cedar	*Juniperus virginiana*	25' in height		Save
8686	5	Red Cedar	*Juniperus virginiana*	15' in height		Save
8687	4	Red Cedar	*Juniperus virginiana*	15' in height		Save
8688	6	Red Cedar	*Juniperus virginiana*	25' in height		Save
8689	6	Red Cedar	*Juniperus virginiana*	20' in height		Save
8690	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8691	5,3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8692	4	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8693	2	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8694	5	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8695	3	Red Cedar	*Juniperus virginiana*	25' in height		Remove
8696	3	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8697	2	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8698	4	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8699	2	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8700	11	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8701	13	Red Cedar	*Juniperus virginiana*	35' in height		Remove
8702	4	Red Cedar	*Juniperus virginiana*	25' in height		Save
8703	2	Red Cedar	*Juniperus virginiana*	25' in height		Save
8704	8	Red Cedar	*Juniperus virginiana*	30' in height		Save
8705	8	Red Cedar	*Juniperus virginiana*	30' in height		Save
8706	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8707	9	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8708	4	Red Cedar	*Juniperus virginiana*	25' in height		Remove
8709	13	Red Cedar	*Juniperus virginiana*	40' in height		Remove
8710	5	Red Cedar	*Juniperus virginiana*	30' in height		Save
8711	18,6	Red Cedar	*Juniperus virginiana*	40' in height		Save
8712	6	Red Cedar	*Juniperus virginiana*	30' in height		Save
8713	5	Red Cedar	*Juniperus virginiana*	30' in height		Save
8714	2	Red Cedar	*Juniperus virginiana*	25' in height		Save
8715	2	Red Cedar	*Juniperus virginiana*	15' in height		Save
8716	8	Red Cedar	*Juniperus virginiana*	30' in height		Save
8717	9	Red Cedar	*Juniperus virginiana*	35' in height		Save
8718	4	Red Cedar	*Juniperus virginiana*	30' in height		Save
8719	6	Red Cedar	*Juniperus virginiana*	35' in height		Save
8720	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8721	14	Red Cedar	*Juniperus virginiana*	30' in height		Save
8722	4	Red Cedar	*Juniperus virginiana*	30' in height		Save
8723	6	Red Cedar	*Juniperus virginiana*	30' in height		Save
8724	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8725	5	Red Cedar	*Juniperus virginiana*	15' in height		Save
8726	6	Red Cedar	*Juniperus virginiana*	30' in height		Save
8727	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8728	6	Red Cedar	*Juniperus virginiana*	35' in height		Save
8729	5	Red Cedar	*Juniperus virginiana*	15' in height		Save
8730	5	Red Cedar	*Juniperus virginiana*	30' in height		Save
8731	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8732	10	Red Cedar	*Juniperus virginiana*	30' in height		Save
8733	15,10	Red Cedar	*Juniperus virginiana*	35' in height		Save
8734	5	Red Cedar	*Juniperus virginiana*	25' in height		Save
8735	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8736	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8737	4	Red Cedar	*Juniperus virginiana*	15' in height		Save
8738	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8739	4	Red Cedar	*Juniperus virginiana*	25' in height		Save
8740	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8741	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8742	2	Red Cedar	*Juniperus virginiana*	15' in height		Save
8743	14,8,8	Siberian Elm	*Ulmus pumila*		x	Save
8744	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8745	4	Red Cedar	*Juniperus virginiana*	25' in height		Save
8746	3	Red Cedar	*Juniperus virginiana*	25' in height		Save
8747	12,8	Siberian Elm	*Ulmus pumila*		x	Remove
8748	7	Black Cherry	*Prunus serotina*			Remove
8749	14,8	Box Elder	*Acer negundo*			Remove

Tag No.	DBH	Common Name	Scientific Name	Notes	Non Qualifying	
8750	15	Siberian Elm	*Ulmus pumila*		x	Remove
8751	7	Black Cherry	*Prunus serotina*			Remove
8752	15	American Elm	*Ulmus americana*		x	Remove
8753	16	American Elm	*Ulmus americana*		x	Remove
8754	13	Box Elder	*Acer negundo*	90% of crown missing	x	Remove
8755	12	Box Elder	*Acer negundo*			Remove
8756	15	Box Elder	*Acer negundo*			Remove
8757	18	Box Elder	*Acer negundo*			Remove
8758	17	Box Elder	*Acer negundo*			Remove
8759	15	Siberian Elm	*Ulmus pumila*	decay along trunk	x	Save
8760	15	Siberian Elm	*Ulmus pumila*		x	Save
8761	17	Siberian Elm	*Ulmus pumila*		x	Save
8762	20	Box Elder	*Acer negundo*	50% of crown dead		Remove
8763	14	Green Ash	*Fraxinus pennsylvanica*	infected by emerald ash borer	x	Remove
8764	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8765	2	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8766	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8767	14	Box Elder	*Acer negundo*			Save
8768	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8769	12,10,9	Box Elder	*Acer negundo*			Save
8770	5	Red Cedar	*Juniperus virginiana*	25' in height		Save
8771	2	Red Cedar	*Juniperus virginiana*	15' in height		Save
8772	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8773	22	Red Cedar	*Juniperus virginiana*	30' in height		Save
8774	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8775	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8776	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8777	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8778	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8779	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8780	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8781	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8782	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8783	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8784	6	Red Cedar	*Juniperus virginiana*	30' in height		Save
8785	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8786	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8787	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8788	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8789	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8790	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8791	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8792	8	Red Cedar	*Juniperus virginiana*	25' in height		Save
8793	7,4	Red Cedar	*Juniperus virginiana*	25' in height		Save
8794	3	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8795	8	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8796	5	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8797	5,4,3,3	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8798	4	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8799	4	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8800	13	Siberian Elm	*Ulmus pumila*		x	Remove
8801	8	Red Cedar	*Juniperus virginiana*	35' in height		Save
8802	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8803	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8804	3	Red Cedar	*Juniperus virginiana*	20' in height		Save
8805	8	Red Cedar	*Juniperus virginiana*	30' in height		Save
8806	7	Red Cedar	*Juniperus virginiana*	20' in height		Save
8807	7	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8808	4	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8809	7	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8810	4	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8811	4	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8812	4	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8813	6	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8814	5	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8815	5	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8816	5	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8817	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8818	2	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8819	5	Red Cedar	*Juniperus virginiana*	20' in height		Remove

Tag No.	DBH	Common Name	Scientific Name	Notes	Non Qualifying	
8820	2	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8821	2	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8822	7,4,2,2	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8823	8,5	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8824	10	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8825	3	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8826	8	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8827	10	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8828	2	Red Cedar	*Juniperus virginiana*	15' in height		Remove
8829	3	Red Cedar	*Juniperus virginiana*	20' in height		Remove
8830	10,8,6,5,2	Red Cedar	*Juniperus virginiana*	30' in height		Remove
8831	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8832	4	Red Cedar	*Juniperus virginiana*	15' in height		Save
8833	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8834	3	Red Cedar	*Juniperus virginiana*	15' in height		Save
8835	4	Red Cedar	*Juniperus virginiana*	20' in height		Save
8836	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8837	5	Red Cedar	*Juniperus virginiana*	20' in height		Save
8838	8	Red Cedar	*Juniperus virginiana*	20' in height		Save

8821 TREE TO BE REMOVED
8802 TREE TO BE SAVED

TREE INVENTORY PROVIDED BY MIDWEST NATURAL RESOURCES, INC.
KEN ARNDT, FORESTER

* Non Qualifying Trees are Elm, Ash, any DNR defined invasive species, or trees that are dead, mostly dead, or hazard
Non Qualifying Trees are excluded from all calculations

Total Significant Inches: 1,127
Total Significant Inches Removed: 574 (51%)
Total Significant Inches Saved: 553
Allowable Removal: 282" (25%)

Removal over threshold: 292"

TREE PRESERVATION NOTES

BEFORE LAND CLEARING BEGINS, CONTRACTOR SHOULD MEET WITH THE CONSULTANT ON SITE TO REVIEW ALL WORK PROCEDURES, ACCESS ROUTES, STORAGE AREAS, AND TREE PROTECTION MEASURES.

NO FILL SHOULD BE PLACED AGAINST THE TRUNK, ON THE ROOT CROWN, OR WITHIN THE DRIP LINE AREA OF ANY TREES THAT ARE TO BE SAVED.

NO GRADING, TRENCHING OR PLACEMENT OF EQUIPMENT IS ALLOWED IN THE TREE PROTECTION AREA.

WORK PERFORMED WITHIN THE TREE PROTECTION AREA SHOULD BE DONE BY HAND AND UNDER THE SUPERVISION OF THE CONSULTING ARBORIST.

PRUNING OF OAK TREES MUST NOT TAKE PLACE FROM APRIL 15 TO JULY 15 TO PREVENT THE SPREAD OF OAK WILT DISEASE.

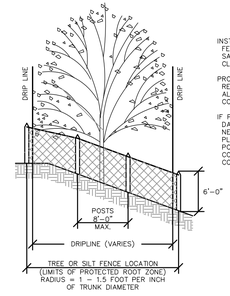
IF WOUNDING OF OAK TREES OCCUR ANYTIME BETWEEN APRIL TO AUGUST, A NON-TOXIC WOUND DRESSING MUST BE APPLIED IMMEDIATELY, (EXCAVATORS MUST HAVE A NON-TOXIC TREE WOUND DRESSING WITH THEM ON DEVELOPMENT SITES).

TREE PROTECTION DETAIL

NOT TO SCALE

TREES TO BE SAVED SHALL BE FENCED OFF WITH BRIGHT ORANGE POLYETHYLENE SAFETY NETTING OR HEAVY DUTY SILT FENCE AND STEEL STAKES AT THE DRIP LINE, OR AS DIRECTED BY THE OWNER'S CONSULTANT.

PROTECTION FENCE WILL HELP INSURE AGAINST DAMAGE BY VEHICLES, COMPACTION OF SOILS AND/OR THE CHEMICAL ALTERATION OF SOILS DUE TO CONCRETE WASHOUT, PAINTS AND LEAKAGE OR SPILLAGE OF ANY TOXIC MATERIALS.



INSTALL TREE OR SILT FENCE PRIOR TO OR AT SAME TIME AS LAND CLEARING.

PROTECTION FENCE SHOULD REMAIN IN PLACE UNTIL ALL CONSTRUCTION IS COMPLETE.

IF PROTECTION FENCE IS DAMAGED OR REMOVED, NEW FENCING MUST BE PLACED BACK IN ORIGINAL POSITION UNTIL CONSTRUCTION IS COMPLETE.

N

0 25 50 100
GRAPHIC SCALE IN FEET

00-PLAN-1231005-SHEET-TREE 95TH ROW

PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota

Name Jennifer L. Thompson
Reg. No. 44763 Date 1-9-2026

Revisions

Date 01-09-26
Designed JLT
Drawn JLT

TREE PRESERVATION PLAN
95TH STREET CORRIDOR

LENNAR
16305 36TH AVENUE NORTH
PLYMOUTH, MINNESOTA 55446

TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

T1 OF 1

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Talcott Glen

Cottage Grove, Minnesota

Preliminary Storm Water Management Plan



January 9, 2026

Property Owner:

Lennar Homes
16305 36th Avenue North
Plymouth, Minnesota 55446

Consultant to Project Owner:

PIONEER engineering P.A.

Pioneer Engineering, P.A.
2422 Enterprise Drive
Mendota Heights Minnesota 55120

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

Brian M. Molinaro
Minn. Reg. No. 47504

_____

Date: _____01-09-2026_____

I. Introduction

The following is a hydrology summary for the construction of a 179-home development to be called Talcott Glen, located at the west end of 95th Avenue in Cottage Grove, Minnesota.

II. Existing Site Conditions

A. Current Land Use

The site is currently 69.50 acres of agricultural land; the open area is farmed in row crops, with Stands of woods on the east side, through the middle of the site around the abandoned farmstead and on the north property line.

B. Topography - Existing Hydrology

The existing topography varies across the site from a wooded slope at the eastern edge of the property to a flat draw running north south in the center of the site. Onsite stormwater runoff discharges to the south into the Bailey's Nursery and to the west along the BNSF right of way. The Summers Landing project to the east of the site discharges storm water through an existing ravine on the eastern slope. A small portion of the site discarges to the north.

Review of the City of Cottage Grove Storm water management plan defines the site in the SW-A3, SW-A6 and SW-A8 drainage districts, with the SW-A2, SWA4 and SW-A6 districts contributing drainage to the site. The Surface Waters & Wetland Areas that receive stormwater within one mile are shown in the Drainage Maps in APPENDIX A.

C. Special or Impaired Waters

A special and impaired waters search was completed using the MPCA search engine (http://pca-gis02.pca.state.mn.us/CSW/index.html) on February 21, 2020. The project no discharge point within one mile of, and flows to, a special water listed in Appendix A, Part B of the NPDES Construction Site General Permit, but does have a discharge point within one mile of, and flows to, the Mississippi River which is a water listed as impaired under Section 303(D) of the Federal Clean Water Act.

Waterbody ID	07010206-814
Name of Waterbody	Mississippi River
Type	Steam
Special Water	No
Impaired Water	Yes
Pollutants	Fecal Coliform; Mercury in fish tissue; Mercury in water column; Nutrients; PCB in fish tissue; Perfluorooctane Sulfonate (PFOS) in fish tissue; Perfluorooctane Sulfonate (PFOS) in water column; Total suspended solids
Approved TMDL	Yes

D. Groundwater

No groundwater was encounter in the soil borings.

E. Soils

Braun Intertec completed soil borings and prepared a Geotechnical Evaluation Report, dated December 16,2025. The general geologic profile consists of ½ to 1½ feet of topsoil underlain by Glacial Outwash with limestone bedrock at elevation 749. The outwash consisted of poorly graded sands with silt and poorly graded sand. Based on the soil borings from the geotechnical investigations, the site consists primarily of sand and silty sand consistent with Hydraulic Soil Group A. The complete report can be found in Appendix C.

A review of the USDA Natural Resources Conservation Services Soils Survey Map (See Appendix C) indicated the following soils on site:

Soil Symbol	Soil Name	% of Site	Hydrologic Soil Group	Kf	T factor	Representative value			Erosion Potential
						% Sand	% Silt	% Clay	
7B	Hubbard loamy sand, 1 to 6 percent slopes	90	131	A	0.02	5	83.8	9.2	Slight
7D	Hubbard loamy sand, 12 to 18 percent slopes	100	121	A	0.02	5	83.8	9.2	Slight
8	Sparta loamy sand, 0 to 2 percent slopes	90	131	A	0.17	5	84.3	9.2	Slight
100B	Copaston loam, 0 to 6 percent slopes	100	112	D	0.28	1	43	38.5	Slight
151	Burkhardt sandy loam, 0 to 3 percent slopes	90	177	A	0.24	2	67.4	23.6	Slight
151B	Burkhardt sandy loam, 3 to 9 percent slopes	90	131	A	0.24	2	67.4	23.6	Slight
298	Richwood silt loam, 0 to 2 percent slopes	90	102	B	0.37	4	11.7	69.8	Slight
327	Dickman sandy loam, 0 to 2 percent slopes	90	131	A	0.2	2	68.3	19.7	Slight
529	Ripon silt loam, 1 to 2 percent slopes	90	121	C	0.43	2	14.2	71.8	Slight

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

F. Karst

This site, as much of southeastern Minnesota does, lies in an area where there is a potential for Karst in the bedrock. The site contains a shallow soil cover over limestone bedrock.

We have performed a detailed review of the South Washington watershed District karst inventory, which documents several karst related features within 1 mile up stream of this project site, including at least 2 within a 1/4-mile of the site. There is a potential for karst related features at this project site.

III. Proposed Site Conditions & Design Considerations

A. Proposed Development

The proposed development consists of a 179-home subdivision of single-family lots. The total impact area of the proposed development is approximately 69.5 acres. Local streets will be constructed with underground sewer and water utilities to provide access and services to each lot. Stormwater will be collected by storm sewer and routed to constructed stormwater basins before discharging offsite.

The table below provides information on the estimated acreage of on-site land cover before and after project development.

Cover Types	Existing - Acres Sub-catchments A,B,C,D,E,F,G	Proposed- Acres Sub-catchments 1,2,100,150,200,220,240,280,350,400,450,500	CN Value
Cropland	46.85	25.63	67
Gravel Surface	0.03	0.0	96
Lawn/landscaping	0.00	16.30	58
Meadow	3.24	2.19	30
Woods	18.34	2.01	30
Impervious surfaces	0.07	21.23	98
Pond	0.00	1.17	100
TOTAL *	**68.53**	**65.53**	

*Onsite areas only – does not include offsite areas

B. Proposed Topography

The proposed drainage patterns will be reflective of the existing drainage patterns when possible. The drainage maps are shown in Appendix A.

C. Design Requirements

The City of Cottage Grove Stormwater Management Plan requires all new developments to meet flow rate, water quality, and volume requirements. The City or Cottage Grove also refers to requirements of the South Washington Watershed District rules for stormwater management features. These requirements are summarized as follows:

1. Rate Control

Sites are required to meet existing conditions for rate control.

In addition to meeting existing flow rates leaving the property, the city has established maximum discharge rates for the drainage area discharging offsite summarized as follows:

SW-A2 thru A8 MAX RATE 0.36 cfs/acre

Based on the contributions from the site and through the site – the total discharge allowable would be 54.4 cfs.

To meet the SWWD requirements, NOAA Atlas 14 rainfall data should be used when modeling the system.

2. Water Quality

The City requires that new development projects include BMPs that at a minimum achieve post-development reductions in TP and TSS by 50% and 80%, respectively. This can be accomplished with any combination of BMP's as designed in the Minnesota Strom Water Manual.

Watershed rules call for a TP loading rate of 0.22 lbs./acre/year or existing loading rates, whichever is less, since the project site drains to the Mississippi River.

To meet the NPDES Construction Stormwater Permit the permanent sedimentation basins must:

- The basin must have a permanent volume of 1800 cubic feet of storage below the outlet pipe for each acre that drains to the basin.
- The basin must be designed to provide live storage for a water quality volume (calculated as an instantaneous volume) of one (1) inch of runoff from the new impervious surfaces created by the project.
- Basin outlets shall be designed such that the water quality volume is discharged at no more than 5.66 cubic feet per second (cfs) per acre of surface area of the pond. The basin's water quality volume is calculated as 1 inch of runoff from the new impervious surfaces created by the project.

3. Volume Control

The required volume reduction is the first 1" of runoff over the development site's impervious surface. The City also requires the location of infiltration basins be located outside the 10-year composite groundwater capture zone.

To meet the NPDES Construction Stormwater Permit the infiltration systems must:

- Be design so that the water quality volume of one (1) inch of runoff from the new impervious surfaces created by the project is retained on site (i.e. infiltration or other volume reduction practices) and not discharged to a Surface Water.
- Discharge the water quality volume routed to the system through the soil surface or filter media within 48 hours or less.
- Verify soil type and to ensure a minimum of three (3) feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration/filtration system.

4. Storm Sewer Design

The storm sewer must be designed to handle a 5-year 24-hour ATLAS 14 Storm Event. (City of Cottage Grove Stormwater Management Plan)

5. Pad Elevations

Home low openings should be 3-feet (minimum) above the 100-year HWL
Elevation and 2-feet above the emergency over-flow, when adjacent to a stormwater basin. Home low openings adjacent to temporary ponding areas must be minimum of 1-foot above local EOF's. (City of Cottage Grove SWMP)

D. Proposed Hydrology

The proposed hydrology is designed to maintain drainage patterns similar to existing conditions where possible. To meet the Rate, Volume and water quality requirements Four (4) pretreatment basins with infiltration components and Four (4) dry basins were designed for the site. The drainage is split into 4 major sub-catchments; East, Central, Northwest and South West. The following is a summary of the proposed components:

East
The eastern drainage consists of drainage from basins from the Summer Landing Development as well as the large slope on the eastern edge of the site. To control this flow a dry basin (500P) is proposed in the rear yards east of 95th street. This will capture and slow the flow rate to the large central basin (600P)

Central
Two pretreatment basins (300P and 400P) take the stormwater from the eastern 2/3rds of the development - including the extension of 95th street into the site. These pretreatment basins discharge to infiltration basins (300I and 400I) meeting volume requirements. The infiltration basins are offline and take the volume from the 2.5" storm. From the 2.5" storm to the 10 year storm the basins are controlled OCS that discharges to Basin 600. Above the 10 year event the basins are connected via a armored channel that equalizes all off the basins to create enough storage to minimize the discharge offsite. Basin 600 discharges to the south.

Northwest
A pretreatment basin (200P) collects water from north of the gas pipeline and discarges to a infiltration basin (200I) with excess drainage overflowing to a dry basin (210/110). The infiltration basin is offline and takes the volume from the 2.5" storm. From the 2.5" storm to the 10 year storm the basins are controlled OCS that discharges to Basin 110/220. Above the 10 year event the basins are connected via a armored channel that equalizes all off the basins to create enough storage to minimize the discharge offsite. The dry basin (110/220) is hydraulically connected to the dry basin south of the gas line.

Southwest
A pretreatment basin (100P) collects water from north of the gas pipeline and discharges to a infiltration basin (100I) with excess drainage overflowing to a dry basin (110/210). The infiltration basin is offline and takes the volume from the 2.5" storm. From the 2.5" storm to the 10 year storm the basins are controlled OCS that discharges to Basin 110/220. Above the 10 year event the basins are connected via a armored channel that equalizes all off the basins to create enough storage to minimize the discharge offsite. The dry basin is hydraulically connected to the dry basin south of the gas line (110/220).

IV. Results

1. Rate Control

The proposed flow rate from the proposed development shall not exceed the flow rate of the existing drainage areas for the two, ten and 100-year storm events.

The following table is a summary of the results of the flow rate derived by the HydroCAD models.

Drainage Designation	2-Year Flow Rate (cfs)		10-Year Flow Rate (cfs)		100-Year Flow Rate (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
South	0.0	0.28	2.98	2.89	29.81	24.45
North	0.0	0.0	0.02	0.0	2.77	0.00
West	3.48	0.95	13.16	1.93	47.65	14.12

The maximum 100-year discharge required by the city is achieved through capturing the majority of the 100-year runoff volume within the live storage volume of the basins, and discharging through an orifice in the control structure weir wall. Reduction is reached for all events.

The City Stromwater Management Plan allows for a maximum discharge from the site (including the offsite contributions – as 54.4 CFS. The total offsite flow from the site is 38.57 CFS.

2. Water Quality

The Minnesota Stormwqater Manual allows for the use of wet basins as pretreatment devises to infiltration. These basins need to be 25% of the volume from a 2.5” storm event in the drainage area. Below is a summary of the pretreatment sizes”

Treatment Basin Volume (Wet Storage)			
Basin Model Name (HydroCAD)	2.5” Event Runoff (ac*ft)	25% Required Volume (ac-ft)	Volume Proposed (ac*ft)
100P	0.52	0.13	0.22
200P	0.17	0.04	0.06
300P	0.90	0.23	0.95
400P	1.30	0.32	1.23

In addition to meeting the aforementioned guidelines, a P8 model was developed to provide calculations verifying the 50% Phosphorus and 80% TSS removal from water discharged off-site. The P8 model results show 92.5% Phosphorus and 97.8% TSS removal for the required water quality volume. An existing condition P8 model was developed to verify that TSS and TP discharge is reduced in proposed conditions. The following table summarizes the reduced discharge in proposed conditions.

	TSS (lbs/yr)	TP (lbs/yr)
Existing	692.2	3.6
Proposed	297.6	3.4
Proposed Reduction	97.8%	92.5%

There is an addition TMDL for the site of meeting the Maximum Allowable Total Phosphorus Loading Rate 0.22 (lbs/ac/yr). The site produces 0.052 lbs/ac/year of Total Phosphorous

Results can be found in Appendix B.

3. Volume Control

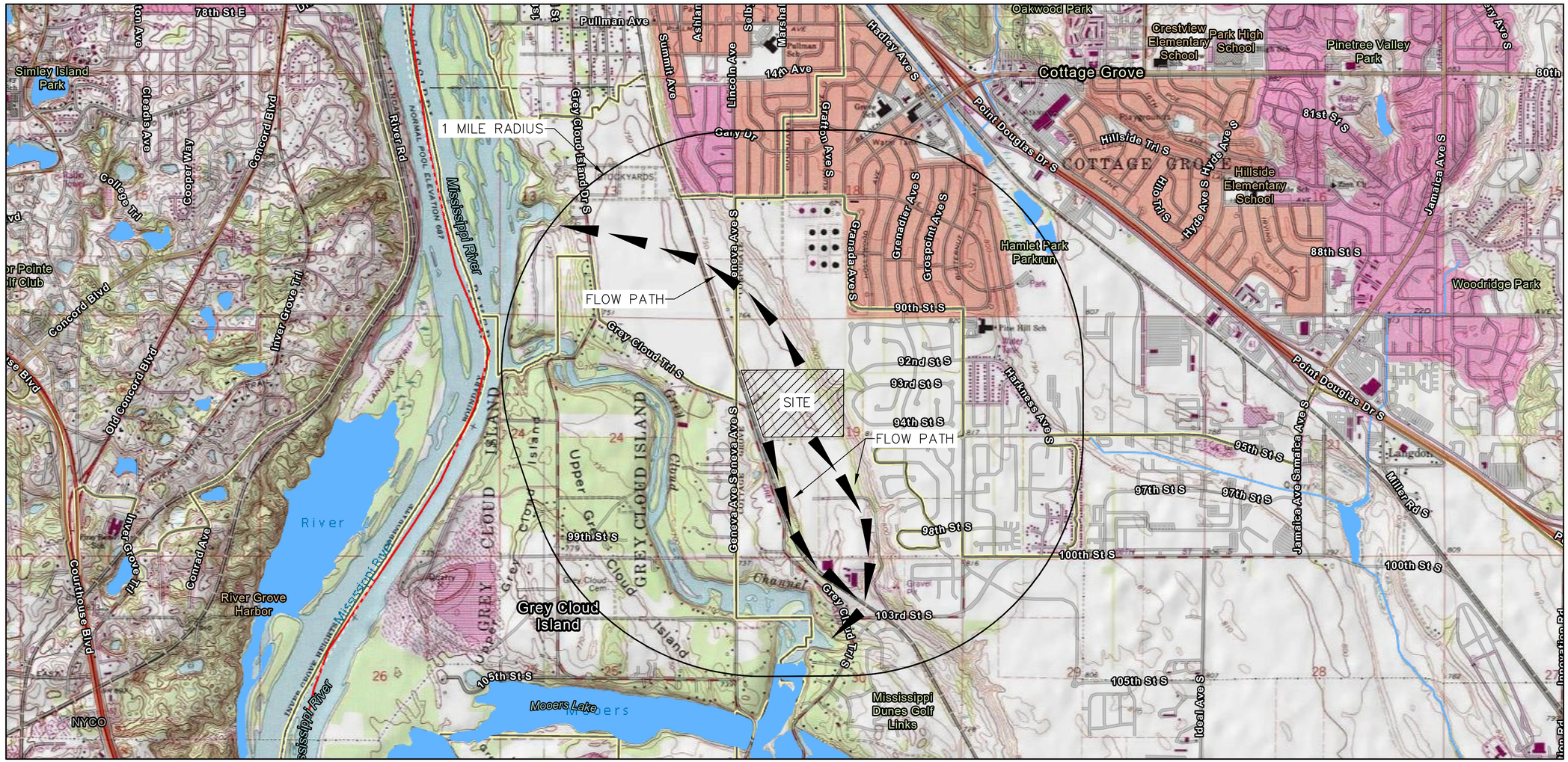
To meet the NPDES Permit the project must be design so that the water quality volume of 1inch of runoff from the new impervious surfaces created by the project is retained on site (i.e. infiltration or other BMP)

Volume Reduction Captured				
Basin Model Name	New Imp. Surface Area (acre)	Live Storage Required 1.0" (ac-ft)	Bottom / Outlet Elev.	Water Quality Volume Proposed (ac*ft)
100I	3.56	0.30	749.0 / 750.75	0.59
200I	1.19	0.10	749.0 / 750.2	0.16
300I	6.03	0.50	752.0 / 752.7	0.50
400I	10.31	0.86	752.0 / 753.1	1.02

Infiltration Basin Capacity					
Basin Name	Captured Volume Below Outlet (ac*ft)	Surface area (sf) @ 1" Volume	Infiltration Rate (in/hr)	Draw Down Time (hr)	48 Hour Drawdown Volume (ac*ft)
100I	0.59	7,617	0.80	48	0.56
200I	0.16	3,367	0.80	48	0.25
300I	0.50	7,839	0.80	48	0.58
400I	1.02	25,801	0.80	48	1.90

Appendix A: Hydrology Maps

MPCA's Construction Stormwater Special Waters Search



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- Waterbody Units - Lakes (1)
- Waterbody Units - Streams (1)
- Impaired Streams with additional construction requirements
- MS4 - MNDOT
- MS4 - County
- MS4 - Watershed District
- MS4 - City or Township

1:36,112

0 0.28 0.55 1.1 mi

0 0.47 0.95 1.9 km

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed

Minnesota Pollution Control Agency

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PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

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Name Brian. N. Molinaro

Reg. No. 47504 Date 01-16-25

Revisions

Date	01-16-25
Designed	NAP
Drawn	SHA

MPCA MAP

LENNAR
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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

OA-ENG-123105-SHEET-MPCA

S3 OF S5

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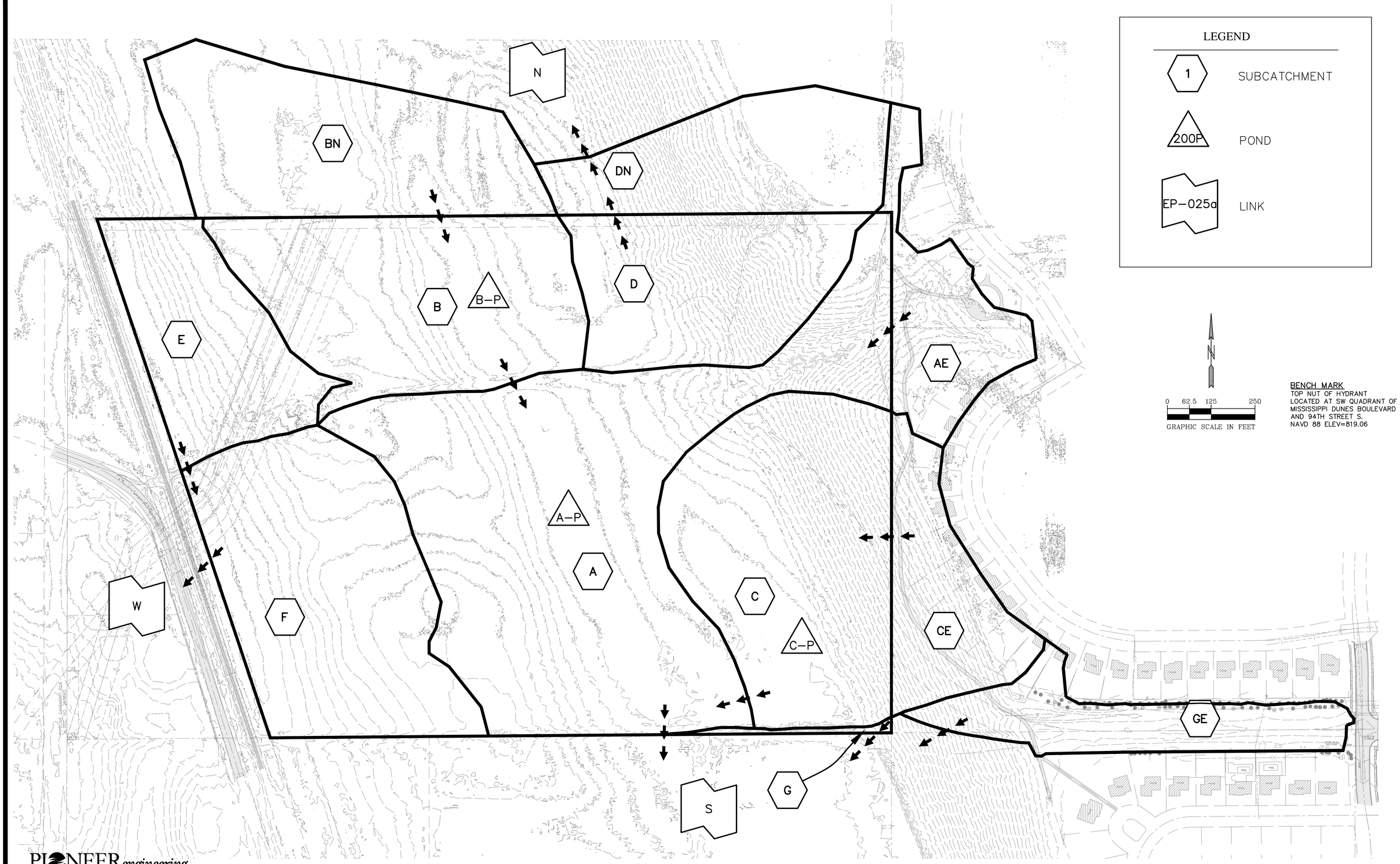

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

OA-ENG-123105-SHEET-HYDR-EXIS

PIONEER engineering
CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

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Reg. No. 47504 Date 01-16-25

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Drawn	SHA

EXISTING HYDROLOGY

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TALCOTT GLEN
COTTAGE GROVE, MINNESOTA

S4 OF S5

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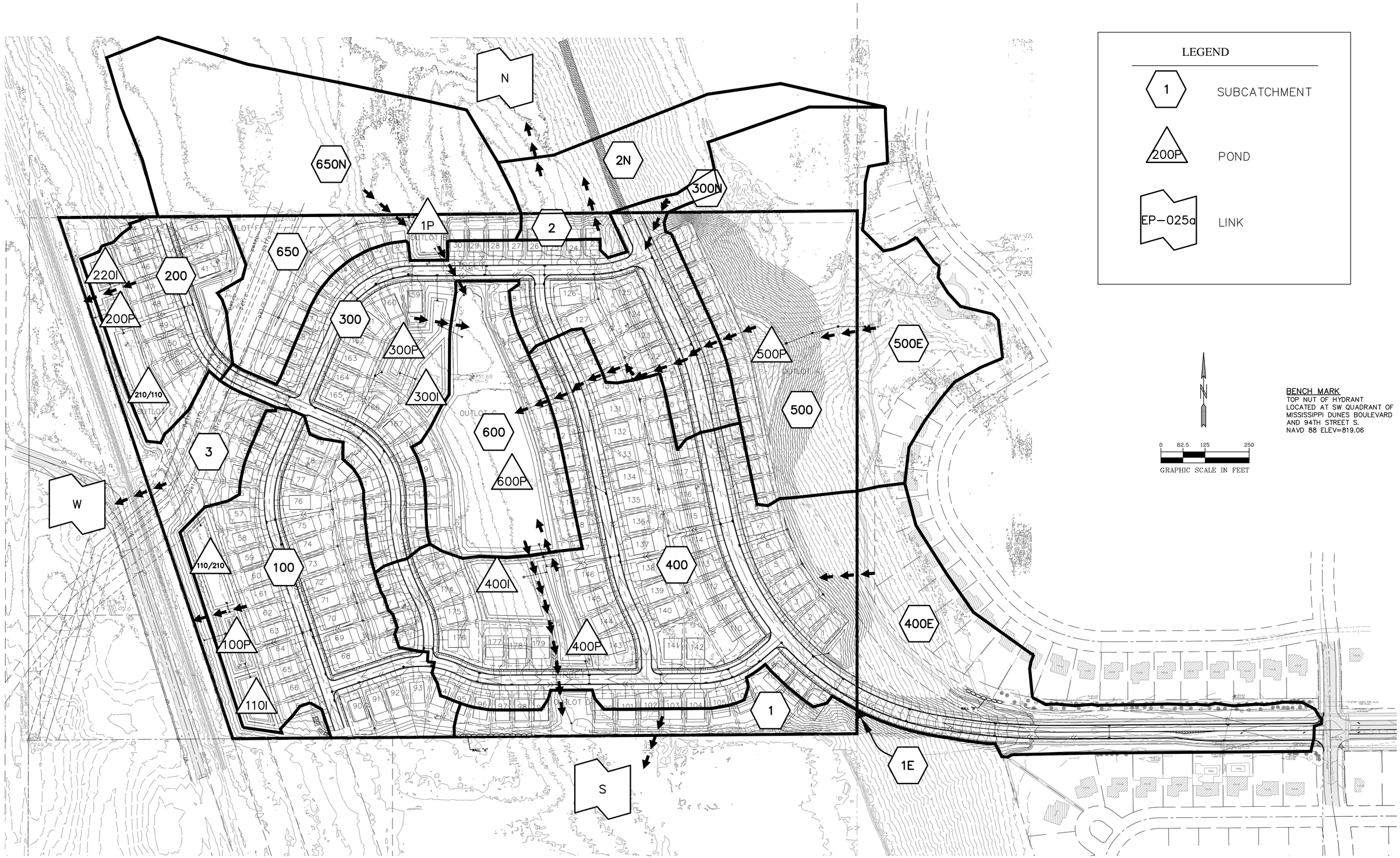

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF
MISSISSIPPI DUNES BOULEVARD
AND 94TH STREET S.
NAVD 88 ELEV=819.06

OA-ENG-123105-SHEET-HYDR-PROP

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CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

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Reg. No. 47504 Date 01-16-25

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PROPOSED HYDROLOGY MAP

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COTTAGE GROVE, MINNESOTA

S5 OF S5

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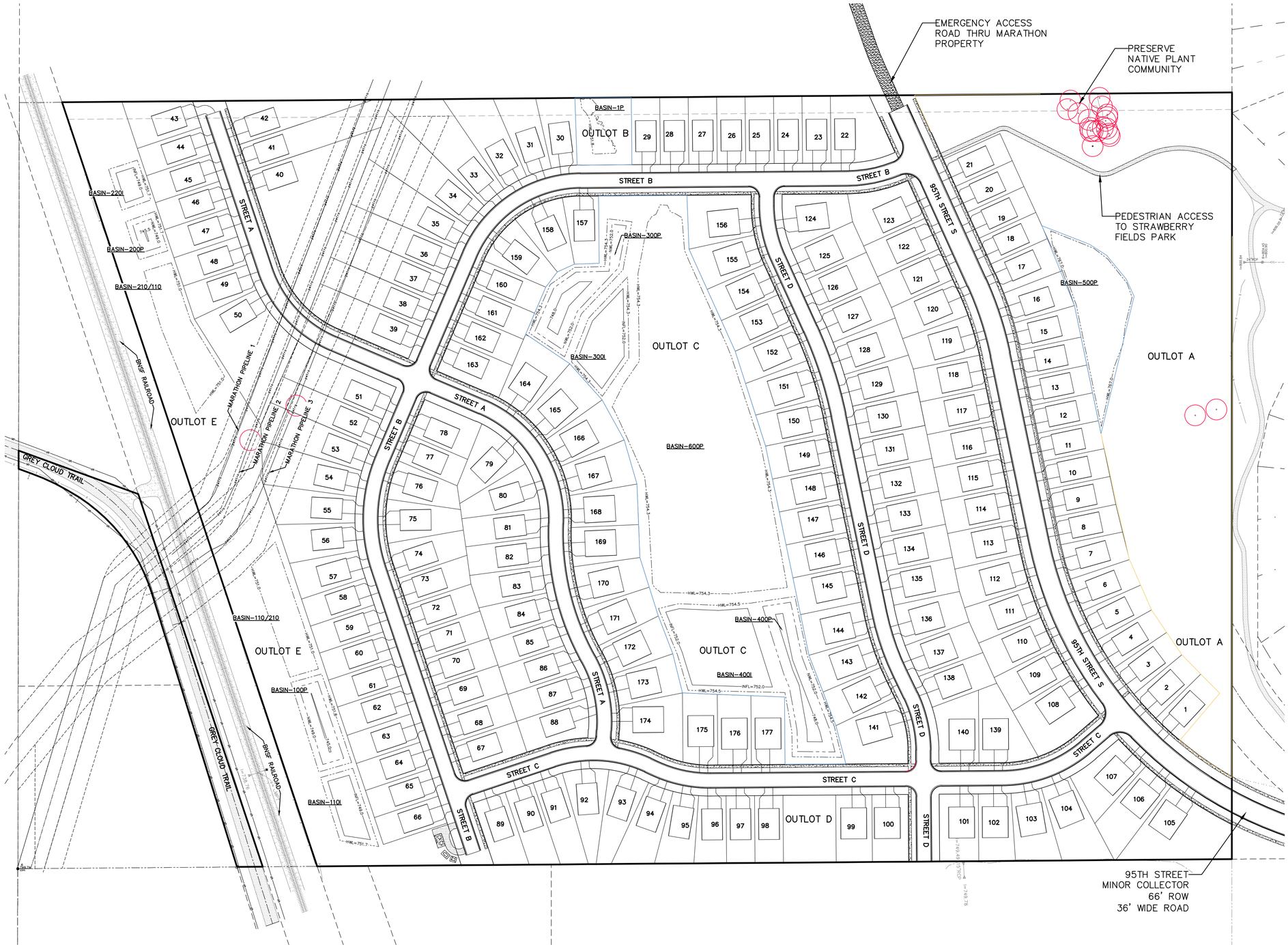

BENCH MARK
TOP NUT OF HYDRANT
LOCATED AT SW QUADRANT OF MISSISSIPPI DUNES BOULEVARD AND 94TH STREET S.
NAVD 88 ELEV=819.06

00-ENG-123105--CITY SITE-REVISIONS

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CIVIL ENGINEERS LAND PLANNERS LAND SURVEYORS LANDSCAPE ARCHITECTS
2422 Enterprise Drive
Mendota Heights, MN 55120
(651) 681-1914
Fax: 681-9488
www.pioneereng.com

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Name Brian N. Molinaro
Reg. No. 47504 Date 01-16-26

Revisions
1. 02-04-2026 FHR Comments

Date	01-16-26
Designed	NAP
Drawn	SHA

REVISED SITE PLAN
FEBRUARY 19, 2026

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PLYMOUTH, MINNESOTA 55446

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COTTAGE GROVE, MINNESOTA

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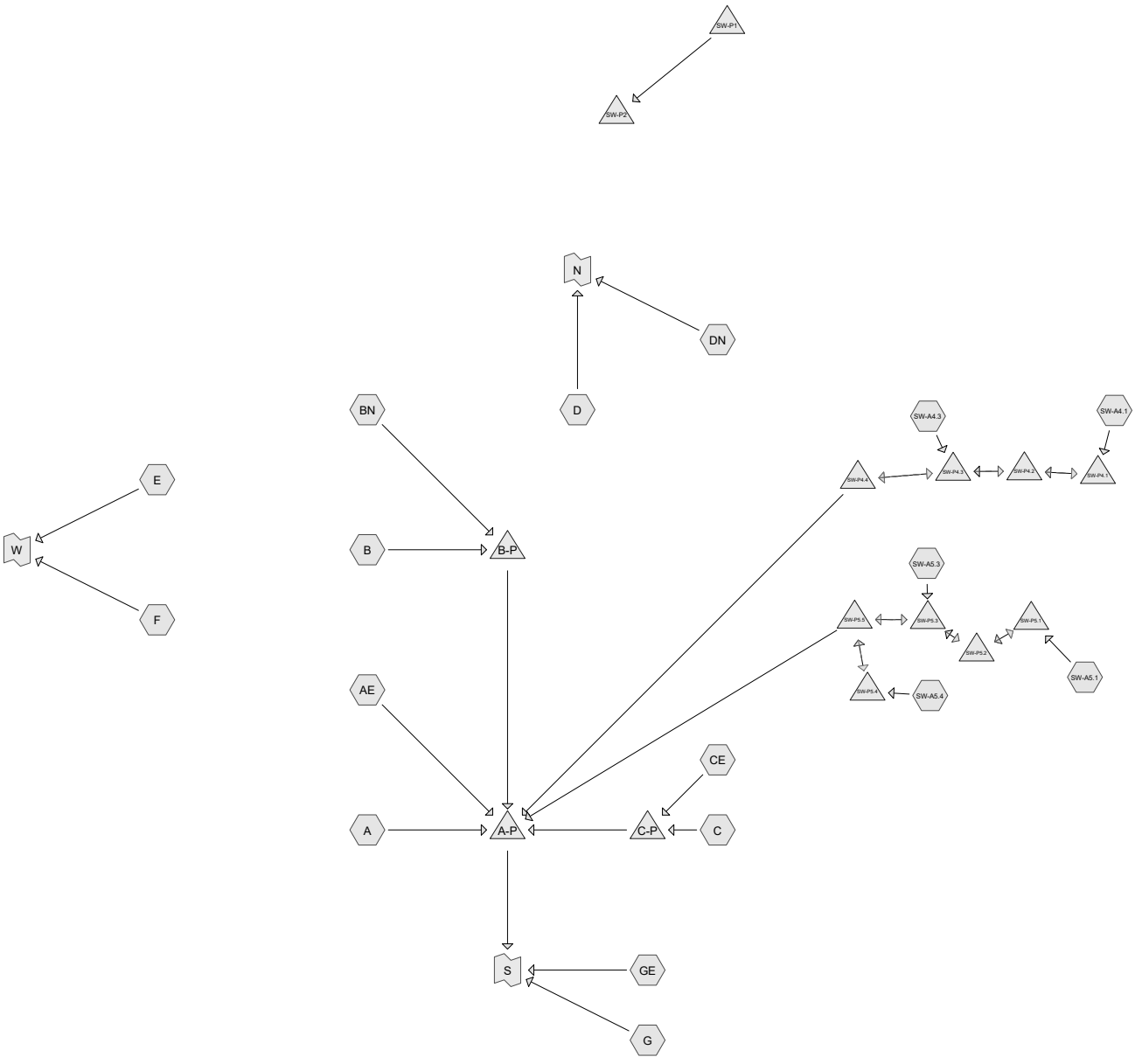
Appendix B: HydroCAD Calculations



Subcat Reach Pond Link

Routing Diagram for 00-123105-Existing (01-23-2026)
Prepared by {enter your company name here}, Printed 1/26/2026
HydroCAD® 10.10-7a s/n 00590 © 2021 HydroCAD Software Solutions LLC

Summary for Subcatchment A: A

Runoff = 2.03 cfs @ 12.70 hrs, Volume= 16,728 cf, Depth= 0.21"
Routed to Pond A-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	720,950	67	Cropland, HSG A
*	203,104	30	Woods, HSG A
*	32,845	30	Meadow_Undisturbed, HSG A
*	170	98	Impervious, HSG A
	957,069	58	Weighted Average
	956,899		99.98% Pervious Area
	170		0.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment AE: AE

Runoff = 0.25 cfs @ 12.77 hrs, Volume= 2,418 cf, Depth= 0.16"
Routed to Pond A-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	52,870	30	Woods, HSG A
*	66,206	75	Single Family Residential, HSG A
*	25,924	58	Meadow, HSG A
*	19,102	30	Meadow_Undisturbed, HSG A
*	13,254	98	Impervious, HSG A
	177,356	56	Weighted Average
	164,102		92.53% Pervious Area
	13,254		7.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment B: B

Runoff = 1.87 cfs @ 12.63 hrs, Volume= 11,879 cf, Depth= 0.32"
Routed to Pond B-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	392,179	67	Cropland, HSG A
*	54,125	30	Woods, HSG A
*	1,476	30	Meadow_Undisturbed, HSG A
*	434	98	Impervious, HSG A
	448,213	62	Weighted Average
	447,779		99.90% Pervious Area
	434		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment BN: BN

Runoff = 0.20 cfs @ 13.37 hrs, Volume= 2,963 cf, Depth= 0.09"
Routed to Pond B-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	240,073	67	Cropland, HSG A
*	67,105	30	Woods, HSG A
*	98,892	30	Meadow_Undisturbed, HSG A
	406,070	52	Weighted Average
	406,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment C: C

Runoff = 0.02 cfs @ 18.37 hrs, Volume= 679 cf, Depth= 0.02"
Routed to Pond C-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	220,908	67	Cropland, HSG A
*	242,386	30	Woods, HSG A
*	44,136	30	Meadow_Undisturbed, HSG A
	507,431	46	Weighted Average
	507,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment CE: CE

Runoff = 0.05 cfs @ 13.57 hrs, Volume= 938 cf, Depth= 0.06"
Routed to Pond C-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	72,622	30	Woods, HSG A
*	73,058	75	Single Family Residential, HSG A
*	41,418	30	Meadow_Undisturbed, HSG A
*	7,599	98	Impervious, HSG A
	194,698	50	Weighted Average
	187,099		96.10% Pervious Area
	7,599		3.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment D: D

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link N : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	51,784	67	Cropland, HSG A
*	216,874	30	Woods, HSG A
*	38,391	30	Meadow_Undisturbed, HSG A
	307,049	36	Weighted Average
	307,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment DN: DN

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link N : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	173,230	30	Woods, HSG A
*	95,432	30	Meadow_Undisturbed, HSG A
	268,661	30	Weighted Average
	268,661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment E: E

Runoff = 0.45 cfs @ 12.70 hrs, Volume= 4,008 cf, Depth= 0.19"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	473	96	Gravel, HSG A
*	184,092	67	Cropland, HSG A
*	49,991	30	Woods, HSG A
*	21,631	30	Meadow_Undisturbed, HSG A
*	2,411	98	Impervious, HSG A
	258,596	57	Weighted Average
	256,186		99.07% Pervious Area
	2,411		0.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment F: F

Runoff = 3.09 cfs @ 12.57 hrs, Volume= 17,126 cf, Depth= 0.41"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	616	96	Gravel, HSG A
*	470,977	67	Cropland, HSG A
*	22,431	30	Woods, HSG A
*	2,971	30	Meadow_Undisturbed, HSG A
*	41	98	Impervious, HSG A
	497,036	65	Weighted Average
	496,995		99.99% Pervious Area
	41		0.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment G: G

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	10,162	30	Woods, HSG A
	10,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment GE: GE

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	100,409	30	Woods, HSG A
*	18,876	75	Single Family Residential, HSG A
*	58,143	30	Meadow_Undisturbed, HSG A
*	2,324	98	Impervious, HSG A
	179,752	36	Weighted Average
	177,428		98.71% Pervious Area
	2,324		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment SW-A4.1: NE QUAD

Runoff = 21.86 cfs @ 12.50 hrs, Volume= 95,557 cf, Depth= 0.83"
Routed to Pond SW-P4.1 : summers landing 30P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	10.250	98	Paved Parking, HSG B
*	1.530	98	Water Surface, HSG B
*	20.080	61	>75% Grass Cover, HSG B
	31.860	75	Weighted Average
	20.080		63.03% Pervious Area
	11.780		36.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.3: NW QUAD

Runoff = 21.22 cfs @ 12.53 hrs, Volume= 95,740 cf, Depth= 0.73"
Routed to Pond SW-P4.3 : Summers landing 31P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	10.510	98	Paved Parking, HSG B
*	23.970	61	>75% Grass cover, Good
*	1.590	98	Water Surface, HSG B
	36.070	73	Weighted Average
	23.970		66.45% Pervious Area
	12.100		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.1: SE QUAD

Runoff = 17.56 cfs @ 12.53 hrs, Volume= 80,550 cf, Depth= 0.69"
Routed to Pond SW-P5.1 : Summers landing 28P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	8.430	98	
*	22.650	61	
*	1.260	98	
	32.340	72	Weighted Average
	22.650		70.04% Pervious Area
	9.690		29.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.3: SW QUAD N

Runoff = 11.07 cfs @ 12.53 hrs, Volume= 51,768 cf, Depth= 0.64"
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	5.230	98	
*	16.000	61	
*	0.960	98	
	22.190	71	Weighted Average
	16.000		72.10% Pervious Area
	6.190		27.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.4: SW QUAD S

Runoff = 6.18 cfs @ 12.53 hrs, Volume= 27,896 cf, Depth= 0.73"
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	2.560	98	
*	7.220	61	
*	0.730	98	
	10.510	73	Weighted Average
	7.220		68.70% Pervious Area
	3.290		31.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Pond A-P: (new Pond)

Inflow = 2.28 cfs @ 12.70 hrs, Volume= 20,219 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link S : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.31' @ 25.67 hrs Surf.Area= 88,328 sf Storage= 20,212 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	327,150 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	43,080	0	0
752.00	190,165	116,623	116,623
753.00	230,890	210,528	327,150

Device	Routing	Invert	Outlet Devices
#1	Primary	752.00'	**20.0' long + 20.0 '/' SideZ x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=0.00' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B-P: (new Pond)

Inflow Area = 854,283 sf, 0.05% Impervious, Inflow Depth = 0.21" for 2-yr event
Inflow = 1.95 cfs @ 12.63 hrs, Volume= 14,842 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond A-P : (new Pond)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.49' @ 25.67 hrs Surf.Area= 44,118 sf Storage= 14,839 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	134,145 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	15,900	0	0
752.00	72,965	44,433	44,433
753.00	106,459	89,712	134,145

Device	Routing	Invert	Outlet Devices
#1	Primary	751.90'	**30.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=751.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond C-P: (new Pond)

Inflow Area = 702,129 sf, 1.08% Impervious, Inflow Depth = 0.03" for 2-yr event
Inflow = 0.06 cfs @ 15.23 hrs, Volume= 1,617 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond A-P : (new Pond)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.15' @ 25.67 hrs Surf.Area= 15,150 sf Storage= 1,614 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	128,974 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	6,033	0	0
753.00	65,844	35,939	35,939
754.00	120,226	93,035	128,974

Device	Routing	Invert	Outlet Devices
#1	Primary	752.60'	**40.0' long + 50.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=752.00' TW=751.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P1: SW-P1

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	87.505 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
810.00	6.048	0.000	0.000
812.00	6.451	12.499	12.499
814.00	6.854	13.305	25.804
816.00	7.284	14.138	39.942
820.00	8.131	30.830	70.772
822.00	8.602	16.733	87.505

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**12.0" Round Culvert** L= 80.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=747.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond SW-P2: SW-P2

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to nonexistent node SW-P3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 747.00' @ 0.00 hrs Surf.Area= 6.476 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	747.00'	67.788 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
747.00	6.476	0.000	0.000
749.00	7.070	13.546	13.546
751.00	7.538	14.608	28.154
753.00	8.024	15.562	43.716
756.00	8.024	24.072	67.788

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**21.0" Round Culvert** L= 500.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 746.00' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=747.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Summary for Pond SW-P4.1: summers landing 30P

Inflow = 21.86 cfs @ 12.50 hrs, Volume= 95,557 cf
Outflow = 1.08 cfs @ 15.87 hrs, Volume= 62,285 cf, Atten= 95%, Lag= 201.9 min
Primary = 1.08 cfs @ 15.87 hrs, Volume= 62,285 cf
Routed to Pond SW-P4.2 : Summers landing 30PI
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.2 : Summers landing 30PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 808.50' Surf.Area= 1.284 ac Storage= 4.283 af
Peak Elev= 809.58' @ 15.87 hrs Surf.Area= 1.541 ac Storage= 5.837 af (1.554 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 762.9 min (1,620.5 - 857.6)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	11.323 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
804.00	0.730	0.000	0.000
808.00	1.112	3.684	3.684
809.00	1.456	1.284	4.968
811.00	1.749	3.205	8.173
812.00	2.121	1.935	10.108
812.50	2.738	1.215	11.323

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**12.0" Round Culvert** L= 35.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 808.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.08 cfs @ 15.87 hrs HW=809.58' TW=806.22' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.08 cfs @ 2.29 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=808.50' TW=805.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SW-P4.2: Summers landing 30PI

Inflow = 1.08 cfs @ 15.87 hrs, Volume= 62,285 cf
Outflow = 0.67 cfs @ 24.23 hrs, Volume= 61,955 cf, Atten= 38%, Lag= 501.7 min
Discarded = 0.67 cfs @ 24.23 hrs, Volume= 61,955 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.1 : summers landing 30P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 807.60' @ 24.23 hrs Surf.Area= 8,791 sf Storage= 18,291 cf

Plug-Flow detention time= 416.3 min calculated for 61,954 cf (99% of inflow)
Center-of-Mass det. time= 394.2 min (2,014.7 - 1,620.5)

Volume	Invert	Avail.Storage	Storage Description
#1	805.00'	124,959 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
805.00	5,274	0	0
808.00	9,331	21,908	21,908
809.00	14,735	12,033	33,941
811.00	19,577	34,312	68,253
812.00	22,804	21,191	89,443
812.50	119,260	35,516	124,959

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**15.0" Round Culvert** L= 661.0' Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.50' S= 0.0068 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	805.01'	**8.300 in/hr Exfiltration over Surface area above 805.01'** Excluded Surface area = 5,288 sf

Discarded OutFlow Max=0.67 cfs @ 24.23 hrs HW=807.60' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.67 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=804.50' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=808.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.3: Summers landing 31P

Inflow = 21.22 cfs @ 12.53 hrs, Volume= 95,740 cf
Outflow = 1.81 cfs @ 15.19 hrs, Volume= 91,567 cf, Atten= 91%, Lag= 159.7 min
Primary = 1.81 cfs @ 15.19 hrs, Volume= 91,567 cf
Routed to Pond SW-P4.4 : Summers landing 31PI
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.4 : Summers landing 31PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 804.50' Surf.Area= 69,445 sf Storage= 195,814 cf
Peak Elev= 805.30' @ 15.19 hrs Surf.Area= 74,827 sf Storage= 253,539 cf (57,725 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 663.8 min (1,526.9 - 863.2)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	805,360 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	35,945	0	0
803.50	53,587	134,298	134,298
804.50	69,445	61,516	195,814
806.50	82,896	152,341	348,155
807.50	100,885	91,891	440,046
808.00	104,644	51,382	491,428
811.00	104,644	313,932	805,360

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.81 cfs @ 15.19 hrs HW=805.30' TW=801.81' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.81 cfs @ 2.69 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=804.50' TW=800.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.4: Summers landing 31PI

Inflow = 1.81 cfs @ 15.19 hrs, Volume= 91,567 cf
Outflow = 0.96 cfs @ 23.43 hrs, Volume= 91,069 cf, Atten= 47%, Lag= 494.1 min
Discarded = 0.96 cfs @ 23.43 hrs, Volume= 91,069 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond A-P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 803.25' @ 23.43 hrs Surf.Area= 13,416 sf Storage= 29,937 cf

Plug-Flow detention time= 479.8 min calculated for 91,069 cf (99% of inflow)
Center-of-Mass det. time= 456.8 min (1,983.7 - 1,526.9)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	215,575 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	8,380	0	0
803.50	13,880	33,390	33,390
804.50	19,929	16,905	50,295
806.50	25,755	45,684	95,979
807.50	34,193	29,974	125,953
808.00	36,033	17,557	143,509
810.00	36,033	72,066	215,575

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**15.0" Round Culvert** L= 1,010.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 801.00' S= 0.0035 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	800.51'	**8.300 in/hr Exfiltration over Surface area above 800.51'** Excluded Surface area = 8,398 sf

Discarded OutFlow Max=0.96 cfs @ 23.43 hrs HW=803.25' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.96 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=751.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=804.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.1: Summers landing 28P

Inflow = 17.56 cfs @ 12.53 hrs, Volume= 80,550 cf
Outflow = 1.97 cfs @ 14.17 hrs, Volume= 78,223 cf, Atten= 89%, Lag= 98.5 min
Primary = 1.97 cfs @ 14.17 hrs, Volume= 78,223 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 55,104 sf Storage= 141,054 cf
Peak Elev= 806.78' @ 14.17 hrs Surf.Area= 60,381 sf Storage= 186,053 cf (44,999 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 520.0 min (1,386.0 - 866.1)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	432,852 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
802.00	23,396	0	0
805.00	39,204	93,900	93,900
806.00	55,104	47,154	141,054
808.00	68,648	123,752	264,806
809.00	86,609	77,629	342,435
810.00	94,225	90,417	432,852

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 806.00' / 805.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	807.00'	**5.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.97 cfs @ 14.17 hrs HW=806.78' TW=804.82' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.97 cfs @ 3.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.2: Summers Landing 28PI

Inflow = 1.97 cfs @ 14.17 hrs, Volume= 78,223 cf
Outflow = 1.79 cfs @ 0.00 hrs, Volume= 101,354 cf, Atten= 9%, Lag= 0.0 min
Discarded = 1.79 cfs @ 0.00 hrs, Volume= 101,354 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.1 : Summers landing 28P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 16,338 sf Storage= 23,268 cf
Peak Elev= 806.00' @ 0.00 hrs Surf.Area= 16,338 sf Storage= 23,268 cf

Plug-Flow detention time= 178.0 min calculated for 78,085 cf (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	141,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.00	6,954	0	0
805.00	11,622	9,288	9,288
806.00	16,338	13,980	23,268
808.00	20,651	36,989	60,257
809.00	26,716	23,684	83,941
810.00	29,463	28,090	112,030
811.00	29,463	29,463	141,493

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 622.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	807.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	804.01'	**8.300 in/hr Exfiltration over Surface area above 804.01'** Excluded Surface area = 7,001 sf

Discarded OutFlow Max=1.79 cfs @ 0.00 hrs HW=806.00' (Free Discharge)
3=Exfiltration (Exfiltration Controls 1.79 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=803.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.3: Summers landing POND 2 NORTH

Inflow = 11.07 cfs @ 12.53 hrs, Volume= 51,768 cf
Outflow = 1.33 cfs @ 14.14 hrs, Volume= 50,260 cf, Atten= 88%, Lag= 96.1 min
Primary = 1.33 cfs @ 14.14 hrs, Volume= 50,260 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 41,920 sf Storage= 152,896 cf
Peak Elev= 803.66' @ 14.14 hrs Surf.Area= 44,356 sf Storage= 181,218 cf (28,323 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 514.0 min (1,383.1 - 869.1)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	532,787 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	24,234	0	0
802.00	33,387	115,242	115,242
803.00	41,920	37,654	152,896
805.00	49,340	91,260	244,156
806.00	58,658	53,999	298,155
810.00	58,658	234,632	532,787

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.33 cfs @ 14.14 hrs HW=803.66' TW=801.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.33 cfs @ 2.43 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=803.00' TW=800.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.4: Summers Landing POND 2 SOUTH

Inflow = 6.18 cfs @ 12.53 hrs, Volume= 27,896 cf
Outflow = 0.75 cfs @ 14.04 hrs, Volume= 27,031 cf, Atten= 88%, Lag= 90.7 min
Primary = 0.75 cfs @ 14.04 hrs, Volume= 27,031 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 31,846 sf Storage= 105,243 cf
Peak Elev= 803.47' @ 14.04 hrs Surf.Area= 33,782 sf Storage= 120,749 cf (15,506 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 533.6 min (1,396.8 - 863.2)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	324,420 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	15,145	0	0
802.00	23,612	77,514	77,514
803.00	31,846	27,729	105,243
805.00	40,039	71,885	177,128
806.00	50,909	45,474	222,602
808.00	50,909	101,818	324,420

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.75 cfs @ 14.04 hrs HW=803.47' TW=801.89' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.75 cfs @ 2.07 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=803.00' TW=800.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.5: Summers Landing 29l

Inflow = 2.08 cfs @ 14.10 hrs, Volume= 77,290 cf
Outflow = 1.31 cfs @ 17.47 hrs, Volume= 77,164 cf, Atten= 37%, Lag= 202.6 min
Discarded = 1.21 cfs @ 17.47 hrs, Volume= 76,091 cf
Primary = 0.10 cfs @ 17.47 hrs, Volume= 1,073 cf
Routed to Pond A-P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 803.18' @ 17.47 hrs Surf.Area= 9,028 sf Storage= 16,599 cf

Plug-Flow detention time= 224.9 min calculated for 77,162 cf (100% of inflow)
Center-of-Mass det. time= 217.5 min (1,605.4 - 1,387.9)

Volume	Invert	Avail.Storage	Storage Description
#1	800.00'	112,832 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.00	2,718	0	0
802.00	5,260	7,978	7,978
803.00	8,713	6,987	14,965
805.00	12,132	20,845	35,810
806.00	15,768	13,950	49,760
810.00	15,768	63,072	112,832

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**18.0" Round Culvert** L= 750.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 801.00' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Tertiary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Discarded	800.01'	**8.300 in/hr Exfiltration over Surface area above 800.01'** Excluded Surface area = 2,731 sf

Discarded OutFlow Max=1.21 cfs @ 17.47 hrs HW=803.18' (Free Discharge)
3=Exfiltration (Exfiltration Controls 1.21 cfs)

Primary OutFlow Max=0.10 cfs @ 17.47 hrs HW=803.18' TW=751.24' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.10 cfs @ 1.27 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.00' TW=803.00' (Dynamic Tailwater)
2=Culvert (Controls 0.00 cfs)

Summary for Link N: (new Link)

Inflow Area = 575,710 sf, 0.00% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link S: (new Link)

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link W: Offsite Discharge

Inflow Area = 755,633 sf, 0.32% Impervious, Inflow Depth = 0.34" for 2-yr event
Inflow = 3.48 cfs @ 12.60 hrs, Volume= 21,134 cf
Primary = 3.48 cfs @ 12.60 hrs, Volume= 21,134 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Subcatchment A: A

Runoff = 11.51 cfs @ 12.57 hrs, Volume= 58,924 cf, Depth= 0.74"
Routed to Pond A-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	720,950	67	Cropland, HSG A
*	203,104	30	Woods, HSG A
*	32,845	30	Meadow_Undisturbed, HSG A
*	170	98	Impervious, HSG A
	957,069	58	Weighted Average
	956,899		99.98% Pervious Area
	170		0.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment AE: AE

Runoff = 1.74 cfs @ 12.57 hrs, Volume= 9,481 cf, Depth= 0.64"
Routed to Pond A-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	52,870	30	Woods, HSG A
*	66,206	75	Single Family Residential, HSG A
*	25,924	58	Meadow, HSG A
*	19,102	30	Meadow_Undisturbed, HSG A
*	13,254	98	Impervious, HSG A
	177,356	56	Weighted Average
	164,102		92.53% Pervious Area
	13,254		7.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment B: B

Runoff = 7.56 cfs @ 12.53 hrs, Volume= 35,481 cf, Depth= 0.95"
Routed to Pond B-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	392,179	67	Cropland, HSG A
*	54,125	30	Woods, HSG A
*	1,476	30	Meadow_Undisturbed, HSG A
*	434	98	Impervious, HSG A
	448,213	62	Weighted Average
	447,779		99.90% Pervious Area
	434		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment BN: BN

Runoff = 2.44 cfs @ 12.63 hrs, Volume= 15,693 cf, Depth= 0.46"
Routed to Pond B-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	240,073	67	Cropland, HSG A
*	67,105	30	Woods, HSG A
*	98,892	30	Meadow_Undisturbed, HSG A
	406,070	52	Weighted Average
	406,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment C: C

Runoff = 1.04 cfs @ 12.77 hrs, Volume= 10,247 cf, Depth= 0.24"
Routed to Pond C-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	220,908	67	Cropland, HSG A
*	242,386	30	Woods, HSG A
*	44,136	30	Meadow_Undisturbed, HSG A
	507,431	46	Weighted Average
	507,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment CE: CE

Runoff = 0.86 cfs @ 12.63 hrs, Volume= 6,225 cf, Depth= 0.38"
Routed to Pond C-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	72,622	30	Woods, HSG A
*	73,058	75	Single Family Residential, HSG A
*	41,418	30	Meadow_Undisturbed, HSG A
*	7,599	98	Impervious, HSG A
	194,698	50	Weighted Average
	187,099		96.10% Pervious Area
	7,599		3.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment D: D

Runoff = 0.02 cfs @ 18.77 hrs, Volume= 509 cf, Depth= 0.02"
Routed to Link N : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	51,784	67	Cropland, HSG A
*	216,874	30	Woods, HSG A
*	38,391	30	Meadow_Undisturbed, HSG A
	307,049	36	Weighted Average
	307,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment DN: DN

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link N : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	173,230	30	Woods, HSG A
*	95,432	30	Meadow_Undisturbed, HSG A
	268,661	30	Weighted Average
	268,661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment E: E

Runoff = 2.82 cfs @ 12.57 hrs, Volume= 14,857 cf, Depth= 0.69"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	473	96	Gravel, HSG A
*	184,092	67	Cropland, HSG A
*	49,991	30	Woods, HSG A
*	21,631	30	Meadow_Undisturbed, HSG A
*	2,411	98	Impervious, HSG A
	258,596	57	Weighted Average
	256,186		99.07% Pervious Area
	2,411		0.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment F: F

Runoff = 10.39 cfs @ 12.50 hrs, Volume= 46,495 cf, Depth= 1.12"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	616	96	Gravel, HSG A
*	470,977	67	Cropland, HSG A
*	22,431	30	Woods, HSG A
*	2,971	30	Meadow_Undisturbed, HSG A
*	41	98	Impervious, HSG A
	497,036	65	Weighted Average
	496,995		99.99% Pervious Area
	41		0.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment G: G

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	10,162	30	Woods, HSG A
	10,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment GE: GE

Runoff = 0.01 cfs @ 18.77 hrs, Volume= 298 cf, Depth= 0.02"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	100,409	30	Woods, HSG A
*	18,876	75	Single Family Residential, HSG A
*	58,143	30	Meadow_Undisturbed, HSG A
*	2,324	98	Impervious, HSG A
	179,752	36	Weighted Average
	177,428		98.71% Pervious Area
	2,324		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment SW-A4.1: NE QUAD

Runoff = 50.15 cfs @ 12.50 hrs, Volume= 206,740 cf, Depth= 1.79"
Routed to Pond SW-P4.1 : summers landing 30P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	10.250	98	Paved Parking, HSG B
*	1.530	98	Water Surface, HSG B
*	20.080	61	>75% Grass Cover, HSG B
	31.860	75	Weighted Average
	20.080		63.03% Pervious Area
	11.780		36.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.3: NW QUAD

Runoff = 51.75 cfs @ 12.50 hrs, Volume= 215,160 cf, Depth= 1.64"
Routed to Pond SW-P4.3 : Summers landing 31P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	10.510	98	Paved Parking, HSG B
*	23.970	61	>75% Grass cover, Good
*	1.590	98	Water Surface, HSG B
	36.070	73	Weighted Average
	23.970		66.45% Pervious Area
	12.100		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.1: SE QUAD

Runoff = 44.18 cfs @ 12.50 hrs, Volume= 184,693 cf, Depth= 1.57"
Routed to Pond SW-P5.1 : Summers landing 28P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	8.430	98	
*	22.650	61	
*	1.260	98	
	32.340	72	Weighted Average
	22.650		70.04% Pervious Area
	9.690		29.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.3: SW QUAD N

Runoff = 28.81 cfs @ 12.50 hrs, Volume= 121,203 cf, Depth= 1.50"
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	5.230	98	
*	16.000	61	
*	0.960	98	
	22.190	71	Weighted Average
	16.000		72.10% Pervious Area
	6.190		27.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.4: SW QUAD S

Runoff = 15.08 cfs @ 12.50 hrs, Volume= 62,693 cf, Depth= 1.64"
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	2.560	98	
*	7.220	61	
*	0.730	98	
	10.510	73	Weighted Average
	7.220		68.70% Pervious Area
	3.290		31.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Pond A-P: (new Pond)

[80] Warning: Exceeded Pond B-P by 0.12' @ 19.53 hrs (7.22 cfs 170,933 cf)

Inflow = 13.25 cfs @ 12.57 hrs, Volume= 203,628 cf
Outflow = 2.95 cfs @ 20.82 hrs, Volume= 86,801 cf, Atten= 78%, Lag= 495.3 min
Primary = 2.95 cfs @ 20.82 hrs, Volume= 86,801 cf
Routed to Link S : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.14' @ 20.82 hrs Surf.Area= 195,674 sf Storage= 142,717 cf

Plug-Flow detention time= 653.7 min calculated for 86,801 cf (43% of inflow)
Center-of-Mass det. time= 436.7 min (1,492.1 - 1,055.5)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	327,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	43,080	0	0
752.00	190,165	116,623	116,623
753.00	230,890	210,528	327,150

Device	Routing	Invert	Outlet Devices
#1	Primary	752.00'	**20.0' long + 20.0 '/' SideZ x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.95 cfs @ 20.82 hrs HW=752.14' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.95 cfs @ 0.96 fps)

Summary for Pond B-P: (new Pond)

[86] Warning: Oscillations may require smaller dt (severity=4971)

Inflow Area = 854,283 sf, 0.05% Impervious, Inflow Depth = 0.72" for 10-yr event
Inflow = 9.91 cfs @ 12.57 hrs, Volume= 51,174 cf
Outflow = 0.41 cfs @ 16.59 hrs, Volume= 6,663 cf, Atten= 96%, Lag= 241.4 min
Primary = 0.41 cfs @ 16.59 hrs, Volume= 6,663 cf
Routed to Pond A-P : (new Pond)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.07' @ 25.67 hrs Surf.Area= 75,423 sf Storage= 49,878 cf

Plug-Flow detention time= 1,120.9 min calculated for 6,663 cf (13% of inflow)
Center-of-Mass det. time= 982.9 min (1,863.4 - 880.5)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	134,145 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	15,900	0	0
752.00	72,965	44,433	44,433
753.00	106,459	89,712	134,145

Device	Routing	Invert	Outlet Devices
#1	Primary	751.90'	**30.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.41 cfs @ 16.59 hrs HW=751.93' TW=751.90' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.41 cfs @ 0.44 fps)

Summary for Pond C-P: (new Pond)

Inflow Area = 702,129 sf, 1.08% Impervious, Inflow Depth = 0.28" for 10-yr event
Inflow = 1.87 cfs @ 12.70 hrs, Volume= 16,473 cf
Outflow = 0.14 cfs @ 21.73 hrs, Volume= 2,086 cf, Atten= 92%, Lag= 541.7 min
Primary = 0.14 cfs @ 21.73 hrs, Volume= 2,086 cf
Routed to Pond A-P : (new Pond)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.61' @ 21.73 hrs Surf.Area= 42,640 sf Storage= 14,895 cf

Plug-Flow detention time= 626.6 min calculated for 2,086 cf (13% of inflow)
Center-of-Mass det. time= 446.8 min (1,380.9 - 934.0)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	128,974 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	6,033	0	0
753.00	65,844	35,939	35,939
754.00	120,226	93,035	128,974

Device	Routing	Invert	Outlet Devices
#1	Primary	752.60'	**40.0' long + 50.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.14 cfs @ 21.73 hrs HW=752.61' TW=752.13' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.14 cfs @ 0.29 fps)

Summary for Pond SW-P1: SW-P1

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	87.505 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
810.00	6.048	0.000	0.000
812.00	6.451	12.499	12.499
814.00	6.854	13.305	25.804
816.00	7.284	14.138	39.942
820.00	8.131	30.830	70.772
822.00	8.602	16.733	87.505

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**12.0" Round Culvert** L= 80.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=747.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Summary for Pond SW-P2: SW-P2

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to nonexistent node SW-P3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 747.00' @ 0.00 hrs Surf.Area= 6.476 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	747.00'	67.788 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
747.00	6.476	0.000	0.000
749.00	7.070	13.546	13.546
751.00	7.538	14.608	28.154
753.00	8.024	15.562	43.716
756.00	8.024	24.072	67.788

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**21.0" Round Culvert** L= 500.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 746.00' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=747.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Summary for Pond SW-P4.1: summers landing 30P

Inflow = 50.15 cfs @ 12.50 hrs, Volume= 206,740 cf
Outflow = 7.77 cfs @ 13.66 hrs, Volume= 173,272 cf, Atten= 85%, Lag= 69.5 min
Primary = 3.10 cfs @ 13.66 hrs, Volume= 136,975 cf
Routed to Pond SW-P4.2 : Summers landing 30PI
Secondary = 4.67 cfs @ 13.66 hrs, Volume= 36,297 cf
Routed to Pond SW-P4.2 : Summers landing 30PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 808.50' Surf.Area= 1.284 ac Storage= 4.283 af
Peak Elev= 810.36' @ 13.66 hrs Surf.Area= 1.655 ac Storage= 7.085 af (2.802 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 456.6 min (1,296.9 - 840.4)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	11.323 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
804.00	0.730	0.000	0.000
808.00	1.112	3.684	3.684
809.00	1.456	1.284	4.968
811.00	1.749	3.205	8.173
812.00	2.121	1.935	10.108
812.50	2.738	1.215	11.323

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**12.0" Round Culvert** L= 35.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 808.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.10 cfs @ 13.66 hrs HW=810.36' TW=807.71' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.10 cfs @ 3.94 fps)

Secondary OutFlow Max=4.67 cfs @ 13.66 hrs HW=810.36' TW=807.71' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 4.67 cfs @ 1.62 fps)

Summary for Pond SW-P4.2: Summers landing 30PI

Inflow = 7.77 cfs @ 13.66 hrs, Volume= 173,272 cf
Outflow = 3.71 cfs @ 15.80 hrs, Volume= 172,906 cf, Atten= 52%, Lag= 128.5 min
Discarded = 2.12 cfs @ 15.80 hrs, Volume= 150,551 cf
Primary = 1.59 cfs @ 15.80 hrs, Volume= 22,355 cf
Routed to Pond SW-P4.3 : Summers landing 31P
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.1 : summers landing 30P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 809.66' @ 15.80 hrs Surf.Area= 16,324 sf Storage= 44,134 cf

Plug-Flow detention time= 312.9 min calculated for 172,903 cf (100% of inflow)
Center-of-Mass det. time= 303.4 min (1,600.3 - 1,296.9)

Volume	Invert	Avail.Storage	Storage Description
#1	805.00'	124,959 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
805.00	5,274	0	0
808.00	9,331	21,908	21,908
809.00	14,735	12,033	33,941
811.00	19,577	34,312	68,253
812.00	22,804	21,191	89,443
812.50	119,260	35,516	124,959

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**15.0" Round Culvert** L= 661.0' Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.50' S= 0.0068 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	805.01'	**8.300 in/hr Exfiltration over Surface area above 805.01'** Excluded Surface area = 5,288 sf

Discarded OutFlow Max=2.12 cfs @ 15.80 hrs HW=809.66' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.12 cfs)

Primary OutFlow Max=1.59 cfs @ 15.80 hrs HW=809.66' TW=805.74' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.59 cfs @ 2.43 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=808.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.3: Summers landing 31P

Inflow = 51.75 cfs @ 12.50 hrs, Volume= 237,515 cf
Outflow = 11.03 cfs @ 13.39 hrs, Volume= 233,098 cf, Atten= 79%, Lag= 53.4 min
Primary = 3.34 cfs @ 13.39 hrs, Volume= 158,171 cf
Routed to Pond SW-P4.4 : Summers landing 31PI
Tertiary = 7.69 cfs @ 13.39 hrs, Volume= 74,927 cf
Routed to Pond SW-P4.4 : Summers landing 31PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 804.50' Surf.Area= 69,445 sf Storage= 195,814 cf
Peak Elev= 806.00' @ 13.39 hrs Surf.Area= 79,547 sf Storage= 307,715 cf (111,901 cf above start)

Plug-Flow detention time= 1,739.9 min calculated for 37,283 cf (16% of inflow)
Center-of-Mass det. time= 410.5 min (1,274.0 - 863.5)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	805,360 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	35,945	0	0
803.50	53,587	134,298	134,298
804.50	69,445	61,516	195,814
806.50	82,896	152,341	348,155
807.50	100,885	91,891	440,046
808.00	104,644	51,382	491,428
811.00	104,644	313,932	805,360

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.34 cfs @ 13.39 hrs HW=806.00' TW=802.75' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.34 cfs @ 4.25 fps)

Tertiary OutFlow Max=7.69 cfs @ 13.39 hrs HW=806.00' TW=802.75' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 7.69 cfs @ 1.91 fps)

Summary for Pond SW-P4.4: Summers landing 31PI

Inflow = 11.03 cfs @ 13.39 hrs, Volume= 233,098 cf
Outflow = 4.44 cfs @ 16.32 hrs, Volume= 232,540 cf, Atten= 60%, Lag= 175.9 min
Discarded = 2.65 cfs @ 16.32 hrs, Volume= 201,167 cf
Primary = 1.79 cfs @ 16.32 hrs, Volume= 31,373 cf
Routed to Pond A-P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 805.27' @ 16.32 hrs Surf.Area= 22,182 sf Storage= 66,581 cf

Plug-Flow detention time= 369.1 min calculated for 232,540 cf (100% of inflow)
Center-of-Mass det. time= 358.4 min (1,632.4 - 1,274.0)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	215,575 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	8,380	0	0
803.50	13,880	33,390	33,390
804.50	19,929	16,905	50,295
806.50	25,755	45,684	95,979
807.50	34,193	29,974	125,953
808.00	36,033	17,557	143,509
810.00	36,033	72,066	215,575

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**15.0" Round Culvert** L= 1,010.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 801.00' S= 0.0035 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	800.51'	**8.300 in/hr Exfiltration over Surface area above 800.51'** Excluded Surface area = 8,398 sf

Discarded OutFlow Max=2.65 cfs @ 16.32 hrs HW=805.27' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.65 cfs)

Primary OutFlow Max=1.79 cfs @ 16.32 hrs HW=805.27' TW=751.87' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.79 cfs @ 3.21 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=804.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.1: Summers landing 28P

Inflow = 44.18 cfs @ 12.50 hrs, Volume= 184,693 cf
Outflow = 9.41 cfs @ 13.41 hrs, Volume= 182,251 cf, Atten= 79%, Lag= 54.4 min
Primary = 3.88 cfs @ 13.41 hrs, Volume= 132,663 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI
Secondary = 5.53 cfs @ 13.41 hrs, Volume= 49,588 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 55,104 sf Storage= 141,054 cf
Peak Elev= 807.55' @ 13.41 hrs Surf.Area= 65,611 sf Storage= 234,697 cf (93,643 cf above start)

Plug-Flow detention time= 1,280.4 min calculated for 41,197 cf (22% of inflow)
Center-of-Mass det. time= 368.3 min (1,214.8 - 846.4)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	432,852 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
802.00	23,396	0	0
805.00	39,204	93,900	93,900
806.00	55,104	47,154	141,054
808.00	68,648	123,752	264,806
809.00	86,609	77,629	342,435
810.00	94,225	90,417	432,852

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 806.00' / 805.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	807.00'	**5.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.88 cfs @ 13.41 hrs HW=807.55' TW=805.82' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.88 cfs @ 4.94 fps)

Secondary OutFlow Max=5.53 cfs @ 13.41 hrs HW=807.55' TW=805.82' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 5.53 cfs @ 2.01 fps)

Summary for Pond SW-P5.2: Summers Landing 28Pl

Inflow = 9.41 cfs @ 13.41 hrs, Volume= 182,251 cf
Outflow = 4.51 cfs @ 15.13 hrs, Volume= 205,375 cf, Atten= 52%, Lag= 103.4 min
Discarded = 2.23 cfs @ 15.14 hrs, Volume= 166,435 cf
Primary = 2.28 cfs @ 15.13 hrs, Volume= 38,940 cf
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.1 : Summers landing 28P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 16,338 sf Storage= 23,268 cf
Peak Elev= 807.06' @ 15.14 hrs Surf.Area= 18,616 sf Storage= 41,734 cf (18,466 cf above start)

Plug-Flow detention time= 184.1 min calculated for 182,104 cf (100% of inflow)
Center-of-Mass det. time= 42.7 min (1,257.5 - 1,214.8)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	141,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.00	6,954	0	0
805.00	11,622	9,288	9,288
806.00	16,338	13,980	23,268
808.00	20,651	36,989	60,257
809.00	26,716	23,684	83,941
810.00	29,463	28,090	112,030
811.00	29,463	29,463	141,493

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 622.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	807.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	804.01'	**8.300 in/hr Exfiltration over Surface area above 804.01'** Excluded Surface area = 7,001 sf

Discarded OutFlow Max=2.23 cfs @ 15.14 hrs HW=807.06' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.23 cfs)

Primary OutFlow Max=2.28 cfs @ 15.13 hrs HW=807.06' TW=804.42' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.28 cfs @ 3.42 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.3: Summers landing POND 2 NORTH

Inflow = 28.81 cfs @ 12.50 hrs, Volume= 160,143 cf
Outflow = 5.35 cfs @ 13.51 hrs, Volume= 158,495 cf, Atten= 81%, Lag= 60.3 min
Primary = 3.19 cfs @ 13.51 hrs, Volume= 116,188 cf
Routed to Pond SW-P5.5 : Summers Landing 29I
Tertiary = 2.19 cfs @ 15.27 hrs, Volume= 42,306 cf
Routed to Pond SW-P5.5 : Summers Landing 29I

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 41,920 sf Storage= 152,896 cf
Peak Elev= 804.43' @ 15.32 hrs Surf.Area= 47,210 sf Storage= 216,438 cf (63,543 cf above start)

Plug-Flow detention time= 2,705.4 min calculated for 5,599 cf (3% of inflow)
Center-of-Mass det. time= 355.1 min (1,245.7 - 890.6)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	532,787 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	24,234	0	0
802.00	33,387	115,242	115,242
803.00	41,920	37,654	152,896
805.00	49,340	91,260	244,156
806.00	58,658	53,999	298,155
810.00	58,658	234,632	532,787

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.19 cfs @ 13.51 hrs HW=804.41' TW=803.50' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.19 cfs @ 4.06 fps)

Tertiary OutFlow Max=2.19 cfs @ 15.27 hrs HW=804.43' TW=804.07' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 2.19 cfs @ 1.71 fps)

Summary for Pond SW-P5.4: Summers Landing POND 2 SOUTH

Inflow = 15.08 cfs @ 12.50 hrs, Volume= 62,693 cf
Outflow = 2.35 cfs @ 13.49 hrs, Volume= 61,735 cf, Atten= 84%, Lag= 59.4 min
Primary = 2.35 cfs @ 13.49 hrs, Volume= 59,670 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Secondary = 0.18 cfs @ 16.06 hrs, Volume= 2,065 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 31,846 sf Storage= 105,243 cf
Peak Elev= 804.10' @ 15.64 hrs Surf.Area= 36,362 sf Storage= 142,840 cf (37,597 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 554.7 min (1,399.1 - 844.4)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	324,420 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	15,145	0	0
802.00	23,612	77,514	77,514
803.00	31,846	27,729	105,243
805.00	40,039	71,885	177,128
806.00	50,909	45,474	222,602
808.00	50,909	101,818	324,420

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.34 cfs @ 13.49 hrs HW=803.99' TW=803.47' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.34 cfs @ 3.73 fps)

Secondary OutFlow Max=0.18 cfs @ 16.06 hrs HW=804.10' TW=804.07' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.18 cfs @ 0.60 fps)

Summary for Pond SW-P5.5: Summers Landing 29l

Inflow = 7.70 cfs @ 13.49 hrs, Volume= 220,229 cf
Outflow = 4.80 cfs @ 15.59 hrs, Volume= 220,081 cf, Atten= 38%, Lag= 125.9 min
Discarded = 1.50 cfs @ 15.59 hrs, Volume= 124,981 cf
Primary = 3.29 cfs @ 15.59 hrs, Volume= 95,100 cf
Routed to Pond A-P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 804.08' @ 15.59 hrs Surf.Area= 10,555 sf Storage= 25,348 cf

Plug-Flow detention time= 141.1 min calculated for 220,081 cf (100% of inflow)
Center-of-Mass det. time= 138.1 min (1,426.7 - 1,288.7)

Volume	Invert	Avail.Storage	Storage Description
#1	800.00'	112,832 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.00	2,718	0	0
802.00	5,260	7,978	7,978
803.00	8,713	6,987	14,965
805.00	12,132	20,845	35,810
806.00	15,768	13,950	49,760
810.00	15,768	63,072	112,832

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**18.0" Round Culvert** L= 750.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 801.00' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Tertiary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Discarded	800.01'	**8.300 in/hr Exfiltration over Surface area above 800.01'** Excluded Surface area = 2,731 sf

Discarded OutFlow Max=1.50 cfs @ 15.59 hrs HW=804.08' (Free Discharge)
↑**3=Exfiltration** (Exfiltration Controls 1.50 cfs)

Primary OutFlow Max=3.29 cfs @ 15.59 hrs HW=804.08' TW=751.77' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 3.29 cfs @ 3.39 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.00' TW=803.00' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.00 cfs)

Summary for Link N: (new Link)

Inflow Area = 575,710 sf, 0.00% Impervious, Inflow Depth = 0.01" for 10-yr event
Inflow = 0.02 cfs @ 18.77 hrs, Volume= 509 cf
Primary = 0.02 cfs @ 18.77 hrs, Volume= 509 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link S: (new Link)

Inflow	=	2.96 cfs @	20.82 hrs,	Volume=	87,098 cf
Primary	=	2.96 cfs @	20.82 hrs,	Volume=	87,098 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link W: Offsite Discharge

Inflow Area = 755,633 sf, 0.32% Impervious, Inflow Depth = 0.97" for 10-yr event
Inflow = 13.16 cfs @ 12.53 hrs, Volume= 61,353 cf
Primary = 13.16 cfs @ 12.54 hrs, Volume= 61,353 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Subcatchment A: A

Runoff = 50.92 cfs @ 12.50 hrs, Volume= 214,141 cf, Depth= 2.68"
Routed to Pond A-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	720,950	67	Cropland, HSG A
*	203,104	30	Woods, HSG A
*	32,845	30	Meadow_Undisturbed, HSG A
*	170	98	Impervious, HSG A
	957,069	58	Weighted Average
	956,899		99.98% Pervious Area
	170		0.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment AE: AE

Runoff = 8.61 cfs @ 12.50 hrs, Volume= 36,688 cf, Depth= 2.48"
Routed to Pond A-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	52,870	30	Woods, HSG A
*	66,206	75	Single Family Residential, HSG A
*	25,924	58	Meadow, HSG A
*	19,102	30	Meadow_Undisturbed, HSG A
*	13,254	98	Impervious, HSG A
	177,356	56	Weighted Average
	164,102		92.53% Pervious Area
	13,254		7.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment B: B

Runoff = 28.01 cfs @ 12.50 hrs, Volume= 115,730 cf, Depth= 3.10"
Routed to Pond B-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	392,179	67	Cropland, HSG A
*	54,125	30	Woods, HSG A
*	1,476	30	Meadow_Undisturbed, HSG A
*	434	98	Impervious, HSG A
	448,213	62	Weighted Average
	447,779		99.90% Pervious Area
	434		0.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment BN: BN

Runoff = 15.96 cfs @ 12.50 hrs, Volume= 70,599 cf, Depth= 2.09"
Routed to Pond B-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	240,073	67	Cropland, HSG A
*	67,105	30	Woods, HSG A
*	98,892	30	Meadow_Undisturbed, HSG A
	406,070	52	Weighted Average
	406,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment C: C

Runoff = 13.22 cfs @ 12.56 hrs, Volume= 64,279 cf, Depth= 1.52"
Routed to Pond C-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	220,908	67	Cropland, HSG A
*	242,386	30	Woods, HSG A
*	44,136	30	Meadow_Undisturbed, HSG A
	507,431	46	Weighted Average
	507,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment CE: CE

Runoff = 6.77 cfs @ 12.53 hrs, Volume= 30,722 cf, Depth= 1.89"
Routed to Pond C-P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	72,622	30	Woods, HSG A
*	73,058	75	Single Family Residential, HSG A
*	41,418	30	Meadow_Undisturbed, HSG A
*	7,599	98	Impervious, HSG A
	194,698	50	Weighted Average
	187,099		96.10% Pervious Area
	7,599		3.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment D: D

Runoff = 2.43 cfs @ 12.63 hrs, Volume= 17,490 cf, Depth= 0.68"
Routed to Link N : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	51,784	67	Cropland, HSG A
*	216,874	30	Woods, HSG A
*	38,391	30	Meadow_Undisturbed, HSG A
	307,049	36	Weighted Average
	307,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment DN: DN

Runoff = 0.47 cfs @ 12.97 hrs, Volume= 6,417 cf, Depth= 0.29"
Routed to Link N : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	173,230	30	Woods, HSG A
*	95,432	30	Meadow_Undisturbed, HSG A
	268,661	30	Weighted Average
	268,661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment E: E

Runoff = 13.16 cfs @ 12.50 hrs, Volume= 55,669 cf, Depth= 2.58"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	473	96	Gravel, HSG A
*	184,092	67	Cropland, HSG A
*	49,991	30	Woods, HSG A
*	21,631	30	Meadow_Undisturbed, HSG A
*	2,411	98	Impervious, HSG A
	258,596	57	Weighted Average
	256,186		99.07% Pervious Area
	2,411		0.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment F: F

Runoff = 34.50 cfs @ 12.50 hrs, Volume= 141,447 cf, Depth= 3.41"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	616	96	Gravel, HSG A
*	470,977	67	Cropland, HSG A
*	22,431	30	Woods, HSG A
*	2,971	30	Meadow_Undisturbed, HSG A
*	41	98	Impervious, HSG A
	497,036	65	Weighted Average
	496,995		99.99% Pervious Area
	41		0.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment G: G

Runoff = 0.02 cfs @ 12.97 hrs, Volume= 243 cf, Depth= 0.29"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	10,162	30	Woods, HSG A
	10,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment GE: GE

Runoff = 1.42 cfs @ 12.63 hrs, Volume= 10,239 cf, Depth= 0.68"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	100,409	30	Woods, HSG A
*	18,876	75	Single Family Residential, HSG A
*	58,143	30	Meadow_Undisturbed, HSG A
*	2,324	98	Impervious, HSG A
	179,752	36	Weighted Average
	177,428		98.71% Pervious Area
	2,324		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment SW-A4.1: NE QUAD

Runoff = 127.55 cfs @ 12.47 hrs, Volume= 520,867 cf, Depth= 4.50"
Routed to Pond SW-P4.1 : summers landing 30P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	10.250	98	Paved Parking, HSG B
*	1.530	98	Water Surface, HSG B
*	20.080	61	>75% Grass Cover, HSG B
	31.860	75	Weighted Average
	20.080		63.03% Pervious Area
	11.780		36.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.3: NW QUAD

Runoff = 137.40 cfs @ 12.47 hrs, Volume= 560,690 cf, Depth= 4.28"
Routed to Pond SW-P4.3 : Summers landing 31P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	10.510	98	Paved Parking, HSG B
*	23.970	61	>75% Grass cover, Good
*	1.590	98	Water Surface, HSG B
	36.070	73	Weighted Average
	23.970		66.45% Pervious Area
	12.100		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.1: SE QUAD

Runoff = 120.03 cfs @ 12.50 hrs, Volume= 489,785 cf, Depth= 4.17"
Routed to Pond SW-P5.1 : Summers landing 28P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	8.430	98	
*	22.650	61	
*	1.260	98	
	32.340	72	Weighted Average
	22.650		70.04% Pervious Area
	9.690		29.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.3: SW QUAD N

Runoff = 80.22 cfs @ 12.50 hrs, Volume= 327,233 cf, Depth= 4.06"
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	5.230	98	
*	16.000	61	
*	0.960	98	
	22.190	71	Weighted Average
	16.000		72.10% Pervious Area
	6.190		27.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.4: SW QUAD S

Runoff = 40.03 cfs @ 12.47 hrs, Volume= 163,373 cf, Depth= 4.28"
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	2.560	98	
*	7.220	61	
*	0.730	98	
	10.510	73	Weighted Average
	7.220		68.70% Pervious Area
	3.290		31.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Pond A-P: (new Pond)

Inflow = 78.65 cfs @ 12.72 hrs, Volume= 1,249,025 cf
Outflow = 29.42 cfs @ 13.91 hrs, Volume= 1,132,124 cf, Atten= 63%, Lag= 71.4 min
Primary = 29.42 cfs @ 13.91 hrs, Volume= 1,132,124 cf
Routed to Link S : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.53' @ 13.91 hrs Surf.Area= 211,646 sf Storage= 222,594 cf

Plug-Flow detention time= 211.5 min calculated for 1,132,124 cf (91% of inflow)
Center-of-Mass det. time= 130.4 min (1,313.1 - 1,182.7)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	327,150 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	43,080	0	0
752.00	190,165	116,623	116,623
753.00	230,890	210,528	327,150

Device	Routing	Invert	Outlet Devices
#1	Primary	752.00'	**20.0' long + 20.0 '/' SideZ x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=29.42 cfs @ 13.91 hrs HW=752.53' TW=0.00' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 29.42 cfs @ 1.83 fps)

Summary for Pond B-P: (new Pond)

[86] Warning: Oscillations may require smaller dt (severity=1045)

Inflow Area = 854,283 sf, 0.05% Impervious, Inflow Depth = 2.62" for 100-yr(7.4") event
Inflow = 43.96 cfs @ 12.50 hrs, Volume= 186,329 cf
Outflow = 19.10 cfs @ 12.79 hrs, Volume= 141,789 cf, Atten= 57%, Lag= 17.1 min
Primary = 19.10 cfs @ 12.79 hrs, Volume= 141,789 cf
Routed to Pond A-P : (new Pond)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.53' @ 13.91 hrs Surf.Area= 90,679 sf Storage= 87,704 cf

Plug-Flow detention time= 385.5 min calculated for 141,789 cf (76% of inflow)
Center-of-Mass det. time= 309.4 min (1,157.9 - 848.5)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	134,145 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	15,900	0	0
752.00	72,965	44,433	44,433
753.00	106,459	89,712	134,145

Device	Routing	Invert	Outlet Devices
#1	Primary	751.90'	**30.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=19.03 cfs @ 12.79 hrs HW=752.30' TW=752.08' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 19.03 cfs @ 1.40 fps)

Summary for Pond C-P: (new Pond)

Inflow Area = 702,129 sf, 1.08% Impervious, Inflow Depth = 1.62" for 100-yr(7.4") event
Inflow = 19.99 cfs @ 12.53 hrs, Volume= 95,001 cf
Outflow = 13.22 cfs @ 12.82 hrs, Volume= 80,614 cf, Atten= 34%, Lag= 17.3 min
Primary = 13.22 cfs @ 12.82 hrs, Volume= 80,614 cf
Routed to Pond A-P : (new Pond)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.82' @ 12.82 hrs Surf.Area= 54,913 sf Storage= 24,904 cf

Plug-Flow detention time= 107.4 min calculated for 80,614 cf (85% of inflow)
Center-of-Mass det. time= 45.9 min (917.0 - 871.2)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	128,974 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	6,033	0	0
753.00	65,844	35,939	35,939
754.00	120,226	93,035	128,974

Device	Routing	Invert	Outlet Devices
#1	Primary	752.60'	**40.0' long + 50.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=13.22 cfs @ 12.82 hrs HW=752.82' TW=752.13' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 13.22 cfs @ 1.20 fps)

Summary for Pond SW-P1: SW-P1

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	87.505 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
810.00	6.048	0.000	0.000
812.00	6.451	12.499	12.499
814.00	6.854	13.305	25.804
816.00	7.284	14.138	39.942
820.00	8.131	30.830	70.772
822.00	8.602	16.733	87.505

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**12.0" Round Culvert** L= 80.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=747.00' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond SW-P2: SW-P2

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to nonexistent node SW-P3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 747.00' @ 0.00 hrs Surf.Area= 6.476 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	747.00'	67.788 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
747.00	6.476	0.000	0.000
749.00	7.070	13.546	13.546
751.00	7.538	14.608	28.154
753.00	8.024	15.562	43.716
756.00	8.024	24.072	67.788

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**21.0" Round Culvert** L= 500.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 746.00' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=747.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Summary for Pond SW-P4.1: summers landing 30P

Inflow = 127.55 cfs @ 12.47 hrs, Volume= 520,867 cf
Outflow = 52.16 cfs @ 12.80 hrs, Volume= 487,120 cf, Atten= 59%, Lag= 19.8 min
Primary = 4.92 cfs @ 12.75 hrs, Volume= 106,678 cf
Routed to Pond SW-P4.2 : Summers landing 30PI
Secondary = 47.83 cfs @ 12.80 hrs, Volume= 380,442 cf
Routed to Pond SW-P4.2 : Summers landing 30PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 808.50' Surf.Area= 1.284 ac Storage= 4.283 af
Peak Elev= 812.11' @ 13.89 hrs Surf.Area= 2.261 ac Storage= 10.357 af (6.074 af above start)

Plug-Flow detention time= 685.1 min calculated for 300,546 cf (58% of inflow)
Center-of-Mass det. time= 367.3 min (1,188.8 - 821.5)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	11.323 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
804.00	0.730	0.000	0.000
808.00	1.112	3.684	3.684
809.00	1.456	1.284	4.968
811.00	1.749	3.205	8.173
812.00	2.121	1.935	10.108
812.50	2.738	1.215	11.323

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**12.0" Round Culvert** L= 35.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 808.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.92 cfs @ 12.75 hrs HW=811.68' TW=809.50' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.92 cfs @ 6.26 fps)

Secondary OutFlow Max=47.76 cfs @ 12.80 hrs HW=811.73' TW=810.08' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 47.76 cfs @ 3.45 fps)

Summary for Pond SW-P4.2: Summers landing 30PI

Inflow = 52.16 cfs @ 12.80 hrs, Volume= 487,120 cf
Outflow = 12.24 cfs @ 13.92 hrs, Volume= 486,697 cf, Atten= 77%, Lag= 67.3 min
Discarded = 6.93 cfs @ 13.93 hrs, Volume= 258,854 cf
Primary = 5.38 cfs @ 13.33 hrs, Volume= 227,843 cf
Routed to Pond SW-P4.3 : Summers landing 31P
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.1 : summers landing 30P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 812.10' @ 13.93 hrs Surf.Area= 41,355 sf Storage= 92,528 cf

Plug-Flow detention time= 199.7 min calculated for 486,687 cf (100% of inflow)
Center-of-Mass det. time= 195.7 min (1,384.5 - 1,188.8)

Volume	Invert	Avail.Storage	Storage Description
#1	805.00'	124,959 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
805.00	5,274	0	0
808.00	9,331	21,908	21,908
809.00	14,735	12,033	33,941
811.00	19,577	34,312	68,253
812.00	22,804	21,191	89,443
812.50	119,260	35,516	124,959

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**15.0" Round Culvert** L= 661.0' Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.50' S= 0.0068 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	805.01'	**8.300 in/hr Exfiltration over Surface area above 805.01'** Excluded Surface area = 5,288 sf

Discarded OutFlow Max=6.93 cfs @ 13.93 hrs HW=812.10' (Free Discharge)
3=Exfiltration (Exfiltration Controls 6.93 cfs)

Primary OutFlow Max=5.38 cfs @ 13.33 hrs HW=811.98' TW=807.55' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.38 cfs @ 4.39 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=808.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.3: Summers landing 31P

Inflow = 137.40 cfs @ 12.47 hrs, Volume= 788,533 cf
Outflow = 59.78 cfs @ 12.84 hrs, Volume= 783,375 cf, Atten= 56%, Lag= 22.3 min
Primary = 5.13 cfs @ 12.78 hrs, Volume= 122,966 cf
Routed to Pond SW-P4.4 : Summers landing 31PI
Tertiary = 55.21 cfs @ 12.84 hrs, Volume= 660,409 cf
Routed to Pond SW-P4.4 : Summers landing 31PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 804.50' Surf.Area= 69,445 sf Storage= 195,814 cf
Peak Elev= 807.92' @ 15.67 hrs Surf.Area= 104,061 sf Storage= 483,340 cf (287,526 cf above start)

Plug-Flow detention time= 689.8 min calculated for 587,561 cf (75% of inflow)
Center-of-Mass det. time= 394.2 min (1,312.7 - 918.5)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	805,360 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	35,945	0	0
803.50	53,587	134,298	134,298
804.50	69,445	61,516	195,814
806.50	82,896	152,341	348,155
807.50	100,885	91,891	440,046
808.00	104,644	51,382	491,428
811.00	104,644	313,932	805,360

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.13 cfs @ 12.78 hrs HW=807.36' TW=805.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.13 cfs @ 6.53 fps)

Tertiary OutFlow Max=55.16 cfs @ 12.84 hrs HW=807.40' TW=805.56' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 55.16 cfs @ 3.62 fps)

Summary for Pond SW-P4.4: Summers landing 31PI

Inflow = 59.78 cfs @ 12.84 hrs, Volume= 783,374 cf
Outflow = 10.27 cfs @ 15.69 hrs, Volume= 782,600 cf, Atten= 83%, Lag= 170.7 min
Discarded = 5.25 cfs @ 15.69 hrs, Volume= 448,387 cf
Primary = 5.02 cfs @ 15.69 hrs, Volume= 334,213 cf
Routed to Pond A-P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 807.92' @ 15.69 hrs Surf.Area= 35,720 sf Storage= 140,462 cf

Plug-Flow detention time= 251.4 min calculated for 782,585 cf (100% of inflow)
Center-of-Mass det. time= 247.1 min (1,559.8 - 1,312.7)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	215,575 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	8,380	0	0
803.50	13,880	33,390	33,390
804.50	19,929	16,905	50,295
806.50	25,755	45,684	95,979
807.50	34,193	29,974	125,953
808.00	36,033	17,557	143,509
810.00	36,033	72,066	215,575

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**15.0" Round Culvert** L= 1,010.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 801.00' S= 0.0035 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	800.51'	**8.300 in/hr Exfiltration over Surface area above 800.51'** Excluded Surface area = 8,398 sf

Discarded OutFlow Max=5.25 cfs @ 15.69 hrs HW=807.92' (Free Discharge)
3=Exfiltration (Exfiltration Controls 5.25 cfs)

Primary OutFlow Max=5.02 cfs @ 15.69 hrs HW=807.92' TW=752.46' (Dynamic Tailwater)
1=Culvert (Barrel Controls 5.02 cfs @ 4.09 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=804.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.1: Summers landing 28P

Inflow = 120.03 cfs @ 12.50 hrs, Volume= 489,785 cf
Outflow = 42.62 cfs @ 12.77 hrs, Volume= 486,957 cf, Atten= 64%, Lag= 16.5 min
Primary = 5.83 cfs @ 12.68 hrs, Volume= 113,504 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI
Secondary = 37.57 cfs @ 12.79 hrs, Volume= 373,452 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 55,104 sf Storage= 141,054 cf
Peak Elev= 809.54' @ 15.19 hrs Surf.Area= 90,694 sf Storage= 389,980 cf (248,926 cf above start)

Plug-Flow detention time= 743.3 min calculated for 345,903 cf (71% of inflow)
Center-of-Mass det. time= 463.5 min (1,289.6 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	432,852 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
802.00	23,396	0	0
805.00	39,204	93,900	93,900
806.00	55,104	47,154	141,054
808.00	68,648	123,752	264,806
809.00	86,609	77,629	342,435
810.00	94,225	90,417	432,852

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 806.00' / 805.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	807.00'	**5.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.81 cfs @ 12.68 hrs HW=808.88' TW=806.51' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.81 cfs @ 7.40 fps)

Secondary OutFlow Max=37.50 cfs @ 12.79 hrs HW=809.04' TW=807.31' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 37.50 cfs @ 3.67 fps)

Summary for Pond SW-P5.2: Summers Landing 28Pl

Inflow = 42.62 cfs @ 12.77 hrs, Volume= 486,957 cf
Outflow = 6.74 cfs @ 15.52 hrs, Volume= 510,055 cf, Atten= 84%, Lag= 164.7 min
Discarded = 4.07 cfs @ 15.21 hrs, Volume= 331,364 cf
Primary = 2.68 cfs @ 18.15 hrs, Volume= 178,691 cf
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.1 : Summers landing 28P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 16,338 sf Storage= 23,268 cf
Peak Elev= 809.53' @ 15.21 hrs Surf.Area= 28,170 sf Storage= 98,467 cf (75,199 cf above start)

Plug-Flow detention time= 206.7 min calculated for 486,778 cf (100% of inflow)
Center-of-Mass det. time= 145.0 min (1,434.7 - 1,289.6)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	141,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.00	6,954	0	0
805.00	11,622	9,288	9,288
806.00	16,338	13,980	23,268
808.00	20,651	36,989	60,257
809.00	26,716	23,684	83,941
810.00	29,463	28,090	112,030
811.00	29,463	29,463	141,493

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 622.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	807.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	804.01'	**8.300 in/hr Exfiltration over Surface area above 804.01'** Excluded Surface area = 7,001 sf

Discarded OutFlow Max=4.07 cfs @ 15.21 hrs HW=809.53' (Free Discharge)
3=Exfiltration (Exfiltration Controls 4.07 cfs)

Primary OutFlow Max=2.68 cfs @ 18.15 hrs HW=809.28' TW=805.96' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.68 cfs @ 3.41 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.3: Summers landing POND 2 NORTH

Inflow = 80.22 cfs @ 12.50 hrs, Volume= 505,924 cf
Outflow = 22.34 cfs @ 12.72 hrs, Volume= 503,996 cf, Atten= 72%, Lag= 13.4 min
Primary = 4.77 cfs @ 12.62 hrs, Volume= 140,392 cf
Routed to Pond SW-P5.5 : Summers Landing 29I
Tertiary = 18.53 cfs @ 12.76 hrs, Volume= 363,604 cf
Routed to Pond SW-P5.5 : Summers Landing 29I

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 41,920 sf Storage= 152,896 cf
Peak Elev= 806.41' @ 13.90 hrs Surf.Area= 58,658 sf Storage= 322,266 cf (169,370 cf above start)

Plug-Flow detention time= 719.2 min calculated for 351,093 cf (69% of inflow)
Center-of-Mass det. time= 311.1 min (1,317.6 - 1,006.6)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	532,787 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	24,234	0	0
802.00	33,387	115,242	115,242
803.00	41,920	37,654	152,896
805.00	49,340	91,260	244,156
806.00	58,658	53,999	298,155
810.00	58,658	234,632	532,787

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.76 cfs @ 12.62 hrs HW=805.55' TW=803.52' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.76 cfs @ 6.06 fps)

Tertiary OutFlow Max=18.47 cfs @ 12.76 hrs HW=805.88' TW=804.69' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 18.47 cfs @ 3.27 fps)

Summary for Pond SW-P5.4: Summers Landing POND 2 SOUTH

[86] Warning: Oscillations may require smaller dt (severity=2)

Inflow = 40.03 cfs @ 12.47 hrs, Volume= 165,013 cf
Outflow = 9.50 cfs @ 12.68 hrs, Volume= 163,891 cf, Atten= 76%, Lag= 12.5 min
Primary = 3.74 cfs @ 12.62 hrs, Volume= 63,230 cf
Routed to Pond SW-P5.5 : Summers Landing 29I
Secondary = 6.56 cfs @ 12.70 hrs, Volume= 100,661 cf
Routed to Pond SW-P5.5 : Summers Landing 29I

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 31,846 sf Storage= 105,243 cf
Peak Elev= 806.18' @ 15.48 hrs Surf.Area= 50,909 sf Storage= 231,607 cf (126,364 cf above start)

Plug-Flow detention time= 1,371.4 min calculated for 58,647 cf (36% of inflow)
Center-of-Mass det. time= 684.6 min (1,509.5 - 824.9)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	324,420 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	15,145	0	0
802.00	23,612	77,514	77,514
803.00	31,846	27,729	105,243
805.00	40,039	71,885	177,128
806.00	50,909	45,474	222,602
808.00	50,909	101,818	324,420

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.72 cfs @ 12.62 hrs HW=804.76' TW=803.51' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.72 cfs @ 4.74 fps)

Secondary OutFlow Max=6.52 cfs @ 12.70 hrs HW=804.91' TW=804.23' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 6.52 cfs @ 2.39 fps)

Summary for Pond SW-P5.5: Summers Landing 29l

Inflow = 31.58 cfs @ 12.69 hrs, Volume= 667,886 cf
Outflow = 10.46 cfs @ 13.99 hrs, Volume= 667,691 cf, Atten= 67%, Lag= 77.9 min
Discarded = 2.50 cfs @ 13.19 hrs, Volume= 224,473 cf
Primary = 7.58 cfs @ 13.99 hrs, Volume= 441,578 cf
Routed to Pond A-P : (new Pond)
Tertiary = 0.38 cfs @ 13.99 hrs, Volume= 1,640 cf
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 806.32' @ 13.99 hrs Surf.Area= 15,768 sf Storage= 54,866 cf

Plug-Flow detention time= 98.1 min calculated for 667,691 cf (100% of inflow)
Center-of-Mass det. time= 96.8 min (1,461.5 - 1,364.7)

Volume	Invert	Avail.Storage	Storage Description
#1	800.00'	112,832 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.00	2,718	0	0
802.00	5,260	7,978	7,978
803.00	8,713	6,987	14,965
805.00	12,132	20,845	35,810
806.00	15,768	13,950	49,760
810.00	15,768	63,072	112,832

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**18.0" Round Culvert** L= 750.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 801.00' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Tertiary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Discarded	800.01'	**8.300 in/hr Exfiltration over Surface area above 800.01'** Excluded Surface area = 2,731 sf

Discarded OutFlow Max=2.50 cfs @ 13.19 hrs HW=806.00' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.50 cfs)

Primary OutFlow Max=7.58 cfs @ 13.99 hrs HW=806.32' TW=752.53' (Dynamic Tailwater)
1=Culvert (Barrel Controls 7.58 cfs @ 4.29 fps)

Tertiary OutFlow Max=0.38 cfs @ 13.99 hrs HW=806.32' TW=805.91' (Dynamic Tailwater)
2=Culvert (Inlet Controls 0.38 cfs @ 1.71 fps)

Summary for Link N: (new Link)

Inflow Area = 575,710 sf, 0.00% Impervious, Inflow Depth = 0.50" for 100-yr(7.4") event
Inflow = 2.77 cfs @ 12.70 hrs, Volume= 23,907 cf
Primary = 2.77 cfs @ 12.70 hrs, Volume= 23,907 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link S: (new Link)

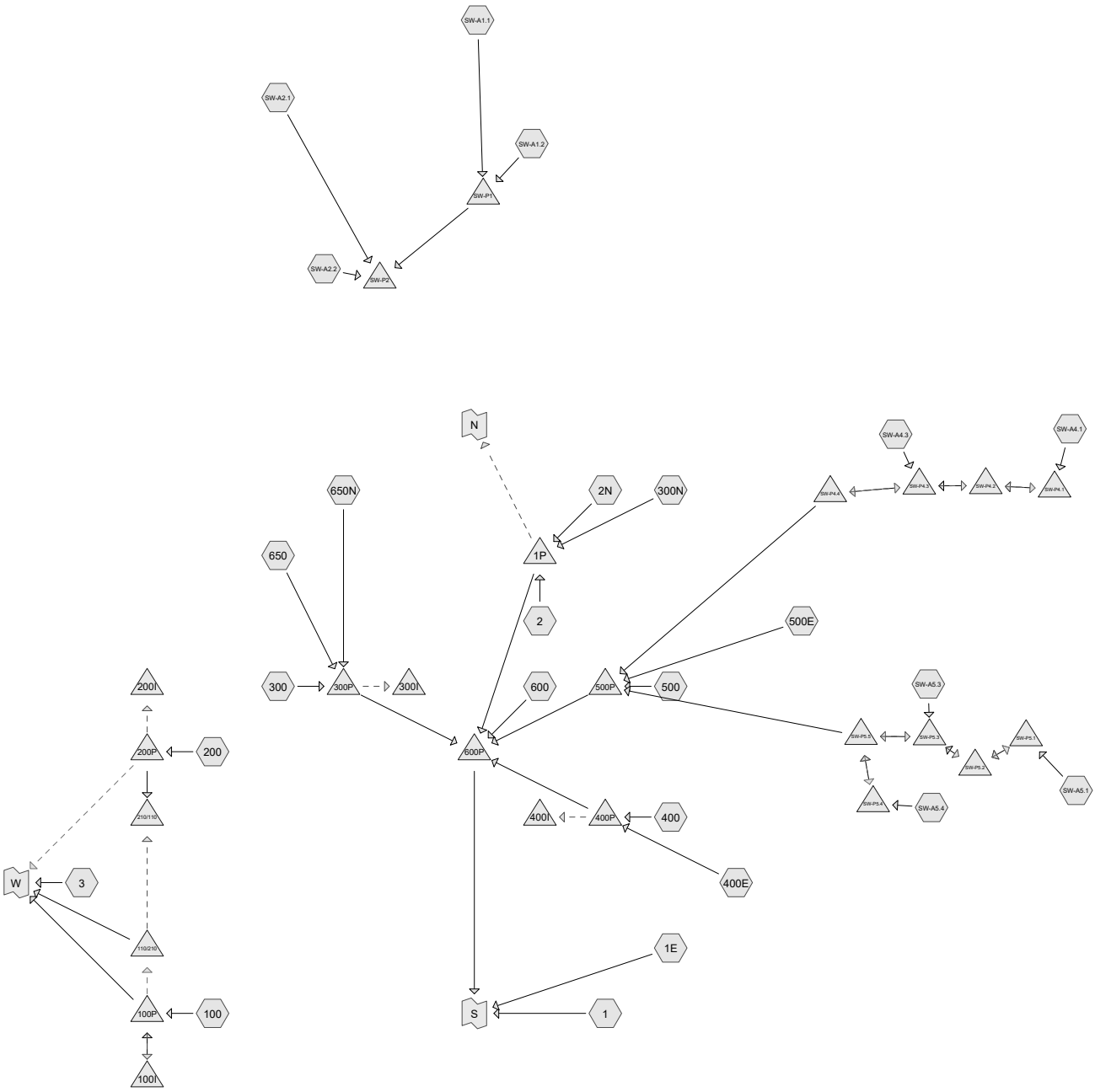
Inflow	=	29.87 cfs @	13.89 hrs,	Volume=	1,142,606 cf
Primary	=	29.87 cfs @	13.89 hrs,	Volume=	1,142,606 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link W: Offsite Discharge

Inflow Area = 755,633 sf, 0.32% Impervious, Inflow Depth = 3.13" for 100-yr(7.4") event
Inflow = 47.65 cfs @ 12.50 hrs, Volume= 197,115 cf
Primary = 47.65 cfs @ 12.50 hrs, Volume= 197,115 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs



Subcat Reach Pond Link

Routing Diagram for 00-123105-Proposed (01-22-2026)
Prepared by {enter your company name here}, Printed 1/26/2026
HydroCAD® 10.10-7a s/n 00590 © 2021 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: 1

Runoff = 0.95 cfs @ 12.57 hrs, Volume= 4,774 cf, Depth= 0.52"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	15,380	58	Meadow, HSG A
*	72,637	61	75%GrassCoverGood, HSG A
*	21,849	98	Impervious, HSG A
	109,867	68	Weighted Average
	88,017		80.11% Pervious Area
	21,849		19.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment 1E: 1

Runoff = 0.00 cfs @ 12.70 hrs, Volume= 5 cf, Depth= 0.21"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	260	58	Meadow, HSG A
	260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, 30**
10.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 2: 2

Runoff = 0.22 cfs @ 12.57 hrs, Volume= 1,086 cf, Depth= 0.56"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	18,100	61	75%GrassCoverGood, HSG A
*	5,161	98	Impervious, HSG A
	23,261	69	Weighted Average
	18,100		77.81% Pervious Area
	5,161		22.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 2N: 2N

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	48,805	30	Meadow Undisturbed, HSG A
*	102,224	30	Woods, HSG A
*	367	61	75%GrassCoverGood, HSG A
	151,396	30	Weighted Average
	151,396		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 3: 3

Runoff = 0.22 cfs @ 12.77 hrs, Volume= 2,187 cf, Depth= 0.16"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	25,414	30	Meadow Undisturbed, HSG A
*	88,248	58	Meadow, HSG A
*	37,923	61	75%GrassCoverGood, HSG A
*	8,826	98	Impervious, HSG A
	160,411	56	Weighted Average
	151,586		94.50% Pervious Area
	8,826		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment 100: 100

Runoff = 6.58 cfs @ 12.50 hrs, Volume= 28,740 cf, Depth= 0.83"
Routed to Pond 100P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	53,291	58	Meadow, HSG A
*	6,304	100	Water Surface, HSG A
*	202,414	61	75%GrassCoverGood, HSG A
*	155,403	98	Impervious, HSG A
	417,413	75	Weighted Average
	255,706		61.26% Pervious Area
	161,707		38.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 200: 200

Runoff = 1.99 cfs @ 12.53 hrs, Volume= 9,526 cf, Depth= 0.60"
Routed to Pond 200P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	78,605	58	Meadow, HSG A
*	2,099	100	Water Surface, HSG A
*	57,616	61	75%GrassCoverGood, HSG A
*	51,948	98	Impervious, HSG A
	190,268	70	Weighted Average
	136,222		71.59% Pervious Area
	54,047		28.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 300: 300

Runoff = 11.67 cfs @ 12.50 hrs, Volume= 48,553 cf, Depth= 1.09"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	41,527	58	Meadow, HSG A
*	11,734	100	Water Surface, HSG A
*	216,369	61	75%GrassCoverGood, HSG A
*	262,554	98	Impervious, HSG A
	532,184	80	Weighted Average
	257,896		48.46% Pervious Area
	274,288		51.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**
10.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 300N: 300N

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	2,354	30	Meadow Undisturbed, HSG A
*	9,502	30	Woods, HSG A
	11,856	30	Weighted Average
	11,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 400: 400

Runoff = 14.04 cfs @ 12.50 hrs, Volume= 60,570 cf, Depth= 0.88"
Routed to Pond 400P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	28,566	30	Meadow Undisturbed, HSG A
*	76,756	58	Meadow, HSG A
*	15,316	100	Water Surface, HSG A
*	5,805	30	Woods, HSG A
*	338,087	61	75%GrassCoverGood, HSG A
*	364,894	98	Impervious, HSG A
	829,424	76	Weighted Average
	449,214		54.16% Pervious Area
	380,210		45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 400E: 400E

Runoff = 2.18 cfs @ 12.57 hrs, Volume= 12,108 cf, Depth= 0.41"
Routed to Pond 400P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	41,605	30	Meadow Undisturbed, HSG A
*	16,296	58	Meadow, HSG A
*	80,928	75	Single Family Residential, HSG A
*	51,903	30	Woods, HSG A
*	76,491	61	75%GrassCoverGood, HSG A
*	84,186	98	Impervious, HSG A
	351,409	65	Weighted Average
	267,223		76.04% Pervious Area
	84,186		23.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 500: 500

Runoff = 0.06 cfs @ 13.70 hrs, Volume= 1,208 cf, Depth= 0.05"
Routed to Pond 500P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	55,625	30	Meadow Undisturbed, HSG A
*	129,892	58	Meadow, HSG A
*	81,587	30	Woods, HSG A
*	36,684	61	75%GrassCoverGood, HSG A
*	17,250	98	Impervious, HSG A
	321,039	49	Weighted Average
	303,789		94.63% Pervious Area
	17,250		5.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 500E: 500E

Runoff = 0.02 cfs @ 15.23 hrs, Volume= 616 cf, Depth= 0.02"
Routed to Pond 500P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	66,520	30	Meadow Undisturbed, HSG A
*	25,924	58	Meadow, HSG A
*	77,212	75	Single Family Residential, HSG A
*	120,110	30	Woods, HSG A
*	0	61	75%GrassCoverGood, HSG A
*	15,779	98	Impervious, HSG A
	305,546	47	Weighted Average
	289,767		94.84% Pervious Area
	15,779		5.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 600: 600

Runoff = 1.02 cfs @ 12.63 hrs, Volume= 6,478 cf, Depth= 0.32"
Routed to Pond 600P : SW-A6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	165,774	58	Meadow, HSG A
*	55,574	61	75%GrassCoverGood, HSG A
*	23,078	98	Impervious, HSG A
	244,426	62	Weighted Average
	221,348		90.56% Pervious Area
	23,078		9.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 650: 650

Runoff = 0.86 cfs @ 12.60 hrs, Volume= 4,984 cf, Depth= 0.38"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	71,141	58	Meadow, HSG A
*	69,683	61	75%GrassCoverGood, HSG A
*	16,439	98	Impervious, HSG A
	157,263	64	Weighted Average
	140,824		89.55% Pervious Area
	16,439		10.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 650N: 650N

Runoff = 0.20 cfs @ 13.37 hrs, Volume= 2,963 cf, Depth= 0.09"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (sf)	CN	Description
*	99,094	30	Meadow Undisturbed, HSG A
*	239,951	67	Cropland, HSG A
*	67,113	30	Woods, HSG A
	406,158	52	Weighted Average
	406,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment SW-A1.1: Fuel Storage Facility Site - SW-A1.1

Runoff = 11.25 cfs @ 12.57 hrs, Volume= 62,436 cf, Depth= 0.41"
Routed to Pond SW-P1 : SW-P1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	41.600	65	Estimated CN for tanks and greenspace
	41.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A1.2: SW-A1.2

Runoff = 55.00 cfs @ 12.47 hrs, Volume= 225,103 cf, Depth= 1.79"
Routed to Pond SW-P1 : SW-P1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	4.500	100	
*	26.600	90	future C/I outside of tank farm
*	3.500	75	SFR
	34.600	90	Weighted Average
	30.100		86.99% Pervious Area
	4.500		13.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A2.1: SW-A2.1

Runoff = 65.52 cfs @ 12.50 hrs, Volume= 272,625 cf, Depth= 1.09"
Routed to Pond SW-P2 : SW-P2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	42.900	75	LDR
*	3.600	100	Pond @ NWL
*	18.700	90	C/I
*	3.400	75	SFR
	68.600	80	Weighted Average
	65.000		94.75% Pervious Area
	3.600		5.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A2.2: SW-A2.2

Runoff = 14.89 cfs @ 12.50 hrs, Volume= 65,084 cf, Depth= 0.83"
Routed to Pond SW-P2 : SW-P2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	21.700	75	LDR
	21.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	1,000	0.0750	1.24		**Lag/CN Method,**
13.5	1,000	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.1: NE QUAD

Runoff = 21.86 cfs @ 12.50 hrs, Volume= 95,557 cf, Depth= 0.83"
Routed to Pond SW-P4.1 : summers landing 30P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	10.250	98	Paved Parking, HSG B
*	1.530	98	Water Surface, HSG B
*	20.080	61	>75% Grass Cover, HSG B
	31.860	75	Weighted Average
	20.080		63.03% Pervious Area
	11.780		36.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.3: NW QUAD

Runoff = 21.22 cfs @ 12.53 hrs, Volume= 95,740 cf, Depth= 0.73"
Routed to Pond SW-P4.3 : Summers landing 31P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	10.510	98	Paved Parking, HSG B
*	23.970	61	>75% Grass cover, Good
*	1.590	98	Water Surface, HSG B
	36.070	73	Weighted Average
	23.970		66.45% Pervious Area
	12.100		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.1: SE QUAD

Runoff = 17.56 cfs @ 12.53 hrs, Volume= 80,550 cf, Depth= 0.69"
Routed to Pond SW-P5.1 : Summers landing 28P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	8.430	98	
*	22.650	61	
*	1.260	98	
	32.340	72	Weighted Average
	22.650		70.04% Pervious Area
	9.690		29.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.3: SW QUAD N

Runoff = 11.07 cfs @ 12.53 hrs, Volume= 51,768 cf, Depth= 0.64"
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	5.230	98	
*	16.000	61	
*	0.960	98	
	22.190	71	Weighted Average
	16.000		72.10% Pervious Area
	6.190		27.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.4: SW QUAD S

Runoff = 6.18 cfs @ 12.53 hrs, Volume= 27,896 cf, Depth= 0.73"
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 2-yr Rainfall=2.79", Smoothing=On

	Area (ac)	CN	Description
*	2.560	98	
*	7.220	61	
*	0.730	98	
	10.510	73	Weighted Average
	7.220		68.70% Pervious Area
	3.290		31.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Pond 1P: SW-A3

Inflow Area = 186,513 sf, 2.77% Impervious, Inflow Depth = 0.07" for 2-yr event
Inflow = 0.22 cfs @ 12.57 hrs, Volume= 1,086 cf
Outflow = 0.08 cfs @ 13.24 hrs, Volume= 1,139 cf, Atten= 65%, Lag= 40.4 min
Discarded = 0.08 cfs @ 13.24 hrs, Volume= 1,139 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 600P : SW-A6
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link N : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.17' @ 13.24 hrs Surf.Area= 3,312 sf Storage= 317 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 63.5 min (939.0 - 875.5)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	78,327 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	500	0	0
752.00	17,399	8,950	8,950
754.00	51,978	69,377	78,327

Device	Routing	Invert	Outlet Devices
#1	Primary	751.25'	**36.0" Round Culvert** L= 136.0' Ke= 0.500 Inlet / Outlet Invert= 751.25' / 751.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	753.50'	**40.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Discarded	751.00'	**1.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 13.24 hrs HW=751.17' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=751.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 100I:

Inflow	=	3.19 cfs @	12.72 hrs,	Volume=	17,772 cf
Outflow	=	0.15 cfs @	14.84 hrs,	Volume=	17,772 cf, Atten= 95%, Lag= 127.0 min
Discarded	=	0.15 cfs @	14.84 hrs,	Volume=	17,772 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 750.26' @ 14.84 hrs Surf.Area= 7,869 sf Storage= 8,333 cf

Plug-Flow detention time= 533.8 min calculated for 17,772 cf (100% of inflow)
Center-of-Mass det. time= 533.8 min (1,888.6 - 1,354.8)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	57,705 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	5,359	0	0
752.00	11,337	25,044	25,044
754.00	21,324	32,661	57,705

Device	Routing	Invert	Outlet Devices
#1	Discarded	749.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.15 cfs @ 14.84 hrs HW=750.26' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond 100P:

Inflow = 6.58 cfs @ 12.50 hrs, Volume= 28,740 cf
Outflow = 3.35 cfs @ 12.74 hrs, Volume= 28,587 cf, Atten= 49%, Lag= 14.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link W : Offsite Discharge
Secondary = 3.19 cfs @ 12.72 hrs, Volume= 17,772 cf
Routed to Pond 100I :
Tertiary = 0.40 cfs @ 14.82 hrs, Volume= 10,815 cf
Routed to Pond 110/210 :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 749.00' Surf.Area= 6,303 sf Storage= 9,680 cf
Peak Elev= 750.26' @ 14.82 hrs Surf.Area= 8,370 sf Storage= 18,928 cf (9,248 cf above start)

Plug-Flow detention time= 719.7 min calculated for 18,908 cf (66% of inflow)
Center-of-Mass det. time= 387.8 min (1,245.4 - 857.6)

Volume	Invert	Avail.Storage	Storage Description
#1	746.00'	1,651,315 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
746.00	150	0	0
749.00	6,303	9,680	9,680
750.75	9,172	13,541	23,220
750.76	21,872	155	23,375
752.00	26,693	30,110	53,486
754.00	36,714	63,407	116,893
800.00	30,000	1,534,422	1,651,315

Device	Routing	Invert	Outlet Devices
#1	Tertiary	751.29'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**15.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 748.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#3	Primary	754.00'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 754.00' / 749.65' S= 0.0870 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#4	Tertiary	749.65'	**24.0" Round Culvert** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 749.65' / 749.00' S= 0.0197 '/' Cc= 0.900 n= 0.130, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=749.00' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=3.18 cfs @ 12.72 hrs HW=750.03' TW=749.47' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 3.18 cfs @ 3.99 fps)

Tertiary OutFlow Max=0.40 cfs @ 14.82 hrs HW=750.26' TW=749.21' (Dynamic Tailwater)
├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**4=Culvert** (Barrel Controls 0.40 cfs @ 0.74 fps)

Summary for Pond 110/210:

Inflow = 0.40 cfs @ 14.82 hrs, Volume= 10,815 cf
Outflow = 0.36 cfs @ 16.10 hrs, Volume= 10,726 cf, Atten= 10%, Lag= 76.8 min
Primary = 0.24 cfs @ 16.10 hrs, Volume= 8,798 cf
Routed to Link W : Offsite Discharge
Secondary = 0.12 cfs @ 16.10 hrs, Volume= 1,929 cf
Routed to Pond 210/110 :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 749.24' @ 16.10 hrs Surf.Area= 8,765 sf Storage= 2,027 cf

Plug-Flow detention time= 189.1 min calculated for 10,726 cf (99% of inflow)
Center-of-Mass det. time= 183.7 min (1,249.2 - 1,065.5)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	1,187,361 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	8,220	0	0
752.00	15,077	34,946	34,946
755.00	18,950	51,041	85,986
800.00	30,000	1,101,375	1,187,361

Device	Routing	Invert	Outlet Devices
#1	Primary	752.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**24.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 749.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	749.00'	**21.0" Round Culvert** L= 67.0' Ke= 0.500 Inlet / Outlet Invert= 749.00' / 748.66' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=0.24 cfs @ 16.10 hrs HW=749.24' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
3=Culvert (Barrel Controls 0.24 cfs @ 1.85 fps)

Secondary OutFlow Max=0.12 cfs @ 16.10 hrs HW=749.24' TW=749.08' (Dynamic Tailwater)
2=Culvert (Barrel Controls 0.12 cfs @ 0.87 fps)

Summary for Pond 200I:

Inflow	=	1.37 cfs @	12.59 hrs, Volume=	9,179 cf
Outflow	=	0.06 cfs @	19.04 hrs, Volume=	9,178 cf, Atten= 95%, Lag= 386.8 min
Discarded	=	0.06 cfs @	19.04 hrs, Volume=	9,178 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 750.26' @ 19.04 hrs Surf.Area= 3,446 sf Storage= 3,500 cf

Plug-Flow detention time= 607.1 min calculated for 9,178 cf (100% of inflow)
Center-of-Mass det. time= 607.1 min (2,058.8 - 1,451.7)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	334,200 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	2,100	0	0
753.50	6,900	20,250	20,250
799.00	6,900	313,950	334,200

Device	Routing	Invert	Outlet Devices
#1	Discarded	749.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.06 cfs @ 19.04 hrs HW=750.26' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond 200P:

Inflow Area = 190,268 sf, 28.41% Impervious, Inflow Depth = 0.60" for 2-yr event
Inflow = 1.99 cfs @ 12.53 hrs, Volume= 9,526 cf
Outflow = 1.37 cfs @ 12.59 hrs, Volume= 9,519 cf, Atten= 31%, Lag= 3.6 min
Primary = 0.02 cfs @ 19.04 hrs, Volume= 341 cf
Routed to Pond 210/110 :
Secondary = 1.37 cfs @ 12.59 hrs, Volume= 9,179 cf
Routed to Pond 200I :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link W : Offsite Discharge

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 749.00' Surf.Area= 2,090 sf Storage= 2,320 cf
Peak Elev= 750.26' @ 19.04 hrs Surf.Area= 3,261 sf Storage= 5,697 cf (3,377 cf above start)

Plug-Flow detention time= 871.7 min calculated for 7,199 cf (76% of inflow)
Center-of-Mass det. time= 569.2 min (1,441.4 - 872.2)

Volume	Invert	Avail.Storage	Storage Description
#1	745.00'	327,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
745.00	10	0	0
748.00	630	960	960
749.00	2,090	1,360	2,320
754.00	6,730	22,050	24,370
799.00	6,730	302,850	327,220

Device	Routing	Invert	Outlet Devices
#1	Primary	751.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**15.0" Round RCP_Round 15"** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 746.00' / 749.00' S= -0.0750 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#3	Primary	750.20'	**15.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 750.20' / 749.00' S= 0.0240 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Tertiary	754.00'	**15.0" Round Culvert** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 754.00' / 749.00' S= 0.1515 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.02 cfs @ 19.04 hrs HW=750.26' TW=749.19' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
3=Culvert (Inlet Controls 0.02 cfs @ 0.85 fps)

Secondary OutFlow Max=1.35 cfs @ 12.59 hrs HW=749.56' TW=749.29' (Dynamic Tailwater)
2=RCP_Round 15" (Inlet Controls 1.35 cfs @ 2.53 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=749.00' TW=0.00' (Dynamic Tailwater)
4=Culvert (Controls 0.00 cfs)

Summary for Pond 210/110:

Inflow	=	0.13 cfs @	16.46 hrs, Volume=	2,269 cf
Outflow	=	0.03 cfs @	20.46 hrs, Volume=	1,724 cf, Atten= 78%, Lag= 240.3 min
Primary	=	0.03 cfs @	20.46 hrs, Volume=	1,724 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 749.21' @ 20.46 hrs Surf.Area= 9,149 sf Storage= 1,853 cf

Plug-Flow detention time= 1,212.4 min calculated for 1,724 cf (76% of inflow)
Center-of-Mass det. time= 1,164.3 min (2,193.7 - 1,029.4)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	2,080,850 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	8,851	0	0
753.50	15,374	54,506	54,506
754.00	34,000	12,344	66,850
756.00	44,000	78,000	144,850
800.00	44,000	1,936,000	2,080,850

Device	Routing	Invert	Outlet Devices
#1	Primary	749.00'	**24.0" Round Culvert** L= 333.0' Ke= 0.500 Inlet / Outlet Invert= 749.00' / 749.00' S= 0.0000 '/' Cc= 0.900 n= 0.016, Flow Area= 3.14 sf

Primary OutFlow Max=0.03 cfs @ 20.46 hrs HW=749.21' (Free Discharge)
1=Culvert (Barrel Controls 0.03 cfs @ 0.24 fps)

Summary for Pond 300I:

Inflow	=	3.57 cfs @	12.87 hrs, Volume=	28,517 cf
Outflow	=	0.21 cfs @	13.83 hrs, Volume=	28,516 cf, Atten= 94%, Lag= 57.7 min
Discarded	=	0.21 cfs @	13.83 hrs, Volume=	28,516 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.90' @ 13.83 hrs Surf.Area= 11,504 sf Storage= 9,613 cf

Plug-Flow detention time= 406.2 min calculated for 28,516 cf (100% of inflow)
Center-of-Mass det. time= 406.1 min (1,938.1 - 1,532.0)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	54,346 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	9,768	0	0
754.00	13,610	23,378	23,378
755.00	15,250	14,430	37,808
756.00	17,826	16,538	54,346

Device	Routing	Invert	Outlet Devices
#1	Discarded	752.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.21 cfs @ 13.83 hrs HW=752.90' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Summary for Pond 300P:

Inflow Area = 1,095,605 sf, 26.54% Impervious, Inflow Depth = 0.62" for 2-yr event
Inflow = 12.49 cfs @ 12.50 hrs, Volume= 56,500 cf
Outflow = 6.75 cfs @ 12.87 hrs, Volume= 56,249 cf, Atten= 46%, Lag= 22.0 min
Primary = 3.18 cfs @ 12.87 hrs, Volume= 27,732 cf
Routed to Pond 600P : SW-A6
Secondary = 3.57 cfs @ 12.87 hrs, Volume= 28,517 cf
Routed to Pond 300I :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 752.00' Surf.Area= 15,962 sf Storage= 41,550 cf
Peak Elev= 753.00' @ 12.87 hrs Surf.Area= 20,035 sf Storage= 59,495 cf (17,945 cf above start)

Plug-Flow detention time= 1,448.6 min calculated for 14,699 cf (26% of inflow)
Center-of-Mass det. time= 371.0 min (1,227.7 - 856.7)

Volume	Invert	Avail.Storage	Storage Description
#1	748.00'	1,471,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
748.00	4,813	0	0
752.00	15,962	41,550	41,550
754.00	24,132	40,094	81,644
755.00	29,560	26,846	108,490
800.00	31,000	1,362,600	1,471,090

Device	Routing	Invert	Outlet Devices
#1	Secondary	752.00'	**15.0" Round RCP_Round 15"** L= 34.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 752.00' S= -0.0882 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Primary	753.57'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	751.00'	**36.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 751.00' / 750.85' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#4	Device 3	752.70'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=3.18 cfs @ 12.87 hrs HW=753.00' TW=751.15' (Dynamic Tailwater)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Culvert** (Passes 3.18 cfs of 16.71 cfs potential flow)
  - **4=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.18 cfs @ 1.78 fps)

Secondary OutFlow Max=3.57 cfs @ 12.87 hrs HW=753.00' TW=752.43' (Dynamic Tailwater)
- **1=RCP_Round 15"** (Inlet Controls 3.57 cfs @ 3.40 fps)

Summary for Pond 400I:

Inflow	=	8.85 cfs @	12.83 hrs, Volume=	64,452 cf
Outflow	=	0.48 cfs @	15.77 hrs, Volume=	64,451 cf, Atten= 95%, Lag= 176.2 min
Discarded	=	0.48 cfs @	15.77 hrs, Volume=	64,451 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 753.20' @ 15.77 hrs Surf.Area= 25,865 sf Storage= 28,930 cf

Plug-Flow detention time= 620.2 min calculated for 64,451 cf (100% of inflow)
Center-of-Mass det. time= 620.2 min (1,914.4 - 1,294.3)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	1,905,717 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	22,201	0	0
754.00	28,289	50,490	50,490
755.00	31,134	29,712	80,202
800.00	50,000	1,825,515	1,905,717

Device	Routing	Invert	Outlet Devices
#1	Discarded	752.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.48 cfs @ 15.77 hrs HW=753.20' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Summary for Pond 400P:

Inflow Area = 1,180,834 sf, 39.33% Impervious, Inflow Depth = 0.74" for 2-yr event
Inflow = 16.10 cfs @ 12.50 hrs, Volume= 72,678 cf
Outflow = 9.83 cfs @ 12.83 hrs, Volume= 72,462 cf, Atten= 39%, Lag= 19.8 min
Primary = 0.98 cfs @ 12.83 hrs, Volume= 8,010 cf
Routed to Pond 600P : SW-A6
Secondary = 8.85 cfs @ 12.83 hrs, Volume= 64,452 cf
Routed to Pond 400I :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 752.00' Surf.Area= 14,785 sf Storage= 53,655 cf
Peak Elev= 753.27' @ 12.83 hrs Surf.Area= 18,464 sf Storage= 74,693 cf (21,038 cf above start)

Plug-Flow detention time= 1,531.7 min calculated for 18,807 cf (26% of inflow)
Center-of-Mass det. time= 400.5 min (1,261.4 - 860.9)

Volume	Invert	Avail.Storage	Storage Description
#1	746.00'	1,394,052 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
746.00	3,100	0	0
752.00	14,785	53,655	53,655
754.00	20,600	35,385	89,040
755.00	26,944	23,772	112,812
800.00	30,000	1,281,240	1,394,052

Device	Routing	Invert	Outlet Devices
#1	Secondary	753.12'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	752.00'	**18.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 750.25' / 752.00' S= -0.0437 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#3	Primary	751.50'	**36.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 751.50' / 751.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#4	Primary	753.74'	**20.0' long + 10.0 '/' SideZ x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#5	Device 3	753.13'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=0.98 cfs @ 12.83 hrs HW=753.27' TW=751.13' (Dynamic Tailwater)
- **3=Culvert** (Passes 0.98 cfs of 16.96 cfs potential flow)
  - **5=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.98 cfs @ 1.21 fps)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=8.85 cfs @ 12.83 hrs HW=753.27' TW=752.33' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 2.76 cfs @ 0.95 fps)
- **2=Culvert** (Inlet Controls 6.09 cfs @ 3.83 fps)

Summary for Pond 500P:

Inflow = 0.15 cfs @ 17.43 hrs, Volume= 2,897 cf
Outflow = 0.12 cfs @ 18.66 hrs, Volume= 2,865 cf, Atten= 19%, Lag= 73.2 min
Primary = 0.12 cfs @ 18.66 hrs, Volume= 2,865 cf
Routed to Pond 600P : SW-A6

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 762.17' @ 18.66 hrs Surf.Area= 5,458 sf Storage= 842 cf

Plug-Flow detention time= 226.1 min calculated for 2,865 cf (99% of inflow)
Center-of-Mass det. time= 221.9 min (1,293.4 - 1,071.5)

Volume	Invert	Avail.Storage	Storage Description
#1	762.00'	916,206 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
762.00	4,629	0	0
765.00	19,533	36,243	36,243
767.00	34,242	53,775	90,018
800.00	15,830	826,188	916,206

Device	Routing	Invert	Outlet Devices
#1	Primary	762.00'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 762.00' / 761.70' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=0.12 cfs @ 18.66 hrs HW=762.17' TW=751.39' (Dynamic Tailwater)
↑—**1=RCP_Round 15"** (Barrel Controls 0.12 cfs @ 1.94 fps)

Summary for Pond 600P: SW-A6

Inflow = 4.95 cfs @ 12.84 hrs, Volume= 45,085 cf
Outflow = 1.25 cfs @ 16.01 hrs, Volume= 45,085 cf, Atten= 75%, Lag= 190.2 min
Discarded = 1.18 cfs @ 16.01 hrs, Volume= 43,920 cf
Primary = 0.08 cfs @ 16.01 hrs, Volume= 1,164 cf
Routed to Link S : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.44' @ 16.01 hrs Surf.Area= 50,780 sf Storage= 14,460 cf

Plug-Flow detention time= 161.3 min calculated for 45,085 cf (100% of inflow)
Center-of-Mass det. time= 161.3 min (1,113.2 - 951.9)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	9,387,964 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	14,707	0	0
752.00	96,389	55,548	55,548
754.00	139,253	235,642	291,190
756.00	150,327	289,580	580,770
800.00	250,000	8,807,194	9,387,964

Device	Routing	Invert	Outlet Devices
#1	Primary	751.00'	**36.0" Round Culvert** L= 150.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 751.00' / 750.50' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf
#2	Device 1	753.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	751.00'	**1.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	751.30'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.18 cfs @ 16.01 hrs HW=751.44' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 1.18 cfs)

Primary OutFlow Max=0.08 cfs @ 16.01 hrs HW=751.44' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.08 cfs of 0.98 cfs potential flow)
├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.28 fps)

Summary for Pond SW-P1: SW-P1

Inflow Area = 3,319,272 sf, 5.91% Impervious, Inflow Depth = 1.04" for 2-yr event
Inflow = 65.43 cfs @ 12.50 hrs, Volume= 287,539 cf
Outflow = 2.10 cfs @ 17.86 hrs, Volume= 236,615 cf, Atten= 97%, Lag= 321.5 min
Primary = 2.10 cfs @ 17.86 hrs, Volume= 236,615 cf
Routed to Pond SW-P2 : SW-P2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 810.81' @ 17.86 hrs Surf.Area= 6.212 ac Storage= 5.088 af

Plug-Flow detention time= 1,446.5 min calculated for 236,610 cf (82% of inflow)
Center-of-Mass det. time= 1,383.0 min (2,216.8 - 833.7)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	87.505 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
810.00	6.048	0.000	0.000
812.00	6.451	12.499	12.499
814.00	6.854	13.305	25.804
816.00	7.284	14.138	39.942
820.00	8.131	30.830	70.772
822.00	8.602	16.733	87.505

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**12.0" Round Culvert** L= 80.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.10 cfs @ 17.86 hrs HW=810.81' TW=748.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.10 cfs @ 3.07 fps)

Summary for Pond SW-P2: SW-P2

Inflow Area = 7,252,740 sf, 4.86% Impervious, Inflow Depth > 0.95" for 2-yr event
Inflow = 80.80 cfs @ 12.50 hrs, Volume= 574,323 cf
Outflow = 3.08 cfs @ 22.65 hrs, Volume= 458,241 cf, Atten= 96%, Lag= 608.9 min
Primary = 3.08 cfs @ 22.65 hrs, Volume= 458,241 cf
Routed to nonexistent node SW-P3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 748.06' @ 22.65 hrs Surf.Area= 6.790 ac Storage= 7.163 af

Plug-Flow detention time= 1,599.5 min calculated for 458,232 cf (80% of inflow)
Center-of-Mass det. time= 1,148.9 min (2,560.3 - 1,411.4)

Volume	Invert	Avail.Storage	Storage Description
#1	747.00'	67.788 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
747.00	6.476	0.000	0.000
749.00	7.070	13.546	13.546
751.00	7.538	14.608	28.154
753.00	8.024	15.562	43.716
756.00	8.024	24.072	67.788

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**21.0" Round Culvert** L= 500.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 746.00' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=3.08 cfs @ 22.65 hrs HW=748.06' (Free Discharge)
1=Culvert (Barrel Controls 3.08 cfs @ 2.91 fps)

Summary for Pond SW-P4.1: summers landing 30P

Inflow = 21.86 cfs @ 12.50 hrs, Volume= 95,557 cf
Outflow = 1.08 cfs @ 15.87 hrs, Volume= 62,285 cf, Atten= 95%, Lag= 201.9 min
Primary = 1.08 cfs @ 15.87 hrs, Volume= 62,285 cf
Routed to Pond SW-P4.2 : Summers landing 30PI
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.2 : Summers landing 30PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 808.50' Surf.Area= 1.284 ac Storage= 4.283 af
Peak Elev= 809.58' @ 15.87 hrs Surf.Area= 1.541 ac Storage= 5.837 af (1.554 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 762.9 min (1,620.5 - 857.6)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	11.323 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
804.00	0.730	0.000	0.000
808.00	1.112	3.684	3.684
809.00	1.456	1.284	4.968
811.00	1.749	3.205	8.173
812.00	2.121	1.935	10.108
812.50	2.738	1.215	11.323

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**12.0" Round Culvert** L= 35.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 808.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.08 cfs @ 15.87 hrs HW=809.58' TW=806.22' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.08 cfs @ 2.29 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=808.50' TW=805.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SW-P4.2: Summers landing 30PI

Inflow = 1.08 cfs @ 15.87 hrs, Volume= 62,285 cf
Outflow = 0.67 cfs @ 24.23 hrs, Volume= 61,955 cf, Atten= 38%, Lag= 501.7 min
Discarded = 0.67 cfs @ 24.23 hrs, Volume= 61,955 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.1 : summers landing 30P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 807.60' @ 24.23 hrs Surf.Area= 8,791 sf Storage= 18,291 cf

Plug-Flow detention time= 416.3 min calculated for 61,954 cf (99% of inflow)
Center-of-Mass det. time= 394.2 min (2,014.7 - 1,620.5)

Volume	Invert	Avail.Storage	Storage Description
#1	805.00'	124,959 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
805.00	5,274	0	0
808.00	9,331	21,908	21,908
809.00	14,735	12,033	33,941
811.00	19,577	34,312	68,253
812.00	22,804	21,191	89,443
812.50	119,260	35,516	124,959

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**15.0" Round Culvert** L= 661.0' Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.50' S= 0.0068 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	805.01'	**8.300 in/hr Exfiltration over Surface area above 805.01'** Excluded Surface area = 5,288 sf

Discarded OutFlow Max=0.67 cfs @ 24.23 hrs HW=807.60' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.67 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=804.50' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=808.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.3: Summers landing 31P

Inflow = 21.22 cfs @ 12.53 hrs, Volume= 95,740 cf
Outflow = 1.81 cfs @ 15.19 hrs, Volume= 91,567 cf, Atten= 91%, Lag= 159.7 min
Primary = 1.81 cfs @ 15.19 hrs, Volume= 91,567 cf
Routed to Pond SW-P4.4 : Summers landing 31PI
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.4 : Summers landing 31PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 804.50' Surf.Area= 69,445 sf Storage= 195,814 cf
Peak Elev= 805.30' @ 15.19 hrs Surf.Area= 74,827 sf Storage= 253,539 cf (57,725 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 663.8 min (1,526.9 - 863.2)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	805,360 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	35,945	0	0
803.50	53,587	134,298	134,298
804.50	69,445	61,516	195,814
806.50	82,896	152,341	348,155
807.50	100,885	91,891	440,046
808.00	104,644	51,382	491,428
811.00	104,644	313,932	805,360

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.81 cfs @ 15.19 hrs HW=805.30' TW=801.81' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.81 cfs @ 2.69 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=804.50' TW=800.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SW-P4.4: Summers landing 31PI

Inflow = 1.81 cfs @ 15.19 hrs, Volume= 91,567 cf
Outflow = 0.96 cfs @ 23.43 hrs, Volume= 91,069 cf, Atten= 47%, Lag= 494.1 min
Discarded = 0.96 cfs @ 23.43 hrs, Volume= 91,069 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 500P :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 803.25' @ 23.43 hrs Surf.Area= 13,416 sf Storage= 29,937 cf

Plug-Flow detention time= 479.8 min calculated for 91,069 cf (99% of inflow)
Center-of-Mass det. time= 456.8 min (1,983.7 - 1,526.9)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	215,575 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	8,380	0	0
803.50	13,880	33,390	33,390
804.50	19,929	16,905	50,295
806.50	25,755	45,684	95,979
807.50	34,193	29,974	125,953
808.00	36,033	17,557	143,509
810.00	36,033	72,066	215,575

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**15.0" Round Culvert** L= 1,010.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 801.00' S= 0.0035 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	800.51'	**8.300 in/hr Exfiltration over Surface area above 800.51'** Excluded Surface area = 8,398 sf

Discarded OutFlow Max=0.96 cfs @ 23.43 hrs HW=803.25' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.96 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=762.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=804.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.1: Summers landing 28P

Inflow = 17.56 cfs @ 12.53 hrs, Volume= 80,550 cf
Outflow = 1.97 cfs @ 14.17 hrs, Volume= 78,223 cf, Atten= 89%, Lag= 98.5 min
Primary = 1.97 cfs @ 14.17 hrs, Volume= 78,223 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 55,104 sf Storage= 141,054 cf
Peak Elev= 806.78' @ 14.17 hrs Surf.Area= 60,381 sf Storage= 186,053 cf (44,999 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 520.0 min (1,386.0 - 866.1)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	432,852 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
802.00	23,396	0	0
805.00	39,204	93,900	93,900
806.00	55,104	47,154	141,054
808.00	68,648	123,752	264,806
809.00	86,609	77,629	342,435
810.00	94,225	90,417	432,852

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 806.00' / 805.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	807.00'	**5.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.97 cfs @ 14.17 hrs HW=806.78' TW=804.82' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.97 cfs @ 3.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.2: Summers Landing 28PI

Inflow = 1.97 cfs @ 14.17 hrs, Volume= 78,223 cf
Outflow = 1.79 cfs @ 0.00 hrs, Volume= 101,354 cf, Atten= 9%, Lag= 0.0 min
Discarded = 1.79 cfs @ 0.00 hrs, Volume= 101,354 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.1 : Summers landing 28P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 16,338 sf Storage= 23,268 cf
Peak Elev= 806.00' @ 0.00 hrs Surf.Area= 16,338 sf Storage= 23,268 cf

Plug-Flow detention time= 178.0 min calculated for 78,085 cf (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	141,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.00	6,954	0	0
805.00	11,622	9,288	9,288
806.00	16,338	13,980	23,268
808.00	20,651	36,989	60,257
809.00	26,716	23,684	83,941
810.00	29,463	28,090	112,030
811.00	29,463	29,463	141,493

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 622.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	807.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	804.01'	**8.300 in/hr Exfiltration over Surface area above 804.01'** Excluded Surface area = 7,001 sf

Discarded OutFlow Max=1.79 cfs @ 0.00 hrs HW=806.00' (Free Discharge)
3=Exfiltration (Exfiltration Controls 1.79 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=803.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.3: Summers landing POND 2 NORTH

Inflow = 11.07 cfs @ 12.53 hrs, Volume= 51,768 cf
Outflow = 1.33 cfs @ 14.14 hrs, Volume= 50,260 cf, Atten= 88%, Lag= 96.1 min
Primary = 1.33 cfs @ 14.14 hrs, Volume= 50,260 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 41,920 sf Storage= 152,896 cf
Peak Elev= 803.66' @ 14.14 hrs Surf.Area= 44,356 sf Storage= 181,218 cf (28,323 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 514.0 min (1,383.1 - 869.1)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	532,787 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	24,234	0	0
802.00	33,387	115,242	115,242
803.00	41,920	37,654	152,896
805.00	49,340	91,260	244,156
806.00	58,658	53,999	298,155
810.00	58,658	234,632	532,787

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.33 cfs @ 14.14 hrs HW=803.66' TW=801.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.33 cfs @ 2.43 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=803.00' TW=800.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.4: Summers Landing POND 2 SOUTH

Inflow = 6.18 cfs @ 12.53 hrs, Volume= 27,896 cf
Outflow = 0.75 cfs @ 14.04 hrs, Volume= 27,031 cf, Atten= 88%, Lag= 90.7 min
Primary = 0.75 cfs @ 14.04 hrs, Volume= 27,031 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 31,846 sf Storage= 105,243 cf
Peak Elev= 803.47' @ 14.04 hrs Surf.Area= 33,782 sf Storage= 120,749 cf (15,506 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 533.6 min (1,396.8 - 863.2)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	324,420 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	15,145	0	0
802.00	23,612	77,514	77,514
803.00	31,846	27,729	105,243
805.00	40,039	71,885	177,128
806.00	50,909	45,474	222,602
808.00	50,909	101,818	324,420

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.75 cfs @ 14.04 hrs HW=803.47' TW=801.89' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.75 cfs @ 2.07 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=803.00' TW=800.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.5: Summers Landing 29l

Inflow = 2.08 cfs @ 14.10 hrs, Volume= 77,290 cf
Outflow = 1.31 cfs @ 17.47 hrs, Volume= 77,164 cf, Atten= 37%, Lag= 202.6 min
Discarded = 1.21 cfs @ 17.47 hrs, Volume= 76,091 cf
Primary = 0.10 cfs @ 17.47 hrs, Volume= 1,073 cf
Routed to Pond 500P :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 803.18' @ 17.47 hrs Surf.Area= 9,028 sf Storage= 16,599 cf

Plug-Flow detention time= 224.9 min calculated for 77,162 cf (100% of inflow)
Center-of-Mass det. time= 217.5 min (1,605.4 - 1,387.9)

Volume	Invert	Avail.Storage	Storage Description
#1	800.00'	112,832 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.00	2,718	0	0
802.00	5,260	7,978	7,978
803.00	8,713	6,987	14,965
805.00	12,132	20,845	35,810
806.00	15,768	13,950	49,760
810.00	15,768	63,072	112,832

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**18.0" Round Culvert** L= 750.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 801.00' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Tertiary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Discarded	800.01'	**8.300 in/hr Exfiltration over Surface area above 800.01'** Excluded Surface area = 2,731 sf

Discarded OutFlow Max=1.21 cfs @ 17.47 hrs HW=803.18' (Free Discharge)
3=Exfiltration (Exfiltration Controls 1.21 cfs)

Primary OutFlow Max=0.10 cfs @ 17.47 hrs HW=803.18' TW=762.15' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.10 cfs @ 1.27 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.00' TW=803.00' (Dynamic Tailwater)
2=Culvert (Controls 0.00 cfs)

Summary for Link N: (new Link)

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link S: (new Link)

Inflow	=	0.95 cfs @	12.57 hrs, Volume=	5,943 cf
Primary	=	0.95 cfs @	12.57 hrs, Volume=	5,943 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link W: Offsite Discharge

Inflow	=	0.28 cfs @	15.37 hrs, Volume=	10,985 cf
Primary	=	0.28 cfs @	15.37 hrs, Volume=	10,985 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Subcatchment 1: 1

Runoff = 2.77 cfs @ 12.50 hrs, Volume= 11,970 cf, Depth= 1.31"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	15,380	58	Meadow, HSG A
*	72,637	61	75%GrassCoverGood, HSG A
*	21,849	98	Impervious, HSG A
	109,867	68	Weighted Average
	88,017		80.11% Pervious Area
	21,849		19.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment 1E: 1

Runoff = 0.00 cfs @ 12.57 hrs, Volume= 16 cf, Depth= 0.74"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	260	58	Meadow, HSG A
	260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, 30**
10.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 2: 2

Runoff = 0.62 cfs @ 12.50 hrs, Volume= 2,659 cf, Depth= 1.37"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	18,100	61	75%GrassCoverGood, HSG A
*	5,161	98	Impervious, HSG A
	23,261	69	Weighted Average
	18,100		77.81% Pervious Area
	5,161		22.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 2N: 2N

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	48,805	30	Meadow Undisturbed, HSG A
*	102,224	30	Woods, HSG A
*	367	61	75%GrassCoverGood, HSG A
	151,396	30	Weighted Average
	151,396		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 3: 3

Runoff = 1.58 cfs @ 12.57 hrs, Volume= 8,575 cf, Depth= 0.64"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	25,414	30	Meadow Undisturbed, HSG A
*	88,248	58	Meadow, HSG A
*	37,923	61	75%GrassCoverGood, HSG A
*	8,826	98	Impervious, HSG A
	160,411	56	Weighted Average
	151,586		94.50% Pervious Area
	8,826		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment 100: 100

Runoff = 15.08 cfs @ 12.50 hrs, Volume= 62,181 cf, Depth= 1.79"
Routed to Pond 100P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	53,291	58	Meadow, HSG A
*	6,304	100	Water Surface, HSG A
*	202,414	61	75%GrassCoverGood, HSG A
*	155,403	98	Impervious, HSG A
	417,413	75	Weighted Average
	255,706		61.26% Pervious Area
	161,707		38.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 200: 200

Runoff = 5.38 cfs @ 12.50 hrs, Volume= 22,793 cf, Depth= 1.44"
Routed to Pond 200P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	78,605	58	Meadow, HSG A
*	2,099	100	Water Surface, HSG A
*	57,616	61	75%GrassCoverGood, HSG A
*	51,948	98	Impervious, HSG A
	190,268	70	Weighted Average
	136,222		71.59% Pervious Area
	54,047		28.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 300: 300

Runoff = 23.63 cfs @ 12.50 hrs, Volume= 96,441 cf, Depth= 2.17"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	41,527	58	Meadow, HSG A
*	11,734	100	Water Surface, HSG A
*	216,369	61	75%GrassCoverGood, HSG A
*	262,554	98	Impervious, HSG A
	532,184	80	Weighted Average
	257,896		48.46% Pervious Area
	274,288		51.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**
10.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 300N: 300N

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	2,354	30	Meadow Undisturbed, HSG A
*	9,502	30	Woods, HSG A
	11,856	30	Weighted Average
	11,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 400: 400

Runoff = 31.32 cfs @ 12.50 hrs, Volume= 128,697 cf, Depth= 1.86"
Routed to Pond 400P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	28,566	30	Meadow Undisturbed, HSG A
*	76,756	58	Meadow, HSG A
*	15,316	100	Water Surface, HSG A
*	5,805	30	Woods, HSG A
*	338,087	61	75%GrassCoverGood, HSG A
*	364,894	98	Impervious, HSG A
	829,424	76	Weighted Average
	449,214		54.16% Pervious Area
	380,210		45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 400E: 400E

Runoff = 7.34 cfs @ 12.50 hrs, Volume= 32,873 cf, Depth= 1.12"
Routed to Pond 400P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	41,605	30	Meadow Undisturbed, HSG A
*	16,296	58	Meadow, HSG A
*	80,928	75	Single Family Residential, HSG A
*	51,903	30	Woods, HSG A
*	76,491	61	75%GrassCoverGood, HSG A
*	84,186	98	Impervious, HSG A
	351,409	65	Weighted Average
	267,223		76.04% Pervious Area
	84,186		23.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 500: 500

Runoff = 1.20 cfs @ 12.67 hrs, Volume= 9,255 cf, Depth= 0.35"
Routed to Pond 500P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	55,625	30	Meadow Undisturbed, HSG A
*	129,892	58	Meadow, HSG A
*	81,587	30	Woods, HSG A
*	36,684	61	75%GrassCoverGood, HSG A
*	17,250	98	Impervious, HSG A
	321,039	49	Weighted Average
	303,789		94.63% Pervious Area
	17,250		5.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 500E: 500E

Runoff = 0.78 cfs @ 12.70 hrs, Volume= 7,008 cf, Depth= 0.28"
Routed to Pond 500P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	66,520	30	Meadow Undisturbed, HSG A
*	25,924	58	Meadow, HSG A
*	77,212	75	Single Family Residential, HSG A
*	120,110	30	Woods, HSG A
*	0	61	75%GrassCoverGood, HSG A
*	15,779	98	Impervious, HSG A
	305,546	47	Weighted Average
	289,767		94.84% Pervious Area
	15,779		5.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 600: 600

Runoff = 4.13 cfs @ 12.53 hrs, Volume= 19,349 cf, Depth= 0.95"
Routed to Pond 600P : SW-A6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	165,774	58	Meadow, HSG A
*	55,574	61	75%GrassCoverGood, HSG A
*	23,078	98	Impervious, HSG A
	244,426	62	Weighted Average
	221,348		90.56% Pervious Area
	23,078		9.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 650: 650

Runoff = 3.07 cfs @ 12.53 hrs, Volume= 13,939 cf, Depth= 1.06"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	71,141	58	Meadow, HSG A
*	69,683	61	75%GrassCoverGood, HSG A
*	16,439	98	Impervious, HSG A
	157,263	64	Weighted Average
	140,824		89.55% Pervious Area
	16,439		10.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 650N: 650N

Runoff = 2.44 cfs @ 12.63 hrs, Volume= 15,697 cf, Depth= 0.46"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (sf)	CN	Description
*	99,094	30	Meadow Undisturbed, HSG A
*	239,951	67	Cropland, HSG A
*	67,113	30	Woods, HSG A
	406,158	52	Weighted Average
	406,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment SW-A1.1: Fuel Storage Facility Site - SW-A1.1

Runoff = 37.87 cfs @ 12.50 hrs, Volume= 169,513 cf, Depth= 1.12"
Routed to Pond SW-P1 : SW-P1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	41.600	65	Estimated CN for tanks and greenspace
	41.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A1.2: SW-A1.2

Runoff = 92.85 cfs @ 12.47 hrs, Volume= 385,735 cf, Depth= 3.07"
Routed to Pond SW-P1 : SW-P1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	4.500	100	
*	26.600	90	future C/I outside of tank farm
*	3.500	75	SFR
	34.600	90	Weighted Average
	30.100		86.99% Pervious Area
	4.500		13.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A2.1: SW-A2.1

Runoff = 132.70 cfs @ 12.50 hrs, Volume= 541,517 cf, Depth= 2.17"
Routed to Pond SW-P2 : SW-P2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	42.900	75	LDR
*	3.600	100	Pond @ NWL
*	18.700	90	C/I
*	3.400	75	SFR
	68.600	80	Weighted Average
	65.000		94.75% Pervious Area
	3.600		5.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A2.2: SW-A2.2

Runoff = 34.16 cfs @ 12.50 hrs, Volume= 140,811 cf, Depth= 1.79"
Routed to Pond SW-P2 : SW-P2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	21.700	75	LDR
	21.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	1,000	0.0750	1.24		**Lag/CN Method,**
13.5	1,000	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.1: NE QUAD

Runoff = 50.15 cfs @ 12.50 hrs, Volume= 206,740 cf, Depth= 1.79"
Routed to Pond SW-P4.1 : summers landing 30P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	10.250	98	Paved Parking, HSG B
*	1.530	98	Water Surface, HSG B
*	20.080	61	>75% Grass Cover, HSG B
	31.860	75	Weighted Average
	20.080		63.03% Pervious Area
	11.780		36.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.3: NW QUAD

Runoff = 51.75 cfs @ 12.50 hrs, Volume= 215,160 cf, Depth= 1.64"
Routed to Pond SW-P4.3 : Summers landing 31P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	10.510	98	Paved Parking, HSG B
*	23.970	61	>75% Grass cover, Good
*	1.590	98	Water Surface, HSG B
	36.070	73	Weighted Average
	23.970		66.45% Pervious Area
	12.100		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.1: SE QUAD

Runoff = 44.18 cfs @ 12.50 hrs, Volume= 184,693 cf, Depth= 1.57"
Routed to Pond SW-P5.1 : Summers landing 28P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	8.430	98	
*	22.650	61	
*	1.260	98	
	32.340	72	Weighted Average
	22.650		70.04% Pervious Area
	9.690		29.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.3: SW QUAD N

Runoff = 28.81 cfs @ 12.50 hrs, Volume= 121,203 cf, Depth= 1.50"
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	5.230	98	
*	16.000	61	
*	0.960	98	
	22.190	71	Weighted Average
	16.000		72.10% Pervious Area
	6.190		27.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.4: SW QUAD S

Runoff = 15.08 cfs @ 12.50 hrs, Volume= 62,693 cf, Depth= 1.64"
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 10-yr Rainfall=4.16", Smoothing=On

	Area (ac)	CN	Description
*	2.560	98	
*	7.220	61	
*	0.730	98	
	10.510	73	Weighted Average
	7.220		68.70% Pervious Area
	3.290		31.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Pond 1P: SW-A3

Inflow Area = 186,513 sf, 2.77% Impervious, Inflow Depth = 0.17" for 10-yr event
Inflow = 0.62 cfs @ 12.50 hrs, Volume= 2,659 cf
Outflow = 0.14 cfs @ 13.40 hrs, Volume= 2,696 cf, Atten= 77%, Lag= 53.9 min
Discarded = 0.14 cfs @ 13.40 hrs, Volume= 2,696 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 600P : SW-A6
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link N : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.33' @ 13.40 hrs Surf.Area= 6,123 sf Storage= 1,102 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 92.9 min (945.6 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	78,327 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	500	0	0
752.00	17,399	8,950	8,950
754.00	51,978	69,377	78,327

Device	Routing	Invert	Outlet Devices
#1	Primary	751.25'	**36.0" Round Culvert** L= 136.0' Ke= 0.500 Inlet / Outlet Invert= 751.25' / 751.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	753.50'	**40.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Discarded	751.00'	**1.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.14 cfs @ 13.40 hrs HW=751.33' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=751.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 100I:

Inflow	=	5.81 cfs @	12.56 hrs,	Volume=	21,308 cf
Outflow	=	0.17 cfs @	13.75 hrs,	Volume=	21,307 cf, Atten= 97%, Lag= 71.4 min
Discarded	=	0.17 cfs @	13.75 hrs,	Volume=	21,307 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.01' @ 13.75 hrs Surf.Area= 9,361 sf Storage= 14,780 cf

Plug-Flow detention time= 705.8 min calculated for 21,307 cf (100% of inflow)
Center-of-Mass det. time= 705.7 min (1,972.8 - 1,267.1)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	57,705 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	5,359	0	0
752.00	11,337	25,044	25,044
754.00	21,324	32,661	57,705

Device	Routing	Invert	Outlet Devices
#1	Discarded	749.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.17 cfs @ 13.75 hrs HW=751.01' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Summary for Pond 100P:

Inflow = 15.08 cfs @ 12.50 hrs, Volume= 62,181 cf
Outflow = 7.14 cfs @ 12.56 hrs, Volume= 62,018 cf, Atten= 53%, Lag= 3.7 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link W : Offsite Discharge
Secondary = 5.81 cfs @ 12.56 hrs, Volume= 21,308 cf
Routed to Pond 100I :
Tertiary = 1.98 cfs @ 13.72 hrs, Volume= 40,711 cf
Routed to Pond 110/210 :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 749.00' Surf.Area= 6,303 sf Storage= 9,680 cf
Peak Elev= 751.01' @ 13.72 hrs Surf.Area= 22,841 sf Storage= 28,945 cf (19,265 cf above start)

Plug-Flow detention time= 380.8 min calculated for 52,339 cf (84% of inflow)
Center-of-Mass det. time= 257.2 min (1,097.6 - 840.4)

Volume	Invert	Avail.Storage	Storage Description
#1	746.00'	1,651,315 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
746.00	150	0	0
749.00	6,303	9,680	9,680
750.75	9,172	13,541	23,220
750.76	21,872	155	23,375
752.00	26,693	30,110	53,486
754.00	36,714	63,407	116,893
800.00	30,000	1,534,422	1,651,315

Device	Routing	Invert	Outlet Devices
#1	Tertiary	751.29'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**15.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 748.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#3	Primary	754.00'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 754.00' / 749.65' S= 0.0870 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#4	Tertiary	749.65'	**24.0" Round Culvert** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 749.65' / 749.00' S= 0.0197 '/' Cc= 0.900 n= 0.130, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=749.00' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=5.79 cfs @ 12.56 hrs HW=750.74' TW=749.78' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 5.79 cfs @ 4.72 fps)

Tertiary OutFlow Max=1.98 cfs @ 13.72 hrs HW=751.01' TW=749.55' (Dynamic Tailwater)
├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**4=Culvert** (Barrel Controls 1.98 cfs @ 1.23 fps)

Summary for Pond 110/210:

Inflow = 1.98 cfs @ 13.72 hrs, Volume= 40,711 cf
Outflow = 1.75 cfs @ 14.64 hrs, Volume= 40,617 cf, Atten= 12%, Lag= 55.6 min
Primary = 1.73 cfs @ 14.73 hrs, Volume= 39,616 cf
Routed to Link W : Offsite Discharge
Secondary = 0.47 cfs @ 13.27 hrs, Volume= 1,001 cf
Routed to Pond 210/110 :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 749.65' @ 14.73 hrs Surf.Area= 9,712 sf Storage= 5,851 cf

Plug-Flow detention time= 97.2 min calculated for 40,616 cf (100% of inflow)
Center-of-Mass det. time= 94.9 min (1,103.7 - 1,008.8)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	1,187,361 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	8,220	0	0
752.00	15,077	34,946	34,946
755.00	18,950	51,041	85,986
800.00	30,000	1,101,375	1,187,361

Device	Routing	Invert	Outlet Devices
#1	Primary	752.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**24.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 749.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	749.00'	**21.0" Round Culvert** L= 67.0' Ke= 0.500 Inlet / Outlet Invert= 749.00' / 748.66' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=1.73 cfs @ 14.73 hrs HW=749.65' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
3=Culvert (Barrel Controls 1.73 cfs @ 3.14 fps)

Secondary OutFlow Max=0.47 cfs @ 13.27 hrs HW=749.43' TW=749.32' (Dynamic Tailwater)
2=Culvert (Outlet Controls 0.47 cfs @ 1.45 fps)

Summary for Pond 200I:

Inflow	=	3.06 cfs @	12.51 hrs, Volume=	9,861 cf
Outflow	=	0.07 cfs @	13.21 hrs, Volume=	9,861 cf, Atten= 98%, Lag= 41.9 min
Discarded	=	0.07 cfs @	13.21 hrs, Volume=	9,861 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 750.78' @ 13.21 hrs Surf.Area= 3,995 sf Storage= 5,413 cf

Plug-Flow detention time= 675.0 min calculated for 9,861 cf (100% of inflow)
Center-of-Mass det. time= 675.0 min (2,071.7 - 1,396.7)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	334,200 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	2,100	0	0
753.50	6,900	20,250	20,250
799.00	6,900	313,950	334,200

Device	Routing	Invert	Outlet Devices
#1	Discarded	749.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.07 cfs @ 13.21 hrs HW=750.78' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 200P:

Inflow Area = 190,268 sf, 28.41% Impervious, Inflow Depth = 1.44" for 10-yr event
Inflow = 5.38 cfs @ 12.50 hrs, Volume= 22,793 cf
Outflow = 3.06 cfs @ 12.51 hrs, Volume= 22,787 cf, Atten= 43%, Lag= 0.7 min
Primary = 1.43 cfs @ 13.21 hrs, Volume= 12,925 cf
Routed to Pond 210/110 :
Secondary = 3.06 cfs @ 12.51 hrs, Volume= 9,861 cf
Routed to Pond 200I :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link W : Offsite Discharge

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 749.00' Surf.Area= 2,090 sf Storage= 2,320 cf
Peak Elev= 750.78' @ 13.21 hrs Surf.Area= 3,739 sf Storage= 7,497 cf (5,177 cf above start)

Plug-Flow detention time= 367.0 min calculated for 20,467 cf (90% of inflow)
Center-of-Mass det. time= 278.4 min (1,129.0 - 850.6)

Volume	Invert	Avail.Storage	Storage Description
#1	745.00'	327,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
745.00	10	0	0
748.00	630	960	960
749.00	2,090	1,360	2,320
754.00	6,730	22,050	24,370
799.00	6,730	302,850	327,220

Device	Routing	Invert	Outlet Devices
#1	Primary	751.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**15.0" Round RCP_Round 15"** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 746.00' / 749.00' S= -0.0750 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#3	Primary	750.20'	**15.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 750.20' / 749.00' S= 0.0240 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Tertiary	754.00'	**15.0" Round Culvert** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 754.00' / 749.00' S= 0.1515 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=1.43 cfs @ 13.21 hrs HW=750.78' TW=749.28' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**3=Culvert** (Inlet Controls 1.43 cfs @ 2.59 fps)

Secondary OutFlow Max=3.02 cfs @ 12.51 hrs HW=750.13' TW=749.84' (Dynamic Tailwater)
↑—**2=RCP_Round 15"** (Inlet Controls 3.02 cfs @ 2.59 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=749.00' TW=0.00' (Dynamic Tailwater)
↑—**4=Culvert** (Controls 0.00 cfs)

Summary for Pond 210/110:

Inflow	=	1.90 cfs @	13.27 hrs, Volume=	13,926 cf
Outflow	=	0.51 cfs @	14.73 hrs, Volume=	13,343 cf, Atten= 73%, Lag= 88.1 min
Primary	=	0.51 cfs @	14.73 hrs, Volume=	13,343 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 749.65' @ 14.73 hrs Surf.Area= 9,797 sf Storage= 6,084 cf

Plug-Flow detention time= 385.3 min calculated for 13,343 cf (96% of inflow)
Center-of-Mass det. time= 365.9 min (1,281.6 - 915.8)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	2,080,850 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	8,851	0	0
753.50	15,374	54,506	54,506
754.00	34,000	12,344	66,850
756.00	44,000	78,000	144,850
800.00	44,000	1,936,000	2,080,850

Device	Routing	Invert	Outlet Devices
#1	Primary	749.00'	**24.0" Round Culvert** L= 333.0' Ke= 0.500 Inlet / Outlet Invert= 749.00' / 749.00' S= 0.0000 '/' Cc= 0.900 n= 0.016, Flow Area= 3.14 sf

Primary OutFlow Max=0.51 cfs @ 14.73 hrs HW=749.65' (Free Discharge)
1=Culvert (Barrel Controls 0.51 cfs @ 0.85 fps)

Summary for Pond 300I:

Inflow	=	5.71 cfs @	12.66 hrs,	Volume=	30,152 cf
Outflow	=	0.23 cfs @	13.31 hrs,	Volume=	30,151 cf, Atten= 96%, Lag= 39.1 min
Discarded	=	0.23 cfs @	13.31 hrs,	Volume=	30,151 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 753.26' @ 13.31 hrs Surf.Area= 12,187 sf Storage= 13,821 cf

Plug-Flow detention time= 462.6 min calculated for 30,150 cf (100% of inflow)
Center-of-Mass det. time= 462.5 min (1,950.5 - 1,488.0)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	54,346 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	9,768	0	0
754.00	13,610	23,378	23,378
755.00	15,250	14,430	37,808
756.00	17,826	16,538	54,346

Device	Routing	Invert	Outlet Devices
#1	Discarded	752.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.23 cfs @ 13.31 hrs HW=753.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Summary for Pond 300P:

Inflow Area = 1,095,605 sf, 26.54% Impervious, Inflow Depth = 1.38" for 10-yr event
Inflow = 28.84 cfs @ 12.50 hrs, Volume= 126,077 cf
Outflow = 21.41 cfs @ 12.69 hrs, Volume= 125,820 cf, Atten= 26%, Lag= 11.3 min
Primary = 15.88 cfs @ 12.71 hrs, Volume= 95,668 cf
Routed to Pond 600P : SW-A6
Secondary = 5.71 cfs @ 12.66 hrs, Volume= 30,152 cf
Routed to Pond 300I :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 752.00' Surf.Area= 15,962 sf Storage= 41,550 cf
Peak Elev= 753.57' @ 12.71 hrs Surf.Area= 22,366 sf Storage= 71,592 cf (30,042 cf above start)

Plug-Flow detention time= 415.2 min calculated for 84,268 cf (67% of inflow)
Center-of-Mass det. time= 193.3 min (1,036.8 - 843.5)

Volume	Invert	Avail.Storage	Storage Description
#1	748.00'	1,471,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
748.00	4,813	0	0
752.00	15,962	41,550	41,550
754.00	24,132	40,094	81,644
755.00	29,560	26,846	108,490
800.00	31,000	1,362,600	1,471,090

Device	Routing	Invert	Outlet Devices
#1	Secondary	752.00'	**15.0" Round RCP_Round 15"** L= 34.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 752.00' S= -0.0882 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Primary	753.57'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	751.00'	**36.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 751.00' / 750.85' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#4	Device 3	752.70'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=15.88 cfs @ 12.71 hrs HW=753.57' TW=751.61' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Passes 15.88 cfs of 25.50 cfs potential flow)
└**4=Sharp-Crested Vee/Trap Weir** (Weir Controls 15.88 cfs @ 3.05 fps)

Secondary OutFlow Max=5.70 cfs @ 12.66 hrs HW=753.56' TW=752.63' (Dynamic Tailwater)
└**1=RCP_Round 15"** (Inlet Controls 5.70 cfs @ 4.64 fps)

Summary for Pond 400I:

Inflow	=	28.66 cfs @	12.58 hrs,	Volume=	68,229 cf
Outflow	=	0.51 cfs @	13.23 hrs,	Volume=	68,228 cf, Atten= 98%, Lag= 39.1 min
Discarded	=	0.51 cfs @	13.23 hrs,	Volume=	68,228 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 753.74' @ 13.23 hrs Surf.Area= 27,505 sf Storage= 43,307 cf

Plug-Flow detention time= 703.2 min calculated for 68,227 cf (100% of inflow)
Center-of-Mass det. time= 703.1 min (1,937.7 - 1,234.5)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	1,905,717 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	22,201	0	0
754.00	28,289	50,490	50,490
755.00	31,134	29,712	80,202
800.00	50,000	1,825,515	1,905,717

Device	Routing	Invert	Outlet Devices
#1	Discarded	752.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.51 cfs @ 13.23 hrs HW=753.74' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.51 cfs)

Summary for Pond 400P:

Inflow Area = 1,180,834 sf, 39.33% Impervious, Inflow Depth = 1.64" for 10-yr event
Inflow = 38.66 cfs @ 12.50 hrs, Volume= 161,570 cf
Outflow = 36.07 cfs @ 12.58 hrs, Volume= 161,348 cf, Atten= 7%, Lag= 4.7 min
Primary = 9.43 cfs @ 13.23 hrs, Volume= 93,119 cf
Routed to Pond 600P : SW-A6
Secondary = 28.66 cfs @ 12.58 hrs, Volume= 68,229 cf
Routed to Pond 400I :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 752.00' Surf.Area= 14,785 sf Storage= 53,655 cf
Peak Elev= 753.74' @ 13.23 hrs Surf.Area= 19,852 sf Storage= 83,834 cf (30,179 cf above start)

Plug-Flow detention time= 435.7 min calculated for 107,691 cf (67% of inflow)
Center-of-Mass det. time= 205.7 min (1,048.9 - 843.2)

Volume	Invert	Avail.Storage	Storage Description
#1	746.00'	1,394,052 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
746.00	3,100	0	0
752.00	14,785	53,655	53,655
754.00	20,600	35,385	89,040
755.00	26,944	23,772	112,812
800.00	30,000	1,281,240	1,394,052

Device	Routing	Invert	Outlet Devices
#1	Secondary	753.12'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	752.00'	**18.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 750.25' / 752.00' S= -0.0437 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#3	Primary	751.50'	**36.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 751.50' / 751.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#4	Primary	753.74'	**20.0' long + 10.0 '/' SideZ x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#5	Device 3	753.13'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=9.43 cfs @ 13.23 hrs HW=753.74' TW=752.08' (Dynamic Tailwater)
- **3=Culvert** (Passes 9.42 cfs of 24.91 cfs potential flow)
  - **5=Sharp-Crested Vee/Trap Weir** (Weir Controls 9.42 cfs @ 2.56 fps)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.13 fps)

Secondary OutFlow Max=28.64 cfs @ 12.58 hrs HW=753.65' TW=752.76' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 20.58 cfs @ 1.93 fps)
- **2=Culvert** (Inlet Controls 8.06 cfs @ 4.56 fps)

Summary for Pond 500P:

Inflow = 5.31 cfs @ 16.03 hrs, Volume= 142,736 cf
Outflow = 5.10 cfs @ 16.86 hrs, Volume= 142,702 cf, Atten= 4%, Lag= 49.3 min
Primary = 5.10 cfs @ 16.86 hrs, Volume= 142,702 cf
Routed to Pond 600P : SW-A6

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 763.43' @ 16.86 hrs Surf.Area= 11,724 sf Storage= 11,677 cf

Plug-Flow detention time= 42.4 min calculated for 142,702 cf (100% of inflow)
Center-of-Mass det. time= 42.3 min (1,123.8 - 1,081.5)

Volume	Invert	Avail.Storage	Storage Description
#1	762.00'	916,206 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
762.00	4,629	0	0
765.00	19,533	36,243	36,243
767.00	34,242	53,775	90,018
800.00	15,830	826,188	916,206

Device	Routing	Invert	Outlet Devices
#1	Primary	762.00'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 762.00' / 761.70' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=5.10 cfs @ 16.86 hrs HW=763.43' TW=752.82' (Dynamic Tailwater)
↑—**1=RCP_Round 15"** (Barrel Controls 5.10 cfs @ 4.55 fps)

Summary for Pond 600P: SW-A6

Inflow = 26.77 cfs @ 12.66 hrs, Volume= 350,838 cf
Outflow = 5.58 cfs @ 19.54 hrs, Volume= 350,838 cf, Atten= 79%, Lag= 412.3 min
Discarded = 2.69 cfs @ 19.54 hrs, Volume= 196,386 cf
Primary = 2.89 cfs @ 19.54 hrs, Volume= 154,452 cf
Routed to Link S : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 752.93' @ 19.54 hrs Surf.Area= 116,257 sf Storage= 154,114 cf

Plug-Flow detention time= 369.2 min calculated for 350,831 cf (100% of inflow)
Center-of-Mass det. time= 369.2 min (1,360.5 - 991.3)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	9,387,964 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	14,707	0	0
752.00	96,389	55,548	55,548
754.00	139,253	235,642	291,190
756.00	150,327	289,580	580,770
800.00	250,000	8,807,194	9,387,964

Device	Routing	Invert	Outlet Devices
#1	Primary	751.00'	**36.0" Round Culvert** L= 150.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 751.00' / 750.50' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf
#2	Device 1	753.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	751.00'	**1.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	751.30'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=2.69 cfs @ 19.54 hrs HW=752.93' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 2.69 cfs)

Primary OutFlow Max=2.89 cfs @ 19.54 hrs HW=752.93' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 2.89 cfs of 16.54 cfs potential flow)
├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Orifice Controls 2.89 cfs @ 5.30 fps)

Summary for Pond SW-P1: SW-P1

Inflow Area = 3,319,272 sf, 5.91% Impervious, Inflow Depth = 2.01" for 10-yr event
Inflow = 130.01 cfs @ 12.50 hrs, Volume= 555,248 cf
Outflow = 3.93 cfs @ 17.38 hrs, Volume= 491,744 cf, Atten= 97%, Lag= 292.8 min
Primary = 3.93 cfs @ 17.38 hrs, Volume= 491,744 cf
Routed to Pond SW-P2 : SW-P2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 811.58' @ 17.38 hrs Surf.Area= 6.367 ac Storage= 9.884 af

Plug-Flow detention time= 1,407.6 min calculated for 491,744 cf (89% of inflow)
Center-of-Mass det. time= 1,360.0 min (2,183.9 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	87.505 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
810.00	6.048	0.000	0.000
812.00	6.451	12.499	12.499
814.00	6.854	13.305	25.804
816.00	7.284	14.138	39.942
820.00	8.131	30.830	70.772
822.00	8.602	16.733	87.505

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**12.0" Round Culvert** L= 80.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.93 cfs @ 17.38 hrs HW=811.58' TW=748.89' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.93 cfs @ 5.01 fps)

Summary for Pond SW-P2: SW-P2

Inflow Area = 7,252,740 sf, 4.86% Impervious, Inflow Depth > 1.94" for 10-yr event
Inflow = 168.36 cfs @ 12.50 hrs, Volume= 1,174,071 cf
Outflow = 7.63 cfs @ 19.65 hrs, Volume= 1,030,949 cf, Atten= 95%, Lag= 429.3 min
Primary = 7.63 cfs @ 19.65 hrs, Volume= 1,030,949 cf
Routed to nonexistent node SW-P3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 748.91' @ 19.65 hrs Surf.Area= 7.042 ac Storage= 12.914 af

Plug-Flow detention time= 1,271.7 min calculated for 1,030,929 cf (88% of inflow)
Center-of-Mass det. time= 952.5 min (2,351.0 - 1,398.5)

Volume	Invert	Avail.Storage	Storage Description
#1	747.00'	67.788 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
747.00	6.476	0.000	0.000
749.00	7.070	13.546	13.546
751.00	7.538	14.608	28.154
753.00	8.024	15.562	43.716
756.00	8.024	24.072	67.788

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**21.0" Round Culvert** L= 500.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 746.00' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=7.63 cfs @ 19.65 hrs HW=748.91' (Free Discharge)
1=Culvert (Barrel Controls 7.63 cfs @ 3.63 fps)

Summary for Pond SW-P4.1: summers landing 30P

Inflow = 50.15 cfs @ 12.50 hrs, Volume= 206,740 cf
Outflow = 7.77 cfs @ 13.66 hrs, Volume= 173,272 cf, Atten= 85%, Lag= 69.5 min
Primary = 3.10 cfs @ 13.66 hrs, Volume= 136,975 cf
Routed to Pond SW-P4.2 : Summers landing 30PI
Secondary = 4.67 cfs @ 13.66 hrs, Volume= 36,297 cf
Routed to Pond SW-P4.2 : Summers landing 30PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 808.50' Surf.Area= 1.284 ac Storage= 4.283 af
Peak Elev= 810.36' @ 13.66 hrs Surf.Area= 1.655 ac Storage= 7.085 af (2.802 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 456.6 min (1,296.9 - 840.4)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	11.323 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
804.00	0.730	0.000	0.000
808.00	1.112	3.684	3.684
809.00	1.456	1.284	4.968
811.00	1.749	3.205	8.173
812.00	2.121	1.935	10.108
812.50	2.738	1.215	11.323

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**12.0" Round Culvert** L= 35.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 808.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.10 cfs @ 13.66 hrs HW=810.36' TW=807.71' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.10 cfs @ 3.94 fps)

Secondary OutFlow Max=4.67 cfs @ 13.66 hrs HW=810.36' TW=807.71' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 4.67 cfs @ 1.62 fps)

Summary for Pond SW-P4.2: Summers landing 30PI

Inflow = 7.77 cfs @ 13.66 hrs, Volume= 173,272 cf
Outflow = 3.71 cfs @ 15.80 hrs, Volume= 172,906 cf, Atten= 52%, Lag= 128.5 min
Discarded = 2.12 cfs @ 15.80 hrs, Volume= 150,551 cf
Primary = 1.59 cfs @ 15.80 hrs, Volume= 22,355 cf
Routed to Pond SW-P4.3 : Summers landing 31P
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.1 : summers landing 30P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 809.66' @ 15.80 hrs Surf.Area= 16,324 sf Storage= 44,134 cf

Plug-Flow detention time= 312.9 min calculated for 172,903 cf (100% of inflow)
Center-of-Mass det. time= 303.4 min (1,600.3 - 1,296.9)

Volume	Invert	Avail.Storage	Storage Description
#1	805.00'	124,959 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
805.00	5,274	0	0
808.00	9,331	21,908	21,908
809.00	14,735	12,033	33,941
811.00	19,577	34,312	68,253
812.00	22,804	21,191	89,443
812.50	119,260	35,516	124,959

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**15.0" Round Culvert** L= 661.0' Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.50' S= 0.0068 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	805.01'	**8.300 in/hr Exfiltration over Surface area above 805.01'** Excluded Surface area = 5,288 sf

Discarded OutFlow Max=2.12 cfs @ 15.80 hrs HW=809.66' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.12 cfs)

Primary OutFlow Max=1.59 cfs @ 15.80 hrs HW=809.66' TW=805.74' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.59 cfs @ 2.43 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=808.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.3: Summers landing 31P

Inflow = 51.75 cfs @ 12.50 hrs, Volume= 237,515 cf
Outflow = 11.03 cfs @ 13.39 hrs, Volume= 233,098 cf, Atten= 79%, Lag= 53.4 min
Primary = 3.34 cfs @ 13.39 hrs, Volume= 158,171 cf
Routed to Pond SW-P4.4 : Summers landing 31PI
Tertiary = 7.69 cfs @ 13.39 hrs, Volume= 74,927 cf
Routed to Pond SW-P4.4 : Summers landing 31PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 804.50' Surf.Area= 69,445 sf Storage= 195,814 cf
Peak Elev= 806.00' @ 13.39 hrs Surf.Area= 79,547 sf Storage= 307,715 cf (111,901 cf above start)

Plug-Flow detention time= 1,739.9 min calculated for 37,283 cf (16% of inflow)
Center-of-Mass det. time= 410.5 min (1,274.0 - 863.5)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	805,360 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	35,945	0	0
803.50	53,587	134,298	134,298
804.50	69,445	61,516	195,814
806.50	82,896	152,341	348,155
807.50	100,885	91,891	440,046
808.00	104,644	51,382	491,428
811.00	104,644	313,932	805,360

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.34 cfs @ 13.39 hrs HW=806.00' TW=802.75' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.34 cfs @ 4.25 fps)

Tertiary OutFlow Max=7.69 cfs @ 13.39 hrs HW=806.00' TW=802.75' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 7.69 cfs @ 1.91 fps)

Summary for Pond SW-P4.4: Summers landing 31PI

Inflow = 11.03 cfs @ 13.39 hrs, Volume= 233,098 cf
Outflow = 4.44 cfs @ 16.32 hrs, Volume= 232,540 cf, Atten= 60%, Lag= 175.9 min
Discarded = 2.65 cfs @ 16.32 hrs, Volume= 201,167 cf
Primary = 1.79 cfs @ 16.32 hrs, Volume= 31,373 cf
Routed to Pond 500P :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 805.27' @ 16.32 hrs Surf.Area= 22,182 sf Storage= 66,581 cf

Plug-Flow detention time= 369.1 min calculated for 232,540 cf (100% of inflow)
Center-of-Mass det. time= 358.4 min (1,632.4 - 1,274.0)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	215,575 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	8,380	0	0
803.50	13,880	33,390	33,390
804.50	19,929	16,905	50,295
806.50	25,755	45,684	95,979
807.50	34,193	29,974	125,953
808.00	36,033	17,557	143,509
810.00	36,033	72,066	215,575

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**15.0" Round Culvert** L= 1,010.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 801.00' S= 0.0035 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	800.51'	**8.300 in/hr Exfiltration over Surface area above 800.51'** Excluded Surface area = 8,398 sf

Discarded OutFlow Max=2.65 cfs @ 16.32 hrs HW=805.27' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.65 cfs)

Primary OutFlow Max=1.79 cfs @ 16.32 hrs HW=805.27' TW=763.41' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.79 cfs @ 3.21 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=804.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.1: Summers landing 28P

Inflow = 44.18 cfs @ 12.50 hrs, Volume= 184,693 cf
Outflow = 9.41 cfs @ 13.41 hrs, Volume= 182,251 cf, Atten= 79%, Lag= 54.4 min
Primary = 3.88 cfs @ 13.41 hrs, Volume= 132,663 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI
Secondary = 5.53 cfs @ 13.41 hrs, Volume= 49,588 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 55,104 sf Storage= 141,054 cf
Peak Elev= 807.55' @ 13.41 hrs Surf.Area= 65,611 sf Storage= 234,697 cf (93,643 cf above start)

Plug-Flow detention time= 1,280.4 min calculated for 41,197 cf (22% of inflow)
Center-of-Mass det. time= 368.3 min (1,214.8 - 846.4)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	432,852 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
802.00	23,396	0	0
805.00	39,204	93,900	93,900
806.00	55,104	47,154	141,054
808.00	68,648	123,752	264,806
809.00	86,609	77,629	342,435
810.00	94,225	90,417	432,852

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 806.00' / 805.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	807.00'	**5.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.88 cfs @ 13.41 hrs HW=807.55' TW=805.82' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.88 cfs @ 4.94 fps)

Secondary OutFlow Max=5.53 cfs @ 13.41 hrs HW=807.55' TW=805.82' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 5.53 cfs @ 2.01 fps)

Summary for Pond SW-P5.2: Summers Landing 28PI

Inflow = 9.41 cfs @ 13.41 hrs, Volume= 182,251 cf
Outflow = 4.51 cfs @ 15.13 hrs, Volume= 205,375 cf, Atten= 52%, Lag= 103.4 min
Discarded = 2.23 cfs @ 15.14 hrs, Volume= 166,435 cf
Primary = 2.28 cfs @ 15.13 hrs, Volume= 38,940 cf
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.1 : Summers landing 28P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 16,338 sf Storage= 23,268 cf
Peak Elev= 807.06' @ 15.14 hrs Surf.Area= 18,616 sf Storage= 41,734 cf (18,466 cf above start)

Plug-Flow detention time= 184.1 min calculated for 182,104 cf (100% of inflow)
Center-of-Mass det. time= 42.7 min (1,257.5 - 1,214.8)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	141,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.00	6,954	0	0
805.00	11,622	9,288	9,288
806.00	16,338	13,980	23,268
808.00	20,651	36,989	60,257
809.00	26,716	23,684	83,941
810.00	29,463	28,090	112,030
811.00	29,463	29,463	141,493

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 622.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	807.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	804.01'	**8.300 in/hr Exfiltration over Surface area above 804.01'** Excluded Surface area = 7,001 sf

Discarded OutFlow Max=2.23 cfs @ 15.14 hrs HW=807.06' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.23 cfs)

Primary OutFlow Max=2.28 cfs @ 15.13 hrs HW=807.06' TW=804.42' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.28 cfs @ 3.42 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.3: Summers landing POND 2 NORTH

Inflow = 28.81 cfs @ 12.50 hrs, Volume= 160,143 cf
Outflow = 5.35 cfs @ 13.51 hrs, Volume= 158,495 cf, Atten= 81%, Lag= 60.3 min
Primary = 3.19 cfs @ 13.51 hrs, Volume= 116,188 cf
Routed to Pond SW-P5.5 : Summers Landing 29I
Tertiary = 2.19 cfs @ 15.27 hrs, Volume= 42,306 cf
Routed to Pond SW-P5.5 : Summers Landing 29I

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 41,920 sf Storage= 152,896 cf
Peak Elev= 804.43' @ 15.32 hrs Surf.Area= 47,210 sf Storage= 216,438 cf (63,543 cf above start)

Plug-Flow detention time= 2,705.4 min calculated for 5,599 cf (3% of inflow)
Center-of-Mass det. time= 355.1 min (1,245.7 - 890.6)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	532,787 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	24,234	0	0
802.00	33,387	115,242	115,242
803.00	41,920	37,654	152,896
805.00	49,340	91,260	244,156
806.00	58,658	53,999	298,155
810.00	58,658	234,632	532,787

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.19 cfs @ 13.51 hrs HW=804.41' TW=803.50' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.19 cfs @ 4.06 fps)

Tertiary OutFlow Max=2.19 cfs @ 15.27 hrs HW=804.43' TW=804.07' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 2.19 cfs @ 1.71 fps)

Summary for Pond SW-P5.4: Summers Landing POND 2 SOUTH

Inflow = 15.08 cfs @ 12.50 hrs, Volume= 62,693 cf
Outflow = 2.35 cfs @ 13.49 hrs, Volume= 61,735 cf, Atten= 84%, Lag= 59.4 min
Primary = 2.35 cfs @ 13.49 hrs, Volume= 59,670 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Secondary = 0.18 cfs @ 16.06 hrs, Volume= 2,065 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 31,846 sf Storage= 105,243 cf
Peak Elev= 804.10' @ 15.64 hrs Surf.Area= 36,362 sf Storage= 142,840 cf (37,597 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 554.7 min (1,399.1 - 844.4)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	324,420 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	15,145	0	0
802.00	23,612	77,514	77,514
803.00	31,846	27,729	105,243
805.00	40,039	71,885	177,128
806.00	50,909	45,474	222,602
808.00	50,909	101,818	324,420

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.34 cfs @ 13.49 hrs HW=803.99' TW=803.47' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.34 cfs @ 3.73 fps)

Secondary OutFlow Max=0.18 cfs @ 16.06 hrs HW=804.10' TW=804.07' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.18 cfs @ 0.60 fps)

Summary for Pond SW-P5.5: Summers Landing 29l

Inflow = 7.70 cfs @ 13.49 hrs, Volume= 220,229 cf
Outflow = 4.80 cfs @ 15.59 hrs, Volume= 220,081 cf, Atten= 38%, Lag= 125.9 min
Discarded = 1.50 cfs @ 15.59 hrs, Volume= 124,981 cf
Primary = 3.29 cfs @ 15.59 hrs, Volume= 95,100 cf
Routed to Pond 500P :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 804.08' @ 15.59 hrs Surf.Area= 10,555 sf Storage= 25,348 cf

Plug-Flow detention time= 141.1 min calculated for 220,081 cf (100% of inflow)
Center-of-Mass det. time= 138.1 min (1,426.7 - 1,288.7)

Volume	Invert	Avail.Storage	Storage Description
#1	800.00'	112,832 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.00	2,718	0	0
802.00	5,260	7,978	7,978
803.00	8,713	6,987	14,965
805.00	12,132	20,845	35,810
806.00	15,768	13,950	49,760
810.00	15,768	63,072	112,832

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**18.0" Round Culvert** L= 750.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 801.00' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Tertiary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Discarded	800.01'	**8.300 in/hr Exfiltration over Surface area above 800.01'** Excluded Surface area = 2,731 sf

Discarded OutFlow Max=1.50 cfs @ 15.59 hrs HW=804.08' (Free Discharge)
3=Exfiltration (Exfiltration Controls 1.50 cfs)

Primary OutFlow Max=3.29 cfs @ 15.59 hrs HW=804.08' TW=763.29' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.29 cfs @ 3.39 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.00' TW=803.00' (Dynamic Tailwater)
2=Culvert (Controls 0.00 cfs)

Summary for Link N: (new Link)

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link S: (new Link)

Inflow	=	2.97 cfs @	19.17 hrs,	Volume=	166,438 cf
Primary	=	2.97 cfs @	19.17 hrs,	Volume=	166,438 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link W: Offsite Discharge

Inflow	=	1.93 cfs @	14.70 hrs, Volume=	48,191 cf
Primary	=	1.93 cfs @	14.70 hrs, Volume=	48,191 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Subcatchment 1: 1

Runoff = 8.38 cfs @ 12.50 hrs, Volume= 34,209 cf, Depth= 3.74"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	15,380	58	Meadow, HSG A
*	72,637	61	75%GrassCoverGood, HSG A
*	21,849	98	Impervious, HSG A
	109,867	68	Weighted Average
	88,017		80.11% Pervious Area
	21,849		19.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment 1E: 1

Runoff = 0.01 cfs @ 12.50 hrs, Volume= 58 cf, Depth= 2.68"
Routed to Link S : (new Link)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	260	58	Meadow, HSG A
	260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, 30**
10.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 2: 2

Runoff = 1.83 cfs @ 12.50 hrs, Volume= 7,453 cf, Depth= 3.84"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	18,100	61	75%GrassCoverGood, HSG A
*	5,161	98	Impervious, HSG A
	23,261	69	Weighted Average
	18,100		77.81% Pervious Area
	5,161		22.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 2N: 2N

Runoff = 0.26 cfs @ 12.97 hrs, Volume= 3,616 cf, Depth= 0.29"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	48,805	30	Meadow Undisturbed, HSG A
*	102,224	30	Woods, HSG A
*	367	61	75%GrassCoverGood, HSG A
	151,396	30	Weighted Average
	151,396		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 3: 3

Runoff = 7.79 cfs @ 12.50 hrs, Volume= 33,183 cf, Depth= 2.48"
Routed to Link W : Offsite Discharge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	25,414	30	Meadow Undisturbed, HSG A
*	88,248	58	Meadow, HSG A
*	37,923	61	75%GrassCoverGood, HSG A
*	8,826	98	Impervious, HSG A
	160,411	56	Weighted Average
	151,586		94.50% Pervious Area
	8,826		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry, 30**

Summary for Subcatchment 100: 100

Runoff = 38.36 cfs @ 12.47 hrs, Volume= 156,660 cf, Depth= 4.50"
Routed to Pond 100P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	53,291	58	Meadow, HSG A
*	6,304	100	Water Surface, HSG A
*	202,414	61	75%GrassCoverGood, HSG A
*	155,403	98	Impervious, HSG A
	417,413	75	Weighted Average
	255,706		61.26% Pervious Area
	161,707		38.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 200: 200

Runoff = 15.36 cfs @ 12.50 hrs, Volume= 62,683 cf, Depth= 3.95"
Routed to Pond 200P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	78,605	58	Meadow, HSG A
*	2,099	100	Water Surface, HSG A
*	57,616	61	75%GrassCoverGood, HSG A
*	51,948	98	Impervious, HSG A
	190,268	70	Weighted Average
	136,222		71.59% Pervious Area
	54,047		28.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 300: 300

Runoff = 54.61 cfs @ 12.47 hrs, Volume= 224,621 cf, Depth= 5.06"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	41,527	58	Meadow, HSG A
*	11,734	100	Water Surface, HSG A
*	216,369	61	75%GrassCoverGood, HSG A
*	262,554	98	Impervious, HSG A
	532,184	80	Weighted Average
	257,896		48.46% Pervious Area
	274,288		51.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**
10.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 300N: 300N

Runoff = 0.02 cfs @ 12.97 hrs, Volume= 283 cf, Depth= 0.29"
Routed to Pond 1P : SW-A3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	2,354	30	Meadow Undisturbed, HSG A
*	9,502	30	Woods, HSG A
	11,856	30	Weighted Average
	11,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 400: 400

Runoff = 78.05 cfs @ 12.47 hrs, Volume= 318,994 cf, Depth= 4.62"
Routed to Pond 400P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	28,566	30	Meadow Undisturbed, HSG A
*	76,756	58	Meadow, HSG A
*	15,316	100	Water Surface, HSG A
*	5,805	30	Woods, HSG A
*	338,087	61	75%GrassCoverGood, HSG A
*	364,894	98	Impervious, HSG A
	829,424	76	Weighted Average
	449,214		54.16% Pervious Area
	380,210		45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 400E: 400E

Runoff = 24.39 cfs @ 12.50 hrs, Volume= 100,004 cf, Depth= 3.41"
Routed to Pond 400P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	41,605	30	Meadow Undisturbed, HSG A
*	16,296	58	Meadow, HSG A
*	80,928	75	Single Family Residential, HSG A
*	51,903	30	Woods, HSG A
*	76,491	61	75%GrassCoverGood, HSG A
*	84,186	98	Impervious, HSG A
	351,409	65	Weighted Average
	267,223		76.04% Pervious Area
	84,186		23.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 500: 500

Runoff = 10.45 cfs @ 12.53 hrs, Volume= 48,117 cf, Depth= 1.80"
Routed to Pond 500P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	55,625	30	Meadow Undisturbed, HSG A
*	129,892	58	Meadow, HSG A
*	81,587	30	Woods, HSG A
*	36,684	61	75%GrassCoverGood, HSG A
*	17,250	98	Impervious, HSG A
	321,039	49	Weighted Average
	303,789		94.63% Pervious Area
	17,250		5.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 500E: 500E

Runoff = 8.62 cfs @ 12.53 hrs, Volume= 41,040 cf, Depth= 1.61"
Routed to Pond 500P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	66,520	30	Meadow Undisturbed, HSG A
*	25,924	58	Meadow, HSG A
*	77,212	75	Single Family Residential, HSG A
*	120,110	30	Woods, HSG A
*	0	61	75%GrassCoverGood, HSG A
*	15,779	98	Impervious, HSG A
	305,546	47	Weighted Average
	289,767		94.84% Pervious Area
	15,779		5.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**
15.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment 600: 600

Runoff = 15.27 cfs @ 12.50 hrs, Volume= 63,111 cf, Depth= 3.10"
Routed to Pond 600P : SW-A6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	165,774	58	Meadow, HSG A
*	55,574	61	75%GrassCoverGood, HSG A
*	23,078	98	Impervious, HSG A
	244,426	62	Weighted Average
	221,348		90.56% Pervious Area
	23,078		9.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 650: 650

Runoff = 10.55 cfs @ 12.50 hrs, Volume= 43,364 cf, Depth= 3.31"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	71,141	58	Meadow, HSG A
*	69,683	61	75%GrassCoverGood, HSG A
*	16,439	98	Impervious, HSG A
	157,263	64	Weighted Average
	140,824		89.55% Pervious Area
	16,439		10.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment 650N: 650N

Runoff = 15.96 cfs @ 12.50 hrs, Volume= 70,614 cf, Depth= 2.09"
Routed to Pond 300P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (sf)	CN	Description
*	99,094	30	Meadow Undisturbed, HSG A
*	239,951	67	Cropland, HSG A
*	67,113	30	Woods, HSG A
	406,158	52	Weighted Average
	406,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					**Direct Entry,**

Summary for Subcatchment SW-A1.1: Fuel Storage Facility Site - SW-A1.1

Runoff = 125.77 cfs @ 12.50 hrs, Volume= 515,686 cf, Depth= 3.41"
Routed to Pond SW-P1 : SW-P1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	41.600	65	Estimated CN for tanks and greenspace
	41.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A1.2: SW-A1.2

Runoff = 181.89 cfs @ 12.47 hrs, Volume= 780,668 cf, Depth= 6.22"
Routed to Pond SW-P1 : SW-P1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	4.500	100	
*	26.600	90	future C/I outside of tank farm
*	3.500	75	SFR
	34.600	90	Weighted Average
	30.100		86.99% Pervious Area
	4.500		13.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A2.1: SW-A2.1

Runoff = 306.66 cfs @ 12.47 hrs, Volume= 1,261,250 cf, Depth= 5.06"
Routed to Pond SW-P2 : SW-P2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	42.900	75	LDR
*	3.600	100	Pond @ NWL
*	18.700	90	C/I
*	3.400	75	SFR
	68.600	80	Weighted Average
	65.000		94.75% Pervious Area
	3.600		5.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A2.2: SW-A2.2

Runoff = 86.88 cfs @ 12.47 hrs, Volume= 354,765 cf, Depth= 4.50"
Routed to Pond SW-P2 : SW-P2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	21.700	75	LDR
	21.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	1,000	0.0750	1.24		**Lag/CN Method,**
13.5	1,000	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.1: NE QUAD

Runoff = 127.55 cfs @ 12.47 hrs, Volume= 520,867 cf, Depth= 4.50"
Routed to Pond SW-P4.1 : summers landing 30P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	10.250	98	Paved Parking, HSG B
*	1.530	98	Water Surface, HSG B
*	20.080	61	>75% Grass Cover, HSG B
	31.860	75	Weighted Average
	20.080		63.03% Pervious Area
	11.780		36.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A4.3: NW QUAD

Runoff = 137.40 cfs @ 12.47 hrs, Volume= 560,690 cf, Depth= 4.28"
Routed to Pond SW-P4.3 : Summers landing 31P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	10.510	98	Paved Parking, HSG B
*	23.970	61	>75% Grass cover, Good
*	1.590	98	Water Surface, HSG B
	36.070	73	Weighted Average
	23.970		66.45% Pervious Area
	12.100		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.1: SE QUAD

Runoff = 120.03 cfs @ 12.50 hrs, Volume= 489,785 cf, Depth= 4.17"
Routed to Pond SW-P5.1 : Summers landing 28P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	8.430	98	
*	22.650	61	
*	1.260	98	
	32.340	72	Weighted Average
	22.650		70.04% Pervious Area
	9.690		29.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.3: SW QUAD N

Runoff = 80.22 cfs @ 12.50 hrs, Volume= 327,233 cf, Depth= 4.06"
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	5.230	98	
*	16.000	61	
*	0.960	98	
	22.190	71	Weighted Average
	16.000		72.10% Pervious Area
	6.190		27.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Subcatchment SW-A5.4: SW QUAD S

Runoff = 40.03 cfs @ 12.47 hrs, Volume= 163,373 cf, Depth= 4.28"
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
MSE 24-hr 3 100-yr(7.4") Rainfall=7.40", Smoothing=On

	Area (ac)	CN	Description
*	2.560	98	
*	7.220	61	
*	0.730	98	
	10.510	73	Weighted Average
	7.220		68.70% Pervious Area
	3.290		31.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0					**Direct Entry,**
25.0	0	Total, Increased to minimum Tc = 30.0 min			

Summary for Pond 1P: SW-A3

Inflow Area = 186,513 sf, 2.77% Impervious, Inflow Depth = 0.73" for 100-yr(7.4") event
Inflow = 1.91 cfs @ 12.50 hrs, Volume= 11,352 cf
Outflow = 0.30 cfs @ 14.11 hrs, Volume= 11,363 cf, Atten= 84%, Lag= 96.5 min
Discarded = 0.30 cfs @ 14.11 hrs, Volume= 11,363 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 600P : SW-A6
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link N : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.75' @ 14.11 hrs Surf.Area= 13,128 sf Storage= 5,092 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 211.0 min (1,090.7 - 879.7)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	78,327 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	500	0	0
752.00	17,399	8,950	8,950
754.00	51,978	69,377	78,327

Device	Routing	Invert	Outlet Devices
#1	Primary	751.25'	**36.0" Round Culvert** L= 136.0' Ke= 0.500 Inlet / Outlet Invert= 751.25' / 751.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	753.50'	**40.0' long + 10.0 '/' SideZ x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Discarded	751.00'	**1.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.30 cfs @ 14.11 hrs HW=751.75' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=751.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=751.00' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 100I:

Inflow	=	5.87 cfs @	12.51 hrs,	Volume=	26,814 cf
Outflow	=	0.19 cfs @	13.21 hrs,	Volume=	26,814 cf, Atten= 97%, Lag= 42.0 min
Discarded	=	0.19 cfs @	13.21 hrs,	Volume=	26,814 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.57' @ 13.21 hrs Surf.Area= 10,490 sf Storage= 20,403 cf

Plug-Flow detention time= 886.0 min calculated for 26,813 cf (100% of inflow)
Center-of-Mass det. time= 886.0 min (2,089.2 - 1,203.3)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	57,705 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	5,359	0	0
752.00	11,337	25,044	25,044
754.00	21,324	32,661	57,705

Device	Routing	Invert	Outlet Devices
#1	Discarded	749.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.19 cfs @ 13.21 hrs HW=751.57' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Summary for Pond 100P:

Inflow = 38.36 cfs @ 12.47 hrs, Volume= 156,660 cf
Outflow = 30.14 cfs @ 12.65 hrs, Volume= 156,482 cf, Atten= 21%, Lag= 10.8 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link W : Offsite Discharge
Secondary = 5.87 cfs @ 12.51 hrs, Volume= 26,814 cf
Routed to Pond 100I :
Tertiary = 24.79 cfs @ 12.66 hrs, Volume= 129,667 cf
Routed to Pond 110/210 :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 749.00' Surf.Area= 6,303 sf Storage= 9,680 cf
Peak Elev= 751.82' @ 12.66 hrs Surf.Area= 26,003 sf Storage= 48,811 cf (39,132 cf above start)

Plug-Flow detention time= 195.0 min calculated for 146,799 cf (94% of inflow)
Center-of-Mass det. time= 148.1 min (969.7 - 821.5)

Volume	Invert	Avail.Storage	Storage Description
#1	746.00'	1,651,315 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
746.00	150	0	0
749.00	6,303	9,680	9,680
750.75	9,172	13,541	23,220
750.76	21,872	155	23,375
752.00	26,693	30,110	53,486
754.00	36,714	63,407	116,893
800.00	30,000	1,534,422	1,651,315

Device	Routing	Invert	Outlet Devices
#1	Tertiary	751.29'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**15.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 748.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#3	Primary	754.00'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 754.00' / 749.65' S= 0.0870 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#4	Tertiary	749.65'	**24.0" Round Culvert** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 749.65' / 749.00' S= 0.0197 '/' Cc= 0.900 n= 0.130, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=749.00' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=5.85 cfs @ 12.51 hrs HW=751.67' TW=750.69' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 5.85 cfs @ 4.77 fps)

Tertiary OutFlow Max=24.79 cfs @ 12.66 hrs HW=751.82' TW=750.34' (Dynamic Tailwater)
├**1=Broad-Crested Rectangular Weir** (Weir Controls 20.62 cfs @ 1.94 fps)
└**4=Culvert** (Barrel Controls 4.17 cfs @ 1.52 fps)

Summary for Pond 110/210:

Inflow = 24.79 cfs @ 12.66 hrs, Volume= 129,667 cf
Outflow = 14.40 cfs @ 12.80 hrs, Volume= 129,567 cf, Atten= 42%, Lag= 8.5 min
Primary = 10.81 cfs @ 13.10 hrs, Volume= 121,700 cf
Routed to Link W : Offsite Discharge
Secondary = 5.75 cfs @ 12.72 hrs, Volume= 7,867 cf
Routed to Pond 210/110 :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.02' @ 13.10 hrs Surf.Area= 12,831 sf Storage= 21,232 cf

Plug-Flow detention time= 53.2 min calculated for 129,567 cf (100% of inflow)
Center-of-Mass det. time= 52.0 min (973.4 - 921.4)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	1,187,361 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	8,220	0	0
752.00	15,077	34,946	34,946
755.00	18,950	51,041	85,986
800.00	30,000	1,101,375	1,187,361

Device	Routing	Invert	Outlet Devices
#1	Primary	752.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**24.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 749.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#3	Primary	749.00'	**21.0" Round Culvert** L= 67.0' Ke= 0.500 Inlet / Outlet Invert= 749.00' / 748.66' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=10.81 cfs @ 13.10 hrs HW=751.02' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
3=Culvert (Barrel Controls 10.81 cfs @ 4.89 fps)

Secondary OutFlow Max=5.66 cfs @ 12.72 hrs HW=750.58' TW=750.33' (Dynamic Tailwater)
2=Culvert (Outlet Controls 5.66 cfs @ 2.91 fps)

Summary for Pond 200I:

Inflow	=	4.62 cfs @	12.46 hrs,	Volume=	13,028 cf
Outflow	=	0.09 cfs @	12.80 hrs,	Volume=	13,028 cf, Atten= 98%, Lag= 20.5 min
Discarded	=	0.09 cfs @	12.80 hrs,	Volume=	13,028 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.66' @ 12.80 hrs Surf.Area= 4,942 sf Storage= 9,380 cf

Plug-Flow detention time= 898.6 min calculated for 13,028 cf (100% of inflow)
Center-of-Mass det. time= 898.6 min (2,214.8 - 1,316.2)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	334,200 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	2,100	0	0
753.50	6,900	20,250	20,250
799.00	6,900	313,950	334,200

Device	Routing	Invert	Outlet Devices
#1	Discarded	749.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.09 cfs @ 12.80 hrs HW=751.66' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Summary for Pond 200P:

Inflow Area = 190,268 sf, 28.41% Impervious, Inflow Depth = 3.95" for 100-yr(7.4") event
Inflow = 15.36 cfs @ 12.50 hrs, Volume= 62,683 cf
Outflow = 14.29 cfs @ 12.55 hrs, Volume= 62,675 cf, Atten= 7%, Lag= 3.3 min
Primary = 10.57 cfs @ 12.59 hrs, Volume= 49,646 cf
Routed to Pond 210/110 :
Secondary = 4.62 cfs @ 12.46 hrs, Volume= 13,028 cf
Routed to Pond 200I :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link W : Offsite Discharge

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 749.00' Surf.Area= 2,090 sf Storage= 2,320 cf
Peak Elev= 751.72' @ 12.59 hrs Surf.Area= 4,610 sf Storage= 11,417 cf (9,097 cf above start)

Plug-Flow detention time= 170.2 min calculated for 60,355 cf (96% of inflow)
Center-of-Mass det. time= 140.5 min (969.7 - 829.2)

Volume	Invert	Avail.Storage	Storage Description
#1	745.00'	327,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
745.00	10	0	0
748.00	630	960	960
749.00	2,090	1,360	2,320
754.00	6,730	22,050	24,370
799.00	6,730	302,850	327,220

Device	Routing	Invert	Outlet Devices
#1	Primary	751.50'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	749.00'	**15.0" Round RCP_Round 15"** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 746.00' / 749.00' S= -0.0750 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#3	Primary	750.20'	**15.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 750.20' / 749.00' S= 0.0240 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Tertiary	754.00'	**15.0" Round Culvert** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 754.00' / 749.00' S= 0.1515 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=10.57 cfs @ 12.59 hrs HW=751.72' TW=749.70' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 4.99 cfs @ 1.16 fps)
3=Culvert (Inlet Controls 5.58 cfs @ 4.54 fps)

Secondary OutFlow Max=4.59 cfs @ 12.46 hrs HW=751.54' TW=750.94' (Dynamic Tailwater)
2=RCP_Round 15" (Inlet Controls 4.59 cfs @ 3.74 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=749.00' TW=0.00' (Dynamic Tailwater)
4=Culvert (Controls 0.00 cfs)

Summary for Pond 210/110:

Inflow	=	15.32 cfs @	12.70 hrs, Volume=	57,513 cf
Outflow	=	5.73 cfs @	13.11 hrs, Volume=	56,914 cf, Atten= 63%, Lag= 24.7 min
Primary	=	5.73 cfs @	13.11 hrs, Volume=	56,914 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.01' @ 13.11 hrs Surf.Area= 11,769 sf Storage= 20,752 cf

Plug-Flow detention time= 150.7 min calculated for 56,914 cf (99% of inflow)
Center-of-Mass det. time= 143.5 min (1,007.1 - 863.6)

Volume	Invert	Avail.Storage	Storage Description
#1	749.00'	2,080,850 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
749.00	8,851	0	0
753.50	15,374	54,506	54,506
754.00	34,000	12,344	66,850
756.00	44,000	78,000	144,850
800.00	44,000	1,936,000	2,080,850

Device	Routing	Invert	Outlet Devices
#1	Primary	749.00'	**24.0" Round Culvert** L= 333.0' Ke= 0.500 Inlet / Outlet Invert= 749.00' / 749.00' S= 0.0000 '/' Cc= 0.900 n= 0.016, Flow Area= 3.14 sf

Primary OutFlow Max=5.73 cfs @ 13.11 hrs HW=751.01' (Free Discharge)
1=Culvert (Barrel Controls 5.73 cfs @ 2.25 fps)

Summary for Pond 300I:

Inflow	=	6.09 cfs @	12.45 hrs,	Volume=	52,048 cf
Outflow	=	0.27 cfs @	14.29 hrs,	Volume=	52,046 cf, Atten= 96%, Lag= 110.5 min
Discarded	=	0.27 cfs @	14.29 hrs,	Volume=	52,046 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 754.50' @ 14.29 hrs Surf.Area= 14,431 sf Storage= 30,393 cf

Plug-Flow detention time= 935.6 min calculated for 52,046 cf (100% of inflow)
Center-of-Mass det. time= 935.5 min (2,470.7 - 1,535.2)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	54,346 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	9,768	0	0
754.00	13,610	23,378	23,378
755.00	15,250	14,430	37,808
756.00	17,826	16,538	54,346

Device	Routing	Invert	Outlet Devices
#1	Discarded	752.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.27 cfs @ 14.29 hrs HW=754.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Summary for Pond 300P:

Inflow Area = 1,095,605 sf, 26.54% Impervious, Inflow Depth = 3.71" for 100-yr(7.4") event
Inflow = 80.83 cfs @ 12.50 hrs, Volume= 338,599 cf
Outflow = 75.92 cfs @ 12.57 hrs, Volume= 338,172 cf, Atten= 6%, Lag= 4.1 min
Primary = 70.12 cfs @ 12.57 hrs, Volume= 286,124 cf
Routed to Pond 600P : SW-A6
Secondary = 6.09 cfs @ 12.45 hrs, Volume= 52,048 cf
Routed to Pond 300I :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 752.00' Surf.Area= 15,962 sf Storage= 41,550 cf
Peak Elev= 754.51' @ 13.98 hrs Surf.Area= 26,904 sf Storage= 94,675 cf (53,125 cf above start)

Plug-Flow detention time= 335.8 min calculated for 296,616 cf (88% of inflow)
Center-of-Mass det. time= 239.0 min (1,065.3 - 826.3)

Volume	Invert	Avail.Storage	Storage Description
#1	748.00'	1,471,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
748.00	4,813	0	0
752.00	15,962	41,550	41,550
754.00	24,132	40,094	81,644
755.00	29,560	26,846	108,490
800.00	31,000	1,362,600	1,471,090

Device	Routing	Invert	Outlet Devices
#1	Secondary	752.00'	**15.0" Round RCP_Round 15"** L= 34.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 749.00' / 752.00' S= -0.0882 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Primary	753.57'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#3	Primary	751.00'	**36.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 751.00' / 750.85' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#4	Device 3	752.70'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=70.12 cfs @ 12.57 hrs HW=754.29' TW=752.70' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 33.16 cfs @ 2.29 fps)
└─**3=Culvert** (Barrel Controls 36.96 cfs @ 5.94 fps)
└─**4=Sharp-Crested Vee/Trap Weir** (Passes 36.96 cfs of 39.53 cfs potential flow)

Secondary OutFlow Max=6.08 cfs @ 12.45 hrs HW=754.19' TW=753.13' (Dynamic Tailwater)
└─**1=RCP_Round 15"** (Inlet Controls 6.08 cfs @ 4.96 fps)

Summary for Pond 400I:

Inflow = 47.38 cfs @ 12.38 hrs, Volume= 102,874 cf
Outflow = 0.55 cfs @ 12.65 hrs, Volume= 102,873 cf, Atten= 99%, Lag= 16.5 min
Discarded = 0.55 cfs @ 12.65 hrs, Volume= 102,873 cf

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 754.53' @ 12.65 hrs Surf.Area= 29,784 sf Storage= 65,747 cf

Plug-Flow detention time= 1,044.5 min calculated for 102,873 cf (100% of inflow)
Center-of-Mass det. time= 1,044.4 min (2,354.3 - 1,309.8)

Volume	Invert	Avail.Storage	Storage Description
#1	752.00'	1,905,717 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
752.00	22,201	0	0
754.00	28,289	50,490	50,490
755.00	31,134	29,712	80,202
800.00	50,000	1,825,515	1,905,717

Device	Routing	Invert	Outlet Devices
#1	Discarded	752.00'	**0.800 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.55 cfs @ 12.65 hrs HW=754.53' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.55 cfs)

Summary for Pond 400P:

Inflow Area = 1,180,834 sf, 39.33% Impervious, Inflow Depth = 4.26" for 100-yr(7.4") event
Inflow = 102.30 cfs @ 12.47 hrs, Volume= 418,998 cf
Outflow = 89.40 cfs @ 12.49 hrs, Volume= 418,675 cf, Atten= 13%, Lag= 1.2 min
Primary = 81.22 cfs @ 12.65 hrs, Volume= 315,802 cf
Routed to Pond 600P : SW-A6
Secondary = 47.38 cfs @ 12.38 hrs, Volume= 102,874 cf
Routed to Pond 400I :

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 752.00' Surf.Area= 14,785 sf Storage= 53,655 cf
Peak Elev= 754.53' @ 12.65 hrs Surf.Area= 23,931 sf Storage= 100,730 cf (47,075 cf above start)

Plug-Flow detention time= 270.2 min calculated for 365,020 cf (87% of inflow)
Center-of-Mass det. time= 179.4 min (1,003.4 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	746.00'	1,394,052 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
746.00	3,100	0	0
752.00	14,785	53,655	53,655
754.00	20,600	35,385	89,040
755.00	26,944	23,772	112,812
800.00	30,000	1,281,240	1,394,052

Device	Routing	Invert	Outlet Devices
#1	Secondary	753.12'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	752.00'	**18.0" Round Culvert** L= 40.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 750.25' / 752.00' S= -0.0437 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#3	Primary	751.50'	**36.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 751.50' / 751.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#4	Primary	753.74'	**20.0' long + 10.0 '/' SideZ x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#5	Device 3	753.13'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=81.20 cfs @ 12.65 hrs HW=754.52' TW=753.10' (Dynamic Tailwater)
- **3=Culvert** (Passes 32.37 cfs of 38.64 cfs potential flow)
  - **5=Sharp-Crested Vee/Trap Weir** (Weir Controls 32.37 cfs @ 3.87 fps)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 48.83 cfs @ 2.23 fps)

Secondary OutFlow Max=46.92 cfs @ 12.38 hrs HW=754.08' TW=753.65' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 41.33 cfs @ 2.15 fps)
- **2=Culvert** (Inlet Controls 5.59 cfs @ 3.16 fps)

Summary for Pond 500P:

Inflow = 21.58 cfs @ 12.89 hrs, Volume= 864,949 cf
Outflow = 12.41 cfs @ 20.43 hrs, Volume= 864,909 cf, Atten= 42%, Lag= 452.6 min
Primary = 12.41 cfs @ 20.43 hrs, Volume= 864,909 cf
Routed to Pond 600P : SW-A6

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 767.04' @ 20.43 hrs Surf.Area= 34,222 sf Storage= 91,244 cf

Plug-Flow detention time= 101.5 min calculated for 864,891 cf (100% of inflow)
Center-of-Mass det. time= 101.5 min (1,377.4 - 1,275.9)

Volume	Invert	Avail.Storage	Storage Description
#1	762.00'	916,206 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
762.00	4,629	0	0
765.00	19,533	36,243	36,243
767.00	34,242	53,775	90,018
800.00	15,830	826,188	916,206

Device	Routing	Invert	Outlet Devices
#1	Primary	762.00'	**15.0" Round RCP_Round 15"** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 762.00' / 761.70' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=12.41 cfs @ 20.43 hrs HW=767.04' TW=754.16' (Dynamic Tailwater)
1=RCP_Round 15" (Inlet Controls 12.41 cfs @ 10.11 fps)

Summary for Pond 600P: SW-A6

Inflow = 168.74 cfs @ 12.62 hrs, Volume= 1,529,946 cf
Outflow = 26.90 cfs @ 13.99 hrs, Volume= 1,529,946 cf, Atten= 84%, Lag= 82.0 min
Discarded = 3.29 cfs @ 13.99 hrs, Volume= 412,156 cf
Primary = 23.61 cfs @ 13.99 hrs, Volume= 1,117,790 cf
Routed to Link S : (new Link)

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 754.51' @ 13.99 hrs Surf.Area= 142,072 sf Storage= 362,813 cf

Plug-Flow detention time= 332.8 min calculated for 1,529,946 cf (100% of inflow)
Center-of-Mass det. time= 332.8 min (1,516.0 - 1,183.2)

Volume	Invert	Avail.Storage	Storage Description
#1	751.00'	9,387,964 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
751.00	14,707	0	0
752.00	96,389	55,548	55,548
754.00	139,253	235,642	291,190
756.00	150,327	289,580	580,770
800.00	250,000	8,807,194	9,387,964

Device	Routing	Invert	Outlet Devices
#1	Primary	751.00'	**36.0" Round Culvert** L= 150.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 751.00' / 750.50' S= 0.0033 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf
#2	Device 1	753.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	751.00'	**1.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	751.30'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=3.29 cfs @ 13.99 hrs HW=754.51' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 3.29 cfs)

Primary OutFlow Max=23.61 cfs @ 13.99 hrs HW=754.51' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 23.61 cfs of 40.38 cfs potential flow)
├**2=Sharp-Crested Rectangular Weir** (Weir Controls 19.22 cfs @ 3.28 fps)
└**4=Orifice/Grate** (Orifice Controls 4.39 cfs @ 8.05 fps)

Summary for Pond SW-P1: SW-P1

Inflow Area = 3,319,272 sf, 5.91% Impervious, Inflow Depth = 4.69" for 100-yr(7.4") event
Inflow = 306.82 cfs @ 12.47 hrs, Volume= 1,296,354 cf
Outflow = 6.15 cfs @ 19.52 hrs, Volume= 1,179,678 cf, Atten= 98%, Lag= 422.9 min
Primary = 6.15 cfs @ 19.52 hrs, Volume= 1,179,678 cf
Routed to Pond SW-P2 : SW-P2

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 813.82' @ 19.52 hrs Surf.Area= 6.818 ac Storage= 24.629 af

Plug-Flow detention time= 1,864.4 min calculated for 1,179,655 cf (91% of inflow)
Center-of-Mass det. time= 1,824.8 min (2,635.6 - 810.8)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	87.505 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
810.00	6.048	0.000	0.000
812.00	6.451	12.499	12.499
814.00	6.854	13.305	25.804
816.00	7.284	14.138	39.942
820.00	8.131	30.830	70.772
822.00	8.602	16.733	87.505

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**12.0" Round Culvert** L= 80.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=6.15 cfs @ 19.52 hrs HW=813.82' TW=751.46' (Dynamic Tailwater)
1=Culvert (Barrel Controls 6.15 cfs @ 7.83 fps)

Summary for Pond SW-P2: SW-P2

Inflow Area = 7,252,740 sf, 4.86% Impervious, Inflow Depth > 4.63" for 100-yr(7.4") event
Inflow = 397.46 cfs @ 12.47 hrs, Volume= 2,795,688 cf
Outflow = 12.45 cfs @ 20.65 hrs, Volume= 2,544,822 cf, Atten= 97%, Lag= 491.0 min
Primary = 12.45 cfs @ 20.65 hrs, Volume= 2,544,822 cf
Routed to nonexistent node SW-P3

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 751.47' @ 20.65 hrs Surf.Area= 7.652 ac Storage= 31.813 af

Plug-Flow detention time= 1,467.5 min calculated for 2,544,771 cf (91% of inflow)
Center-of-Mass det. time= 1,172.1 min (2,755.4 - 1,583.3)

Volume	Invert	Avail.Storage	Storage Description
#1	747.00'	67.788 af	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
747.00	6.476	0.000	0.000
749.00	7.070	13.546	13.546
751.00	7.538	14.608	28.154
753.00	8.024	15.562	43.716
756.00	8.024	24.072	67.788

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**21.0" Round Culvert** L= 500.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 746.00' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf

Primary OutFlow Max=12.45 cfs @ 20.65 hrs HW=751.47' (Free Discharge)
1=Culvert (Barrel Controls 12.45 cfs @ 5.18 fps)

Summary for Pond SW-P4.1: summers landing 30P

Inflow = 127.55 cfs @ 12.47 hrs, Volume= 520,867 cf
Outflow = 52.16 cfs @ 12.80 hrs, Volume= 487,120 cf, Atten= 59%, Lag= 19.8 min
Primary = 4.92 cfs @ 12.75 hrs, Volume= 106,678 cf
Routed to Pond SW-P4.2 : Summers landing 30PI
Secondary = 47.83 cfs @ 12.80 hrs, Volume= 380,442 cf
Routed to Pond SW-P4.2 : Summers landing 30PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 808.50' Surf.Area= 1.284 ac Storage= 4.283 af
Peak Elev= 812.11' @ 13.89 hrs Surf.Area= 2.261 ac Storage= 10.357 af (6.074 af above start)

Plug-Flow detention time= 685.1 min calculated for 300,546 cf (58% of inflow)
Center-of-Mass det. time= 367.3 min (1,188.8 - 821.5)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	11.323 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
804.00	0.730	0.000	0.000
808.00	1.112	3.684	3.684
809.00	1.456	1.284	4.968
811.00	1.749	3.205	8.173
812.00	2.121	1.935	10.108
812.50	2.738	1.215	11.323

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**12.0" Round Culvert** L= 35.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 808.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.92 cfs @ 12.75 hrs HW=811.68' TW=809.50' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.92 cfs @ 6.26 fps)

Secondary OutFlow Max=47.76 cfs @ 12.80 hrs HW=811.73' TW=810.08' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 47.76 cfs @ 3.45 fps)

Summary for Pond SW-P4.2: Summers landing 30PI

Inflow = 52.16 cfs @ 12.80 hrs, Volume= 487,120 cf
Outflow = 12.24 cfs @ 13.92 hrs, Volume= 486,697 cf, Atten= 77%, Lag= 67.3 min
Discarded = 6.93 cfs @ 13.93 hrs, Volume= 258,854 cf
Primary = 5.38 cfs @ 13.33 hrs, Volume= 227,843 cf
Routed to Pond SW-P4.3 : Summers landing 31P
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.1 : summers landing 30P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 812.10' @ 13.93 hrs Surf.Area= 41,355 sf Storage= 92,528 cf

Plug-Flow detention time= 199.7 min calculated for 486,687 cf (100% of inflow)
Center-of-Mass det. time= 195.7 min (1,384.5 - 1,188.8)

Volume	Invert	Avail.Storage	Storage Description
#1	805.00'	124,959 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
805.00	5,274	0	0
808.00	9,331	21,908	21,908
809.00	14,735	12,033	33,941
811.00	19,577	34,312	68,253
812.00	22,804	21,191	89,443
812.50	119,260	35,516	124,959

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**15.0" Round Culvert** L= 661.0' Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.50' S= 0.0068 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	810.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	805.01'	**8.300 in/hr Exfiltration over Surface area above 805.01'** Excluded Surface area = 5,288 sf

Discarded OutFlow Max=6.93 cfs @ 13.93 hrs HW=812.10' (Free Discharge)
3=Exfiltration (Exfiltration Controls 6.93 cfs)

Primary OutFlow Max=5.38 cfs @ 13.33 hrs HW=811.98' TW=807.55' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.38 cfs @ 4.39 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=805.00' TW=808.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P4.3: Summers landing 31P

Inflow = 137.40 cfs @ 12.47 hrs, Volume= 788,533 cf
Outflow = 59.78 cfs @ 12.84 hrs, Volume= 783,375 cf, Atten= 56%, Lag= 22.3 min
Primary = 5.13 cfs @ 12.78 hrs, Volume= 122,966 cf
Routed to Pond SW-P4.4 : Summers landing 31PI
Tertiary = 55.21 cfs @ 12.84 hrs, Volume= 660,409 cf
Routed to Pond SW-P4.4 : Summers landing 31PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 804.50' Surf.Area= 69,445 sf Storage= 195,814 cf
Peak Elev= 807.92' @ 15.67 hrs Surf.Area= 104,061 sf Storage= 483,340 cf (287,526 cf above start)

Plug-Flow detention time= 689.8 min calculated for 587,561 cf (75% of inflow)
Center-of-Mass det. time= 394.2 min (1,312.7 - 918.5)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	805,360 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	35,945	0	0
803.50	53,587	134,298	134,298
804.50	69,445	61,516	195,814
806.50	82,896	152,341	348,155
807.50	100,885	91,891	440,046
808.00	104,644	51,382	491,428
811.00	104,644	313,932	805,360

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.13 cfs @ 12.78 hrs HW=807.36' TW=805.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.13 cfs @ 6.53 fps)

Tertiary OutFlow Max=55.16 cfs @ 12.84 hrs HW=807.40' TW=805.56' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 55.16 cfs @ 3.62 fps)

Summary for Pond SW-P4.4: Summers landing 31PI

Inflow = 59.78 cfs @ 12.84 hrs, Volume= 783,374 cf
Outflow = 10.27 cfs @ 15.69 hrs, Volume= 782,600 cf, Atten= 83%, Lag= 170.7 min
Discarded = 5.25 cfs @ 15.69 hrs, Volume= 448,387 cf
Primary = 5.02 cfs @ 15.69 hrs, Volume= 334,213 cf
Routed to Pond 500P :
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P4.3 : Summers landing 31P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 807.92' @ 15.69 hrs Surf.Area= 35,720 sf Storage= 140,462 cf

Plug-Flow detention time= 251.4 min calculated for 782,585 cf (100% of inflow)
Center-of-Mass det. time= 247.1 min (1,559.8 - 1,312.7)

Volume	Invert	Avail.Storage	Storage Description
#1	800.50'	215,575 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.50	8,380	0	0
803.50	13,880	33,390	33,390
804.50	19,929	16,905	50,295
806.50	25,755	45,684	95,979
807.50	34,193	29,974	125,953
808.00	36,033	17,557	143,509
810.00	36,033	72,066	215,575

Device	Routing	Invert	Outlet Devices
#1	Primary	804.50'	**15.0" Round Culvert** L= 1,010.0' Ke= 0.700 Inlet / Outlet Invert= 804.50' / 801.00' S= 0.0035 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Tertiary	805.50'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	800.51'	**8.300 in/hr Exfiltration over Surface area above 800.51'** Excluded Surface area = 8,398 sf

Discarded OutFlow Max=5.25 cfs @ 15.69 hrs HW=807.92' (Free Discharge)
3=Exfiltration (Exfiltration Controls 5.25 cfs)

Primary OutFlow Max=5.02 cfs @ 15.69 hrs HW=807.92' TW=766.63' (Dynamic Tailwater)
1=Culvert (Barrel Controls 5.02 cfs @ 4.09 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=800.50' TW=804.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.1: Summers landing 28P

Inflow = 120.03 cfs @ 12.50 hrs, Volume= 489,785 cf
Outflow = 42.62 cfs @ 12.77 hrs, Volume= 486,957 cf, Atten= 64%, Lag= 16.5 min
Primary = 5.83 cfs @ 12.68 hrs, Volume= 113,504 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI
Secondary = 37.57 cfs @ 12.79 hrs, Volume= 373,452 cf
Routed to Pond SW-P5.2 : Summers Landing 28PI

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 55,104 sf Storage= 141,054 cf
Peak Elev= 809.54' @ 15.19 hrs Surf.Area= 90,694 sf Storage= 389,980 cf (248,926 cf above start)

Plug-Flow detention time= 743.3 min calculated for 345,903 cf (71% of inflow)
Center-of-Mass det. time= 463.5 min (1,289.6 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	432,852 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
802.00	23,396	0	0
805.00	39,204	93,900	93,900
806.00	55,104	47,154	141,054
808.00	68,648	123,752	264,806
809.00	86,609	77,629	342,435
810.00	94,225	90,417	432,852

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 806.00' / 805.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	807.00'	**5.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.81 cfs @ 12.68 hrs HW=808.88' TW=806.51' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.81 cfs @ 7.40 fps)

Secondary OutFlow Max=37.50 cfs @ 12.79 hrs HW=809.04' TW=807.31' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 37.50 cfs @ 3.67 fps)

Summary for Pond SW-P5.2: Summers Landing 28PI

Inflow = 42.62 cfs @ 12.77 hrs, Volume= 486,957 cf
Outflow = 6.74 cfs @ 15.52 hrs, Volume= 510,055 cf, Atten= 84%, Lag= 164.7 min
Discarded = 4.07 cfs @ 15.21 hrs, Volume= 331,364 cf
Primary = 2.68 cfs @ 18.15 hrs, Volume= 178,691 cf
Routed to Pond SW-P5.3 : Summers landing POND 2 NORTH
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-P5.1 : Summers landing 28P

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 806.00' Surf.Area= 16,338 sf Storage= 23,268 cf
Peak Elev= 809.53' @ 15.21 hrs Surf.Area= 28,170 sf Storage= 98,467 cf (75,199 cf above start)

Plug-Flow detention time= 206.7 min calculated for 486,778 cf (100% of inflow)
Center-of-Mass det. time= 145.0 min (1,434.7 - 1,289.6)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	141,493 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.00	6,954	0	0
805.00	11,622	9,288	9,288
806.00	16,338	13,980	23,268
808.00	20,651	36,989	60,257
809.00	26,716	23,684	83,941
810.00	29,463	28,090	112,030
811.00	29,463	29,463	141,493

Device	Routing	Invert	Outlet Devices
#1	Primary	806.00'	**12.0" Round Culvert** L= 622.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	807.00'	**8.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	804.01'	**8.300 in/hr Exfiltration over Surface area above 804.01'** Excluded Surface area = 7,001 sf

Discarded OutFlow Max=4.07 cfs @ 15.21 hrs HW=809.53' (Free Discharge)
3=Exfiltration (Exfiltration Controls 4.07 cfs)

Primary OutFlow Max=2.68 cfs @ 18.15 hrs HW=809.28' TW=805.96' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.68 cfs @ 3.41 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=806.00' TW=806.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond SW-P5.3: Summers landing POND 2 NORTH

Inflow = 80.22 cfs @ 12.50 hrs, Volume= 505,924 cf
Outflow = 22.34 cfs @ 12.72 hrs, Volume= 503,996 cf, Atten= 72%, Lag= 13.4 min
Primary = 4.77 cfs @ 12.62 hrs, Volume= 140,392 cf
Routed to Pond SW-P5.5 : Summers Landing 29I
Tertiary = 18.53 cfs @ 12.76 hrs, Volume= 363,604 cf
Routed to Pond SW-P5.5 : Summers Landing 29I

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 41,920 sf Storage= 152,896 cf
Peak Elev= 806.41' @ 13.90 hrs Surf.Area= 58,658 sf Storage= 322,266 cf (169,370 cf above start)

Plug-Flow detention time= 719.2 min calculated for 351,093 cf (69% of inflow)
Center-of-Mass det. time= 311.1 min (1,317.6 - 1,006.6)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	532,787 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	24,234	0	0
802.00	33,387	115,242	115,242
803.00	41,920	37,654	152,896
805.00	49,340	91,260	244,156
806.00	58,658	53,999	298,155
810.00	58,658	234,632	532,787

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Tertiary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.76 cfs @ 12.62 hrs HW=805.55' TW=803.52' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.76 cfs @ 6.06 fps)

Tertiary OutFlow Max=18.47 cfs @ 12.76 hrs HW=805.88' TW=804.69' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 18.47 cfs @ 3.27 fps)

Summary for Pond SW-P5.4: Summers Landing POND 2 SOUTH

Inflow = 40.03 cfs @ 12.47 hrs, Volume= 165,013 cf
Outflow = 9.50 cfs @ 12.68 hrs, Volume= 163,891 cf, Atten= 76%, Lag= 12.5 min
Primary = 3.74 cfs @ 12.62 hrs, Volume= 63,230 cf
Routed to Pond SW-P5.5 : Summers Landing 29l
Secondary = 6.56 cfs @ 12.70 hrs, Volume= 100,661 cf
Routed to Pond SW-P5.5 : Summers Landing 29l

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Starting Elev= 803.00' Surf.Area= 31,846 sf Storage= 105,243 cf
Peak Elev= 806.18' @ 15.48 hrs Surf.Area= 50,909 sf Storage= 231,607 cf (126,364 cf above start)

Plug-Flow detention time= 1,371.4 min calculated for 58,647 cf (36% of inflow)
Center-of-Mass det. time= 684.6 min (1,509.5 - 824.9)

Volume	Invert	Avail.Storage	Storage Description
#1	798.00'	324,420 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
798.00	15,145	0	0
802.00	23,612	77,514	77,514
803.00	31,846	27,729	105,243
805.00	40,039	71,885	177,128
806.00	50,909	45,474	222,602
808.00	50,909	101,818	324,420

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 802.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	804.00'	**3.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.72 cfs @ 12.62 hrs HW=804.76' TW=803.51' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.72 cfs @ 4.74 fps)

Secondary OutFlow Max=6.52 cfs @ 12.70 hrs HW=804.91' TW=804.23' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 6.52 cfs @ 2.39 fps)

Summary for Pond SW-P5.5: Summers Landing 29l

Inflow = 31.58 cfs @ 12.69 hrs, Volume= 667,886 cf
Outflow = 10.46 cfs @ 13.99 hrs, Volume= 667,691 cf, Atten= 67%, Lag= 77.9 min
Discarded = 2.50 cfs @ 13.19 hrs, Volume= 224,473 cf
Primary = 7.58 cfs @ 13.99 hrs, Volume= 441,578 cf
Routed to Pond 500P :
Tertiary = 0.38 cfs @ 13.99 hrs, Volume= 1,640 cf
Routed to Pond SW-P5.4 : Summers Landing POND 2 SOUTH

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs
Peak Elev= 806.32' @ 13.99 hrs Surf.Area= 15,768 sf Storage= 54,866 cf

Plug-Flow detention time= 98.1 min calculated for 667,691 cf (100% of inflow)
Center-of-Mass det. time= 96.8 min (1,461.5 - 1,364.7)

Volume	Invert	Avail.Storage	Storage Description
#1	800.00'	112,832 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
800.00	2,718	0	0
802.00	5,260	7,978	7,978
803.00	8,713	6,987	14,965
805.00	12,132	20,845	35,810
806.00	15,768	13,950	49,760
810.00	15,768	63,072	112,832

Device	Routing	Invert	Outlet Devices
#1	Primary	803.00'	**18.0" Round Culvert** L= 750.0' Ke= 0.700 Inlet / Outlet Invert= 803.00' / 801.00' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Tertiary	806.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.700 Inlet / Outlet Invert= 806.00' / 803.00' S= 0.0857 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Discarded	800.01'	**8.300 in/hr Exfiltration over Surface area above 800.01'** Excluded Surface area = 2,731 sf

Discarded OutFlow Max=2.50 cfs @ 13.19 hrs HW=806.00' (Free Discharge)
3=Exfiltration (Exfiltration Controls 2.50 cfs)

Primary OutFlow Max=7.58 cfs @ 13.99 hrs HW=806.32' TW=766.01' (Dynamic Tailwater)
1=Culvert (Barrel Controls 7.58 cfs @ 4.29 fps)

Tertiary OutFlow Max=0.38 cfs @ 13.99 hrs HW=806.32' TW=805.91' (Dynamic Tailwater)
2=Culvert (Inlet Controls 0.38 cfs @ 1.71 fps)

Summary for Link N: (new Link)

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link S: (new Link)

Inflow	=	24.45 cfs @	13.88 hrs,	Volume=	1,152,057 cf
Primary	=	24.45 cfs @	13.88 hrs,	Volume=	1,152,057 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Summary for Link W: Offsite Discharge

Inflow = 14.12 cfs @ 12.85 hrs, Volume= 154,883 cf
Primary = 14.12 cfs @ 12.85 hrs, Volume= 154,883 cf, Atten= 0%, Lag= 0.1 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.002 hrs

Appendix C: P8 Calculations

P8 Urban Catchment Model, Version 3.5

Case	00-123105 Existing.p8c	FirstDate	10/01/71	Run Date	01/23/26
Title	Msp Case	LastDate	12/31/00	Precip(in)	851.7
PrecFile	MSP_19700101-20001231.pcp	Events	2145	Rain(in)	739.41
PartFile	nurp50.p8p	TotalHrs	256426	Snow(in)	112.25
				TotalYrs	29.25

Mass Balances by Device and Variable

Device: OUT Type: PIPE Variable: TSS

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	217.86	0.01	20249.3	692.2	34.20
06 normal outlet	217.86	0.01	20249.3	692.2	34.20
09 total inflow	217.86	0.01	20249.3	692.2	34.20
10 surface outflow	217.86	0.01	20249.3	692.2	34.20
12 total outflow	217.86	0.01	20249.3	692.2	34.20
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	0.00	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	0.0	0.0	

Device: OUT Type: PIPE Variable: TP

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	217.86	0.01	105.4	3.6	0.18
06 normal outlet	217.86	0.01	105.4	3.6	0.18
09 total inflow	217.86	0.01	105.4	3.6	0.18
10 surface outflow	217.86	0.01	105.4	3.6	0.18
12 total outflow	217.86	0.01	105.4	3.6	0.18
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	0.00	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	0.0	0.0	

P8 Urban Catchment Model, Version 3.5

Case	00-123105 Existing.p8c	FirstDate	10/01/71	Run Date	01/23/26
Title	Msp Case	LastDate	12/31/00	Precip(in)	851.7
PrecFile	MSP_19700101-20001231.pcp	Events	2145	Rain(in)	739.41
PartFile	nurp50.p8p	TotalHrs	256426	Snow(in)	112.25
				TotalYrs	29.25

Case Title	Msp Case
Case Data File	00-123105 Existing.p8c
Path	L:\Engineering 3D\23\123105 Nesvig Lennar\Hydrology Design\P8\
Case Notes:	□
Storm Data File	MSP_19700101-20001231.pcp
Particle File	nurp50.p8p
Air Temp File File	MSP_19700101-20001231.tem

Time Steps Per Hour	60
Minimum Inter-Event Time (hrs)	10
Maximum Continuity Error %	2
Rainfall Breakpoint (inches)	0.8
Precipitation Scale Factor	1
Air Temp Offset (deg-F)	0
Loops Thru Storm File	5
Simulation Dates	
Start	1/1/1971
Keep	10/1/1971
Stop	12/31/2000

Max Snowfall Temperature (deg-f)	32.0
SnowMelt Temperature (deg-f)	32.0
Snowmelt Coef (in/degF-Day)	0.06
Soil Freeze Temp (deg-F)	32.0
Snowmelt Abstraction Factor	1.00
Evapo-Trans. Calibration Factor	1.00
Growing Season Start Month	5
Growing Season End Month	10

5-Day Antecedent Rainfall + Runoff (inches)		
CN Antecedent Moisture Condition	AMC-II	AMC-III
Growing Season	1.40	2.10
NonGrowing Season	0.50	1.10

Watershed Data

Watershed Name	GE	B	D	A	G	C	DN	BN	E	F	CE	AE			
Runoff to Device	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT			
Infiltration to Device															
Watershed Area	4.126543	10.289563	7.048876	21.971284	0.233278	11.649012	6.167615	9.32208	5.936556	11.410384	4.469643	4.071545			
SCS Curve Number (Pervious)	34.787287	62.405741	36.240027	57.876659	30	46.107832	30	51.874773	56.709477	65.144795	47.571612	52.578287			

Scale Factor for Pervious Runoff Load	1	1	1	1	1	1	1	1	1	1	1	1			
Indirectly Connected Imperv Fraction	0.012932	0.000969	0	0.000178	0	0	0	0	0.009322	0.000083	0.039028	0.074733			
UnSwept Impervious Fraction	0	0	0	0	0	0	0	0	0	0	0	0			
UnSwept Depression Storage (inches)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
UnSwept Imperv. Runoff Coefficient	1	1	1	1	1	1	1	1	1	1	1	1			
UnSwept Scale Factor for Particle Loads	1	1	1	1	1	1	1	1	1	1	1	1			
Swept Impervious Fraction	0	0	0	0	0	0	0	0	0	0	0	0			
Swept Depression Storage (inches)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
Swept Imperv. Runoff Coefficient	1	1	1	1	1	1	1	1	1	1	1	1			
Swept Scale Factor for Particle Loads	1	1	1	1	1	1	1	1	1	1	1	1			
Sweeping Frequency	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5			
Sweeping Efficiency	1	1	1	1	1	1	1	1	1	1	1	1			
Sweeping Start Date (MMDD)	101	101	101	101	101	101	101	101	101	101	101	101			
Sweeping Stop Date (MMDD)	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231			

Device Data															
Device Name	OUT														
Device Type	PIPE														
Infiltration Outlet															
Normal Outlet															
Spillway Outlet															
Particle Removal Scale Factor															
Bottom Elevation (ft)															
Bottom Area (acres)															
Permanent Pool Area (acres)															
Permanent Pool Volume (ac-ft)															
Perm Pool Infilt Rate (in/hr)															
Flood Pool Area (acres)															
Flood Pool Volume (ac-ft)															
Flood Pool Infilt Rate (in/hr)															
Infilt Basin Void Fraction (%)															
Detention Pond Outlet Parameters															
Outlet Type															
Outlet Orifice Diameter (in)															
Orifice Discharge Coef															
Outlet Weir Length (ft)															
Weir Discharge Coef															
Perforated Riser Height (ft)															
Number of Holes in Riser															
Holes Diameter															
Flood Pool Drain Time (hrs)															
Swale Parameters															
Length of Flow Path (ft)															
Slope of Flow Path %															
Bottom Width (ft)															
Side Slope (ft-v/ft-h)															
Maximum Depth of Flow (ft)															

Mannings n Constant															
Hydraulic Model															
Pipe, Splitter, Aquifer Parameter															
Hydraulic Res. Time (hrs)	0.5														

Particle Data					
Particle File	nurp50.p8p				
Particle Class	P0%	P10%	P30%	P50%	P80%
Filtration Efficiency (%)	90	100	100	100	100
Settling Velocity (ft/hr)	0	0.03	0.3	1.5	15
First Order Decay Rate (1/day)	0	0	0	0	0
2nd Order Decay (1/day-ppm)	0	0	0	0	0
Impervious Runoff Conc (ppm)	1	0	0	0	0
Pervious Runoff Conc (ppm)	1	100	100	100	200
Pervious Conc Exponent	0	1	1	1	1
Accum. Rate (lbs-ac-day)	0	1.75	1.75	1.75	3.5
Particle Removal Rate (1/day)	0	0.25	0.25	0.25	0.25
Washoff Coefficient	0	20	20	20	20
Washoff Exponent	0	2	2	2	2
Sweeper Efficiency	0	0	0	5	15

Water Quality Component Data										
Component Name	TSS	TP	TKN	CU	PB	ZN	HC			
Water Quality Criteria (ppm)										
Level 1	5	0.025	2	2	0.02	5	0.1			
Level 2	10	0.05	1	0.0048	0.014	0.0362	0.5			
Level 3	20	0.1	0.5	0.02	0.15	0.38	1			
Content Scale Factor	1	1	1	1	1	1	1			
Particle Composition (mg/kg)										
P0%	0	99000	600000	13600	2000	640000	250000			
P10%	1000000	3850	15000	340	180	1600	22500			
P30%	1000000	3850	15000	340	180	1600	22500			
P50%	1000000	3850	15000	340	180	1600	22500			
P80%	1000000	0	0	340	180	0	22500			

P8 Urban Catchment Model, Version 3.5				Run Date	01/23/26
Case	00-123105 Proposed.p8c	FirstDate	01/01/71	Precip(in)	870.4
Title	Startup Case	LastDate	12/31/00	Rain(in)	756.51
PrecFile	MSP_19700101-20001231.pcp	Events	2196	Snow(in)	113.84
PartFile	nurp50.p8p	TotalHrs	261888	TotalYrs	29.88

Case Title	Startup Case
Case Data File	00-123105 Proposed.p8c
Path	L:\Engineering 3D\23\123105 Nesvig Lennar\Hydrology Design\P8\
Case Notes:	simple startup case□
Storm Data File	MSP_19700101-20001231.pcp
Particle File	nurp50.p8p
Air Temp File File	MSP_19700101-20001231.tem

Time Steps Per Hour	4
Minimum Inter-Event Time (hrs)	10
Maximum Continuity Error %	2
Rainfall Breakpoint (inches)	0.8
Precipitation Scale Factor	1
Air Temp Offset (deg-F)	0
Loops Thru Storm File	1
Simulation Dates	
Start	1/1/1971
Keep	1/1/1971
Stop	12/31/2000

Max Snowfall Temperature (deg-f)	32.0
SnowMelt Temperature (deg-f)	32.0
Snowmelt Coef (in/degF-Day)	0.06
Soil Freeze Temp (deg-F)	32.0
Snowmelt Abstraction Factor	1.00
Evapo-Trans. Calibration Factor	1.00
Growing Season Start Month	5
Growing Season End Month	10

5-Day Antecedent Rainfall + Runoff (inches)		
CN Antecedent Moisture Condition	AMC-II	AMC-III
Growing Season	1.40	2.10
NonGrowing Season	0.50	1.10

Watershed Data

Watershed Name	650	650N	600	500	500E	400	400E	300	300N	200	100	3	2	2N	1	1E
Runoff to Device	BASIN 600	OUT	BASIN 600	BASIN 500	BASIN 500	BASIN 400	BASIN 400	BASIN 300	BASIN 300	BASIN 200	BASIN 100	OUT	OUT	OUT	OUT	OUT
Infiltration to Device																
Watershed Area	3.610253	9.32411	5.611256	7.370038	7.014381	19.04096	8.067247	12.217264	0.272179	4.367961	9.582481	3.682539	0.534007	3.47557	2.522193	0.005969
SCS Curve Number (Pervious)	59.484466	51.858929	58.753206	45.715537	44.495895	59.496435	54.209158	62.235175	30	59.886869	61.328126	54.056147	61	30.075229	60.475785	58
Scale Factor for Pervious Runoff Load	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Indirectly Connected Imperv Fraction	0.104532	0	0.094418	0.053732	0.051643	0.043994	0.023957	0.049335	0	0.027303	0.03723	0.05502	0.22187	0	0.198873	0

UnSwept Impervious Fraction	0	0	0	0	0	0.395943	0.21561	0.444017	0	0.245723	0.335071	0	0	0	0	0
UnSwept Depression Storage (inches)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
UnSwept Imperv. Runoff Coefficient	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UnSwept Scale Factor for Particle Loads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Swept Impervious Fraction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Swept Depression Storage (inches)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Swept Imperv. Runoff Coefficient	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Swept Scale Factor for Particle Loads	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sweeping Frequency	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sweeping Efficiency	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sweeping Start Date (MMDD)	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
Sweeping Stop Date (MMDD)	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231	1231

Device Data																
Device Name	BASIN 100I	BASIN 110/220	BASIN 100	BASIN 200I	BASIN 200	BASIN 300I	BASIN 600	BASIN 300	BASIN 400I	BASIN 400	BASIN 500	OUT				
Device Type	INF_BASIN	POND	POND	INF_BASIN	POND	INF_BASIN	POND	POND	INF_BASIN	POND	POND	PIPE				
Infiltration Outlet																
Normal Outlet			BASIN 100I		BASIN 200I			BASIN 300I		BASIN 400I	BASIN 600					
Spillway Outlet			BASIN 110/220		BASIN 110/220			BASIN 600		BASIN 600	BASIN 600					
Particle Removal Scale Factor	1	1	1	1	1	1	1	1	1	1	1					
Bottom Elevation (ft)	749	749	746	749	746	752	751	747	752	746	762					
Bottom Area (acres)	0.123	0.39	0.06	0.05	0.02	0.22	0.34	0.11	0.51	0.07	0.11					
Permanent Pool Area (acres)		0.39	0.14		0.05		0	0.366		0.33	0.11					
Permanent Pool Volume (ac-ft)		0.01	0.22		0.05		0	0.95		1.23	0.01					
Perm Pool Infilt Rate (in/hr)		0	0		0		0.8	0		0	0.8					
Flood Pool Area (acres)	0.26	0.69	0.61	0.16	0.15	0.31	3.2	0.55	0.65	0.56	0.79					
Flood Pool Volume (ac-ft)	0.59	1.21	0.69	0.16	0.55	0.58	6.68	0.92	1.02	1.36	1.23					
Flood Pool Infilt Rate (in/hr)	0.8	0.8	0	0.8	0	0.8	0.8	0	0.8	0	0.8					
Infilt Basin Void Fraction (%)	100			100		100			100							
Detention Pond Outlet Parameters																
Outlet Type		ORIFICE	ORIFICE		ORIFICE		ORIFICE	ORIFICE		ORIFICE	ORIFICE					
Outlet Orifice Diameter (in)		24	15		15		36	15		18	15					
Orifice Discharge Coef		0.5	0.6		0.6		0.6	0.6		0.6	0.6					
Outlet Weir Length (ft)																
Weir Discharge Coef																
Perforated Riser Height (ft)																
Number of Holes in Riser																
Holes Diameter																
Flood Pool Drain Time (hrs)																
Swale Parameters																
Length of Flow Path (ft)																
Slope of Flow Path %																
Bottom Width (ft)																
Side Slope (ft-v/ft-h)																
Maximum Depth of Flow (ft)																
Mannings n Constant																
Hydraulic Model																
Pipe, Splitter, Aquifer Parameter																
Hydraulic Res. Time (hrs)												0				

Particle Data					
Particle File	nurp50.p8p				
Particle Class	P0%	P10%	P30%	P50%	P80%
Filtration Efficiency (%)	90	100	100	100	100
Settling Velocity (ft/hr)	0	0.03	0.3	1.5	15
First Order Decay Rate (1/day)	0	0	0	0	0
2nd Order Decay (1/day-ppm)	0	0	0	0	0
Impervious Runoff Conc (ppm)	1	0	0	0	0
Pervious Runoff Conc (ppm)	1	100	100	100	200
Pervious Conc Exponent	0	1	1	1	1
Accum. Rate (lbs-ac-day)	0	1.75	1.75	1.75	3.5
Particle Removal Rate (1/day)	0	0.25	0.25	0.25	0.25
Washoff Coefficient	0	20	20	20	20
Washoff Exponent	0	2	2	2	2
Sweeper Efficiency	0	0	0	5	15

Water Quality Component Data										
Component Name	TSS	TP	TKN	CU	PB	ZN	HC			
Water Quality Criteria (ppm)										
Level 1	5	0.025	2	2	0.02	5	0.1			
Level 2	10	0.05	1	0.0048	0.014	0.0362	0.5			
Level 3	20	0.1	0.5	0.02	0.15	0.38	1			
Content Scale Factor	1	1	1	1	1	1	1			
Particle Composition (mg/kg)										
P0%	0	99000	600000	13600	2000	64000	250000			
P10%	1000000	3850	15000	340	180	1600	22500			
P30%	1000000	3850	15000	340	180	1600	22500			
P50%	1000000	3850	15000	340	180	1600	22500			
P80%	1000000	0	0	340	180	0	22500			

P8 Urban Catchment Model, Version 3.5

Case	00-123105 Proposed.p8c	FirstDate	01/01/71	Run Date	01/23/26
Title	Startup Case	LastDate	12/31/00	Precip(in)	870.4
PrecFile	MSP_19700101-20001231.pcp	Events	2196	Rain(in)	756.51
PartFile	nurp50.p8p	TotalHrs	261888	Snow(in)	113.84
				TotalYrs	29.88

Mass Balances by Device and Variable

Device: OVERALL Type: NONE Variable: P0%

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	4164.2	139.4	1.00
03 infiltrate	1401.21	0.06	3801.5	127.2	1.00
04 exfiltrate	1401.21	0.06	380.1	12.7	0.10
05 filtered	0.00	0.00	3421.3	114.5	
06 normal outlet	71.81	0.00	195.0	6.5	1.00
07 spillway outlet	59.13	0.00	160.8	5.4	1.00
09 total inflow	1532.08	0.07	4164.2	139.4	1.00
10 surface outflow	130.94	0.01	355.9	11.9	1.00
11 groundw outflow	1401.21	0.06	380.1	12.7	0.10
12 total outflow	1532.15	0.07	736.0	24.6	0.18
13 total trapped	0.00	0.00	3421.3	114.5	
14 storage increase	0.00	0.00	6.7	0.2	
15 mass balance check	-0.07	0.00	0.1	0.0	
Reduction (%)	0.00	0.00	82.2	82.2	

Device: OVERALL Type: NONE Variable: P10%

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	80743.4	2702.7	19.39
03 infiltrate	1401.21	0.06	20491.8	685.9	5.38
04 exfiltrate	1401.21	0.06	0.0	0.0	0.00
05 filtered	0.00	0.00	20491.8	685.9	
06 normal outlet	71.81	0.00	1747.6	58.5	8.95
07 spillway outlet	59.13	0.00	1617.8	54.2	10.07
08 sedimen + decay	0.00	0.00	56884.5	1904.1	
09 total inflow	1532.08	0.07	80743.4	2702.7	19.39
10 surface outflow	130.94	0.01	3365.4	112.6	9.46
11 groundw outflow	1401.21	0.06	0.0	0.0	0.00
12 total outflow	1532.15	0.07	3365.4	112.6	0.81
13 total trapped	0.00	0.00	77376.3	2590.0	
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	-0.07	0.00	1.6	0.1	
Reduction (%)	0.00	0.00	95.8	95.8	

Device: OVERALL Type: NONE Variable: P30%

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	80743.4	2702.7	19.39
03 infiltrate	1401.21	0.06	3217.0	107.7	0.84
04 exfiltrate	1401.21	0.06	0.0	0.0	0.00
05 filtered	0.00	0.00	3217.0	107.7	
06 normal outlet	71.81	0.00	1454.5	48.7	7.45
07 spillway outlet	59.13	0.00	914.1	30.6	5.69
08 sedimen + decay	0.00	0.00	75157.7	2515.7	
09 total inflow	1532.08	0.07	80743.4	2702.7	19.39
10 surface outflow	130.94	0.01	2368.6	79.3	6.66
11 groundw outflow	1401.21	0.06	0.0	0.0	0.00
12 total outflow	1532.15	0.07	2368.6	79.3	0.57
13 total trapped	0.00	0.00	78374.7	2623.4	
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	-0.07	0.00	0.1	0.0	
Reduction (%)	0.00	0.00	97.1	97.1	

Device: OVERALL Type: NONE Variable: P50%

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	80743.4	2702.7	19.39
03 infiltrate	1401.21	0.06	416.1	13.9	0.11
04 exfiltrate	1401.21	0.06	0.0	0.0	0.00
05 filtered	0.00	0.00	416.1	13.9	
06 normal outlet	71.81	0.00	1105.3	37.0	5.66
07 spillway outlet	59.13	0.00	324.0	10.8	2.02
08 sedimen + decay	0.00	0.00	78898.0	2640.9	
09 total inflow	1532.08	0.07	80743.4	2702.7	19.39
10 surface outflow	130.94	0.01	1429.3	47.8	4.02
11 groundw outflow	1401.21	0.06	0.0	0.0	0.00
12 total outflow	1532.15	0.07	1429.3	47.8	0.34
13 total trapped	0.00	0.00	79314.1	2654.8	
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	-0.07	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	98.2	98.2	

Device: OVERALL Type: NONE Variable: P80%

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	161486.8	5405.3	38.78
03 infiltrate	1401.21	0.06	19.4	0.6	0.01
04 exfiltrate	1401.21	0.06	0.0	0.0	0.00
05 filtered	0.00	0.00	19.4	0.6	
06 normal outlet	71.81	0.00	1703.7	57.0	8.73
07 spillway outlet	59.13	0.00	24.8	0.8	0.15
08 sedimen + decay	0.00	0.00	159738.8	5346.8	

09 total inflow	1532.08	0.07	161486.8	5405.3	38.78
10 surface outflow	130.94	0.01	1728.6	57.9	4.86
11 groundw outflow	1401.21	0.06	0.0	0.0	0.00
12 total outflow	1532.15	0.07	1728.6	57.9	0.42
13 total trapped	0.00	0.00	159758.2	5347.5	
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	-0.07	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	98.9	98.9	

Device: OVERALL Type: NONE Variable: TSS

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	403717.0	13513.3	96.95
03 infiltrate	1401.21	0.06	24144.3	808.2	6.34
04 exfiltrate	1401.21	0.06	0.0	0.0	0.00
05 filtered	0.00	0.00	24144.3	808.2	
06 normal outlet	71.81	0.00	6011.2	201.2	30.80
07 spillway outlet	59.13	0.00	2880.7	96.4	17.92
08 sedimen + decay	0.00	0.00	370679.0	12407.5	
09 total inflow	1532.08	0.07	403717.0	13513.3	96.95
10 surface outflow	130.94	0.01	8892.0	297.6	24.99
11 groundw outflow	1401.21	0.06	0.0	0.0	0.00
12 total outflow	1532.15	0.07	8892.0	297.6	2.14
13 total trapped	0.00	0.00	394823.3	13215.7	
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	-0.07	0.00	1.7	0.1	
Reduction (%)	0.00	0.00	97.8	97.8	

Device: OVERALL Type: NONE Variable: TP

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	1344.8	45.0	0.32
03 infiltrate	1401.21	0.06	469.2	15.7	0.12
04 exfiltrate	1401.21	0.06	37.6	1.3	0.01
05 filtered	0.00	0.00	431.6	14.4	
06 normal outlet	71.81	0.00	35.9	1.2	0.18
07 spillway outlet	59.13	0.00	26.9	0.9	0.17
08 sedimen + decay	0.00	0.00	812.1	27.2	
09 total inflow	1532.08	0.07	1344.8	45.0	0.32
10 surface outflow	130.94	0.01	62.8	2.1	0.18
11 groundw outflow	1401.21	0.06	37.6	1.3	0.01
12 total outflow	1532.15	0.07	100.4	3.4	0.02
13 total trapped	0.00	0.00	1243.7	41.6	
14 storage increase	0.00	0.00	0.7	0.0	
15 mass balance check	-0.07	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	92.5	92.5	

Device: OVERALL Type: NONE Variable: TKN

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	6132.0	205.3	1.47
03 infiltrate	1401.21	0.06	2642.7	88.5	0.69
04 exfiltrate	1401.21	0.06	228.1	7.6	0.06
05 filtered	0.00	0.00	2414.7	80.8	
06 normal outlet	71.81	0.00	181.6	6.1	0.93
07 spillway outlet	59.13	0.00	139.3	4.7	0.87
08 sedimen + decay	0.00	0.00	3164.1	105.9	
09 total inflow	1532.08	0.07	6132.0	205.3	1.47
10 surface outflow	130.94	0.01	321.0	10.7	0.90
11 groundw outflow	1401.21	0.06	228.1	7.6	0.06
12 total outflow	1532.15	0.07	549.1	18.4	0.13
13 total trapped	0.00	0.00	5578.8	186.7	
14 storage increase	0.00	0.00	4.0	0.1	
15 mass balance check	-0.07	0.00	0.1	0.0	
Reduction (%)	0.00	0.00	91.0	91.0	

Device: OVERALL Type: NONE Variable: CU

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	193.9	6.5	0.05
03 infiltrate	1401.21	0.06	59.9	2.0	0.02
04 exfiltrate	1401.21	0.06	5.2	0.2	0.00
05 filtered	0.00	0.00	54.7	1.8	
06 normal outlet	71.81	0.00	4.7	0.2	0.02
07 spillway outlet	59.13	0.00	3.2	0.1	0.02
08 sedimen + decay	0.00	0.00	126.0	4.2	
09 total inflow	1532.08	0.07	193.9	6.5	0.05
10 surface outflow	130.94	0.01	7.9	0.3	0.02
11 groundw outflow	1401.21	0.06	5.2	0.2	0.00
12 total outflow	1532.15	0.07	13.0	0.4	0.00
13 total trapped	0.00	0.00	180.8	6.1	
14 storage increase	0.00	0.00	0.1	0.0	
15 mass balance check	-0.07	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	93.2	93.2	

Device: OVERALL Type: NONE Variable: PB

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	81.0	2.7	0.02
03 infiltrate	1401.21	0.06	11.9	0.4	0.00
04 exfiltrate	1401.21	0.06	0.8	0.0	0.00
05 filtered	0.00	0.00	11.2	0.4	
06 normal outlet	71.81	0.00	1.5	0.0	0.01
07 spillway outlet	59.13	0.00	0.8	0.0	0.01

08 sedimen + decay	0.00	0.00	66.7	2.2	
09 total inflow	1532.08	0.07	81.0	2.7	0.02
10 surface outflow	130.94	0.01	2.3	0.1	0.01
11 groundw outflow	1401.21	0.06	0.8	0.0	0.00
12 total outflow	1532.15	0.07	3.1	0.1	0.00
13 total trapped	0.00	0.00	77.9	2.6	
14 storage increase	0.00	0.00	0.0	0.0	
15 mass balance check	-0.07	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	96.2	96.2	

Device: OVERALL Type: NONE Variable: ZN

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	654.1	21.9	0.16
03 infiltrate	1401.21	0.06	281.9	9.4	0.07
04 exfiltrate	1401.21	0.06	24.3	0.8	0.01
05 filtered	0.00	0.00	257.6	8.6	
06 normal outlet	71.81	0.00	19.4	0.6	0.10
07 spillway outlet	59.13	0.00	14.9	0.5	0.09
08 sedimen + decay	0.00	0.00	337.5	11.3	
09 total inflow	1532.08	0.07	654.1	21.9	0.16
10 surface outflow	130.94	0.01	34.2	1.1	0.10
11 groundw outflow	1401.21	0.06	24.3	0.8	0.01
12 total outflow	1532.15	0.07	58.6	2.0	0.01
13 total trapped	0.00	0.00	595.1	19.9	
14 storage increase	0.00	0.00	0.4	0.0	
15 mass balance check	-0.07	0.00	0.0	0.0	
Reduction (%)	0.00	0.00	91.0	91.0	

Device: OVERALL Type: NONE Variable: HC

Mass Balance Term	Flow_acft	Flow_cfs	Load_lbs	Load_lbs/yr	Conc_ppm
01 watershed inflows	1532.08	0.07	10124.7	338.9	2.43
03 infiltrate	1401.21	0.06	1493.6	50.0	0.39
04 exfiltrate	1401.21	0.06	95.0	3.2	0.02
05 filtered	0.00	0.00	1398.6	46.8	
06 normal outlet	71.81	0.00	184.0	6.2	0.94
07 spillway outlet	59.13	0.00	105.0	3.5	0.65
08 sedimen + decay	0.00	0.00	8340.3	279.2	
09 total inflow	1532.08	0.07	10124.7	338.9	2.43
10 surface outflow	130.94	0.01	289.0	9.7	0.81
11 groundw outflow	1401.21	0.06	95.0	3.2	0.02
12 total outflow	1532.15	0.07	384.1	12.9	0.09
13 total trapped	0.00	0.00	9738.9	326.0	
14 storage increase	0.00	0.00	1.7	0.1	
15 mass balance check	-0.07	0.00	0.1	0.0	
Reduction (%)	0.00	0.00	96.2	96.2	

Appendix D: NRCS Soils Report & Geotechnical Reports

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Washington County, Minnesota

Talcott Glen



January 12, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 21, Sep 10, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7B	Hubbard loamy sand, 1 to 6 percent slopes	9.1	12.5%
7D	Hubbard loamy sand, 12 to 18 percent slopes	12.8	17.5%
8	Sparta loamy sand, 0 to 2 percent slopes	2.5	3.5%
100B	Copaston loam, 0 to 6 percent slopes	7.8	10.7%
151	Burkhardt sandy loam, 0 to 3 percent slopes	6.0	8.2%
151B	Burkhardt sandy loam, 3 to 9 percent slopes	10.2	14.0%
298	Richwood silt loam, 0 to 2 percent slopes	6.8	9.3%
327	Dickman sandy loam, 0 to 2 percent slopes	10.4	14.3%
529	Ripon silt loam, 1 to 2 percent slopes	7.4	10.2%
Totals for Area of Interest		**73.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They

generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Washington County, Minnesota

7B—Hubbard loamy sand, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1t932
Elevation: 700 to 1,500 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hubbard and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hubbard

Setting

Landform: Outwash plains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash

Typical profile

Ap,AB - 0 to 20 inches: loamy sand
Bw - 20 to 35 inches: sand
C - 35 to 60 inches: sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Dickman

Percent of map unit: 5 percent

Hydric soil rating: No

Sparta

Percent of map unit: 5 percent
Hydric soil rating: No

7D—Hubbard loamy sand, 12 to 18 percent slopes

Map Unit Setting

National map unit symbol: 1t934
Elevation: 700 to 1,500 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hubbard and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hubbard

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Outwash

Typical profile

Ap,AB - 0 to 20 inches: loamy sand
Bw - 20 to 35 inches: sand
C - 35 to 60 inches: sand

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland

Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

8—Sparta loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1t935
Elevation: 700 to 1,200 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Sparta and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sparta

Setting

Landform: Outwash terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

Ap,AB - 0 to 16 inches: loamy sand
Bw - 16 to 28 inches: loamy sand
C - 28 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Dickman
Percent of map unit: 4 percent
Hydric soil rating: No

Hubbard
Percent of map unit: 3 percent
Hydric soil rating: No

Sparta, bedrock substratum
Percent of map unit: 3 percent
Hydric soil rating: No

100B—Copaston loam, 0 to 6 percent slopes

Map Unit Setting
National map unit symbol: 1t93h
Elevation: 700 to 1,200 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Copaston and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Copaston

Setting
Landform: Terraces, hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy sediment over bedrock

Typical profile
A - 0 to 8 inches: loam
Bw1 - 8 to 14 inches: sandy loam
Bw2 - 14 to 18 inches: gravelly sandy loam
2R - 18 to 22 inches: unweathered bedrock

Properties and qualities
Slope: 0 to 6 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F090AY014WI - Loamy Bedrock Upland
Forage suitability group: Rocky (G090AN019MN)
Other vegetative classification: Rocky (G090AN019MN)
Hydric soil rating: No

151—Burkhardt sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 1t93r
Elevation: 700 to 1,900 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Burkhardt and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burkhardt

Setting
Landform: Outwash terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits over outwash

Typical profile
A1,A2 - 0 to 13 inches: sandy loam
AB - 13 to 16 inches: sandy loam
2BC,2C - 16 to 60 inches: gravelly coarse sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Dickman

Percent of map unit: 4 percent
Hydric soil rating: No

Hubbard

Percent of map unit: 3 percent
Hydric soil rating: No

Sparta

Percent of map unit: 3 percent
Hydric soil rating: No

151B—Burkhardt sandy loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1t93s
Elevation: 700 to 1,900 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Burkhardt and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burkhardt

Setting

Landform: Outwash terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits over outwash

Typical profile

A1,A2 - 0 to 13 inches: sandy loam
AB - 13 to 16 inches: sandy loam
2BC,2C - 16 to 60 inches: gravelly coarse sand

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Dickman

Percent of map unit: 4 percent
Hydric soil rating: No

Hubbard

Percent of map unit: 3 percent
Hydric soil rating: No

Sparta

Percent of map unit: 3 percent
Hydric soil rating: No

298—Richwood silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1t94p
Elevation: 700 to 1,950 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Richwood and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Richwood

Setting

Landform: Outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over outwash

Typical profile

Ap,A - 0 to 19 inches: silt loam
Bt - 19 to 49 inches: silt loam
2C - 49 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Sloping Upland, Neutral (G090AN002MN)
Other vegetative classification: Sloping Upland, Neutral (G090AN002MN)
Hydric soil rating: No

Minor Components

Lindstrom

Percent of map unit: 10 percent
Hydric soil rating: No

327—Dickman sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1t94w
Elevation: 700 to 1,600 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dickman and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dickman

Setting

Landform: Outwash terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash

Typical profile

Ap,A - 0 to 14 inches: sandy loam
Bw - 14 to 17 inches: sandy loam
2BC,2C - 17 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Sandy (G090AN022MN)
Other vegetative classification: Sandy (G090AN022MN)
Hydric soil rating: No

Minor Components

Hubbard

Percent of map unit: 5 percent
Hydric soil rating: No

Sparta

Percent of map unit: 5 percent
Hydric soil rating: No

529—Ripon silt loam, 1 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1t962
Elevation: 700 to 1,950 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 39 to 48 degrees F
Frost-free period: 120 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ripon and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ripon

Setting

Landform: Terraces, hills
Landform position (two-dimensional): Summit
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over limestone bedrock

Typical profile

A - 0 to 13 inches: silt loam
Bt - 13 to 26 inches: silt loam
2R - 26 to 30 inches: unweathered bedrock

Properties and qualities

Slope: 1 to 2 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F090AY014WI - Loamy Bedrock Upland
Forage suitability group: Rocky (G090AN019MN)
Other vegetative classification: Rocky (G090AN019MN)
Hydric soil rating: No

Minor Components

Channahon

Percent of map unit: 4 percent
Hydric soil rating: No

Whalan

Percent of map unit: 3 percent
Hydric soil rating: No

Waukegan

Percent of map unit: 3 percent
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Management

Land management interpretations are tools designed to guide the user in evaluating existing conditions in planning and predicting the soil response to various land management practices, for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture, and rangeland. Example interpretations include suitability for a variety of irrigation practices, log landings, haul roads and major skid trails, equipment operability, site preparation, suitability for hand and mechanical planting, potential erosion hazard associated with various practices, and ratings for fencing and waterline installation.

Erosion Hazard (Off-Road, Off-Trail) (Talcott Glen)

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope, soil erosion factor K, and an index of rainfall erosivity (R). The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

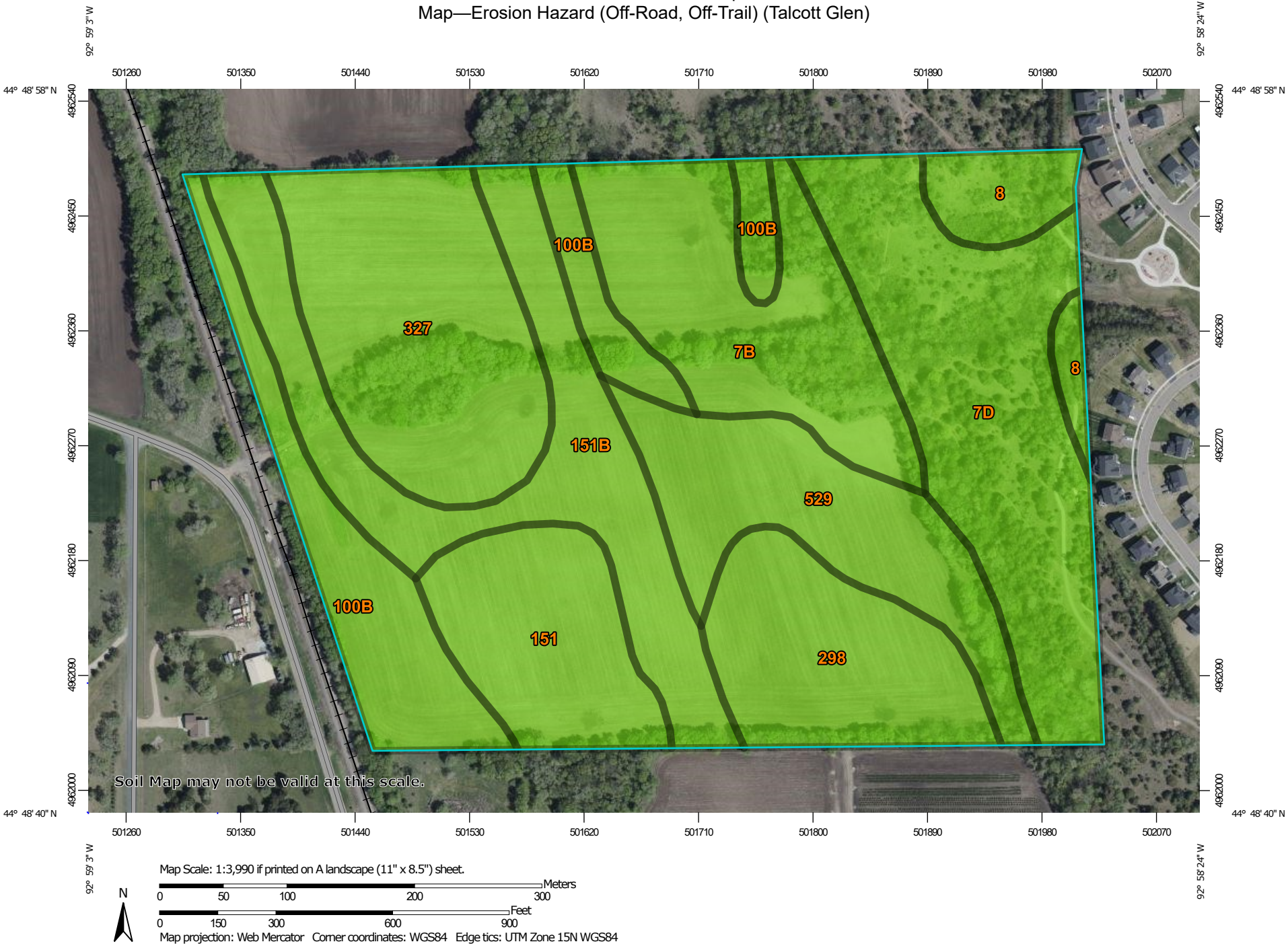
The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report
Map—Erosion Hazard (Off-Road, Off-Trail) (Talcott Glen)



Map Scale: 1:3,990 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Lines
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Soil Rating Points
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 21, Sep 10, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Erosion Hazard (Off-Road, Off-Trail) (Talcott Glen)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
7B	Hubbard loamy sand, 1 to 6 percent slopes	Slight	Hubbard (90%)		9.1	12.5%
7D	Hubbard loamy sand, 12 to 18 percent slopes	Slight	Hubbard (100%)		12.8	17.5%
8	Sparta loamy sand, 0 to 2 percent slopes	Slight	Sparta (90%)		2.5	3.5%
100B	Copaston loam, 0 to 6 percent slopes	Slight	Copaston (100%)		7.8	10.7%
151	Burkhardt sandy loam, 0 to 3 percent slopes	Slight	Burkhardt (90%)		6.0	8.2%
151B	Burkhardt sandy loam, 3 to 9 percent slopes	Slight	Burkhardt (90%)		10.2	14.0%
298	Richwood silt loam, 0 to 2 percent slopes	Slight	Richwood (90%)		6.8	9.3%
327	Dickman sandy loam, 0 to 2 percent slopes	Slight	Dickman (90%)		10.4	14.3%
529	Ripon silt loam, 1 to 2 percent slopes	Slight	Ripon (90%)		7.4	10.2%
Totals for Area of Interest					**73.0**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Slight	73.0	100.0%
Totals for Area of Interest	**73.0**	**100.0%**

Rating Options—Erosion Hazard (Off-Road, Off-Trail) (Talcott Glen)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

RUSLE2 Related Attributes (Talcott Glen)

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factor Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic layer.

Report—RUSLE2 Related Attributes (Talcott Glen)

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed or the first mineral horizon below an organic surface horizon. Organic horizons are not displayed.

RUSLE2 Related Attributes–Washington County, Minnesota

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
7B—Hubbard loamy sand, 1 to 6 percent slopes								
Hubbard	90	131	A	.02	5	83.8	9.2	7.0
7D—Hubbard loamy sand, 12 to 18 percent slopes								
Hubbard	100	121	A	.02	5	83.8	9.2	7.0

RUSLE2 Related Attributes–Washington County, Minnesota								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
8—Sparta loamy sand, 0 to 2 percent slopes								
Sparta	90	131	A	.17	5	84.3	9.2	6.5
100B—Copaston loam, 0 to 6 percent slopes								
Copaston	100	112	D	.28	1	43.0	38.5	18.5
151—Burkhardt sandy loam, 0 to 3 percent slopes								
Burkhardt	90	177	A	.24	2	67.4	23.6	9.0
151B—Burkhardt sandy loam, 3 to 9 percent slopes								
Burkhardt	90	131	A	.24	2	67.4	23.6	9.0
298—Richwood silt loam, 0 to 2 percent slopes								
Richwood	90	102	B	.37	4	11.7	69.8	18.5
327—Dickman sandy loam, 0 to 2 percent slopes								
Dickman	90	131	A	.20	2	68.3	19.7	12.0
529—Ripon silt loam, 1 to 2 percent slopes								
Ripon	90	121	C	.43	2	14.2	71.8	14.0

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BRAUN INTERTEC

the science you build on

Geotechnical Evaluation Report

Nesvig Property

East of Grey Cloud Trail South & Geneva Avenue South
Cottage Grove, Minnesota

Prepared for

Lennar Corporation

Professional Certification:
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.

Ryan M. Braun, PE
Project Engineer
License Number: 60238
December 16, 2025

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Braun Intertec Corporation

Project B2508001

December 16, 2025 Project B2508001

Jacob Champeau
Lennar Corporation
16355 36th Avenue North, Suite #100
Plymouth, MN 55446

Re: Geotechnical Evaluation
Nesvig Property
East of Grey Cloud Trail South & Geneva Avenue South
Cottage Grove, Minnesota

Dear Mr. Champeau:

We are pleased to present this geotechnical evaluation report for the new residential development located on the Nesvig Property. Please read the entire report for the results of the soil borings and our recommendations.

Thank you for making Braun Intertec Corporation (Braun Intertec) your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Ryan Braun at 952.738.2171 (rbraun@braunintertec.com) or Joe Westphal at 952.995.2238 (jwestphal@braunintertec.com).

Sincerely,
Braun Intertec Corporation

Ryan M. Braun, PE
Project Engineer

Joseph L. Westphal, PE
Director, Senior Engineer

c: Mr. Steve Troskey, Lennar Corporation
Mr. Joseph Jablonski, Lennar Corporation
Mr. Nicholas Polta, Pioneer Engineering P.A

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Descriptive Terminology of Soil

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1.0 Introduction

1.1 Project Description

This geotechnical evaluation report addresses the proposed design and construction of the residential development, located east of Grey Cloud Trail South and Geneva Avenue South in Cottage Grove, Minnesota. The project will include the construction of a new single-family residential development. The proposed development will also include associated streets, sidewalks, curb and gutter, site utilities, and stormwater management features. The provided site layout shows the proposed development will include a total of 164 single-family homes. We understand that the homes could consist of a variety of types within the development including slab-on-grade, full basement, walk-out and look-out style homes. Figure 1-1 below shows an illustration of the proposed site layout.

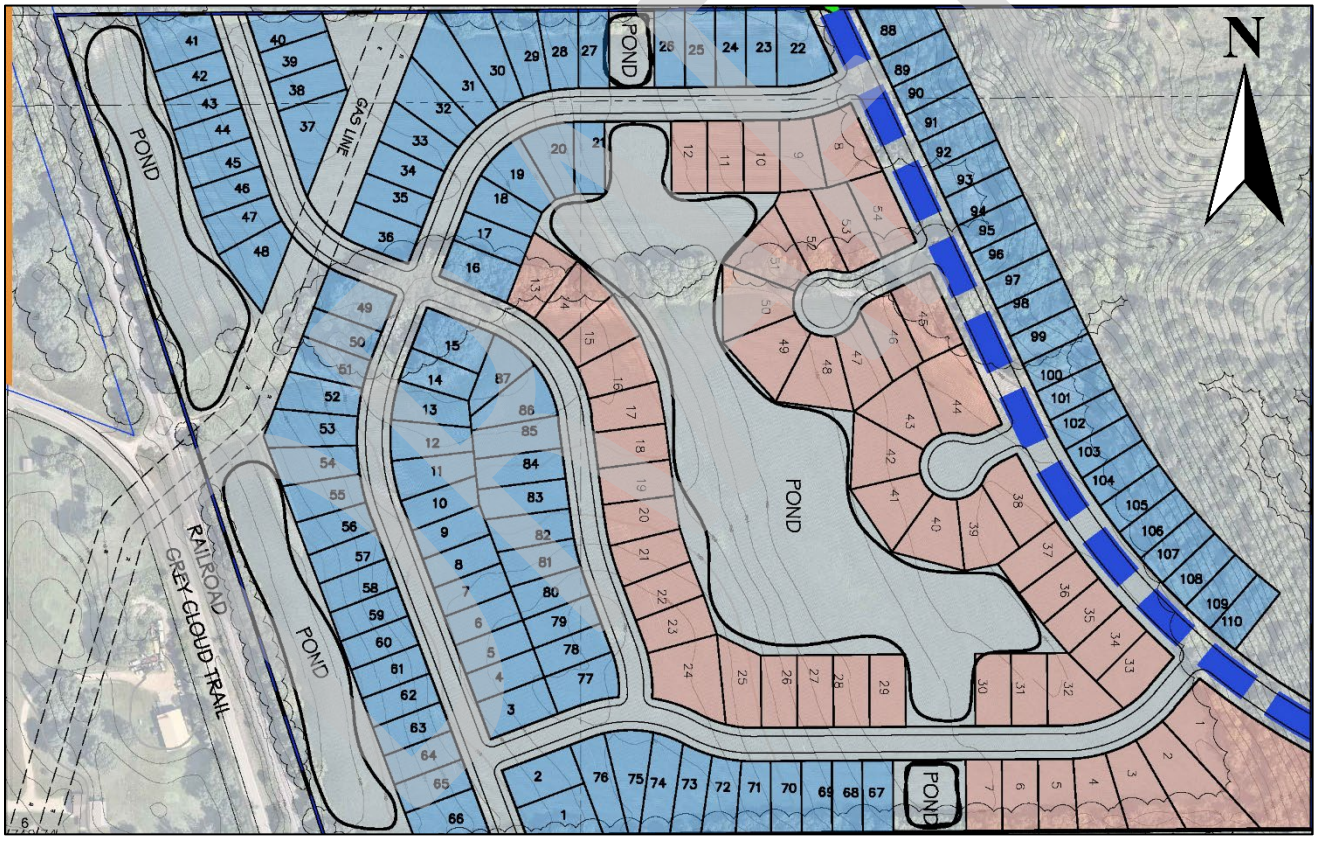

Figure 1-1. Site Layout
Figure provided by Pioneer Engineering dated July 14, 2025.

1.1.1 Structural Loads

We have assumed that the construction will consist of one to two-story, wood framed homes with full- or partial-depth basements, supported by cast in place concrete foundations. We have assumed that bearing

wall loads associated with the proposed residential construction will range from 3 to 4 kips (3,000 to 4,000) per linear foot (klf) and column loads, if any, will be no greater than 50 kips per column.

1.1.2 Pavement and Traffic Loads

We have assumed that bituminous pavements, typical of residential neighborhoods, will be subject to normal traffic conditions of cars, with occasional school buses, garbage trucks and light delivery trucks and road maintenance equipment estimated to be under 150,000 equivalent single axle loads (ESAL) over an assumed design life of 20 years.

1.2 Site Conditions and History

Currently, and historically the site has been used for agricultural purposes. The middle of the site is higher and is moderately wooded. The site is generally sloping from the northwest corner downwards to the southeast and southwest corners of the site, with surface elevations at the borings ranging from about 765 to 753 Mean Sea Level (MSL). Figure 1-2 shows an aerial photograph of the site.



Figure 1-2. Aerial Photograph of the Site in 2025
Figure provided by Washington County GIS.

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1.3 Purpose

The purpose of our geotechnical evaluation was to characterize subsurface geologic conditions at selected boring locations, evaluate their impact on the project, and provide geotechnical recommendations for the design and construction of the residential development.

1.4 Background Information and Reference Documents

We reviewed the following information:

- Existing topographic map prepared by MnTOPO.
- Preliminary site layout plan prepared by Pioneer Engineering, dated July 14, 2025.
- Previous test pit logs prepared by Braun Intertec under project number B2310333, dated October 16, 2023.
- Previous test pit logs prepared by Haugo Geotechnical Services dated November 2022.
- Previous Geotechnical Evaluation prepared by GME Consultants, Inc. dated December 21, 2005.

In addition to the provided sources, we have used several publicly available sources of information.

- Current and historic aerial photos from Google Earth, Minnesota Historical Aerial Photographs Online and Washington County GIS for information on site history.
- Geologic Atlas of Washington County, Minnesota – Surficial Geology map prepared and published by the Minnesota Geological Survey, dated 2016 for geological information of native soils

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses, and/or recommendations.

1.5 Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB205644 to Lennar Corporation, dated August 29, 2025, and authorized on September 4, 2025. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and clearing the exploration location of underground utilities. Braun Intertec selected and staked the new exploration locations. We acquired the surface elevations and locations with GPS

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technology using the State of Minnesota's permanent GPS base station network. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.

- Performing seven standard penetration test (SPT) borings, denoted as ST-1 to ST-7, to nominal depths of 15 to 20 feet below grade across the site. Note, several of the borings were terminated early due to auger refusal on apparent bedrock.
- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.
- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for structure and pavement subgrade preparation and the design of foundations, floor slabs, exterior slabs, utilities, stormwater improvements and pavements.

Our scope of services did not include environmental services or testing and our geotechnical personnel performing this evaluation are not trained to provide environmental services or testing. We can provide environmental services or testing at your request.

2.0 Results

2.1 Geologic Overview

As part of our assessment, we reviewed the geologic maps for the general site area. Based on the geologic maps for Washington County dated 2016, the geology of the site generally consists of glacially deposited sands and gravel. We also reviewed bedrock geology and depth to bedrock maps for Washington County dated 2016. The depth to bedrock is relatively shallow, commonly less than 50 feet below existing grades and generally consists of Limestone from the Shakopee Formation.

We based the geologic origins used in this report on the soil types, in-situ and laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

2.2 Boring Results

Table 2-1 provides a summary of the soil boring results, in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details. The Descriptive Terminology sheets in the Appendix include definitions of abbreviations used in the table below.

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Table 2-1. Subsurface Profile Summary*

Strata	Soil Type -ASTM Classification	Range of Penetration Resistances	Commentary and Details
Topsoil	SM	NA	▪ Encountered in all borings and consists predominantly of silty sand (SM). ▪ Thicknesses at boring locations varied from 1/2 to 2 feet. ▪ Generally dark brown to black in color. ▪ Moisture condition generally moist.
Alluvial	CL	4 to 6 Blows per Foot (BPF)	▪ Encountered in Borings ST-2, ST-5, and ST-6 below the topsoil to a depth of about 4 feet. ▪ Encountered in Previous Braun Test Pits in TP-18 and TP-20 below the topsoil to a depth of about 3 to 6 feet. ▪ Encountered in Previous Haugo Test Pits in Test Pit #3 to a depth of about 7 feet. ▪ Encountered in Previous GME Borings at Borings 199, 204, and 210 below the topsoil to a depth of about 4 to 5 feet. ▪ Generally brown in color. ▪ Moisture condition generally moist.
Glacial deposits	SC, CL	7 to 35 BPF	▪ Encountered in Borings ST-1, ST-4, ST-5, and ST-7. ▪ Encountered in Previous GME Borings 197, 198, 201, 205, 206, and 218. ▪ Consists of clay soils with trace to with gravel and weathered bedrock fragments. ▪ Generally brown in color. ▪ Moisture condition generally moist.
	SP, SP-SM, SM	7 to 32 BPF (select samples had 50 blows for 5 inches of penetration)	▪ Encountered in most of the borings and consisted of silty sand (SM), poorly graded sand with silt (SP-SM), and poorly graded sand. ▪ Generally brown in color. ▪ Moisture condition generally varied from dry to moist.
Bedrock	Limestone	50 blows for 1 to 3 inches of penetration	▪ Encountered in Borings ST-2, ST-3, ST-4, ST-5, and ST-7. ▪ Encountered in Previous Braun Test Pits TP-15 through TP-22. ▪ Encountered in Previous Haugo Test Pits #1 through #9, and #11 through #13. ▪ Encountered in Previous GME Borings 197 through 207, 212, and 218. ▪ Highly weathered bedrock varied from elevation approx. 742 ft to 752.

*Abbreviations are defined in the attached Descriptive Terminology sheet.

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2.3 Groundwater

We did not observe groundwater while advancing our borings. Therefore, it appears that groundwater is below the depths explored. Project planning should anticipate seasonal and annual fluctuations of groundwater.

2.4 Laboratory Test Results

The boring logs show the results of laboratory testing testing we performed, next to the tested sample depth. The tests were completed in accordance with the latest American Society for Testing and Materials (ASTM) standards. The Appendix contains the results of these tests.

The moisture content (ASTM D 2216) of the selected samples varied from approximately 4 to 7 percent for the granular/sandy soils and moisture contents ranging from 10 to 28 percent moisture by weight for clay-laden soils. This indicates that the granular material is below or at its probable optimum moisture content, and near or above its probable optimum moisture content for the clay-laden soils.

Our mechanical analyses (ASTM C 117) indicated that the selected samples from Borings ST-1, ST-3, and ST-6 contained 8 to 13 percent silt and clay by weight. This indicates soils with classifications of poorly graded sand with silt (SP-SM) or silty sand (SM).

3.0 Recommendations

3.1 Design and Construction Discussion

The site generally appears suitable for the proposed residential development following mass grading construction. Shallow bedrock was encountered during our investigation, which could complicate the proposed development. Key discussion points for the project are provided below.

3.1.1 Building Subgrade Preparation

Based on the results of our subsurface exploration and evaluation, spread footing foundations bearing on engineered fill and/or native soils can support the proposed houses, after performing subgrade preparation. Subgrade preparation includes removing existing vegetation, topsoil, and any existing structures and soft/very loose soils. In agricultural fields, there is the possibility of field drain lines which will also need to be removed, if encountered.

Although preliminary grading plans were not available, we anticipate cuts and fills to be less than 10 feet from existing grades.

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3.1.2 Shallow Bedrock Site

Limestone bedrock was identified generally across the entire site, which could affect utility line trenches, plumbing, and footing excavations. The highly weathered limestone may possibly be excavated with a toothed excavating bucket; however, this will likely only work for only the upper weathered bedrock. Deeper excavation will likely require a hydraulic hammer, ripper, or explosive techniques. It is also possible that there may be areas where the bedrock has been eroded by nature and there may be deeper areas of soil which have filled in subsurface erosion channels.

Each house pad will require easily excavatable soil (not bedrock) **a minimum of 4 feet below the proposed low floor grade**. This 4-foot soil buffer zone will allow the installation of water and sanitary sewer services, foundations (spread footings and poured foundation walls) as well as interior plumbing (including drain tile and sump baskets) below the lowest floor, as required.

3.1.3 Reuse of On-Site Soils

The on-site soils that are free of organic materials and debris, are generally suitable for reuse as engineered fill. Some of the on-site soils may require moisture conditioning prior to reuse and compaction Any material to be used as engineered fill should be tested and approved by the geotechnical engineer prior to placement.

3.1.4 Pavement

Based on the soil borings, it is our opinion the pavements can be constructed on the on-site fill and/or native alluvial soils, as long as the in-place soils can pass a proofroll test. If difficulties passing a proofroll on these soils occur during construction, re-engineering of the existing soil or excavation to more suitable soils may be necessary prior to raising grade. In addition, we recommend a minimum of 4 feet of soil cover over shallow bedrock areas.

3.1.5 Karst

This site, as much of southeastern Minnesota does, lies in an area where there is a potential for Karst in the bedrock. The site contains a shallow soil cover over limestone bedrock.

We have performed a detailed review of the South Washington watershed District karst inventory, which documents several karst related features with 1 mile of this project site, including at least 2 within a 1/4-mile of the site. There is a potential for karst related features at this project site. We have discussed the potential of karst related concerns with the developer.

3.1.6 Reuse of Limestone Bedrock

Removed limestone is typically not reused as engineered fill. Often, the pieces of removed limestone exceed 4 inches in diameter and are too large to reuse as engineered fill. In addition, portions of the removed limestone are typically wet and require moisture conditioning (drying) which is often impractical. If reuse of some limestone is permitted, limestone fragments under 4 inches is size may be blended with soil, but we recommend no more than 1 part limestone fragment to 3 parts engineered soil (approximately 25 percent by volume, or less).

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Based on the quantity of proposed limestone bedrock removal required during construction, the limestone could likely be crushed and reused as an engineered product, if permitted. We anticipate MnDOT Class 5 Aggregate Base could possibly be produced, provided an experienced crushing and screening process is used. Additional soundness and durability testing of the limestone should be performed prior to crushing.

3.2 Site Grading and Subgrade Preparation

3.2.1 Building Subgrade Excavations

We recommend removing the topsoil and any unsuitable material below the proposed house pads and their oversize areas. We define unsuitable materials as existing fill (if encountered), frozen materials, organic soils, existing structures, existing utilities, vegetation, and soft/loose soils. Table 3-1 shows the anticipated excavation depths and bottom elevations for each of the at each of the boring locations. We have included soil correction depths at all the borings, assuming a building pad or pavement will be constructed.

Table 3-1. Building Excavation Depths

Location	Year Performed	Approximate Surface Elevation (ft)	Anticipated Excavation Depth (ft)	Anticipated Bottom Elevation (ft)
ST-1	2025	756.6	1	755 1/2
ST-2	2025	764.2	4	760
ST-3	2025	756.6	1/2	756
ST-4	2025	759.0	2	757
ST-5	2025	760.5	1	759 1/2
ST-6	2025	762.3	1 1/2	760 1/2
ST-7	2025	753.2	1 1/2	751 1/2
TP-15	2023	750.2	1 1/2	748 1/2
TP-16	2023	748.5	1 1/2	747
TP-17	2023	756.5	1 1/2	755
TP-18	2023	762.0	1 1/2	760 1/2
TP-19	2023	752.6	1 1/2	751
TP-20	2023	756.3	1	755
TP-21	2023	759.0	4	755
TP-22	2023	766	1	765
TP #1	2022	752.2	2	750
TP #3	2022	757.1	3	754
TP #4	2022	751.4	1 1/2	750
TP #5	2022	751.7	4	747 1/2
TP #6	2022	751.1	1 1/2	749 1/2
TP #7	2022	750.9	3	748
TP #9	2022	766.9	1	766
TP #10	2022	764.1	2	762

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Location	Year Performed	Approximate Surface Elevation (ft)	Anticipated Excavation Depth (ft)	Anticipated Bottom Elevation (ft)
TP #11	2022	765.7	1 1/2	764
TP #12	2022	749.6	1	748 1/2
TP #13	2022	747.3	1	746
197	2005	751.1	2	749
198	2005	751.0	2	749
199	2005	752.1	2	750
200	2005	751.8	1	751
201	2005	751.2	2	749
202	2005	750.3	1 1/2	748 1/2
203	2005	766.6	2	764 1/2
204	2005	755.1	1 1/2	753 1/2
205	2005	752.9	2	750 1/2
206	2005	752.4	1 1/2	750 1/2
207	2005	751.8	1 1/2	750
208	2005	795.8	1	794 1/2
209	2005	786.5	1	785 1/2
210	2005	760.6	1	759 1/2
211	2005	755.7	1 1/2	754
212	2005	755.0	2	753
213	2005	797.6	1	796 1/2
214	2005	803.6	1 1/2	802
215	2005	802.4	1	801
216	2005	791.7	4	787 1/2
217	2005	769.8	1	768 1/2
218	2005	758.3	1	757

Excavation depths will vary between the borings. Portions of the excavations may also extend deeper than indicated by the borings. A geotechnical representative should observe the excavations to make the necessary field judgments regarding the suitability of the exposed soils.

The contractor should use equipment and techniques to minimize soil disturbance. If soils become disturbed or are wet, we recommend excavation and replacement.

3.2.2 House Pad Bedrock Separation

We recommend that the house pads have easily excavatable soil (not bedrock) a minimum of 4 feet below the proposed low floor grade. This 4-foot soil buffer zone will allow the installation of water and sanitary sewer services, foundations (spread footings and poured foundation walls) as well as interior plumbing (including drain tile and sump baskets) below the lowest floor.

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Based on the proposed basement floor grades, and lowest floor elevations in the final grading plan (currently unavailable), we anticipate areas of bedrock conflicts, and the recommended separation may not be met. Test pits should be performed during mass grading to verify that the recommended 4-foot (or greater) bedrock separations is provided. Any areas where bedrock is found with less than 4-foot of separation, bedrock removal for the full extent of the proposed house pad envelope should be performed.

Based on this evaluation we are confident the bedrock surface is not flat; therefore, it is assumed there will be variable depths to bedrock within each house pad. In areas where extensive bedrock removal occurs for utility construction, stormwater ponds, or general mass grading, the adjacent house pad(s) should also be evaluated.

3.2.3 Excavation Oversizing

When removing unsuitable materials below structures or pavements, we recommend the excavation extend outward and downward at a slope of 1H:1V (horizontal:vertical) or flatter. See Figure 3-1 for an illustration of excavation oversizing.

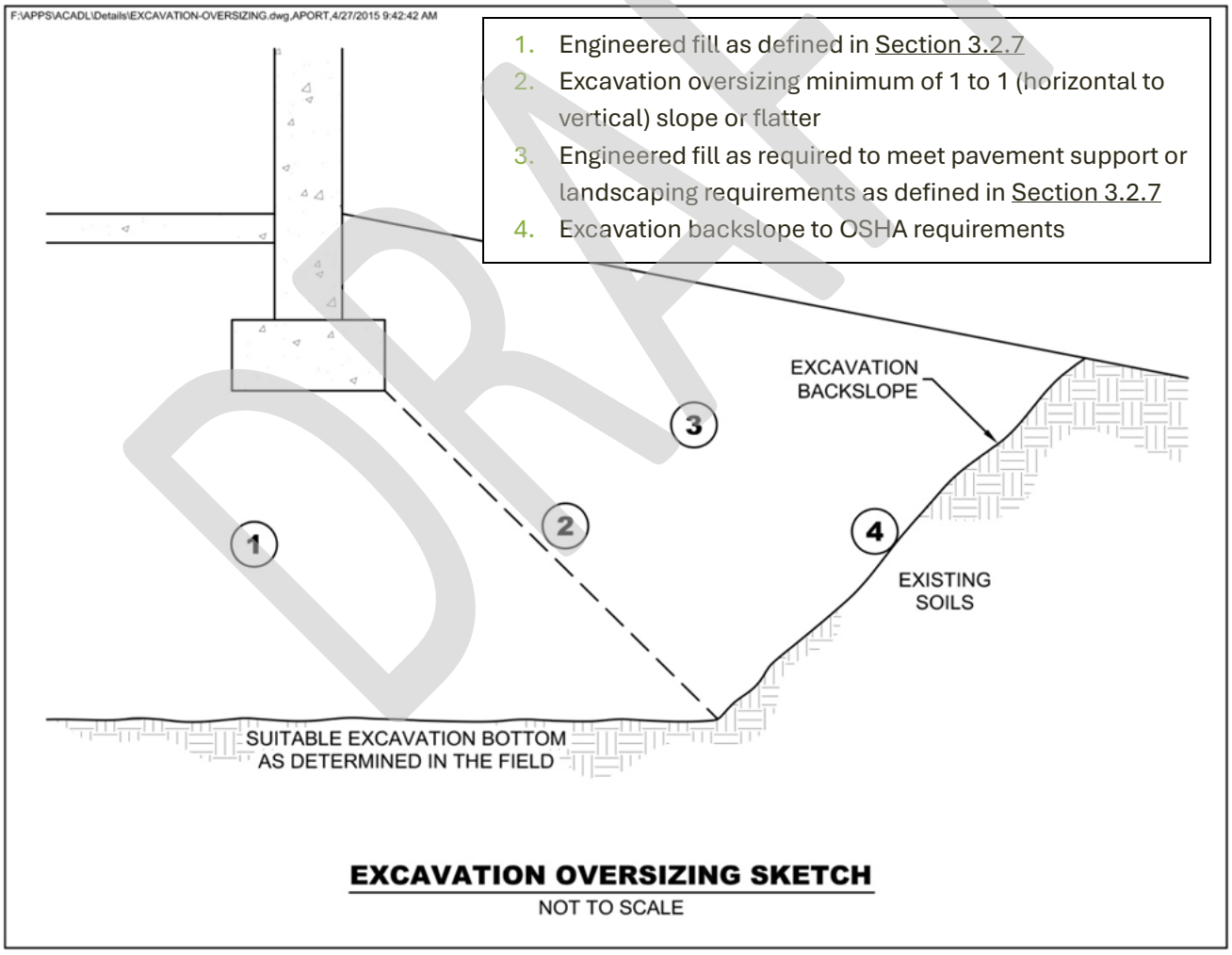

Figure 3-1. Generalized Illustration of Oversizing

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3.2.4 Excavated Slopes

Based on the borings, we anticipate on-site soils in excavations will consist of clays and silty sands. These soils are typically considered Type B Soil under OSHA (Occupational Safety and Health Administration) guidelines. OSHA guidelines indicate unsupported excavations in Type B soils should have a gradient no steeper than 1H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

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 that excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

3.2.5 Pavement and Exterior Slab Subgrade Preparation

We recommend the following steps for pavement and exterior slab subgrade preparation. Note that project planning may require additional subcuts to limit frost heave.

1. Strip unsuitable soils consisting of topsoil, organic soils, and existing fill down to native soils.
2. Have a geotechnical representative observe the excavated subgrade to evaluate if additional subgrade improvements are necessary, specifically soft or saturated soils.
3. Slope subgrade soils to areas of sand or drain tile (if fine grained soils are present) to allow the removal of accumulating water.
4. Scarify, moisture condition and surface compact the subgrade with at least three passes of a large roller with a minimum drum diameter of 3 1/2 feet.
5. Place pavement engineered fill to grade and compact in accordance with Section 3.2.7 to bottom of pavement and exterior slab section. See Section 3.6 for additional considerations related to frost heave.
6. Proofroll the pavement or exterior slab subgrade as described in Section 3.2.6.

3.2.6 Pavement Subgrade Proofroll

After preparing the subgrade as described above and prior to the placement of the aggregate base, we recommend proofrolling the subgrade soils with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the proofroll. Areas that fail the proofroll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the proofroll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and recompaction, subcutting and replacement with soil or crushed aggregate, chemical stabilization, and/or geotextiles. We recommend performing a second proofroll after the aggregate base material is in place, and prior to placing bituminous or concrete pavement.

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3.2.7 Engineered Fill Materials and Compaction

Table 3-2 below contains our recommendations for engineered fill materials.

Table 3-2. Engineered Fill Materials*

Locations To Be Used	Engineered Fill Classification	Possible Soil Type Descriptions	Gradation	Additional Requirements
▪ Below foundations < 10 ft of fill	Structural fill	SP, SP-SM, SM, SC, CL	100% passing 2-inch sieve	< 2% Organic Content (OC) Plasticity Index (PI)<20%
▪ Below foundations > 10 ft of fill	Structural fill	SP, SP-SM	100% passing 2-inch sieve < 12% passing #200 sieve	< 2% OC
▪ Drainage layer ▪ Non-frost-susceptible	▪ Free draining ▪ Non-frost-susceptible fill	GP, GW, SP, SW	100% passing 1-inch sieve < 50% passing #40 sieve < 5% passing #200 sieve	< 2% OC
Behind below-grade walls, beyond drainage layer	Retained fill	*SP, SP-SM, SM	100% passing 3-inch sieve < 20% passing #200 sieve	< 2% OC PI< 4%
Pavements	Pavement fill	SP, SP-SM, SM, SC, CL	100% passing 3-inch sieve	< 2% OC PI < 20%
Below landscaped surfaces, where subsidence is not a concern	Non-structural fill	Any	100% passing 6-inch sieve	< 10% OC PI<20%

* More select soils comprised of coarse sands with < 5% passing #200 sieve may be needed to accommodate work occurring in periods of wet or freezing weather.

Project grading plans were not available at the time of this report, so it is unknown if there will be any deep fill areas. If only clay fill is used to fill house pads where more than 10 feet of fill is needed, a construction delay of at least 3 to 9 months may be needed, depending on the final depths of clay fill used. As an alternative, on lots where deep fills are needed, sand fill (less than 12 percent passing the #200 sieve) could be used to initially fill the excavations below these house pads. The sand fill should be placed in thin compacted lifts, up to an elevation of 10 feet or less from the finished basement floor grades. On-site fine-grained soil can then be used to complete construction of the building pads. If the alternative method of filling the house pads partially with sand fill is used, a construction delay would not be needed.

We recommend spreading engineered fill in loose lifts of approximately 8 to 12 inches thick. We recommend compacting engineered fill in accordance with the criteria presented below in Table 3-3. The project documents should specify relative compaction of engineered fill, based on the structure located above the engineered fill, and vertical proximity to that structure.

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Table 3-3. Compaction Recommendations Summary

Reference	Relative Compaction, percent (ASTM D698 – Standard Proctor)	Moisture Content Variance from Optimum, percentage points	
		< 12% Passing #200 Sieve (typically SP, SP-SM)	> 12% Passing #200 Sieve (typically CL, SC, ML, SM)
Below building foundations and oversizing zones, less than 10 feet of fill	95	**	-1 to +3
Below building foundations and oversizing zones, more than 10 feet of fill	98	**	-1 to +2
Within 3 feet of pavement subgrade	100	**	-2 to +1
More than 3 feet below pavement subgrade	95	**	-1 to +3
Below landscaped surfaces	90	**	-1 to +3
Adjacent to below grade wall	95*	**	-1 to +3

*Increase compaction requirement to meet compaction required for structure supported by this engineered fill.
**The moisture content of the clean sand fill should be greater than 5 percent, but no more than 3 percentage points over optimum.

The project documents should not allow the contractor to use frozen material as engineered fill or to place engineered fill on frozen material. Frost should not penetrate under foundations during construction.

We recommend performing density tests in engineered fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

3.3 Spread Footings

3.3.1 Embedment Depth

For frost protection, we recommend embedding perimeter footings of the structures, including attached garages, a minimum of 42 inches below the lowest exterior grade. Interior footings may be placed directly below floor slabs unless they will be subjected to freezing. We recommend embedding building footings not heated during winter construction, and other unheated footings associated with porches, decks, or stoops 60 inches below the lowest exterior grade.

3.3.2 Subgrade Improvement

If a small amount of groundwater is present within the footing excavation, or if the footing subgrade soils become disturbed prior to placing forms or reinforcement, we recommend subcutting the soft or wet soil and placing a 6- to 8-inch layer of crushed aggregate, which should be compacted into the subgrade. The aggregate will provide a stable working surface and will allow for the flow of water to a drain tile or sump pump.

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3.3.3 Net Allowable Bearing Pressure

We recommend sizing spread footings to exert a net allowable bearing pressure of up to 2,000 pounds per square foot (psf). This value includes a safety factor of at least 3.0 with regard to bearing capacity failure.

3.3.4 Settlement

We estimate that total and differential settlements among the footings will amount to less than 1- and 1/2-inch, respectively, under the assumed loads. Settlements could be higher if more than 10 feet of clayey fill is used to construct the building pads. Those lots would require a construction delay. To avoid a construction delay, those pads requiring more than 10 feet of fill below the lowest floor grades could initially be filled with clean sand fill, meeting the soil classification of poorly graded sand (SP) or poorly graded sand with silt (SP-SM) up to an elevation of less than 10 feet below the lowest floor slab and oversize areas. Less select clayey soil can then be used to fill the remainder of the building pad and oversize areas.

3.4 Below-Grade Walls

The following sections address soil parameters for basement wall design. Although construction of retaining walls has not been specified for this project to date, the following recommendations can also be used for preliminary retaining wall design. Additional soil analysis, including additional soil borings may be needed for final retaining wall design.

3.4.1 Drainage Control

We recommend installing drain tile to remove water behind the below-grade walls, at the location shown in Figure 3-2. The below-grade wall drainage system should also incorporate free-draining, engineered fill or a drainage board placed against the wall and connected to the drain tile.

Even with the use of free-draining, engineered fill, we recommend general waterproofing of below-grade walls that surround occupied or potentially occupied areas because of the potential cost impacts related to seepage after construction is complete.

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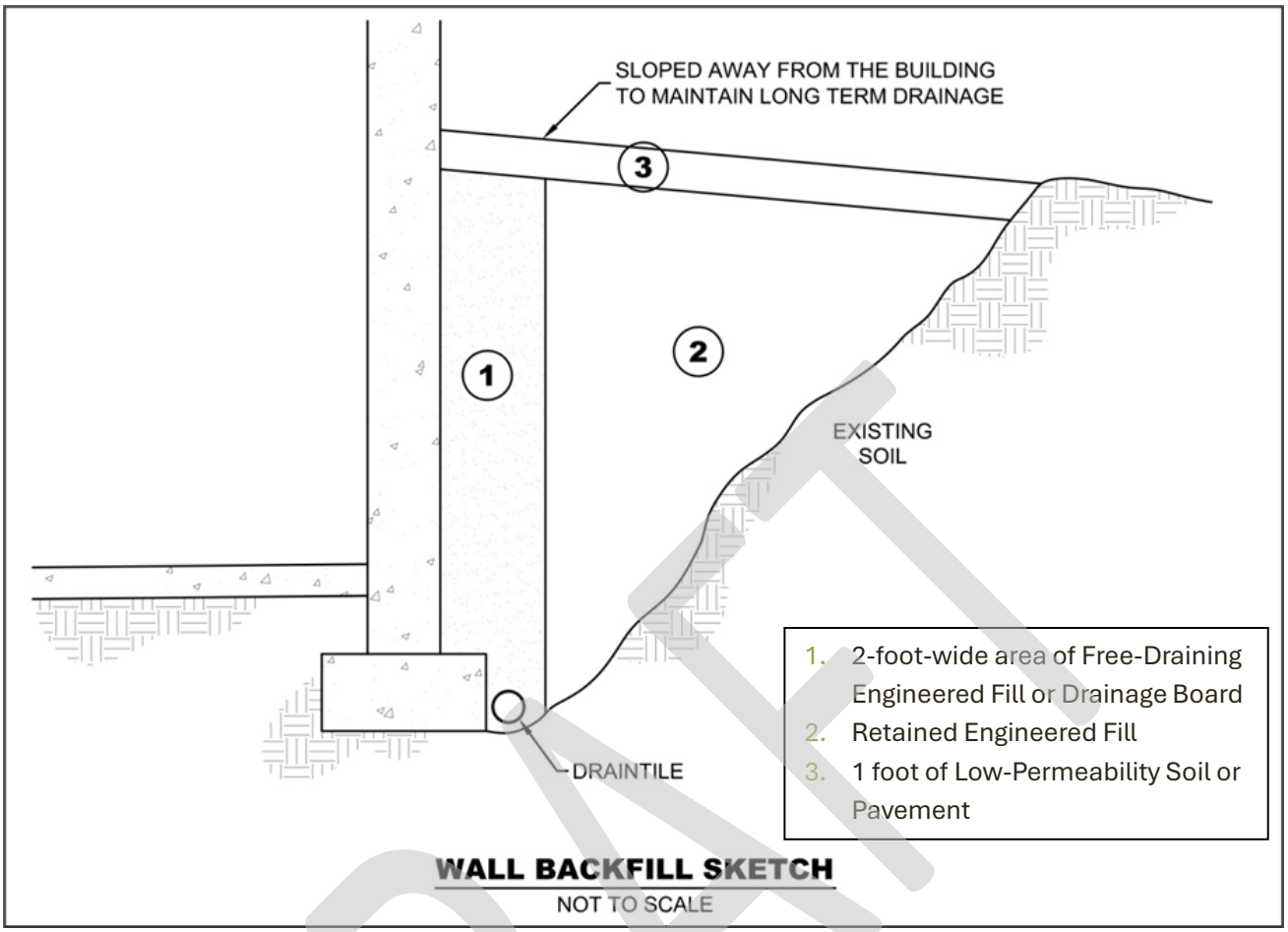

Figure 3-2. Generalized Illustration of Wall Engineered Fill

The materials listed in the sketch should meet the definitions in Section 3.4. Low-permeability material is capable of directing water away from the wall, like clay, topsoil, or pavement. The project documents should indicate if the contractor should brace the walls prior to filling and allow unbalanced fill heights.

3.4.2 Configuring and Resisting Lateral Loads

Below-grade wall design can use active earth pressure conditions if the walls can rotate slightly. If the wall design cannot tolerate rotation, then design should use at-rest earth pressure conditions. Rotation up to 0.002 times the wall height is generally required for walls supporting sand. Rotation up to 0.02 times the wall height is required when wall supports clay.

Table 3-4 presents our recommended lateral coefficients and equivalent fluid pressures for wall design of active, at-rest and passive earth pressure conditions. The table also provides recommended wet unit weights and internal friction angles. Designs should also consider the slope of any engineered fill, and dead or live loads placed behind the walls within a horizontal distance that is equal to the height of the walls. Our recommended values assume the wall design provides drainage so water cannot accumulate behind the

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walls. The construction documents should clearly identify what soils the contractor should use for engineered fill of walls.

Table 3-4. Recommended Below-Grade Wall Design Parameters – Drained Conditions

Retained Soil	Wet Unit Weight (pcf)	Friction Angle (degrees)	Equivalent Active Fluid Pressure (pcf)	Equivalent At-Rest Fluid Pressure (pcf)	Equivalent Fluid Passive Pressure* (pcf)
Imported/ On-site Sand (SP, SP-SM)	120	33	35	55	N/A
On-site Silty Sand (SM)	125	30	42	62	375
On-site clayey soil (CL, SC)	125	26	50	70	320

* Based on Rankine model for soils in a region behind the wall extending at least 2 horizontal feet beyond the bottom outer edges of the wall footings and then rising up and away from the wall at an angle no steeper than 60 degrees from horizontal.

Sliding resistance between the bottom of the footing and the soil can also resist lateral pressures. We recommend assuming a sliding coefficient equal to 0.3 between the concrete and soil.

The values presented in this section are un-factored.

3.5 Interior Slabs

3.5.1 Proposed Slab Separation

We recommend that the house pads have easily excavatable soil (not bedrock) a minimum of 4 feet below the proposed low floor grade. See Section 3.2.2 for more discussion.

3.5.2 Moisture Vapor Protection

Excess transmission of water vapor could cause floor dampness, certain types of floor bonding agents to separate, or mold to form under floor coverings. If project planning includes using floor coverings or coatings, we recommend placing a vapor retarder or vapor barrier immediately beneath the slab. We also recommend consulting with floor covering manufacturers regarding the appropriate type, use and installation of the vapor retarder or barrier to preserve warranty assurances.

3.5.3 Radon

We recommend installing a radon mitigation system in accordance with local building code. Our certified and licensed radon mitigation professionals can assist in the design, at your request.

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3.6 Frost Protection

3.6.1 General

A mixture of clayey and silty sand soils will underlie exterior slabs, as well as pavements. We consider clayey and silty sand soils to be moderately to highly frost susceptible. Soils of this type can retain moisture and heave upon freezing. In general, this characteristic is not an issue unless these soils become saturated, due to surface runoff or infiltration, or are excessively wet in-situ. Once frozen, unfavorable amounts of general and isolated heaving of the soils and the surface structures supported on them could develop. This type of heaving could affect design drainage patterns and the performance of exterior slabs and pavements, as well as any isolated exterior footings and piers.

Note that general runoff and infiltration from precipitation are not the only sources of water that can saturate subgrade soils and contribute to frost heave. Roof drainage and irrigation of landscaped areas in close proximity to exterior slabs, pavements, and isolated footings and piers, contribute as well.

3.6.2 Frost Heave Mitigation

To address most of the heave related issues, we recommend setting general site grades and grades for exterior surface features to direct surface drainage away from buildings, across large, paved areas and away from walkways. Such grading will limit the potential for saturation of the subgrade and subsequent heaving. General grades should also have enough “slope” to tolerate potential larger areas of heave, which may not fully settle after thawing.

Even small amounts of frost-related differential movement at walkway joints or cracks can create tripping hazards. Project planning can explore several subgrade improvement options to address this condition.

One of the more conservative subgrade improvement options to mitigate potential heave is removing any frost-susceptible soils present below the exterior slab areas down to a minimum depth of 4 feet below subgrade elevations. We recommend filling the resulting excavation with non-frost-susceptible fill. We recommend providing drainage at the base of the subcut, as well as gradual transitions from this subcut (3H:1V or flatter gradient). We also recommend sloping the bottom of the excavation toward one or more collection points to remove any water entering the engineered fill. This approach will not be effective in controlling frost heave without removing the water.

An important geometric aspect of the excavation and replacement approach described above is sloping the banks of the excavations to create a more gradual transition between the unexcavated soils considered frost susceptible and the engineered fill in the excavated area, which is not frost susceptible. The slope allows attenuation of differential movement that may occur along the excavation boundary. We recommend slopes that are 3H:1V, or flatter, along transitions between frost-susceptible and non-frost-susceptible soils.

Figure 3-3 shows an illustration summarizing some of the recommendations.

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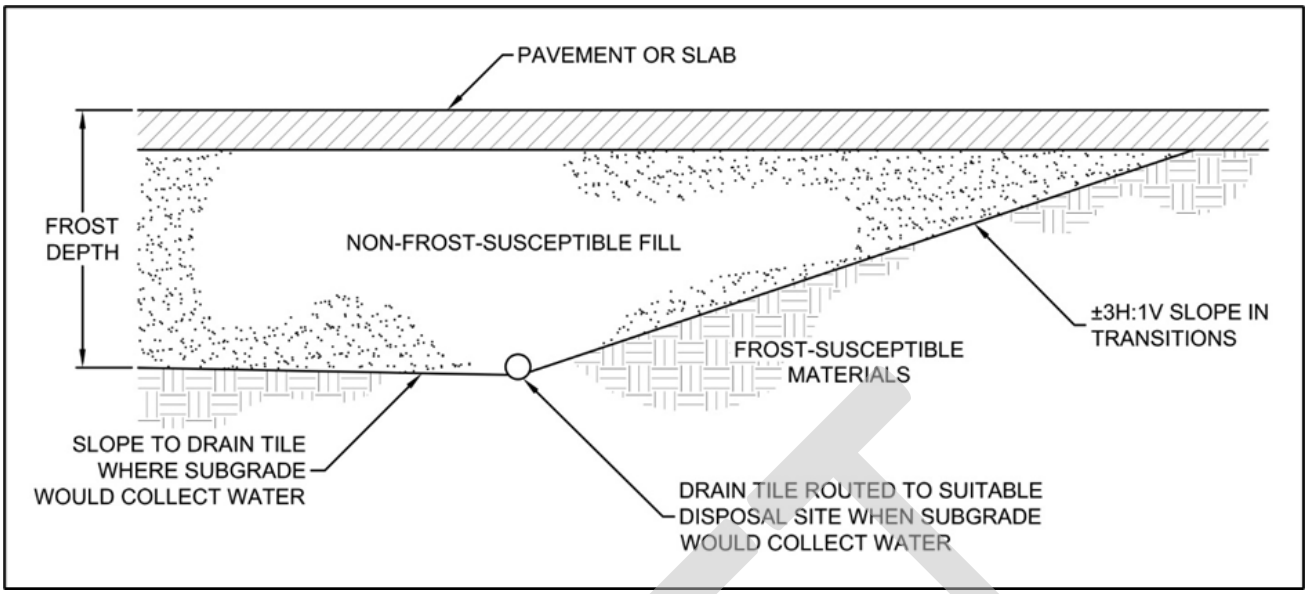

Figure 3-3. Frost Protection Geometry Illustration

Another option is to limit frost heave in critical areas, such as doorways and entrances, via frost-depth footings or localized excavations with sloped transitions between frost-susceptible and non-frost-susceptible soils, as described above.

Over the life of slabs and pavements, cracks will develop, and joints will open up, which will expose the subgrade and allow water to enter from the surface and either saturate or perch atop the subgrade soils. This water intrusion increases the potential for frost heave or moisture-related distress near the crack or joint. Therefore, we recommend implementing a detailed maintenance program to seal and/or fill any cracks and joints. The maintenance program should give special attention to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.

3.7 Pavements and Exterior Slabs

3.7.1 Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine an R-value for pavement design. Based on our experience with similar silty and clayey soils anticipated at the pavement subgrade elevation, we recommend pavement design assume an R-value of 20.

We assume that the City of Cottage Grove Standard Plates will be used pavement designs. If City standard plates aren't available, we recommend a bituminous pavement section that includes a minimum of 3 1/2 inches of bituminous pavement (a 1 1/2-inch surface course over a 2-inch base course) over 8 inches of aggregate base material over 18 inches of select granular. The local government agency may require alternative standard pavement sections.

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The ongoing performance of bituminous pavements is impacted by conditions under which the pavement is asked to perform in. These conditions include the environmental conditions, the actual use conditions, and the level of ongoing maintenance performed. Because of normal thermos-expansion and contraction, it is not unusual to have cracking develop within the first few years of placement and for the cracking to continue throughout the life of the pavement. A regular maintenance plan should be developed for filling cracks to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade. It is also not unusual for the pavement to require a seal coat within the first 5 to 10 years to increase the long-term performance of the bituminous pavement.

3.7.2 Bituminous Pavement Materials

Appropriate mix designs are critical to the performance of flexible pavements. We can provide recommendations for pavement material selection during final pavement design.

3.7.3 Subgrade Drainage

We recommend installing perforated drainpipes throughout pavement areas at low points, around catch basins, and behind curb in landscaped areas. However, subgrade drainage should not be required where the pavement section subgrade consists of granular soils, with less than 20% passing a #200 Sieve. When required, we recommend installing drainpipes along pavement and exterior slab edges where exterior grades promote drainage toward those edge areas. The contractor should place drainpipes at the base of the granular subbase layer or in shallow trenches below the aggregate base material where no subbase is present.

3.7.4 Performance and Maintenance

We based the above pavement designs on a 20-year performance life for bituminous. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

It is common to place the non-wear course of bituminous and then delay placement of wear course. For this situation, we recommend evaluating if the reduced pavement section will have sufficient structure to support construction traffic.

3.8 Utilities

3.8.1 Subgrade Stabilization

Earthwork activities associated with utility installations located inside the building area should adhere to the recommendations in Section 3.2.

For exterior utilities, we anticipate the soils at typical invert elevations will be suitable for utility support. However, if construction encounters unfavorable conditions such as soft clay, organic soils or perched water at invert grades, the unsuitable soils may require some additional subcutting and replacement with sand or

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crushed rock to prepare a proper subgrade for pipe support. Project design and construction should not place utilities within the 1H:1V oversizing of foundations.

3.8.2 Excavations in Bedrock

As previously stated, excavations for utilities may encounter zones of bedrock at proposed pipe subgrade bearing elevations. The bedrock surface may be weathered where a typical backhoe can excavate through it but if excavations for utilities extend beyond the upper 3 feet of bedrock, the contractor will likely need alternative excavation practices, relatively larger equipment, pneumatic chisels, hammers, rippers, or blasting to remove more sound, less weathered bedrock below auger refusal depths. The rock should be removed deep enough that a suitable bedding material can also be placed beneath the pipes.

3.8.3 Corrosion Potential

The soil borings indicated the site predominantly consists of sandy soils with lesser amounts of clayey soil. We consider the sandy soils to be non- to slightly corrosive to metallic conduits. However, the clayey soils should be corrosive to metallic conduits unless the clayey soils are tested to verify that they are not corrosive to metallic conduits. If utilities extend through clay soils, we recommend bedding the utilities in sandy soil free of any clay lumps or constructing the utilities with non-corrosive materials.

3.9 Stormwater

We understand that stormwater basins or ponds will be included within the proposed development. Typical stormwater recommendations can be found in the Minnesota Stormwater Manual.

We understand the South Washington Watershed District, in conjunction with the stormwater manual, allows construction of infiltration stormwater ponds when there is a minimum 10 feet of soil separation from the proposed pond bottom to limestone bedrock surface. We further understand if there is less 10 feet of separation from the bottom of ponds to the bedrock surface, infiltration is not permitted, and stormwater basins require placement of a clay liner.

Based on our review of the current civil plans, the identified karst related features being in close proximity of the site, and the shallow depth to bedrock, we do not recommend infiltration of stormwater at this site. Furthermore, the stormwater management plan should consider a potential of long-term karst related concerns.

We understand the South Washington Watershed District, in conjunction with the stormwater manual, allows construction of retention stormwater ponds in close proximity to the limestone bedrock surface provided a clay liner is placed. For the clay liner, we recommend the clay liner be at least 2 feet thick and consist of lean clay soils with Plasticity Index (PI) of 20 or less. Additional soil parameters can be provided if required or requested. A project alternative could include using a manufactured geo-synthetic liner (minimum 12 mil Thickness) instead of a clay linear.

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4.0 Procedures

4.1 Penetration Test Borings

We drilled penetration test borings ST-1 and ST-7 with an all-terrain vehicle (ATV)-mounted core and auger drill equipped with hollow-stem auger on October 20, 2025. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance with ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

We sealed the penetration test boreholes (ST-1 to ST-7), that Braun Intertec performed in 2025, which extended beyond 15 feet, meeting the Minnesota Department of Health (MDH) Environmental Borehole criteria with an MDH-approved grout.

4.2 Exploratory Test Pits

Enebak Construction excavated the test pits that were observed by Braun Intertec with a backhoe, under the direction and observation of our staff on October 16, 2023. We prepared Test Pit Logs by visually examining the sidewalls of the test pits and classifying the materials brought to the surface by the backhoe bucket. We measured strata boundary depths with a steel tape and generally rounded to the nearest 1/2-foot.

4.3 Exploration Logs

4.3.1 Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials and present the results of penetration resistance and other in-situ tests performed. The logs also present the results of laboratory tests performed on penetration test samples and groundwater measurements.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

4.3.2 Log of Test Pit Sheets

The Appendix also includes Log of Test Pit sheets. The logs classify and describe the geologic materials exposed in the sidewalls and bottoms of the pits, present the results of laboratory tests performed on bulk samples obtained from them, and depict groundwater measurements.

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4.3.3 Log of Data Sheets – By Others

In addition to the Explorations (soil borings and test pits) we were apart from 2023to 2025, we were provided that data from 2005 Soil borings, performed by GME and 2022 Test pits, observed by Haugo Geotechnical Services. We assume the 2005 borings were also performed as standard penetration test borings in a similar manor under ASTM D1586, however as we were not overseeing the borings we cannot confirm their procedure. The excavating contractor and equipment were not noted in the information provided with 2022 test pit information. We assume they used similar procedures to the test pits that we used when performing the test pits but as we were not present,we cannot confirm the procedures used.

4.3.4 Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance and other in-situ testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past .

4.4 Material Classification and Testing

4.4.1 Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

4.4.2 Laboratory Testing

The exploration logs in the Appendix note the results of the laboratory tests performed on geologic material samples. We performed the tests in general accordance with ASTM procedures.

4.5 Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes as noted on the boring logs.

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5.0 Qualifications

5.1 Variations in Subsurface Conditions

5.1.1 Material Strata

We developed our evaluation, analyses, and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation, and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

5.1.2 Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

5.2 Continuity of Professional Responsibility

5.2.1 Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

5.2.2 Construction Observations and Testing

We recommend retaining Braun Intertec to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

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5.3 Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

5.4 Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

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Appendix

Soil Boring Location Sketch
Log of Boring Sheets ST-1 through ST-7
Logs of Previous Test Pit Sheets TP-15 through TP-22
Logs of Previous Test Pit Sheets from Haugo #1 through #13
Logs of Previous Boring Sheets from GME Consultants 197 through 218
Descriptive Terminology of Soil

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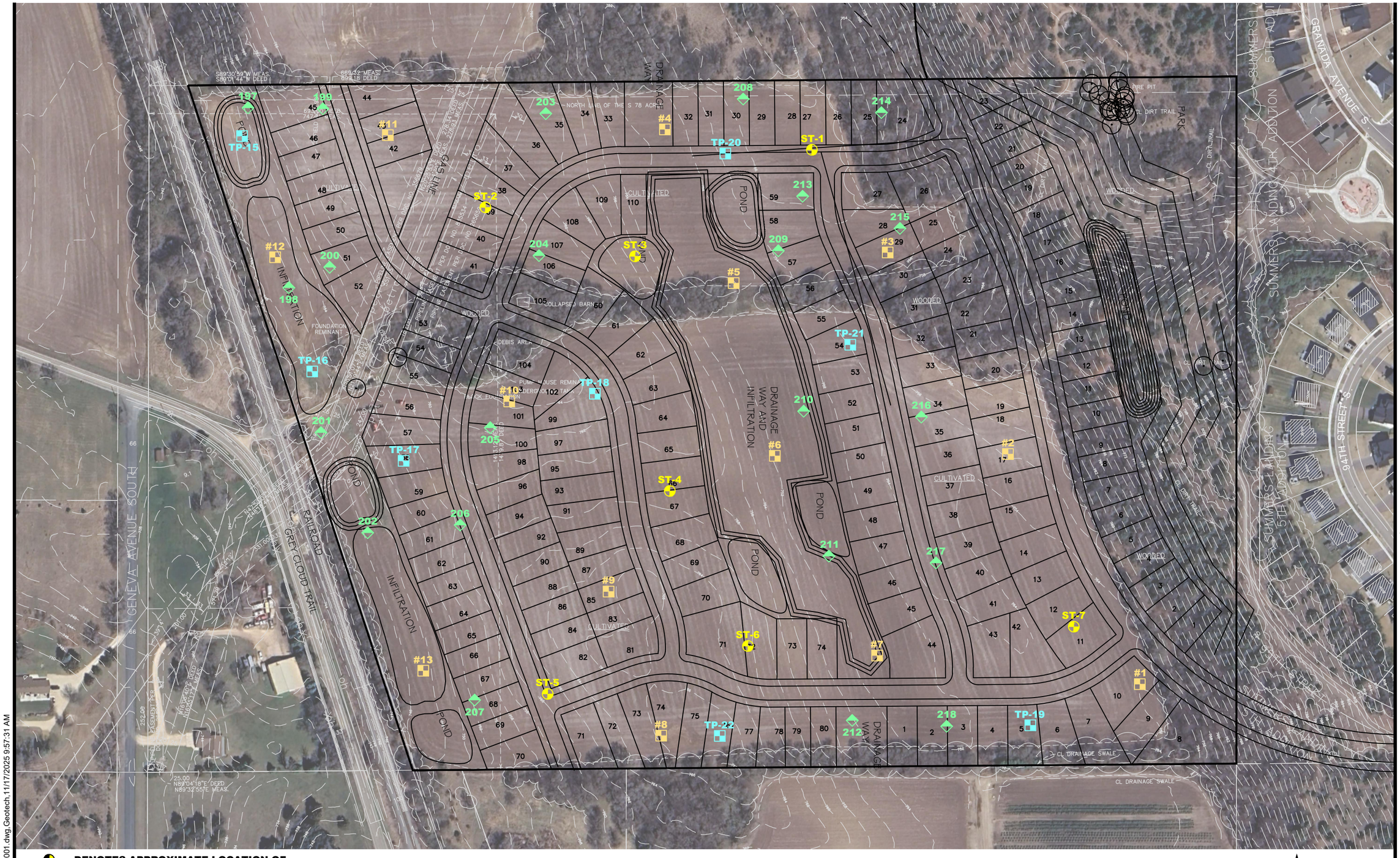
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INFILTRATION
DRAINAGE WAY AND INFILTRATION
POND
CULTIVATED
WOODED
COLLAPSED BARN
FOUNDATION REMNANT
DEBRIS AREA
PUMP HOUSE REMNANT
UNDERGROUND TANK
FOUNDATION
NORTH LINE OF THE S 78 ACRES
CL DRAINAGE SWALE
CL DIRT TRAIL
FIRE PIT
PARK
GRANADA AVENUE S.
SUMMERS LANDING 4TH ADDITION
SUMMERS LANDING 5TH ADDITION
94TH STREET S.
GENEVA AVENUE SOUTH
GREY CLOUD TRAIL
RAILROAD
EASEMENT PER DOC. NO. 2658534
EASEMENT PER DOC. NO. 2658535
EASEMENT PER DOC. NO. 2658536
EASEMENT PER DOC. NO. 2658537
S89°30'59"W MEAS.
S90°01'44"W DEED
669.32' MEAS.
669.18' DEED
N89°04'18"E DEED
N89°32'55"E MEAS.
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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-1**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 125386.1 EASTING: 462382.1
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 756.6 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
755.6		SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, moist (TOPSOIL)					
1.0		SILTY SAND (SM), fine to medium-grained, with Gravel, tan, moist, dense (GLACIAL OUTWASH)		7-11-21 (32) 10"		4	P200=13%
752.6							
4.0		POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, moist, medium dense (GLACIAL OUTWASH)	5	11-12-7 (19) 14"		4	P200=10%
749.6							
7.0		SANDY LEAN CLAY (CL), little Gravel, brown, dry to moist, hard (GLACIAL TILL)		11-27-8 (35) 14"			
747.6							
9.0		LEAN CLAY (CL), brown, moist, stiff (GLACIAL TILL)	10	4-6-7 (13) 14"			
				4-6-7-7 (13) 14"			
742.1							
14.5		END OF BORING	15				Water not observed while drilling.
		Boring immediately backfilled					

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-2**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 125261.9 EASTING: 461678.2
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 764.2 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
762.9		SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, dry (TOPSOIL)					
1.3		SANDY LEAN CLAY (CL), brown, moist, soft (ALLUVIUM)		1-2-2 (4) 14"		28	
760.2							
4.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, with Gravel, brown, dry, medium dense (GLACIAL OUTWASH)	5	13-12-11 (23) 10"			
				6-8-11 (19) 14"			
755.2							
9.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, dry, medium dense (GLACIAL OUTWASH)	10	4-7-8 (15) 14"			
752.2							
12.0		LIMESTONE, tan, highly weathered, (APPARENT BEDROCK)		13-15-16-19 (31) 10"			
749.7							
14.5		END OF BORING	15				Water not observed while drilling.
		Boring immediately backfilled					

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-3**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 125156.5 EASTING: 462000.8
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 756.6 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
756.1	SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, moist (TOPSOIL)					
0.5	POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, brown, moist, loose (GLACIAL OUTWASH)		3-4-5 (9) 14"		4	P200=9%
752.6						
4.0	POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, lenses of Clay and weathered bedrock, brown, moist, medium dense (GLACIAL OUTWASH)	5	3-7-5 (12) 14"			
749.6						
7.0	LIMESTONE, tan, highly weathered, (APPARENT BEDROCK)		13-15-11 (26) 14"			
		10	16-23-32 (55) 14"			
743.9						
12.7	END OF BORING		50/2" (REF) 2"			Water not observed while drilling.
	Boring immediately backfilled	15				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-4**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 124650.4 EASTING: 462075.7
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 759.0 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
757.0		SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, dry (TOPSOIL)					
2.0		SANDY LEAN CLAY (CL), trace Gravel, brown, moist (GLACIAL TILL)		3-3-4 (7) 14"		20	
755.0							
4.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, dry (GLACIAL OUTWASH)	5	3-4-6 (10) 14"			
				3-4-6 (10) 14"			
750.0							
9.0		LIMESTONE, tan, highly weathered, (APPARENT BEDROCK)	10	6-11-13 (24) 12"			
746.4							
12.7		END OF BORING Boring immediately backfilled		50/2" (REF) 2"			Water not observed while drilling.
			15				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-5**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 124213.1 EASTING: 461812.4
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 760.5 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
759.5		SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, dry (TOPSOIL)					
1.0		SANDY LEAN CLAY (CL), trace Gravel, brown, moist, medium (ALLUVIUM)		1-2-3 (5) 12"		17	
756.5							
4.0		SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist, loose (GLACIAL OUTWASH)	5	3-4-6 (10) 14"		7	
753.5							
7.0		CLAYEY SAND (SC), with Gravel, reddish brown, moist, stiff (GLACIAL TILL)		4-7-8 (15) 12"			
751.5							
9.0		SILTY SAND (SM), fine-grained, brown, dry, medium dense (RESIDUUM)	10	3-6-7 (13) 14"			
748.5							
12.0		LIMESTONE, tan, highly weathered, (APPARENT BEDROCK)		50/2" (REF) 2"			Water not observed while drilling.
747.8							
12.7		END OF BORING					
		Boring immediately backfilled	15				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-6**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 124316.2 EASTING: 462244.2
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 762.3 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
760.7		SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, dry (TOPSOIL)					
1.6		SANDY LEAN CLAY (CL), brown, moist, medium (ALLUVIUM)		3-2-4 (6) 14"		25	
758.3							
4.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, brown, moist, loose (GLACIAL OUTWASH)	5	3-3-4 (7) 14"		6	P200=8%
755.3							
7.0		SILTY SAND (SM), fine to coarse-grained, with Gravel, brown, moist, medium dense (GLACIAL TILL)		3-4-11 (15) 14"			
753.3							
9.0		SILTY SAND (SM), fine-grained, with Gravel, brown, dry, dense (RESIDUUM)	10	27-50/5" (REF) 8"			
				19-21-27-36 (48) 14"			
747.8							
14.5		END OF BORING	15				Water not observed while drilling.
		Boring immediately backfilled					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2508001
Geotechnical Evaluation
Nesvig Property - Cottage Grove
East of Grey Cloud Trail S & Geneva Ave S
Cottage Grove, Minnesota

BORING: **ST-7**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN Washington (US Feet)
NORTHING: 124358.0 EASTING: 462946.7
DRILLER: M. Takada LOGGED BY: M. Kudanovych START DATE: 10/20/25 END DATE: 10/20/25
SURFACE ELEVATION: 753.2 ft RIG: 75011 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
751.8		SILTY SAND (SM), fine to medium-grained, trace roots, dark brown, dry (TOPSOIL)					
1.4		CLAYEY SAND (SC), trace Limestone, brown, moist, stiff (GLACIAL TILL)		3-4-7 (11) 14"		10	
749.2							
4.0		LIMESTONE, tan, highly weathered, (APPARENT BEDROCK)	5	7-6-9 (15) 14"			
				50/3" (REF)			
			10				
742.2				50/3" (REF) 2"			
11.0		END OF BORING Boring immediately backfilled	15				Water not observed while drilling.

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-15**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 750.2 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
748.7		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.5		SILTY SAND (SM), fine to medium-grained, little Gravel, and Cobbles, brown, moist			
746.2					
4.0		LIMESTONE, brown, highly weathered			
745.2					
5.0		END OF TEST PIT Test pit then backfilled with spoils			Water not observed while excavating.

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-16**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 748.5 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
747.0		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.5		SILTY SAND (SM), fine to medium-grained, with Gravel, and Cobbles, brown, moist			
743.5					
5.0		LIMESTONE, brown, highly weathered			
743.0		END OF TEST PIT			Water not observed while excavating.
5.5		Test pit then backfilled with spoils			

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-17**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 756.5 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
755.0		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.5 751.0		SILTY SAND (SM), fine to medium-grained, with Gravel, and Cobbles, brown, moist			
5.5 749.0		LIMESTONE, brown, highly weathered			
7.5		END OF TEST PIT Test pit then backfilled with spoils			Water not observed while excavating.

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-18**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 762.0 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
760.5		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.5		LEAN CLAY (CL), brown, moist			
756.5			5		
5.5		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist			
			10		
751.0					
11.0		LIMESTONE, brown, highly weathered			
750.0					
12.0		END OF TEST PIT Test pit then backfilled with spoils			Water not observed while excavating.
			15		
			20		

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-19**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 752.6 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
751.1		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.5		SILTY SAND (SM), fine to medium-grained, with Gravel, and Cobbles, brown, moist			
748.6					
4.0		LIMESTONE, brown, highly weathered			
744.6					
8.0		END OF TEST PIT Test pit then backfilled with spoils			Water not observed while excavating.

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-20**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 756.3 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
755.3		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.0		LEAN CLAY (CL), brown, moist			
753.3					
3.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, and Cobbles, light brown, moist			
749.3					
7.0		LIMESTONE, brown, highly weathered			
745.3					
11.0		END OF TEST PIT Test pit then backfilled with spoils			Water not observed while excavating.

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-21**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 759.0 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
755.0		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
4.0		SILTY SAND (SM), fine to medium-grained, with Gravel, and Cobbles, brown, moist			
751.5			5		
7.5		LIMESTONE, brown, highly weathered			
			10		
744.5					
14.5		END OF TEST PIT	15		Water not observed while excavating.
		Test pit then backfilled with spoils			
			20		

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LOG OF TEST PIT

Project Number B2310333
Geotechnical Evaluation
Nesvig Property
9451 Grey Cloud Trail South
Cottage Grove, Minnesota

TEST PIT:	**TP-22**
LOCATION: See attached sketch	
DATUM:	
NORTHING:	EASTING:
EXCAVATOR: Enebak Construction	LOGGED BY: J. Carlson
START DATE: 10/16/23	END DATE: 10/16/23
SURFACE ELEVATION: 766.0 ft	RIG: Excavator
SURFACING: Field	WEATHER: Sun, 60°F

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487)	Sample	PID ppm	Tests or Remarks
765.0		SILTY SAND (SM), dark brown, moist (TOPSOIL)			
1.0		SILTY SAND (SM), fine to medium-grained, with Gravel, and Cobbles, brown, moist			
763.0					
3.0		POORLY GRADED SAND (SP), fine-grained, trace Gravel, light brown, moist			
			5		
			10		
			15		
750.0					
16.0		LIMESTONE, brown, highly weathered			
749.5		END OF TEST PIT			Water not observed while excavating.
16.5		Test pit then backfilled with spoils			
			20		

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

TEST PIT NUMBER TP-1

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 752.2 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Clay, black to dark brown, moist (Topsoil)						
2.5		(SM) Silty Sand, fine to medium grained, trace Gravel, brown, medium dense (Alluvium)						
5.0		(SP) Poorly Graded Sand, fine to medium grained, with Gravel, trace Cobbles, brown, moist (Alluvium)						
7.5		Limestone, tan (Bedrock)						

Bottom of test pit at 8.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 11/18/22 11:46 - C:\USERS\HGTS 3\DROPBOX (HGTS)\HAUGO GEOTECHNICAL SERVICES\2022\22-0302 PID 1902721240001\22-0302 TEST PIT LOG DRAFT.GPJ

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

TEST PIT NUMBER TP-3

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 757.1 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Sand, dark brown and black, moist (Topsoil)						
2.5		(SP-SM) Poorly Graded Sand with Silt, fine to coarse grained, with Gravel, brown, medium dense (Alluvium)						
5.0		(CL) Lean Clay, greenish grey, moist (Alluvium)						
7.5		Weathered Limestone, tan (Bedrock)						
		Limestone, tan (Bedrock)						

Bottom of test pit at 9.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 11/18/22 11:48 - C:\USERS\HGTS 3\DROPBOX (HGTS)\HAUGO GEOTECHNICAL SERVICES\2022\22-0302 PID 1902721240001\22-0302 TEST PIT LOG DRAFT.GPJ

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

TEST PIT NUMBER TP-4

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 751.4 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES
0.0		Silty Clay, black, moist (Topsoil)					
2.5		(SP-SM) Poorly Graded Sand with Silt, fine to coarse grained, with Gravel, brown, medium dense					
5.0		Limestone, tan (Bedrock)					

Bottom of test pit at 5.0 feet.

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

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 11/18/22 11:48 - C:\USERS\HGTS 3\DROPBOX (HGTS)\HAUGO GEOTECHNICAL SERVICES\2022\22-0302 PID 190272124000\122-0302 TEST PIT LOG DRAFT.GPJ

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

TEST PIT NUMBER TP-5

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 751.7 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Clay, black, moist (Topsoil)						
2.5		Limestone, tan (Bedrock)						

Bottom of test pit at 4.5 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 11/18/22 11:48 - C:\USERS\HGTS 3\DROPBOX (HGTS)\HAUGO GEOTECHNICAL SERVICES\2022\22-0302 PID 190272124000\22-0302 TEST PIT LOG DRAFT.GPJ

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

TEST PIT NUMBER TP-6

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 751.1 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Clay, black, moist (Topsoil)						
2.5		(SM) Silty Sand, fine to medium grained, trace Gravel, brown, moist (Alluvium)						
		Limestone, tan (Bedrock)						

Bottom of test pit at 3.5 feet.

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

TEST PIT NUMBER TP-7

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 750.9 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Clay, black, moist (Topsoil)						
2.5		(SP-SM) Poorly Graded Sand with Silt, fine to medium grained, with Gravel, reddish brown (Alluvium)						
5.0		Weathered Limestone, tan (Bedrock)						
		Limestone, tan (Bedrock)						

Bottom of test pit at 7.0 feet.

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Minneapolis, MN 55407
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Fax: 763-445-2238

TEST PIT NUMBER TP-9

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 766.9 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Sandy Lean Clay, dark brown, moist (Topsoil)						
2.5		(SM) Silty Sand, fine to medium grained, reddish brown, moist (Alluvium)						
5.0		(SP) Poorly Graded Sand, fine to coarse grained, with Gravel, brown, medium dense (Alluvium)						
7.5		(SP) Poorly Graded Sand, fine grained, brown, moist (Alluvium)						
10.0								
12.5								
15.0		(SC) Clayey Sand, reddish brown, moist (Alluvium)						
		Limestone, tan (Bedrock)						

Bottom of test pit at 16.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 11/16/22 11:46 - C:\USERS\HGTS 3\DROPBOX (HGTS)\HAUGO GEOTECHNICAL SERVICES\2022\22-0302 PID 1902721240001\22-0302 TEST PIT LOG DRAFT.GPJ

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

TEST PIT NUMBER TP-10

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 764.1 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Sand, black, moist (Topsoil)						
2.5		(SP-SM) Poorly Graded Sand with Silt, fine to medium grained, trace Gravel, moist (Alluvium)						
5.0								
7.5								
10.0								

Bottom of test pit at 12.0 feet.

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

TEST PIT NUMBER TP-11

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 765.7 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES
0.0		Silty Sand, dark brown and black, moist (Topsoil)					
2.5		(SM) Silty Sand, fine to medium grained, brown, moist (Alluvium)					
5.0		(SP) Poorly Graded Sand, fine to medium grained, brown, moist (Alluvium)					
12.5		Weathered Limestone, tan (Bedrock)					
15.0		Limestone, tan (Bedrock)					

Bottom of test pit at 15.0 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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Haugo GeoTechnical Services
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959
Fax: 763-445-2238

TEST PIT NUMBER TP-12

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 749.6 ft **TEST PIT SIZE** 3 1/4 inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Sand, dark brown and black, medium grained (Topsoil)						
		(SP-SM) Poorly Graded Sand with Silt, fine to medium grained, brown, moist (Alluvium)						
2.5		Limestone, tan (Bedrock)						

Bottom of test pit at 4.0 feet.

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

TEST PIT NUMBER TP-13

CLIENT C G Land LLC
PROJECT NAME PID 1902721240001
PROJECT NUMBER 22-0302
PROJECT LOCATION Cottage Grove, MN
DATE STARTED 11/10/22 **COMPLETED** 11/10/22
GROUND ELEVATION 747.3 ft **TEST PIT SIZE** 3 1/4 Inches
EXCAVATION CONTRACTOR HGTS - 45
GROUND WATER LEVELS:
EXCAVATION METHOD Test Pit
AT TIME OF EXCAVATION --- Not Encountered
LOGGED BY NA **CHECKED BY** PG
AT END OF EXCAVATION --- Not Encountered
NOTES
AFTER EXCAVATION --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		Silty Clay, black, moist (Topsoil)						
2.5		(SM) Silty Sand, fine to medium grained, reddish brown, moist (Alluvium)						
5.0		Weathered Limestone, tan (Bedrock)						
		Limestone, tan (Bedrock)						

Bottom of test pit at 6.0 feet.

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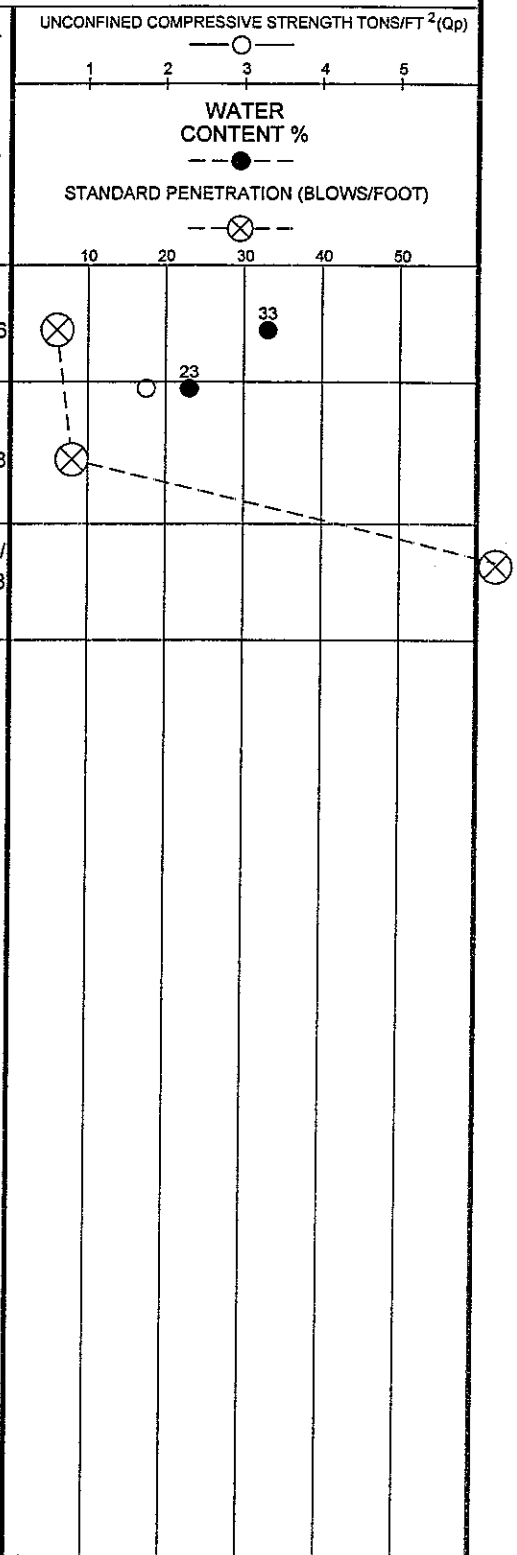
LOG OF BORING 197

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 751.1

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		1.8	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		6
	2SS		4.0	Brown lean Clay, trace sand - very stiff - (CL)		8
5	3SS			Brown Silty Sand with sandstone fragments - extremely dense - damp - (SM) (Probable Weathered Bedrock)		73/ 0.8
				Auger refusal at 5 8 feet End of boring at 5.8 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

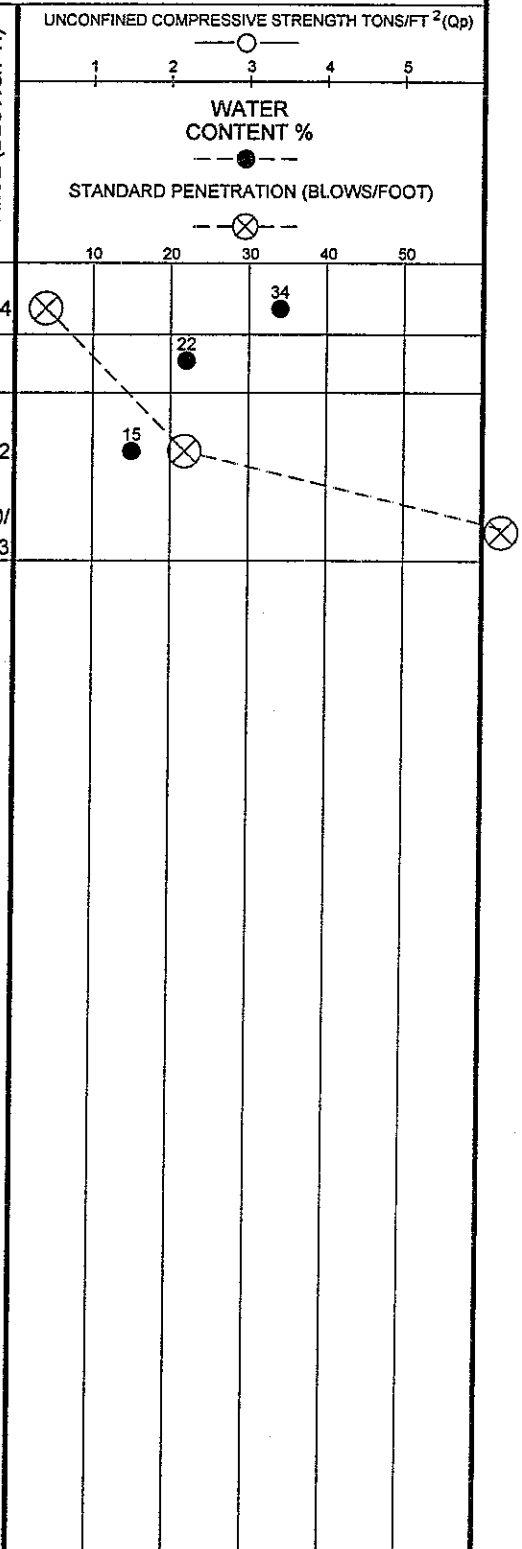
BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 198

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
				SURFACE ELEVATION 751.0		
	1SS		1.1	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		4
			2.0	Brown lean Clay, trace sand - (CL)		
	2SS			Brown Silty Sand with rock fragments - medium dense to extremely dense - damp - (SM) (Probable Weathered Bedrock)		22
	3SS					50/ 0.3
				Auger refusal at 4.6 feet End of boring at 4.6 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

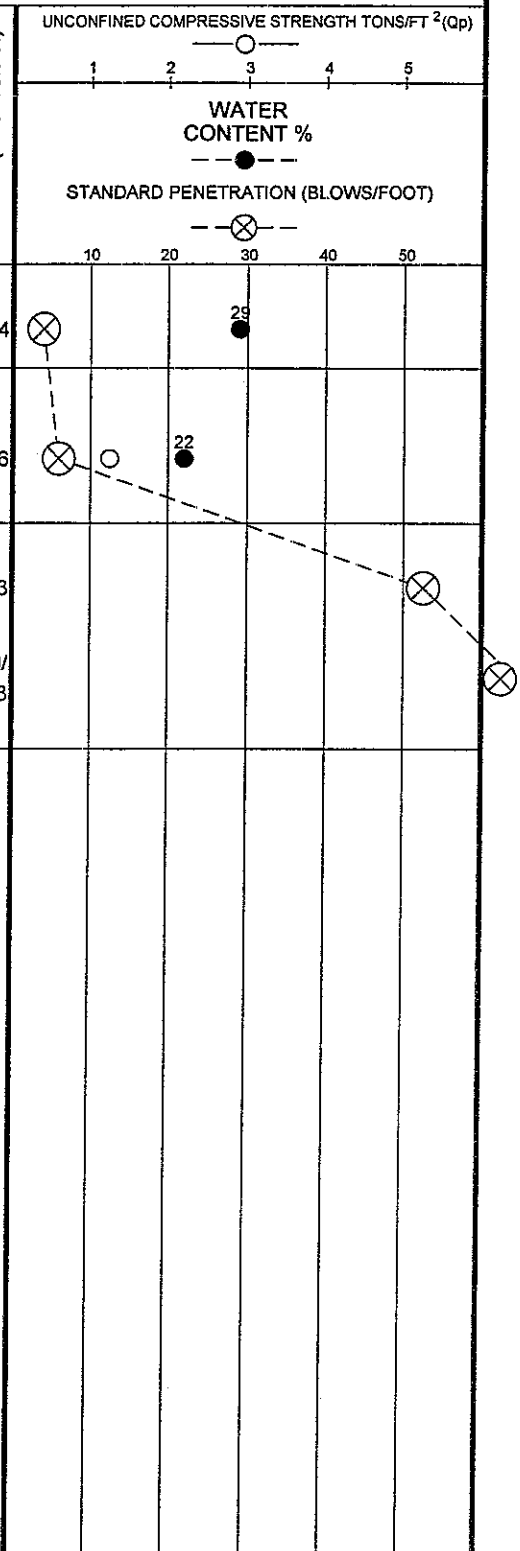
BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 199

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
				SURFACE ELEVATION 752.1		
	1SS		1.6	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		4
	2SS		4.0	Brown lean Clay, trace sand - firm - (CL)		6
5	3SS			Brown Silty Sand with sanstone and shale fragments - very dense to extremely dense - damp - (SM) (Probable Weathered Bedrock)		53
	4SS					50/ 0 3
				Auger refusal at 7.5 feet End of boring at 7.5 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

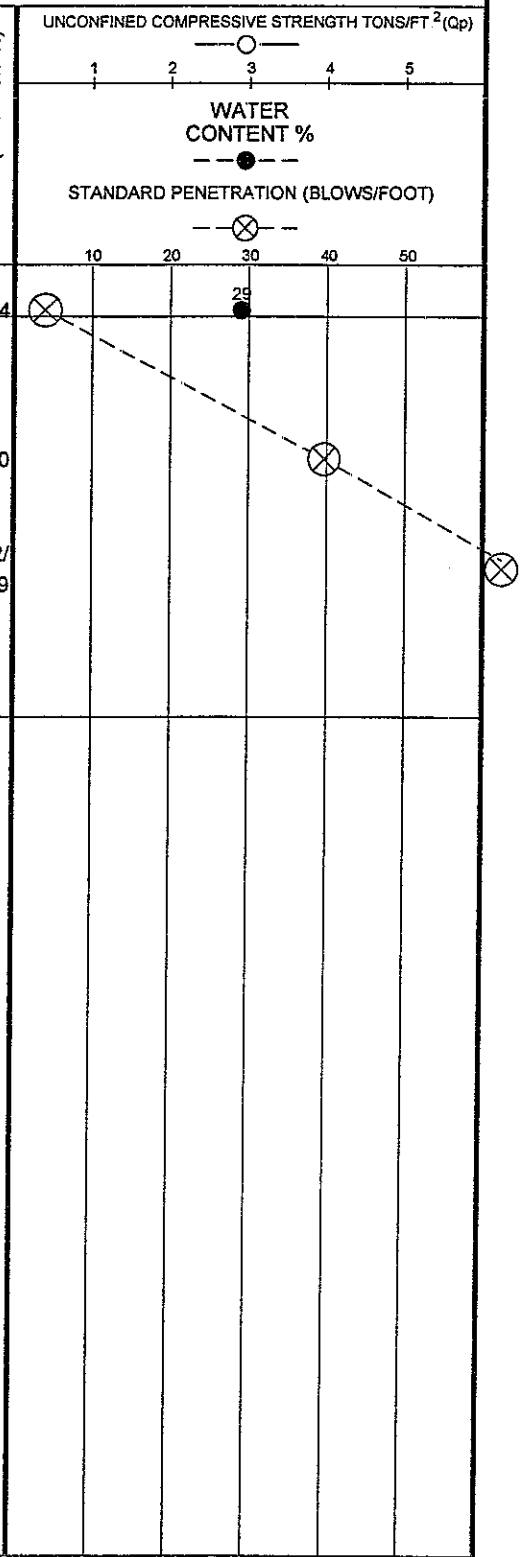
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 200

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 751.8

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		0.8	Black Silt, trace sand, organic fines - (ML) (Topsoil)		4
				Brown Silty Sand with shale fragments - medium dense to extremely dense - damp - (SM) (Probable Weathered Bedrock)		
	2SS					40
5	3SS					92/ 0 9
				Auger refusal at 7 feet End of boring at 7 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

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Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

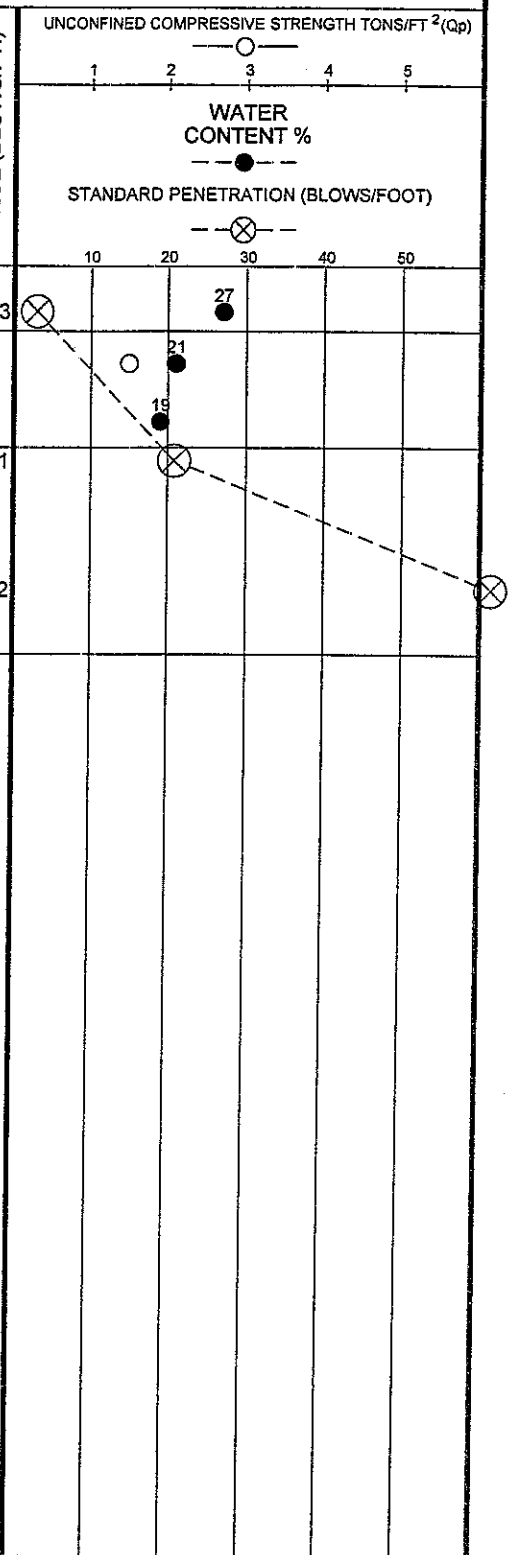
BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 201

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
				SURFACE ELEVATION 751.2		
	1SS		1.0	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		3
				Brown lean Clay, trace sand, gravel - (CL)		
	2SS		2.8	Brown Silty Sand with sandstone and shale fragments - very dense - damp - (SM) (Probable Weathered Bedrock)		21
5	3SS					62
				Auger refusal at 6 feet End of boring at 6 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 202

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 750.3

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
			0.8	Black Silt, trace sand, organic fines - (ML) (Topsoil)		
	1SS			Brown Silty Sand with rock fragments - medium dense to extremely dense - damp - (SM) (Probable Weathered Bedrock)		4
	2SS					17
	3SS					50/ 0.5
				Auger refusal at 4.6 feet End of boring at 4.6 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50

29

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05
BORING COMPLETED	11/30/05
RIG CME-750	DRILLER SB
DRAWN KMB	APPROVED JPB
JOB # 9794-A	SHEET 1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

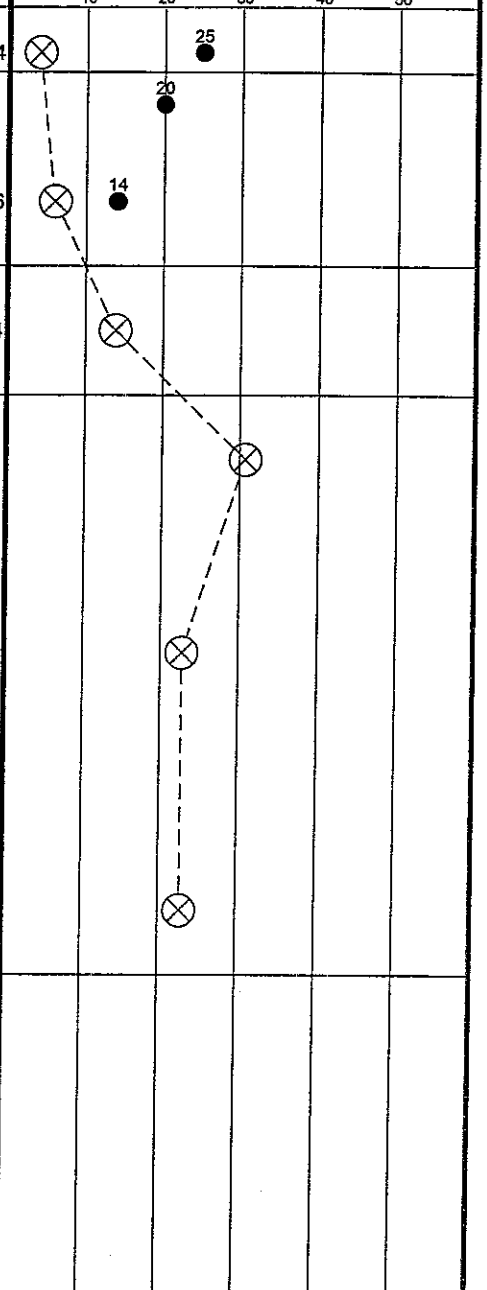
LOG OF BORING 203

PROJECT: Rivers Edge Residential Development
SITE: Grey Cloud Island Drive, St. Paul Park, Minnesota
CLIENT: D.R. Horton, Inc.
ARCHITECT-ENGINEER:

SURFACE ELEVATION: 766.6

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		1.0	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		4
	2SS		4.0	Brown Silt with Sand - loose - (ML)		6
5	3SS		6.0	Brown Silty Sand, trace gravel - medium dense - damp - (SM)		14
	4SS			Brown poorly graded Sand with Silt, trace gravel - dense to medium dense - damp - (SP-SM)		31
10	5SS					23
	6SS					23
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT^2 (Qp): 1 2 3 4 5
WATER CONTENT %
STANDARD PENETRATION (BLOWS/FOOT): 10 20 30 40 50



WATER LEVEL OBSERVATIONS

W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 13 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

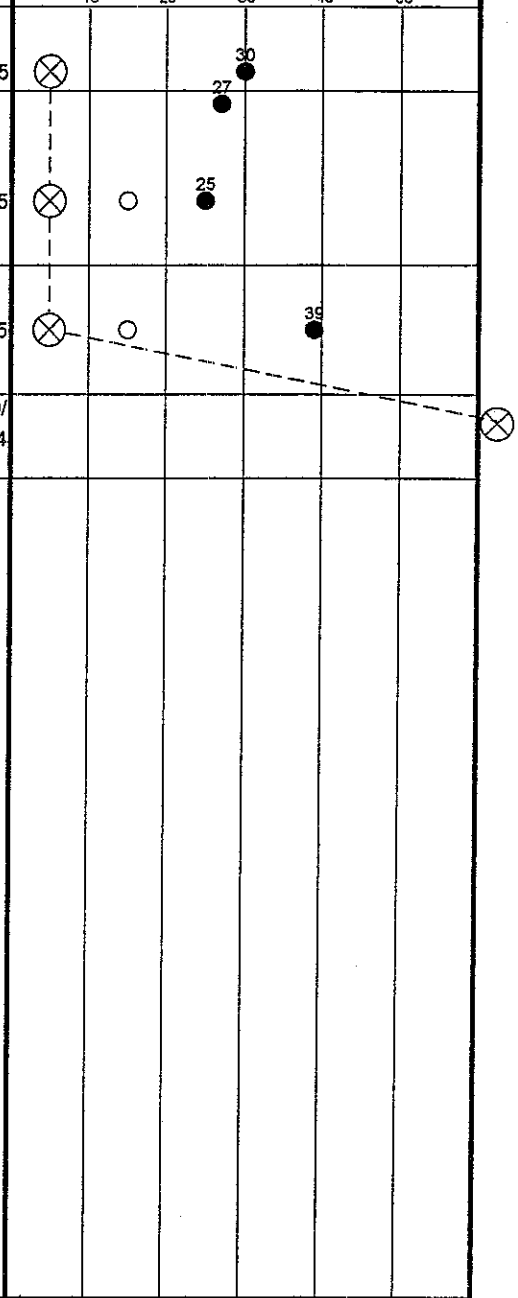
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 204

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
				SURFACE ELEVATION 755.1		
	1SS		1.3	Black Silt, trace sand, organic fines - firm - (ML) (Topsoil)		5
	2SS		4.0	Brown lean Clay, trace sand - firm - (CL)		5
5	3SS		6.0	Gray brown lean to fat Clay - firm - (CL/CH)		5
	4SS			Brown Silty Sand with rock fragments - extremely dense - damp - (SM) (Probable Weathered Bedrock)		50/0.4
				Auger refusal at 7 3 feet End of boring at 7 3 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2}(Qp)
1 2 3 4 5
WATER CONTENT %
STANDARD PENETRATION (BLOWS/FOOT)
10 20 30 40 50



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

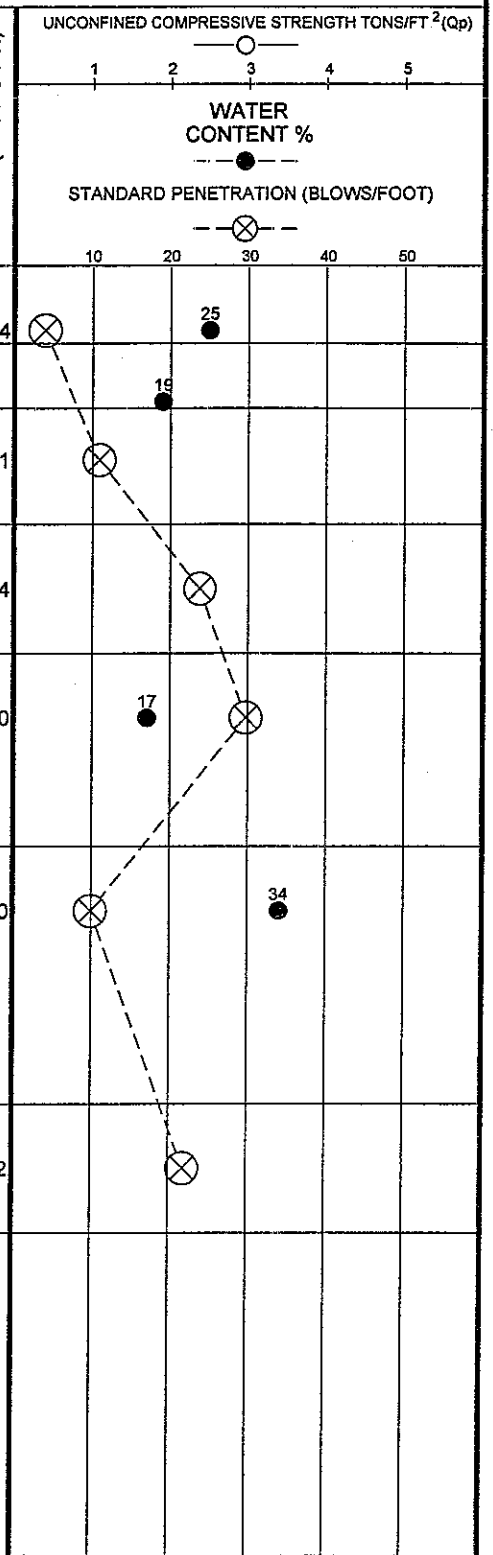
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 205

PROJECT: Rivers Edge Residential Development
SITE: Grey Cloud Island Drive, St. Paul Park, Minnesota
CLIENT: D.R. Horton, Inc.
ARCHITECT-ENGINEER:

SURFACE ELEVATION: 752.9

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		1.2	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		4
			2.2	Brown lean Clay with Sand, trace gravel - (CL)		
	2SS		4.0	Brown Silty Sand with Gravel - medium dense - damp - (SM)		11
5	3SS		6.0	Brown poorly graded Sand, trace silt, gravel - medium dense - damp - (SP)		24
	4SS		9.0	Brown and red brown lean Clay, trace sand - very stiff - (CL)		30
10	5SS		13.0	Brown and dark brown lean Clay, trace sand - stiff - (CL)		10
15	6SS			Brown Silty Sand with sandstone fragments - medium dense - damp - (SM) (Probable Weathered Bedrock)		22
				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 13.6 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

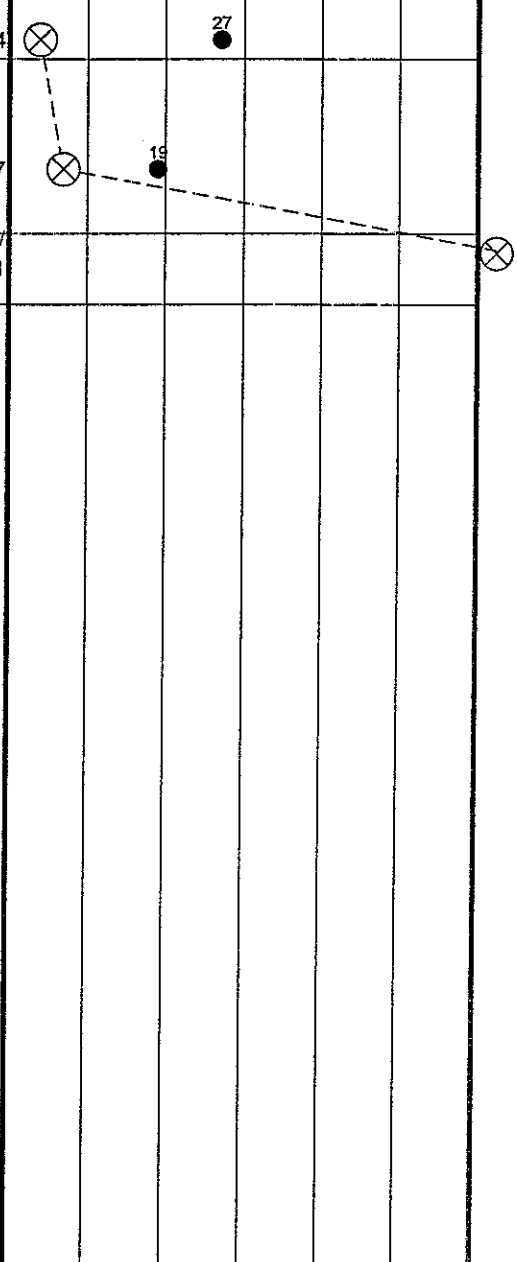
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 206

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
				SURFACE ELEVATION 752.4		
	1SS		1.3	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		4
	2SS		4.0	Brown Silty Clay with Sand, trace gravel - firm - (CL/ML)		7
5	3SS			Brown Silty Sand with sandstone fragments - extremely dense - damp - (SM) (Probable Weathered Bedrock)		50/0.1
				Auger refusal at 5 1 feet End of boring at 5.1 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)
1 2 3 4 5
WATER CONTENT %
STANDARD PENETRATION (BLOWS/FOOT)
10 20 30 40 50



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 207

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 751.8

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		1.2	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		4
	2SS			Brown Silty Sand with sandstone fragments - very dense to extremely dense - damp - (SM) (Probable Weathered Bedrock)		59
	3SS					50/0.1
5				Auger refusal at 5 feet End of boring at 5 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)
1 2 3 4 5
WATER CONTENT %
STANDARD PENETRATION (BLOWS/FOOT)
10 20 30 40 50
24

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	12/1/05		
BORING COMPLETED	12/1/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 208

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 795.8

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		0.6	Black to dark brown Silty Sand, trace organic fines - damp - (SM) (Topsoil)		5
			2.0	Brown Silty Sand, trace gravel - loose - damp - (SM)		
	2SS			Brown poorly graded Sand with Silt, trace gravel - loose - damp - (SP-SM)		7
5	3SS		6.0			6
	4SS			Brown poorly graded Sand, trace silt, gravel - loose to medium dense - damp - (SP)		9
10	5SS					20
	6SS					18
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 12 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/29/05		
BORING COMPLETED	11/29/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 209

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 786.5

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		0.8	Black Sandy Silt, trace organic fines - (ML) (Topsoil)		10
				Brown Silty Sand, trace gravel - medium dense - damp - (SM)		
	2SS		4.0			9
5	3SS		6.0	Brown poorly graded Sand, trace silt, gravel - medium dense - damp - (SP)		20
	4SS		9.0	Brown Silty Sand, trace gravel - medium dense - damp - (SM)		14
10	5SS			Brown poorly graded Sand, trace silt, gravel - medium dense - damp - (SP)		11
	6SS					13
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50

22

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 12.6 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/29/05		
BORING COMPLETED	11/29/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

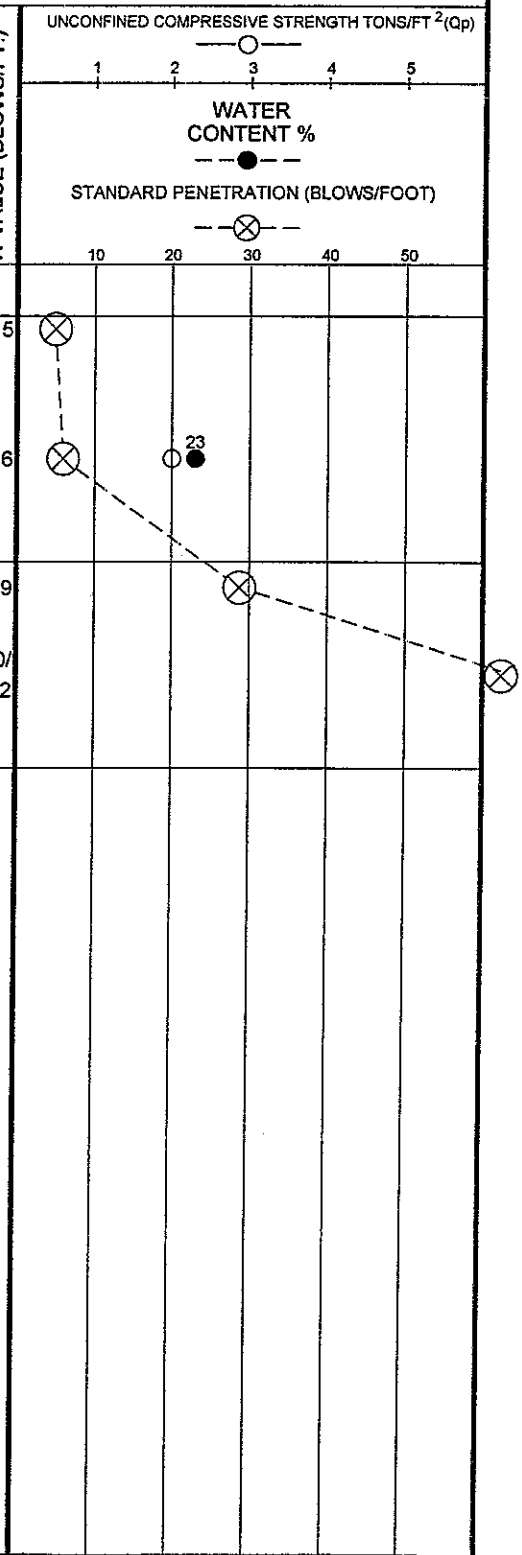
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 210

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 760.6

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		0.8	Black to dark brown Clayey Sand with Organic Fines - (SC/OL) (Topsoil) Brown lean Clay, trace sand - firm - (CL)		5
	2SS					6
			4.6			
5	3SS			Brown Silty Sand, trace gravel - medium dense to extremely dense - damp - (SM)		29
	SS					50/0.2
				Auger refusal at 7.8 feet End of boring at 7.8 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 211

PROJECT: Rivers Edge Residential Development

SITE: Grey Cloud Island Drive, St. Paul Park, Minnesota

CLIENT: D.R. Horton, Inc.

ARCHITECT-ENGINEER:

SURFACE ELEVATION: 755.7

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		1.4	Black Silt, trace sand, organic fines - soft - (ML) (Topsoil)		3
	2SS		4.0	Brown Sandy Silt - loose - (ML)		4
	3SS			Brown Silty Sand with clay seams, trace gravel - (SM)		50/0.4
				Auger refusal at 4.5 feet End of boring at 4.5 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50

25

19

22

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/30/05		
BORING COMPLETED	11/30/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 212

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 755.0

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
			0.8	Black Silt, trace sand, organic fines - (ML) (Topsoil)		
	1SS			Brown Silty Sand, trace gravel - loose to medium dense - damp - (SM)		4
	2SS		4.0			12
	3SS			Brown to light brown Silty Sand with rock fragments - extremely dense - damp - (SM) (Probable Weathered Bedrock)		50/ 0.5
5	4SS					50/ 0 3
	5SS					50/ 0.3
10				Auger refusal at 11 4 feet End of boring at 11.4 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50

24

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	12/1/05		
BORING COMPLETED	12/1/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 213

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 797.6

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
			0.6	Black Sandy Silt, trace organic fines - (ML) (Topsoil)		
	1SS			Brown poorly graded Sand with Silt, trace gravel - loose to medium dense - damp - (SP-SM)		5
	2SS					6
5	3SS					8
	4SS					5
10	5SS					10
			13.0			
	6SS			Brown poorly graded Sand, trace silt, gravel - medium dense - damp - (SP)		10
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2}(Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 13 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/29/05		
BORING COMPLETED	11/29/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 214

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 803.6

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		1.3	Black Sandy Silt, trace organic fines - very loose - (ML) (Topsoil)		2
	2SS		4.0	Brown Silty Sand, trace gravel - loose - damp - (SM)		9
5	3SS		6.0	Brown poorly graded Sand with Silt, trace gravel - medium dense - damp - (SP-SM)		17
	4SS			Brown poorly graded Sand, trace silt, gravel - loose to medium dense - damp - (SP)		9
10	5SS					14
	6SS					11
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)
1 2 3 4 5
WATER CONTENT %
STANDARD PENETRATION (BLOWS/FOOT)
10 20 30 40 50

WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 12 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/29/05		
BORING COMPLETED	11/29/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

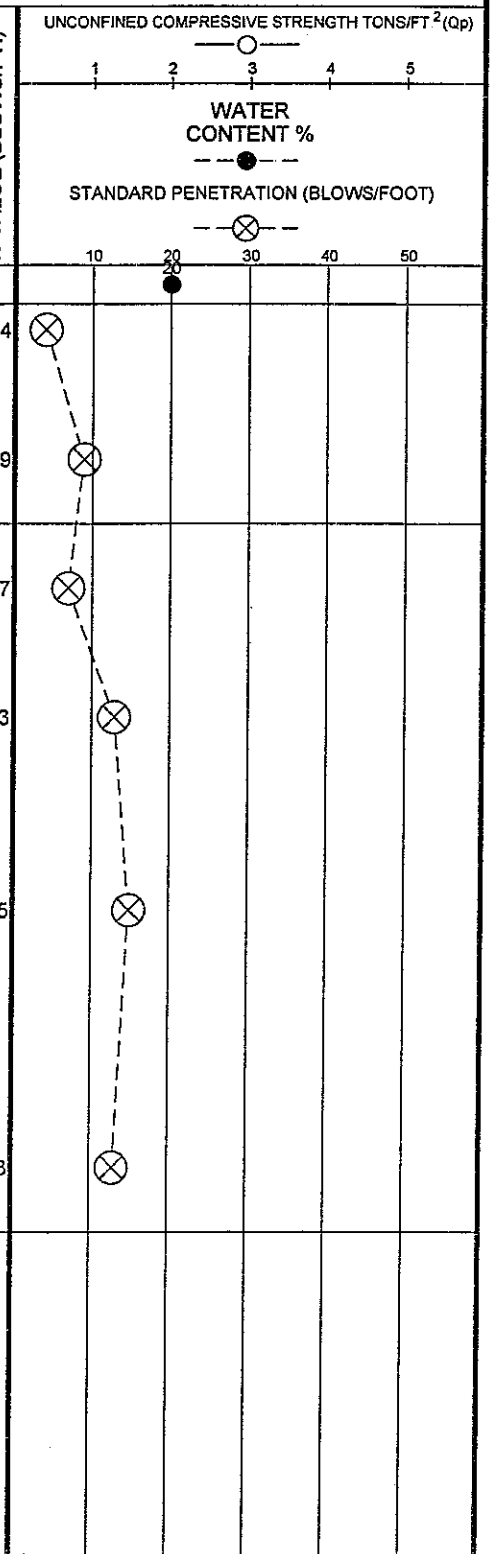
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 215

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 802.4

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
			0.6	Dark brown Silty Sand, trace organic fines - damp - (SM) (Topsoil)		
	1SS			Brown Silty Sand, trace gravel - loose - damp - (SM)		4
	2SS		4.0			9
5	3SS			Brown poorly graded Sand, trace silt, gravel - loose to medium dense - damp - (SP)		7
	4SS					13
10	5SS					15
	6SS					13
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 13 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/29/05		
BORING COMPLETED	11/29/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

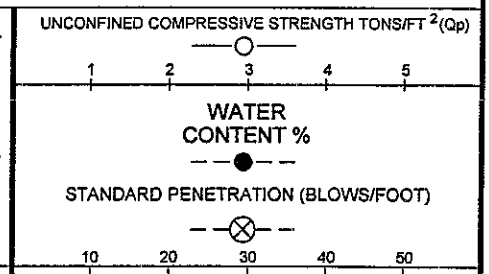
The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 216

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 791.7

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
			0.6	Dark brown Silty Sand, trace organic fines - (SM) (Topsoil)		
	1SS			Dark brown Silty Sand, trace organic fines - loose - damp - (SM)		4
	2SS		4.0			9
5	3SS			Brown poorly graded Sand, trace silt, gravel - loose to medium dense - damp - (SP)		11
	4SS					7
10	5SS					10
	6SS					7
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

Boring caved at 13 feet after HSA removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	11/29/05		
BORING COMPLETED	11/29/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 217

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

SURFACE ELEVATION 769.8

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
	1SS		0.8	Black to dark brown Silty Sand, trace organic fines - damp - (SM) (Topsoil)		4
				Brown Silty Sand, trace gravel - loose to medium dense - damp - (SM)		
	2SS					8
5	3SS		6.0			11
	4SS			Brown poorly graded Sand with Silt, Gravel - very dense to medium dense - damp - (SP-SM)		61/ 0 8
10	5SS		13.0			13
	6SS			Brown Silty Sand with Gravel - extremely dense - damp - (SM)		65/ 0 1
15				End of boring at 15 feet Hollow stem auger used full depth Borehole backfilled with cuttings		

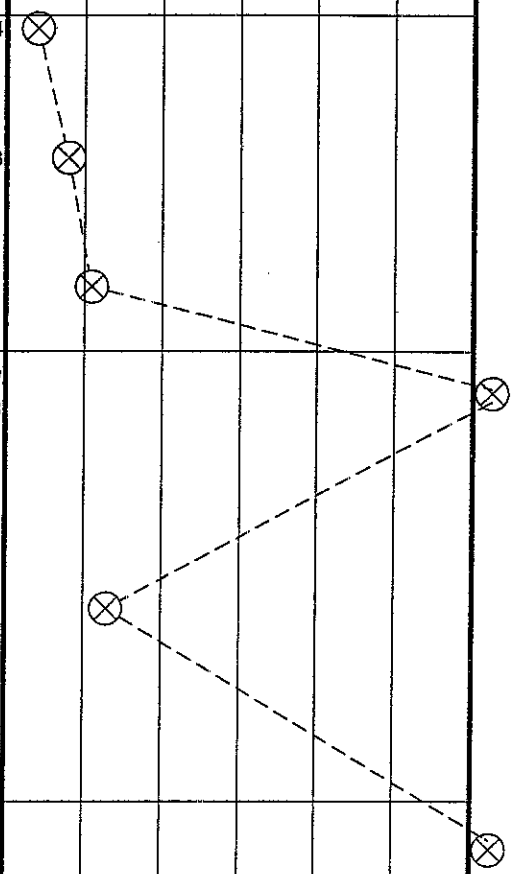
UNCONFINED COMPRESSIVE STRENGTH TONS/FT ^{2} (Qp)

1 2 3 4 5

WATER CONTENT %

STANDARD PENETRATION (BLOWS/FOOT)

10 20 30 40 50



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

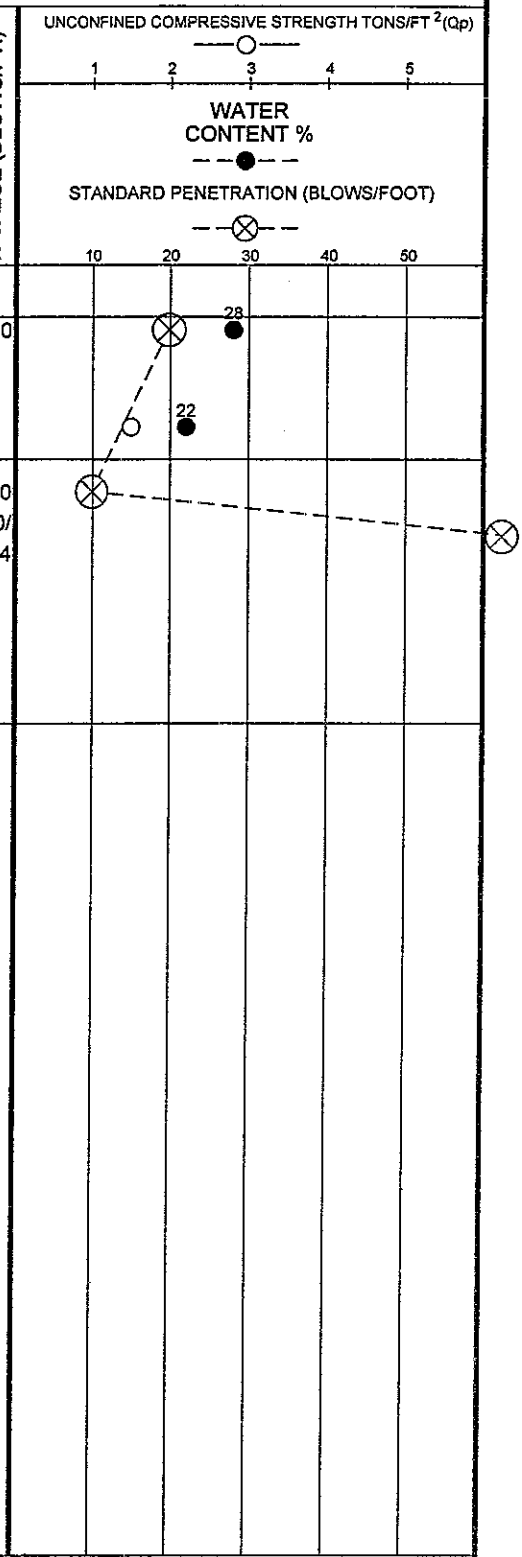
BORING STARTED	12/1/05		
BORING COMPLETED	12/1/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

LOG OF BORING 218

PROJECT Rivers Edge Residential Development	SITE Grey Cloud Island Drive St. Paul Park, Minnesota
CLIENT D.R. Horton, Inc.	ARCHITECT-ENGINEER

DEPTH, FEET	SAMPLE NUMBER AND TYPE	WATER LEVEL	STRATA CHANGE, FEET	DESCRIPTION OF MATERIAL	SPECIAL TEST RESULTS	N-VALUE (BLOWS/FT.)
				SURFACE ELEVATION 758.3		
	1SS		0.8	Black Silt, trace sand, organic fines - (ML) (Topsoil)		
				Brown lean Clay, trace sand - soft - (CL)		20
			3.0			
	2SS			Brown Silty Sand with sandstone fragments - very dense to extremely dense - damp - (SM) (Probable Weathered Bedrock)		10
	3SS					50/
5						0.4
				Auger refusal at 7 1 feet End of boring at 7.1 feet Hollow stem auger used full depth Borehole backfilled with cuttings		



WATER LEVEL OBSERVATIONS	
W.L.	Groundwater not encountered
W.L.	while drilling or after HSA
W.L.	removal

GME CONSULTANTS, INC.
Geotechnical Materials Environmental
14000 21st Avenue No.
Minneapolis, MN 55447
(763) 559-1859

BORING STARTED	12/1/05		
BORING COMPLETED	12/1/05		
RIG	CME-750	DRILLER	SB
DRAWN	KMB	APPROVED	JPB
JOB #	9794-A	SHEET	1 of 1

The stratification lines represent approximate boundaries between soil types; insitu the transition may be gradual.

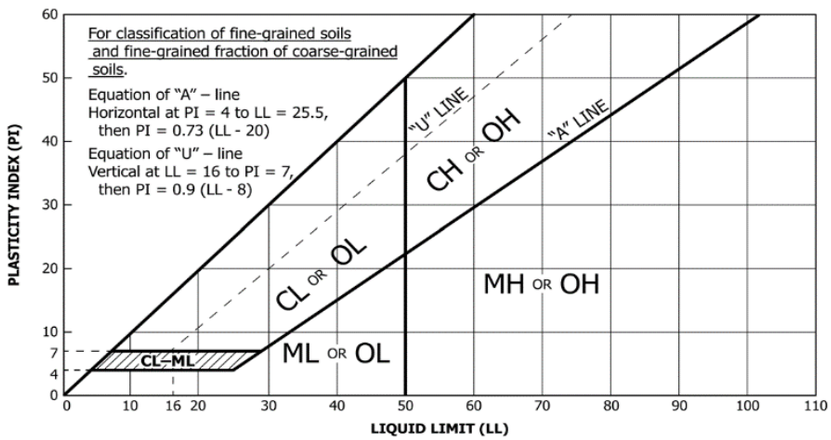
BRAUN INTERTEC
the science you build on

Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil 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 (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3^D$	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3^D$	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[I]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes 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] / 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] / 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-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. 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
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
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. 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
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% 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	**q_p**	Pocket penetrometer strength, tsf
WD	Wet density, pcf	**q_U**	Unconfined compression test, tsf
P200	% Passing #200 sieve	**LL**	Liquid limit
MC	Moisture content, %	**PL**	Plastic limit
OC	Organic content, %	**PI**	Plasticity index

Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L,M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent 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	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

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

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

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▽).

Sample Symbols

Standard Penetration Test
Modified California (MC)
Auger
Grab Sample
Rock Core
Thinwall (TW)/Shelby Tube (SH)
Texas Cone Penetrometer
Dynamic Cone Penetrometer

5/2021

Stantec Consulting Services Inc.
2080 Wooddale Drive Suite 100, Woodbury MN 55125-2920

February 18, 2026
File: 193807632

Joe Fox, PE
Project Engineer
10875 Ideal Avenue South
Cottage Grove, Minnesota 55016

Reference: Talcott Glen (Review Comments – Preliminary Plat Submittal)

Dear Joe,

Below are our review comments for the proposed Talcott Glen preliminary plat submittal received on 1/27/26:

General Comments:

1. A lighting plan must be submitted for review, 200'-250' maximum spacing between lights.
2. Submit a signing and pavement marking plan for review. Include two stop signs at a four-way intersection, prewarning signs at the 95th Street midblock trail crossing. The city will produce a map showing locations of park/open space identification signs; this information should be included in the sign plans.
3. Has the pipeline approved the proposed street and utility (sanitary & water) crossings over their facilities?
4. An emergency access route designed to meet fire code requirements north of 95th Street will be required. Survey, design and plan information for this emergency access must be submitted for review.
    a. This route should have a hammerhead turnaround just north of the property line.
    b. A gate should be installed at the property line.
5. Fire marshal requires temporary cul de sac off the end of Street A.
    a. Developer should get an easement from landowner to north for this purpose and for extension of utilities.
6. Include reference to the current City of Cottage Grove "Standard Specification for Utility and Street Construction", dated January 2025, in the project plans.

7. The location map on the cover sheet should be updated with current/existing streets.
8. Provide plan information on the flora to be protected during construction.

9. Will a development monument sign be proposed? If so, provide location and details.
10. Bedrock will be encountered throughout this site, please provide details for excavation and how the bedrock material will be disposed of or utilized.
11. Provide the most recent concept figures showing future development layouts for the properties located north of this development. Has any preplanning been prepared to aid in determining the sanitary sewer depth north of the proposed development?

Preliminary Plat Comments:

12. Has the entire right-of-way been acquired for extending 95th Street east of the development?
13. The preliminary grading plan indicates that a "construction easement required" to construct a portion of 95th Street. Has this construction easement been acquired to date?
14. City requires two 20-foot-wide access points for each pond.
15. Extend property lines for lots 34 thru 43 to the center of the pipeline easement.
16. Include an easement for a temporary turnaround at the north end of Street A.
17. Extend trail from Strawberry Fields Park as directed by the City. One segment is to extend the trail to the north for future development. The City is also considering another segment that may extend west to the sidewalk on 95th Street constructed with mulch and steps. All trails will need to be placed in a 20'outlot.
18. Maintenance benches are required around the entire perimeter for all ponds and basins, they must be contained entirely in an outlot.
19. If the pond on the east side of 95th Street stays, it should be platted in a separate outlot.
20. The preliminary site plan shows 15' side yard setbacks for corner lots, the City requirement is 20' side yard setbacks for corner lots.
21. Street D should be extended south beyond Street C to the southern property line of the development to provide access for future development (eliminate lot 102).

Preliminary Grading Plan Comments:

22. There is a significant amount of storm sewer in backyards that will be challenging to access for maintenance. Review the storm sewer and position as much in the streets as possible, stubs down lot lines to catch basins are ok and easy to access from the street for maintenance (jetting).
23. If the storm sewer in backyards stays, please provide EOF information that allows for safe overland passage through the development in accordance with the City's EOF requirements. Multiple locations appeared to not meet this standard.
24. Ensure all drainage is not being routed offsite (northeast, southeast), these areas will be required to be picked up with catch basins or an onsite graded swale instead of being drained offsite.
    a. This refers to lots 23-30 and 91-109
25. Provide information for where the storm sewer ponding overflows go (west side, south side).
    a. For example, FES-100B: When water leaves the pond, where does water flow?
26. There are a number of low points (LP) labeled on the plan that do not line up with a proposed low point CB (Ex: e of lot 48, e of lot 64, int of Street B&C, int of Street B&95th, etc.).
27. Where localized EOFs are being proposed between lot lines, multiple locations do not have a defined swale between the lots to ensure drainage stays within the drainage easement. (Ex: lot 177, 123, 107, etc)
28. Provide reasoning and purpose for the storm pond (500P) on the east side of 95th Street.
29. Lowest adjacent grade must be 2-feet above the adjacent detention basin EOF and 3-feet above the adjacent detention basin HWL (Ex: lots 47-49, 16-18).
30. Many of the HWL elevations labeled for the ponds and basins do not match the HWL elevation contour.
31. Include spot elevations at high points along side lot lines.
32. Flexamat is not allowed for overflows, use riprap.
33. Include riprap at both ends of pipes within basins.

34. If topsoil and aggregate backfill will be salvaged onsite indicate this on the plans, notes, and typical sections.

Preliminary Street & Utility Plan Comments:

35. Existing conditions plan: Include additional information for the extension of 95th Street east to Mississippi Dunes Boulevard.
36. Preliminary removals plan: Verify any wells on the property that need to be sealed/capped. Remove the gravel path/drive on the west side over the railroad tracks to Grey Cloud Trail, this will have to be coordinated with the railroad. There are structures in the proposed 95th Street ROW, near Mississippi Dunes Boulevard, that will have to be removed (south side of proposed street).
37. Preliminary overall site plan: The City will not provide the emergency access route to the north. The developer will provide the emergency access route (all weather road) to the north and include gate access as part of this plan.
    a. Please include survey and grading design work in the next submittal.
38. Preliminary overall site plan: There are areas that should be colored (Ex: outlot F, area near proposed lift station).
39. The preliminary site plan indicates the "lift station design by others". The developer will be responsible for the design of the lift station.
40. Preliminary site plan: A trail extension north from Strawberry Fields Park will be required. The City may consider a trail extension (mulch, steps) west to 95th Street.
41. Preliminary site plan: Street C indicates street width as 27' F-F, this should be 28' F-F. 95th Street within the development limits should be 36' F-F with 66' ROW. The plan shows an 8' trail constructed on the east side of 95th Street, a 5' sidewalk should be installed west of the 95th Street midblock trail crossing. Review realigned trail 95th Street midblock crossing with City staff for snow plowing access.
42. 95th Street turn lanes plan: Include additional information on the east side of Mississippi Dunes Boulevard to tie in location. Proposed trail and boulevard segments on the west side of Mississippi Dunes Boulevard should match up with the existing trails on the east side of Mississippi Dunes Boulevard. Proposed lane width (11') on the west side of Mississippi Dunes Boulevard should match the lane width (12') on the east side of Mississippi Dunes Boulevard. Verify turn lane taper lengths are correct.
43. Preliminary wall plan: Wall "A" is proposed to be placed in an easement, can grading modifications be made to eliminate the need for this wall? Wall "B" is proposed to be placed in City easement, can grading modifications be made to

eliminate the need for this wall? Note, nearby existing fence appears to be in easement. If these walls cannot be eliminated a maintenance and access agreement will be the required by the homeowner or HOA.

44. Preliminary road profile: Maintain a minimum longitudinal grade of 0.75% (Ex: Street A, Street D, 95th Street). Is there any reason why a consistent grade on 95th, from approximate station 0+00 to 8+50, cannot be maintained? What is the reasoning for the low point at approximate station 6+24?
45. Preliminary grading details: The final lift of bituminous will not be placed as part of this project, a separate final street project will be completed in the future.
46. Preliminary grading details: The clay section should be updated to include only clay and topsoil, use of liner is not allowed. Onsite clay material can only be used if it meets City specifications. Provide reasoning for the use of the clay anti seep.
47. Include one sheet that shows utilities in entire development.
48. Include sanitary, watermain, and storm profile views within the plans. The profiles should include utility crossing and show the anticipated rock depth based on geotechnical information available.
49. Label all water fittings and include the size of all gate valves within the plans. Note valves 12" or larger must be butterfly valves.
50. Fit all hydrant branches with gate valves.
    a. The planned short-pattern hydrant extensions may be a challenge to construct.
51. There are many mid-block hydrants. Could the plans be revised to place hydrants at intersections while still meeting the spatial requirements of the Ten State Standards.
52. Place hydrants at dead ends. At the northern end of Street A; at the southern end of Street B; at the northern end of 95th Street; at the southern end of Street D.
53. The preference is for GVs at intersections rather than mid-block. Unless the need can be justified.
54. The 8-inch line through Outlot A should be constructed with restraining gaskets or glands for the full length of this segment.
55. Add a hydrant branch and gate valve on top of hill. Suggested location is in the ROW of 95th where it fits best.
56. The City recommends that the water in this area be served by the Low Pressure Zone (maximum expected pressures near 80 psi, no PRV needed). This is in part driven by the desire to avoid issues with low service pressures as experienced in other parts of the City's water distribution system.
57. It is recommended to provide 12-inch trunk watermain connections available on both the north and south sides of this development. This will support future

extension of the Low Pressure Zone into the adjacent parcels and provide for acceptable service pressures and fire flows. The current plans show a 12-inch watermain extending along 95th Street S from the east and curving to the north, but no connection to the south is currently shown. The city will work with the developer to find the place for a 12-inch connection to the south. If Street D is extended south beyond Street C to the southern property line of the development (eliminating lot 102), this could be an acceptable location to route a 12-inch trunk watermain to the south.

58. Make sure sanitary sewer and water stubs are extended beyond driveways (Ex: north end of Street A).
59. Utilities should be stubbed into property to south on Streets B and D. The developer is required to work with the property owner to secure easements for the utilities.
60. Past projects have had issues with contractors not obtaining the minimum 8" sanitary grade of 0.40%. Less than 0.40% is not allowed. It is recommended that you increase the design grade to allow room for installation irregularities.
61. Use SDR 26 sanitary sewer pipe when depths are between 18' and 28' deep (Ex: north of MH-14, between MH-35 and MH-36).
62. Sanitary sewer and water services should be shown, verify they do not fall within proposed driveways wherever applicable.
63. Include irrigation plans and location for irrigation cabinets if the development is planning for irrigation.
64. There is approximately 700' of proposed sanitary sewer being installed within 95th Street just west of Mississippi Dunes Boulevard. Provide reasoning for the use of 8" DIP rather than continuing the extension of the proposed 4" DIP FM from the west.
65. Include storm sewer sump manholes in the last manholes in paved areas prior to entering ponding areas.
66. The existing storm sewer information at the east end of 95th Street near Mississippi Dunes Boulevard should be confirmed.
67. All storm pipes are shown to be RCP, use of corrugated polypropylene pipe (PP) is also allowed.
68. Storm sewer must be reachable by 300-foot jetting hose with jetter parked in the street. Backyard storm runs may need to be adjusted.
69. Stormwater pollution prevention plan: Include missing information.
70. Preliminary seeding plan shows upland natural area seeding to be located in basins and permanent basin seeding to be located in grassy areas, please confirm.

Landscape Plan Comments:

71. The City forester will review the proposed tree species. Allowable species are listed on the Cottage Grove Engineering Guidelines, available online.
72. Include proposed landscaping on 95th Street east to Mississippi Dunes Boulevard.

Stormwater Requirements:

73. Confirm pipe flow directions at ponds. SWMP and HydroCAD models indicate flow goes from 300P into 300I, but the pipe shown on sheet 6.01 indicates a flow direction from 300I to 300P.
74. HWL contours do not match HWL listed at various ponds. Verify and update information in HydroCAD and plans to be consistent with each other.
75. Please submit calculations showing the storm sewer is being met based on the 5-year rational method design. Pipes should be sized to have a minimum velocity of 3fps and no more than 10fps.
76. Stormwater pond 200P does not appear to contain the 100-yr storm at an elevation of 751.85 when comparing the EOF of 751.5. Please revise this design to contain this storm event.
77. Section 5 of the SWMP: the following are the rules for freeboard
    a. For stormwater facilities with emergency overflows, the low adjacent grade elevation for all new structures must be a minimum of 3 feet above the peak surface water elevation for the 100-year precipitation event and 2 feet above the emergency overflow elevation of any immediately adjacent new stormwater basin.
    b. For backyard and side-yard conveyance and temporary ponding areas, there must be at least 1 foot between the overland overflow elevation and the low adjacent grade elevation of the adjacent structure.

Regards,

Stantec Consulting Services Inc.

Tyler K. Johnson, PE
Phone: 612-712-2065
tyler.johnson@stantec.com

David R. Sanocki, PE
Phone: 651-712-2124
dave.sanocki@stantec.com

Hi Emily,

I am Jason's next door neighbor - It was nice to meet you, and thanks for the discussion at this evening's meeting. I wanted to write to follow up regarding a few of the points that we discussed today and a request for consideration. We have a number of concerns regarding the impact the extension of 95th Street will have on public safety (as people already speed down the road, often blowing the stop signs) and oversaturation for school and other purposes, but I know that nothing I say will stop the planned development - so I will focus on the concerns that can be addressed and dealt with if the City is willing to do right by its residents.

One of the most frustrating parts of this has been the complete lack of notice until just now, a couple of months before the nature scenery in our backyard and the safety/privacy/peace that come with it are about to be completely destroyed and traded for months of disruption followed by a perpetual loss of one of the things we love about where we live. When we moved in here in Nov. 2022, there was no indication, notice, or suggestion whatsoever that a road was even being contemplated in our backyard - and the first we heard about it was just days before this meeting. The lack of notice to be heard BEFORE the project was determined to be occurring, and the lack of transparency - including the portions of the meeting where it seemed like just a "blame game" between Lennar and the City - are really concerning to us as residents.

We have a few significant concerns about this. Chief among those is, as noted, the loss of privacy, peace, and safety that come with the removal of the tree line and creation of a main road immediately behind our back yard. This will result in a significant increase in traffic and noise right behind our house which will be majorly disruptive to all aspects of our lives - both leisure time at home and when we are working from home. Additionally, while I know you are not an appraiser, I can all but guarantee that this will significantly decrease our property value, as we lose the feeling of privacy and the nature scene in our backyard. All the while, we will keep paying taxes - into the City machine that has made decisions that will negatively impact the significant investment we've made into trying to build a home here, in favor of its partnership with Lennar.

This brings me to my two requests:

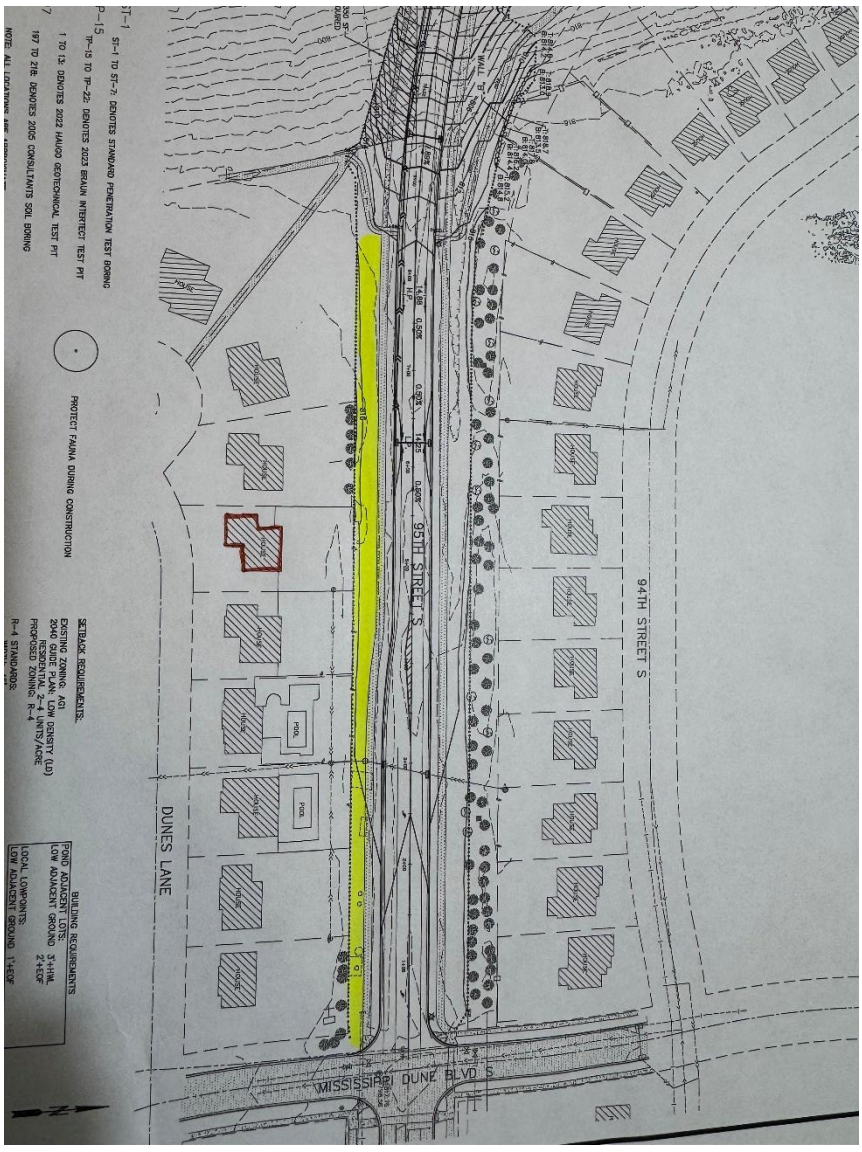
- First, I am attaching a snapshot of the blueprint preliminary grading plan that you provided a copy of. My house is outlined in red (9421 Dunes Lane) and there is a section highlighted in yellow, which I understand to be part of the right of way that the City has that will be between the sidewalk and our back yards, likely turned into green space that it was alluded to that we as the residents - who are already losing a lot with this development - could go above and beyond to help maintain. **I respectfully request that the City development and planning committee consider planting trees or shrubs in this space on the City's right of way to compensate for the loss of privacy, peace, quiet, and nature that we are all losing as a result of this road being built.** Contrary to what was suggested at the meeting, this does not have to take place on private property - nor should the entire burden of preserving our expectations fall to the residents - as there is ample space on the City's property to include this buffer. I submit that this is a minimal effort that the City can and should offer and provide to my neighbors in compensation for what we are losing. The cost would be relatively low and goodwill and equity considerations lean strongly in favor of doing so. This is also similar to how trees were planted behind the houses on the North side to provide a buffer from this development - there is no reason that those of us on the South side should be left to fend for ourselves given this abrupt change. **I implore that this idea be raised and meaningfully considered as part of this development project**.
- Second, I simply ask that my neighbors and I be notified and informed of any and all future opportunities to be heard as a community regarding these developments and projects.

As discussed at the meeting, buying a home is the single biggest purchase people make. My wife and I moved to Cottage Grove because we didn't want to be in a city like Woodbury - we valued the nature, the greenery, the private feel that we got with our home, and the security, safety, and peace that came with that. We then suddenly learned that the City snapped its fingers and all of those expectations and things we loved about this lot were being completely upended. Again, I understand that the development is occurring and that the City has the right to do so - but the City also owes duties to its residents and taxpayers, which certainly will not feel like they are being met if the City fails to consider the impact that this development will have on those living along the new extension to 95th Street and the values of our properties. A reasonable, fair, and equitable consideration for this disruption would be the inclusion of trees or shrubs as both a sound and visual barrier in the City's right of way/green space as identified in the attached image.

I would greatly appreciate it if you can confirm receipt and that this suggestion will be considered. I am happy to discuss this further if you would like, and can be reached by email here or in the phone number below.

Thank you for your time and consideration.

Raoul Shah



STAFF REPORT CASE: PP/PUD2026-006

ITEM: 6.5

PUBLIC MEETING DATE: 2/23/26 **TENTATIVE COUNCIL REVIEW DATE: 3/18/26**

APPLICATION

APPLICANT: M/I Homes

REQUEST: A preliminary plat to be called McHattie Landing that will consist of 85 single family lots and 7 outlots; and a PUD, Planned Unit Development.

SITE DATA

LOCATION: 9119 Military Road and 9165 Military Road

ZONING: R-4, Low Density Residential

GUIDED LAND USE: Low Density Residential

LAND USE OF ADJACENT PROPERTIES:	CURRENT	GUIDED
NORTH:	Single Family Residential	Low Density Residential
EAST:	Single Family Residential	Low Density Residential
SOUTH:	Single Family Residential	Low Density Residential
WEST:	Low Density Residential	Low Density Residential

SIZE: 36.35 acres **DENSITY:** 2.66 units per acre

RECOMMENDATION

Approval, subject to the conditions stipulated in this staff report.

COTTAGE GROVE PLANNING DIVISION

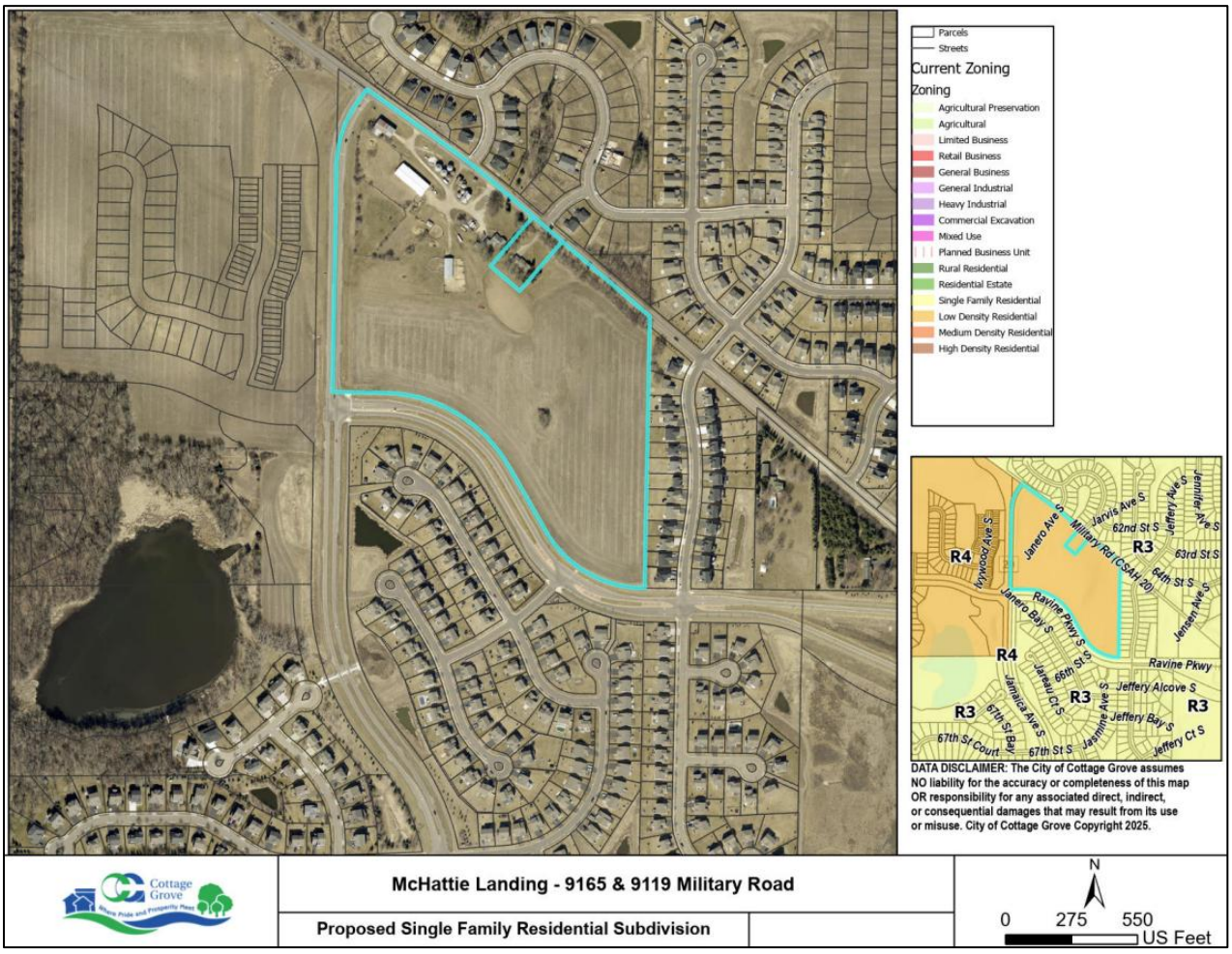
Planning Staff Contact: Kelly Becker, Associate Planner; 651-458-2834; kbecker@cottagegrovemn.gov

Application Accepted: 1/28/26 60-Day Review Deadline: 3/29/26

Planning Staff Report
McHattie Landing
Planning Case No. PP/PUD2026-006
February 23, 2026

Proposal

M/I Homes of Minneapolis/St. Paul, LLC (Applicant) is requesting approval of a Preliminary Plat and Planned Unit Development (PUD) for a project to be known as McHattie Landing. The subject property is located at 9119 and 9165 Military Road. The Applicant is proposing to construct 85 single family homes on approximately 36.35 acres. The property is currently zoned R-4, Transitional Residential District. The project will also incorporate long-range plans for the conversion of Military Road to a pedestrian trail with a small wayside park in the northwest corner of the site.



Review Schedule
Application Submitted: January 28, 2026
Application Accepted: January 28, 2026
Planning Commission Meeting: February 23, 2026
Tentative City Council Meeting: March 18, 2026
60-Day Review Deadline: March 29, 2026
120-Day Review Deadline: May 28, 2026

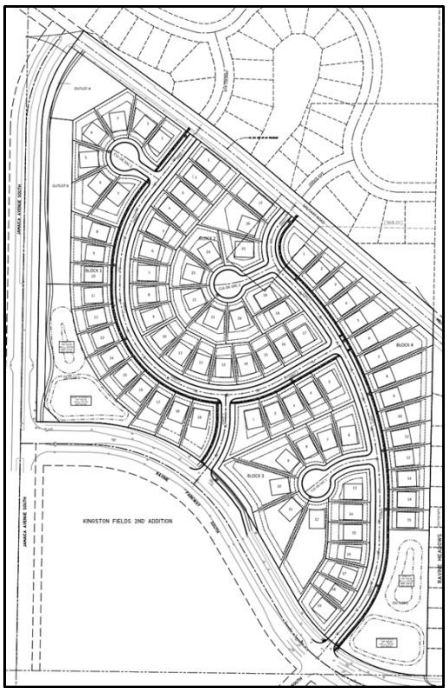
Background

Prior Approvals

In 2021, Manley Development submitted an application for a Preliminary Plat, Zoning Amendment, and Planned Unit Development (PUD) on the subject property. The proposal at that time included 80 single family homes and rezoning from AG-1, Agriculture Preservation, to R-4, Low Density Residential with a PUD. Flexibility proposed with the PUD included a reduced front yard setback from 30 feet to 25 feet, increased minimum side yard setbacks (garage side) to 5 feet from 7.5 feet, and reduced minimum side yard setbacks (house side) from 10 feet to 7.5 feet. The preliminary plat layout had two proposed accesses to Ravine Parkway; a full access at the existing intersection at 66th Street; and a second right-in/right-out access further to the west.

In February 2022, City Council approved all requests for the site; however, upon grading review prior to site construction, it was discovered that a significant amount of bedrock posed a challenge to feasibly construct the second right-in/right-out access onto Ravine Parkway. The project did not move forward at that time as the Applicant needed to pursue a revised layout and access plan to avoid the geotechnical constraints.

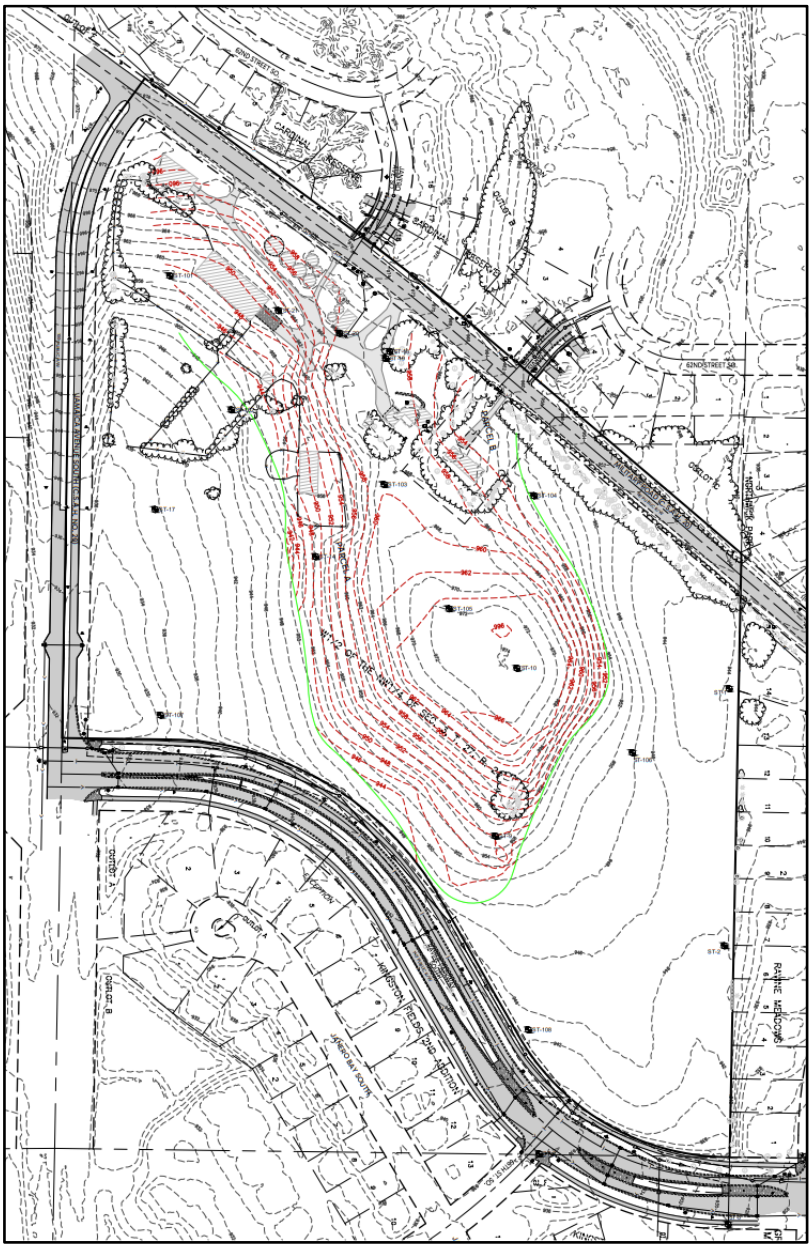
With the Council approval in February 2022, the property became zoned R-4, Low Density Residential. However, at the end of 2022, the City underwent a comprehensive zoning code update, which included amending the Zoning Map in its entirety, with various districts being renamed or renumbered. The Low Density Residential District was renamed to Transitional Residential District, and reductions in lot sizes and setback requirements were reflected in the Transitional Residential District to reflect the modern trend of smaller lot sizes and building heights. The purpose of the R-4, Transitional Residential District, is to provide transitional areas that will allow a mixing of single-family detached and single-family attached dwellings on smaller lots where property is adjacent to a minor or major collector street and/or where property is adjacent to higher intensity development or land use.



Previous Site Layout

Site Conditions

The 36.35-acre site consists of tilled fields with existing homesteads and agricultural buildings adjacent to Military Road. The proposed site has an overall topography that increases in height towards the center and northwestern corner as shown below. As previously noted, the site has some shallow bedrock as shown by the green line on the image below, and rock, noted by the red line.



Existing Conditions

Neighborhood Meeting

The Applicant held a neighborhood meeting on February 12, 2026. Notice of the neighborhood meeting was sent to surrounding property owners within 500 feet of the project area. The intent of the meeting was to give neighboring property owners the opportunity to ask questions and present concerns they might have to the developer in the early planning stages of the proposed project. The Applicant gave an overview of the development to 16 residents in attendance, and City staff responded to questions as well.

A primary concern voiced by several at the meeting was the impact that closing Military Road from Jamaica Avenue to Jeffery Avenue would have on traffic. Residents voiced concern that Jeffery Avenue already receives a high volume of traffic, with parking on street and speeding traffic presenting fears about safety. With the closure of Military Road, the concern is that traffic on the road will be increased from the neighborhoods to the north using Jeffery Avenue.

When Military is closed and the neighborhoods are completely built out, city staff estimate conservatively that Jeffery Avenue will see an average of 2,500 trips per day This is based on the approximation that a typical single-family home generates 10 trips per day. As a comparison, other residential streets with homes on both sides in the city see similar traffic. Hyde Avenue, just north of Hillside Trail, sees an average of 2,305 cars per day. Grenadier Avenue just south of Grange sees 3,002 cars. One benefit of closing Military is that traffic from the south will no longer use Jeffery to reach Military.

To further understand the impact of closing Military Road to traffic, city staff is currently working with a consultant to study the existing traffic volume on Jeffrey Avenue and Military Road. Using the results of this study, the consultant will estimate the traffic volume on Jeffrey Avenue after Military Road is closed. This estimate will assume fully built-out neighborhoods in this area of the city. Study estimates will likely not be available for the February 23 Planning Commission meeting.

A request was made to consider keeping Military Road open to vehicular traffic until the County roundabout project at the Jamaica Avenue intersection is complete and additional road connections to the north in Woodbury are open. Staff clarified that the date of any future connections to the north through the existing neighborhoods and future Woodbury neighborhoods is dependent on development within Woodbury.

Questions and concerns about timeline of construction were also posed. The Applicant noted that mass grading onsite will begin this spring pending approvals, and blasting bedrock will be required on a portion of the site. Residents had concerns over the impact of blasting on the surrounding community, and the Applicant noted that they would be taking as much care as possible to be less disruptive while grading. While blasting might sound impactful, it does not have the power one might assume. Blasting was carried out at recent developments such as Lochridge, Mississippi Landing, and Hohenstein’s with no adverse effects.

While the City has no requirements regarding notification, at the other sites either the developer or contractor gave written or oral notification to neighbors. As construction on this development nears, city staff can work with the developer to notify residents who live nearby.

Additional comments and concerns were raised about the elevation and views of the homes, particularly where the proposed homes will be closest to existing homes in Ravine Meadows at the southeast corner of the plat. One resident requested that the number of homes in the development be reduced to 79, with no lots in the southeast corner or create a greater physical buffer along the east side. The Applicant and staff noted on the grading plans that a berm currently exists on the southeastern boundary and will remain in place. It was discussed that the berm will aid in providing a visual buffer between the homes due to the elevation of the berm and proposed walkout elevations of the new homes. Additionally, coniferous trees will be planted as a visual buffer along the east side of the project area. The developer may work with adjacent property owners to plant larger trees to create a more substantial buffer.

There were also concerns about maintenance of the stormwater ponds. The Applicant clarified that an HOA will be created for all landscaping and common area maintenance. The ponds will be dedicated to the city and are required to be maintained per city code standards.

Planning Considerations

Zoning and Comprehensive Plan

As mentioned previously, the subject property received approval in 2022 for rezoning from AG-1, Agriculture Preservation, to R-4, Low Density Residential, which is now Transitional Residential. Although the development proposed with the rezoning application at that time did not move forward, the rezoning of the property was still finalized, and it is currently zoned R-4. The site is guided as Low Density Residential in the 2040 Comprehensive Plan, which supports the Transitional Residential zoning district. The Applicant is proposing 2.66 units per net acre. Net density is defined as, "The total number of units divided by the total land area less major right of ways (arterials and collectors) and less wetland protected by the Wetland Conservation Act, provided that right of way (including major roads) shall not be deducted if dedicated to the City at no cost." The McHattie Landing calculation is shown below:

Gross Acreage of McHattie Landing Development: 36.35 acres
Subtract Major Road ROW Military and Jamaica: 4.48
Equals Net Acreage: 31.87 acres

Divide 85 total housing units by net acreage to get units per acre of 2.66. At 2.66 units per acre, the McHattie Landing development complies with the definition of Low Density residential of 2 to 4 units per acre.

The proposed preliminary plat and the land use map from the City's 2040 Comprehensive Plan are consistent in the following ways:

- The Future Land Use Map in the 2040 Comprehensive Plan identifies the future land use development of the Applicant's property for low density residential land uses. The developer is proposing single-family lots for the property, which is consistent with the City's Future Vision 2040 Comprehensive Plan.

- The proposed density of 2.66 units per acre aligns with the Comprehensive Plan guidance of 2 to 4 units per acre.

- Trail and sidewalk connections are proposed and acceptable to the city.

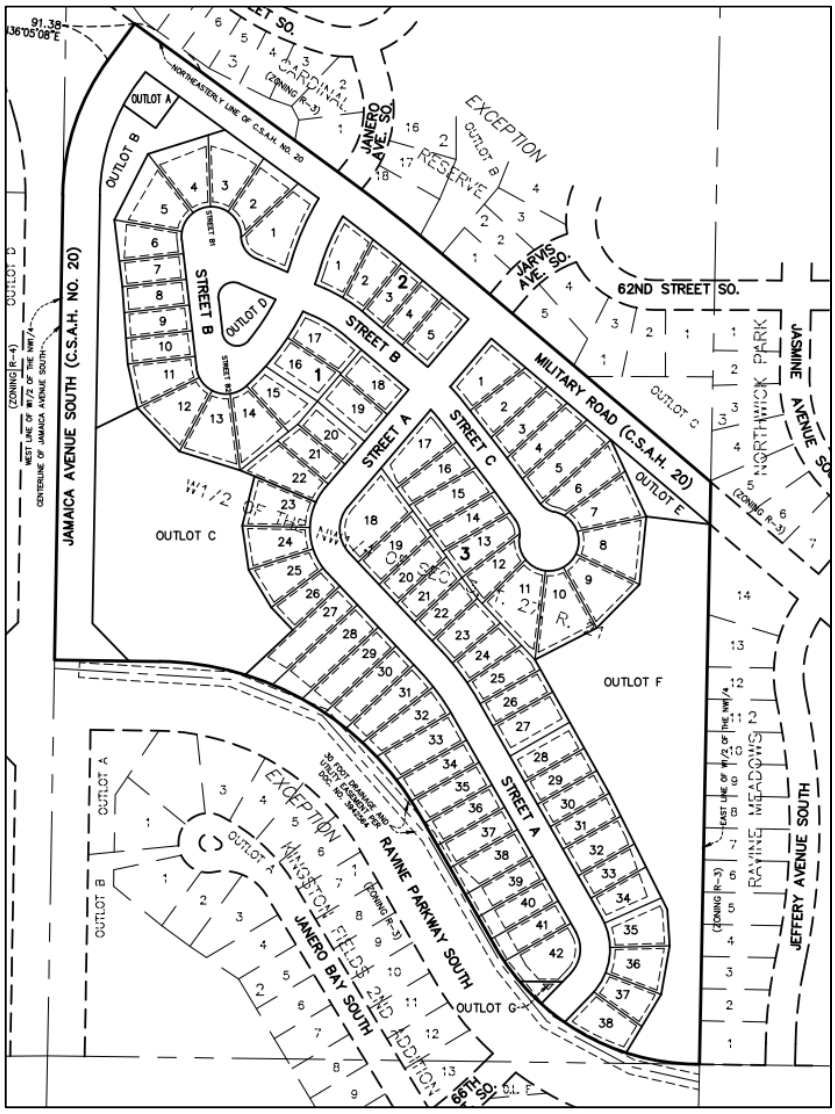
- The proposed preliminary plat and grading plan are consistent with the low-density residential land use designation for this area.

Preliminary Plat

The preliminary plat, as proposed, depicts a logical development of a viable property given the adopted performance standards of the zoning district. The Applicant has not yet finalized any phasing plans for the development. The proposed plat consists of 85 single family homes on mostly 52-foot and 62-foot wide lots. The homes will consist primarily of walkout and lookout designs, with some rambler designs as well. The preliminary plat includes proposed Streets A, B,

and C and Outlots A, B, C, D, E, F, and G. Outlots C and F will be deeded to the city for stormwater ponding. Outlots B shall be owned and maintained by the Homeowners Association for a landscape buffer. Outlots D and E shall also be owned and maintained by the HOA as open space. Finally, Outlot G shall be owned and maintained by the HOA for an entrance monument sign.

Road connections from Jarvis and Janero Avenues to the north will be established and converge within the proposed development before connecting to Ravine Parkway in the southest corner of the property. A pedestrian trail is designed within the Historic Military Road Corridor along the entire north boundary of the plat. Adjacent to the trail in the northwest corner of the plat will be a trail wayside park, within Outlot A.



McHattie Landing Preliminary Plat

Zoning Development Standards

The Planned Unit Development (PUD) is a zoning tool that provides additional flexibility for development that an underlying zoning district would not otherwise allow. The Applicant is requesting PUD flexibility on the following zoning performance standards as shown in the table below.

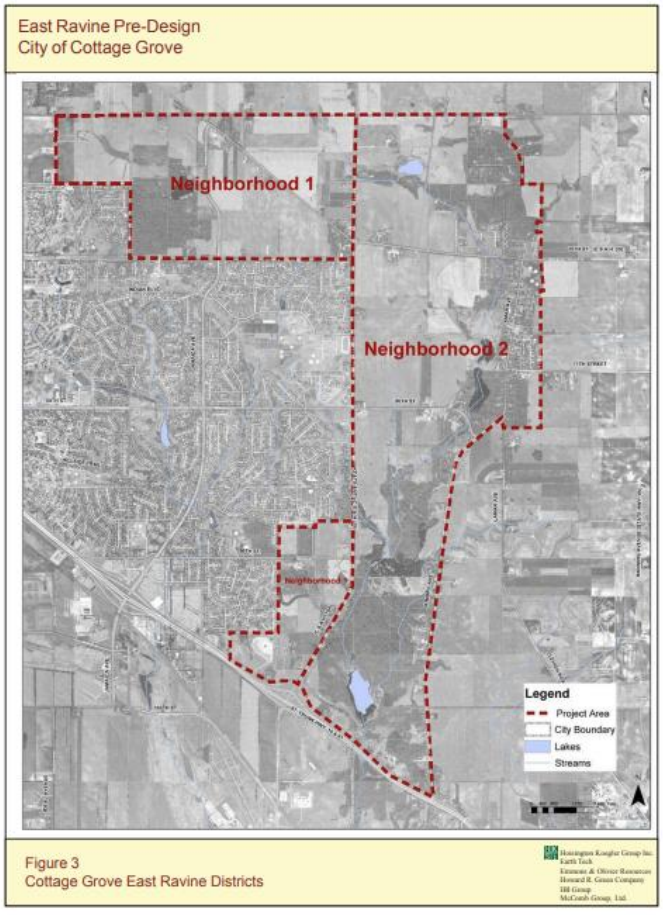
Lot Development Performance Standards		
Standard	**R-4 Transitional Residential**	**Proposed**
Lot width	45 feet	52 feet
Lot depth	120 feet	120 feet
Front yard setback	25 feet	25 feet
Rear yard setback	30 feet	30 feet
Side yard setback	7.5 feet	*6 feet
Side yard, garage setback	5 feet	6 feet
Corner lot side setback	20 feet	20 feet
Maximum structure height	35 feet	35 feet
Maximum impervious surface coverage	50%	50%

**requires flexibility per the PUD request*

The requested PUD flexibility for the reduced minimum side yard setback is consistent with the goals and policies of the comprehensive plan, including preservation of natural features (bedrock) while maintaining an allowed density. The R-4 zoning district requires a minimum side yard setback of 7.5 feet and minimum garage side yard setback of 5 feet. The Applicant is proposing to decrease the minimum house side yard setback to 6 feet and increase the minimum garage side yard setback to 6 feet. With the proposed flexibility, the minimum distance between structures would be maintained at 12 feet. Besides the flexibility for the side yard setback, the proposed development meets or exceeds all other R-4 zoning district standards.

East Ravine Master Plan and Alternative Urban Areawide Review (AUAR)

In 2006 the city completed the East Ravine Master Plan, a tool used to guide future development of the East Ravine area, which at the time had not yet been developed. The proposed development is within the area defined as Neighborhood 1 in the East Ravine Master Plan. Neighborhood 1 consists of large areas of predominantly Single-Family residential housing, which are interspersed with a combination of medium and higher density attached residences to provide a balance of housing opportunities. The Master Plan provides a layout pattern for streets, trails, and utilities in Neighborhood 1, which have been incorporated into the proposed plat.



East Ravine Neighborhood Map

Part of the East Ravine Master Plan process was completion of an Alternative Urban Areawide Review (AUAR) for the East Ravine neighborhoods. AUARs are used to understand cumulative development/land use impacts at a high level when site and project specifics are unknown. The AUAR was originally completed in 2005 and is required to be updated every five years to remain valid. The AUAR and associated Mitigation Plan were most recently updated in November 2025. The Mitigation Plan specifies measures or procedures that will be used to avoid, minimize, or mitigate the potential impacts of development within the AUAR study area. The primary mechanism for mitigation of environmental impacts is the effective use of ordinances, rules, regulations, and policies, including guidance given in the Master Plan and Comprehensive Plans. The proposed preliminary plat is consistent with the AUAR, and mitigation strategies have been included in the conditions of approval for this proposed development.

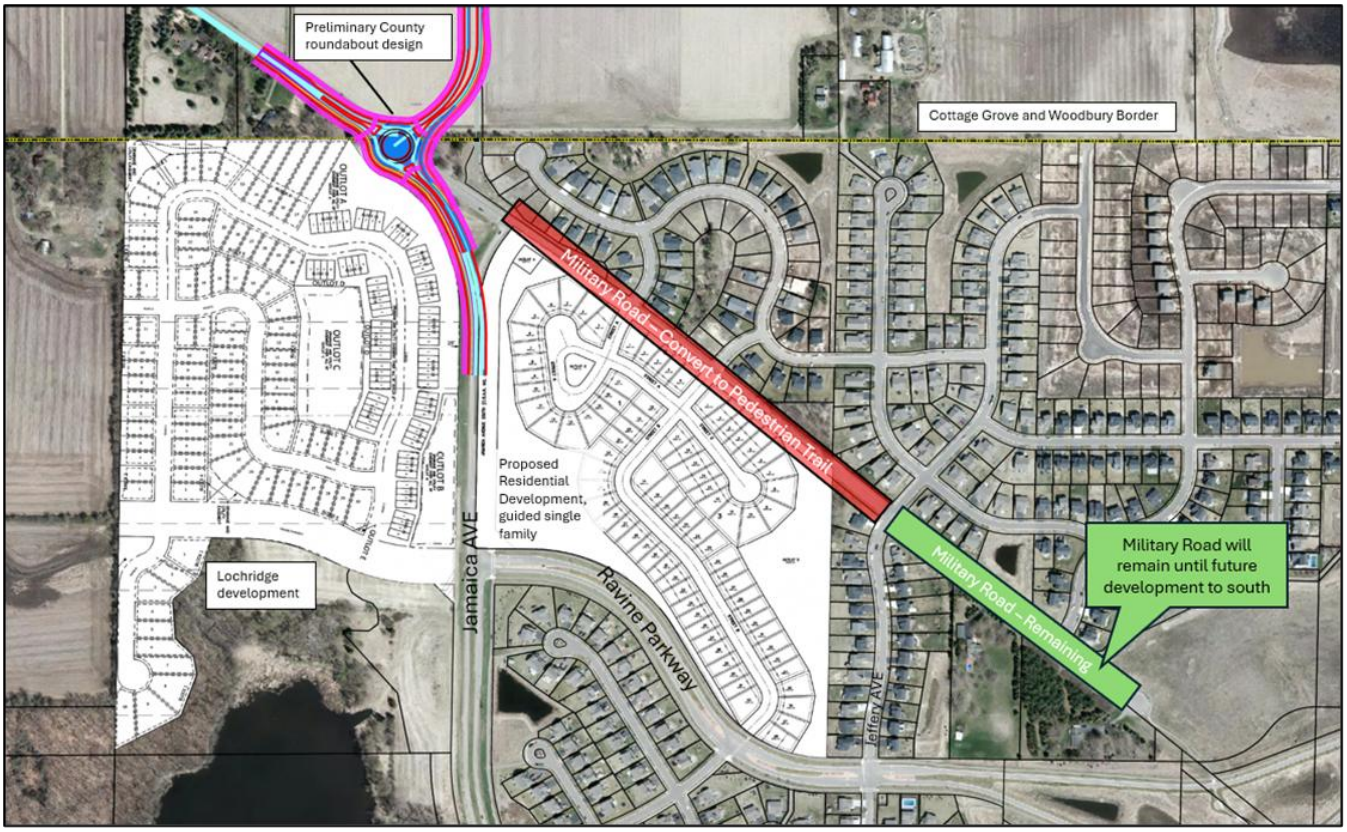
Military Road Removal

As growth within the East Ravine area was projected, the Master Plan was completed to provide a guide for the overall layout of roads, utilities, stormwater, and other development patterns. In addition to road alignment, utilities and design, the Master Plan also outlined a long-range trail plan to ensure pedestrian connectivity through the East Ravine area. The conversion of Military Road to a pedestrian trail was included in the Master Plan beginning at Keats Avenue in the Cedarhurst area to the Cottage Grove/Woodbury border. The plan for conversion of Military Road from Keats Avenue up to Jamaica Avenue to a trail was further illustrated and outlined in the City's 2030 Comprehensive Plan, completed in 2011, and continues to be outlined as the long-range plan for the corridor transitioning to a recreational trail.

In conjunction with this development and an anticipated Washington County roundabout project, the Military Road connection between Jeffery Avenue and Jamaica Avenue is planned to be removed and the corridor converted into a pedestrian trail. Since 2018, the conversion of Military Road to pedestrian trail has been implemented with several other developments in the East Ravine area including Woodward Ponds, Eastridge Woods, and Glacial Valley Estates starting at Keats Avenue and currently ending at Ravine Parkway.

The removal of Military Road and construction of the pedestrian trail is anticipated to begin either with the County's roundabout construction project or at the time the developer undertakes the final streets projects, which will likely be in two to three years. Military Road east of Jefferey Avenue will remain a vehicular connection between Jeffery Avenue and Jensen Avenue until such a time as the remaining two properties on that stretch of the road no longer require access from Military Road.

The trail itself within the Military Road Corridor will be composed of an 8-foot-wide asphalt surface. The Developer will be required to pay half of the estimated costs for the removal of the roadway and installation of a trail for the segment adjacent to the proposed development. These funds will be outlined and collected with the development agreement and will be combined with the funds collected previously from the Cardinal Reserve development for this portion of road removal and trail installation.



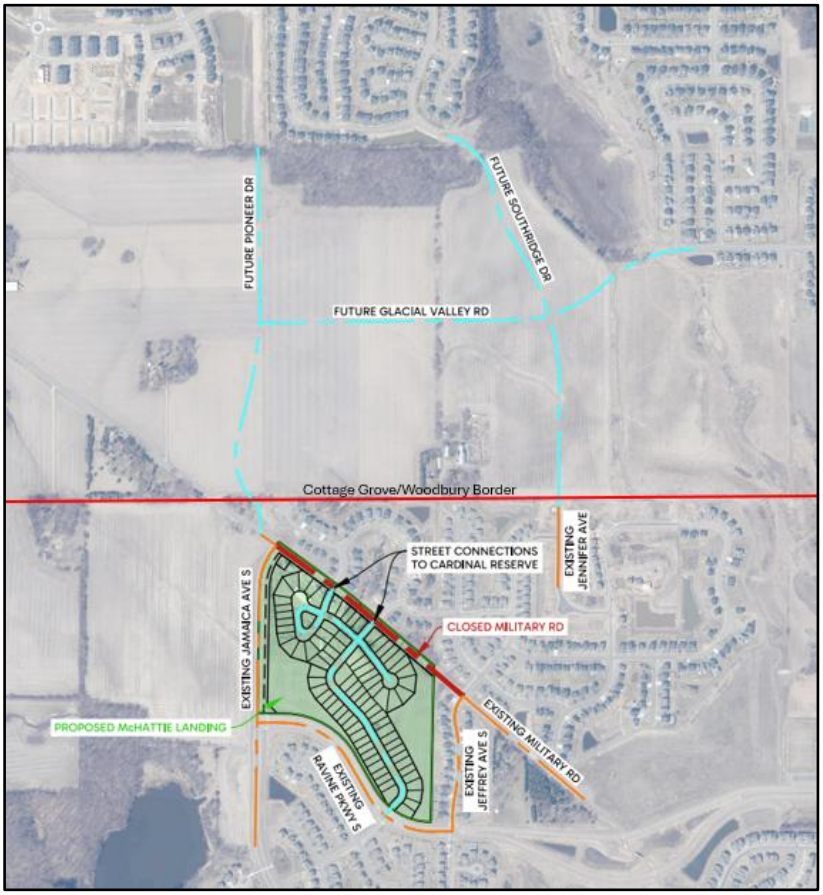
Future Roundabout and Military Road Closure

Access and Transportation

The site will have one primary access to the south on Ravine Parkway, aligning with 66th Street South. This will be a full access. A right-turn lane will be added on Ravine Parkway to accommodate the new development. When Ravine Parkway was constructed in 2018/2019, a left-turn lane was installed in anticipation of development on the McHattie Parcel. The developer will be required to adjust the existing striping now that the left turn lane will be in use. The singular connection on Ravine Parkway will branch into two roadways to connect with Janero Avenue and Jarvis Avenue to the north.

A traffic study was completed by the Developer to evaluate the impact of the development to traffic volume at the Ravine Parkway and 66th Street intersection. Traffic operations at the Ravine Parkway and 66th Street intersection were reviewed with the proposed and potential McHattie Landing development traffic and traffic from the neighborhoods to the north. Operations are predicted to be acceptable in terms of vehicle delay and queuing during typical weekday AM and PM peak traffic hours. Additionally, traffic operations are predicted to be acceptable as background traffic volumes increase on Ravine Parkway.

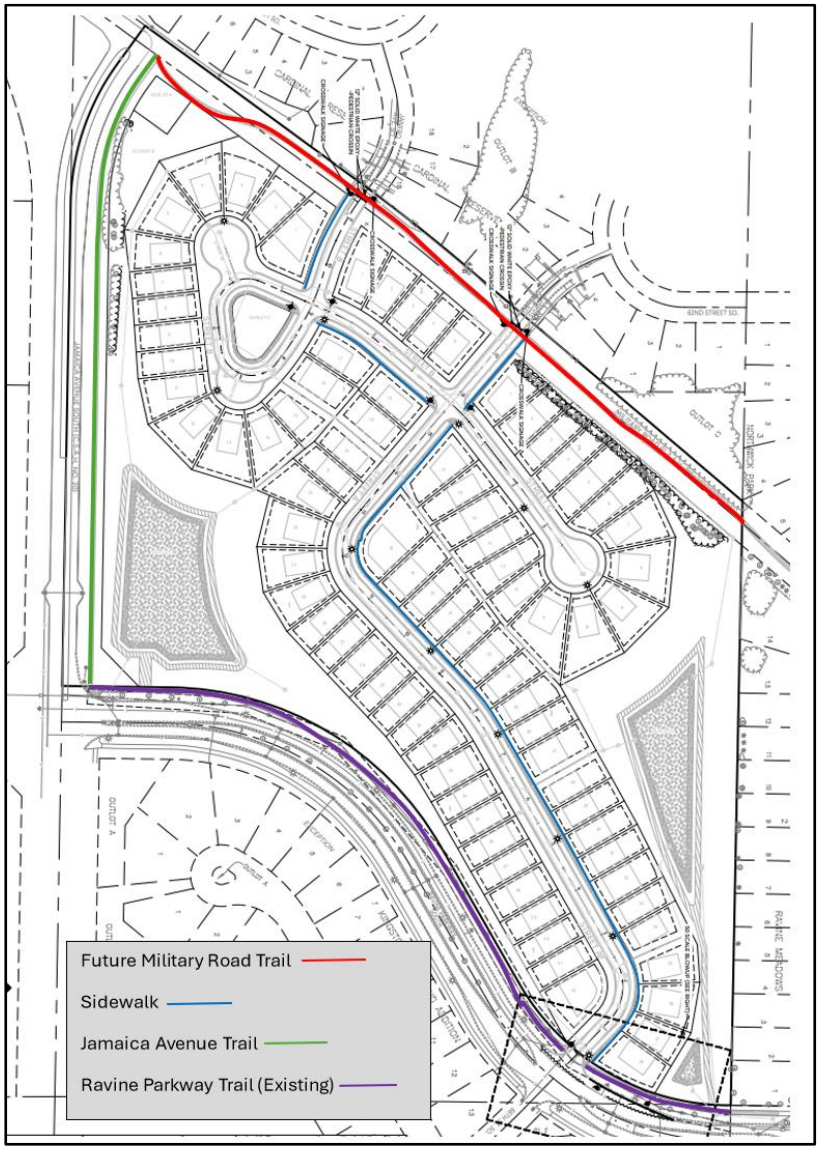
As previously mentioned, the County plans to rebuild Jamaica Avenue and the Jamaica Avenue/Military Road intersection in 2028. Preliminary plans call for a roundabout in this area that will connect Jamaica Avenue and Military Road to the northwest to Pioneer Trail in Woodbury. The County project is focused on realignment of the roadways to conform to long-range plans that staff from Washington County, City of Cottage Grove, and City of Woodbury have discussed. The County's 2015 reconstruction of Jamaica as a two-lane road was seen as an interim solution. The road section (pavement and gravel depth) was minimized with the knowledge that the road would be fully reconstructed before 2030. Future road connections are planned as development progresses in Woodbury, which will provide additional traffic flow to the north after the closure of Military Road between Jeffrey and Jamaica Avenues. Future roads shown in the image below are based on information from Woodbury's Comprehensive Plan. The blue lines are planned roads that would be built as part of future developments. Future Pioneer Drive would connect with Military/Jamaica at the County's planned roundabout. Future Southridge Drive would connect to Cottage Grove's Jennifer Avenue.



Future Road Connections

Sidewalks and Trails

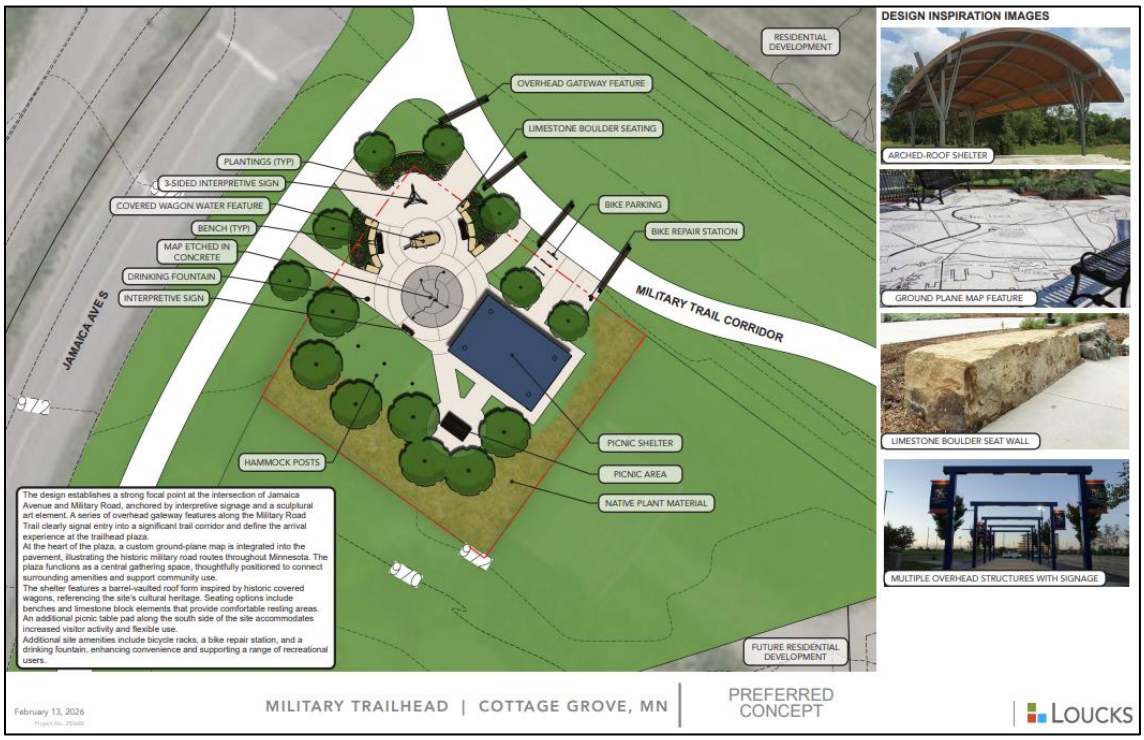
The Developer is proposing five-foot-wide sidewalks on one side of all internal streets as depicted below. A sidewalk connection is proposed to connect this proposed development to the Cardinal Reserve development to the north at Jarvis and Janero Avenues. Crosswalk signage will be placed at the Military Road trail intersection where the sidewalks connect into Cardinal Reserve. The western terminus of the proposed Military Road trail will connect with a new 8-foot-wide asphalt trail along Jamaica Avenue that will be built as part of the County's 2028 project. An existing 8-foot-wide asphalt trail runs along Ravine Parkway on the south side of the property and will remain as is.



Sidewalk and Trail Connections

Park Land and Open Space

A minimum of 10 percent of developable area shall be required to provide residents with public recreation facilities including parks and open spaces as a part of development projects per City Code Title 10-4-3 (2.9 acres in the McHattie development after subtracting 4.48 acres of right-of-way of Jamaica Avenue and Military Road and 3.2 acres of land below the ordinary high water mark of stormwater ponds). Outlot A (0.15 acres) is proposed to be established as a wayside park to serve as an entryway onto the new Military Road trail in the northwest corner of the plat. A preliminary park layout is included below. Dedication of Outlot A will account for 5 percent of developable area, so a combination of land and cash will be required. Cash payments shall be calculated using the current fee schedule and will be detailed in the development agreement.



Preliminary Plan - Outlot A Wayside Park

Tree Preservation and Landscaping

City Code Title 11-3-13 requires completion of a tree inventory (all qualifying trees) for the entire project area of a proposed development. The Applicant submitted a Tree Preservation Plan that included a tree survey of the existing trees on site. The existing site has 1,613 qualifying caliper inches of trees. There are 730 exempt inches on site, which include invasive species. The Applicant is proposing to remove 988 qualifying inches. The ordinance allows removal of 25 percent (403 inches) qualifying inches without replacement. The Applicant is proposing to remove 585 qualifying inches above the permitted removal of 403 qualifying inches; therefore, 293 inches (50 percent of excess removal) are required to be mitigated. The developer will propose trees to account for the required 293 inches of mitigation and a final mitigation plan shall be reviewed by staff prior to Council.

A number of existing trees will remain along the Military Road trail corridor from Jarvis Avenue to the eastern edge of the development within Outlot E. The landscape plans shall be updated to remove all non-qualifying trees which include Ash and Elm trees from the project. Additional tree plantings have also been requested by staff along Jamaica Avenue at the corner of Jamaica Avenue and Ravine Parkway. Landscape plans shall be updated to reflect these trees. The Applicant will be required to provide updated tree mitigation calculations prior to Council consideration of the preliminary plat and PUD.

City Code Title 11-3-12 requires a minimum amount of landscape plantings to be installed as a part of development projects within the city. These required plantings include yard trees, building perimeter plantings, and landscape requirements. Lots less than 60 feet wide must have two yard trees, one of which must be a front yard tree outside of the public right-of-way. These smaller lots may have a small statured tree (maximum canopy spread of 30 feet and maximum height of 30 feet) in the front yard. Lots over 60 feet wide must have three yard trees, one of which must be an overstory deciduous as the front yard tree.

The required plantings per City Code Title 11-3-12 are detailed below.

Landscape Lot Performance Standards		
Standard	**Less than 60' Wide**	**60' Lot Width or Greater**
Lot Trees	2 per lot – one in the front yard	3 per lot, no less than 2 different species – one in the front yard
Shrubs	10 per lot	10 per lot

A buffer averaging 50-feet in width but no less than 30-feet wide must run parallel to the rear lot line along Major Roadways in R-2 through R-5 zoned districts. The buffer shall be a combination of trees, fences, and shrubs that create a minimum of 50 percent year-round opacity at maturity. Jamaica Avenue and Ravine Parkway are considered Major Roadways; therefore, the Applicant has provided a buffer that averages at least 50 feet in width along the boundary of each major roadway. The buffers must include a combination of evergreen and overstory deciduous trees to accomplish 50 percent year-round opacity. The buffer along Ravine Parkway is composed of land adjacent to the trail along Ravine Parkway and the landscaped areas within the rear yard of Lots 27 through 42 of Block 1. Lots 34 through 42, Block 1 shall have two coniferous trees in the rear yard to accomplish 50 percent year-round opacity. The buffer along Jamaica Avenue will be encompassed in Outlot B. The HOA shall be responsible for maintenance of the buffer areas along both roads.

Residential buffer plantings have been added along the east side of the plat to provide additional screening from the development to the east, Ravine Meadows.

Stormwater Management Plan
The developer's engineer submitted a stormwater management plan, which has been reviewed by the city. The plan calls for two ponds – one on the east and one on the west side of the development. Comments on stormwater are included in the plan review memo dated February 17, 2026. City engineering staff will continue to work with the developer's engineer to ensure the site meets water quality standards as well as rate and volume control rules. The developer will be required to deed Outlots C and F to the city for stormwater purposes.

Grading
As with all new development projects, site grading is necessary to build the streets, provide proper drainage and ponding, and to create building pads, among other things. City staff and engineering consultants will review grading plans to ensure the plans meet city, state, and watershed district requirements for freeboard, drainage, erosion control, and vegetation establishment. The preliminary grading plan was reviewed by the city's engineering staff, and their review comments are included in the February 17, 2026, plan review memo. Additional grading review will be required upon submittal of final grading and utility plans for the site.

Utilities
The proposed development will connect to the existing watermain in three locations: Janero and Jarvis Avenues on the north side of the development and Ravine Parkway in the south. This will allow sufficient looping of the water main. The proposed sanitary sewer connects to existing infrastructure in two locations. The northern part of the development will connect to sanitary main

to the north in Cardinal Reserve. The southern part will connect at Ravine Parkway. Discharge from stormwater ponds will outlet to existing pipe in Ravine Parkway.

The engineering plan review memo dated February 17, 2026, contains comments from city staff and from consulting engineers regarding utility design that will be required to be addressed by the Applicant prior to approval of final plans.

Area Charges and Development Fees
Area charges and related development fees for this project will be based on the acreages shown on the final plat. These fees and charges will be accurately adjusted based on the final plat layout and be provided in the development agreement. Payment to the City will be required at the time the development agreement is fully executed by the City and Developer.

Public Hearing Notices
Public hearing notices were mailed to 158 property owners who are within 500 feet of the proposed subdivision and published in the *St. Paul Pioneer Press* on February 11, 2026.

Recommendation

That the Planning Commission recommend that the City Council approve the Preliminary Plat and Planned Unit Development (PUD) for a residential subdivision to be called McHattie Landing, which will consist of 85 lots for single-family homes, subject to the following conditions of approval:

Conditions of Approval:

General Development

1. The Developer and builders must comply with all city ordinances and policies except as may be modified by agreement of the Applicant and City staff.

2. The Applicant must obtain appropriate building permits from the City, and permits or approvals from other regulatory agencies including, but not limited to: Minnesota Department of Health, Minnesota Department of Natural Resources, and Minnesota Pollution Control Agency.

3. The Applicant shall enter into a development agreement with the City. The development agreement shall be executed by the Applicant prior to City Council approval of the final plat.

4. The Applicant shall incorporate into the final plat the recommendations, requirements, and evaluations noted in the Bolton & Menk memorandum dated February 17, 2026, subject to modifications that are agreed to by the developer and City Engineer. All comments shall be adopted herein by reference.

5. This approval does not include monument signs. A separate sign permit is required for all proposed monument signage in accordance with the city's sign code requirements.

Platting, Land Dedication, and Easements

6. The project shall be completed in accordance with the plans submitted and as amended by the conditions of approval and as approved by the City Engineer. Any significant changes to the plans, as determined by Planning staff, shall require review and approval by the Planning Commission and City Council.

7. Outlots A, C, and F shall be deeded to the City at the time of recording of the final plat.

8. Outlots B, D, E and G shall be owned and maintained by the HOA.

9. The park dedication requirements will be satisfied upon dedication of Outlot A and cash paid in lieu of dedication prior to the recording of the final plat.

10. The HOA will be responsible for maintenance of the sign located on Outlot G.

Construction and Grading

11. A grading permit and financial guarantee is required prior to beginning any site work.

12. Upon completing the installation of sanitary, water, and storm utilities, an as-built survey of these utilities must be submitted to the city. Electronic copies of site utilities must be submitted to the city.

Lot Performance Standards

13. The architectural standards of the homes shall be consistent with the following:

    a. Architectural design is required on all four sides of the principal structure.

    b. Architectural materials must be varying on the front façade of the principal structure (shakes, board and batten, accent siding, shutters, window boxes, etc.).

14. Once a house plan is approved for a given lot, no identical house plan may be constructed on the five lots surrounding it, i.e., the lots adjacent on either side, the lot most directly across the street, and the lots adjacent to the lot most directly across the street.

Utilities

15. The Developer is responsible for providing the necessary easements and for building the road and utility improvements serving the site. All drainage and utility easements, as recommended by the City Engineer, must be shown on the final plat and dedicated to the City for public purposes.

16. The Developer shall be responsible for obtaining the necessary permits and approvals to seal the existing wells onsite. The well sealing report shall be sent to the City once the existing wells are- sealed.

Streets

17. The Developer shall be responsible for removing Military Road and building the proposed 8-foot-wide bituminous trail. The Developer will coordinate with City staff on the timing of this part of the project. The Developer shall include a provision within the closing

documents for each lot to provide notice that Military Road will be removed at such a time as final streets in the development are complete.

Landscaping and Irrigation

18. Irrigation systems installed within city right-of-way are solely the responsibility and risk of the developers or individual. The City is not responsible or liable for any damage or costs related to installation, damage, or replacement of lawn irrigation systems placed in the boulevard as a result of city use of or future changes in the right-of-way.

19. Grading for stormwater ponds to be deeded to the City shall be no steeper than a 4:1 slope and shall be seeded with a seed mix approved by the City Engineer. Stormwater ponds will be maintained and mowed by the City twice a year.

20. The HOA will be responsible for vegetating outlots under HOA ownership with a seed mix approved by the City, and the HOA will provide maintenance of these outlots.

21. The Developer is responsible for establishing the final grades, topsoil, and sodding of all the lots, outlots, and boulevards within the subdivision.

22. Two overstory deciduous or coniferous yard trees and ten shrubs shall be installed within each lot less than 60 feet wide. One yard tree shall be located in the front yard. Landscaping plans shall be updated to show overstory deciduous or coniferous trees in rear yards.

23. Three overstory deciduous or coniferous yard trees (no less than two different species), and ten shrubs shall be installed within each lot 60 feet wide or greater. One yard tree shall be located in the front yard. Landscaping plans shall be updated to show overstory deciduous or coniferous trees in rear yards.

24. Prior to releasing the plat for recording, a final landscaping plan shall be approved by planning staff in writing.

25. Additional trees are required along Jamaica Avenue at the corner of Jamaica and Ravine Parkway as part of the required buffer in Outlot C and shall be reflected on the final landscape plans. These trees may be planted after the County's reconstruction of Jamaica Avenue, on or before October 31, 2028.

26. Trees adjacent to the rear lots on Outlots C and F shall be relocated into the rear yards of the adjoining lots. Revised landscaping plans shall reflect this change.

27. Two coniferous trees shall be planted in the rear yards of Lots 33 through 42 Block 1 as the required vegetative buffer. These trees may count as required yard trees. The HOA shall be responsible for maintenance of these trees.

28. If fencing is installed by any property owner adjoining Ravine Parkway (between Jamaica Avenue and the east boundary line for the McHattie Landing plat, Block 1, Lots 22-42) or adjoining Jamaica (Jamaica Avenue between Ravine Parkway and the northwest corner of the McHattie Landing plat, Block 1, Lots 3-13), they must use the same fence design,

materials, and color. The fence must be placed on the house side of any earth-berm or buffer landscaping and must not encroach within the Ravine Parkway or Jamaica Avenue right-of-way. Fencing along Ravine Parkway must be a minimum of five feet away from the trail/sidewalk paralleling Ravine Parkway. The adjoining property owner must mow and maintain that five-foot area.

29. All non-qualifying trees shall be removed from the existing stand of trees proposed to remain on site south of Military Road. Updated tree mitigation calculations shall be provided to staff prior to Council consideration.

Onsite Infrastructure Improvements

30. A street lighting plan must be submitted by the Developer and approved by the City Engineer.

31. The Developer is responsible for the cost and installation of public land boundary markers at the corners of private properties abutting Outlots C and F, and the Military Road trail corridor. The open space markers must be installed before a building permit is issued for the lot that abuts the recommended marker location. The actual number and location of park boundary markers is subject to approval of the Parks Director.

32. The Developer must place iron monuments at all lot and block corners and at all other angle points on property lines. Iron monuments must be placed after all site and right-of-way grading has been completed in order to preserve the lot markers for future property owners.

33. The Developer shall contact the electric, telephone, gas, and cable companies that are authorized to provide service to the property to ascertain whether any of those utility providers intend to install underground lines within the development.

34. The Developer is responsible for all street maintenance; upkeep and repair of curbs, boulevards, and sod; and street sweeping until the project is complete. All streets must be maintained free of debris and soil until the subdivision is complete. The Developer hereby agrees to indemnify and hold the City harmless from any and all claims for damages of any nature whatsoever arising out of Developer's acts or omissions in performing the obligations imposed upon Developer by this paragraph.

35. The Developer will provide to the City copies of test results, suppliers, subcontractors, etc., relating to the work to be performed by the Developer. The Developer agrees to furnish to the City a list of contractors being considered for retention by the Developer for the performance of the work described in the development agreement.

36. The Developer is responsible for the control of grass and weeds in excess of eight inches on vacant lots or boulevards within their development. Failure to control grass and weeds will be considered a developer's default, and the City may, at its option, perform the work and the Developer shall promptly reimburse the City for any expense incurred by the City.

37. The Developer will be required to conduct all major activities to construct the public improvements during the following hours of operation:

Monday through Friday	7:00 A.M. to 7:00 P.M.
Saturday	9:00 A.M. to 7:00 P.M. (with prior approval from the City Engineer)
Sunday/City Holidays	Not Allowed

This does not apply to activities that are required on a 24-hour basis such as dewatering or bi-pass pumping, etc. Any deviations from the above hours are subject to approval of the City Engineer.

38. All debris, including brush, vegetation, trees, and demolition materials, shall be properly disposed of off-site; burying construction debris, trees, and other vegetation is prohibited. Burning of trees and structures is prohibited, except for fire training only.

39. The Developer grants the City, its agents, employees, officers, and contractors permission to enter the site to perform all necessary work and/or inspections during grading and the installation of public improvements by the Developer.

40. The Developer is responsible to require each builder to provide an on-site dumpster to contain all construction debris, thereby preventing it from being blown off-site. It is the responsibility of the Developer to ensure no debris blows on or off site.

41. Adequate portable toilets must be on-site at all times during construction of utilities, roadways, and houses. At no time shall any house under construction be more than 250 feet away from any portable toilet. Toilets must be regularly emptied.

42. At all times during construction, the approved SWPPP must be followed. The City may impose additional erosion control requirements if it is determined that the methods implemented are insufficient to properly control erosion.

43. The Developer is responsible for erosion control inspection fees at the current rates. If the Developer does not reimburse the City for the costs the City incurred for such work within thirty (30) days, the City may draw down the letter of credit to pay such costs.

44. Temporary parking during construction shall be permitted on only one side of the street. No construction parking shall be allowed on Ravine Parkway, Jamaica Avenue, or Military Road.

Prepared by:

Kelly Becker
Associate Planner

Attachments:

A. Civil Plans 2-17-2026
B. Engineering Review Memorandum 2-17-2026
C. Landscaping Plans
D. Neighbor Comments
E. Narrative
F. Traffic Review Memo
G. Wetland Letter

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY PLAT

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

INDEX

TITLE SHEET	C1.0
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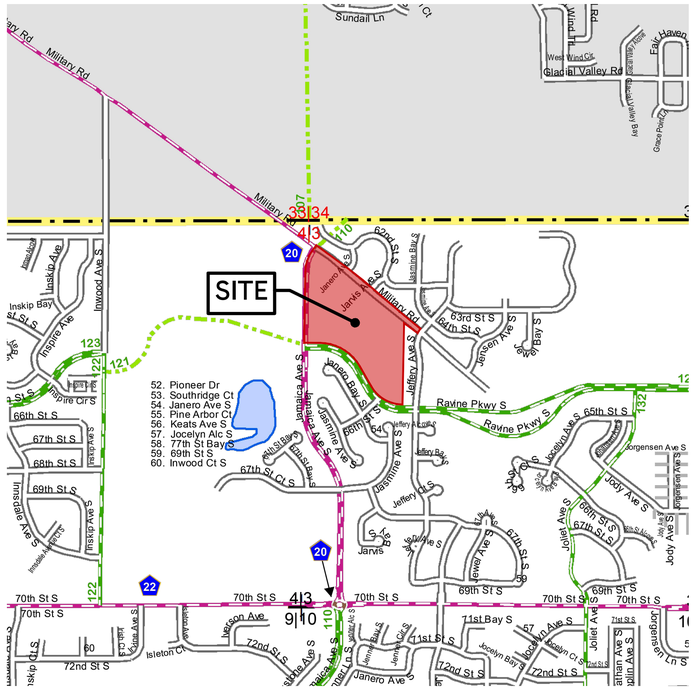
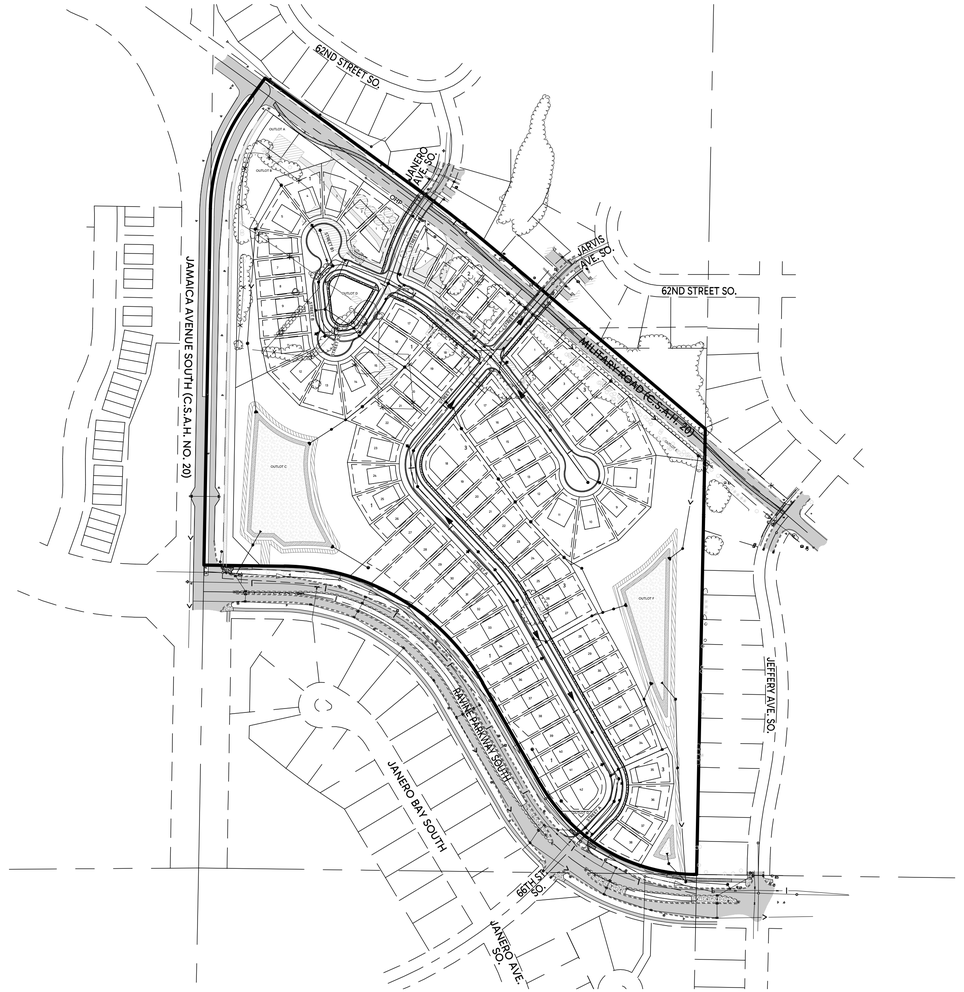
PRELIMINARY CONSTRUCTION DETAILS	C8.0-C8.4
PRELIMINARY TREE PRESERVATION PLAN	C9.0-C9.4
PRELIMINARY LANDSCAPE PLAN	L1.0-L3.0



LOCATION MAP

1" = 1000'



BENCHMARKS

#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86

#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

PROJECT COORDINATES

N44° 51' 29.83"
W92° 55' 15.54"

SITE ADDRESS

PARCEL A: 9119 MILITARY ROAD, COTTAGE GROVE, MN 55016
PARCEL B: 9165 MILITARY ROAD, COTTAGE GROVE, MN 55016

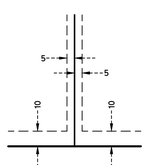
SITE AREA

36.35 ACRES

SCALE IN FEET
0 200 400

Know what's **below.** **Call** before you dig.

DRAINAGE AND UTILITY EASEMENTS ARE SHOWN THUS:



DRAINAGE AND UTILITY EASEMENTS BEING 5 FEET IN WIDTH, UNLESS OTHERWISE INDICATED, ADJOINING LOT LINES, AND BEING 10 FEET IN WIDTH, UNLESS OTHERWISE INDICATED, ADJOINING RIGHT OF WAY LINES, AS SHOWN ON THIS PLAT.

PROJECT CONTACTS

PROJECT ENGINEER:	KURT D. QUAINTANCE, P.E. - HILL, INC.	612-508-8890 (M)
DEVELOPER:	JASON BIEDERWOLF - M/I HOMES OF MPLS/ST. PAUL, LLC.	763-586-7283 (O)
CITY ENGINEER:	JOE FOX, P.E. - CITY OF COTTAGE GROVE	651-458-2826 (O)
NPDES OFFICER:	MATT HOSKINS - MPCA	651-757-2864
GENERAL CONTRACTOR REPRESENTATIVE:	TBD - TBD	xxx-xxx-xxxx

LEGEND

- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING UNDERGROUND GAS
- EXISTING UNDERGROUND ELECTRIC
- EXISTING UNDERGROUND TELEPHONE
- EXISTING UNDERGROUND FIBER OPTIC
- EXISTING OVERHEAD POWER LINE
- EXISTING LIGHT POLE
- EXISTING TRANSFORMER
- EXISTING TELEPHONE PEDESTAL
- EXISTING TV PEDESTAL
- EXISTING CURB & GUTTER
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING CONTOUR
- APPROXIMATE EXISTING CONTOUR - ROCK (TOP OF WEATHERED)
- APPROXIMATE EDGE/DROPOFF - ROCK
- EXISTING SOIL BORING/TEST PIT LOCATION
- EXISTING TREELINE
- EXISTING AIR CONDITIONER
- EXISTING CLEANOUT
- EXISTING CURB STOP
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- EXISTING SIGN
- EXISTING WELL
- EXISTING EMERGENCY SIREN
- EXISTING OVERHEAD POWER
- EXISTING OVERHEAD UTILITY
- EXISTING UNDERGROUND TELEVISION
- EXISTING ASPHALT
- EXISTING CONCRETE
- EXISTING GRAVEL
- EXISTING RIPRAP
- EXISTING BUILDING/SILO
- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CURB & GUTTER
- PROPOSED CONTOUR
- PROPOSED EMERGENCY OVERFLOW
- PROPOSED CONCRETE
- PROPOSED ASPHALT SURFACE
- PROPOSED SEDIMENT BASIN
- PROPOSED 10' AQUATIC BENCH
- PROPOSED 10' POND MAINTENANCE ACCESS
- FUTURE ASPHALT SURFACE
- PROPOSED FLOATING HEAD SKIMMER OUTLET
- PROPOSED SILT FENCE/TREE PRESERVATION FENCE
- PROPOSED SILT FENCE POST CONSTRUCTION
- PROPOSED WIMCO OR EQUAL POST STORM SEWER CONSTRUCTION
- PROPOSED REAR YARD CB INLET PROTECTION POST STORM SEWER CONSTRUCTION
- PROPOSED DITCH CHECK - POST GRADING/UTILITY CONSTRUCTION
- PROPOSED FES PROTECTION - PRE GRADING/UTILITY CONSTRUCTION
- PROPOSED WIMCO OR EQUAL PRE GRADING/UTILITY CONSTRUCTION
- PROPOSED REAR YARD CB INLET PROTECTION PRE GRADING/UTILITY CONSTRUCTION
- PROPOSED ROCK CONSTRUCTION ENTRANCE
- PROPOSED EROSION CONTROL BLANKET
- PROPOSED TEMPORARY SEDIMENT BASIN
- PROPOSED DEMOLITION
- PROPOSED DEMOLITION - SAWCUT
- PROPOSED DEMOLITION - PAVEMENT
- PROPOSED GENERAL SEED & MULCH MIX - SOUTHERN BOULEVARD (SB)
- PROPOSED STORMWATER SEED & MULCH MIX - WET DITCH (WD)
- PROPOSED UPLAND SEED & MULCH MIX - MNDOT 35-642
- PROPOSED 6" MIN. TOPSOIL RESPREAD AREA - MASS GRADING CONTRACTOR
- PROPOSED 12" MIN.TOPSOIL + 12" CLAY LINER RESPREAD AREA (POND AREA) - MASS GRADING CONTRACTOR
- PROPOSED TOPSOIL STOCKPILE - MASS GRADING CONTRACTOR (HOME CONSTRUCTION/BUILDER PILE)
- PROPOSED STREET LIGHT LOCATION (3' BOC)
- PROPOSED STREET & STOP SIGN LOCATION (6' BOC)
- PROPOSED CROSSWALK SIGNAGE
- PROPOSED TREE REMOVAL AREA

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUAINTANCE, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

TITLE SHEET

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

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24310-00

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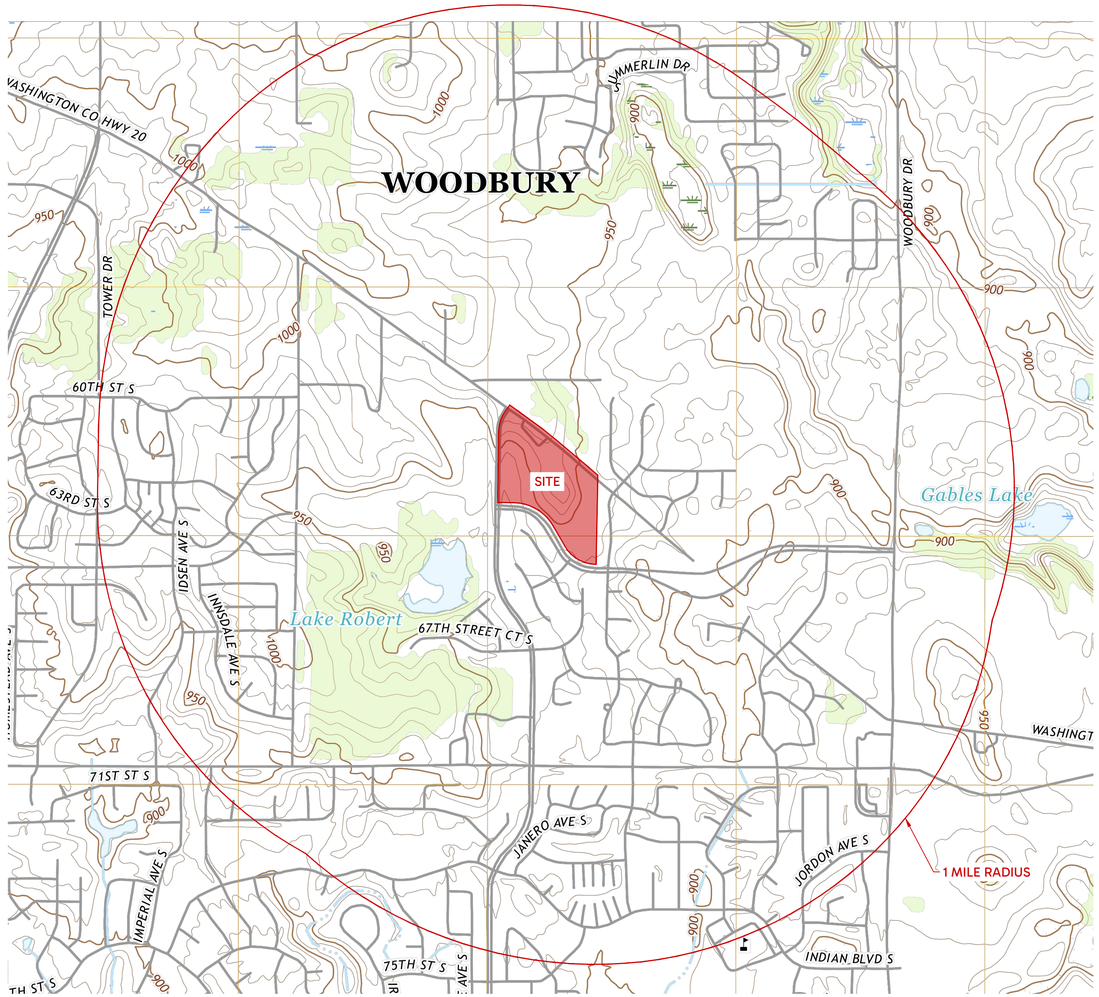
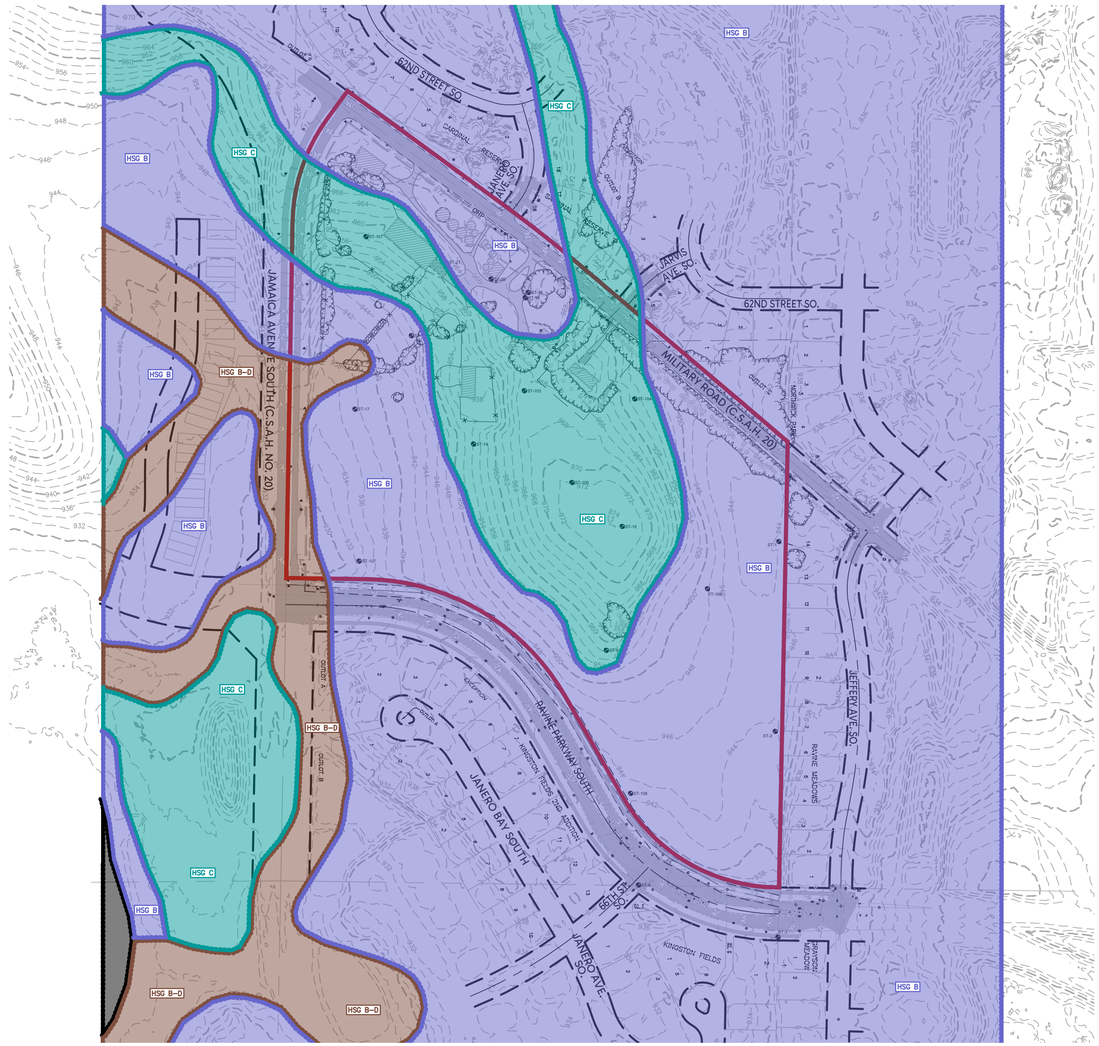


USGS MAP

1" = 1000'



SOILS MAP

1" = 200'

- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP B/D
- HYDROLOGIC SOIL GROUP NOT RATED (WATER)

BENCHMARKS
#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86
#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

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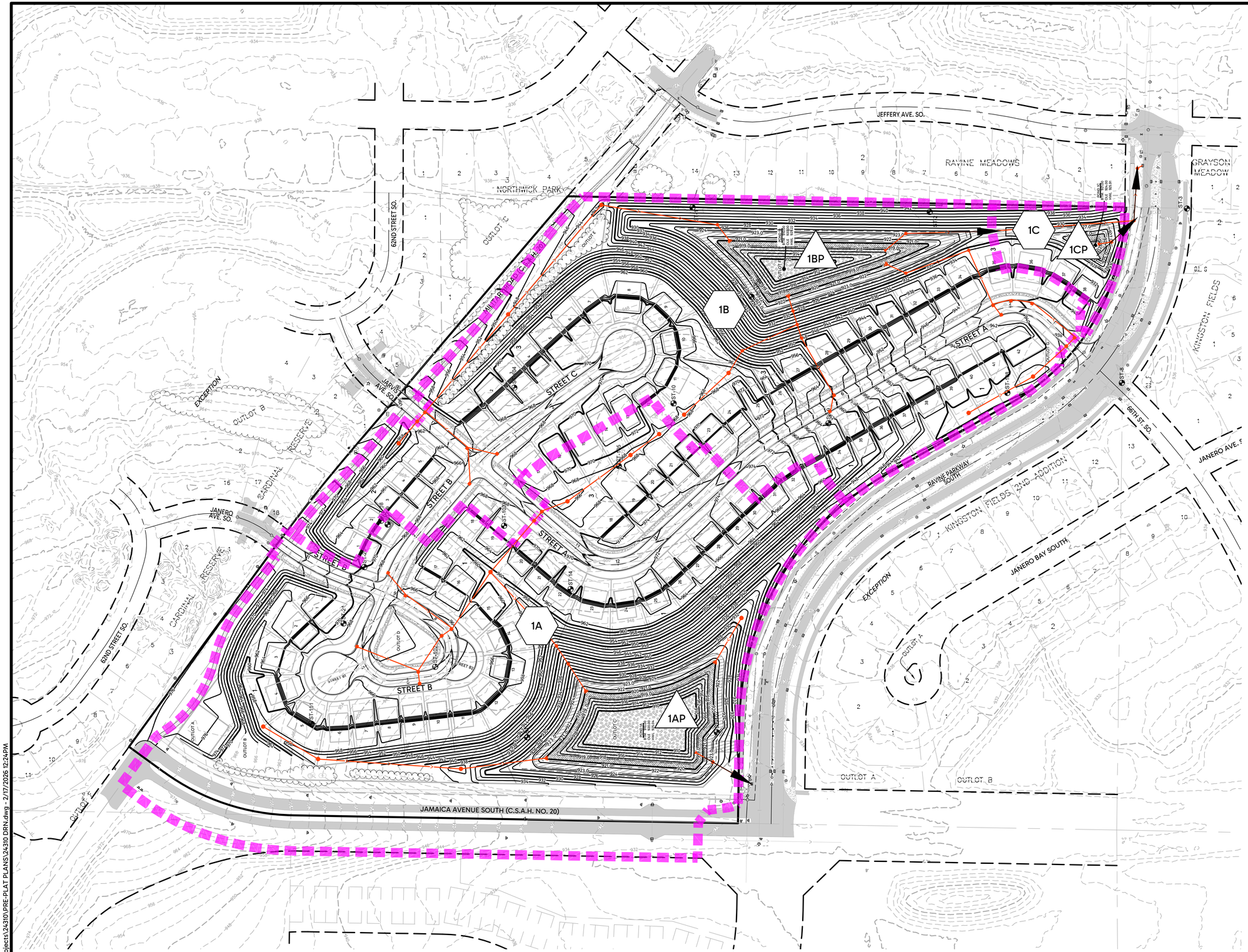

PROPOSED DRAINAGE MAP

LEGEND

- 1P — POND AREA
- 1S — DRAINAGE AREA
- 1R — REACH
- FLOW DIRECTION
- DRAINAGE BOUNDARY

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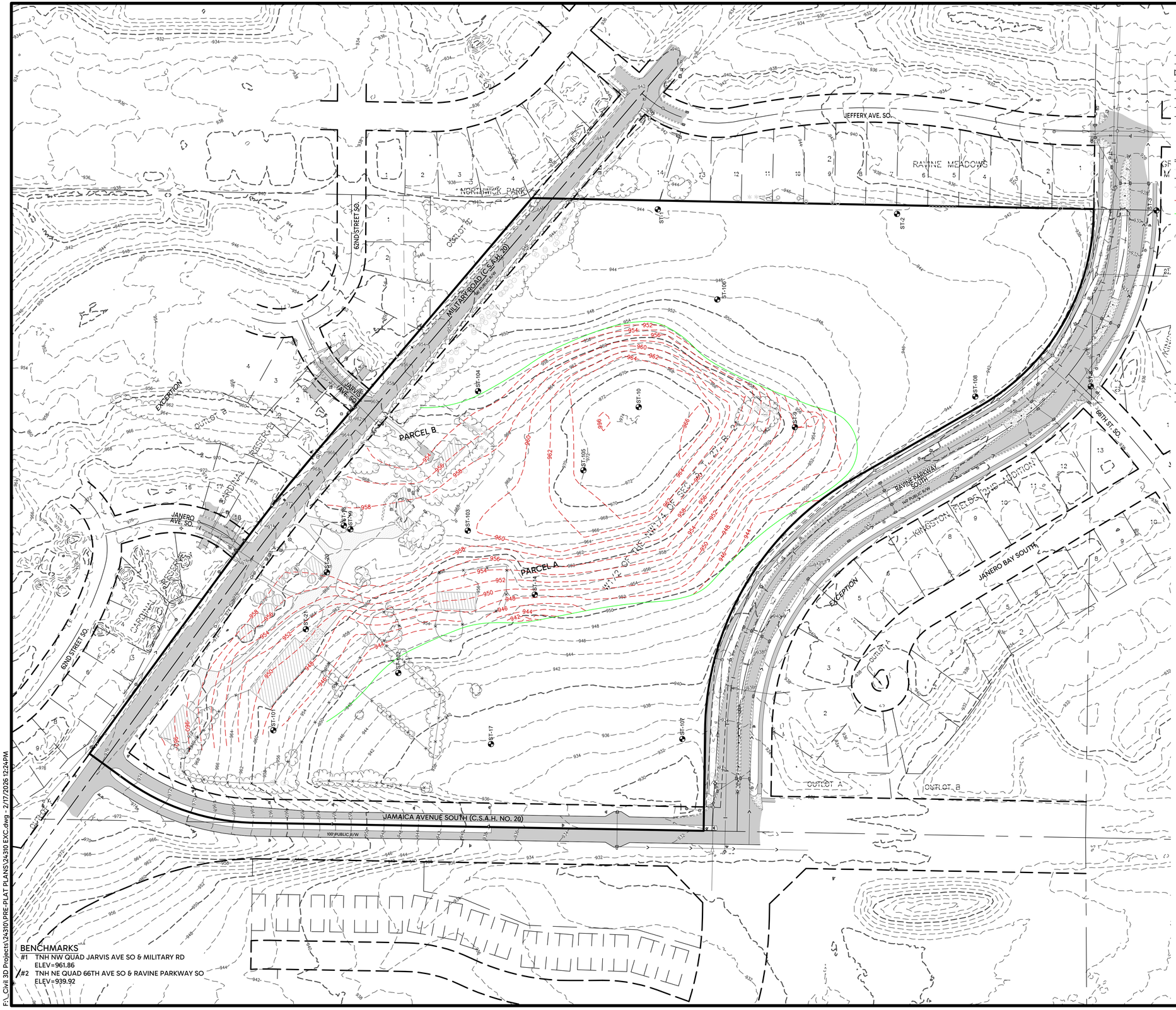

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PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

EXISTING CONDITIONS
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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COTTAGE GROVE, MINNESOTA

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DRAWN BY
CTY

DATE
01/28/2026

REVISIONS
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 EXC

PROJECT NO.
24310-00

C1.5

SCALE IN FEET
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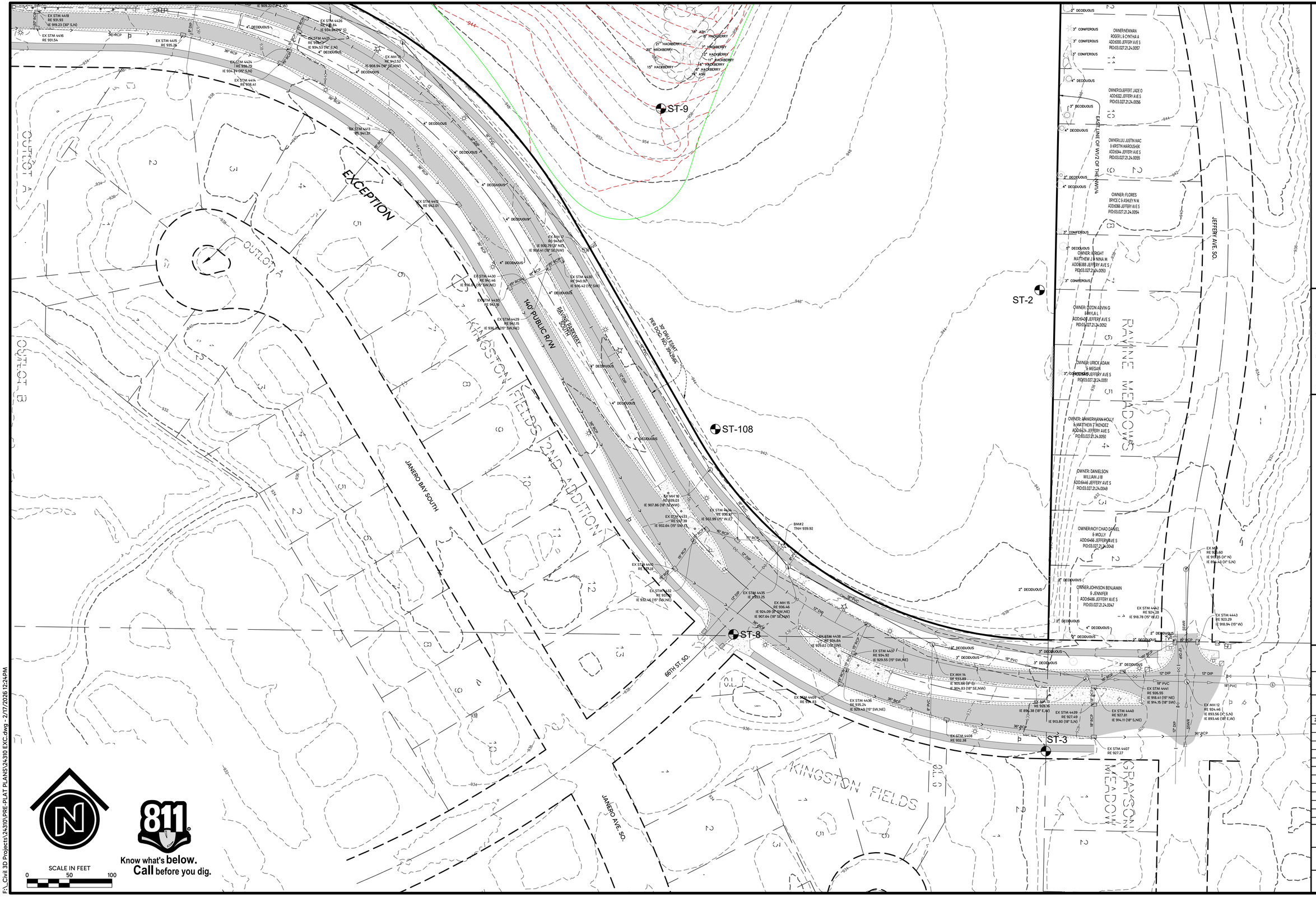

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CAD FILE	24310 EXC
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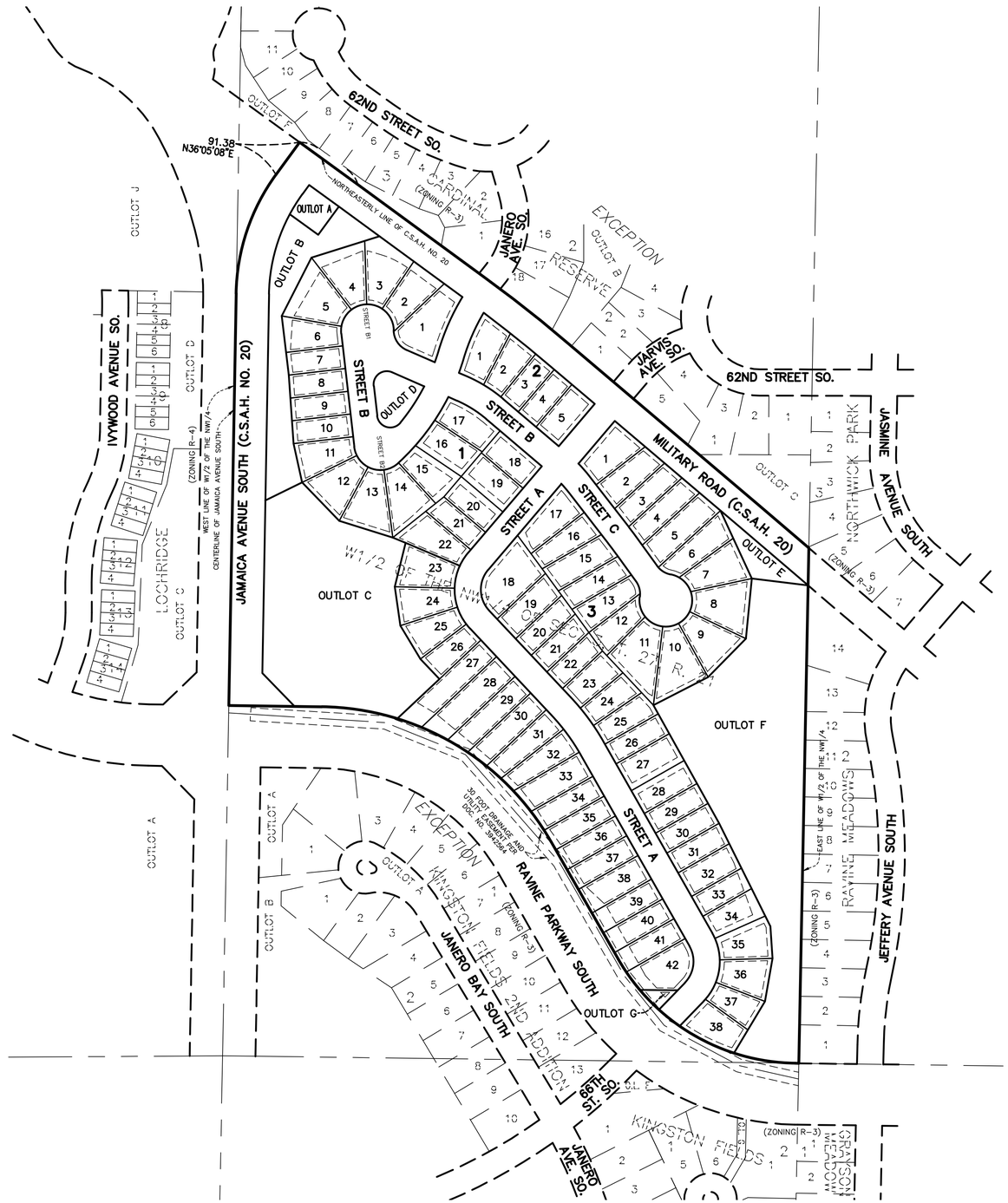

SCALE IN FEET
0 150 300

PROPERTY DESCRIPTION

That part of the West Half of the Northwest Quarter of Section 3 lying easterly of Jamaica Avenue, Except that portion lying Northeasterly of County Road No. 20.
Also except the property platted as Kingston Fields and Kingston Fields 2nd Addition, Washington County, Minnesota. Subject to County Road 20, Jamaica Avenue and Ravine Parkway South.

PID NOS. 0302721230003 & 0302721230001

ZONING INFORMATION

CURRENT ZONING:	R-4 (TRANSITIONAL RESIDENTIAL)
PROPOSED ZONING:	PUD

SITE DATA

GROSS AREA	36.35 ACRES
LOTS	85 LOTS
GROSS DENSITY (TOTAL UNITS/GROSS AREA)	2.3 D.U./ACRE
NET DENSITY (TOTAL UNITS/GROSS AREA-COUNTY ROADS-OUTLOTS(PARK & PONDING))	3.5 D.U./ACRE
LOTS	17.85 ACRES
R.O.W.	9.28 ACRES
EXISTING ROAD (JAMAICA AVENUE SOUTH)	(2.30 ACRES)
EXISTING ROAD (MILITARY ROAD)	(2.18 ACRES)
SUBDIVISION ROADS	(4.80 ACRES)
OUTLOTS	9.22 ACRES
OUTLOT A (PARK)	(0.15 ACRES)
OUTLOT B	(1.03 ACRES)
OUTLOT C (PONDING)	(3.35 ACRES)
OUTLOT D	(0.22 ACRES)
OUTLOT E	(0.22 ACRES)
OUTLOT F (PONDING)	(4.21 ACRES)
OUTLOT G	(0.04 ACRES)
TOTAL	36.35 ACRES

MINIMUM SETBACKS	
FRONT	25 FEET
SIDE (HOUSE & GARAGE)	6 FEET
SIDE (STREET)	20 FEET
REAR	30 FEET
MINIMUM LOT REQUIREMENTS	
LOT WIDTH	45 FEET
LOT DEPTH	120 FEET
MAXIMUM IMPERVIOUS COVERAGE	50%
LOT DATA	
NO. OF LOTS	85 LOTS
SMALLEST LOT SIZE	6,665 S.F.
LARGEST LOT SIZE	14,577 S.F.
AVERAGE LOT SIZE	9,149 S.F.

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
marcus@mnhill.com
www.mnhill.com

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

MARCUS F. HILL

Date: 01/28/2026 Reg No. 47484

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY PLAT
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
PLM

DATE
01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

CAD FILE
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PROJECT NO.
24310-00

C2.0

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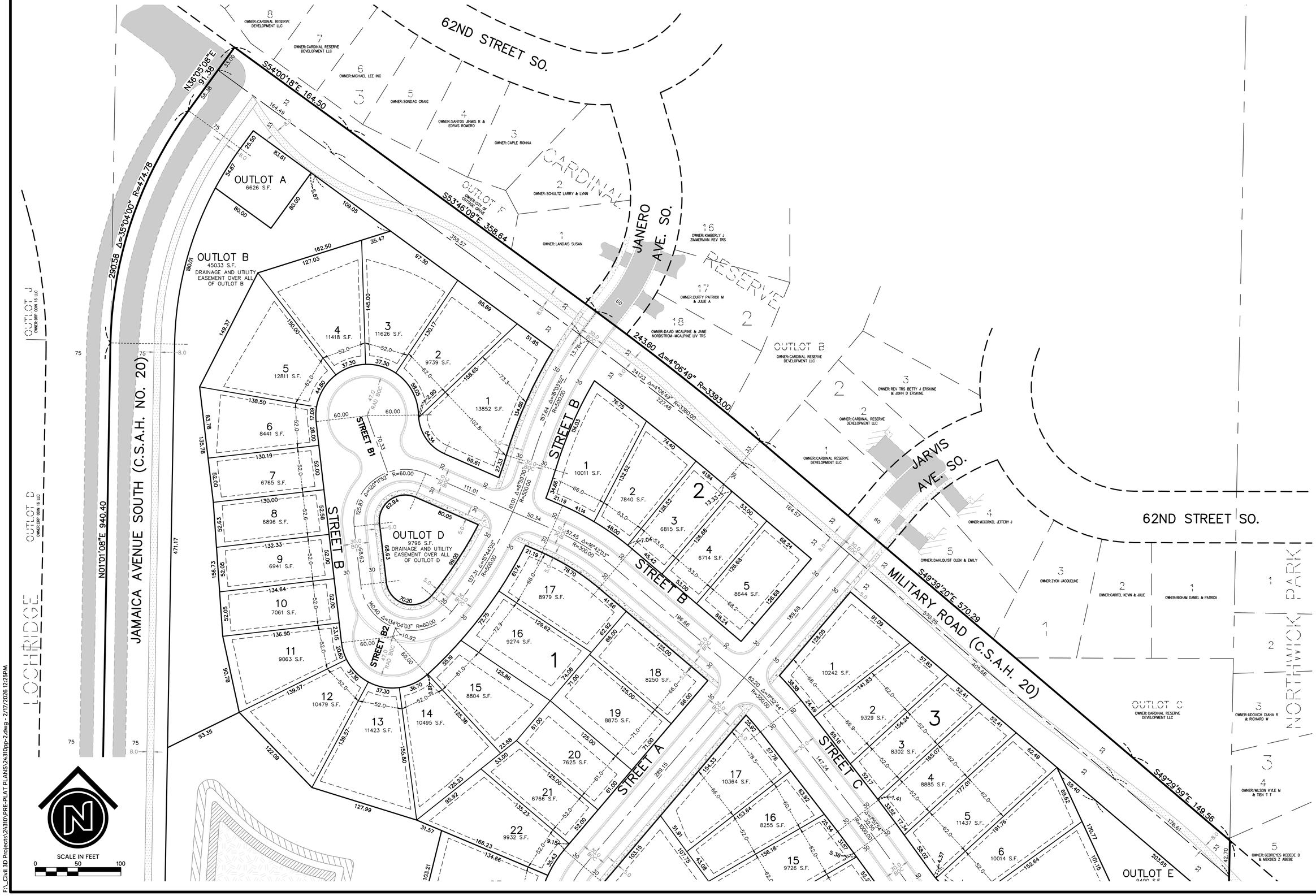
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290.58 Δ=35°04'00" R=474.78
S53°45'09"E 358.64
243.60 Δ=4°06'49" R=3393.00
CARDINAL RESERVE 2
OUTLOT A
6626 S.F.
OUTLOT B
45033 S.F.
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT B
OUTLOT C
OWNER:CITY OF COTTAGE GROVE
OUTLOT D
9796 S.F.
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT D
OUTLOT E
OUTLOT F
OUTLOT J
OWNER:DSP CDN 16 LLC
OUTLOT D
OWNER:DSP CDN 16 LLC
JANERO AVE. SO.
JARVIS AVE. SO.
RESERVE 2
OUTLOT B
OWNER:CARDINAL RESERVE DEVELOPMENT LLC
STREET B
STREET B1
STREET B2
STREET A
STREET C
MILITARY ROAD (C.S.A.H. 20)
S49°39'20"E 570.29
S49°29'59"E 149.56
JAMAICA AVENUE SOUTH (C.S.A.H. NO. 20)
N01°01'08"E 940.40
LOCUST RIDGE
NORTHWICK PARK
OWNER:CARDINAL RESERVE DEVELOPMENT LLC
OWNER:MICHAEL LEE INC
OWNER:SONDAG CRAIG
OWNER:SANTOS JINMS R & EDRAS ROMERO
OWNER:CAPLE RONNA
OWNER:SCHULTZ LARRY & LYNN
OWNER:LANDAIS SUSAN
OWNER:KIMBERLY J ZIMMERMAN REV TRS
OWNER:DUFFY PATRICK M & JULIE A
OWNER:DAVID MCALPINE & JANE NORDSTROM-MCALPINE LIV TRS
OWNER:REV TRS BETTY J ERSKINE & JOHN D ERSKINE
OWNER:MCCORKEL JEFFERY J
OWNER:DAHLQUIST GLEN & EMILY
OWNER:ZYCH JACQUELINE
OWNER:CARFEL KEVIN & JULIE
OWNER:BIGHAM DANIEL & PATRICA
OWNER:UDOVICH DIANA R & RICHARD W
OWNER:WILSON KYLE M & TIEN T T
OWNER:GEBREYES KEBEDE B & MEKDES Z ABEBE
OWNER:CARDINAL RESERVE DEVELOPMENT LLC
OWNER:CARDINAL RESERVE DEVELOPMENT LLC
OWNER:CARDINAL RESERVE DEVELOPMENT LLC

OUTLOT C
OWNER:CITY OF COTTAGE GROVE

JAMAICA AVENUE SOUTH (C.S.A.H. NO. 20)

N01°01'08"E 940.40

OUTLOT C
145776 S.F.
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT C

STREET A

STREET C

MILITARY ROAD (C.S.A.H. 20)

S49°29'59"E 149.56

OUTLOT E
9400 S.F.
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT E

OUTLOT F
183258 S.F.
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT F

N89°12'41"W 212.42

635.36 Δ=59°26'04" R=612.50

OUTLOT A
OWNER:KINGSTON FIELDS HOMEOWNERS ASSOC

O.L. A

OUTLOT B

30 FOOT DRAINAGE AND UTILITY EASEMENT PER DOC. NO. 3942564

RAVINE PARKWAY SOUTH

KINGSTON

N29°46'38"W 308.17

S01°06'59"W 1176.21

RAVINE MEADOWS

SCALE IN FEET
0 50 100

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HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
marcus@mnhill.com
www.mnhill.com

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MARCUS F. HILL

Reg No. 47684

Date: 01/28/2026

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY PLAT
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY	PLM
DATE	01/28/2026
REVISIONS	
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CAD FILE	24310PP-2.dwg
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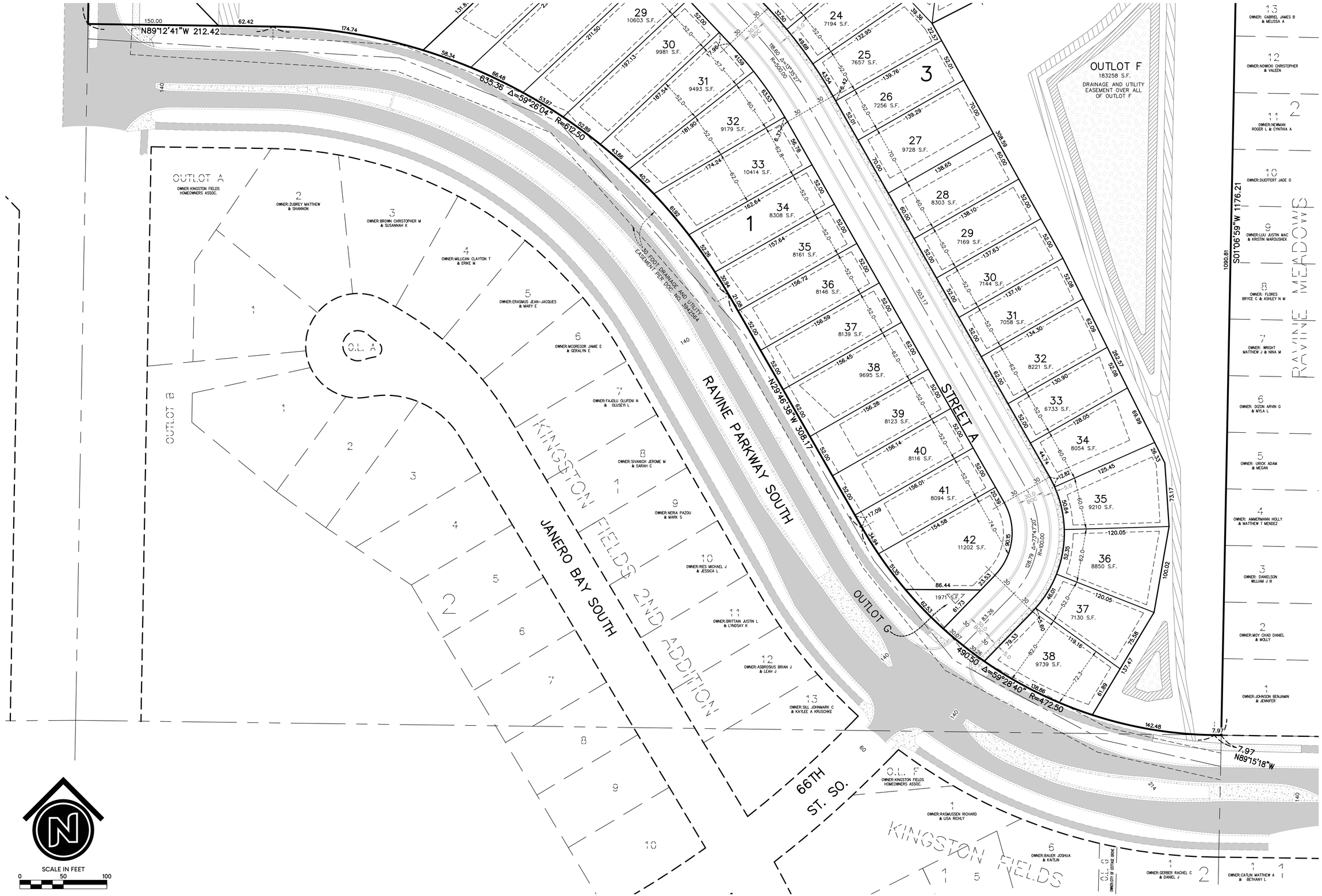
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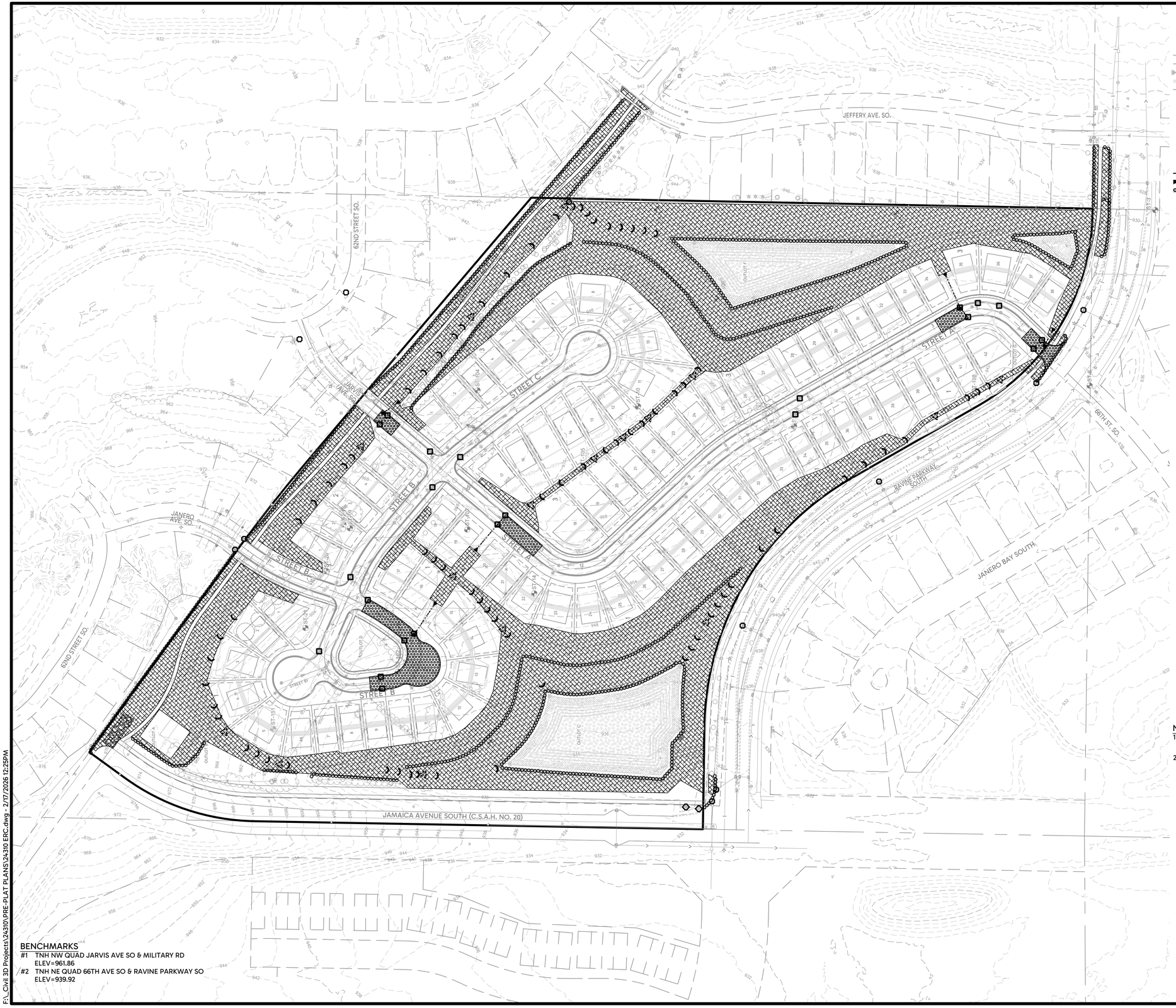
635.36 Δ=59°26'04" R=612.50
N29°46'38"W 308.17
490.30 Δ=59°28'40" R=472.50
N89°15'18"W 7.97
S01°06'59"W 1176.21
1090.81
OUTLOT A
OWNER: KINGSTON FIELDS HOMEOWNERS ASSOC.
OUTLOT B
OUTLOT C
OUTLOT F
183258 S.F.
DRAINAGE AND UTILITY EASEMENT OVER ALL OF OUTLOT F
O.L. A
O.L. B
O.L. F
OWNER: KINGSTON FIELDS HOMEOWNERS ASSOC.
O.L. G
OWNER: CITY OF COTTAGE GROVE
RAVINE PARKWAY SOUTH
STREET A
JANERO BAY SOUTH
66TH ST. SO.
KINGSTON FIELDS 2ND ADDITION
KINGSTON FIELDS
RAVINE MEADOWS
30' TOOT DRAINAGE AND UTILITY EASEMENT PER DOC. NO. 3945464
1 OWNER: ZUBREY MATTHEW & SHANNON
2 OWNER: BROWN CHRISTOPHER M & SUSANNAH K
3 OWNER: MILLICAN CLAYTON T & ERIKE M
4 OWNER: ERASMUS JEAN-JACQUES & MARY E
5 OWNER: MCGREGOR JAMIE E & GERALYN E
6 OWNER: FAJOLU OLUFENI N & OLUSEYI L
7 OWNER: SIVANICH JEROME M & SARAH C
8 OWNER: NERIA PAZOU & MARK S
9 OWNER: RIES MICHAEL J & JESSICA L
10 OWNER: BRITTAIN JUSTIN L & LYNDSAY K
11 OWNER: ASBROSIUS BRIAN J & LEAH J
12 OWNER: SILL JOHNMARK C & KAYLEE A KRUSCHKE
13 OWNER: GABRIEL JAMES B & MELISSA A
12 OWNER: NOWOKI CHRISTOPHER & VALEEN
11 OWNER: NEWMAN ROGER L & CYNTHIA A
10 OWNER: DUEFFERT JADE O
9 OWNER: LUU JUSTIN MAC & KRISTIN MAROUSHEK
8 OWNER: FLORES BRYCE C & ASHLEY N M
7 OWNER: WRIGHT MATTHEW J & NINA M
6 OWNER: DIZON ARVIN G & MYLA L
5 OWNER: URICK ADAM & MEGAN
4 OWNER: AMMERMANN HOLLY & MATTHEW T MENDEZ
3 OWNER: DANIELSON WILLIAM J III
2 OWNER: MOY CHAD DANIEL & MOLLY
1 OWNER: JOHNSON BENJAMIN & JENNIFER
1 OWNER: RASMUSSEN RICHARD & LISA RICKLY
6 OWNER: BAUER JOSHUA & KAITLIN
1 OWNER: GERBER RACHEL C & DANIEL J
2 OWNER: CATLIN MATTHEW A & BETHANY L
1 OWNER: CATLIN MATTHEW A
1 OWNER: CATLIN MATTHEW A
1 OWNER: CATLIN MATTHEW A



LEGEND

- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CURB & GUTTER
- 923 PROPOSED CONTOUR
- PROPOSED CONCRETE
- PROPOSED ASPHALT SURFACE
- PROPOSED SEDIMENT BASIN
- PROPOSED 10' AQUATIC BENCH
- PROPOSED 10' POND MAINTENANCE ACCESS
- PROPOSED FLOATING HEAD SKIMMER OUTLET
- PROPOSED SILT FENCE/TREE PRESERVATION FENCE
- PROPOSED SILT FENCE POST CONSTRUCTION
- PROPOSED WIMCO OR EQUAL POST STORM SEWER CONSTRUCTION
- PROPOSED REAR YARD CB INLET PROTECTION POST STORM SEWER CONSTRUCTION
- PROPOSED DITCH CHECK - POST GRADING/UTILITY CONSTRUCTION
- PROPOSED FES PROTECTION - PRE GRADING/UTILITY CONSTRUCTION
- PROPOSED WIMCO OR EQUAL PRE GRADING/UTILITY CONSTRUCTION
- PROPOSED REAR YARD CB INLET PROTECTION PRE GRADING/UTILITY CONSTRUCTION
- PROPOSED ROCK CONSTRUCTION ENTRANCE
- PROPOSED EROSION CONTROL BLANKET
- PROPOSED TEMPORARY SEDIMENT BASIN

NOTES

1. PERIMETER EROSION CONTROL MEASURES MUST BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY THE CITY PRIOR TO THE START OF WORK.
2. CONTRACTOR MUST PROVIDE CITY A MINIMUM 24-HOUR NOTICE PRIOR TO INSPECTION.

BENCHMARKS

#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86

#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

Know what's **below.** **Call** before you dig.

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0 100 200

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUANRUD, P.E.

PRELIMINARY

Date: 01/28/2026 Reg.No. 24670

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY EROSION & SEDIMENT CONTROL PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY	CTY
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2026-02-17 REV PER CITY COMMENTS	
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PROJECT NO.	24310-00
	C3.0

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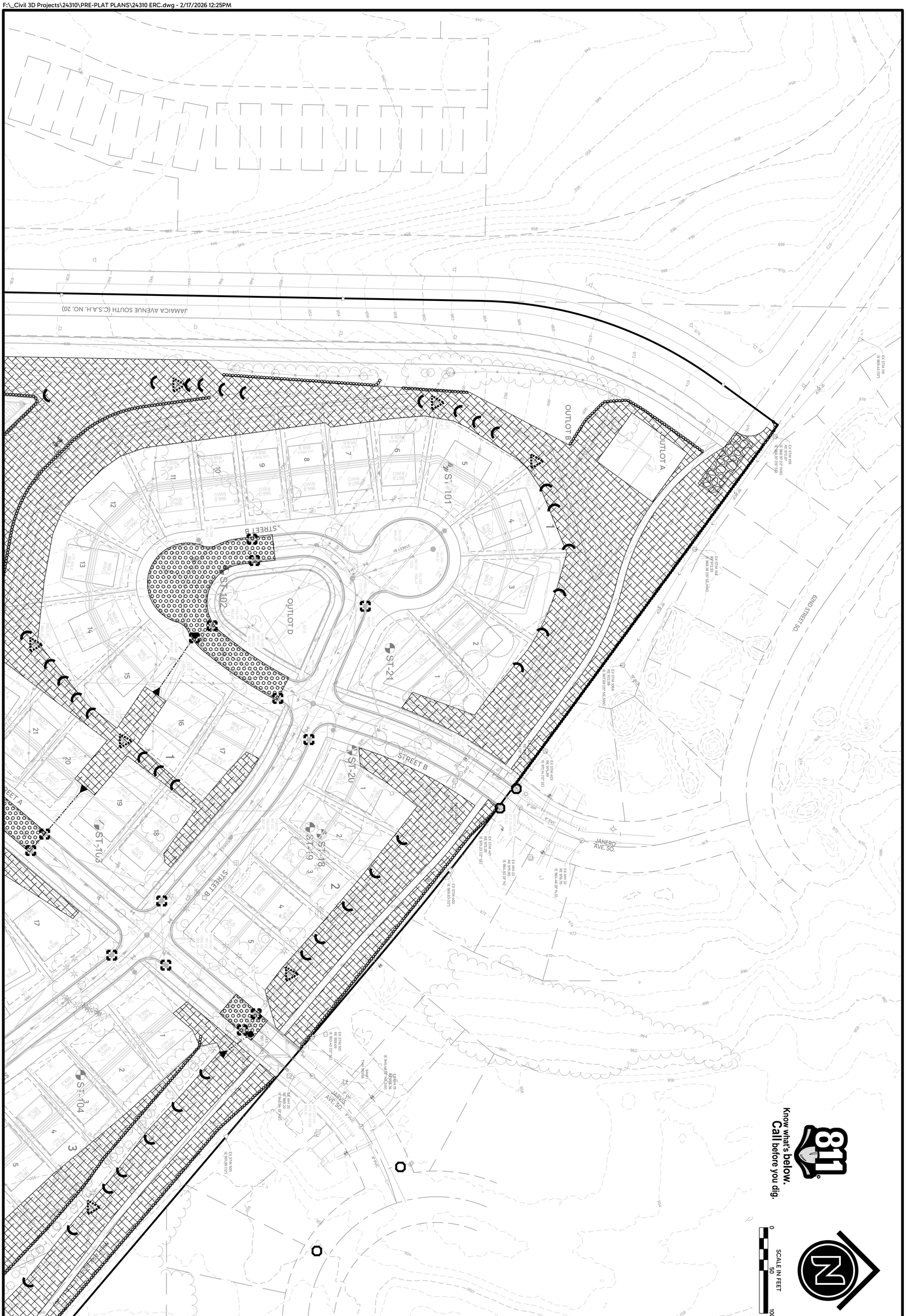

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PROJECT NO. 24310-00

CAD FILE 24310 ERC

DATE 01/28/2026

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REVISIONS

2026-02-09 REV PER CITY COMMENTS

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY EROSION & SEDIMENT CONTROL PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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PRELIMINARY

KURT D. QUAINTANCE, P.E.

Date: 01/28/2026 Reg.No. 24678

HILL INCORPORATED

2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
KurtQ@mnhill.com
www.mnhill.com

HILL
INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
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KURT D. QUAINTANCE, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY EROSION & SEDIMENT CONTROL PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY EROSION & SEDIMENT CONTROL PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.
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DEVELOPMENT SUMMARY

MCHATTIE LANDING - COTTAGE GROVE, MINNESOTA
-These plans shall be considered part of the project's SWPPP. A copy of the SWPPP shall remain on-site throughout active construction.

TYPE OF PROJECT: 85 Lots - Single-Family Construction

TYPE OF WORK: Mass Grading, Utility Installation, Street Construction. Subsequently, Joint Trench and Home construction will occur.

TOTAL PLATTED AREA: 36.35 AC

TOTAL DISTURBED AREA: 33.55 AC

EXISTING IMPERVIOUS AREA: 2.71 AC
(WITHIN DISTURBED AREA OF PROJECT)

POST CONSTRUCTION IMPERVIOUS AREA: 9.80 AC
(WITHIN DISTURBED AREA OF PROJECT)

CONSTRUCTION PHASING
The project is expected to be mass graded in one phase within one construction season, but developed with utility and street construction in two phases.

Three proposed stormwater basins will treat the project stormwater. The proposed basins can be constructed either partially or in whole at the early portion of the project grading to serve as temporary sedimentation basins. Upon completion of grading, the contractor may also utilize the street subgrade and the rear yard low points as temporary sediment basins prior to discharge to the proposed stormwater basins.

POTENTIONAL FOR EROSION AND DISCHARGE OF SEDIMENT
As the site will be disturbed for a period of several weeks during construction, the potential for erosion will increase. The overall gradients on the site are moderate. Certain portions of the site exceed 10% gradients and shall be closely monitored and managed to prevent erosion. The proposed street subcut and rear yard low points as well as the stormwater basins will serve as temporary sediment basins during construction.

The risk of discharge of sediment off of the site is moderate, due to the grade orientation, soil type, design, and discharge area. The highest potential for discharge off the site is to Ravine Parkway South. This area will be controlled by a cut-off swale, silt fence, ditch checks, and erosion control blanket.

Contractor will be required to manage completion of 3:1 slopes such that soil exposure is minimized. After excavation and embankments are completed, slopes shall be re-spread with on-site topsoil where specified (stockpiling in the remainder), the slope grades certified, and erosion blanket or seed and mulch installed as per the plan. Contractor shall coordinate these steps to be carried out in a timely manner such that active construction areas are minimized.

GENERAL CONSTRUCTION SEQUENCING
1. Install perimeter control and rock construction entrance.
2. Perform any clearing, as needed.
3. Perform demolition and debris removal, as needed.
4. Place topsoil stockpiles and stabilize with mulch.
5. Perform mass grading. As sheet drainage patterns develop, place ditch checks, silt fence, and temporary sediment basins as necessary to dissipate and control sediment transfer.
6. Stabilize disturbed areas (non-utility installation areas) with seed and mulch, erosion control blanket, or temporary mulch as needed.
7. Construct utilities and pavements.
8. Stabilize remaining disturbed areas with seed and mulch or erosion control blanket until final stabilization.
9. Install phone, cable, gas and electric utilities.
10. Construct buildings and structures.
11. Stabilize home areas with final permanent vegetation, landscaping or turf.

GUIDANCE FOR TIMING OF BMP INSTALLATION

Prior to Start of Construction
1. Install all perimeter control BMPs as specified on plans prior to start of construction.
2. Install or establish stabilized construction entrance.
3. Install protection devices on existing storm sewer inlets and flared ends prior to start of construction.

During Construction
1. Identify temporary topsoil stockpile locations and stabilize with temporary mulch.
2. Areas in which construction becomes inactive must have stabilization commence immediately and be completed no later than 14 days after construction activity in that area has either temporarily or permanently ceased.
3. Provide temporary or permanent energy dissipation at all pipe outlets within 24 hours of connection to a surface water.
4. Minimize active construction areas. Where possible, establish final grade and stabilize with permanent vegetation - particularly around stormwater basins.
5. During grading construction, utilize street subgrade and rear yard low points for stormwater management to the fullest extent practicable - establish temporary sediment basins and outlets as required.
6. Identify and establish where topsoil stockpiles will be placed for Home Construction/Builders. Stabilize with temporary seed and mulch and install perimeter control around stockpile base.
7. After construction is completed and grades are certified in a particular area of the site, establish permanent vegetation or other permanent cover.

During Inactivity or After Construction
1. Areas in which construction becomes inactive must have stabilization commence immediately and be completed no later than 14 days after construction activity in that area has either temporarily or permanently ceased.
2. Final stabilization cover types are shown on this sheet of the plan set. Final cover consists of vegetation, paved and gravel surfaces, sod, landscaping and buildings.
3. At the point where vegetated cover has achieved 70% of expected full growth density, vegetated areas can be considered fully stabilized. Removal of synthetic sediment control BMPs can be initiated.
4. Inlet protection devices can be removed from structures as the attributing drainage area becomes fully stabilized.
5. Maintain street sweeping activities until construction activities are fully completed.

EROSION CONTROL BMPs
The construction plans anticipate the use of, but are not limited to, the following Erosion Control BMPs:
1. Perimeter delineation to minimize disturbed areas
2. Temporary Rock Construction Entrance
3. Temporary straw mulch as needed.
4. Seed and mulch/Sod
5. Erosion Control Blanket
6. Minimize active or disturbed work areas
7. Horizontal slope grading
8. Rip rap

SEDIMENT CONTROL BMPs
The construction plans anticipate the use of, but are not limited to, the following Sediment Control BMPs:
1. Utilize street subcut, rear yard low points, and stormwater basins as Temporary Sediment Basins
2. Silt Fence at project perimeter and throughout site
3. Inlet protection after utility construction
4. Linear control along back of new curb and gutter (sod, erosion control blanket, bioroll, or silt fence)
5. Routine street sweeping adjacent to construction entrance.
6. Ditch checks
7. Post construction silt fence - stormwater basins, large slope areas, and topsoil stockpiles

Refer to plans for designated locations of BMPs, details and implementation notes. All BMP's selected and implemented shall be appropriate for the time of year, the current site conditions and for the estimated duration of use.

BASIN AND TRAP DEWATERING BMPs
Should the need arise for basin or trap dewatering, contractor shall utilize a floating skimmer pump intake, such that the water is drawn from the surface of the basin. Pumped effluent shall not be discharged into Surface Waters in a turbid state.
Turbid effluent shall be filtered with mechanical devices, chemical filtering, or a combination thereof, to prevent discharges with visual turbidity.

POLLUTION CONTROL BMPs
BMP's and good housekeeping should be implemented to prevent spills, pollutants or chemicals from entering the drainage system.
1. Fueling: A fixed fueling station is not anticipated. Contractor will be required to implement BMPs for onsite re-fueling of equipment.
2. Concrete Washout: A washout area will be specified on the plan for construction. The builder/developer has the ability to adjust location or to provide alternative washout containment.
3. There is not an anticipated need for storing chemicals, paints, solvents or other potentially toxic or hazardous materials on site.

SEED & MULCH SPECIFICATIONS
Seed placed for permanent cover or final stabilization requires the respread of 6" minimum existing/salvaged topsoil. Multiple site visits will be required to accommodate permanent or temporary stabilization as required during the phases of construction.

1. General
A. Seed: **MNDOT Southern Boulevard (SB)** at a rate of 160 lb/acre
B. Fertilzer: Type 3 slow release at a rate of 200 lb/acre
C. Mulch: MNDOT Type 1 at a rate of 2 tons/acre

2. Stormwater
A. Seed: **MNDOT Wet Ditch (WD)** at a rate of 20 lb/acre
B. Fertilzer: Type 3 slow release at a rate of 200 lb/acre
C. Mulch: MNDOT Type 3 at a rate of 2 tons/acre

3. Upland
A. Seed: **MNDOT 35-642** at a rate of 34.25 lb/acre
B. Fertilzer: Type 3 slow release at a rate of 200 lb/acre
C. Mulch: MNDOT Type 3 at a rate of 2 tons/acre

4. Temporary Cover Crop
A. Seed: **MNDOT 21-111 or 21-112** at a rate of 100 lb/acre
B. Fertilzer: Type 3 slow release at a rate of 200 lb/acre
C. Mulch: MNDOT Type 3 at a rate of 2 tons/acre

5. Temporary Mulch
A. Mulch: Type 1 (Non-Native Seed Areas) at a rate of 2 tons/ac
B. Mulch: Type 3 (Native Seed Areas) at a rate of 2 tons/ac

ADDITIONAL SWPPP NOTES
1. All Erosion and Sediment Control facilities shall be maintained by the contractor during the construction operations. Any temporary facilities which are to be removed as called for on these plans and specifications shall be removed by the contractor at the time directed by the engineer. The contractor shall then restore the subsequently disturbed areas in accordance with these plans and specifications.
2. Wherever practical and feasible, the contractor shall protect and preserve existing natural trees, grass and other vegetative cover in effort to provide natural buffering and filtering of runoff.
3. Contractor shall be adaptable in adjusting construction schedules in anticipation of weather forecasts of precipitation, in order to minimize risk of erosion and sediment transport.
4. It is the responsibility of the contractor to keep public streets, travel ways, parking lots and trails utilized for ingress to and egress from the construction site free of dirt, sediment and debris, resulting from construction activity.
5. Adequate control of dust shall be maintained by the contractor.
6. Perimeter controls shall not be removed until final stabilization of areas draining toward the control devices is achieved.
7. When temperatures do not exceed 40 degrees F, areas that require seed and mulch stabilization shall be dormant seeded. Application rate shall be two times the normal rate. No dormant seeding shall be done on ice or snow greater than 2" in depth.
8. Any areas that were seeded that do not achieve 70% coverage shall be reseeded at the contractor's expense.

STORMWATER BASIN MAINTENANCE
All stormwater basins within the project will be owned and maintained by the City. Suggested practices are as follows:
1. For the first three years after construction, basins should be inspected for obvious signs of erosion, such as gullies, rills or sediment plumes. Identify the cause and take corrective measures such that grades are restored and surfaces re-established with appropriate vegetation.
2. Inspect for sediment accumulation at the pipe outlets into the pond at the completion of sod installation of last lot in plat. Remove sediment. Re-inspect every 3-5 years.
3. Inspect inlets and outlets for blockage or debris buildup annually. Remove debris as necessary to allow for inlets and outlets to function as designed.
4. Verify basin design capacity after 15 to 20 years of service.

MPCA STORMWATER PERMIT - RESPONSIBILITY
The Contractor will be required to become the Permittee for the project, until final stabilization and transfer of responsibility is completed. Transfer of responsibility shall be completed with the Permit Modification Form. Contractor must provide trained individual(s) per Section 21.1 while responsible for NPDES permit and until transfer of responsibility is complete.

OWNER: JASON BIEDERWOLF - M/I HOMES OF MPLS/ST. PAUL, LLC. - 763-586-7283 (O)

PERMITTEE: TBD - TBD - XXX-XXX-XXXX

OPERATOR(S): Supt (TBD)

ENGINEER: KURT D. QUAINTANCE, P.E. - HILL, INC. - 612-508-8890(C)

TRAINING REQUIREMENTS
KURT D. QUAINTANCE, P.E.
DESIGN OF CONSTRUCTION SWPPP (CERTIFICATION(2023-2026))
UNIVERSITY OF MINNESOTA
INSTRUCTORS : JOHN CHAPMAN

LGU CONTACT: JOE FOX, P.E. - CITY OF COTTAGE GROVE - 651-458-2826 (O)

MPCA COMPLIANCE: MATT HOSKINS - MPCA - 651-757-2864

ESTIMATED EROSION AND SEDIMENT CONTROL QUANTITIES

ROCK CONSTRUCTION ENTRANCE	EA	1
SILT FENCE/TREE PRESERVATION FENCE - PRE CONSTRUCTION	LF	3,550
SILT FENCE - POST CONSTRUCTION	LF	4,100
SILT FENCE - TOPSOIL STOCKPILE - POST CONSTRUCTION	LF	1,800
SEED & MULCH - GENERAL (SB)	AC	19.3
SEED & MULCH - STORMWATER (WD)	AC	2.1
SEED & MULCH - UPLAND (MNDOT 35-642)	AC	7.7
SEED & MULCH - TEMPORARY CROP COVER (MNDOT 21-111 OR MNDOT 21-112)	AC	20.0
TEMPORARY MULCH - MNDOT TYPE 1	AC	15.0
TEMPORARY MULCH - MNDOT TYPE 3	AC	10.0
EROSION CONTROL BLANKET - MNDOT CATEGORY 3 "WILDLIFE FRIENDLY"	SY	56,800
DITCH CHECK	EA	75
INLET PROTECTION - STREET CB	EA	32
INLET PROTECTION - REAR YARD CB/FLARED END	EA	18
TEMPORARY SEDIMENT BASINS AND FLOATING HEAD SKIMMER OUTLET	EA	5

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.
KURT D. QUAINTANCE, P.E.
Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY EROSION & SEDIMENT CONTROL DETAILS
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 ERD

PROJECT NO.
24310-00

C3.4

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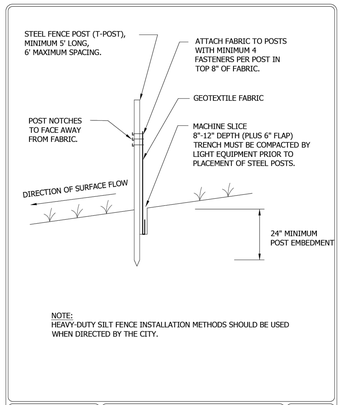
NPDES REQUIREMENTS

1.1 Permit Coverage. [Minn. R. 7090]
1.2 This permit is required for construction activity that results in land disturbance of equal to or greater than one (1) acre or if a project is part of a common plan of development or sale that ultimately will disturb greater than one (1) acre, and authorizes, subject to the terms and conditions of this permit, the discharge of stormwater associated with construction activity. [Minn. R. 7090]
1.3 Construction activity covered by this permit cannot commence until coverage under this permit is effective as described in item 3.3 through 3.4 or, if applicable, until the Minnesota Pollution Control Agency (MPCA) has issued an individual National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) construction stormwater permit for the project. [Minn. R. 7090]
1.4 This permit covers all areas of the State of Minnesota except land wholly within the boundaries of a federally recognized Indian Reservation owned by a tribe or a tribal member or land held in trust by the federal government for a tribe or tribal member. [Minn. R. 7090]
1.5 Coverage under this permit is not required when all stormwater from construction activity is routed directly to and treated by a "treatment works," as defined in Minn. Stat. Section 115.01, subd. 21, operated under an individual NPDES/SDS permit with a Total Suspended Solids (TSS) effluent limit. [Minn. R. 7090]
1.6 This permit covers ongoing projects covered under any previous construction stormwater permit that are not complete on the issuance date of this permit. Permittees must either remain in compliance with the previous permit and terminate coverage within 18 months of the issuance date of this permit or comply with this permit, including updating the Stormwater Pollution Prevention Plan (SWPPP), within the 18-month period. Permittees of previously permitted projects are not required to incorporate any additional requirements regarding the permanent stormwater treatment system included in this reissued permit. [Minn. R. 7090]
1.7 Coverage for projects that extend beyond the expiration date of this permit remains effective for a grace period of 18 months. If Permittees cannot complete projects during the grace period, the MPCA will extend coverage under the next permit and permittees must comply with the requirements of the new permit including updating the SWPPP. Permittees are not required to follow changes to the permanent stormwater treatment section of the next permit. [Minn. R. 7090]
2.1 Prohibitions and Limitations of Coverage. [Minn. R. 7090]
2.2 The owner must develop a complete and accurate SWPPP that complies with item 5.2 prior to submitting the application for coverage and starting construction activity. Failure to prepare a SWPPP prior to submitting the application may result in permit revocation. [Minn. R. 7090]
2.3 This permit prohibits discharges of any material other than stormwater treated in compliance with this permit and discharges from dewatering or basin draining activities in accordance with Section 10. Prohibited discharges include, but are not limited to, wastewater from washout of concrete, stucco, paint, form release oils, curing compounds and other construction materials; fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; soaps or solvents used in vehicle and equipment washing and maintenance, and other hazardous substances or wastes. [Minn. R. 7090]
2.4 This permit does not authorize stormwater discharges related to the placement of fill into waters of the state requiring local, state or federal authorizations (such as U.S. Army Corps of Engineers Section 404 permits, Minnesota Department of Natural Resources (DNR) Public Waters Work permits or local governmental unit (LGU) Wetland Conservation Act replacement plans or determinations). [Minn. R. 7090]
2.5 This permit does not authorize stormwater discharges associated with industrial activity except for construction activity. Permittees must obtain coverage for discharges associated with industrial activity under a separate NPDES/SDS permit once day-to-day operational activities commence even if construction is ongoing. [Minn. R. 7090]
2.6 This permit does not authorize discharges from non-point source agricultural and silvicultural activities excluded from NPDES permit requirements under 40 CFR pt. 122.3(e). [Minn. R. 7090]
2.7 This permit does not authorize stormwater discharges to Prohibited, Restricted, Special or Impaired waters unless permittees follow the additional requirements in Section 23. [Minn. R. 7090]
2.8 This permit does not replace or satisfy any environmental review requirements including those under the Minnesota Environmental Policy Act or the National Environmental Policy Act. The owner must verify completion of any environmental review requirements by law, including any required Environmental Assessment Worksheets or Environmental Impact Statements, Federal environmental review, or other required review prior to applying for coverage under this permit. If any part of your common plan of development or sale requires environmental review, coverage under this permit cannot be obtained until such environmental review is complete. [Minn. R. 7090]
2.9 This permit does not regulate or satisfy any review requirements for discharges adversely impacting State or Federally designated endangered or threatened species or a designated critical habitat. The owner must comply with the National Historic Preservation Act and conduct all required review and coordination related to historic preservation, including significant anthropological sites and any burial sites, with the Minnesota Historic Preservation Officer. [Minn. R. 7090]
2.10 This permit does not authorize discharges to wetlands unless the permittee complies with the requirements in Section 22. Coverage under this permit cannot be issued until the requirements for wetland permits, decisions, other determinations, or the mitigative sequence required in section 22 have been finalized and documented. [Minn. R. 7050.0186]
3.1 Application and Coverage Effective Date. [Minn. R. 7090]
3.2 The owner must submit a complete and accurate on-line application with the appropriate fee to the MPCA for each project that disturbs one (1) or more acres of land or for a common plan of development or sale that will ultimately disturb one (1) or more acres. [Minn. R. 7090]
3.3 For projects or common plans of development or sale that disturb less than 50 acres or do not discharge stormwater within 1 mile (aerial radius measurement) of a special or impaired water, permittees do not need to submit the SWPPP with the application. Permit coverage for these projects is effective upon application and completing the payment process. [Minn. R. 7090]
3.4 For certain projects or common plans of development or sale disturbing 50 acres or more, the complete SWPPP must be included with the application and submitted at least 30 days before the start of construction activity. This applies if there is a discharge to or within one mile (aerial radius measurement) of, and flows to, a special water listed in item 23.3 through 23.6 or an impaired water as described in item 23.7. Permit coverage for these projects is effective upon submitting the application and complete SWPPP, completing the payment process and receiving a determination from the MPCA that the review of the SWPPP is complete. The determination may take longer than 30 days if the SWPPP is incomplete. If the MPCA fails to contact the permittee within 30 days of applicaiton receipt, coverage is effective 30 days after completing the payment process. [Minn. R. 7090]
3.5 The application requires listing all persons meeting the definition of owner and operator as permittees. The owner is responsible for compliance with all terms and conditions of this permit. The operator is responsible for compliance with Sections 3, 4, 5, 24 and applicable requirements for construction activity in Sections 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23. [Minn. R. 7090]
3.6 Permittees will receive coverage notification in a manner determined by the MPCA. [Minn. R. 7090]
3.7 For construction projects where the owner or operator changes (e.g., an original developer sells portions of the property to various homebuilders or sells the entire site to a new owner), the current owner and the new owner or operator must submit a complete permit modification form provided by the MPCA. The current owner and the new owner or operator must submit the form prior to the new owner or operator commencing construction activity or no later than 30 days after taking ownership of the property. [Minn. R. 7090]
3.8 For construction projects where the owner or operator changes, the current owner must provide a SWPPP to the new owner and operator that specifically addresses the remaining construction activity. The new owner or operator can implement the original SWPPP, modify the SWPPP, or develop a new SWPPP. Permittees must ensure their activities do not render another party's erosion and permanent stormwater control BMPs ineffective. [Minn. R. 7090]
4.1 Termination of Coverage. [Minn. R. 7090]
4.2 Permittees must submit a NOT within 30 days after all termination conditions listed in Section 13 are complete.[Minn. R. 7090]
4.3 Permittees must submit a NOT within 30 days after selling or otherwise legally transferring the entire site, including permit responsibility for roads (e.g., street sweeping) and stormwater infrastructure final clean out, or transferring portions of a site to another party. The permittees' coverage under this permit terminates at midnight on the submission date of the NOT.[Minn. R. 7090]
4.4 Permittees may terminate permit coverage prior to completion of all construction activity if they meet all of the following conditions:
a. construction activity has ceased for at least 90 days; and
b. at least 90 percent (by area) of all originally proposed construction activity has been completed and permanent cover has been established on those areas; and
c. on areas where construction activity is not complete, permanent cover has been established; and
d. the site complies with item 13.3 through 13.7.
After permit coverage is terminated under this item, any subsequent development on the remaining portions of the site will require permit coverage if the subsequent development itself or as part of the remaining common plan of development or sale will result in land disturbing activities of one (1) or more acres in size. [Minn. R. 7090]
4.5 Permittees may terminate coverage on less than MPCA approval after submitting information documenting the owner cancelled the project. [Minn. R. 7090]
5.1 Stormwater Pollution Prevention Plan (SWPPP) Content. [Minn. R. 7090]
5.2 The owner must develop and implement a SWPPP. The SWPPP must include items 5.3 through 5.26. [Minn. R. 7090]
5.3 The SWPPP must incorporate specific Best Management Practices (BMP) used to comply with the requirements of this permit. [Minn. R. 7090]
5.4 The SWPPP must include a narrative describing the timing for installation of all erosion prevention and sediment control BMPs and a description of the permanent stormwater treatment system. [Minn. R. 7090]
5.5 The SWPPP must include the location and type of all temporary and permanent erosion prevention and sediment control BMPs along with procedures used to establish additional temporary BMPs as necessary for the site conditions during construction. Standard details and/or specifications for BMPs must be included in the final plans and specifications for the project. [Minn. R. 7090]
5.6 The SWPPP must include the calculations and other information used for the design of temporary sediment basins and any of the permanent stormwater treatment systems required in Section 15. [Minn. R. 7090]
5.7 The SWPPP must include estimated quantities anticipated at the start of the project for the life of the project for all erosion prevention and sediment control BMPs (e.g., linear feet of silt fence or square feet of erosion control blanket). [Minn. R. 7090]
5.8 The SWPPP must include the number of acres of impervious surface for both pre- and post-construction. [Minn. R. 7090]
5.9 The SWPPP must include a site map with existing and final grades, including drainage area boundaries, directions of flow and all discharge points where stormwater is leaving the site or entering a surface water. The site map must indicate the areas of steep slopes. The site map must also include impervious surfaces, soil types and locations of potential pollutant-generating activities as identified in Section 12. [Minn. R. 7090]
5.10 The SWPPP must include a map of all surface waters, existing wetlands, and stormwater ponds or basins that can be identified on maps such as United States Geological Survey 7.5-minute quadrangle maps, the National Wetland Inventory map or equivalent maps and are within one mile (aerial radius measurement) from the project boundaries that will receive stormwater from the construction site, during or after construction. The SWPPP must identify if the surface waters are special or impaired waters. [Minn. R. 7090]
5.11 The SWPPP must include a site map showing construction activity areas that are adjacent to and drain to Public Waters for which the DNR has promulgated "work in water restrictions" during specified fish spawning time frames. [Minn. R. 7090]
5.12 Permittees must identify locations of 50' buffer zones as required in item 9.17 and 100' permanent buffer zones as required in item 23.11, on plan sheets in the SWPPP. [Minn. R. 7090]
5.13 If permittees determine compliance with the following requirements is infeasible, they must document the determination in the SWPPP:
a. temporary sediment basins as described in Section 14; and
b. for linear projects, if the permanent stormwater treatment system cannot be constructed within the right-of-way, a reasonable attempt must be made to obtain additional right-of-way [item 15.9); and
c. buffer zones as described in item 9.17 and item 23.11. [Minn. R. 7090]
5.14 If permittees determine that a temporary sediment basin is infeasible as described in item 14.10, the SWPPP must describe the alternative BMPs used. [Minn. R. 7090]
5.15 Where permittees cannot meet the full volume reduction requirement on-site, (e.g., the site has infiltration prohibitions, see item 16.14 through item 16.21) the permittee must document the reasons in the SWPPP. [Minn. R. 7090]
5.16 The SWPPP must include any stormwater mitigation measures proposed to be part of the final project in any environmental review document, endangered species review, archeological or other required local, state or federal review conducted for the project. For purposes of this permit, mitigation measures mean actions necessary to avoid, minimize, or mitigate for impacts related to erosion prevention, sediment control, the permanent stormwater treatment system, pollution prevention management measures and discharges associated with the project's construction activity. [Minn. R. 7090]
5.17 The SWPPP must describe the methods used for permanent cover of all exposed soil areas. [Minn. R. 7090]
5.18 Permittees must identify the locations of areas where construction will be phased to minimize the duration of exposed soil areas in the SWPPP. [Minn. R. 7090]
5.19 For projects with a discharge point on the project within one (1) mile (aerial radius measurement) of and which flows to an impaired water, permittees must identify the impaired water(s), and any United States Environmental Protection Agency (USEPA)-approved Total Maximum Daily Load (TMDL) for the pollutant(s) or stressor(s) described in item 23.7. Permittees' identification must include those TMDLs approved at any time prior to permit application submittal and are still in effect. [Minn. R. 7090]
5.20 Permittees must document in the SWPPP, all trained individuals identified in item 21.2. Documentation must include:
a. names of personnel required to be trained; and
b. dates of training and name of instructor(s) and entity providing training; and
c. content of training course.
If permittees do not know the names of the individuals at the time of application, permittees must ensure they document training before construction activity commences. [Minn. R. 7090]
5.21 The SWPPP must identify a person knowledgeable and experienced in the application of erosion prevention and sediment control BMPs who will coordinate with all contractors, subcontractors, and operators on-site to oversee the implementation of the SWPPP. [Minn. R. 7090]
5.22 The SWPPP must describe any specific chemicals and chemical treatment systems used for enhancing the sedimentation process and how it achieves compliance with item 9.19. [Minn. R. 7090]
5.23 The SWPPP must identify the person(s), organizations, or entities responsible for long-term operation and maintenance of permanent stormwater treatment systems. [Minn. R. 7090]
5.24 The SWPPP must describe methods to minimize soil compaction and preserve topsoil. Minimizing soil compaction is not required where the function of a specific area dictates compaction. [Minn. R. 7090]
5.25 The SWPPP must include any site assessments for groundwater or soil contamination required in item 16.15.[Minn. R. 7090]
5.26 The SWPPP must account for the following factors in designing temporary erosion prevention and sediment control BMPs:
a. the expected amount, frequency, intensity, and duration of precipitation; and
b. the nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features; and
c. the stormwater volume, velocity, and peak flowrates to minimize discharge of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and
d. the range of soil particle sizes expected to be present. [Minn. R. 7090]
6.1 SWPPP Amendments. [Minn. R. 7090]
6.2 One of the individuals described in item 21.2.a or item 21.2.b or another qualified individual must complete all SWPPP changes. Changes involving the use of a less stringent BMP must include a justification describing how the replacement BMP is effective for the site characteristics. [Minn. R. 7090]
6.3 Permittees must amend the SWPPP within 7 days to include additional or modified BMPs whenever there is a change in design, construction, operation, maintenance, weather or seasonal conditions having a significant effect on the discharge of pollutants to surface waters or groundwater. [Minn. R. 7090]
6.4 Permittees must amend the SWPPP within 7 days to include additional or modified BMPs whenever inspections or investigations by the site owner or operator, USEPA or MPCA officials indicate the SWPPP is not effective in eliminating or significantly minimizing the discharge of pollutants to surface waters or groundwater or the discharges are causing water quality standard exceedances (e.g., nuisance conditions as defined in Minn. R. 7050.0210, subp. 2) or the SWPPP is not consistent with the objectives of a USEPA approved TMDL. [Minn. R. 7050.0210]
7.1 BMP Selection and Stormwater Management. [Minn. R. 7090]
7.2 Permittees must select, install, and maintain the BMPs identified in the SWPPP and in this permit in an appropriate and functional manner and in accordance with relevant manufacturer specifications and accepted engineering practices to minimize the discharge of pollutants in stormwater from construction activities. Examples of stormwater management practices for this section include but are not limited to wet sedimentation basins, temporary depressions to hold stormwater, stormwater routing, dikes, berms, pumping, and stormwater treatment BMPs. Permittees must phase and incorporate stormwater management principles as the construction progresses. Unless infeasible, temporary or permanent wet sedimentation basins (when required, see section 14 and 15) should be constructed as a first step in the process and stormwater routed to these. [Minn. R. 7090]
7.3 Permittees must not disturb more land (i.e., phasing) than can be effectively inspected and maintained in accordance with Section 11. [Minn. R. 7090]
7.4 If permittees will be using some type of erosion control netting on the site as part of the soil stabilization techniques, permittees are encouraged to use products that have been shown to minimize impacts on wildlife. The U.S. Fish & Wildlife Service recommends using types of netting practices that are considered "wildlife friendly," including those that use natural fiber or 100 percent biodegradable materials and that use a loose weave with a non-welded, movable grid netting. Products that are not wildlife friendly include square plastic netting that are degradable (e.g., photodegradable, UV-degradable, oxo-degradable), netting made from polypropylene, nylon, polyethylene, or polyester. Other recommendations include removing the netting product when it is no longer needed. More information may be found at: https://www.fws.gov/midwest/endangered/ecoservices/documents/WildlifeFriendlyErosionControlFactSheet.pdf or property edge. Permittees must complete stabilization of remaining portions of temporary or permanent ditches or swales within 14 calendar days (7 days for sites discharging to special or impaired waters, see section 24) after connecting to a surface water or property edge and construction in that portion of the ditch temporarily or permanently ceases. [Minn. R. 7090]
7.5 Temporary or permanent ditches or swales being used as a sediment containment system during construction (with properly designed rock-ditch checks, bio rolls, silt dikes, etc.) do not need to be stabilized. Permittees must stabilize these areas within 24 hours after their use as a sediment containment system ceases. [Minn. R. 7090]
8.8 Permittees must not use mulch, hydromulch, tackifier, polyacrylamide or similar erosion prevention practices within any portion of the normal wetted perimeter of a temporary or permanent drainage ditch or swale section with a continuous slope of greater than 2 percent. Examples of acceptable erosion prevention practices include blankets, poly, riprap, etc. [Minn. R. 7090]
8.9 Permittees must provide temporary or permanent energy dissipation at all pipe outlets within 24 hours after connection to a surface water or permanent stormwater treatment system. [Minn. R. 7090]
9.1 Sediment Control Practices. [Minn. R. 7090]
9.2 Permittees must establish sediment control BMPs on all downgradient perimeters of the site and downgradient areas of the site that drain to any surface water, including curb and gutter systems. Permittees must locate sediment control practices upgradient of any buffer zones. Permittees must establish sediment control BMPs on any upgradient land-disturbing activities begin and must keep the sediment control practices in place until they establish permanent cover. [Minn. R. 7090]
9.3 If downgradient sediment controls are overloaded, based on frequent failure or excessive maintenance requirements, permittees must install additional upgradient sediment control practices or other practices to eliminate the overloading and amend the SWPPP to identify these additional practices as required in item 6.3. [Minn. R. 7090]
9.4 Temporary or permanent drainage ditches and sediment basins designed as part of a sediment containment system (e.g., ditches with rock-check dams) require sediment control practices only as appropriate for site conditions. [Minn. R. 7090]
9.5 A floating silt curtain placed in the water is not a sediment control BMP to satisfy item 9.2 except when working on a shoreline or below the waterline. Immediately after the construction activity (e.g., installation of rip rap along the shoreline) in that area is complete, permittees must install an upland perimeter control practice if exposed soils still drain to a surface water. [Minn. R. 7090]
9.6 Permittees must re-install all sediment control practices adjusted or removed to accommodate short-term activities such as clearing or grubbing, or passage of vehicles, immediately after the short-term activity is completed. Permittees must re-install sediment control practices before the next precipitation event even if the short-term activity is not complete. [Minn. R. 7090]
9.7 Permittees must protect all storm drain inlets using appropriate BMPs during construction until they establish permanent cover on all areas with potential for discharging to the inlet. [Minn. R. 7090]
9.8 Permittees may remove inlet protection for a particular inlet if a specific safety concern (e.g. street flooding/freezing) is identified by the permittees or the jurisdictional authority (e.g., city/county/township/Minnesota Department of Transportation engineer). Permittees must document the need for removal in the SWPPP. [Minn. R. 7090]
9.9 Permittees must provide silt fence or other effective sediment controls at the base of stockpiles on the downgradient perimeter prior to the initiation of stockpiling. Sediment controls must be managed in accordance with section 9.6. [Minn. R. 7090]
9.10 Permittees must locate stockpiles outside of natural buffers or surface waters, including stormwater conveyances such as curb and gutter systems unless there is a bypass in place for the stormwater. [Minn. R. 7090]
9.11 Permittees must install a vehicle tracking BMP to minimize the track out of sediment from the construction site or onto paved roads within the site. [Minn. R. 7090]
9.12 Permittees must use street sweeping in addition to vehicle tracking BMPs if vehicle tracking BMPs alone are not adequate to prevent sediment tracking onto the street. [Minn. R. 7090]
9.13 Permittees must install temporary sediment basins as required in Section 14. [Minn. R. 7090]
9.14 In any areas of the site where final vegetative stabilization will occur, permittees must restrict vehicle and equipment use to minimize soil compaction. [Minn. R. 7090]
9.15 Permittees must preserve topsoil on the site, unless infeasible. [Minn. R. 7090]
9.16 Permittees must direct discharges from BMPs to vegetated areas unless infeasible. [Minn. R. 7090]
9.17 Permittees must preserve a 50-foot natural buffer or, if a buffer is infeasible on the site, provide redundant (double) perimeter sediment controls when a surface water is located within 50 feet of the project's earth disturbances and stormwater flows to the surface water. Permittees must install perimeter sediment controls at least 5 feet apart unless limited by lack of available space. Natural buffers are not required adjacent to road ditches, judicial ditches, county ditches, stormwater conveyance channels, storm drain inlets, and sediment basins. If preserving the buffer is infeasible, permittees must document the reasons in the SWPPP. Sheet piling and other impermeable barriers installed in a manner that retains all stormwater are considered redundant perimeter control. [Minn. R. 7090]
9.18 Any sediment control made of soil must be temporarily or permanently stabilized within 24 hours. [Minn. R. 7090]
9.19 Permittees must use polymers, flocculants, or other sedimentation chemicals in accordance with accepted engineering practices, dosing specifications and sediment removal design specifications provided by the manufacturer or supplier. The permittees must use conventional erosion and sediment controls prior to chemical addition and must direct treated stormwater to a sediment control system for filtration or settlement of the floc prior to discharge. [Minn. R. 7090]
10.1 Dewatering and Basin Draining. [Minn. R. 7090]
10.2 Permittees must not cause nuisance conditions (see Minn. R. 7050.0210, subp. 2) in surface waters from dewatering and basin draining (e.g., pumped discharges, trench/ditch cuts for drainage) discharges. Permittees must discharge turbid or sediment-laden waters related to dewatering or basin draining to a sediment control (e.g. sediment trap or basin, filter bag) designed to prevent discharges with visual turbidity. To the extent feasible, use well-vegetated (e.g., grassy or wooded), upland areas of the site to infiltrate dewatering water before discharge. Permittees are prohibited from using receiving waters as part of the treatment area. Permittees must visually check and photograph the discharge at the beginning and at least once every 24 hours of operation to ensure adequate treatment has been obtained and nuisance conditions will not result from the discharge. [Minn. R. 7050.0210]
10.3 If nuisance conditions result from the discharge, Permittees must cease dewatering immediately and corrective actions must occur before dewatering is resumed. Nuisance conditions includes, but is not limited to, a sediment plume in the discharge or the discharge appears cloudy, or opaque, or has a visible oil film, or has aquatic habitat degradation that can be identified by an observer. [Minn. R. 7050.0210]
10.4 If permittees must discharge water containing oil or grease, they must use an oil-water separator or suitable filtration device (e.g., cartridge filters, absorbents pads) prior to discharge. [Minn. R. 7090]
10.5 Permittees must discharge all water from dewatering or basin-draining activities in a manner that does not cause erosion or scour in the immediate vicinity of discharge points or inundation of wetlands in the immediate vicinity of discharge points that causes significant adverse impact to the wetland. [Minn. R. 7090]
10.6 If permittees use filters with backwash water, they must haul away the backwash water away for disposal, return the backwash water to the beginning of the treatment process, or incorporate the backwash water into the site in a manner that does not cause erosion. [Minn. R. 7090]
11.1 Inspections and Maintenance. [Minn. R. 7090]
11.2 Permittees must ensure a trained person, as identified in item 21.2.b, will inspect the entire construction site at least once every seven (7) days during active construction and within 24 hours after a rainfall event greater than 1/2 inch in 24 hours. [Minn. R. 7090]
11.3 Permittees must inspect and maintain all permanent stormwater treatment BMPs. [Minn. R. 7090]
11.4 Permittees must inspect all erosion prevention and sediment control BMPs and Pollution Prevention Management Measures to ensure integrity and effectiveness. Permittees must repair, replace or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery unless another time frame is specified in item 11.5 or 11.6. Permittees may take additional time if field conditions prevent access to the area. [Minn. R. 7090]
11.5 During each inspection, permittees must inspect areas adjacent to the project, surface waters, including drainage ditches and conveyance systems but not curb and gutter systems, for evidence of erosion and sediment deposition. Permittees must remove all deltas and sediment deposited in areas adjacent to the project, surface waters, including drainage ways, catch basins, and other drainage systems and restabilize the areas where sediment removal results in exposed soil. Permittees must complete removal and stabilization within seven (7) calendar days of discovery unless precluded by legal, regulatory, or physical access constraints. Permittees must use all reasonable efforts to obtain access. If precluded, removal and stabilization must take place within seven (7) days of obtaining access. Permittees are responsible for contacting all local, regional, state and federal authorities and receiving any applicable permits, prior to conducting any work in surface waters. [Minn. R. 7090]
11.6 Permittees must inspect construction site vehicle exit locations, streets and curb and gutter systems within and adjacent to the project for sedimentation from erosion or tracked sediment from vehicles. Permittees must remove sediment from all paved surfaces within one (1) calendar day of discovery or, if applicable, within a shorter time to avoid a safety hazard to users of public streets. [Minn. R. 7090]
11.7 Permittees must repair, replace or supplement all perimeter control devices when they become nonfunctional or the sediment reaches 1/2 of the height of the device. [Minn. R. 7090]
11.8 Permittees must inspect temporary and permanent sediment basins and remove the sediment when the depth of sediment collected in the basin reaches 1/2 the storage volume within 72 hours of discovery. [Minn. R. 7090]
11.9 Permittee's must inspect and photograph dewatering discharges at the beginning and at least once every 24 hours during operation. Dewatering discharges that only last for minutes, as opposed to hours, and do not reach a surface water, do not require photographs or documentation. [Minn. R. 7090]
11.10 Permittees must ensure that at least one individual present on the site (or available to the project site in three (3) calendar days) is trained in the job duties described in item 21.2.b. [Minn. R. 7090]
11.11 Permittees may adjust the inspection schedule described in item 11.2 as follows:
a. inspections of areas with permanent cover can be reduced to once per month, even if construction activity continues on other portions of the site; or
b. where sites have permanent cover on all exposed soil and no construction activity is occurring anywhere on the site, inspections can be reduced to once per month and, after 12 months, may be suspended completely until construction activity resumes. The MPCA may require inspections to resume if conditions warrant; or
c. where construction activity has been suspended due to frozen ground conditions, inspections may be suspended. Inspections must resume within 24 hours of runoff occurring, or upon resuming construction, whichever comes first.
d. for grading projects that leave agricultural land or native prairie type vegetated areas undisturbed, inspections may be reduced to once per month if the site has temporary vegetation with a density of 70% temporary uniform cover. If after 24 months no significant erosion problems are observed, inspections may be suspended completely until the termination requirements in section 13 have been met. [Minn. R. 7090]
11.12 Permittees must document all inspections and maintenance activities within 24 hours of being conducted and these records must be retained with the SWPPP. These records must include:
a. date and time of inspections; and
b. name of persons conducting inspections; and
c. actual findings of inspections, including the specific location where corrective actions are needed; and
d. corrective actions taken (including dates, times, and party completing maintenance activities); and
e. date of all rainfall events greater than 1/2 inches in 24 hours, and the amount of rainfall for each event. Permittees must obtain rainfall amounts by either a properly maintained rain gauge installed on-site, a weather station that is within one (1) mile of your location, a weather reporting system that provides site specific rainfall data from radar summaries; and
f. if permittees observe a discharge during the inspection, they must record and should photograph and describe the location of the discharge (i.e., color, odor, settled or suspended solids, oil sheen, and other obvious indicators of pollutants); and
g. any amendments to the SWPPP proposed as a result of the inspection must be documented as required in Section 6 within seven (7) calendar days; and
h. all photographs of dewatering activities and documentation of nuisance conditions resulting from dewatering activities as described in section 10. [Minn. R. 7090]
12.1 Pollution Prevention Management Measures. [Minn. R. 7090]
12.2 Permittees must place construction materials and landscape materials under cover (e.g., plastic sheeting or temporary days) or protect them by similarly effective means designed to minimize contact with stormwater. Permittees are not required to cover or protect products which are either not a source of contamination to stormwater or are designed to be exposed to stormwater. [Minn. R. 7090]
12.3 Permittees must place pesticides, fertilizers and treatment chemicals under cover (e.g., plastic sheeting or temporary roofs) or protect them by similarly effective means designed to minimize contact with stormwater. [Minn. R. 7090]
12.4 Permittees must store hazardous materials and toxic waste, (including oil, diesel fuel, gasoline, hydraulic fluids, paint solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids) in sealed containers to prevent spills, leaks or other discharge. Storage and disposal of hazardous waste materials must be in compliance with Minn. R. ch. 7045 including secondary containment as applicable. [Minn. R. 7090]
12.5 Permittees must properly store, collect and dispose solid waste in compliance with Minn. R. ch. 7035. [Minn. R. 7035]
12.6 Permittees must properly operate and maintain portable toilets so they are secured and will not tip or be knocked over. Permittees must properly dispose sanitary waste in accordance with Minn. R. ch. 7041. [Minn. R. 7041]
12.7 Permittees must take reasonable steps to prevent the discharge of spilled or leaked chemicals, including fuel, from any area where chemicals or fuel will be loaded or unloaded including the use of drip pans or absorbents unless infeasible. Permittees must ensure adequate supplies are available at all times to clean up discharged materials and that an appropriate disposal method is available for recovered spilled materials. Permittees must report and clean up spills immediately as required by Minn. Stat. 115.061, using dry clean up measures where possible. [Minn. Stat. 115.061]
12.8 Permittees must properly operate and maintain all vehicles and equipment to a defined area of the site. Permittees must contain runoff from the washing area in a sediment basin or other similarly effective controls and must dispose waste from the washing activity properly. Permittees must properly use and store soaps, detergents, or solvents. [Minn. R. 7090]
12.9 Permittees must provide effective containment for all liquid and solid wastes generated by washout operations (e.g., concrete, stucco, paint with latex additives, form release oils, curing compounds and other construction materials) related to the construction activity. Permittees must prevent liquid and solid washout wastes from contacting the ground and must design the containment so it does not result in runoff from the washout operations or areas. Permittees must properly dispose liquid and solid wastes in compliance with MPCA rules. Permittees must install a sign indicating the location of the washout facility. [Minn. R. 7035; Minn. R. 7090]
13.1 Permit Termination Conditions. [Minn. R. 7090]
13.2 Permittees must complete all construction activity and must install permanent cover over all areas prior to submitting the NOT. Vegetative cover must consist of a uniform perennial vegetation with a density of 70 percent of its expected final growth Vegetation is not required where the function of a specific area dictates no vegetation, such as impervious surfaces or the base of a sand filter. [Minn. R. 7090]
13.3 Permittees must clean the permanent stormwater treatment system of any accumulated sediment and must ensure the system meet all design requirements in Section 15 through 19 and is operating as designed. [Minn. R. 7090]
13.4 Permittees must remove all sediment from conveyance systems prior to submitting the NOT. [Minn. R. 7090]
13.5 Permittees must remove all temporary synthetic erosion prevention and sediment control BMPs prior to submitting the NOT. Permittees may leave BMPs designed to decompose on-site in place. [Minn. R. 7090]
13.6 For residential construction only, permit coverage terminates on individual lots if the lot is sold to the homeowner, structures are finished, and permanent cover has been established. For lots that are sold to the homeowner where permanent cover has not been established, coverage terminates if temporary erosion prevention and downgradient perimeter control is properly installed and the permittee distributes the MPCA's "Homeowner Fact Sheet" to the homeowner. [Minn. R. 7090]
13.7 For construction projects on agricultural land (e.g., pipelines across cropland), permittees must return the disturbed land to its preconstruction agricultural use prior to submitting the NOT. [Minn. R. 7090]
13.8 When submitting the NOT, Permittees must include either ground or aerial photographs showing the requirements of 13.2 have been met. Permittees must keep photographs of every distinct part of the site, however the photographs do not have to be portrayed must be substantially similar to those areas that are not photographed. Photographs must be clear and in focus and must include the date the photo was taken. [Minn. R. 7090]
14.1 Temporary Sediment Basins. [Minn. R. 7090]
14.2 Where ten (10) or more acres of disturbed soil (5 acres for sites discharging to special or impaired waters, see section 24) drain to a common location, permittees must provide a temporary sediment basin to provide treatment of the runoff before it leaves the construction site or enters surface waters. Permittees may convert a temporary sediment basin to a permanent basin after construction is complete. The temporary basin is no longer required when permanent cover has reduced the acreage of disturbed soil to less than ten (10) acres draining to a common location. [Minn. R. 7090]
14.3 The temporary basin must provide live storage for a calculated volume of runoff from a two (2)-year, 24-hour storm from each acre drained to the basin or 1,800 cubic feet of live storage per acre drained, whichever is greater. [Minn. R. 7090]
14.4 Where permittees have calculated the two (2)-year, 24-hour storm runoff amount, the temporary basin must provide 3,600 cubic feet of live storage per acre of the basins' drainage area. [Minn. R. 7090]
14.5 Permittees must design basin outlets to prevent short-circuiting and the discharge of floating debris. [Minn. R. 7090]
14.6 Permittees must design the outlet structure to withdraw water from the surface to minimize the discharge of pollutants. Permittees may temporarily suspend the use of a surface withdrawal method during frozen conditions. The basin must include a stabilized emergency overflow to prevent failure of pond integrity. [Minn. R. 7090]
14.7 Permittees must provide energy dissipation for the basin outlet within 24 hours after connection to a surface water. [Minn. R. 7090]
14.8 Permittees must locate temporary basins outside of surface waters and any buffer zone required in item 23.11.[Minn. R. 7090]
14.9 Permittees must construct the temporary basins prior to disturbing 10 or more acres of soil draining to a common location. [Minn. R. 7090]
14.10 Where a temporary sediment basin meeting the requirements of item 14.3 through 14.9 is infeasible, permittees must install effective sediment controls such as smaller sediment basins and/or sediment traps, silt fences, vegetative buffer strips or any appropriate combination of measures as dictated by individual site conditions. In determining whether installing a sediment basin is infeasible, permittees must consider public safety and may consider factors such as site soils, slope, and available area on-site. Permittees must document this determination of infeasibility in the SWPPP.[Minn. R. 7090]
15.1 Permanent Stormwater Treatment System. [Minn. R. 7090]
15.2 Permittees must design and implement the project so all stormwater discharged from the project during and after construction activities does not cause a violation of state water quality standards, including nuisance conditions, erosion in receiving channels or on downslope properties, or a significant adverse impact to wetlands caused by inundation or decrease of flow. [Minn. R. 7090]
15.3 Permittees must design and construct a permanent stormwater treatment system to treat the water quality volume if the project's ultimate development replaces vegetation and/or other pervious surfaces creating a net increase of one (1) or more acres of cumulative impervious surface. [Minn. R. 7090]
15.4 Permittees must calculate the water quality volume as one (1) inch times the net increase of impervious surfaces created by the project. [Minn. R. 7090]
15.5 Permittees must first consider volume reduction practices on-site (e.g., infiltration or other) when designing the permanent stormwater treatment system. If this permit prohibits infiltration as described in item 16.14 through item 16.21, permittees may consider a wet sedimentation basin, filtration basin or regional pond. This permit does not consider wet sedimentation basins and filtration systems to be volume reduction practices. [Minn. R. 7090]
15.6 For projects where the full volume reduction requirement cannot be met on-site, (e.g., the site has infiltration prohibitions), permittees must document the reasons in the SWPPP. [Minn. R. 7090]
15.7 Permittees must discharge the water quality volume to a permanent stormwater treatment system prior to discharge to a surface water. For purposes of this item, surface waters do not include man-made drainage systems that convey stormwater to a permanent stormwater treatment system. [Minn. R. 7090]
15.8 Where the proximity to bedrock precludes the installation of any of the permanent stormwater treatment practices required by Sections 15 through 19, permittees must install other treatment such as grassed swales, smaller ponds, or grit chambers, prior to the discharge of stormwater to surface waters. [Minn. R. 7090]
15.9 For linear projects where permittees cannot treat the entire water quality volume within the existing right-of-way, permittees must make a reasonable attempt to obtain additional right-of-way, easement or other permission for stormwater treatment during the project planning process. Documentation of these attempts must be in the SWPPP. Permittees must still consider volume reduction practices first as described in item 15.5. If permittees cannot obtain additional right-of-way, easement or other permission, they must maximize the treatment of the water quality volume prior to discharge to surface waters. [Minn. R. 7090]
16.1 Infiltration Systems. [Minn. R. 7090]
16.2 Infiltration options include, but are not limited to: infiltration basins, infiltration trenches, rainwater gardens, bioretention areas without underdrains, swales with impermeable check dams, and natural depressions. If permittees utilize an infiltration system to meet the requirements of this permit, they must incorporate the design parameters in item 16.3 through item 16.21. Permittees must follow the infiltration prohibition in item 16.14 anytime an infiltration system is designed, installed, or implemented on the project site. [Minn. R. 7090]
16.3 Permittees must design infiltration systems such that pre-existing hydrologic conditions of wetlands in the vicinity are not impacted (e.g., inundation or breaching a perched water table supporting a wetland). [Minn. R. 7090]
16.4 Permittees must not excavate infiltration systems to final grade, or within three (3) feet of final grade, until the contributing drainage area is completely stabilized and fully stabilize the contributing drainage area unless they provide rigorous erosion prevention and sediment controls (e.g., diversion berms) to keep sediment and runoff completely away from the infiltration area. [Minn. R. 7090]
16.5 When excavating an infiltration system to within three (3) feet of final grade, permittees must stake



Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
MACHINE SLICED SILT FENCE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-1

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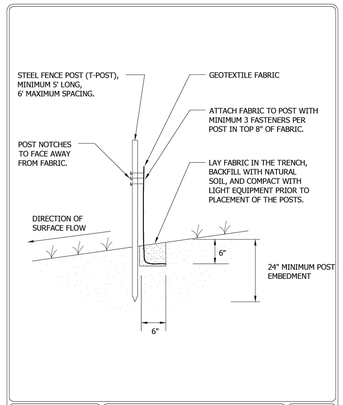


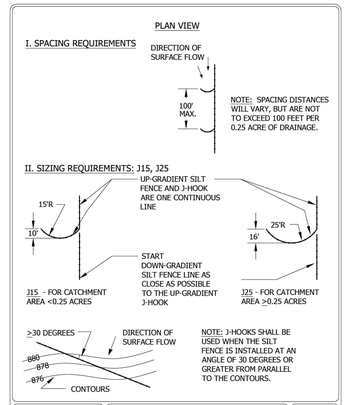
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
HAND INSTALLED SILT FENCE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-2

4B_ERO2.DWG



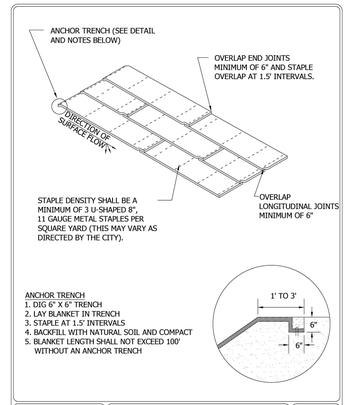
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
J-HOOK SILT FENCE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-4

4B_ERO4.DWG



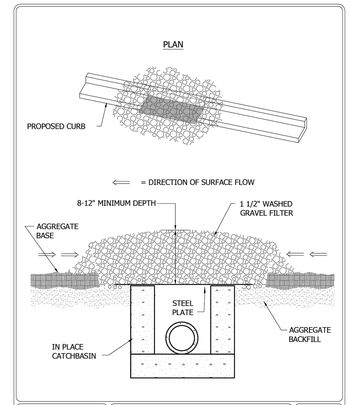
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
ROLLED EROSION PREVENTION PRODUCTS INSTALLATION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-5

4B_ERO5.DWG



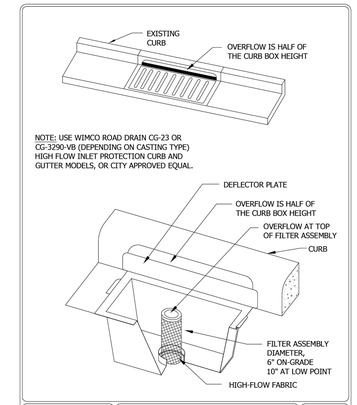
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
INLET PROTECTION ROCK FILTER FOR CATCH BASIN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-8

4B_ERO8.DWG



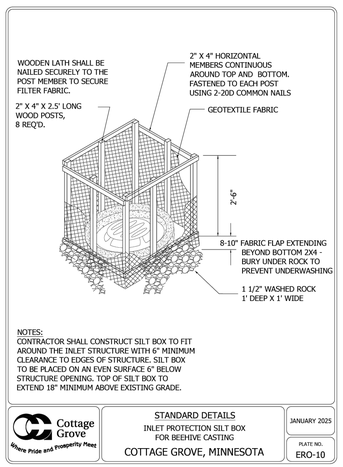
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
INLET PROTECTION CATCH BASIN INSERT
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-9

4B_ERO9.DWG



NOTES:
CONTRACTOR SHALL CONSTRUCT SILT BOX TO FIT AROUND THE INLET STRUCTURE WITH 6" MINIMUM CLEARANCE TO EDGES OF STRUCTURE. SILT BOX TO BE PLACED ON AN EVEN SURFACE 6" BELOW STRUCTURE OPENING. TOP OF SILT BOX TO EXTEND 18" MINIMUM ABOVE EXISTING GRADE.

Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
INLET PROTECTION SILT BOX FOR BEEHIVE CASTING
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-10

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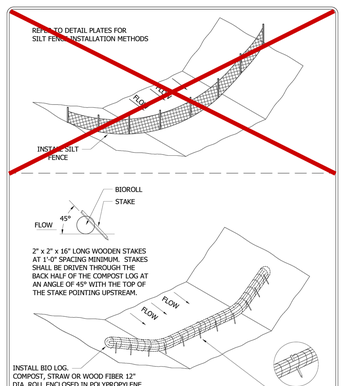


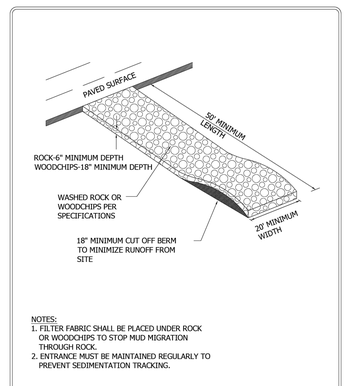
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
FILTER BERMS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-11

4B_ERO11.DWG



NOTES:
1. FILTER FABRIC SHALL BE PLACED UNDER ROCK OR WOODCHIPS TO STOP MUD MIGRATION THROUGH ROCK.
2. ENTRANCE MUST BE MAINTAINED REGULARLY TO PREVENT SEDIMENTATION TRACKING.

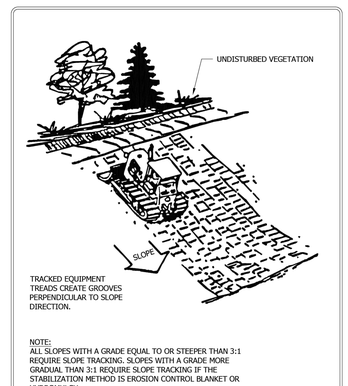
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONSTRUCTION ENTRANCE ROCK AND WOODCHIP
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-12

4B_ERO12.DWG



NOTE:
ALL SLOPES WITH A GRADE EQUAL TO OR STEEPER THAN 3:1 REQUIRE SLOPE TRACKING. SLOPES WITH A GRADE MORE GRADUAL THAN 3:1 REQUIRE SLOPE TRACKING IF THE STABILIZATION METHOD IS EROSION CONTROL BLANKET OR HYDROMULCH.

Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SLOPE TRACKING
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. ERO-13

4B_ERO13.DWG

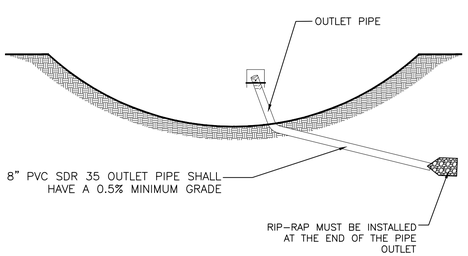
The basins must provide storage below the outlet pipe for a calculated volume of runoff from a 2 year, 24 hour storm from each acre drained to the basin, except that in no case shall the basin provide less than 1800 cubic feet of storage below the outlet pipe from each acre drained to the basin.

2. Where no such calculation has been performed, a temporary sediment basin providing 3,600 cubic feet of storage below the outlet pipe per acre drained tothe basin, shall be provided where attainable until final stabilization of the site.

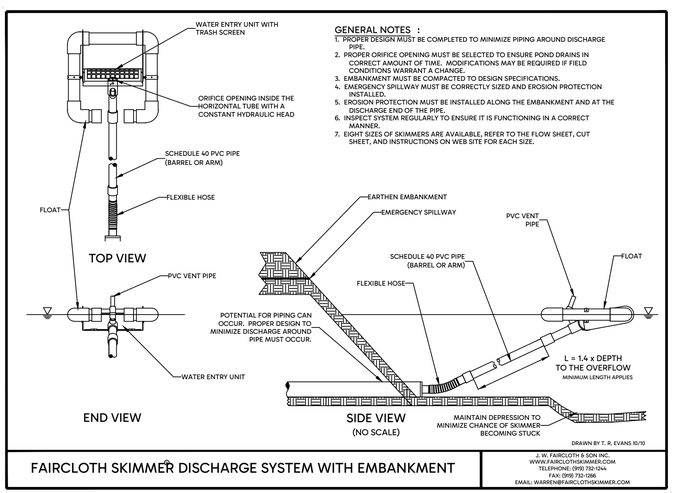
3. Temporary basin outlets must be designed to prevent short–circuiting and the discharge of floating debris. The basin must be designed with the ability to allow complete basin drawdown for maintenance activities, and provide a stabilized emergency overflow to prevent failure of pond integrity. Energy dissipation must be provided for the basin outlet.

4. The temporary basins must be constructed and made operational concurrent with the start of soil disturbance that is upgradient of the area and contributes runoff to the pond.

5. Outlet pipe must be installed with a floating head skimmer or equal – to allow complete basin drawdown and water withdraw from basin surface.



TEMPORARY SEDIMENTATION BASIN WITH OUTLET PIPE



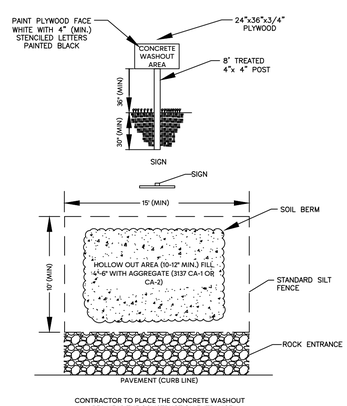
GENERAL NOTES :
1. PROPER DESIGN MUST BE COMPLETED TO MINIMIZE PIPING AROUND DISCHARGE PIPE.
2. PROPER ORIFICE OPENING MUST BE SELECTED TO ENSURE POND DRAINS IN CORRECT AMOUNT OF TIME. MODIFICATIONS MAY BE REQUIRED IF FIELD CONDITIONS WARRANT A CHANGE.
3. EMBANKMENT MUST BE COMPACTED TO DESIGN SPECIFICATIONS.
4. EMERGENCY SPILLWAY MUST BE CORRECTLY SIZED AND EROSION PROTECTION INSTALLED.
5. EROSION PROTECTION MUST BE INSTALLED ALONG THE EMBANKMENT AND AT THE DISCHARGE END OF THE PIPE.
6. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER.
7. EIGHT SIZES OF SKIMMERS ARE AVAILABLE, REFER TO THE FLOW SHEET, CUT SHEET, AND INSTRUCTIONS ON WEB SITE FOR EACH SIZE.

FAIRCLOTH SKIMMER® DISCHARGE SYSTEM WITH EMBANKMENT

J. W. FAIRCLOTH & SON INC.
WWW.FAIRCLOTHSKIMMER.COM
TELEPHONE: (919) 732-1244
FAX: (919) 732-1266
EMAIL: WARREN@FAIRCLOTHSKIMMER.COM

DRAWN BY T. R. EVANS 10/10

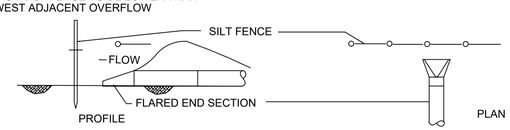
FLOATING HEAD SKIMMER



CONTRACTOR TO PLACE THE CONCRETE WASHOUT AREA NEAR THE CONSTRUCTION ENTRANCE

CONCRETE WASHOUT AREA

SILT FENCE AT FLARED END SECTION
TOP OF SILT FENCE TO BE LOWER THAN LOWEST ADJACENT OVERFLOW



INLET PROTECTION - FLARED END SECTION

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

PRELIMINARY

KURT D. QUAINTANCE, P.E.

Date: 01/28/2026 Reg.No. 24670

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY EROSION & SEDIMENT CONTROL DETAILS
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 ERD

PROJECT NO.
24310-00

C3.6

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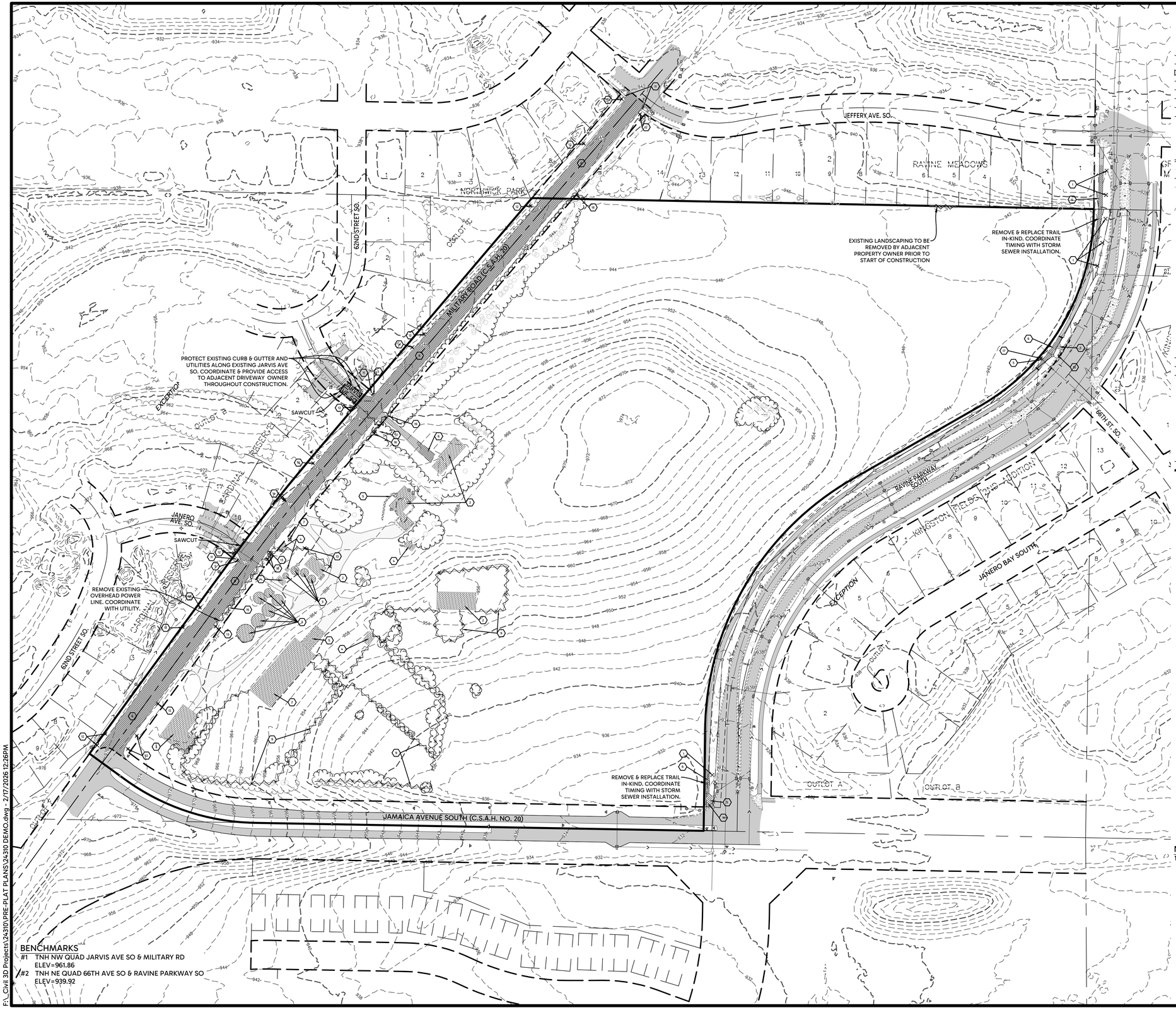

LEGEND

- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING UNDERGROUND GAS
- EXISTING UNDERGROUND ELECTRIC
- EXISTING UNDERGROUND TELEPHONE
- EXISTING UNDERGROUND FIBER OPTIC
- EXISTING OVERHEAD POWER LINE
- EXISTING LIGHT POLE
- EXISTING TRANSFORMER
- EXISTING TELEPHONE PEDESTAL
- EXISTING TV PEDESTAL
- EXISTING CURB & GUTTER
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING CONTOUR
- EXISTING SOIL BORING/TEST PIT LOCATION
- EXISTING TREELINE
- EXISTING AIR CONDITIONER
- EXISTING CLEANOUT
- EXISTING CURB STOP
- EXISTING ELECTRIC METER
- EXISTING ELECTRIC OUTLET POST
- EXISTING GAS METER
- EXISTING GAS VALVE
- EXISTING GUY WIRE
- EXISTING GUY WIRE POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING PROPANE TANK
- EXISTING SIGN
- EXISTING WELL
- EXISTING EMERGENCY SIREN
- EXISTING OVERHEAD POWER
- EXISTING OVERHEAD UTILITY
- EXISTING UNDERGROUND TELEVISION
- EXISTING ASPHALT
- EXISTING CONCRETE
- EXISTING GRAVEL
- EXISTING RIPRAP
- EXISTING BUILDING/SILO
- PROPOSED DEMOLITION
- PROPOSED DEMOLITION - SAWCUT
- PROPOSED DEMOLITION - PAVEMENT

REMOVAL QUANTITIES

1	BOULEVARD TREE	6 EA
2	BUILDINGS	6 EA
3	SILOS	10 EA
4	SHEDS	5 EA
5	CONCRETE	237 SY
6	ASPHALT	7,827 SY
7	WELLS	1 EA+
8	SEPTICS	1 EA+
9	FENCING	2,572 LF
10	CURB & GUTTER	113 LF
11	PEDESTRIAN RAMPS	5 EA
12	STREET SIGNS/BARRICADES	15 EA
13	POWER POLES (CONTACT GTE COMPANIES ABOUT RELOCATION)	5 EA
14	MAILBOXES	3 EA
15	OVERHEAD WIRE (CONTACT GTE COMPANIES ABOUT RELOCATION)	331 LF
16	UTILITY PEDESTALS (CONTACT GTE COMPANIES ABOUT RELOCATION)	3 EA
17	HYDRANT	1 EA
18	12" STORM SEWER (CMP)	34 LF
19	15" STORM SEWER (CMP)	30 LF

NOTES

1. REFER TO SHEETS C9.0 - C9.4 FOR SPECIFIC TREE REMOVAL/PRESERVATION INFORMATION.

BENCHMARKS

#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86

#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

Know what's **below.** **Call** before you dig.

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PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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KURT D. QUAM, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY DEMOLITION & REMOVALS PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

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01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

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24310 DEMO

PROJECT NO.
24310-00

C3.7

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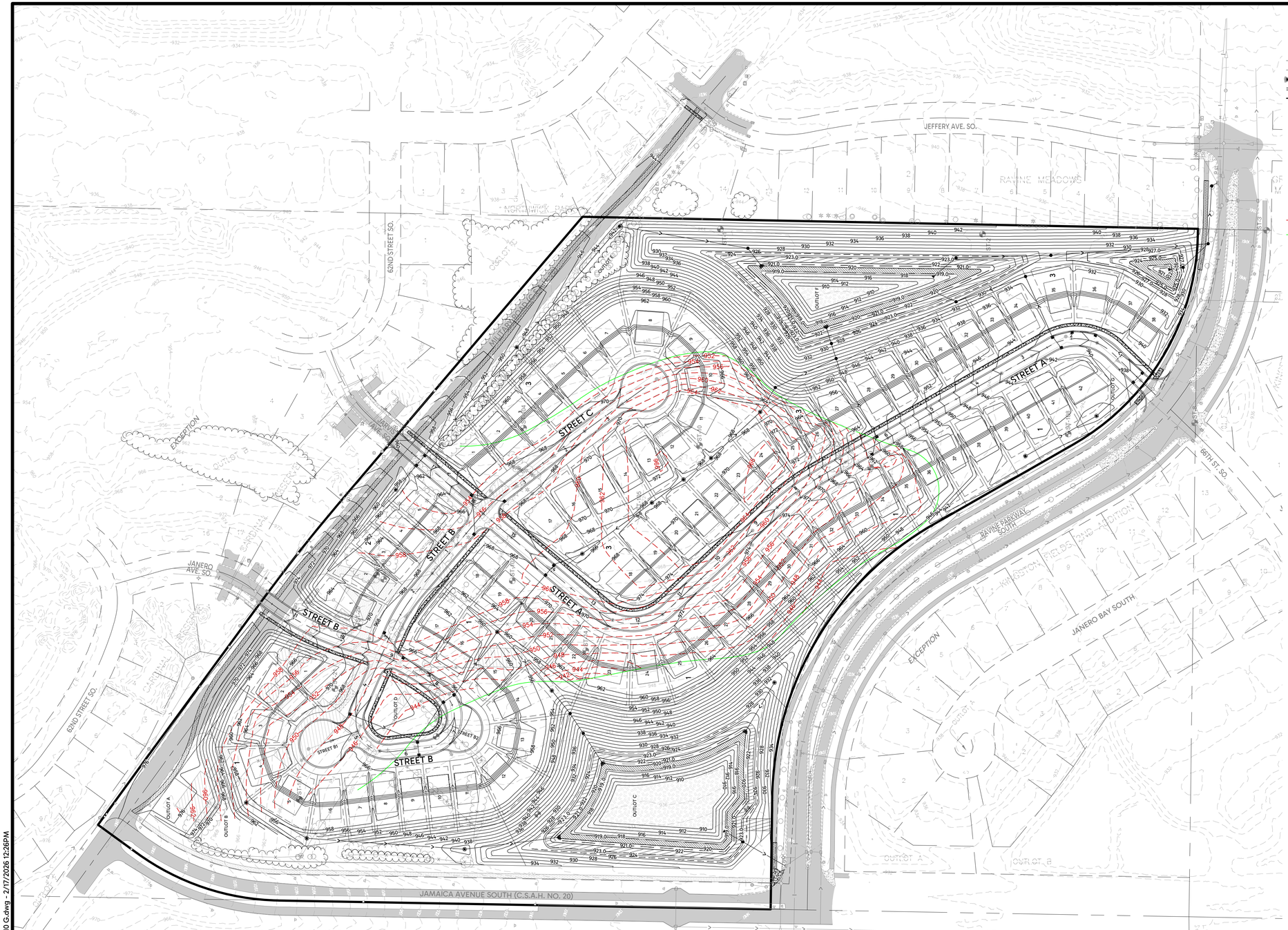

LEGEND

- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CURB & GUTTER
- PROPOSED CONTOUR
- PROPOSED EMERGENCY OVERFLOW
- PROPOSED CONCRETE
- PROPOSED ASPHALT SURFACE
- PROPOSED SEDIMENT BASIN
- PROPOSED 10' AQUATIC BENCH
- PROPOSED 10' POND MAINTENANCE ACCESS
- FUTURE ASPHALT SURFACE
- APPROXIMATE EXISTING CONTOUR - ROCK (TOP OF WEATHERED)
- APPROXIMATE EDGE/DROPOFF - ROCK

BENCHMARKS

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PRELIMINARY GRADING & DRAINAGE PLAN

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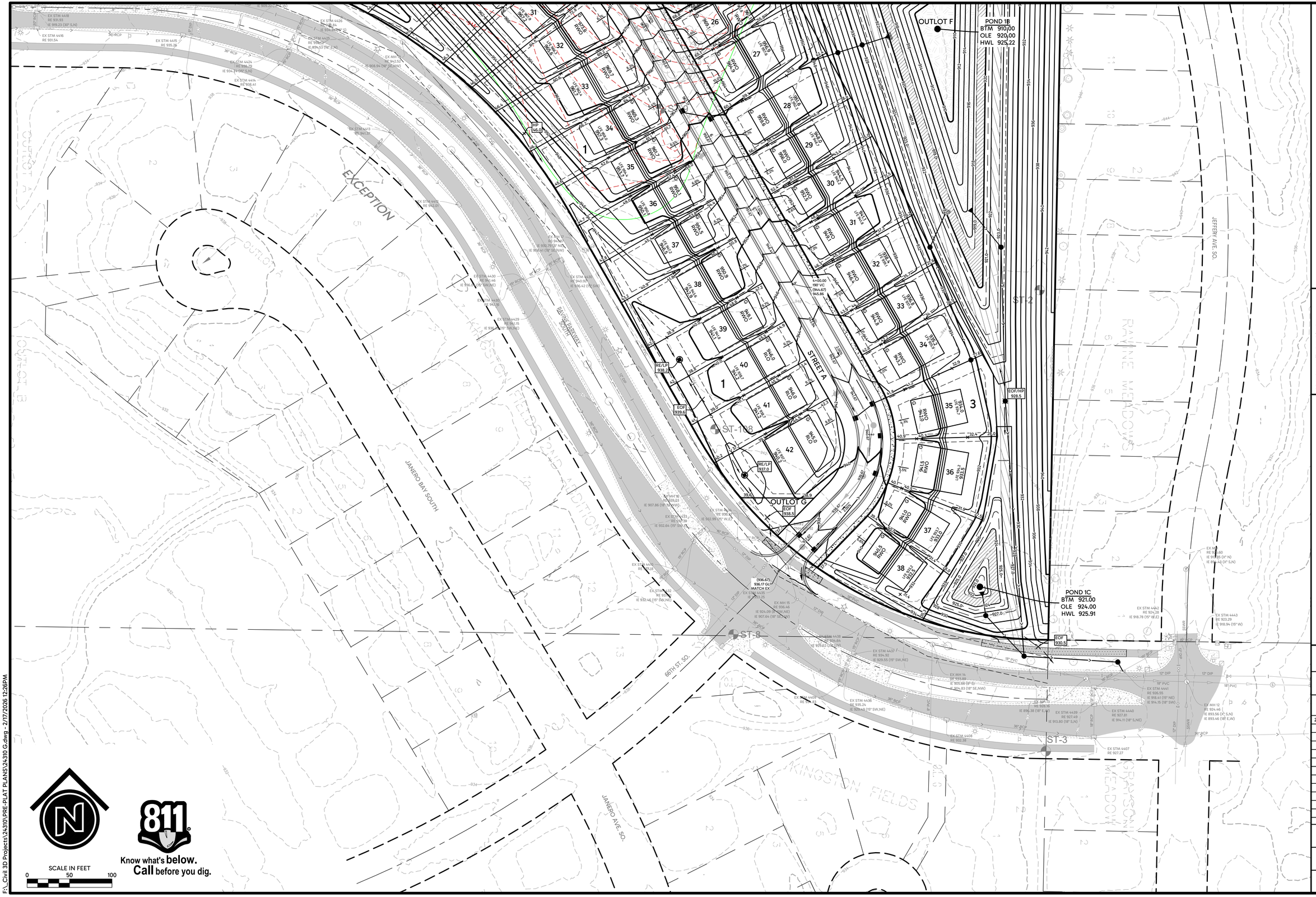

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LEGEND

PROPOSED GENERAL SEED & MULCH MIX - MNDOT SOUTHERN BOULEVARD (SB)
PROPOSED STORMWATER SEED & MULCH MIX - MNDOT WET DITCH (WD)
PROPOSED UPLAND SEED & MULCH MIX - MNDOT 35-642

NOTES

1. REFER TO SHEET C3.4 FOR DETAILS ON SEEDING SPECIFICATIONS

ESTIMATED QUANTITIES

GENERAL SEED & MULCH MIX - MNDOT SOUTHERN BOULEVARD (SB)	19.3 AC
STORMWATER SEED & MULCH MIX - MNDOT WET DITCH (WD)	2.1 AC
UPLAND SEED & MULCH MIX - MNDOT 35-642	7.7 AC

BENCHMARKS

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PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY SEEDING PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
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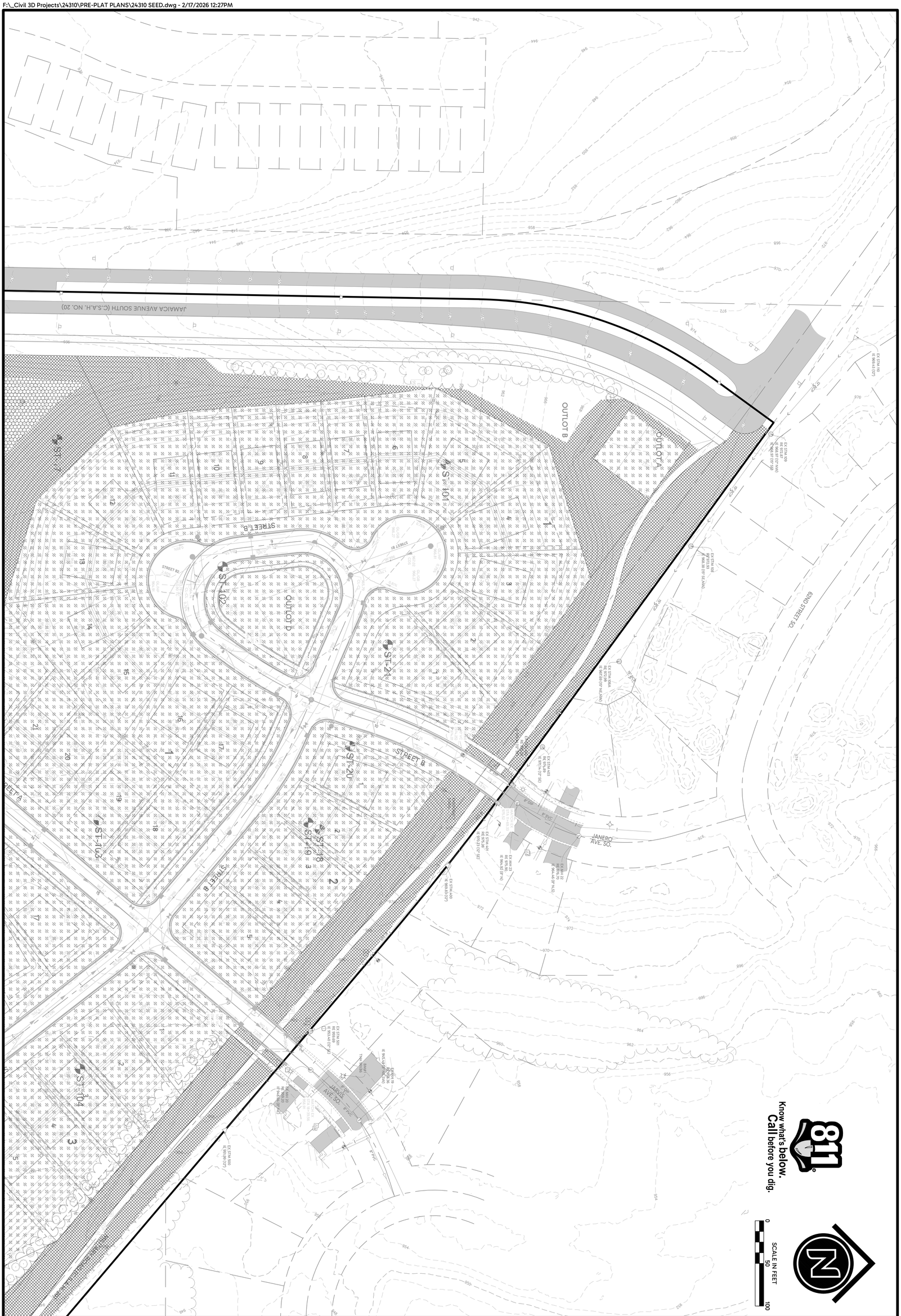

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McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY SEEDING PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

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PRELIMINARY SEEDING PLAN

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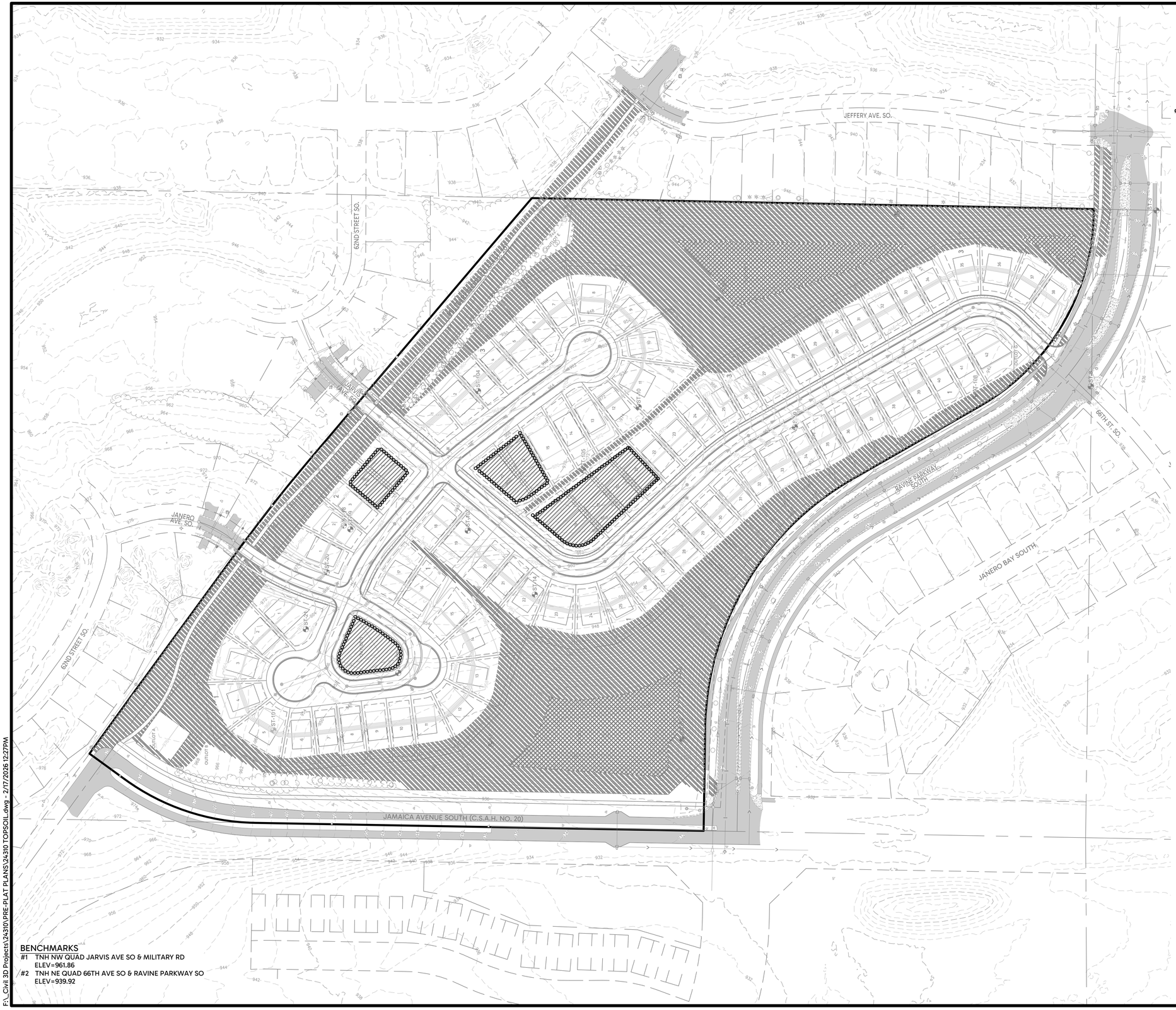

LEGEND

- PROPOSED 6" MIN. TOPSOIL RESPREAD AREA - MASS GRADING CONTRACTOR
- PROPOSED 12" MIN.TOPSOIL + 12" CLAY LINER RESPREAD AREA (POND AREA) - MASS GRADING CONTRACTOR
- PROPOSED TOPSOIL STOCKPILE - MASS GRADING CONTRACTOR (HOME CONSTRUCTION/BUILDER PILE)
- PROPOSED STOCKPILE SILT FENCE PERIMETER CONTROL BMP

NOTES

1. PERMANENT STOCKPILES ARE PROVIDED ON-SITE FOR NON-HATCHED AREAS. BUILDER TO USE STOCKPILED TOPSOIL FOR EACH LOT AND ADJACENT RIGHT OF WAY AT TIME OF FINISH GRADING FOR EACH HOUSE (6" MIN. THICKNESS).
2. A 6" MIN. THICKNESS OF TOPSOIL MUST BE PROVIDED IN ALL HATCHED AREAS, AS INDICATED ON THIS SHEET.
3. BUILDER MUST PROTECT HATCHED TOPSOIL RESPREAD AREAS DURING HOUSE CONSTRUCTION.
4. ALL PROPOSED TOPSOIL (RESPREAD/STOCKPILED) IS GENERATED FROM THE SALVAGING OF EXISTING TOPSOIL DURING MASS GRADING.

BENCHMARKS

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ELEV=961.86
#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

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PHONE: 952-890-6044
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www.mnhill.com

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PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY TOPSOIL MANAGEMENT PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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CAD FILE
24310 TOPSOIL

PROJECT NO.
24310-00

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TOPSOIL STOCKPILE LOCATION
APPROX. 2,000 CY
PROTECT STOCKPILE WITH SILT FENCE
OR OTHER PERIMETER CONTROL BMP

TOPSOIL STOCKPILE LOCATION
APPROX. 1,000 CY
PROTECT STOCKPILE WITH SILT FENCE
OR OTHER PERIMETER CONTROL BMP

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PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY TOPSOIL MANAGEMENT PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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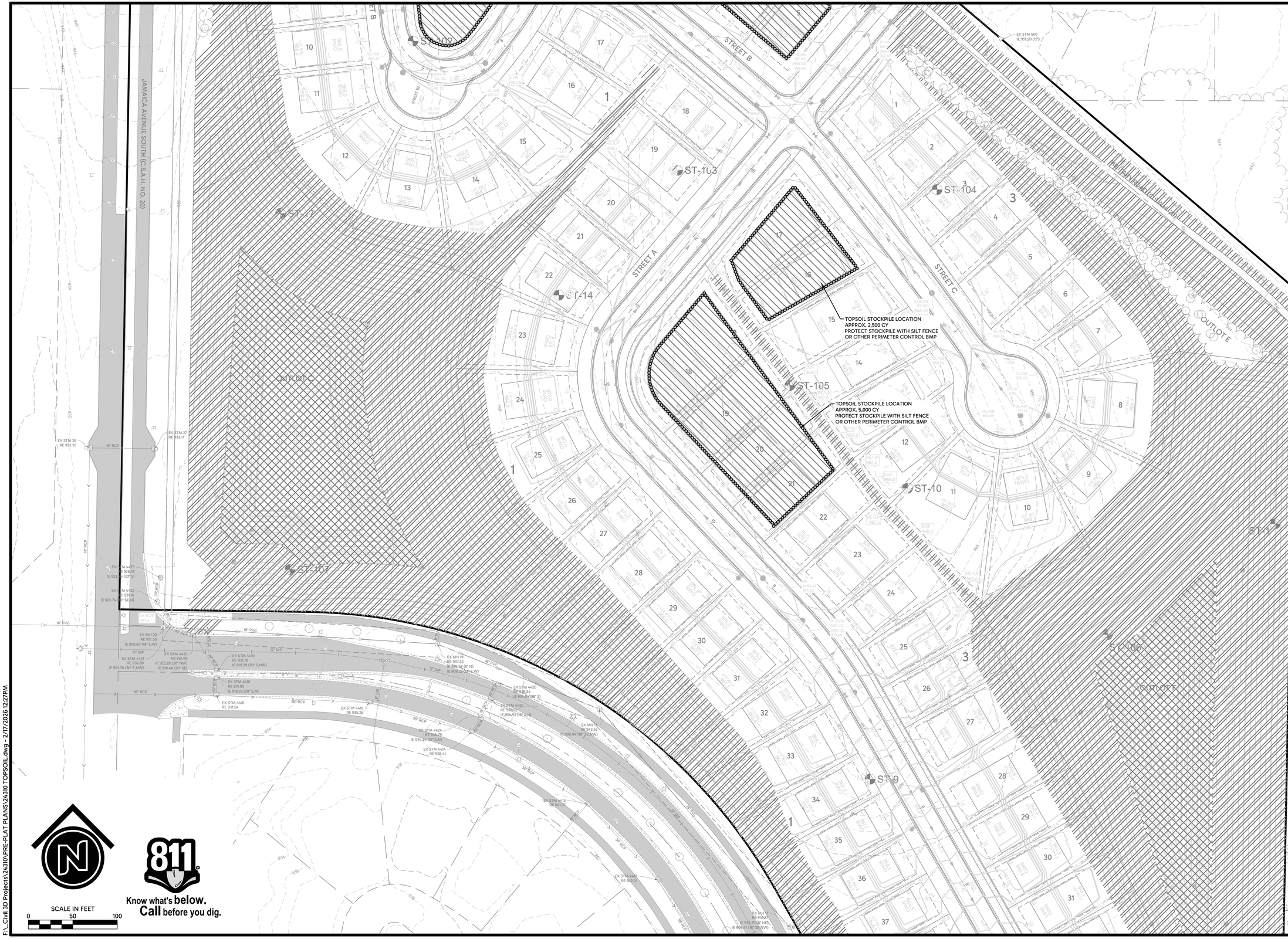

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COTTAGE GROVE, MINNESOTA

PRELIMINARY TOPSOIL MANAGEMENT PLAN

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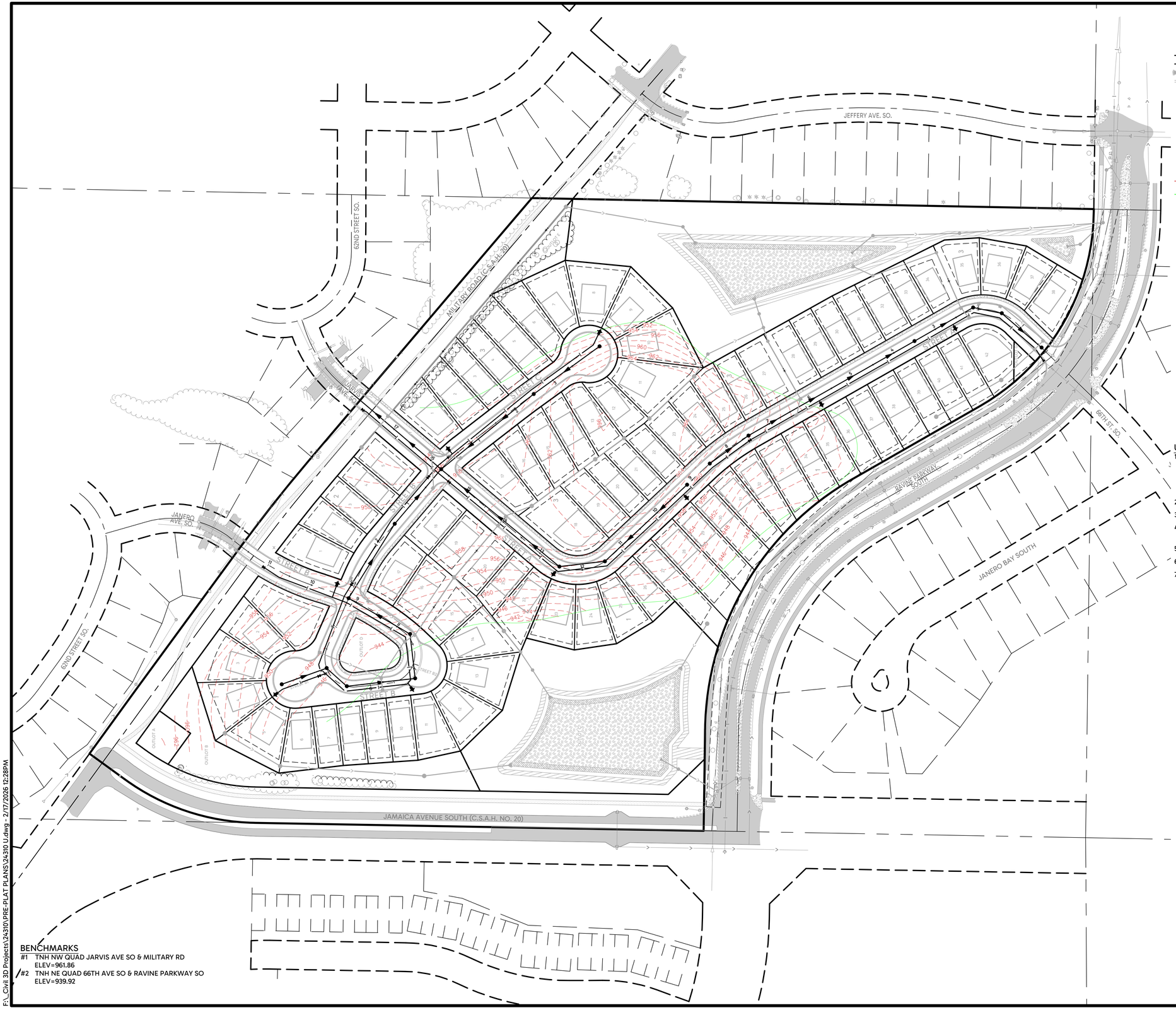
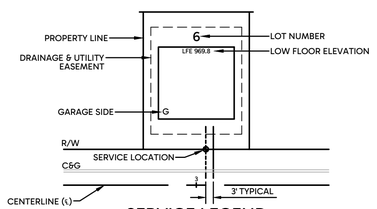


LEGEND

- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CURB & GUTTER
- PROPOSED CONCRETE
- PROPOSED ASPHALT SURFACE
- PROPOSED SEDIMENT BASIN
- PROPOSED 10' AQUATIC BENCH
- PROPOSED 10' POND MAINTENANCE ACCESS
- FUTURE ASPHALT SURFACE
- 923 — APPROXIMATE EXISTING CONTOUR - ROCK (TOP OF WEATHERED)
- APPROXIMATE EDGE/DROPOFF - ROCK

UTILITY NOTES

1. SANITARY SEWER PIPE TYPE & CLASS AS FOLLOWS:
   - A) 0' - 18' DEEP = PVC SDR 35
   - B) 18' - 28' DEEP = PVC SDR 26
2. SANITARY SEWER SERVICE PIPE AND RISER TO BE 4" PVC SCHEDULE 40.
3. ALL WATERMAIN TO BE INSTALLED WITH 7.5' MINIMUM COVER.
4. ALL 6" & 8" WATERMAIN TO BE CONSTRUCTED OF DIP CLASS 52 PIPE WITH POLYWRAP.
5. WATERMAIN SERVICE PIPE TO BE 1" TYPE K COPPER.
6. ALL FIRE HYDRANTS TO BE INSTALLED WITH CONCRETE HYDRANT PAD.
7. SANITARY/STORM SEWER AND WATERMAIN MUST MAINTAIN A 10' SEPARATION.



SERVICE LEGEND

BENCHMARKS

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PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY UTILITY PLAN - SANITARY SEWER & WATERMAIN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

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PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY UTILITY PLAN - SANITARY SEWER & WATERMAIN
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
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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.

KURT D. QUAKENBUSH, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY UTILITY PLAN - SANITARY SEWER & WATERMAIN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 U

PROJECT NO.
24310-00

C5.2

SCALE IN FEET
0 50 100

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HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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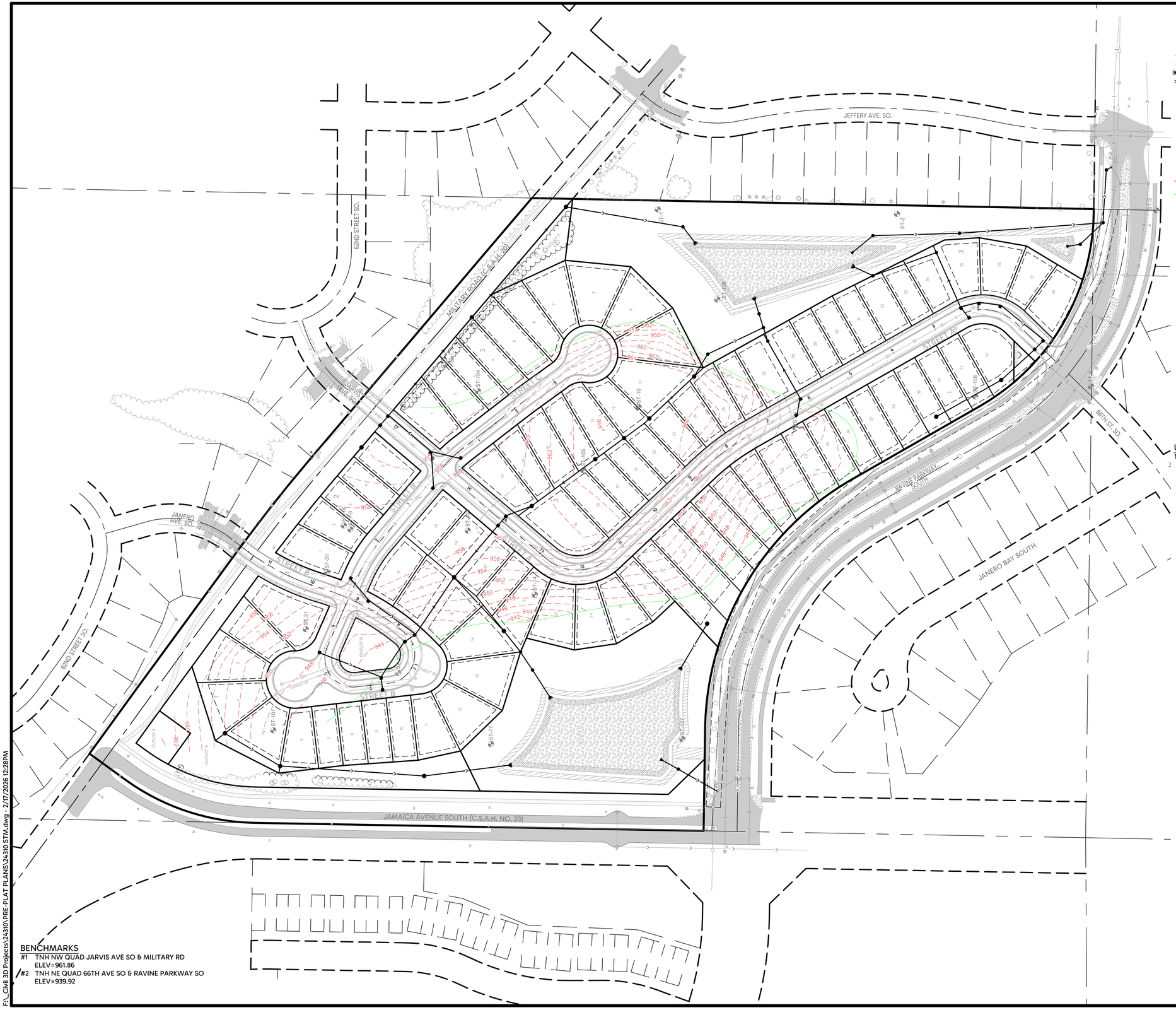

LEGEND

- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CURB & GUTTER
- PROPOSED CONCRETE
- PROPOSED ASPHALT SURFACE
- PROPOSED SEDIMENT BASIN
- PROPOSED 10' AQUATIC BENCH
- PROPOSED 10' POND MAINTENANCE ACCESS
- FUTURE ASPHALT SURFACE
- 923 — APPROXIMATE EXISTING CONTOUR - ROCK (TOP OF WEATHERED)
- APPROXIMATE EDGE/DROPOFF - ROCK

UTILITY NOTES

1. ALL REAR YARD CATCH BASINS TO BE INSTALLED WITH CONCRETE STOOL GRATE FRAME.

BENCHMARKS

#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86

#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

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McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY UTILITY PLAN - STORM SEWER
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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CAD FILE
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PROJECT NO.
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C6.0

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PRELIMINARY UTILITY PLAN - STORM SEWER
FOR
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24310 STM

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C6.1

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Date: 01/28/2026 Reg.No. 24670

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McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY UTILITY PLAN - STORM SEWER

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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2026-02-17 REV PER CITY COMMENTS
CAD FILE 24310 STM
PROJECT NO. 24310-00
C6.2

POND 1A
BTM 910.00
OLE 920.00
HWL 925.04

POND 1B
BTM 910.00
OLE 920.00
HWL 925.22

OUTLET CONTROL STRUCTURE 100 (OCS-100)

SCALE IN FEET
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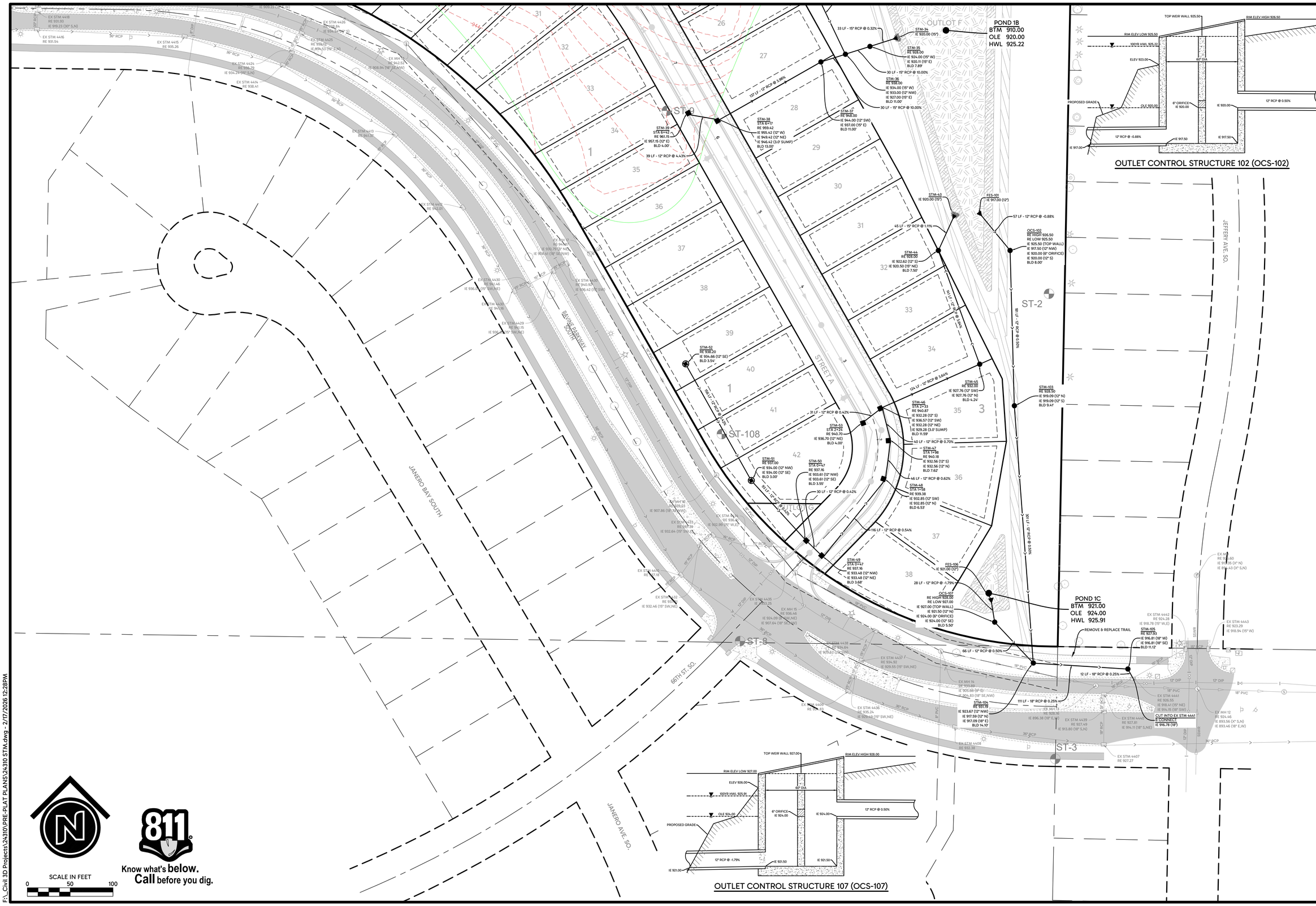

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PRELIMINARY

KURT D. QUAIN, P.E.

Date: 01/28/2026 Reg.No. 24676

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY UTILITY PLAN - STORM SEWER

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

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CAD FILE
24310 STM

PROJECT NO.
24310-00

C6.3

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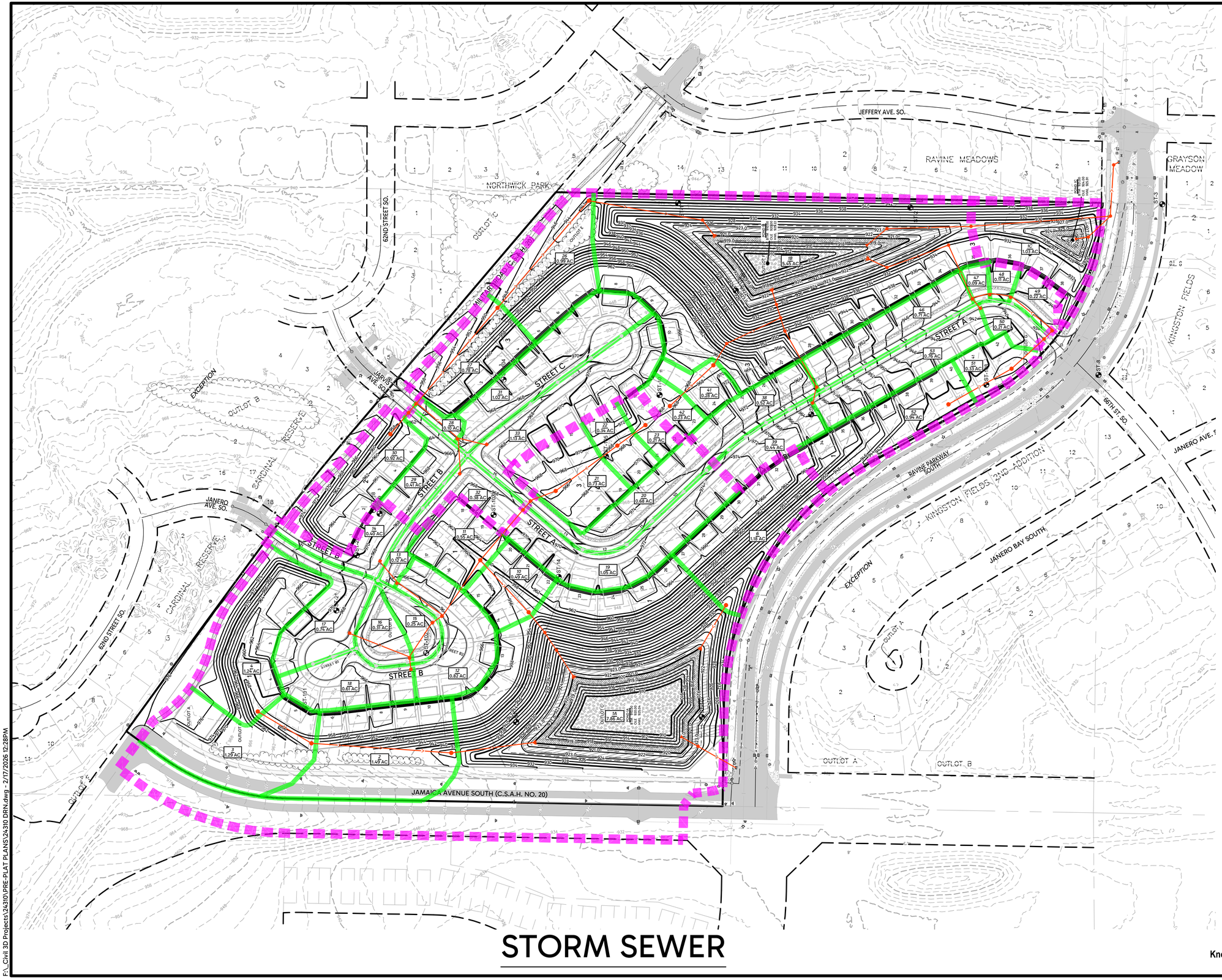

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McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY UTILITY PLAN - STORM SEWER

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

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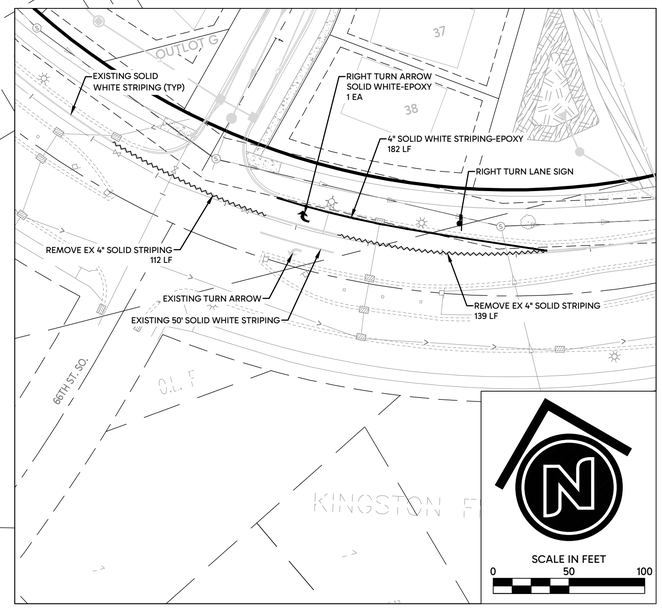
LEGEND

- EXISTING LIGHT POLE
- PROPOSED STREET LIGHT LOCATION (3' BOC)
- PROPOSED STREET & STOP SIGN LOCATION (6' BOC)
- PROPOSED SIGNAGE

50 SCALE BLOWUP (SEE RIGHT)

CROSSWALK SIGNAGE
12" SOLID WHITE EPOXY -PEDESTRIAN CROSSIN
CROSSWALK SIGNAGE

CROSSWALK SIGNAGE
12" SOLID WHITE EPOXY -PEDESTRIAN CROSSIN
CROSSWALK SIGNAGE



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BENCHMARKS

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ELEV=961.86

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ELEV=939.92

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BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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PRELIMINARY

Date: 01/28/2026 Reg.No. 24670

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY STREET LIGHT, STRIPING, & SIGNAGE PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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CAD FILE
24310 PAV

PROJECT NO.
24310-00

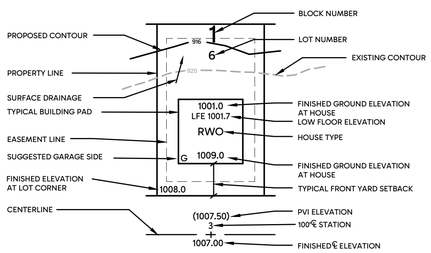
C7.0

STANDARD GRADING NOTES:

1. SPECIFICATIONS WHICH APPLY ARE THE MOST RECENT EDITIONS OF THE MUNICIPALITY IN WHICH THE WORK IS LOCATED AND THE MINNESOTA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS FOR HIGHWAY CONSTRUCTION UNLESS MODIFIED HEREIN ON THESE CONTRACT DOCUMENTS.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO UTILIZE THE "GOPHER STATE ONE CALL" EXCAVATION NOTICE SYSTEM AS REQUIRED UNDER MINNESOTA STATUTE CHAPTER 216D, 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION (PHONE 651-454-0002 IN THE TWIN CITIES METRO AREA OR TOLL FREE 1-800-252-1166).
3. GRADING CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL UNDERGROUND UTILITIES WITH THE RESPECTIVE UTILITY COMPANIES PRIOR TO CONSTRUCTION.
4. ALL CONSTRUCTION AS CALLED FOR ON THESE CONTRACT DOCUMENTS SHALL BE PERFORMED IN ACCORDANCE WITH ALL OSHA REQUIREMENTS.
5. ALL LOT AND EASEMENT DIMENSIONS ARE SUBJECT TO FINAL PLAT.
6. THE GRADING CONTRACTOR SHALL SCHEDULE THE SOILS ENGINEER SO THAT CERTIFICATION OF ALL CONTROLLED FILLS CAN BE FURNISHED TO THE OWNER DURING AND UPON COMPLETION OF THE PROJECT.
7. DENSITY TESTS SHALL BE TAKEN TO EVALUATE THE COMPACTION WITHIN THE STREETS, TRAVEL WAYS OR PARKING LOTS. WITHIN THE UPPER 3 FEET OF STREET, TRAVEL WAYS OR PARKING LOT SUBGRADE, THE CONTRACTOR SHALL INSURE THAT ALL SOILS BE NOT MORE THAN ONE PERCENTAGE POINT OVER THE SOIL'S STANDARD PROCTOR OPTIMUM MOISTURE CONTENT, AND THAT COMPACTION TO A MINIMUM OF 100% OF STANDARD PROCTOR DENSITY BE PROVIDED. IN AREAS BELOW THE UPPER THREE FEET OF SUBGRADE OF THE STREETS, TRAVEL WAYS OR PARKING LOTS, THE CONTRACTOR SHALL INSURE THAT ALL SOILS BE NOT MORE THAN THREE PERCENTAGE POINTS OVER THE SOIL'S STANDARD PROCTOR OPTIMUM MOISTURE CONTENT, AND THAT COMPACTION TO A MINIMUM OF 95% OF STANDARD PROCTOR DENSITY BE PROVIDED. THE GRADING TOLERANCE FOR THESE AREAS SHALL BE WITHIN ±.1'.
8. LOT GRADING AND/OR THE PREPARATION OF BUILDING/STRUCTURAL PADS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS. THE GRADING TOLERANCE SHALL BE ±0.3'. ALL EARTHWORK OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE HUD-FHA DATA SHEET 79G "LAND DEVELOPMENT WITH CONTROLLED EARTHWORK", PROVIDING FOR A MINIMUM OF 95% STANDARD DENSITY, OR AS OTHERWISE SPECIFIED BY THE GEO-TECHNICAL ENGINEER.
9. IN AREAS WHERE RETAINING WALLS ARE PROPOSED ON CONTROLLED FILL AREAS, A MINIMUM 95% STANDARD DENSITY NEEDS TO BE ATTAINED. WHERE FILL THICKNESSES EXCEED 10' BELOW WALL FOUNDATION ELEVATIONS, A HIGHER MINIMUM OF 98% SHALL BE ATTAINED, OR AS OTHERWISE SPECIFIED BY THE GEOTECHNICAL ENGINEER.
10. BUILDING PADS SHOWN ON EACH LOT ARE TYPICAL ONLY. THE DEPTH OF THE PAD FROM FRONT TO BACK SHALL BE GRADED THROUGHOUT THE FULL WIDTH OF THE LOT OR AS NECESSARY TO ALLOW FOR CONSTRUCTION OF A BUILDING AT THE MINIMUM SIDE YARD SETBACKS. (REFER TO THE PLANS FOR SPECIFIC SETBACK DISTANCES.) IF UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED WITHIN A PROPOSED BUILDING PAD THAT CANNOT BE CORRECTED OR REMOVED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER OF THE CONDITIONS AND TO LOCATE THE LIMITS OF THE UNSUITABLE AREAS.
11. THE GRADING TOLERANCE FOR THE SITE SHOULD BE ±0.1' FOR STREETS/PARKING LOTS AND ±0.3' FOR LANDSCAPED/OPEN/PAD AREAS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN ADEQUATE STORM DRAINAGE PROTECTION OF THE SITE IN ORDER TO PREVENT EROSION AND SILTING OF ON-SITE AND OFF-SITE AREAS. THIS SHALL BE ACCOMPLISHED BY PLACEMENT OF HAY BALES OR FILTER FABRIC FENCE AROUND THE DRAINAGE INLETS AND OUTLETS AND BY CONSTRUCTION OF DITCHES, BERMS, DEBRIS BASINS, FILTER FABRIC FENCING AND BY ANY OTHER ON-SITE PROTECTION AS DETERMINED BY THE ENGINEER. UNLESS SPECIFICALLY CALLED OUT AS A BID ITEM ON THE BID FORM, ANY TEMPORARY DITCHING, CULVERTS, HAY BALES, AND FILTER FABRIC FENCE NECESSARY TO ACCOMPLISH THIS SHALL BE AT THE CONTRACTOR'S EXPENSE.

SPECIFIC GRADING NOTES:

1. THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS ON THE PLANS WERE LIDAR AND SPOT CHECKED BY HILL, INC. ON NOVEMBER 11, 2025. THE DEGREE OF ACCURACY OF THE EXISTING CONTOURS SHOWN ON THE PLAN IS EQUAL TO ± ONE HALF THE CONTOUR INTERVAL.



TYPICAL LOT

RECOMMENDED SINGLE FAMILY LOT TYPES

R	STANDARD LOT - FINISHED GROUND ELEVATION IS THE SAME AT THE FRONT AND REAR OF HOUSE. LOT CAN ACCOMMODATE RAMBLER OR TWO STORY HOME. BASEMENT FLOOR ELEVATION IS 7.3' LOWER THAN FINISHED GROUND ELEVATION SHOWN AT FRONT OF HOUSE.
RWO	WALKOUT LOT - FINISHED GROUND ELEVATION FOR WALKOUT IS 8.0' LOWER THAN FINISHED GROUND ELEVATION SHOWN AT FRONT OF HOUSE. BASEMENT FLOOR ELEVATION/OPENING IS 0.7' ABOVE FINISHED GROUND ELEVATION SHOWN AT WALKOUT.
RLO	LOOKOUT LOT - FINISHED GROUND ELEVATION FOR LOOKOUT IS 4.8' LOWER THAN FINISHED GROUND ELEVATION SHOWN AT FRONT OF HOUSE. WINDOW OPENINGS ARE 0.7' ABOVE FINISHED GROUND ELEVATION SHOWN AT LOOKOUT.

NOTE: FOR ALL RECOMMENDED HOUSE TYPES, GARAGE FLOOR ELEVATION IS 0.3' ABOVE FINISHED GROUND ELEVATION SHOWN AT FRONT OF HOUSE. TOP OF BLOCK ELEVATION IS 0.7' ABOVE FINISHED GROUND ELEVATION SHOWN AT FRONT OF HOUSE.

GENERAL UTILITY CONSTRUCTION NOTES:

1. SPECIFICATIONS:
THE WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF COTTAGE GROVE, MINNESOTA.

2. EXISTING FACILITIES:
IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ALL EXISTING UTILITIES BEFORE STARTING CONSTRUCTION. THIS INCLUDES, BUT IS NOT LIMITED TO SANITARY AND STORM SEWER, WATERMAIN, NATURAL GAS, ELECTRIC, TELEPHONE AND CABLE TELEVISION SERVICES.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONFLICT BETWEEN THE EXISTING UTILITIES AND THE PROPOSED CONSTRUCTION. THE ENGINEER IN COOPERATION WITH THE UTILITY COMPANIES, SHALL DETERMINE THE NECESSITY FOR ANY RELOCATION OF THESE FACILITIES.

THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND FACILITIES SO THAT THEY WILL CONTINUE TO FUNCTION IN THEIR PROPER MANNER BOTH DURING CONSTRUCTION AND IN THE FUTURE. ANY SUPPORTING STRUCTURE THAT MAY BE REQUIRED BECAUSE OF THE CONTRACTOR'S OPERATION SHALL BE PROVIDED BY HIM.

THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ENGINEER ANY CONDITIONS SUCH AS SAND IN MANHOLES OR VALVE BOXES EXISTING PRIOR TO THE CONTRACTOR'S EXCAVATION. ONCE EXCAVATION HAS COMMENCED, IT WILL BE ASSUMED THAT ALL DAMAGE TO UNDERGROUND UTILITIES HAS BEEN CAUSED BY THE CONTRACTOR'S OPERATIONS AND IT WILL BE HIS RESPONSIBILITY TO MAKE THE NECESSARY REPAIRS.

3. CONTRACTOR RESPONSIBILITIES:
THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR RECEIVING WATER FROM PUBLIC OR PRIVATE SOURCES AND SECURE NECESSARY PERMITS AND PAY REGULAR CHARGES. ALL CITY WATER SHALL BE METERED. DISPOSAL OF ANY WASTE WATER OR ANY TEST WATER INTO THE CITY SANITARY SEWER SYSTEM IS SUBJECT TO CITY CHARGE. CONTRACTORS ARE NOT TO OPERATE GATE VALVES OR HYDRANTS ON CITY WATER SUPPLY.

THE CITY ENGINEER AND THE ENGINEER SHALL BE NOTIFIED 48 HOURS PRIOR TO COMMENCING WORK. CONTRACTORS SHALL BE SUBJECT TO SHUT DOWN IF PROPER NOTIFICATION IS NOT GIVEN TO THE ENGINEER.

CITY STREETS THAT ARE UTILIZED FOR INGRESS TO OR EGRESS FROM THE CONSTRUCTION SITE SHALL BE KEPT FREE OF DIRT AND OTHER DEBRIS RESULTING FROM SAID CONSTRUCTION.

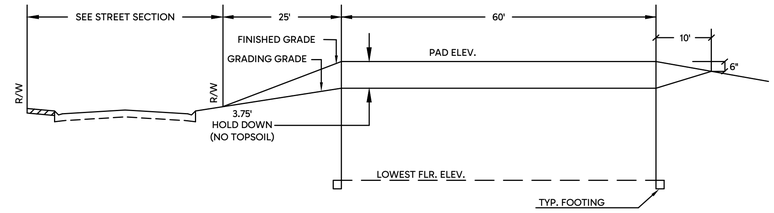
THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN ADEQUATE STORM DRAINAGE PROTECTION OF THE SITE IN ORDER TO PREVENT EROSION AND SILTING OF ON-SITE AND OFF-SITE AREAS. THIS SHALL BE ACCOMPLISHED BY PLACEMENT OF HAY BALES OR FILTER FABRIC FENCE AROUND THE DRAINAGE INLETS AND OUTLETS AND BY CONSTRUCTION OF DITCHES, BERMS, DEBRIS BASINS, FILTER FABRIC FENCING AND BY ANY OTHER ON-SITE PROTECTION AS DETERMINED BY THE ENGINEER. UNLESS SPECIFICALLY CALLED OUT AS A BID ITEM ON THE BID FORM, ANY TEMPORARY DITCHING, CULVERTS, HAY BALES, AND FILTER FABRIC FENCE NECESSARY TO ACCOMPLISH THIS SHALL BE AT THE CONTRACTOR'S EXPENSE.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT AND LEAVE UNDISTURBED THOSE MARKERS OR MONUMENTS SET FOR THE SUBDIVISION OF LAND.

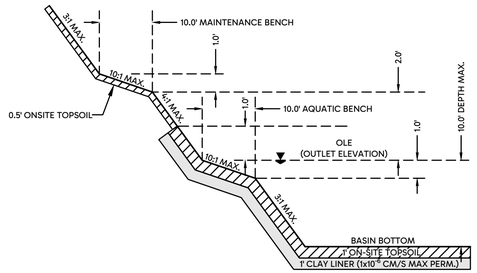
IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO UTILIZE THE "GOPHER STATE ONE CALL" EXCAVATION NOTICE SYSTEM AS REQUIRED UNDER MINNESOTA STATUTE CHAPTER 216D, 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION (PHONE 651-454-0002 IN THE TWIN CITIES METRO AREA OR TOLL FREE 1-800-252-1166).

4. COMPACTION:
DENSITY TESTS SHALL BE TAKEN ON ALL TRENCHES WITHIN THE STREET/PARKING CROSS SECTION AND THE PAD AREAS TO EVALUATE THE COMPACTION ACHIEVED DURING UTILITY CONSTRUCTION. WITHIN THE UPPER 3 FEET OF STREET SUBGRADE THE CONTRACTOR SHALL INSURE THAT ALL SOILS BE NOT MORE THAN ONE PERCENTAGE POINT OVER THE SOILS STANDARD PROCTOR OPTIMUM MOISTURE CONTENT, AND THAT COMPACTION TO A MINIMUM OF 100 % OF STANDARD PROCTOR DENSITY (AASHTO T-99) BE PROVIDED. WITHIN UTILITY TRENCHES IN OPEN SPACE AREAS (PAD AREAS) AND AREAS BELOW THE UPPER 3 FEET OF STREET SUBGRADE, THE CONTRACTOR SHALL INSURE THAT ALL SOILS BE NOT MORE THAN THREE PERCENTAGE POINTS OVER THE SOIL'S STANDARD PROCTOR OPTIMUM MOISTURE CONTENT, AND THAT COMPACTION TO A MINIMUM OF 95 % OF STANDARD PROCTOR DENSITY BE PROVIDED. THE SURFACE OF ALL UTILITY TRENCHES SHALL BE FINISHED GRADED TO THE ELEVATIONS AS STAKED BY THE ENGINEER TO WITHIN A TOLERANCE OF ±0.3' IN OPEN SPACE AREAS AND ± 0.1' WITHIN STREET RIGHT OF WAYS. THE DENSITY WILL BE TESTED BY AN APPROVED TESTING LABORATORY. AN APPROVED TESTING METHOD WHICH UTILIZES A NUCLEAR DENSITY METER MAY BE USED FOR THE DENSITY TESTS. THE LOCATION OF THE TESTS WILL BE AT THE DIRECTION OF THE ENGINEER.

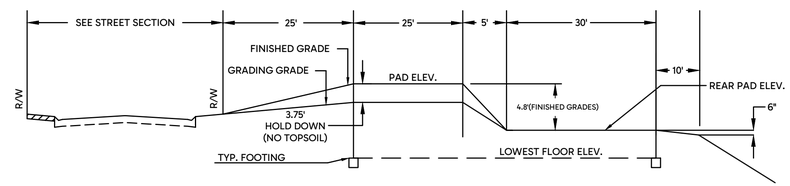
THE OWNER SHALL BEAR ALL COSTS OF THE TESTING. ANY AREAS WHICH FAIL TO MEET THE COMPACTION REQUIREMENTS OUTLINED IN THIS SECTION SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. ALL COSTS FOR ANY RE-TESTING ASSOCIATED WITH ANY CORRECTIVE WORK SHALL BE AT THE EXPENSE OF THE CONTRACTOR.



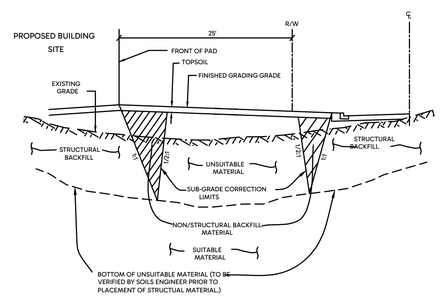
SINGLE FAMILY - RAMBLER SECTION (R)



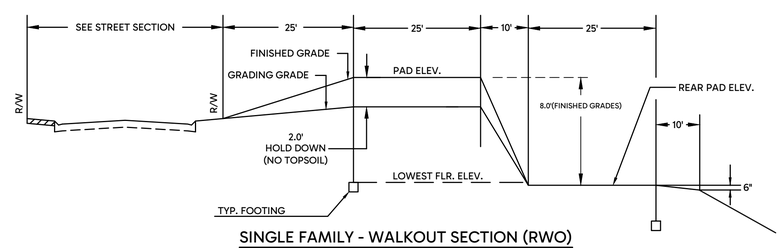
SEDIMENT BASIN



SINGLE FAMILY - LOOKOUT SECTION (RLO)



BUILDING SITE & STREET SUB-GRADE CORRECTION DETAIL



SINGLE FAMILY - WALKOUT SECTION (RWO)

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
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Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY CONSTRUCTION DETAILS

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

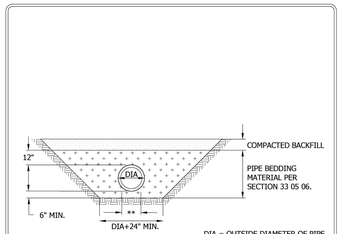
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 D

PROJECT NO.
24310-00

C8.0

F:_Civil 3D Projects\24310\PRE-PLAT PLANS\24310 D.dwg - 2/17/2026 12:29PM



PVC AND POLYPROPYLENE PIPE FOUNDATION & BEDDING IN GOOD SOILS

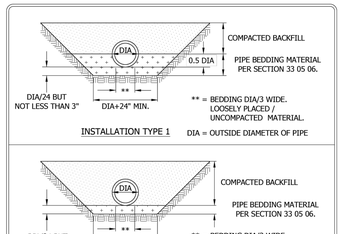
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
PIPE FOUNDATION & BEDDING METHOD FOR PVC & POLYPROPYLENE PIPE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. BED-1

48_BED1.DWG



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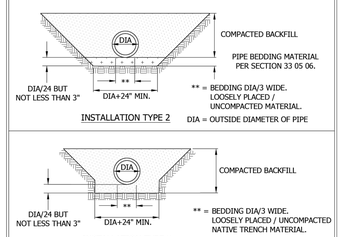

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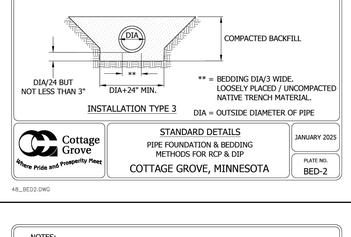


INSTALLATION TYPE 3

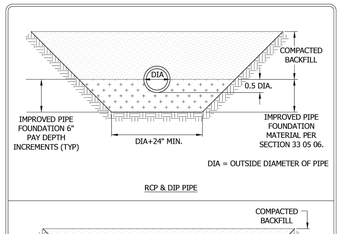
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
PIPE FOUNDATION & BEDDING METHODS FOR RCP & DIP
COTTAGE GROVE, MINNESOTA

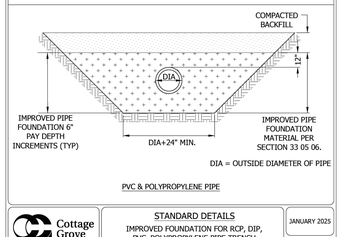
JANUARY 2025

PLATE NO. BED-2

48_BED2.DWG



RCP & DIP PIPE



PVC & POLYPROPYLENE PIPE

Cottage Grove — Where Pride and Prosperity Meet

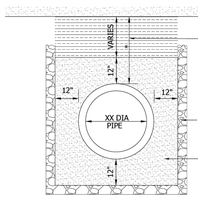
STANDARD DETAILS
IMPROVED FOUNDATION FOR RCP, DIP, PVC, POLYPROPYLENE PIPE TRENCH
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. BED-3

48_BED3.DWG

* USE GRANULAR BORROW WHEN TOP OF PIPE IS WITHIN 3 FEET OF SUBGRADE. IF GREATER THAN 3 FEET, USE SUITABLE EXISTING ONSITE BACKFILL.



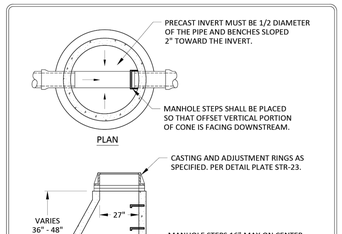
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
PVC, POLYPROPYLENE, RCP AND DIP PIPE BEDDING IN ROCK
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. BED-4

48_BED4.DWG



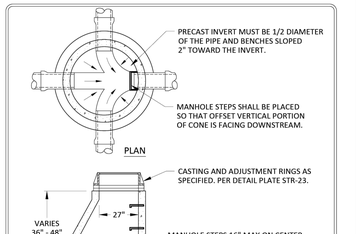
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SANITARY SEWER MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. SAN-1

48_SAN1.DWG



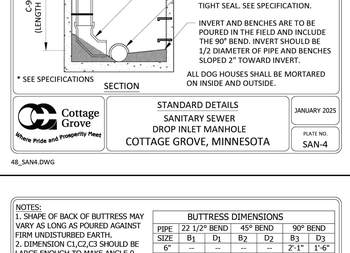
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SANITARY SEWER JUNCTION MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. SAN-2

48_SAN2.DWG



Cottage Grove — Where Pride and Prosperity Meet

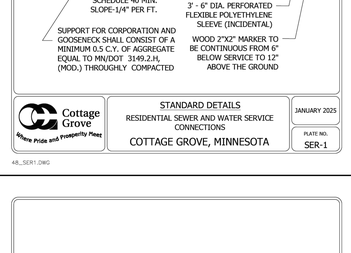
STANDARD DETAILS
SANITARY SEWER DROP INLET MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. SAN-4

48_SAN4.DWG

NOTES:
① REF. SER-11 FOR CURB STOP AND BOX THAT FALL WITHIN BITUMINOUS OR CONCRETE.
② *EXTEND CURB STOP 1' BEYOND R/W WHEN SIDEWALK IS PRESENT.



Cottage Grove — Where Pride and Prosperity Meet

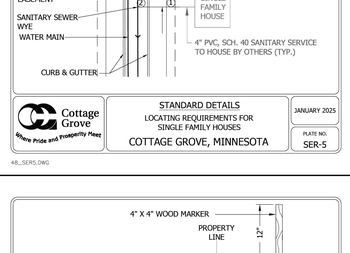
STANDARD DETAILS
RESIDENTIAL SEWER AND WATER SERVICE CONNECTIONS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. SER-1

48_SER1.DWG

CONTRACTOR TO PROVIDE THE FOLLOWING DIMENSIONS:
① CURB STOP TO SANITARY SEWER PIPE (PERPENDICULAR TO COPPER).
② SANITARY SEWER PIPE TO COPPER WATER LINE (PERPENDICULAR TO COPPER ALONG SANITARY SEWER MAIN) OR CORPORATION STOP TO SANITARY SEWER SERVICE LINE (PERPENDICULAR TO COPPER WATER LINE).
③ EXTEND CURB STOP 1' BEYOND R/W WHEN SIDEWALK IS PRESENT.



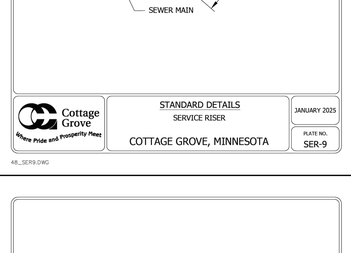
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
LOCATING REQUIREMENTS FOR SINGLE FAMILY HOUSES
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. SER-5

48_SER5.DWG



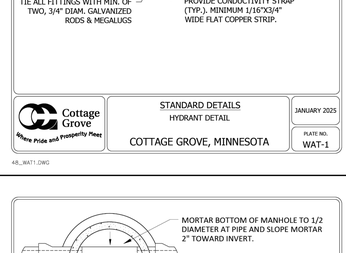
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SERVICE RISER
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. SER-9

48_SER9.DWG



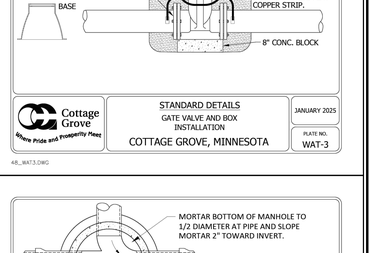
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
HYDRANT DETAIL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. WAT-1

48_WAT1.DWG



Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
GATE VALVE AND BOX INSTALLATION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

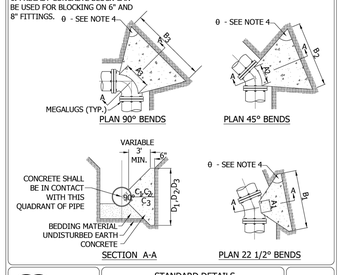
PLATE NO. WAT-3

48_WAT3.DWG

NOTES:
1. SHAPE OF BACK OF BUTTRESS MAY VARY AS LONG AS POURED AGAINST FIRM UNDISTURBED EARTH.
2. DIMENSION C1,C2,C3 SHOULD BE LARGE ENOUGH TO MAKE ANGLE θ EQUAL TO OR LARGER THAN 45°.
3. DIMENSION A1,A2,A3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH MJ BOLTS.
4. θ = 45° MINIMUM.
5. PLACE POLYETHYLENE BETWEEN CONCRETE & PIPE.
6. PRECAST CONCRETE BLOCK CAN BE USED FOR BLOCKING ON 6" AND 8" FITTINGS.

BUTTRESS DIMENSIONS

PIPE	22 1/2° BEND		45° BEND		90° BEND	
SIZE	B_1	D_1	B_2	D_2	B_3	D_3
6"	--	--	--	--	2'-1"	1'-6"
8"	--	--	--	--	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6"	3'-4"	8'-4"	4'-0"
24"	4'-4"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"
30"	--	--	9'-3"	6'-0"	12'-0"	6'-0"



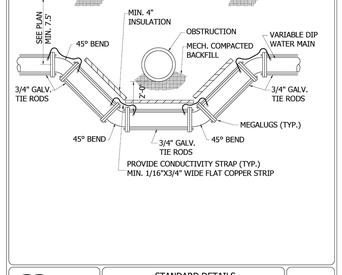
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE THRUST BLOCKING
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. WAT-6

48_WAT6.DWG



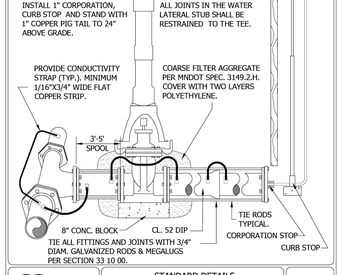
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
WATER MAIN OFFSET
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. WAT-7

48_WAT7.DWG



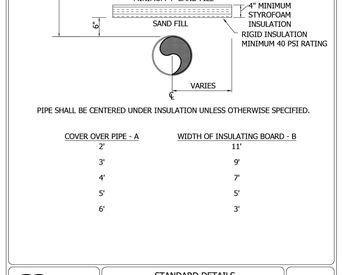
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
DIP SERVICE OR DEAD END LINE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. WAT-8

48_WAT8.DWG



COVER OVER PIPE - A	WIDTH OF INSULATING BOARD - B
2'	11'
3'	9'
4'	7'
5'	5'
6'	3'

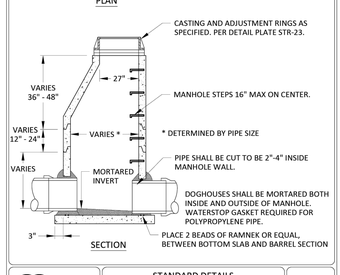
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
INSULATION DETAIL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. WAT-9

48_WAT9.DWG



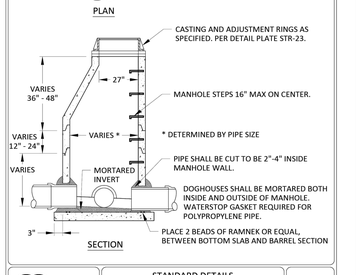
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STORM SEWER MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-1

48_STO1.DWG



Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STORM SEWER JUNCTION MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-2

48_STO2.DWG

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUANRUD

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY CONSTRUCTION DETAILS

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 D

PROJECT NO.
24310-00

C8.1

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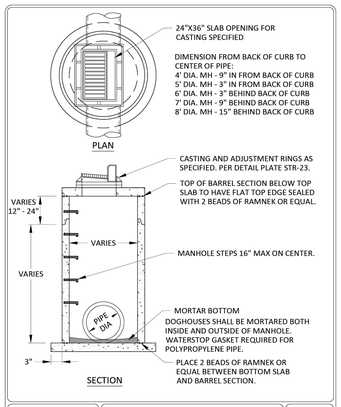


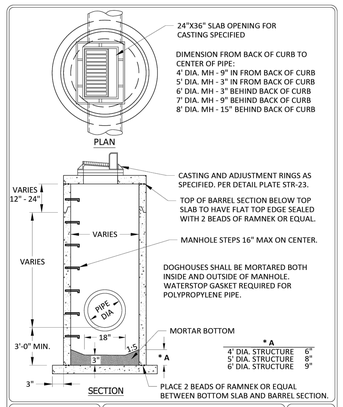
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CATCH BASIN MANHOLE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-5

48_STO5.DWG



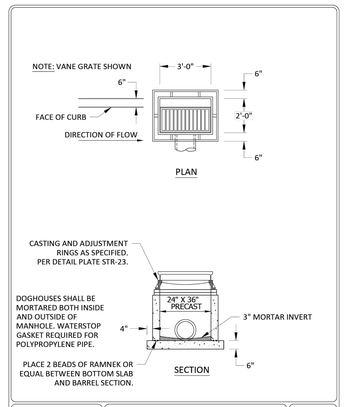
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CATCH BASIN MANHOLE WITH SUMP
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-6

48_STO6.DWG



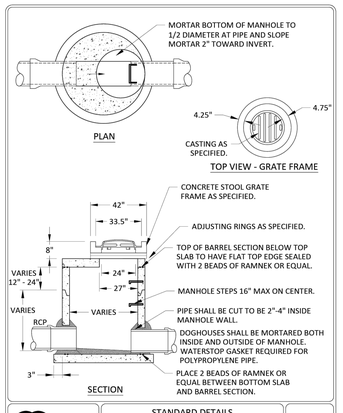
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CATCH BASIN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-7

48_STO7.DWG



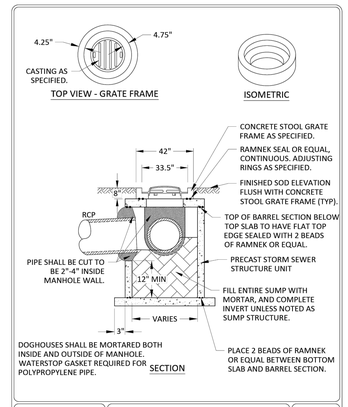
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
OFF STREET CATCH BASIN
WITH CONCRETE STOOL GRATE FRAME
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-9

48_STO9.DWG



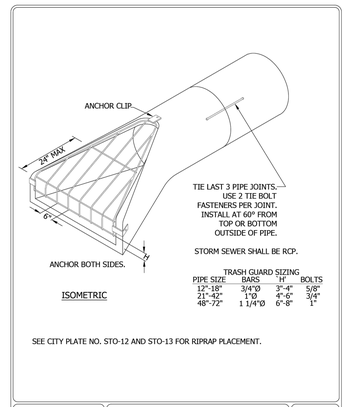
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SHALLOW OFF STREET CATCH BASIN
WITH CONCRETE STOOL GRATE FRAME
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-10

48_STO10.DWG



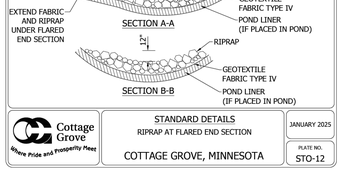
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
FLARED END SECTION AND
TRASH GAURD
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-11

48_STO11.DWG



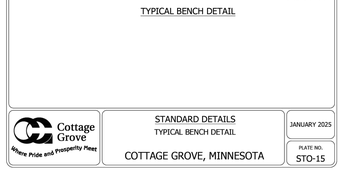
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
RIPRAP AT FLARED END SECTION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-12

48_STO12.DWG



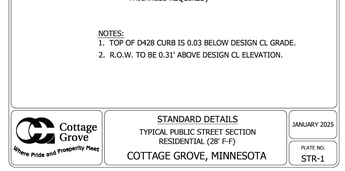
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL BENCH DETAIL
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STO-15

48_STO15.DWG



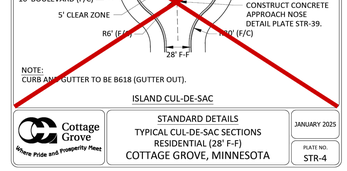
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL PUBLIC STREET SECTION
RESIDENTIAL (28' F-F)
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-1

48_STR1.DWG



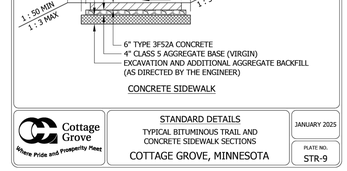
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL CUL-DE-SAC SECTIONS
RESIDENTIAL (28' F-F)
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-4

48_STR4.DWG



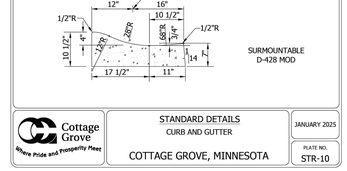
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL BITUMINOUS TRAIL AND
CONCRETE SIDEWALK SECTIONS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-9

48_STR9.DWG



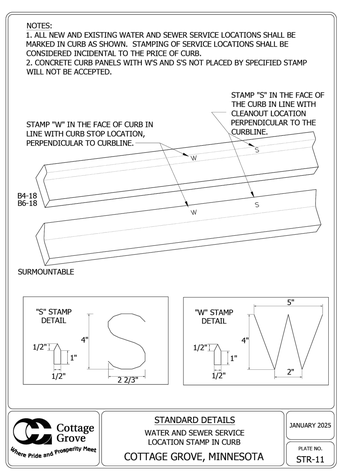
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CURB AND GUTTER
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-10

48_STR10.DWG



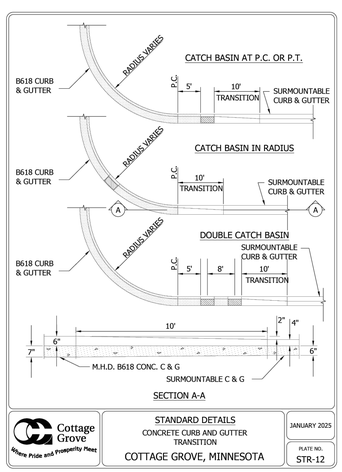
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
WATER AND SEWER SERVICE
LOCATION STAMP IN CURB
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-11

48_STR11.DWG



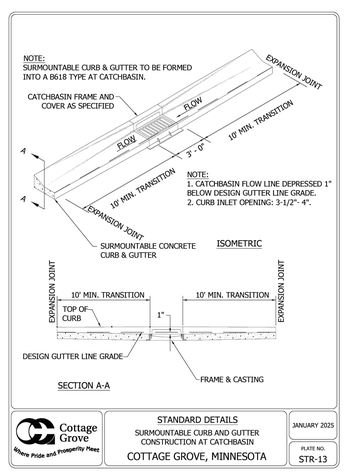
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE CURB AND GUTTER
TRANSITION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-12

48_STR12.DWG



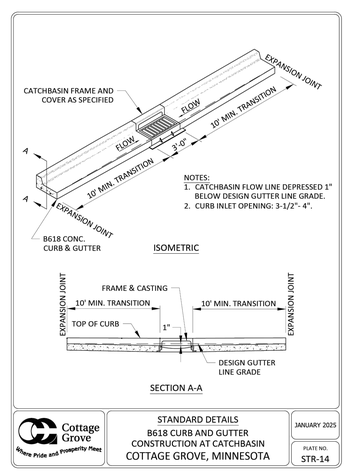
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
SURMOUNTABLE CURB AND GUTTER
CONSTRUCTION AT CATCHBASIN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-13

48_STR13.DWG



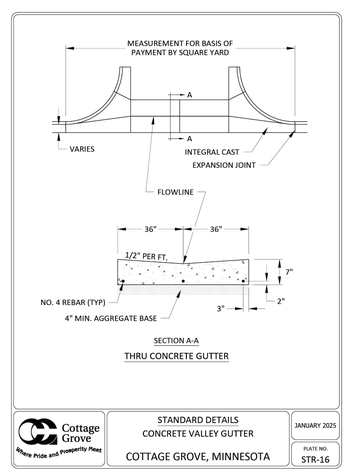
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
B618 CURB AND GUTTER
CONSTRUCTION AT CATCHBASIN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-14

48_STR14.DWG



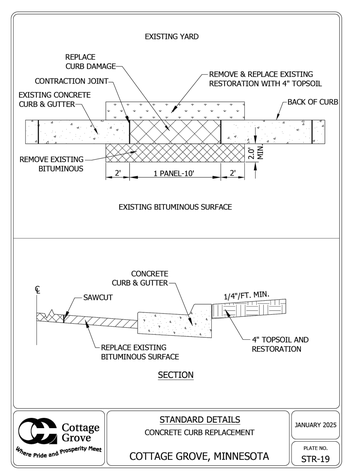
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE VALLEY GUTTER
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-16

48_STR16.DWG



Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE CURB REPLACEMENT
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-19

48_STR19.DWG

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUANRUD, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

PRELIMINARY CONSTRUCTION DETAILS

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

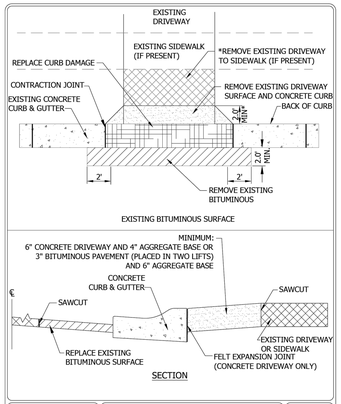
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 D

PROJECT NO.
24310-00

C8.2

F:_Civil 3D Projects\24310\PRE-PLAT PLANS\24310 D.dwg - 2/17/2026 12:29PM



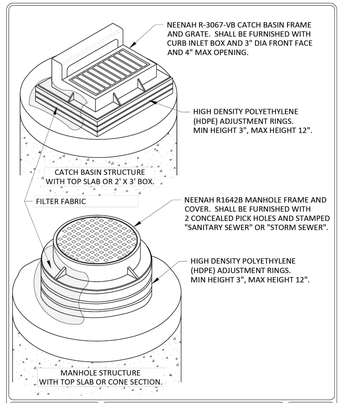
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE CURB REPLACEMENT AT DRIVEWAY LOCATION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-20

48_STR20.DWG



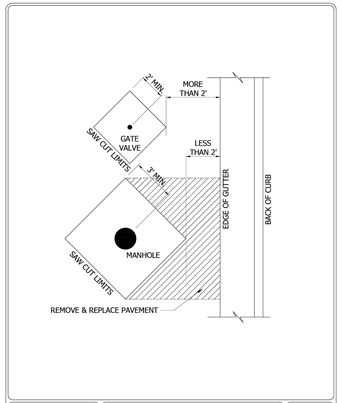
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CATCHBASIN AND MANHOLE ADJUSTMENT
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-23

48_STR23.DWG



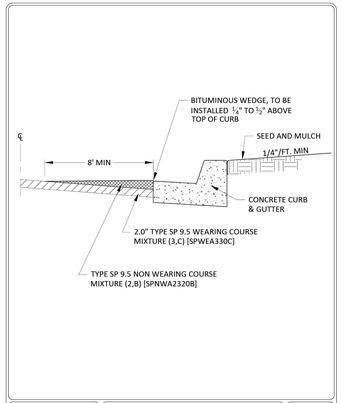
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STRUCTURE ADJUSTMENT PATCH (BITUMINOUS OR CONCRETE)
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-25

48_STR25.DWG



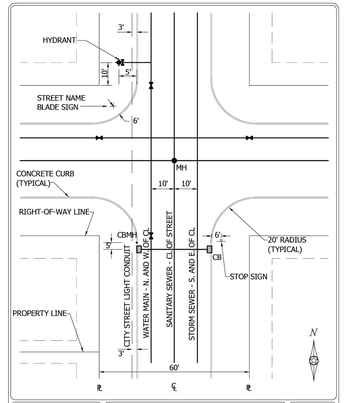
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE CURB PROTECTION BITUMINOUS WEDGE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-26

48_STR26.DWG



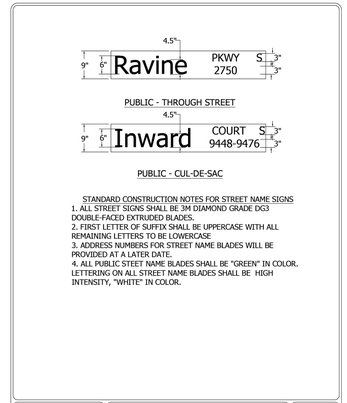
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL UTILITY LOCATIONS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-28

48_STR28.DWG



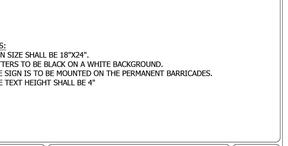
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STREET NAME BLADE SIGNS PUBLIC STREETS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-29

48_STR29.DWG



NOTES:
1. SIGN SIZE SHALL BE 18"X24".
2. LETTERS TO BE BLACK ON A WHITE BACKGROUND.
3. THE SIGN IS TO BE MOUNTED ON THE PERMANENT BARRICADES.
4. THE TEXT HEIGHT SHALL BE 4"

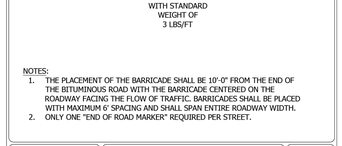
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
FUTURE ROAD EXTENSION SIGN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-31

48_STR31.DWG



NOTES:
1. THE PLACEMENT OF THE BARRICADE SHALL BE 10'-0" FROM THE END OF THE BITUMINOUS ROAD WITH THE BARRICADE CENTERED ON THE ROADWAY FACING THE FLOW OF TRAFFIC. BARRICADES SHALL BE PLACED WITH MAXIMUM 6' SPACING AND SHALL SPAN ENTIRE ROADWAY WIDTH.
2. ONLY ONE "END OF ROAD MARKER" REQUIRED PER STREET.

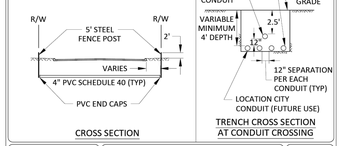
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
PERMANENT BARRICADE
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-32

48_STR32.DWG



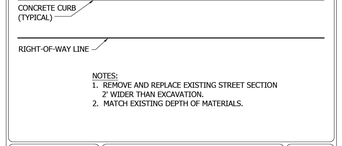
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
PRIVATE UTILITY CONDUIT CROSSING
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-34

48_STR34.DWG



NOTES:
1. REMOVE AND REPLACE EXISTING STREET SECTION 2' WIDER THAN EXCAVATION.
2. MATCH EXISTING DEPTH OF MATERIALS.

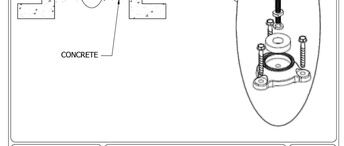
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
BITUMINOUS REMOVAL LIMITS
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-35

48_STR35.DWG



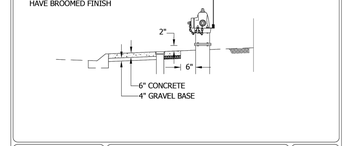
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
TYPICAL TRAFFIC SIGN INSTALLATION MEDIAN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-36

48_STR36.DWG



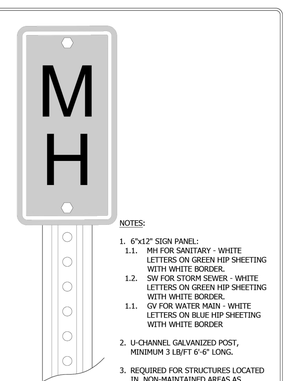
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE HYDRANT PAD
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-37

48_STR37.DWG



NOTES:
1. 6"x12" SIGN PANEL:
   1.1. MH FOR SANITARY - WHITE LETTERS ON GREEN HIP SHEETING WITH WHITE BORDER.
   1.2. SW FOR STORM SEWER - WHITE LETTERS ON GREEN HIP SHEETING WITH WHITE BORDER.
   1.1. GV FOR WATER MAIN - WHITE LETTERS ON BLUE HIP SHEETING WITH WHITE BORDER
2. U-CHANNEL GALVANIZED POST, MINIMUM 3 LB/FT 6'-6" LONG.
3. REQUIRED FOR STRUCTURES LOCATED IN NON-MAINTAINED AREAS AS DIRECTED BY ENGINEER.

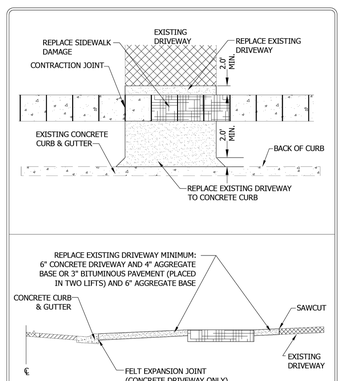
Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
STRUCTURE MARKER SIGN
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-41

48_STR41.DWG



Cottage Grove — Where Pride and Prosperity Meet

STANDARD DETAILS
CONCRETE SIDEWALK REPLACEMENT AT DRIVEWAY LOCATION
COTTAGE GROVE, MINNESOTA

JANUARY 2025

PLATE NO. STR-42

48_STR42.DWG

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUANSTROM, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY CONSTRUCTION DETAILS

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 D

PROJECT NO.
24310-00

C8.3

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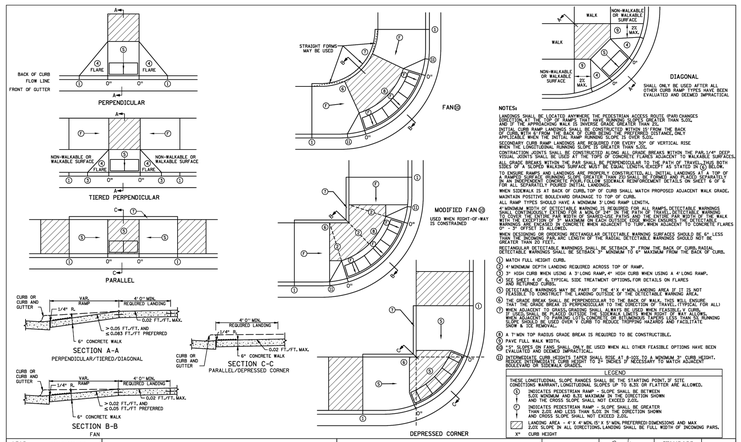


NOTES:

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS (UNLESS OTHERWISE NOTED), AND AT THE BOTTOM OF RAMPS.

BOTTOM CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN OR FROM THE BACK OF CURB WITH A MINIMUM 4' DEPTH AND A MINIMUM WIDTH EQUAL TO THE RAMP.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS GREATER THAN 5.0%.

CONTRACTION JOINTS SHALL BE CONSTRUCTED AT ONE-ALL GRADE BREAKS WITHIN THE PAR (1/4" DEEP VISUAL JOINT) AND AT 10' MAXIMUM SPACING. THE JOINT SHALL BE PERPENDICULAR TO THE GUTTER FLOW LINE.

ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL.

TRUE WITH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH.

TO CONFINE DETECTABLE WARNINGS TO THE CURB RAMP, THE DETECTABLE WARNING SHALL BE 2' MINIMUM IN THE DIRECTION OF TRAVEL.

THE PAR SPECIAL TRAFFICKED CONSTRUCTION OF RAMPS.

TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

WHEN THE ROADWAY IS 8" HIGH OR LESS THE TOP OF CURB LAYER SHALL MATCH THE RAMP. SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

A MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS (DETECTABLE WARNINGS SHALL NOT EXTEND BEYOND THE RAMP). THE DETECTABLE WARNING SHALL BE LOCATED SO THAT IT IS WITHIN THE ENTIRE PAR WIDTH OF CURB RAMP FLARE AND THE BACK OF CURB.

RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 7" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB. THIS ENSURES THE PAR ARE PROVIDED FOR PEDESTRIANS WHILE REGULAR DETECTABLE WARNING PLACEMENT.

① MATCH FULL HEIGHT CURB.
② 6" MINIMUM DEPTH LANDING REQUIRED ACROSS TOP OF RAMP.
③ 31" HIGH CURB WHEN USING A 3 LONG RAMP, 6" HIGH CURB WHEN USING A 4' LONG RAMP.
④ SEE SHEET 4 OF 6 FOR TYPICAL SIDE TREATMENT OPTIONS FOR DETAILS ON FLARES
⑤ DETECTABLE WARNING.
⑥ PEDESTRIAN CROSSWALK MARKINGS ARE PART OF THE PEDESTRIAN ACCESS ROUTE (PAR) AND IS NOT REQUIRED TO CONSTRUCT THE LANDING OUTSIDE OF THE CROSSWALK MARKING AREA.
⑦ SEE SHEET 6 OF 6 FOR DETECTABLE EDGE WITH CURB AND GUTTER DETAILS.
⑧ WHEN ADJACENT TO GRADED DRAINAGE SWALE, A 6" CURB SHOULD BE USED WHEN FLEXIBLE 4.5" CURB IS NOT AVAILABLE. THE 6" CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.
V CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.
V CURB NEXT TO BUILDING SHALL BE A 9" WIDTH AND SHALL MATCH PREVIOUS TOP OF SIDEWALK ELEVATIONS.
⑨ A 1"-WIDE TOP RADIUS GRADE BREAK IS REQUIRED TO BE CONSTRUCTIBLE.
⑩ PAVE FULL WIDTH.
⑪ CRUSHED AGGREGATE BASE MATERIAL IS NOT REQUIRED TO BE PLACED UNDER ALL OTHER FEASIBLE OPTIONS HAVE BEEN EXHAUSTED AND THE CURB RAMP IS TO BE CONSTRUCTED ON NATIVE SOIL.
⑫ INTERMEDIATE CURB HEIGHTS TAPER SMALL RISE AT 9:200 TO A MINIMUM 2" CURB HEIGHT. INCREASE CURB TAPER LENGTH AT LESS THAN 6% OR REDUCE INTERMEDIATE CURB HEIGHTS TO 2" INCHES IF NECESSARY TO MATCH ADJACENT BOULEVARD OR SIDEWALK GRADES.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT/ IF SITE CONDITIONS WARRANT/LONGITUDINAL SLOPES UP TO 5.0% OR FLATTER ARE ALLOWED.

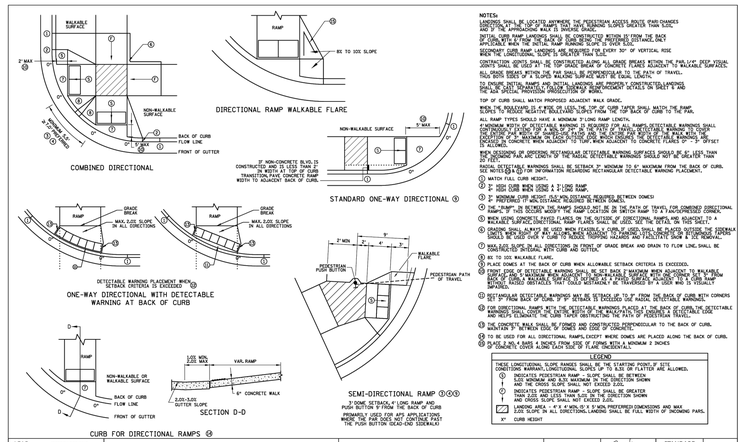
① INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 4.00% MIN AND 5.00% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%

② INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 5.00% UP TO 8.33% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

LANDING AREA - 4' X 4' MIN./5' X 5' MIN.PREFERRED/DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS/LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

LEAD EXPERT OFFICE	JEFFREY PERKINS OPERATIONS DIVISION	PEDESTRIAN CURB RAMP DETAILS	APPROVED: 11-04-2021 REVISED:	STANDARD PLAN 5-297.250	1 OF 6
DEPARTMENT OF TRANSPORTATION		STANDARD PLAN	STATE PROJ. NO.	SHEET NO.	
			TRUNK HWY.	TOTAL SHEETS	



NOTES:

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS (UNLESS OTHERWISE NOTED), AND AT THE BOTTOM OF RAMPS.

BOTTOM CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN OR FROM THE BACK OF CURB WITH A MINIMUM 4' DEPTH AND A MINIMUM WIDTH EQUAL TO THE RAMP.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS GREATER THAN 5.0%.

CONTRACTION JOINTS SHALL BE CONSTRUCTED AT ONE-ALL GRADE BREAKS WITHIN THE PAR (1/4" DEEP VISUAL JOINT) AND AT 10' MAXIMUM SPACING. THE JOINT SHALL BE PERPENDICULAR TO THE GUTTER FLOW LINE.

ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL.

TRUE WITH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH.

TO CONFINE DETECTABLE WARNINGS TO THE CURB RAMP, THE DETECTABLE WARNING SHALL BE 2' MINIMUM IN THE DIRECTION OF TRAVEL.

THE PAR SPECIAL TRAFFICKED CONSTRUCTION OF RAMPS.

TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

WHEN THE ROADWAY IS 8" HIGH OR LESS THE TOP OF CURB LAYER SHALL MATCH THE RAMP. SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

A MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS (DETECTABLE WARNINGS SHALL NOT EXTEND BEYOND THE RAMP). THE DETECTABLE WARNING SHALL BE LOCATED SO THAT IT IS WITHIN THE ENTIRE PAR WIDTH OF CURB RAMP FLARE AND THE BACK OF CURB.

RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 7" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB. THIS ENSURES THE PAR ARE PROVIDED FOR PEDESTRIANS WHILE REGULAR DETECTABLE WARNING PLACEMENT.

① MATCH FULL CURB HEIGHT.
② 7" HIGH CURB WHEN USING A 3' LONG RAMP.
③ 6" HIGH CURB WHEN USING A 4' LONG RAMP.
④ 2" MINIMUM CURB HEIGHT (TO) MIN.DISTANCE REQUIRED BETWEEN DOMES/ 2" REQUIRED TO BE MAINTAINED BETWEEN DOMES.
⑤ THE 7" OR 6" CURB HEIGHT MAY BE REDUCED TO 2" MINIMUM (TO) FOR COMBINED DIRECTIONAL RAMPS WHERE THE RAMP ADJACENT TO THE OUTSIDE OF ADDITIONAL RAMPS MAY BE REDUCED TO A REVERSE SLOPE DIRECTION TOWARD THE ROADWAY.
⑥ ENSURE SIDE SLOPE OF 2% OR LESS WHEN FLEXIBLE 4.5" CURB IS USED. SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. A 6" CURB SHALL BE USED WHEN FLEXIBLE 4.5" CURB IS NOT AVAILABLE. THE 6" CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. SHOULD BE USED OVER 9" CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.
⑦ MIN.FLAT SLOPE IN ALL DIRECTIONS IN FRONT OF GRADE BREAK AND DRAIN TO FLOW LINE, SHALL BE PROVIDED TO MAINTAIN POSITIVE DRAINAGE WITH CURB AND GUTTER.
⑧ 8% TO USE WALKABLE FLARE.
⑨ PLACE DOMES AT THE BACK OF CURB WHEN ALLOWABLE SETBACK CRITERIA IS EXCEEDED.
⑩ CONSTRUCT A DETECTABLE WARNING SURFACE WITH TRUNCATED DOMES WITH A DIAMETER OF 0.9" TO 1.4", A HEIGHT OF 0.2", AND A CENTER-TO-CENTER SPACING OF 1.66" MINIMUM TO 2.4" MAXIMUM. THE DOMES SHALL BE ARRANGED IN A RADIAL PATTERN WITH THE CURVED EDGE OF THE DOMES PARALLEL TO THE BACK OF CURB. A WALKABLE SURFACE OF AT LEAST 2' IS PROVIDED BETWEEN THE DETECTABLE WARNING AND THE BACK OF CURB. THE DETECTABLE WARNING SHALL CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHTER OR DARKER. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE SLIP RESISTANT AND NOT BE ABRADED WHEN SUBJECTED TO FOOT TRAFFIC. DETECTABLE WARNINGS SHALL NOT BE PLACED OVER EXPANSION JOINTS.
⑪ RECTANGULAR DETECTABLE WARNINGS MAY BE SETBACK UP TO 9" FROM THE BACK OF CURB WITH CORNERS SET 3" FROM EDGE OF CURB. 3" OF CONCRETE SHALL BE PLACED BEHIND DETECTABLE WARNINGS.
⑫ FOR DIRECTIONAL RAMPS WITH THE DETECTABLE WARNINGS PLACED AT THE BACK OF CURB,THE DETECTABLE WARNING SHALL BE 2' MINIMUM IN THE DIRECTION OF TRAVEL. THIS ENSURES THE PAR ARE PROVIDED AND HELPS ELIMINATE THE CURB TAPER OBSTRUCTING THE PATH OF PEDESTRIAN TRAVEL.
⑬ THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE BACK OF CURB. MAINTAIN 3" MIN.BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
⑭ TO BE USED FOR ALL DIRECTIONAL RAMPS,EXCEPT WHERE DOMES ARE PLACED ALONG THE BACK OF CURB.
⑮ WHERE 2 ADJ.4 BARS 6 INCHES FROM SIDE OF CURVES WITH A MINIMUM 2 INCHES OF CONCRETE COVER ALONG EACH SIDE TO BE CONSTRUCTIBLE.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT/ IF SITE CONDITIONS WARRANT/LONGITUDINAL SLOPES UP TO 5.0% OR FLATTER ARE ALLOWED.

① INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 5.00% UP TO 8.33% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%

② INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 8.33% UP TO 10.0% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

LANDING AREA - 4' X 4' MIN./5' X 5' MIN.PREFERRED/DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS/LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

LEAD EXPERT OFFICE	JEFFREY PERKINS OPERATIONS DIVISION	PEDESTRIAN CURB RAMP DETAILS	APPROVED: 11-04-2021 REVISED:	STANDARD PLAN 5-297.250	2 OF 6
DEPARTMENT OF TRANSPORTATION		STANDARD PLAN	STATE PROJ. NO.	SHEET NO.	
			TRUNK HWY.	TOTAL SHEETS	

NOTES:

POSITIVE FLOW LINE DRAINAGE SHALL BE MAINTAINED THROUGH THE PEDESTRIAN ACCESS ROUTE (PAR) AT A 2% MAXIMUM. NO PONDING SHALL BE PRESENT IN PAR.

ANY VERTICAL LIP THAT OCCURS AT THE FLOW LINE SHALL NOT BE GREATER THAN 1/4 INCH.

① TRANSITION PANELS - TO BE USED FOR TRANSITIONING THE CROSS-SLOPE OF A RAMP TO THE EXISTING WALK CROSS-SLOPE, BUT IT TRANSITION SHOULD BE LESS PER 1 LINEAR FOOT OF WALK.SEE SHEET 5 FOR ADDITIONAL INFORMATION.

② BEGIN GUTTER SLOPE TRANSITION 30' OUTSIDE OF ALL CURB RAMPS.

③ FACE SHALL BE NO VERTICAL DISCONTINUITIES GREATER THAN 1/4".

④ ELEVATION CHANGE TAKES PLACE FROM THE EXISTING 70 MCR FRONT OF GUTTER. PATCH IS USED TO MATCH THE NEW GUTTER PASS INTO THE EXISTING PAVEMENT.

⑤ FAVORABLE WITH STRUCTURAL CURB APPLICATIONS. SEE SHEET 6 FOR ADDITIONAL CURB SLOPE REQUIREMENTS. TOP 12" OF THE GUTTER TRANSITION SHALL BE PROPERLY ADJACENT PAVEMENT ELEVATION. TOP 12" OF THE GUTTER TRANSITION SHALL BE A FORMED CONCRETE SURFACE AND SHALL NOT BE TROWELED.

⑥ SHOULD BE USED AT VERTICALLY CONSTRAINED AREAS WHEN AT A DRAINAGE HIGH POINT OR SUPER ELEVATED ROADWAY SECTIONS.

⑦ DRILL AND GROUT NO.4 EPOXY-COATED 18" LONG TIE BARS AT 30" CENTER TO CENTER MINIMUM. SEE SHEET 6 FOR ADDITIONAL CURB RAMP REINFORCEMENT.

⑧ HELPS PROVIDE TWO SEPARATE RAMPS,PREFERRED, THE SOME SETBACK LENGTH AND MINIMIZES DIRECTIONAL CURB. THIS RADIUS DESIGN CLOSELY FOLLOWS THE TURNING VEHICLE PATH WHILE OPTIMIZING CURB RAMP LENGTH.

⑨ CURB EXTENSIONS SHOULD BE USED IN VERTICALLY CONSTRAINED AREAS,USUALLY IN DOWNTOWN ROADWAY SEGMENTS WHERE ON-STREET PARKING IS AVAILABLE.CURB EXTENSIONS SHOULD BE CONSIDERED FOR LOCATIONS WITH HIGH PEDESTRIAN VOLUMES.

⑩ PUSH BUTTONS MUST MEET APS CRITERIA AS DESCRIBED IN THE PUSH BUTTON LOCATION DETAIL SHEET.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT/ IF SITE CONDITIONS WARRANT/LONGITUDINAL SLOPES UP TO 5.0% OR FLATTER ARE ALLOWED.

① INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 4.00% MIN AND 5.00% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%

② INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 5.00% UP TO 8.33% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

LANDING AREA - 4' X 4' MIN./5' X 5' MIN.PREFERRED/DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS/LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

LEAD EXPERT OFFICE	JEFFREY PERKINS OPERATIONS DIVISION	PEDESTRIAN CURB RAMP DETAILS	APPROVED: 11-04-2021 REVISED:	STANDARD PLAN 5-297.250	3 OF 6
DEPARTMENT OF TRANSPORTATION		STANDARD PLAN	STATE PROJ. NO.	SHEET NO.	
			TRUNK HWY.	TOTAL SHEETS	

NOTES:

INTERMEDIATE CURB HEIGHTS TAPER SMALL RISE AT 9:200 TO A MINIMUM 2-INCH CURB HEIGHT.INCREASE CURB TAPER LENGTH AT LESS THAN 6% OR REDUCE INTERMEDIATE CURB HEIGHTS TO 2" INCHES IF NECESSARY TO MATCH ADJACENT BOULEVARD OR SIDEWALK GRADES.

SEE STANDARD PLATE 7008 AND THIS SHEET FOR ADDITIONAL DETAILS ON DETECTABLE WARNING.

① 0" CURB HEIGHT,SEE INSET A ON SHEET 3 OF 6.
② FULL CURB HEIGHT.
③ SIDE TREATMENTS ARE APPLICABLE TO ALL RAMP TYPES AND SHOULD BE IMPLEMENTED AS NEEDED AS FIELD CONDITIONS WARRANT.SIDE TREATMENTS SHOULD BE DETERMINED BASED ON A COMBINATION OF FACTORS INCLUDING: WIDTH OF BOTH ROADWAY AND SIDEWALK,ADJACENT PROPERTY CONSIDERATIONS,AND MITIGATING CONSTRUCTION IMPACTS.
④ TYPICALLY USED FOR MEDIANS AND ISLANDS.
⑤ WHEN NO CONCRETE FLARES ARE PROPOSED,THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE EDGE OF ROADWAY. MAINTAIN 3" MIN.BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
⑥ IF NO CURB AND GUTTER IS PLACED IN RURAL SECTIONS,DETECTABLE WARNINGS SHALL BE PLACED 1' FROM THE EDGE OF ESTABLISHED ROADWAY AND/OR ENGINEERED/PARALLEL EDGE PATH TO PHYSICALLY/VISUAL CONTRAST.
⑦ SIDE TREATMENTS EXAMPLES SHOWN ARE WHEN THE INITIAL LANDING IS APPROXIMATELY LEVEL WITH THE FULL HEIGHT CURB RAMP.LONG RAMP FOR 8" HIGH CURBS, WHEN THE INITIAL LANDING IS MORE THAN 1" BELOW FULL HEIGHT CURB REFER TO TABLES 1 & 2 TO MODIFY THE CURB HEIGHT TAPERS AND MAINTAIN POSITIVE BOULEVARD DRAINAGE.CONSTRUCT THESE TAPERS AT 2% MAXIMUM SLOPE.SEE SHEET 5 FOR ADDITIONAL CURB SLOPE REQUIREMENTS.
⑧ THE NEAREST EDGE OF DETECTABLE WARNING SURFACE SHALL BE PLACED 12' MINIMUM TO 72' MAXIMUM FROM THE NEAREST RAIL.FOR SKEWED RAILWAYS 30 NO DISTANCE SHALL THE DETECTABLE WARNING BE CLOSER THAN 12' MEASURED PERPENDICULAR TO THE NEAREST RAIL.
⑨ WHEN PEDESTRIAN GATES ARE PROVIDED,DETECTABLE WARNING SURFACES SHALL BE PLACED ON THE SIDE OF THE GATES OPPOSITE THE RAIL,2' FROM THE APPROACHING SIDE OF THE GATE ARM.THIS CRITERIA GOVERNS OVER NOTE ⑧.
⑩ DETECTABLE SURFACE SHALL EXTEND 2' MINIMUM PAST THE OUTSIDE EDGE OF WALK OF SHARED-USE PATH.
⑪ SIDE TREATMENT SHALL BE USED WHEN ADJACENT TO A SLOPE OF 3:1 OR STEEPER WITHIN 2' OF THE FREE RIGHT ISLANDS.
⑫ SIDEWALK TRANSITION - PLACED 1.00 MIN.FROM THE FACE OF SIDEWALK/DETECTED FACE OF CURB.THIS ENSURES MIN.CLEARANCE BETWEEN THE SIDEWALK AND GATE ARM COUNTERWEIGHT SUPPORTS.
⑬ CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-C. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE.

LEAD EXPERT OFFICE	JEFFREY PERKINS OPERATIONS DIVISION	PEDESTRIAN CURB RAMP DETAILS	APPROVED: 11-04-2021 REVISED:	STANDARD PLAN 5-297.250	4 OF 6
DEPARTMENT OF TRANSPORTATION		STANDARD PLAN	STATE PROJ. NO.	SHEET NO.	
			TRUNK HWY.	TOTAL SHEETS	

CONCRETE CURB DESIGN V

CURB HEIGHT H	CURB WIDTH W
6"	6"
8.5"	8"

NOTES:

A WALKABLE FLARE IS AN 8-020 CONCRETE FLARE THAT IS REQUIRED WHEN THE FLARE IS ADJACENT TO A NON-WALKABLE SURFACE OR WHEN THE PEDESTRIAN PATH OF TRAVEL OF A PUSH BUTTON TRAVERSES THE FLARE.

ALL V CURB CONTRACTION JOINTS SHALL MATCH CONCRETE WALK JOINTS.

WHERE RIGHT-OF-WAY ALLOWS,USE OF V CURB SHOULD BE MINIMIZED. GRADING ADJACENT TO V CURB SHOULD BE FLATTER THAN 3:1 WHERE FEASIBLE.

V CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.

V CURB NEXT TO BUILDING SHALL BE A 9" WIDTH AND SHALL MATCH PREVIOUS TOP OF SIDEWALK ELEVATIONS.

① END TAPERS AT TRANSITION SECTION SHALL MATCH SIMPLACE SIDEWALK GRADES.
② ALL V CURB SHALL MATCH BOTTOM OF ADJACENT WALK.
③ CONSTRUCT USING APPROVED EXPANSION MATERIAL PER MNDOT TYPE A-E EXPANSION. LEAVE SUFFICIENT SPACE OF TOP GAP AND SEAL WITH MNDOT APPROVED SILICONE PER MANUFACTURER'S RECOMMENDATIONS.
④ THE MAX.RATE OF CROSS SLOPE TRANSITIONING IS 1 LINEAR FOOT OF SIDEWALK PER HALF PERCENT CROSS SLOPE,WHEN PAR WIDTH IS GREATER THAN 4 OR THE RUNNING SLOPE IS GREATER THAN 5%,DOUBLE THE CALCULATED TRANSITION LENGTH.
⑤ TRANSITION PANELS ARE TO ONLY BE USED AFTER THE RAMP,OR 3' NEEDED,LANDING ARE AT THE FULL CURB HEIGHT TYPICAL SECTION.
⑥ EXISTING CROSS SLOPE GREATER THAN 2.0%.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT/ IF SITE CONDITIONS WARRANT/LONGITUDINAL SLOPES UP TO 5.0% OR FLATTER ARE ALLOWED.

① INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 4.00% MIN AND 5.00% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%

② INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 5.00% UP TO 8.33% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

LANDING AREA - 4' X 4' MIN./5' X 5' MIN.PREFERRED/DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS/LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

LEAD EXPERT OFFICE	JEFFREY PERKINS OPERATIONS DIVISION	PEDESTRIAN CURB RAMP DETAILS	APPROVED: 11-04-2021 REVISED:	STANDARD PLAN 5-297.250	5 OF 6
DEPARTMENT OF TRANSPORTATION		STANDARD PLAN	STATE PROJ. NO.	SHEET NO.	
			TRUNK HWY.	TOTAL SHEETS	

GENERAL NOTES:

LANDING OF CROSSWALKS MEANS MAINTAINING LESS THAN 2% CROSS SLOPE WITHIN A CROSSWALK,IS REQUIRED WHEN A ROADWAY IS IN A STOP OR YIELD CONDITION AND THE PROJECT SCOPE ALLOWS.

RECONSTRUCTION PROJECTS-ON FULL PAVEMENT REPLACEMENT PROJECTS *TABLING* OF ENTIRE CROSSWALK SHALL OCCUR WHEN FEASIBLE.

MILL & OVERLAY PROJECTS-*TABLING* OF FLOW LINE IN FRONT OF THE PEDESTRIAN RAMP IS REQUIRED WHEN THE EXISTING FLOW LINE IS GREATER THAN 2% WARPING OF THE BITUMINOUS PAVEMENT CAN NOT ENTIRELY INTO THE TABLING/TABLE FLOW LINE TO 2% AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA:

① 2% MAX.CROSS-SLOPE OF THE ROAD.
② 0.50% MIN.CROSS-SLOPE OF THE ROAD.
③ 0.50% MIN.FLOW LINE SLOPE FROM EXISTING SLOPE IN FRONT OF PEDESTRIAN RAMP
④ UP TO 1/2 INCH CHANGE IN FLOW LINE FROM EXISTING TO BEYOND THE PEDESTRIAN CURB RAMP

STAND-ALONE ADA RETROFITS-FOLLOW MILL & OVER-AY CRITERIA ABOVE.HOWEVER ALL PAVEMENT WARPING IS DONE WITH BITUMINOUS PATCHING ON BITUMINOUS ROADWAYS AND FULL-DEPTH APRON REPLACEMENT ON CONCRETE ROADWAYS.

RAISING OF CURB LINES SHOULD OCCUR IN VERTICALLY CONSTRAINED AREAS.RAISE THE CURB LINES ENOUGH TO ALLOW COMPLIANT RAMPS OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA:

① 2% MAX.CROSS-SLOPE OF THE ROAD.
② 0.50% MIN.FLOW LINE SLOPE FROM EXISTING SLOPE IN FRONT OF PEDESTRIAN RAMP TO MAINTAIN POSITIVE DRAINAGE
③ UNCONDITIONAL THROUGH LANE ROADWAY TAPERS SHOULD BE 1" VERTICAL PER 10 HORIZONTAL

NOTES:

① TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED,ALL INITIAL LANDINGS AT A TOP OF A RAMPED SURFACE SHALL BE PLACED AT THE FULL CURB HEIGHT AND SHALL BE CONSTRUCTED PRIOR TO PLACEMENT OF THE CONCRETE PAVE. FOLLOW SEPARATE REINFORCEMENT DETAILS ON THIS SHEET FOR ALL SEPARATELY POURED INITIAL LANDINGS.
② DRILL AND GROUT NO.4 13" LONG REINFORCEMENT BARS EPOXY-COATED AT 36" MAXIMUM CENTER TO CENTER MINIMUM 12" SPACING FROM CONSTRUCTION JOINTS.BARS TO BE ADJUSTED TO MATCH RAMP GRADE.BARS TO BE PAID BY EACH.
③ DRILL AND GROUT 2 - NO.4 X 10'-0" LONG 48" EMBEDDED REINFORCEMENT BARS EPOXY COATED.
④ TIE BARS SHALL BE PLACED AT 36" MAXIMUM CENTER TO CENTER MINIMUM AND NO LESS THAN 3 INCHES IN HEIGHT IN THE CURB.
⑤ THIS CURB LINE REINFORCEMENT DETAIL SHALL BE USED ON BITUMINOUS ROADWAYS FOLLOW CONCRETE ROADWAYS,SEE NOTE 6.
⑥ CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-C.EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE.
⑦ USE AN APPROVED TYPE F 0/4 INCH THICK) SEPARATION MATERIAL.SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.

LEAD EXPERT OFFICE	JEFFREY PERKINS OPERATIONS DIVISION	PEDESTRIAN CURB RAMP DETAILS	APPROVED: 11-04-2021 REVISED:	STANDARD PLAN 5-297.250	6 OF 6
DEPARTMENT OF TRANSPORTATION		STANDARD PLAN	STATE PROJ. NO.	SHEET NO.	
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HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUANSTROM, P.E.

Date: 01/28/2026 Reg.No. 24670

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

PRELIMINARY CONSTRUCTION DETAILS

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 D

PROJECT NO.
24310-00

C8.4

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LEGEND

- SAVED TREE
- REMOVE TREE
- EXISTING TREE (OFF-SITE)
- PROPOSED TREE REMOVAL AREA

NOTES

1. REFER TO SHEET C9.4 FOR TREE DATA TABULATION
2. TREE PRESERVATION (QUALIFYING TREES, MITIGATION) BASED ON CITY CODE 11-3-13: TREE PRESERVATION.
3. ALLOWED REMOVAL = 25% OF EXISTING QUALIFYING TREES
4. TREE INCH MITIGATION = 50% OF QUALIFYING TREE INCHES BEYOND ALLOWED REMOVAL THRESHOLD.
5. TREE REMOVAL AREA = 1.9 AC

REMOVAL/MITIGATION SUMMARY	DBH (INCHES)	TREE (EACH)
TOTAL ONSITE	2343	148
EXEMPT (INVASIVE)	730	37
TOTAL QUALIFYING TREES	1613	111
ALLOWED REMOVAL (25%)	403	N/A
SAVED	625	49
NON-EXEMPT REMOVAL	988	62
EXCESS REMOVAL	585	N/A
MITIGATION REQUIRED (50%)	293	N/A

BENCHMARKS

#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86

#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

Know what's **below.** **Call** before you dig.

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BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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KURT D. QUANRUD, P.E.
Reg.No. 24670
Date: 01/28/2026

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY TREE PRESERVATION PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 TP

PROJECT NO.
24310-00

C9.0

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CAD FILE 24310 TP	
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REVISIONS	2026-02-06 PER PER CITY COMMENTS
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McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY TREE PRESERVATION PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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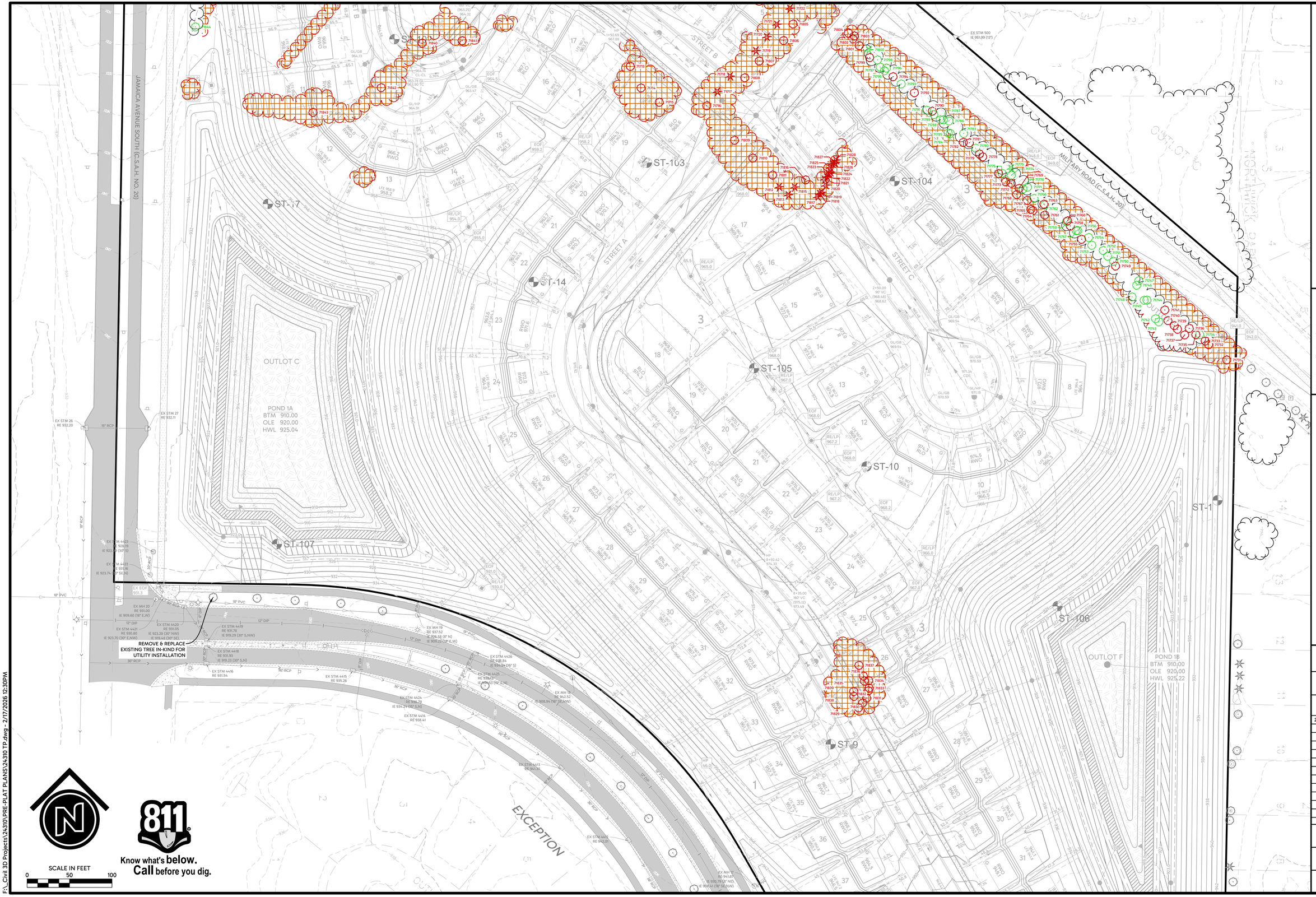
PRELIMINARY

KURT D. QUAINTANCE, P.E.

Date: 01/28/2026 Reg.No. 24678

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
KurtQ@mnhill.com
www.mnhill.com



HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

PRELIMINARY TREE PRESERVATION PLAN

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2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 TP

PROJECT NO.
24310-00

C9.2

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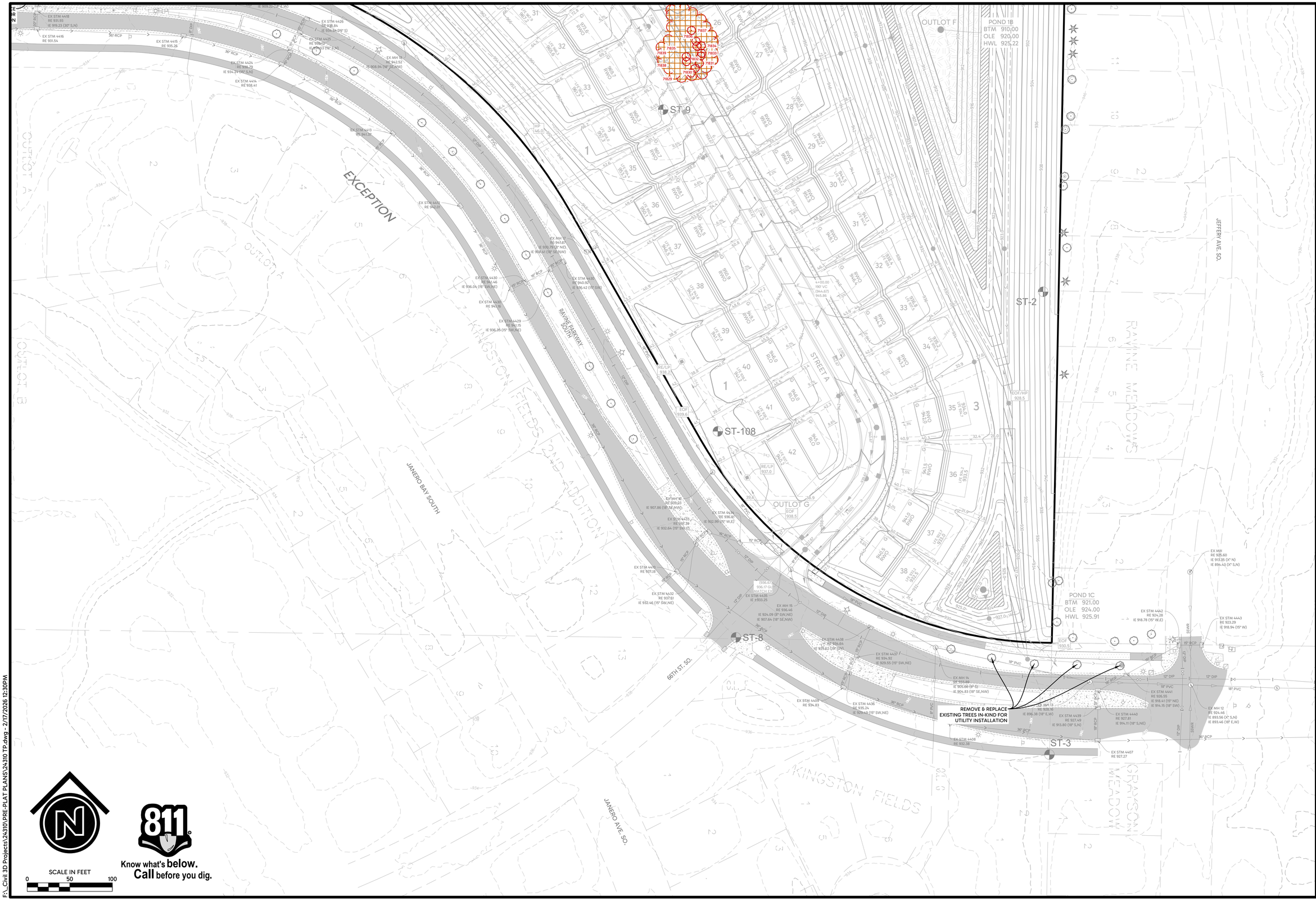

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BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY TREE PRESERVATION PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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DATE	01/28/2026
REVISIONS	
2026-02-17 REV PER CITY COMMENTS	
CAD FILE	24310 TP
PROJECT NO.	24310-00
	C9.3

TagID/Point #	DBH	Common Name	Scientific Name	Status	Notes
71712	10,11,13	Birch	*Betula*	REMOVE	
71713	16	Ash	*Fraxinus*	REMOVE - EXEMPT	
71714	19	Soft Maple	*Acer*	REMOVE	
71715	24	Ash	*Fraxinus*	REMOVE - EXEMPT	
71716	27	Ash	*Fraxinus*	REMOVE - EXEMPT	
71717	19	Spruce	*Picea*	REMOVE	
71718	19	Spruce	*Picea*	REMOVE	
71719	22	Spruce	*Picea*	REMOVE	
71720	19	Spruce	*Picea*	REMOVE	
71721	21	Spruce	*Picea*	REMOVE	
71722	19	Spruce	*Picea*	REMOVE	
71723	12	Crab Apple	*Malus*	REMOVE - EXEMPT	
71724	12	Crab Apple	*Malus*	REMOVE - EXEMPT	
71725	16	Spruce	*Picea*	REMOVE	
71726	18	Spruce	*Picea*	REMOVE	
71727	23	Pine	*Pinus*	REMOVE	
71728	12	Spruce	*Picea*	REMOVE	
71729	18	Maple	*Acer*	REMOVE	
71730	37	Maple	*Acer*	REMOVE	
71731	16	Hackberry	*Celtis occidentalis*	REMOVE	
71732	16,17	Ash	*Fraxinus*	REMOVE - EXEMPT	
71733	9	Ash	*Fraxinus*	REMOVE - EXEMPT	
71734	17	Hackberry	*Celtis occidentalis*	SAVE	
71735	11	Ash	*Fraxinus*	REMOVE - EXEMPT	
71736	12	Ash	*Fraxinus*	REMOVE - EXEMPT	
71737	19	Ash	*Fraxinus*	REMOVE - EXEMPT	
71738	7,8	Ash	*Fraxinus*	REMOVE - EXEMPT	
71739	15	Ash	*Fraxinus*	REMOVE - EXEMPT	
71740	13	Ash	*Fraxinus*	REMOVE - EXEMPT	
71741	11,12	Ash	*Fraxinus*	REMOVE - EXEMPT	
71742	6	Maple	*Acer*	SAVE	
71743	6	Maple	*Acer*	SAVE	
71744	9	Hackberry	*Celtis occidentalis*	SAVE	
71745	11	Hackberry	*Celtis occidentalis*	SAVE	
71746	10	Hackberry	*Celtis occidentalis*	SAVE	
71747	7	Hackberry	*Celtis occidentalis*	SAVE	
71748	11,12	Hackberry	*Celtis occidentalis*	SAVE	
71749	8	Ash	*Fraxinus*	REMOVE - EXEMPT	
71750	8	Hackberry	*Celtis occidentalis*	SAVE	
71751	18	Hackberry	*Celtis occidentalis*	SAVE	
71752	9	Hackberry	*Celtis occidentalis*	SAVE	
71753	26	Hackberry	*Celtis occidentalis*	SAVE	
71754	10,6	Hackberry	*Celtis occidentalis*	SAVE	
71755	9	Ash	*Fraxinus*	REMOVE - EXEMPT	
71756	9	Hackberry	*Celtis occidentalis*	SAVE	
71757	17	Hackberry	*Celtis occidentalis*	SAVE	
71758	13	Ash	*Fraxinus*	REMOVE - EXEMPT	
71759	9	Hackberry	*Celtis occidentalis*	SAVE	
71760	16	Ash	*Fraxinus*	REMOVE - EXEMPT	
71761	9	Hackberry	*Celtis occidentalis*	REMOVE	
71762	11	Hackberry	*Celtis occidentalis*	SAVE	
71763	15,12	Ash	*Fraxinus*	REMOVE - EXEMPT	
71764	7	Hackberry	*Celtis occidentalis*	REMOVE	
71765	11	Hackberry	*Celtis occidentalis*	REMOVE	
71766	9	Hackberry	*Celtis occidentalis*	SAVE	
71767	9	Hackberry	*Celtis occidentalis*	REMOVE	
71768	8	Hackberry	*Celtis occidentalis*	REMOVE	
71769	8	Hackberry	*Celtis occidentalis*	REMOVE	
71770	7	Hackberry	*Celtis occidentalis*	SAVE	
71771	8	Hackberry	*Celtis occidentalis*	SAVE	
71772	11	Hackberry	*Celtis occidentalis*	REMOVE	
71773	18	Hackberry	*Celtis occidentalis*	REMOVE	
71774	6	Hackberry	*Celtis occidentalis*	SAVE	
71775	18	Pine	*Pinus*	SAVE	
71776	9	Hackberry	*Celtis occidentalis*	SAVE	
71777	12	Elm	*Ulmus*	REMOVE - EXEMPT	
71778	14	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71779	17	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71780	12	Hackberry	*Celtis occidentalis*	SAVE	
71781	12	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71782	18,11	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71783	7	Hackberry	*Celtis occidentalis*	SAVE	
71784	9	Hackberry	*Celtis occidentalis*	SAVE	
71785	8	Hackberry	*Celtis occidentalis*	SAVE	
71786	8	Hackberry	*Celtis occidentalis*	SAVE	
71787	13	Hackberry	*Celtis occidentalis*	SAVE	
71788	11	Hackberry	*Celtis occidentalis*	SAVE	
71789	7	Hackberry	*Celtis occidentalis*	SAVE	
71790	12,6	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71791	11	Hackberry	*Celtis occidentalis*	SAVE	
71792	20,18	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71793	7,10,11,18	Hackberry	*Celtis occidentalis*	SAVE	
71794	10,11,12	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71795	6	Hackberry	*Celtis occidentalis*	SAVE	
71796	9	Hackberry	*Celtis occidentalis*	SAVE	
71797	7,7,7,5	Hackberry	*Celtis occidentalis*	SAVE	
71798	7	Hackberry	*Celtis occidentalis*	SAVE	
71799	19	Ash	*Fraxinus*	REMOVE - EXEMPT	
71800	21	Pine	*Pinus*	SAVE	

TagID/Point #	DBH	Common Name	Scientific Name	Status	Notes
71801	7,8	Hackberry	*Celtis occidentalis*	REMOVE	
71802	7,7,9,10	Hackberry	*Celtis occidentalis*	REMOVE	
71803	14	Hackberry	*Celtis occidentalis*	REMOVE	
71804	12	Hackberry	*Celtis occidentalis*	REMOVE	
71805	12	Hackberry	*Celtis occidentalis*	REMOVE	
71806	9	Hackberry	*Celtis occidentalis*	REMOVE	
71807	14,18	Maple	*Acer*	REMOVE	
71808	18	Birch	*Betula*	REMOVE	
71809	27	Maple	*Acer*	REMOVE	
71810	35	Maple	*Acer*	REMOVE	
71811	25	Maple	*Acer*	REMOVE	
71812	12	Spruce	*Picea*	REMOVE	
71813	17	Spruce	*Picea*	REMOVE	
71815	22	Spruce	*Picea*	REMOVE	
71816	33	Maple	*Acer*	REMOVE	
71817	12	Spruce	*Picea*	REMOVE	
71818	9	Spruce	*Picea*	REMOVE	
71819	12	Spruce	*Picea*	REMOVE	
71820	9	Spruce	*Picea*	REMOVE	
71821	6	Spruce	*Picea*	REMOVE	
71822	10	Spruce	*Picea*	REMOVE	
71823	11	Spruce	*Picea*	REMOVE	
71824	6	Spruce	*Picea*	REMOVE	
71825	14	Spruce	*Picea*	REMOVE	
71826	12	Spruce	*Picea*	REMOVE	
71827	8	Spruce	*Picea*	REMOVE	
71828	15	Spruce	*Picea*	REMOVE	
71829	14	Ash	*Fraxinus*	REMOVE - EXEMPT	
71830	8	Hackberry	*Celtis occidentalis*	REMOVE	
71831	6	Hackberry	*Celtis occidentalis*	REMOVE	
71832	11	Hackberry	*Celtis occidentalis*	REMOVE	
71833	12	Hackberry	*Celtis occidentalis*	REMOVE	
71834	7	Hackberry	*Celtis occidentalis*	REMOVE	
71835	21	Hackberry	*Celtis occidentalis*	REMOVE	
71836	8	Hackberry	*Celtis occidentalis*	REMOVE	
71837	16	Ash	*Fraxinus*	REMOVE - EXEMPT	
71838	15	Hackberry	*Celtis occidentalis*	REMOVE	
71839	25	Hackberry	*Celtis occidentalis*	REMOVE	
71840	17,10,14,11	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71841	8,7,7	Hackberry	*Celtis occidentalis*	REMOVE	
71842	19,12,11	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71843	19	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71844	7,7,7	Hackberry	*Celtis occidentalis*	SAVE	
71845	7,8,11,12	Hackberry	*Celtis occidentalis*	SAVE	
71846	7,6	Hackberry	*Celtis occidentalis*	SAVE	
71847	13	Hackberry	*Celtis occidentalis*	SAVE	
71848	9	Hackberry	*Celtis occidentalis*	SAVE	
71849	9,8	Hackberry	*Celtis occidentalis*	SAVE	
71850	12	Hackberry	*Celtis occidentalis*	SAVE	
71851	7	Hackberry	*Celtis occidentalis*	SAVE	
71852	11	Hackberry	*Celtis occidentalis*	SAVE	
71853	7	Hackberry	*Celtis occidentalis*	SAVE	
71854	7	Hackberry	*Celtis occidentalis*	SAVE	
71855	13	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71856	14	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71857	12	Box Elder	*Acer negundo*	REMOVE - EXEMPT	
71858	8	Hackberry	*Celtis occidentalis*	REMOVE	
71859	12	Hackberry	*Celtis occidentalis*	REMOVE	
71860	13,12,9,8	Box Elder	*Acer negundo*	REMOVE - EXEMPT	

SAVE
REMOVE
REMOVE - EXEMPT

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
Kurt@mnhill.com
www.mnhill.com

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.

KURT D. QUANRUD, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING

COTTAGE GROVE, MINNESOTA

PRELIMINARY TREE PRESERVATION PLAN

FOR

M/I HOMES OF MPLS/ST. PAUL, LLC.

5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

REVISIONS

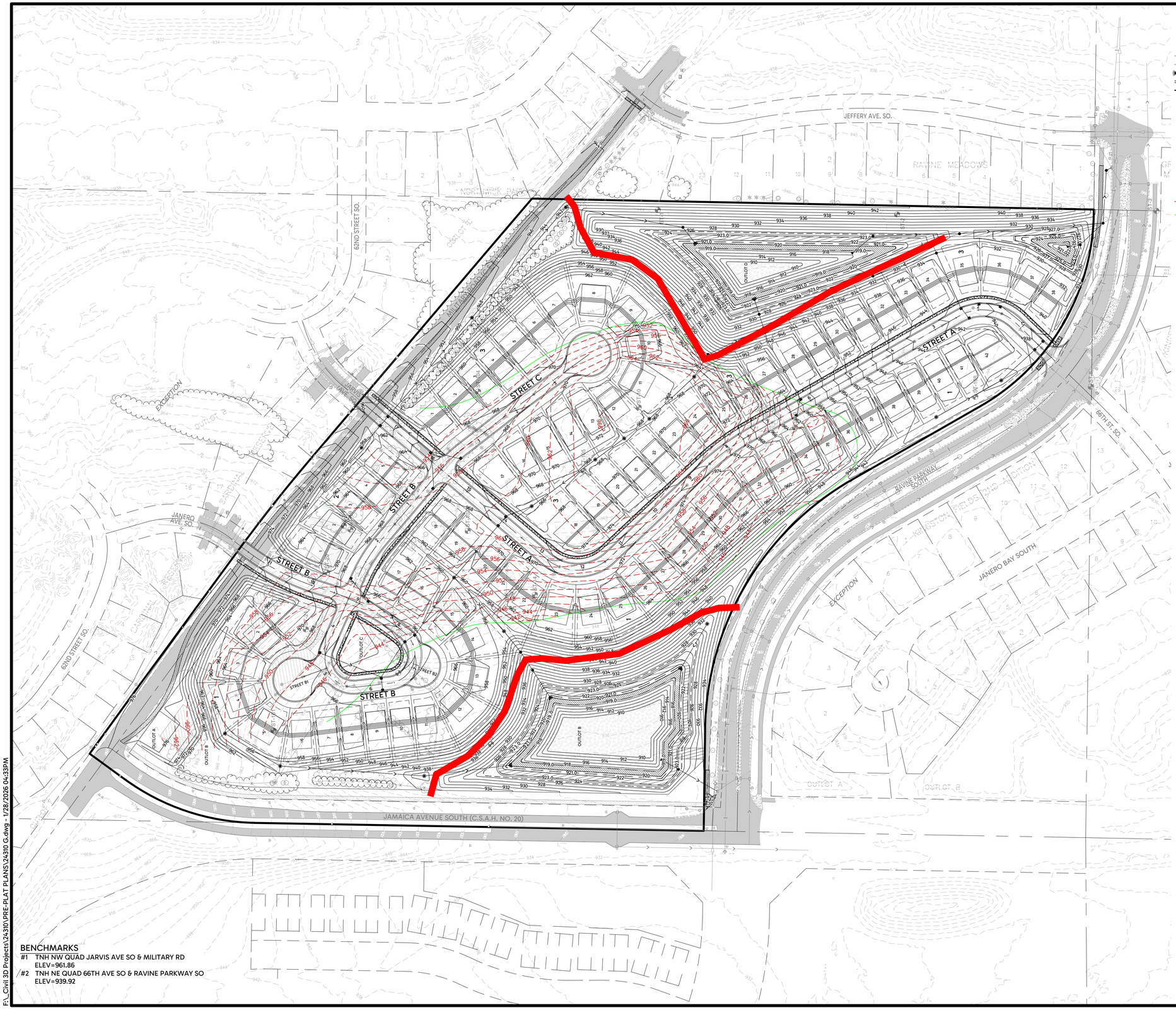
2026-02-17 REV PER CITY COMMENTS

CAD FILE
24310 TP

PROJECT NO.
24310-00

C9.4

F:_Civil 3D Projects\24310\PRE-PLAT PLANS\24310 TP.dwg - 2/17/2026 12:30PM



LEGEND

- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CURB & GUTTER
- PROPOSED CONTOUR
- PROPOSED EMERGENCY OVERFLOW
- PROPOSED CONCRETE
- PROPOSED ASPHALT SURFACE
- PROPOSED SEDIMENT BASIN
- PROPOSED 10' AQUATIC BENCH
- PROPOSED 10' POND MAINTENANCE ACCESS
- FUTURE ASPHALT SURFACE
- APPROXIMATE EXISTING CONTOUR - ROCK (TOP OF WEATHERED)
- APPROXIMATE EDGE/DROPOFF - ROCK

Approximate location of secondary maintenance bench

BENCHMARKS

#1 TNH NW QUAD JARVIS AVE SO & MILITARY RD
ELEV=961.86

#2 TNH NE QUAD 66TH AVE SO & RAVINE PARKWAY SO
ELEV=939.92

Know what's **below.** **Call** before you dig.

SCALE IN FEET
0 100 200

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
KurtQ@mnhill.com
www.mnhill.com

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.

KURT D. QUANRUD, P.E.

Date: 01/28/2026 Reg.No. 24670

PRELIMINARY

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA

PRELIMINARY GRADING & DRAINAGE PLAN

FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
CTY

DATE
01/28/2026

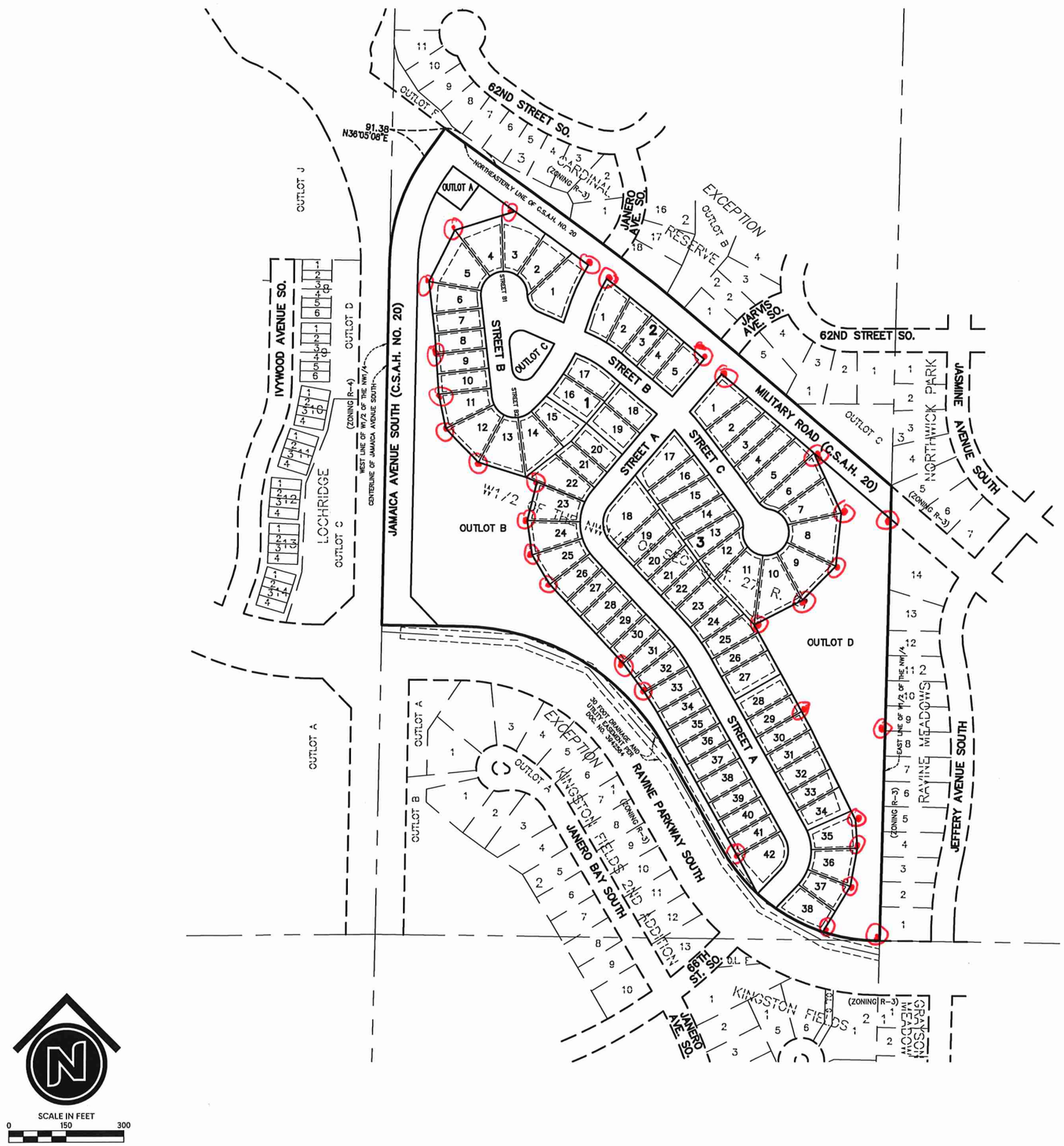
REVISIONS

CAD FILE
24310 G

PROJECT NO.
24310-00

C4.0

F:_Civil 3D Projects\24310\PRE-PLAT PLANS\24310 G.dwg - 1/28/2026 04:33PM



PROPERTY DESCRIPTION

That part of the West Half of the Northwest Quarter of Section 3 lying easterly of Jamaica Avenue, Except that portion lying Northeasterly of County Road No. 20.
Also except the property platted as Kingston Fields and Kingston Fields 2nd Addition, Washington County, Minnesota. Subject to County Road 20, Jamaica Avenue and Ravine Parkway South.

PID NOS. 0302721230003 & 0302721230001

ZONING INFORMATION

CURRENT ZONING:	R-4 (TRANSITIONAL RESIDENTIAL)
PROPOSED ZONING:	PUD

SITE DATA

GROSS AREA	36.35 ACRES
LOTS	85 LOTS
GROSS DENSITY (TOTAL UNITS/GROSS AREA)	2.3 D.U./ACRE
NET DENSITY (TOTAL UNITS/GROSS AREA-COUNTY ROADS-OUTLOTS(PARK & PONDING))	3.9 D.U./ACRE
LOTS	17.01 ACRES
R.O.W.	9.28 ACRES
EXISTING ROAD (JAMAICA AVENUE SOUTH)	(2.30 ACRES)
EXISTING ROAD (MILITARY ROAD)	(2.18 ACRES)
SUBDIVISION ROADS	(4.80 ACRES)
OUTLOTS	10.06 ACRES
OUTLOT A (PARK)	(0.15 ACRES)
OUTLOT B (PONDING)	(5.27 ACRES)
OUTLOT C	(0.22 ACRES)
OUTLOT D (PONDING)	(4.42 ACRES)
TOTAL	36.35 ACRES

MINIMUM SETBACKS	
FRONT	25 FEET
SIDE (HOUSE & GARAGE)	6 FEET
SIDE (STREET)	20 FEET
REAR	30 FEET
MINIMUM LOT REQUIREMENTS	
LOT WIDTH	45 FEET
LOT DEPTH	120 FEET
MAXIMUM IMPERVIOUS COVERAGE	50%
LOT DATA	
NO. OF LOTS	85 LOTS
SMALLEST LOT SIZE	6,665 S.F.
LARGEST LOT SIZE	14,577 S.F.
AVERAGE LOT SIZE	8,719 S.F.

31 property markers

2/12/26

HILL INCORPORATED
2999 WEST C.R. 42, SUITE 100
BURNSVILLE, MN 55306
PHONE: 952-890-6044
marcus@mnhill.com
www.mnhill.com

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

PRELIMINARY

MARCUS F. HAMPTON
Date: 01/28/2026 Reg.No. 47451

McHATTIE LANDING
COTTAGE GROVE, MINNESOTA
PRELIMINARY PLAT
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
PLM

DATE
01/28/2026

REVISIONS

CAD FILE
24310PP-1.dwg

PROJECT NO.
24310-00

C2.0

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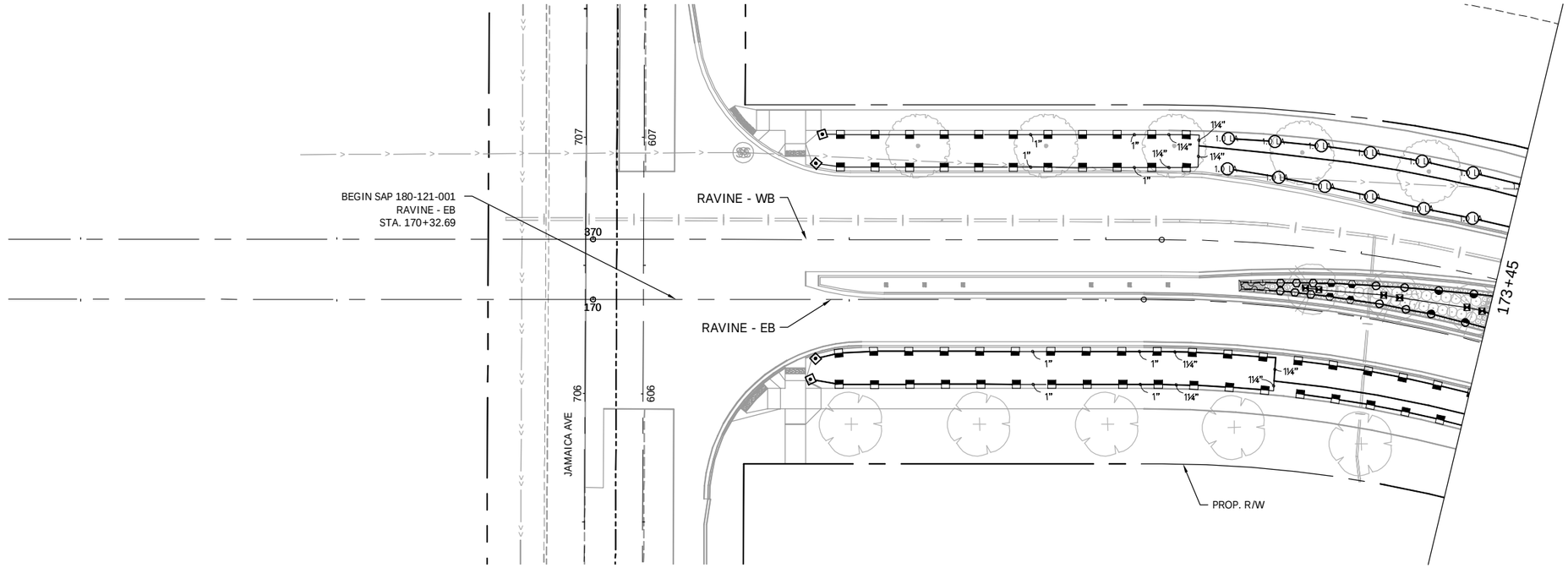

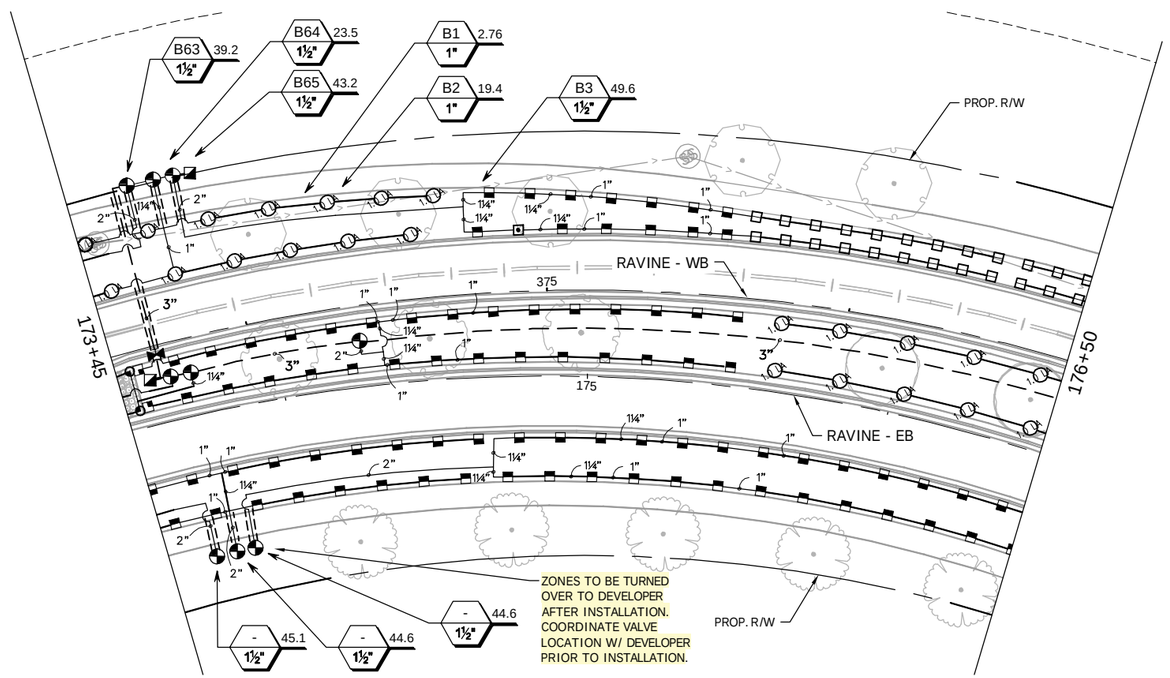

NO	DATE	APPR	REVISION

SURVEY	PBW
DRAWN	SMV/MAF
DESIGNED	JDP
CHECKED	JDP
APPROVED	DRS
PROJ. NO.	193803878

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

PRINT NAME: TODD R. WICHMAN

SIGNATURE: Todd R. Wichman

DATE: 04/23/2018 LIC. NO. 19524

Cottage Grove
Where Pride and Prosperity Meet

Stantec
2335 Highway 36 W
St. Paul, MN 55113
www.stantec.com

IRRIGATION PLAN
RAVINE PARKWAY

CITY OF COTTAGE GROVE, MN
RAVINE PARKWAY STREET AND UTILITY IMPROVEMENTS
SAP 180-121-001, SAP 180-123-001
SAP 180-110-013, SAP 180-020-013

SHEET 346 OF 572

Plot Date: 05/11/2018 - 3:04pm
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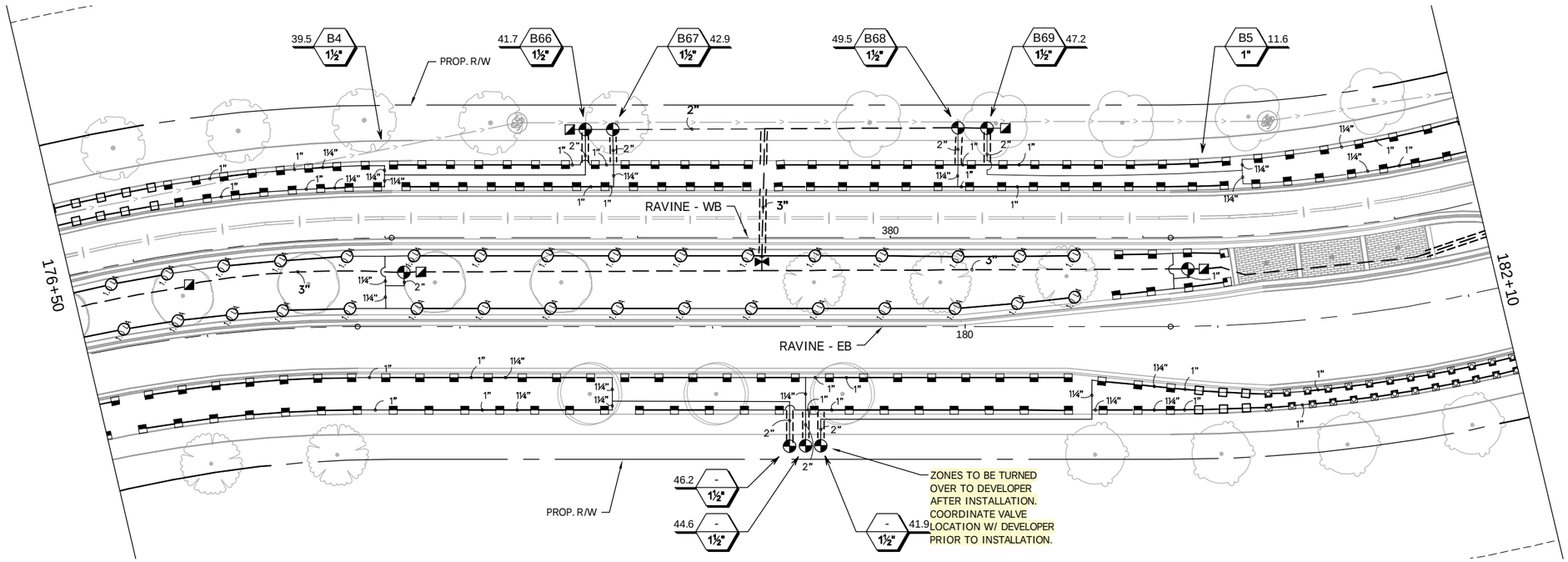

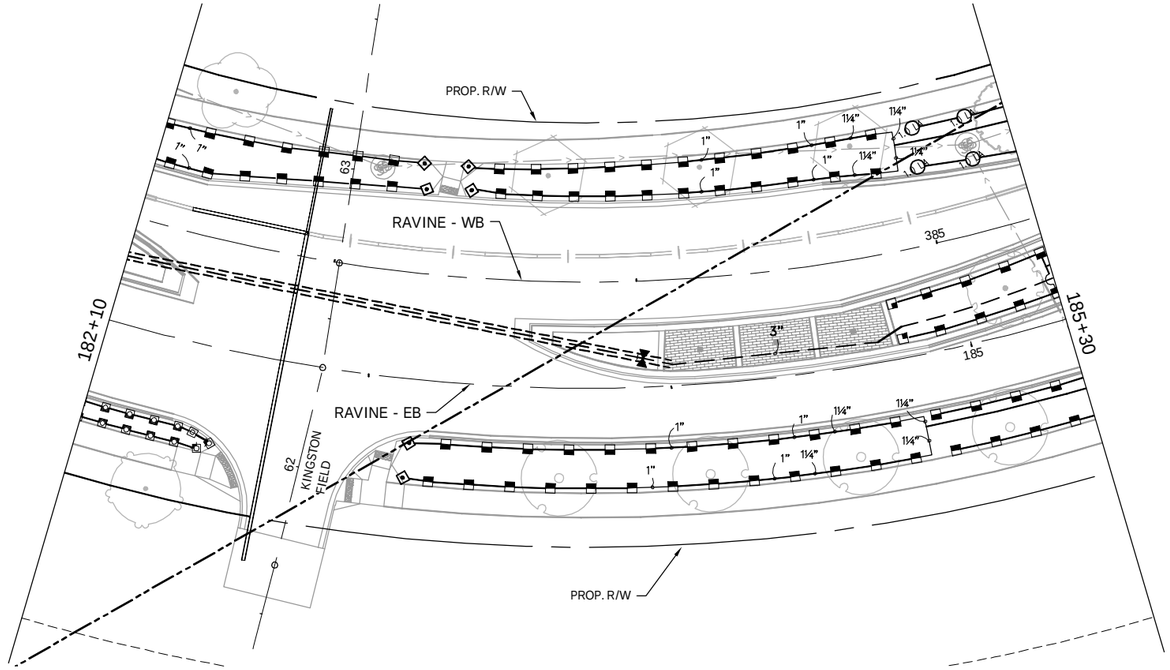

N
0 25' 50'

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SHEET 347 OF 572

Plot Date: 05/11/2018 - 3:04pm
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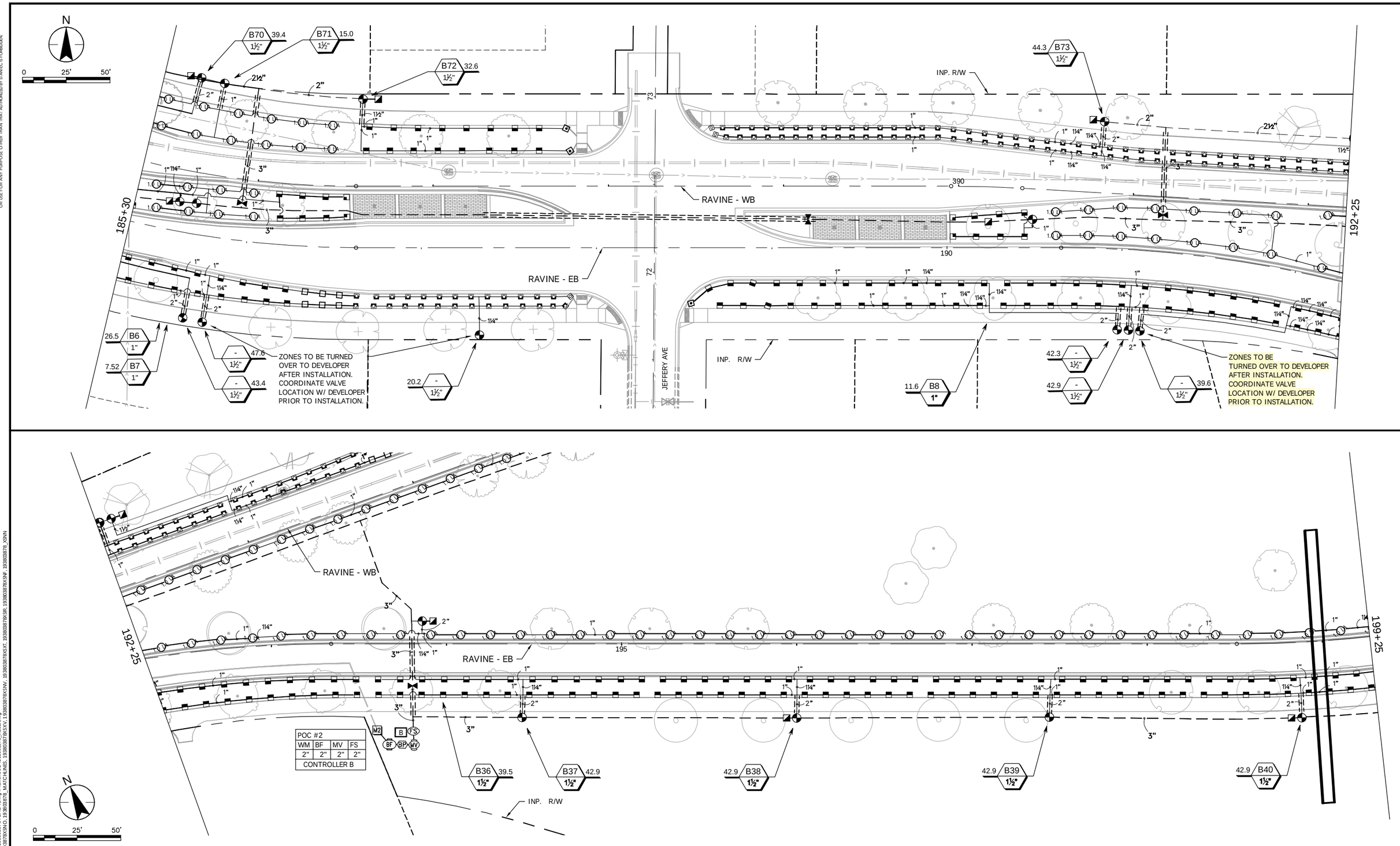

NO	DATE	APPR	REVISION

SURVEY	PBW
DRAWN	SMV/MAF
DESIGNED	JDP
CHECKED	JDP
APPROVED	DRS
PROJ. NO.	193803878

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SAP 180-121-001, SAP 180-123-001
SAP 180-110-013, SAP 180-020-013

SHEET 348 OF 572

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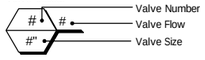
IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI
Q T H TT TQ F	TORO 570Z-6P-PR-COM 8 SERIES TURF SPRAY, 6" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-6P-PR-COM 10 SERIES TURF SPRAY, 6" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-6P-PR-COM 12 SERIES TURF SPRAY, 6" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-6P-PR-COM 15 SERIES TURF SPRAY, 6" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
8 10 12 15	TORO 570Z-6P-PR-COM ADJ TURF SPRAY, 6" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-6P-PR-COM 5 SERIES TURF SPRAY, 6" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-12P-PR-COM 5 SERIES SHRUB SPRAY, 12" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-12P-PR-COM 8 SERIES SHRUB SPRAY, 12" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-12P-PR-COM 10 SERIES SHRUB SPRAY, 12" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-12P-PR-COM 12 SERIES SHRUB SPRAY, 12" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
Q T H TT TQ F	TORO 570Z-12P-PR-COM 15 SERIES SHRUB SPRAY, 12" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
8 10 12 15 17	TORO 570Z-12P-PR-COM ADJ SHRUB SPRAY, 12" POP-UP, WITH BUILT IN-RISER PRESSURE REGULATOR. ALSO INCLUDES THE ZERO FLUSH WIPER SEAL. 1/2" FEMALE-THREADED INLET. WITH CHECK VALVE.	30
2–180 4–180 90 180 360	TORO 570Z-6-COM-SB-PC PRESSURE COMPENSATING SHRUB STREAM SPRAY BUBBLER ON 6.0" POP-UP. WITH CHECK-O-MATIC CHECK VALVE.	30

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	GPM	RADIUS
1.0 A	TORO T5-P-CK-LA TURF ROTOR, 5" POP-UP, LOW ANGLE NOZZLES, PLASTIC RISER. ADJUSTABLE ARC PATTERNS 40-360, 25`-50` RADIUS (7,6M TO 15,2M). WITH CHECK VALVE.	35	0.94	25'
1.3 A	TORO T5-P-CK-LA TURF ROTOR, 5" POP-UP, LOW ANGLE NOZZLES, PLASTIC RISER. ADJUSTABLE ARC PATTERNS 40-360, 25`-50` RADIUS (7,6M TO 15,2M). WITH CHECK VALVE.	35	1.35	27'
3.0 A	TORO T5-P-CK-LA TURF ROTOR, 5" POP-UP, LOW ANGLE NOZZLES, PLASTIC RISER. ADJUSTABLE ARC PATTERNS 40-360, 25`-50` RADIUS (7,6M TO 15,2M). WITH CHECK VALVE.	35	2.60	29'

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	TORO P220-27-9 GLOBE ELECTRIC, 1", 1-1/2", 2" AND 3" PLASTIC IN-LINE REMOTE CONTROL VALVE. EQUIPPED TO WITHSTAND PRESSURE UP TO 220 PSI. FILTER SCREEN ON 2" AND 3" MODELS. DC LATCHING SOLENOID. GLOBE BODY STYLE. WITH EZ REG PRESSURE REGULATOR.
	TORO 100-2SLVC TWO-PIECE, 1" SINGLE LUG QUICK COUPLER VALVE WITH VINYL COVER.
	NIBCO T-113-K CLASS 125 BRONZE GATE SHUT OFF VALVE WITH CROSS HANDLE, SAME SIZE AS MAINLINE PIPE DIAMETER AT VALVE LOCATION. SIZE RANGE - 1/4" - 3"
MV	TORO 220-26-9 2" BRASS 1", 1-1/4", 1-1/2", 2", 2-1/2", AND 3" MASTER VALVE. WITH DC LATCHING SOLENOID. 1"-2" HAVE IN-LINE GLOBE BODY STYLE, AND 2-1/2" - 3" ARE ANGLE VALVE BODY STYLES.
BF	ZURN 975XL 1-1/2" REDUCED PRESSURE BACKFLOW DEVICE
BF	ZURN 975XL 2" REDUCED PRESSURE BACKFLOW DEVICE
A	TORO CDEC-SA-050 50-STATION 2-WIRE DECODER CONTROLLER, WITH REMOTE CONNECTION. WALL MOUNT METAL CABINET.
B	TORO CDEC-SA-100 100-STATION 2-WIRE DECODER CONTROLLER, WITH REMOTE CONNECTION. WALL MOUNT METAL CABINET.
FS	CREATIVE SENSOR TECHNOLOGY FSI-S30-001 2", 3" PVC SADDLE TYPE FLOW SENSOR, CUSTOM MOUNTING SADDLE AND ULTRA-LIGHTWEIGHT IMPELLER ENHANCES LOW FLOW MEASUREMENT. TWO WIRE DIGITAL OUTPUT COMPATIBLE WITH ALL IRRIGATION CONTROLLERS. FLOW RANGE: 6-300 GPM.
BP	RAIN BIRD CLP07VEASE1 7.5 HP SUCTION BOOST MODEL. UP TO 63 PSI AND 160 GPM.
BP	RAIN BIRD CLP05VEASC1 7.5 HP SUCTION BOOST MODEL. UP TO 63 PSI AND 160 GPM..
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21
	IRRIGATION MAINLINE: PVC CLASS 315 SDR 13.5
	PIPE SLEEVE: DUCTILE IRON PIPE TYPICAL PIPE SLEEVE FOR IRRIGATION PIPE UNDER VEHICULAR PAVEMENT. ALL OTHER SLEEVING SHALL BE PVC CLASS 200. SIZE SHALL BE MIN. 2X THE DIA. OF PIPE BEING SLEEVED. WIRING SHALL BE SLEEVED SEPARATELY WITHIN A 2" MIN. CONDUIT. EXTEND SLEEVES 12" BEYOND EDGES OF PAVING AND CURBS.

Valve Callout



CRITICAL ANALYSIS

Generated:	2018-04-05 23:34
P.O.C. NUMBER: 01	
Water Source Information:	DUCTILE IRON STUB
FLOW AVAILABLE	
Water Meter Size:	2"
Flow Available:	120.00 gpm
PRESSURE AVAILABLE	
Static Pressure at POC:	65.00 psi
Elevation Change:	8.00 ft
Service Line Size:	3"
Length of Service Line:	50.00 ft
Booster Pump pressure provided:	30.00 psi
Pressure Available:	91.00 psi
DESIGN ANALYSIS	
Maximum Multi-valve Flow:	47.00 gpm
Flow Available at POC:	120.00 gpm
Residual Flow Available:	73.00 gpm
Critical Station:	A9
Design Pressure:	35.00 psi
Friction Loss:	6.22 psi
Fittings Loss:	0.62 psi
Elevation Loss:	0.00 psi
Loss through Valve:	3.15 psi
Pressure Req. at Critical Station:	44.99 psi
Loss for Fittings:	1.95 psi
Loss for Main Line:	19.49 psi
Loss for POC to Valve Elevation:	0.87 psi
Loss for Backflow:	13.54 psi
Loss for Master Valve:	2.00 psi
Loss for Water Meter:	1.72 psi
Critical Station Pressure at POC:	84.56 psi
Pressure Available:	91.00 psi
Residual Pressure Available:	6.44 psi

CRITICAL ANALYSIS

Generated:	2018-04-05 23:24
P.O.C. NUMBER: 02	
Water Source Information:	DUCTILE IRON STUB
FLOW AVAILABLE	
Water Meter Size:	2"
Flow Available:	120.00 gpm
PRESSURE AVAILABLE	
Static Pressure at POC:	65.00 psi
Elevation Change:	6.00 ft
Service Line Size:	3"
Length of Service Line:	218.00 ft
Booster Pump pressure provided:	55.00 psi
Pressure Available:	115.00 psi
DESIGN ANALYSIS	
Maximum Multi-valve Flow:	100.00 gpm
Flow Available at POC:	120.00 gpm
Residual Flow Available:	20.00 gpm
Critical Station:	B31
Design Pressure:	30.00 psi
Friction Loss:	1.38 psi
Fittings Loss:	0.14 psi
Elevation Loss:	0.00 psi
Loss through Valve:	3.83 psi
Pressure Req. at Critical Station:	35.33 psi
Loss for Fittings:	3.97 psi
Loss for Main Line:	39.69 psi
Loss for POC to Valve Elevation:	6.50 psi
Loss for Backflow:	13.60 psi
Loss for Master Valve:	6.00 psi
Loss for Water Meter:	7.80 psi
Critical Station Pressure at POC:	112.89 psi
Pressure Available:	115.00 psi
Residual Pressure Available:	2.11 psi

IRRIGATION DESIGN NOTES:

1. IRRIGATION SYSTEM DEMAND AT POINT OF CONNECTION: 70 GPM MAX. AT 65 PSI MIN. CONFIRM STATIC PRESSURE PRIOR TO START OF WORK. NOTIFY LANDSCAPE ARCHITECT IF STATIC PRESSURE IS LOWER THAN STATED DEMAND.
2. MAKE IRRIGATION POINT OF CONNECTION AS INDICATED ON PLAN AND COORDINATE WITH OTHER WORK AS REQUIRED. EXACT LOCATION OF BACKFLOW PREVENTER TO BE APPROVED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. PRIOR TO ORDERING IRRIGATION CABINET, CONTRACTOR TO CONFIRM THAT IT IS SIZED APPROPRIATELY TO ACCOMMODATE ALL EQUIPMENT, SUPPORTS, AND ALLOWS SUFFICIENT ROOM FOR MAINTENANCE ACCESS.
3. THE IRRIGATION PLAN IS DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE COMPLETED. IRRIGATION EQUIPMENT AND PIPING MAY BE SHOWN IN PAVED AREAS FOR GRAPHIC CLARITY. INSTALL ALL PIPING AND EQUIPMENT ON OWNER'S PROPERTY, WITHIN CONSTRUCTION LIMITS, AND WITHIN PLANTING AREAS UNLESS OTHERWISE NOTED ON PLANS. TO THE EXTENT POSSIBLE, LOCATE ELECTRIC REMOTE CONTROL VALVE BOXES OUT OF DIRECT VIEW, YET ACCESSIBLE. LANDSCAPE ARCHITECT TO ACCEPT ALL SPRINKLER, VALVE, AND CONTROLLER LOCATIONS PRIOR TO INSTALLATION.
4. CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL IRRIGATION EQUIPMENT AND APPURTENANCES, INCLUDING ITEMS NOT SHOWN, BUT NECESSARY TO ACHIEVE A COMPLETE AND OPERABLE IRRIGATION SYSTEM.
5. ALL PRODUCT APPLICATIONS AND INSTALLATIONS MUST MEET MANUFACTURER'S REQUIREMENTS.
6. FLOW RATES THROUGH PVC PIPING NOT TO EXCEED MANUFACTURER'S RECOMMENDATIONS.
7. FULL (HEAD-TO-HEAD) COVERAGE IS REQUIRED WITHIN THE AREAS DELINEATED TO RECEIVE IRRIGATION.
8. IRRIGATION PLANS TAKE PRECEDENCE OVER IRRIGATION SPECIFICATIONS. ANY DISCREPANCIES BETWEEN THESE TWO DOCUMENTS MUST BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO BID OPENING.
9. DESIGN INTENT IS TO PROVIDE AN IRRIGATION SYSTEM THAT PROVIDES SUFFICIENT WATER TO ALL PLANTING AREAS AND LIMITS WATER FROM NON-IRRIGATED AREAS. KEEP IRRIGATION WATER OFF OF ALL BUILDINGS, SIDEWALKS, ROADWAYS, AND OTHER PAVED SURFACES. IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO FIELD ADJUST AND / OR RECTIFY THESE CONDITIONS AS NECESSARY TO ENSURE THAT OVERSPRAY AND RUNOFF DO NOT OCCUR.
10. IRRIGATION SUPPLY SYSTEM IS DESIGNED TO ACCOMMODATE POSSIBLE FUTURE EXPANSION.
11. TURF AREAS MUST BE WATERED AND MAINTAINED UNTIL ESTABLISHED AND APPROVED PER SPECIFICATIONS.
12. WATER METER TO BE PROVIDED BY OTHERS. CONTRACTOR TO INSTALL PER CITY STANDARD.
13. IRRIGATION SYSTEM TO INCLUDE BACKFLOW PREVENTER, WATER METER, RAIN SENSOR, CONTROLLER, CABINETS, PIPING, VALVES, EMITTERS AND ALL OTHER COMPONENTS NECESSARY TO INSTALL A COMPLETE SYSTEM AS REQUIRED IN THE PLANS AND SPECIFICATIONS. IRRIGATION BID TO INCLUDE CONTRACTOR PROVIDED SUBMITTALS FOR REVIEW. SEE SPECIFICATIONS.
14. SLEEVING LOCATIONS ARE APPROXIMATE AND INTENDED TO SHOW INTENT ONLY. FIELD ADJUST SLEEVE LOCATIONS AS NECESSARY.
15. CAP THE ENDS OF ALL SLEEVES NOT CURRENTLY IN USE.

IRRIGATION CONTROLLER NOTES:

1. IRRIGATION CONTROLLER LOCATIONS ARE DIAGRAMMATIC, FIELD LOCATE WITH LANDSCAPE ARCHITECT AND GENERAL CONTRACTOR. ELECTRICAL CONTRACTOR TO PROVIDE 120 V.A.C. TO DETERMINED LOCATION.
2. IRRIGATION CONTROLLER AND EQUIPMENT TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

ELECTRICAL NOTES:

1. ALL 120 V.A.C. PRIMARY, AND 24 V.A.C. SECONDARY POWER TO BE INSTALLED AS PER STATE AND LOCAL CODES, WITH GROUND WIRE; MEETING N.E.C. AND M.A.C. REQUIREMENTS.
2. ALL WIRE TO BE UL APPROVED FOR (CONDUIT 2"), SIZE PER MANUFACTURER'S RECOMMENDATION.
3. ALL POWER WIRE TAPS AND CONNECTIONS TO CONFORM TO LOCAL AND STATE CODES AND TO BE PERFORMED BY A LICENSED ELECTRICIAN.
4. INSTALL VALVE WIRES IN ONE CONTINUOUS PULL FROM VALVES TO CONTROLLER, WITHOUT SPLICES. IF NECESSARY, ALL 24 V.A.C. FIELD SPLICES TO BE NOTED ON "AS-BUILT" DRAWINGS AND LOCATED IN ECONO VALVE BOXES AND MARKED.

NO	DATE	APPR	REVISION

SURVEY	PBW
DRAWN	SMV/MAF
DESIGNED	JDP
CHECKED	JDP
APPROVED	DRS
PROJ. NO.	193803878

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

PRINT NAME: TODD R. WICHMAN

SIGNATURE: Todd R. Wichman

DATE: 04/23/2018 LIC. NO. 19524

Cottage Grove
Where Pride and Prosperity Meet

Stantec
2335 Highway 36 W
St. Paul, MN 55113
www.stantec.com

IRRIGATION PLAN
LEGEND & NOTES

CITY OF COTTAGE GROVE, MN
RAVINE PARKWAY STREET AND UTILITY IMPROVEMENTS
SAP 180-121-001, SAP 180-123-001
SAP 180-110-013, SAP 180-020-013

SHEET 355
OF 572

Plot Date: 05/11/2018 - 2:14 pm
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Xrefs: 193803878_BORDER_48_SER16_48_SER12A_193803878XSR

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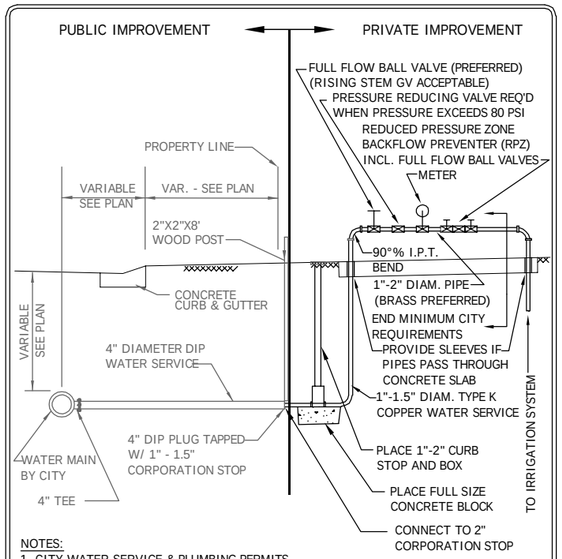
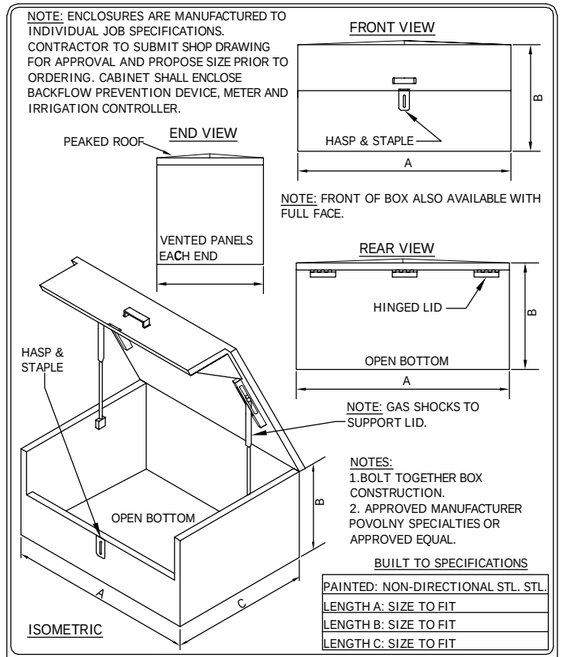


NOTES:
1. CITY WATER SERVICE & PLUMBING PERMITS REQUIRED FOR WORK BY PRIVATE CONTRACTORS.
2. ANNUAL TESTING OF RPZ REQUIRED
3. REQUIRED EQUIPMENT MUST BE ENCLOSED AND SUPPORTED.
4. 2" DIAMETER SIZE IS STANDARD. OTHER SIZES ALLOWED ONLY BY APPROVAL OF CITY.
5. SLEEVES FOR PIPES IN CONCRETE SLABS SHALL BE 4" DIAMETER PVC OR SIMILAR.

Cottage Grove — Where Pride and Prosperity Meet	STANDARD DETAILS IRRIGATION SERVICE BY PRIVATE CONTRACTOR COTTAGE GROVE, MINNESOTA	LAST REVISION: FEBRUARY 2018 PLATE NO. SER-13

NOTE: ENCLOSURES ARE MANUFACTURED TO INDIVIDUAL JOB SPECIFICATIONS. CONTRACTOR TO SUBMIT SHOP DRAWING FOR APPROVAL AND PROPOSE SIZE PRIOR TO ORDERING. CABINET SHALL ENCLOSE BACKFLOW PREVENTION DEVICE, METER AND IRRIGATION CONTROLLER.



NOTE: FRONT OF BOX ALSO AVAILABLE WITH FULL FACE.

NOTE: GAS SHOCKS TO SUPPORT LID.

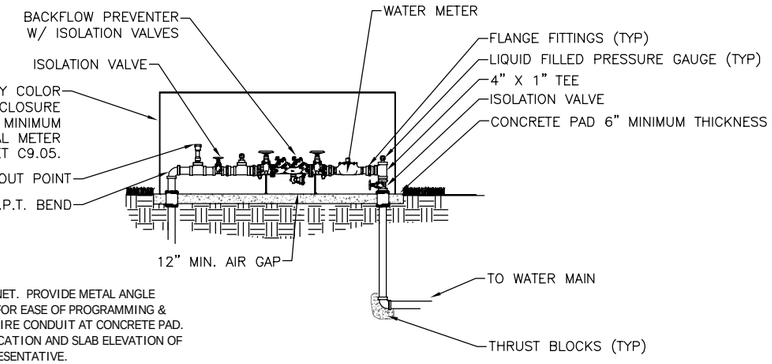
NOTES:
1.BOLT TOGETHER BOX CONSTRUCTION.
2. APPROVED MANUFACTURER POVOLNY SPECIALTIES OR APPROVED EQUAL.

ISOMETRIC

BUILT TO SPECIFICATIONS

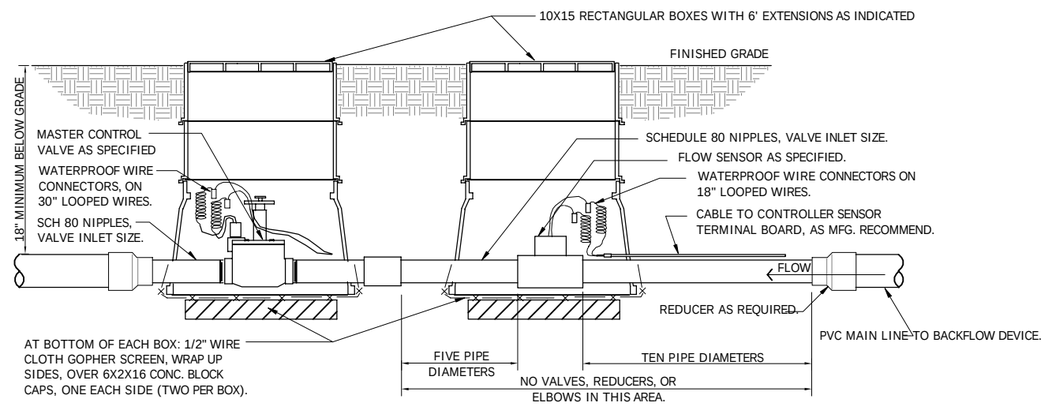
PAINTED: NON-DIRECTIONAL STL. STL.
LENGTH A: SIZE TO FIT
LENGTH B: SIZE TO FIT
LENGTH C: SIZE TO FIT

Cottage Grove — Where Pride and Prosperity Meet / Stantec	STANDARD DETAILS IRRIGATION CABINET COTTAGE GROVE, MINNESOTA	LAST REVISION: JAN 2014 PLATE NO. SER-16

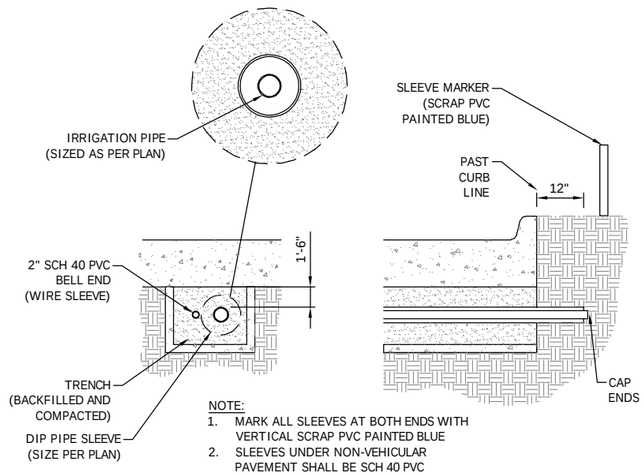


GENERAL NOTES:
1. MOUNT CONTROLLER TO INSIDE OF CABINET. PROVIDE METAL ANGLE BRACKETS FOR MOUNTING CONTROLLER FOR EASE OF PROGRAMMING & ADJUSTMENTS. PROVIDE PVC CONTROL WIRE CONDUIT AT CONCRETE PAD.
2. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND SLAB ELEVATION OF CONNECTION POINT WITH OWNER'S REPRESENTATIVE.
3. ALL WATER LINES THAT WILL REMAIN PERMANENTLY CHARGED WITH WATER (NOT WINTERIZED) SHALL BE 8' MINIMUM DEPTH BELOW GRADE.

1 POINT OF CONNECTION DETAIL
SCALE: N.T.S.



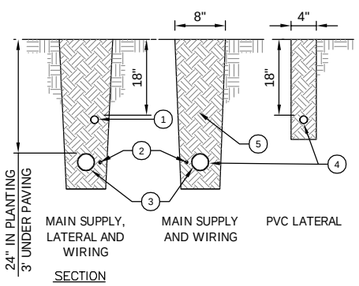
2 MASTER VALVE/ FLOW SENSOR ASSEMBLY
SCALE: N.T.S.



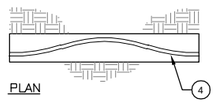
NOTE:
1. MARK ALL SLEEVES AT BOTH ENDS WITH VERTICAL SCRAP PVC PAINTED BLUE
2. SLEEVES UNDER NON-VEHICULAR PAVEMENT SHALL BE SCH 40 PVC

3 SLEEVING - VEHICULAR PAVEMENT
SCALE: N.T.S.

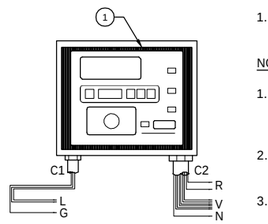
1. NON-PRESSURIZED IRRIGATION LATERAL
2. DIRECT BURIAL LOW VOLTAGE CONTROL WIRES: TAPE AND BUNDLE WIRING AT 10'-0" INTERVALS. COMMON TRENCHING OF IRRIGATION PIPE AND REMOTE CONTROL VALVE WIRING TO BE DONE WHERE EVER POSSIBLE.
3. PRESSURIZED MAIN LINE: ALL MAIN LINE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. MAINTAIN MIN. 4" SPACE BETWEEN PARALLEL PIPE LINES AND 6" VERTICAL SPACE BETWEEN MAIN LINE AND LATERAL LINES. WIRING AND MAIN LINE TO BE AT SAME MIN. DEPTH.
4. ALL PVC PIPE TO BE SNAKED IN TRENCHED AS SHOWN
5. BACKFILL PER SPECIFICATIONS
6. ALL PIPING UNDER PAVING SHALL BE SLEEVED



NOTES:
1. SEE IRRIGATION LEGEND FOR PIPE SIZES AND TYPE
2. DIRECT BURIAL CONTROL WIRE SHALL BE INSTALLED IN SHC. 40 PVC ELECTRICAL CONDUIT IF REQUIRED
3. DETECTABLE LOCATOR TAPE SHALL BE LOCATED SIX INCHES (6") ABOVE THE ENTIRE MAINLINE RUN
4. MAINLINE SHALL BE 24" MIN. FROM WALKS, WALLS, PAVING, ETC.



4 TRENCHING
SCALE: N.T.S.

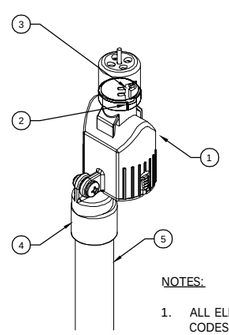


C1 CONDUIT
C2 CONDUIT
G GROUND WIRE (SEE ELECTRICAL)
L POWER SUPPLY WIRES (SEE ELECTRICAL)
N COMMON NEUTRAL WIRE
R RAIN SENSOR WIRES
V 2-WIRE JACKETED CONTROL WIRES: SPARE JACKETED WIRE TO MAIN LINE STUBS

1. CONTROLLER, SEE IRRIGATION LEGEND.

NOTES:
1. INSTALL CONTROLLER PEDESTAL PER MANUFACTURER'S RECOMMENDATIONS.
2. COORDINATE W/ ELECTRICAL CONTRACTOR FOR POWER HOOK UP.
3. INSTALLATION SHALL MEET ALL LOCAL CODES.
4. INCLUDE BATTERY AND LOCK.
5. SEE SPECIFICATIONS FOR MORE INFORMATION.

5 EXTERIOR CONTROLLER
SCALE: N.T.S.



1. RAIN SENSOR, REFER TO PLAN FOR SENSOR LOCATION
2. VENT/DRY-OUT ADJUSTMENT
3. RAINFALL ADJUSTMENT
4. CONDUIT ADAPTER
5. 1/2" PVC WIRE CONDUIT; SEE NOTE 3

NOTES:
1. ALL ELECTRICAL WORK MUST CONFORM TO LOCAL CODES. REFER TO PRODUCT LITERATURE FOR ADDITIONAL INSTALLATION REQUIREMENTS.
2. MOUNT RAIN SENSOR TO LIGHT POLE, COORDINATE INSTALLATION WITH ELECTRICAL.
3. FOR CONDUIT AND WIRING, SEE ELECTRICAL.

6 RAIN SENSOR
SCALE: N.T.S.

NO	DATE	APPR	REVISION

SURVEY	PBW
DRAWN	SMV/MAF
DESIGNED	JDP
CHECKED	JDP
APPROVED	DRS
PROJ. NO.	193803878

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
PRINT NAME: TODD R. WICHMAN
SIGNATURE: Todd R. Wichman
DATE: 04/23/2018 LIC. NO. 19524

Cottage Grove — Where Pride and Prosperity Meet

Stantec
2335 Highway 36 W
St. Paul, MN 55113
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IRRIGATION PLAN DETAILS

CITY OF COTTAGE GROVE, MN
RAVINE PARKWAY STREET AND UTILITY IMPROVEMENTS
SAP 180-121-001, SAP 180-123-001
SAP 180-110-013, SAP 180-020-013

SHEET 356
OF 572

Plot Date: 05/11/2018 - 3:14pm
Drawing name: v:\1938\active\193803878\CAD\Dwg\Plansheets\193803878_IR501.dwg
Xrefs: 193803878_BORDER_48_SER16_48_SER12A_193803878XR

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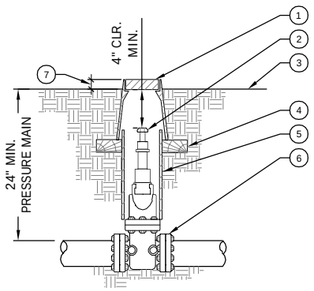
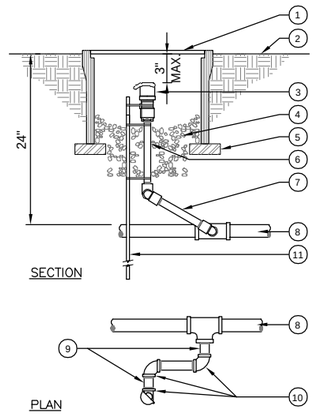


1. 10" ROUND PLASTIC VALVE BOX AND LOCKING COVER W/ BOX EXTENSIONS AS REQUIRED. REFER TO SPECS. HEAT BRAND 'GV' ON LID
2. ISOLATION VALVE, SEE IRRIGATION LEGEND FOR MANUFACTURER AND MODEL
3. FINISH GRADE BEFORE PLANTING
4. COMMON BRICK SUPPORTS (4)
5. 10" PVC SLEEVE
6. SCH. 80 PVC FLANGES, TYP. 2 PLACES
7. KEEP FINISH GRADE BELOW VALVE BOX LID:
   1/2" SEED
   1½" SOD
   2" IN PLANTER BED

NOTES:
1. INSTALL GATE VALVES A MIN. OF 24" FROM STRUCTURES OR HARDSCAPING
2. INSTALL GATE VALVES IN PLANTING BEDS WHEREVER POSSIBLE
3. INSTALL VALVE BOX SO THAT TOP OF VALVE BOX IS FLUSH W/ ADJACENT HARDSCAPING
4. REFER TO SPECS. AND PLAN SHEETS FOR MORE INFORMATION

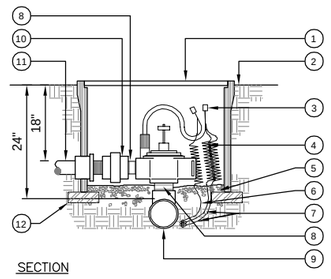
1 ISOLATION VALVE
SCALE: N.T.S.



1. 10" ROUND PLASTIC VALVE BOX W/ LOCK BOLT & Q.C. HEAT BRANDED ON COVER. REFER TO SPECS.
2. FINISH GRADE BELOW VALVE BOX LID:
   1/2" SEED
   1½" SOD
   2" IN PLANTER BED
3. QUICK COUPLING VALVE AS SPECIFIED
4. PEA GRAVEL: 6" DEEP BELOW QUICK COUPLING VALVE
5. COMMON BRICK SUPPORTS (2)
6. 3/4" SCH. 80 PVC NIPPLE.
7. 3/4" SCH. 80 PVC 6" LONG NIPPLE
8. PVC MAIN LINE
9. 3/4" X 3" SCH. 80 NIPPLE
10. 3/4" SCH. 80 PVC 90° ELL
11. 2"X2"X1/40" ANGLE IRON (36" LONG) W/ STAINLESS STEEL SCREW CLAMPS MIN. (3) PLACES

NOTE:
1. USE TEFLON TAPE ON ALL THREADED CONNECTIONS

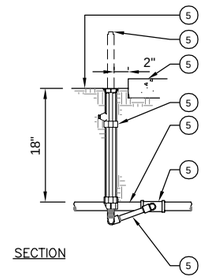
2 ISOLATION VALVE
SCALE: N.T.S.



1. PLASTIC VALVE BOX W/ LOCK BOLT & VALVE NUMBER HEAT BRANDED ON COVER
2. FINISH GRADE BELOW VALVE BOX LID:
   1/2" SEED
   1½" SOD
   2" IN PLANTER BED
3. UL LISTED WATERPROOF CONNECTORS
4. COILS: LEAVE EXCESS 2'-0" COILS IN EACH VALVE BOX. WRAP WIRE AROUND 1/2" PIPE 15 TIMES TO CREATE COILS
5. 3" LAYER OF PEA GRAVEL
6. CONTROL WIRE FROM CONTROLLER
7. COMMON WIRES
8. SCHEDULE 80 PVC
9. PVC MAIN LINE W/ PVC TEE
10. PVC UNION
11. PVC LATERAL TO SPRINKLER HEADS
12. COMMON BRICK SUPPORTS (4)

NOTE:
1. ALL WIRE TO BE INSTALLED AS PER LOCAL CODE

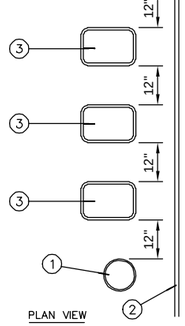
3 REMOTE CONTOL VALVE
SCALE: N.T.S.



1. FINISH GRADE
2. NOZZLE
3. CURB, WALK, HEADER OR WALL
4. POP-UP SPRAY BODY PER IRRIGATION PLAN. SET HEAD FLUSH WITH FINISH GRADE
5. PVC LATERAL LINE
6. LATERAL TEE OR ELL
7. PREFABRICATED SWING JOINT

NOTES:
1. LOCATE HEAD 2" FROM WALKS, CURBS, PAVING, MOWSTRIPS OR HEADER
2. USE TEFLON TAPE ON ALL MALE THREADS (EXCEPT MARLEX FITTINGS)

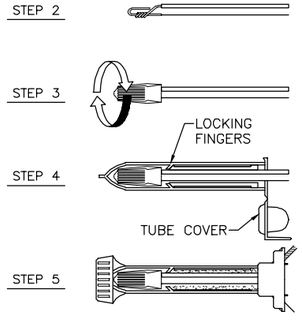
4 POP-UP SPRAY
SCALE: N.T.S.



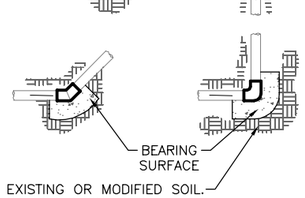
1. 10" DIAMETER CIRCULAR VALVE BOX
2. EDGE OF LAWN, WALK, FENCE, CURB, ETC.
3. 12" x 18" RECTANGULAR VALVE BOX
4. 20" x 30" RECTANGULAR VALVE BOX

NOTES:
1. CENTER VALVE BOX OVER VALVE TO FACILITATE SERVICING OF VALVE
2. SET VALVE BOXES 2" MAXIMUM ABOVE GRADE IN MULCH COVER OR GROUNDCOVER/SHRUB AREAS
   SET 1 1/2" ABOVE FINISH GRADE IN TURF AREAS
   SET 1/2" ABOVE FINISH GRADE IN SEEDED AREAS
3. SET VALVE BOX AND VALVE ASSEMBLY IN GROUNDCOVER/SHRUB AREA WHERE POSSIBLE. INSTALL IN TURF ONLY IF THERE IS NO ADJACENT GROUNDCOVER
4. SET VALVE BOXES PARALLEL TO ONE ANOTHER AND PERPENDICULAR TO EDGE
5. AVOID HEAVY COMPACTION OF SOIL AROUND VALVE BOXES TO PREVENT THEIR DEFORMATION/COLLAPSE

5 VALVE BOX LAYOUT
SCALE: N.T.S.



6 WIRE CONNECTOR
SCALE: N.T.S.



NOTES:
1. THRUST BLOCK SIZE SHALL BE SPECIFIED AS SHOW IN TABLE BELOW
2. CONTROL WIRES SHALL NOT BE ENCASED IN CONCRETE
3. ALL FITTINGS SHALL BE WRAPPED WITH POLYETHYLENE TO PREVENT CONCRETE FROM ADHERING TO PIPE FITTINGS OR BOLTS
4. JOINTS AND BOLTS SHALL BE ACCESSIBLE FOR REPAIRS
5. THRUST BLOCKS SHALL BE A MINIMUM OF 6" THICK
6. ONE 80 LBS. SACK OF CONCRETE SHALL COVER .6 FT³

MINIMUM BEARING SURFACE AREA

PIPE SIZE	TEE AND PLUG	90° BEND	45° BEND
1-1/2"	0.45 FEET ²	0.63 FEET ²	0.34 FEET ²
2"	0.69 FEET ²	0.97 FEET ²	0.53 FEET ²
2-1/2"	1.00 FEET ²	1.41 FEET ²	0.77 FEET ²
3"	1.48 FEET ²	2.10 FEET ²	1.14 FEET ²
4"	2.43 FEET ²	3.45 FEET ²	1.87 FEET ²
6"	5.25 FEET ²	7.41 FEET ²	4.02 FEET ²
8"	9.08 FEET ²	12.83 FEET ²	6.96 FEET ²
10"	14.93 FEET ²	21.07 FEET ²	11.44 FEET ²

7 THRUST BLOCK
SCALE: N.T.S.

NO	DATE	APPR	REVISION

SURVEY	PBW
DRAWN	SMV/MAF
DESIGNED	JDP
CHECKED	JDP
APPROVED	DRS
PROJ. NO.	193803878

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
PRINT NAME: TODD R. WICHMAN
SIGNATURE: Todd R. Wichman
DATE: 04/23/2018 LIC. NO. 19524

Cottage Grove
Where Pride and Prosperity Meet

Stantec
2335 Highway 36 W
St. Paul, MN 55113
www.stantec.com

IRRIGATION PLAN DETAILS

CITY OF COTTAGE GROVE, MN
RAVINE PARKWAY STREET AND UTILITY IMPROVEMENTS
SAP 180-121-001, SAP 180-123-001
SAP 180-110-013, SAP 180-020-013

SHEET 357
OF 572

Plot Date: 05/11/2018 - 2:14pm
Drawing name: V:\1938\active\193803878\CAD\Dwg\Plansheets\193803878_IR501.dwg
Xrefs: 193803878_BORDER_48_SER16_48_SER12A_193803878XSR

McHATTIE LANDING

PRELIMINARY LANDSCAPE PLANS

LANDSCAPE SHEET INDEX:

L1.0	Title Page
L1.1	Landscape Plan
L1.2	Landscape Plan
L1.3	Landscape Plan
L1.4	Landscape Plan
L1.5	Landscape Plan
L2.0	Details & Schedule
L3.0	Monument Sign

SURVEYOR + CIVIL ENGINEER:

HILL INCORPORATED

PLANNERS / ENGINEERS / SURVEYORS
2999 W. City Rd. 42, Suite 100, Burnsville, MN 55306
PHONE: (952)890-6044 FAX: (952)890-6244

LANDSCAPE CALCULATIONS:

Total No. of Single Family Dwelling Units:	85
Total Lot Trees Required: (85 Lots x 3 Trees):	255
Additional Trees Required for Corner Lots:	09
Total Trees Required:	264
Total Mitigation Trees Required:	246" (100 Trees)
Total Lot Trees Shown:	264
Mitigation Trees Shown:	100
Additional Buffer Trees Shown:	40
Total Trees Shown:	404

CITY OF Cottage Grove LANDSCAPE RESTRICTIONS:

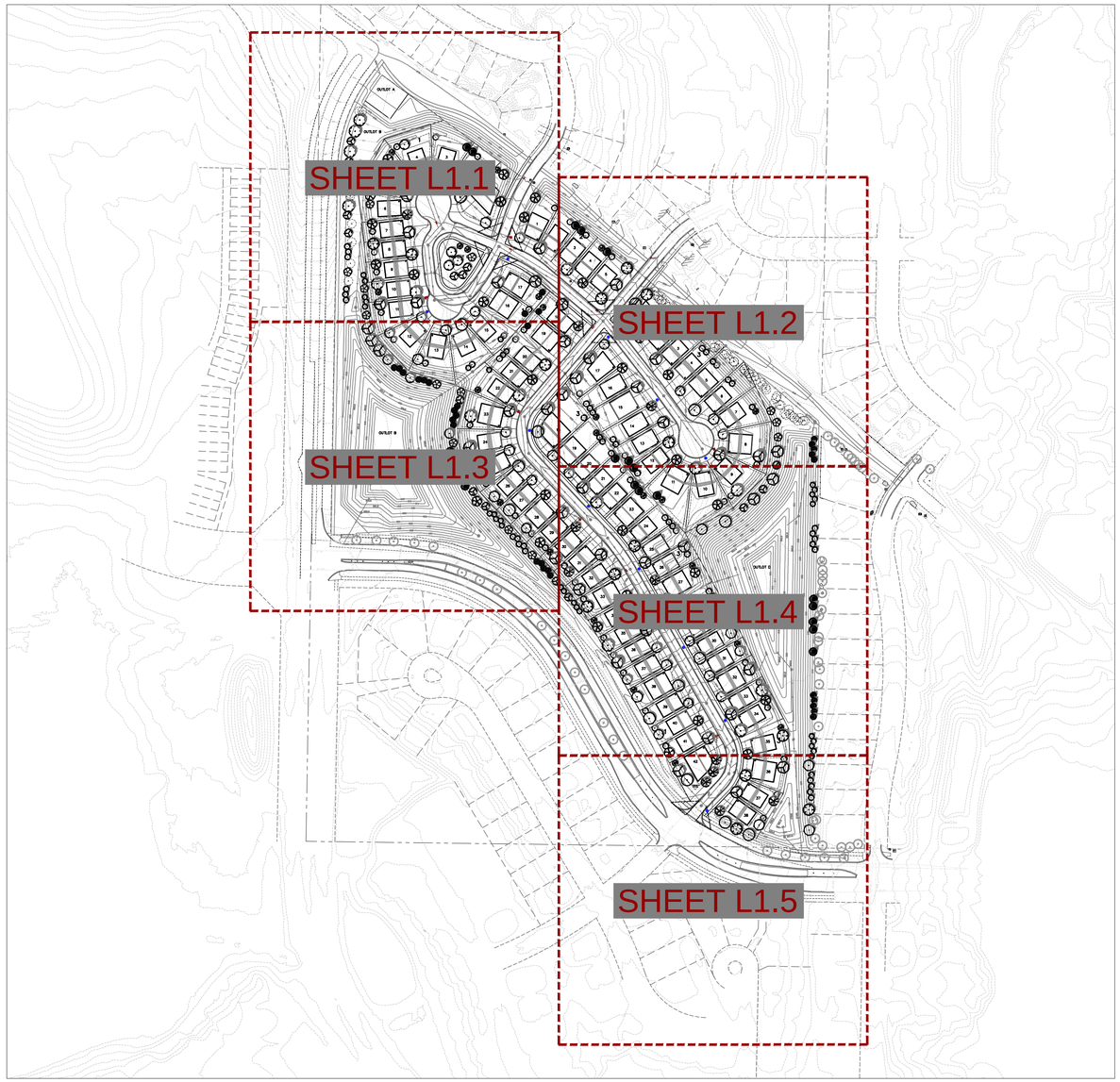
A. Deciduous trees should be located a minimum of 5' off any utility pipe
B. Coniferous trees should be located a minimum of 15' off any utility pipe
C. No trees should be located within 10' of a hydrant or 15' from a streetlight
D. No trees should be located within a storm pond HWL
E. No trees should be located within a storm pond's 20' access route, and no coniferous trees within 5' of the 20' pond access route
F. No coniferous trees within 20' of a proposed sidewalk/trail
G. No deciduous trees within 5' of sidewalk/ trail

CITY OF Cottage Grove LANDSCAPE REQUIREMENTS:

Zoning Designation: R-4 transitional Residential

Lot (Builder) Trees Required: (3) Trees Per Lot
- 1 Front yard tree required
- Up to (2) Coniferous Trees can be substituted for overstory trees per lot (maximum 2).
- 10 shrubs required per lot

see sheet L1.1 for additional landscape requirements



OVERALL LANDSCAPE PLAN:

CONSULTANT LOGO:

M/I HOMES

GENERAL NOTES:

1. Actual locations of trees may vary, depending on final location of driveways and utilities.
2. See Civil Engineer's plans for grading layout and requirements.
3. Contractor to coordinate all work in the city right-of-way with City of Cottage Grove Public Works Department.
4. Sod all disturbed areas except plant beds and areas noted to receive seed.
5. Place a minimum of 6" topsoil or slope dressing on all areas disturbed by construction, including right-of-way boulevards, unless specified otherwise.
6. Test tree pits to ensure sub-soils permeability of no less than .25" per hour of water infiltration.
7. See Sheet L2.0 for Landscape Details & Plant Schedule.

Know what's below. Call before you dig.

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Landscape Architecture - Planning
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Saint Paul, MN 55104
651.788.9018 | www.calyxdesigngroup.com

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PHONE: (952)890-6044 FAX: (952)890-6244

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

Print Name: Brian Alton Hunters, PLA

Signature:

Date:

License No.: 55247

PRELIMINARY

MCHATTIE LANDING
COTTAGE GROVE, MINNESOTA
LANDSCAPE TITLE SHEET
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

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AL

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01/28/2026

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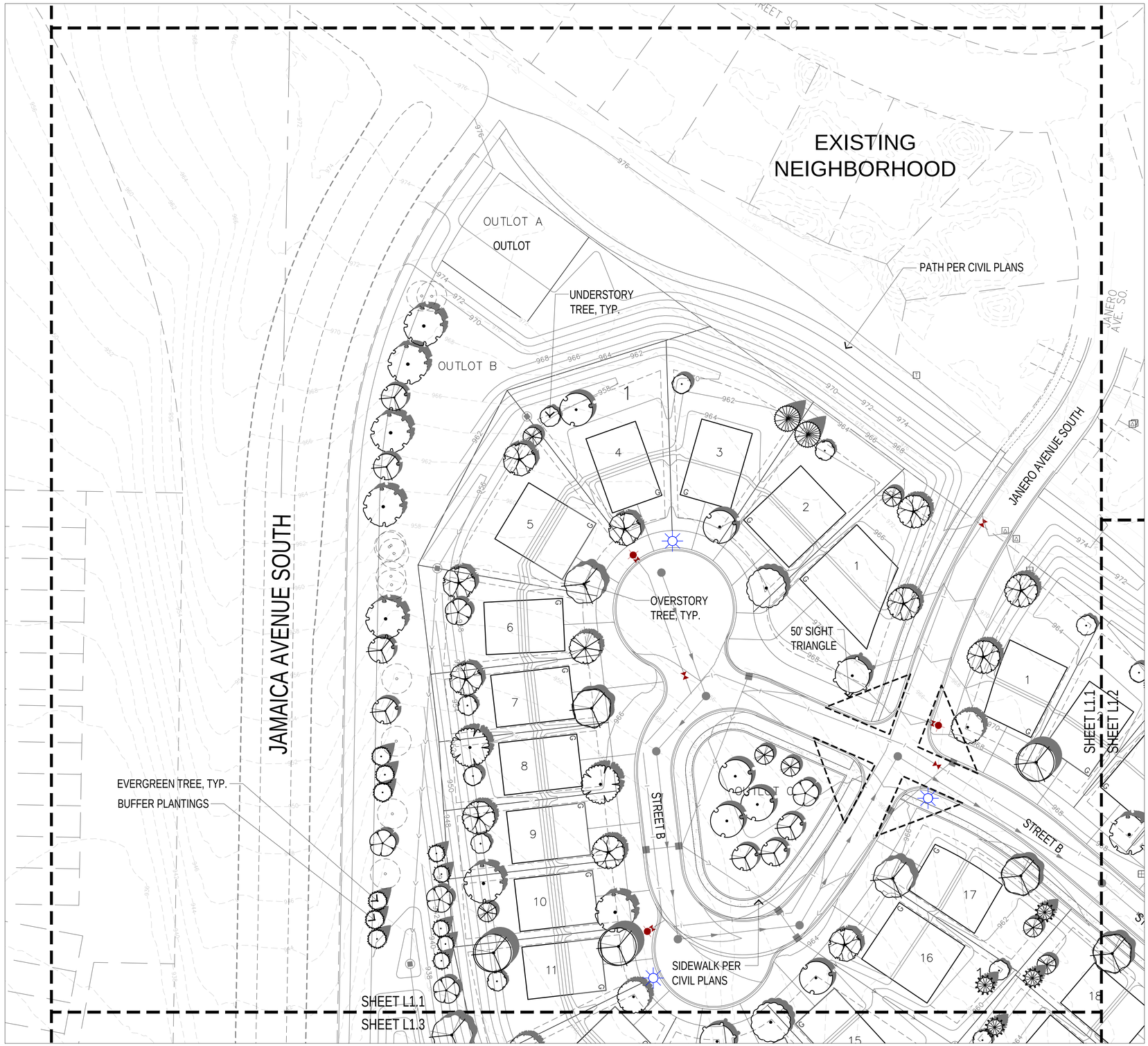
25-164

SHEET NO.
L1.0



LANDSCAPE LEGEND:

Existing Tree To Remain

Fire Hydrants by Others

Street Lights by Others

CITY OF COTTAGE GROVE
LANDSCAPE REQUIREMENTS CONTINUED:

11-3-12: LANDSCAPING:
D. Residential Developments

Single Family Dwellings
- Coniferous Trees: May be substituted for any of the overstory deciduous trees (maximum of 2)
- Ornamental Deciduous Trees: No requirements
- Overstory Deciduous Trees: On lots 60 feet wide or less: 2 per lot On lots greater than 60 feet wide: 3 per lot, no less than 2 different species
- Shrubs: 10 per unit

3. Residential district landscape buffer along major roadways.
b. Requirements. For all residential and nonresidential developments within the R-2 through R-5 residentially zoned districts include frontage along a Major Roadway, the landscape plan must provide an average of a fifty-foot (50') buffer, but not less than a thirty-foot (30') buffer, running parallel to the rear lot line for the purposes of creating a barrier to the Major Roadway. The buffer shall be a combination of trees, fences and shrubs that create a minimum of fifty percent (50%) year-round opacity at maturity.

CITY OF COTTAGE GROVE
MINIMUM PLANT REQUIREMENTS:

11-3-12: LANDSCAPING:

Ornamental Tree: 1.5 Caliper Inch
Overstory Tree: 2.5 Caliper Inch
Coniferous Tree: 6 Feet in Height
Shrubs: 18 Inches in Height
Street Tree: 2.5 Caliper Inch

GENERAL NOTES:

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6. Test tree pits to ensure sub-soils permeability of no less than .25" per hour of water infiltration.
7. See Sheet L2.0 for Landscape Details & Plant Schedule.

SCALE IN FEET
0 100 200
1 inch = 40 feet

LANDSCAPE PLAN:

See Sheet L2.0 for Planting Details, Notes, and Schedule

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Saint Paul, MN 55104
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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 Landscape Architect under the laws of the State of Minnesota.

Print Name: Brian Aldrich, Hill Partners, P.A.
Signature:
Date:
License No.: 55416

PRELIMINARY

MCHATTIE LANDING
COTTAGE GROVE, MINNESOTA
LANDSCAPE PLAN
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
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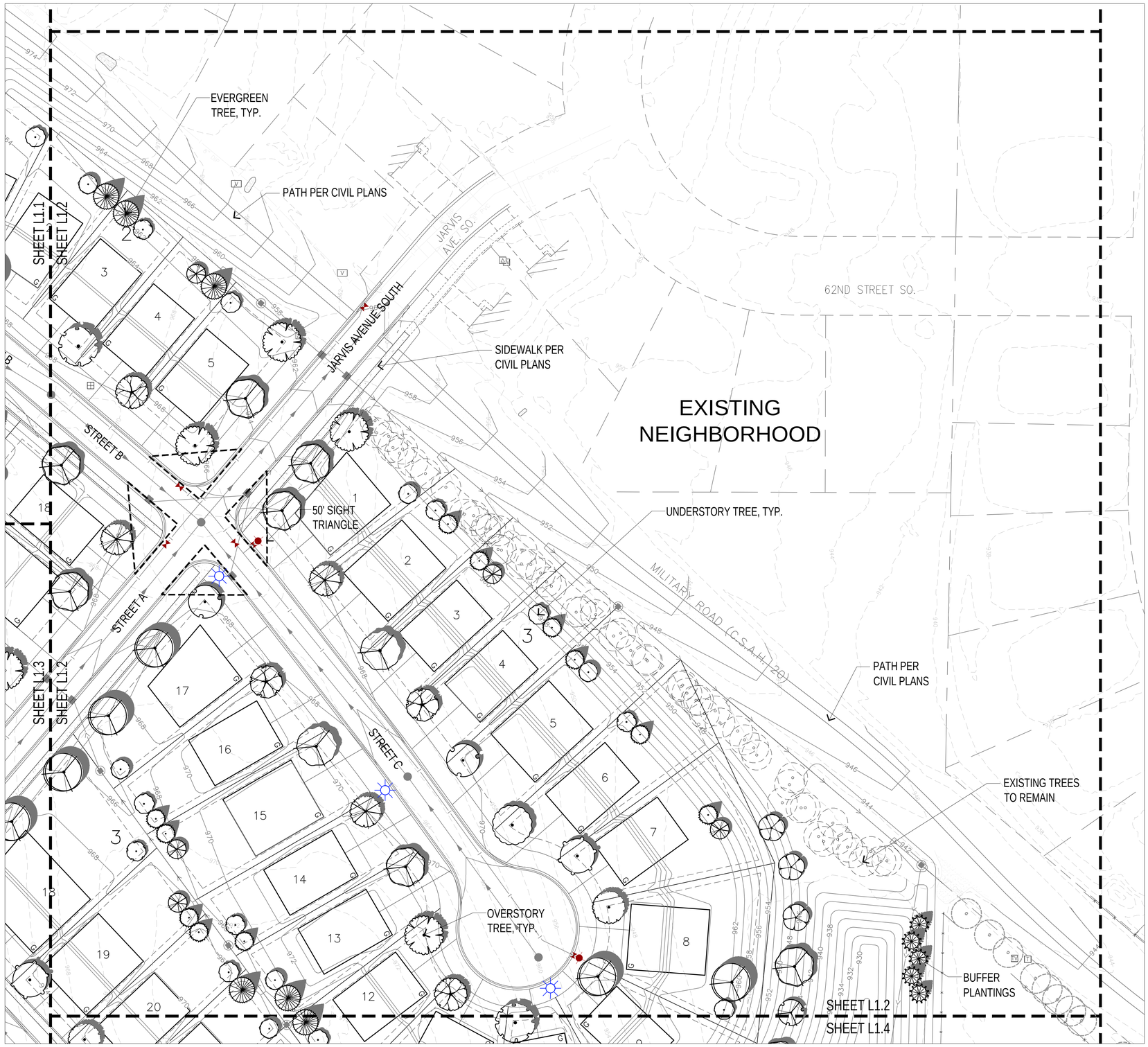

LANDSCAPE LEGEND:

- Existing Tree To Remain
- Fire Hydrants by Others
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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 Landscape Architect under the laws of the State of Minnesota.

Print Name: Brad Engstrom, PLA
Signature:
Date:
License No.: 59247

PRELIMINARY

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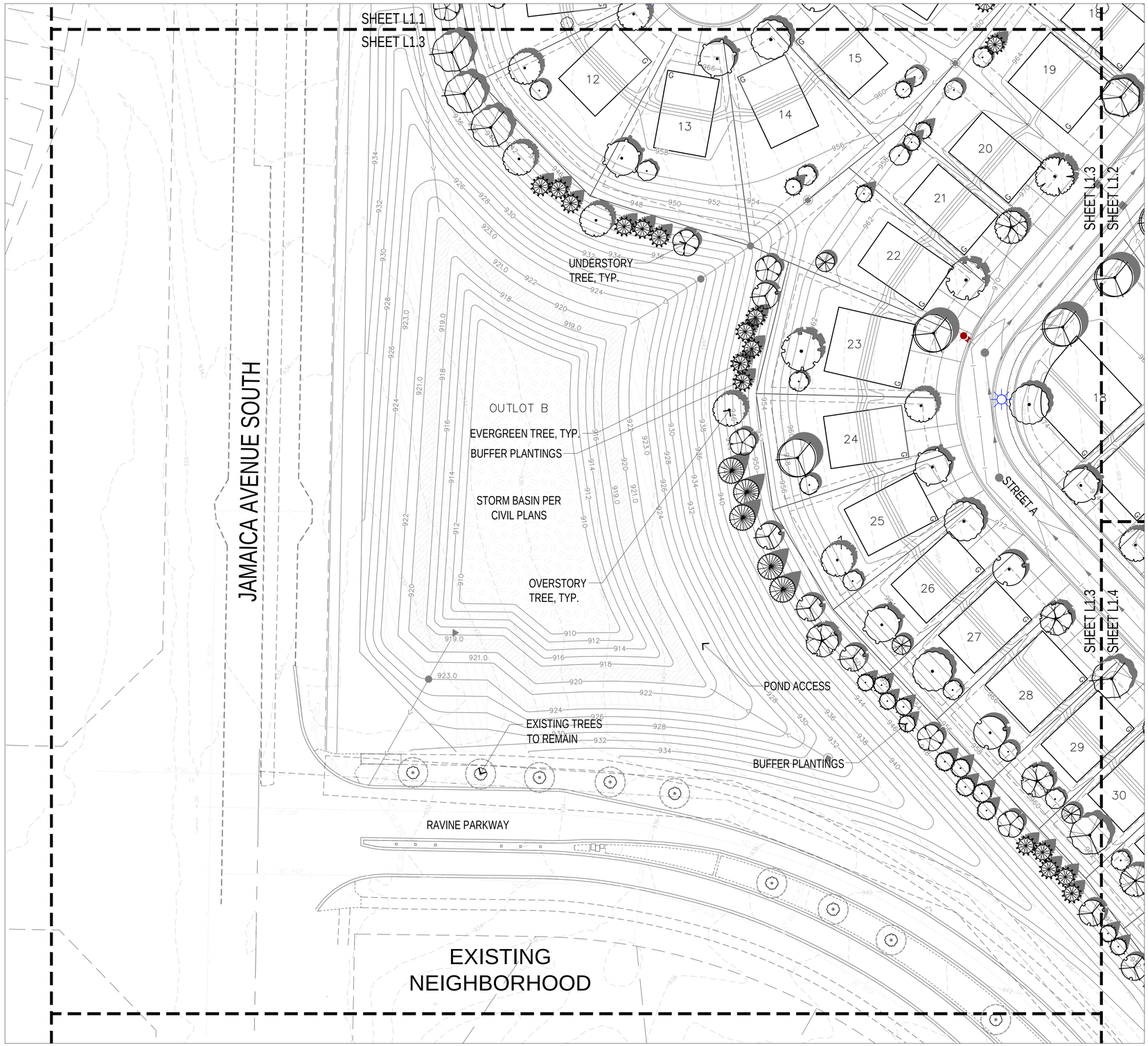

LANDSCAPE PLAN:

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PRELIMINARY

Print Name: Brian Aanenson, Hilgers, P.A.
Signature:
Date:
License No.: 49477

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LANDSCAPE PLAN
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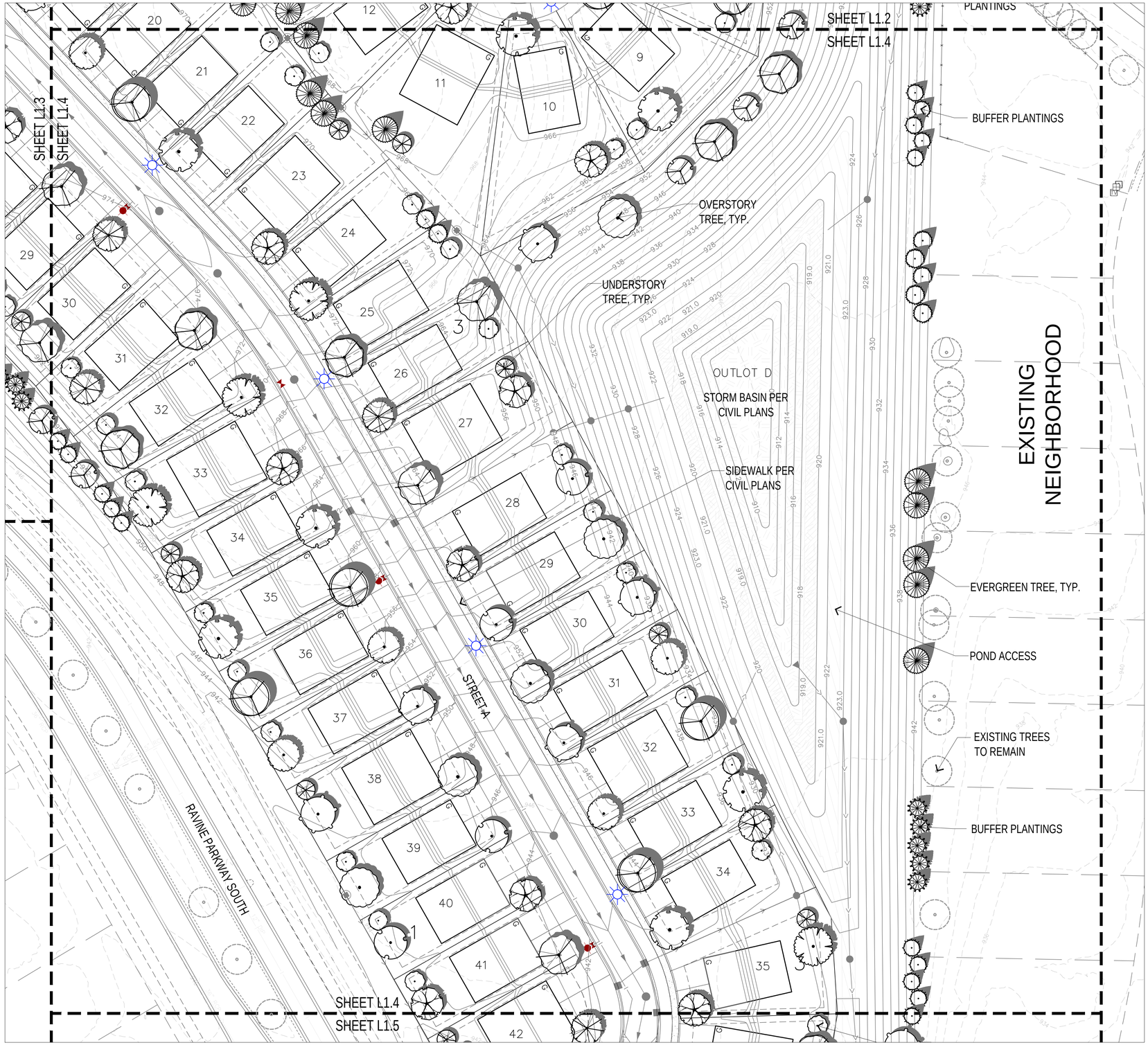

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LANDSCAPE PLAN:

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PRELIMINARY

Print Name: Brad Engstrom, PLA
Signature:
Date:
License No. 49677

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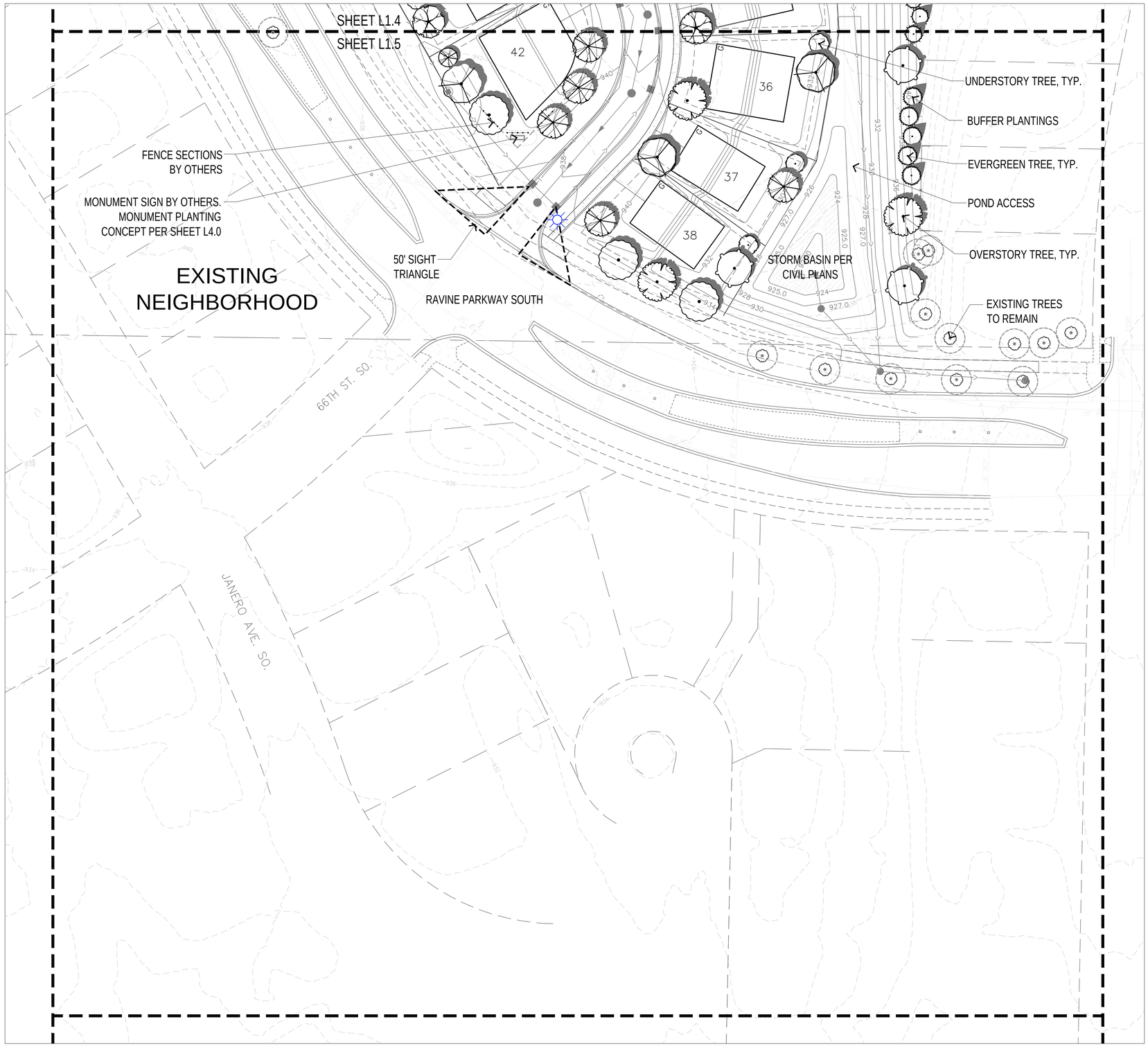

LANDSCAPE LEGEND:

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LANDSCAPE PLAN:

See Sheet L2.0 for Planting Details, Notes, and Schedule

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PRELIMINARY

Print Name: Brian Alton Slothers, PLA
Signature:
Date:
License No.: 60427

MCHATTIE LANDING
COTTAGE GROVE, MINNESOTA
LANDSCAPE PLAN
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
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LANDSCAPE NOTES:

1. Tree saucer mulch to be four inches (4") depth natural single-shred hardwood mulch for trees outside of a plant bed. Install per tree planting detail.

2. Refer to civil plan sheets for grading, drainage, site dimensions, survey, tree removal, proposed utilities & erosion control.

3. All plant material shall comply with the latest edition of the American Standard for Nursery Stock, American Association of Nurserymen. Unless noted otherwise, deciduous shrubs shall have at least 5 canes at the specified shrub height. Plant material shall be delivered as specified.

4. Plan takes precedence over plant schedule if discrepancies in quantities exist.

5. All proposed plants shall be located and staked as shown.

6. Adjustment in location of proposed plant material may be needed in field. Should an adjustment be required, the client will provide field approval. Significant changes may require city review and approval.

7. The project landscape contractor shall be held responsible for watering and properly handling all plant materials brought on the site both before and after installation. Schedule plant deliveries to coincide with expected installation time within 36 hours.

8. All plant materials shall be fertilized upon installation as specified.

9. The landscape contractor shall provide the owner with a watering schedule appropriate to the project site conditions and to plant material growth requirements.

10. If the landscape contractor is concerned or perceives any deficiencies in the plant selections, soil conditions, drainage or any other site condition that might negatively affect plant establishment, survival or guarantee, they must bring these deficiencies to the attention of the landscape architect & client prior to bid submission. Plant bed drainage concerns during plant installation shall be brought to the attention of the Owner and General Contractor immediately.

11. Contractor shall establish to his/ her satisfaction that soil and compaction conditions are adequate to allow for proper drainage at and around the building site.

12. Contractor is responsible for ongoing maintenance of all newly installed material until time of owner acceptance. Any acts of vandalism or damage which may occur prior to owner acceptance shall be the responsibility of the contractor. Contractor shall provide the owner with a maintenance program including, but not limited to, pruning, fertilization and disease/pest control.

13. The contractor shall guarantee newly planted material through one calendar year from the date of written owner acceptance. Plants that exhibit more than 10% die-back damage shall be replaced at no additional cost to the owner. The contractor shall also provide adequate tree wrap and deer/rodent protection measures for the plantings during the warranty period.

14. This layout plan constitutes our understanding of the landscape requirements listed in the ordinance. Changes and modifications may be requested by the city based on applicant information, public input, council decisions, etc.

15. The landscape contractor shall be responsible for obtaining any permits and coordinating inspections as required throughout the work process.

16. Plant size & species substitutions must be approved in writing prior to acceptance in the field.

17. The landscape contractor shall provide the builder with an irrigation design for common areas and individual lots as directed.

18. Landscape Contractor is responsible for coordination with the General Contractor, to protect the new improvements on and off-site during landscape work activities. Report any damage to the General Contractor immediately.

19. All planting, seeding, and sodded areas shall be prepared prior to installation activities with a harley power box rake or equal to provide a firm planting bed free of stones, sticks, construction debris, etc.

20. Turf installation activity shall conform to all rules and regulations as established in the MnDOT Seeding Manual, 2024 edition, for turf bed preparation, installation, maintenance, and warranty.

21. The Landscape Contractor shall furnish samples of all landscape materials for approval prior to installation.

22. The Landscape Contractor shall clear and grub the underbrush from within the work limits to remove dead branches, leaves, trash, weeds and foreign materials. Remove trees where noted on the plan, including the stump to 30" below grade.

23. The landscape contractor shall contact Gopher State One Call no less than 48 hours before digging for field utility locations.

24. The landscape contractor shall be responsible for the removal of erosion control measures once vegetation has been established to the satisfaction of the municipal staff. This includes silt curtain fencing and sediment logs placed in the landscape.

25. The landscape contractor shall be responsible for visiting the site to become familiar with the conditions prior to bidding and installation. Coordinate with the general contractors on matters such as fine grading, landscaped area conditions, staging areas, irrigation connection to building, etc.

26. See Site and Civil plans for grading, utilities, and additional information regarding the project.

27. All sub-cut areas of the site that are designated on the site plan as open space for landscape shall have no less than 4" of imported, pulverized topsoil. Place 16" of topsoil in tree pits. Always slope away from building.

28. Landscape contractor must prove the open sub-grade of all planting areas after their excavation is capable of infiltrating a minimum requirement of 1/4-inch of water per hour prior to installation of plant materials, topsoil, irrigation, weed mat, and mulch. Planting areas not capable of meeting this requirement shall have 4" diameter X 48" depth holes augured every 36" on-center and filled with MnDOT Free-Draining Coarse Filter Aggregate. Re-test sub-grade percolation for compliance to infiltration minimum requirement.

29. Fencing (if noted) per Architect's Plans and Specifications.

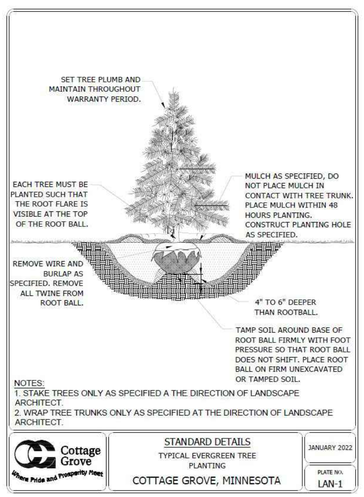
30. Landscape contractor shall coordinate tree removal activities (if required) and ensure all trees designated for removal are gone before start of landscape installation. Grind stump to 30" below grade and back-fill with topsoil.

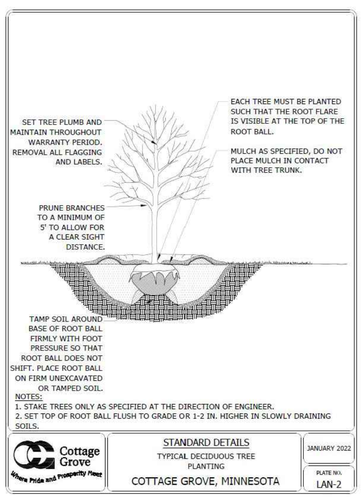
31. All disturbed areas are to receive turf sod or seed to establish final vegetation.

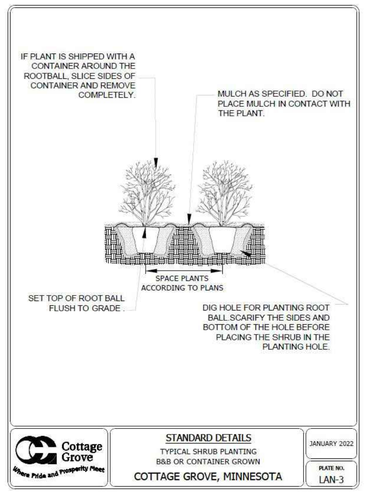
32. Retaining walls and stairs require structural engineering by others. Unless otherwise specified, retaining walls to be County Material 'County Block' straight face units, gray color with matching cap units.

33. Native Seed Areas (if called for on plans): Prairie seeding contractor is required to include a 1 year warranty with maintenance in base bid. Prairie contractor shall provide the Owner with a proposal for (2) additional years of prairie maintenance, in addition to the (3) year warranty. It shall be the Owner's option to continue maintenance of the native prairie areas after the 1 year warranty expires. Maintain under warranty per MnDOT Seeding Manual, 2024 edition. Warranty includes seeding contractor on-site maintenance visits for mowing, weeding, spot-spraying invasives, garbage removal, and re-seeding bare areas larger than 6"X6". Ensure cover crop achieves 80% germination and erosion is not evident. Maintenance requires no less than 4 visits for warranty work per year. An acceptable stand of seeding is full, lush, and free of invasive plants & weeds.

CITY OF COTTAGE GROVE REQUIRED STANDARD DETAIL PLATES:







PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	QTY
EVERGREEN TREES						
	AB	Abies balsamea	Balsam Fir	6` Hgt.	B&B	30
	JE	Juniperus virginiana	Eastern Redcedar	6` Hgt.	B&B	30
	PD	Picea glauca `Densata`	Black Hills Spruce	6` Hgt.	B&B	34
	PR	Pinus resinosa	Red Pine	6` Hgt.	B&B	21
ORNAMENTAL TREES						
	AO	Aesculus glabra	Ohio Buckeye	1.5" Cal.	B&B	13
	CC	Crataegus laevigata `Crimson Cloud`	Crimson Cloud Hawthorn	1.5" Cal.	B&B	21
	MA	Maackia amurensis	Amur Maackia	1.5" Cal.	B&B	21
	MP	Malus x 'Pink Spires'	Pink Spires Crabapple	1.5" Cal.	B&B	21
	OV	Ostrya virginiana	American Hophornbeam	1.5" Cal.	B&B	16
	SI	Syringa reticulata `Ivory Silk`	Ivory Silk Japanese Tree Lilac	1.5" Cal.	B&B	23
OVERSTORY TREE						
	Ar	Acer rubrum	Red Maple	2.5" Cal.	B&B	12
	AJ	Acer saccharum 'JFS-KW8' TM	Autumn Fest Sugar Maple	2.5" Cal.	B&B	14
	AS	Acer x freemanii `Sienna`	Sienna Glen Maple	2.5" Cal.	B&B	16
	BR	Betula nigra	River Birch	2.5" Cal.	B&B	16
	CO	Celtis occidentalis	Common Hackberry	2.5" Cal.	B&B	14
	GI	Gleditsia triacanthos inermis `Skycole` TM	Skyline Thornless Honey Locust	2.5" Cal.	B&B	15
	GI2	Gymnocladus dioica `McKBranched` TM	Kentucky Coffeetree	2.5" Cal.	B&B	14
	QA	Quercus alba	White Oak	2.5" Cal.	B&B	17
	QE	Quercus ellipsoidalis	Northern Pin Oak	2.5" Cal.	B&B	14
	QM	Quercus macrocarpa	Burr Oak	2.5" Cal.	B&B	14
	QR	Quercus rubra	Northern Red Oak	2.5" Cal.	B&B	13
	UN	Ulmus americana 'New Horizon'	New Horizon Elm	2.5" Cal.	B&B	15

811 Know what's below. Call before you dig.

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CALYX DESIGN GROUP
Landscape Architecture - Planning
475 Cleveland Ave. N | Suite 101A
Saint Paul, MN 55104
651.788.9018 | www.calyxdesigngroup.com

HILL INCORPORATED
PLANNERS / ENGINEERS / SURVEYORS
2999 W. City Rd. 42, Suite 100, Burnsville, MN 55306
PHONE (952)890-6944 FAX (952)890-8244

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 Landscape Architect under the laws of the State of Minnesota.

PRELIMINARY

Print Name: Brian Aanenson, PLA
Signature:
Date:
License No. 43467

MCHATTIE LANDING
COTTAGE GROVE, MINNESOTA
LANDSCAPE DETAILS
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
AL

DATE
01/28/2026

REVISIONS

01/28/26 - INITIAL CITY SUBMITTAL SET

PROJECT NO.
25-164

SHEET NO.
L2.0

LANDSCAPE DETAILS, NOTES, AND SCHEDULE



MAY NIGHT SALVIA



PRAIRIE DROPSEED



feather reed grass



DWARF GLOBE SRUCE



SENSATION SKY SALVIA



MIDNIGHT SUN WEIGELA



SHOWTIME CRABAPPLE



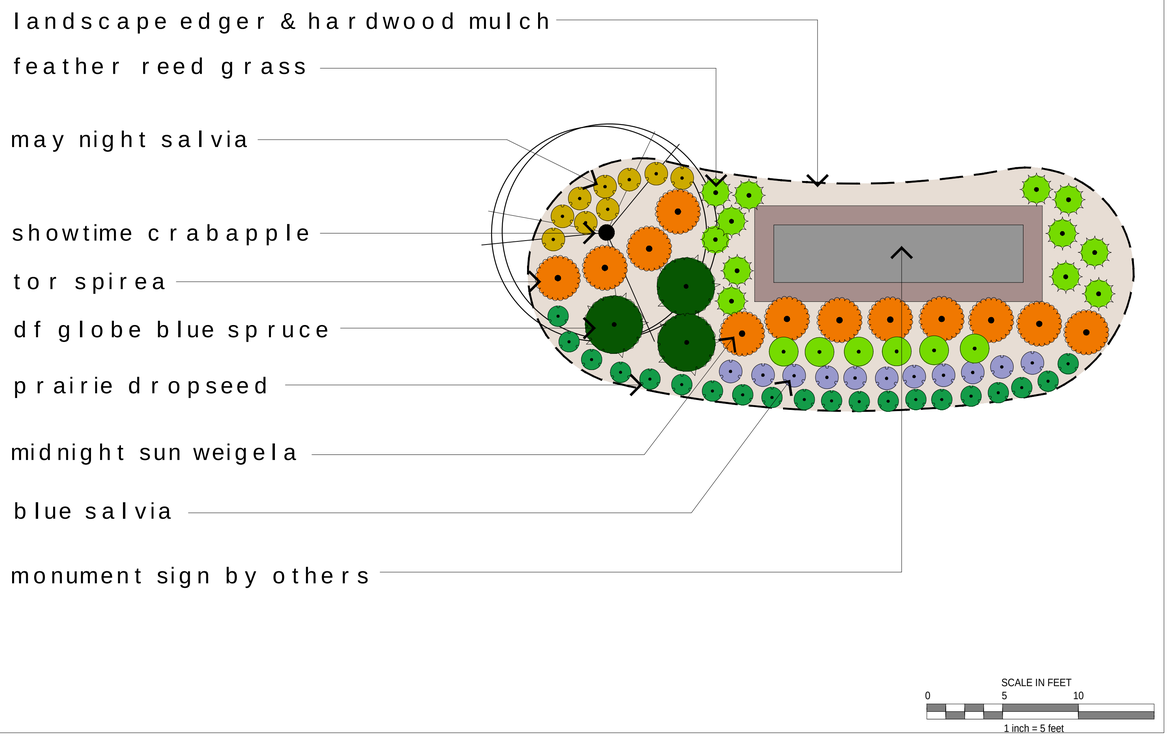
feather reed grass



TOR SPIREA

GENERAL NOTES:

1. Actual locations of trees may vary, depending on final location of driveways and utilities.
2. See Civil Engineer's plans for grading layout and requirements.
3. Contractor to coordinate all work in the city right-of-way with City of Cottage Grove Public Works Department.
4. Sod all disturbed areas except plant beds and areas noted to receive seed.
5. Place a minimum of 6" topsoil or slope dressing on all areas disturbed by construction, including right-of-way boulevards, unless specified otherwise.
6. Test tree pits to ensure sub-soils permeability of no less than .25" per hour of water infiltration.
7. See Sheet L2.0 for Landscape Details & Plant Schedule.



MONUMENT SIGN FOUNDATION PLANTING ENLARGEMENT:



CONCEPT MONUMENT SIGN ELEVATION:

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2999 W. CTY. RD. 42, SUITE 100, BURNSVILLE, MN 55306
PHONE: (952)890-6044 FAX: (952)890-6244

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 Landscape Architect under the laws of the State of Minnesota.

PRELIMINARY

Print Name: Jeffrey Engberg, P.L.A.
Signature:
Date:
License No. 41944

MCHATTIE LANDING
COTTAGE GROVE, MINNESOTA
MONUMENT SIGN CONCEPT
FOR
M/I HOMES OF MPLS/ST. PAUL, LLC.
5354 PARKDALE DRIVE #100, ST. LOUIS PARK, MN 55416

DRAWN BY
AL
DATE
01/28/2026
REVISIONS
01/28/26 - INITIAL CITY SUBMITTAL SET

PROJECT NO.
25-164
SHEET NO.
L3.0

Outlook

RE: Ravine Ridge/McHattie Landing Neighborhood meeting comments

From Kelly Becker <KBecker@cottagegrovemn.gov>
Date Tue 2/17/2026 8:01 AM
To Kelly Becker <KBecker@cottagegrovemn.gov>

-----Original Message-----
From: Adam Urick <adamurick@yahoo.com>
Sent: Thursday, February 12, 2026 9:24 PM
To: Emily Schmitz <ESchmitz@cottagegrovemn.gov>
Subject: Ravine Ridge/McHattie Landing Neighborhood meeting comments

[You don't often get email from adamurick@yahoo.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

EXTERNAL EMAIL WARNING: This email originated from an outside organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Emily,

Thanks for your time tonight. Here are my comments/requests for the city/MI homes:

1. Determine if Military Rd can remain open until the Woodbury roads to the north are fully built and connected with Cottage Grove roads.
2. Remove lots 34-38 from current position and adjust to fit lots closer to southwest corner storm basin, or extend street C lots by 2 more to keep total units at 85.
3. Place larger conifer trees (8+ ft) as buffers between Ravine Ridge and Ravine Meadows lots, especially near southern portion of Jeffery Ave S.

Thanks,
Adam Urick

MCHATTIE LANDING PRELIMINARY PLAT AND PLANNED UNIT DEVELOPMENT PLAN

INTRODUCTION

M/I Homes of Minneapolis/St. Paul, LLC (M/I Homes) is submitting an application for a Preliminary Plat and Planned Unit Development (PUD) plan for development of the property located at 9119 and 9165 Military Road. The proposed plan includes 85 homes on an approximately 34.3-acre site. The site had previously received preliminary plat and PUD approval in February of 2022 and a one-year extension of the preliminary plat approval in February of 2023. That approval and extension have since expired, requiring filing of a new preliminary plat application.

SITE PLAN

Lot Widths/Side Yard Setbacks. Since the former preliminary plat and PUD approval, the City of Cottage Grove has undergone a comprehensive Zoning Code update that went into effect in January of 2023. This resulted in a reduction of the allowable minimum lot width to 45 feet, which provided flexibility to reduce the lot widths from the previously approved development to 52 and 62 feet wide. We have selected homes for this development that we feel will meet market demand and complement the surrounding area. The current side yard setback requirement of the City's R-4 zoning district is 7.5 feet from the home and 5 feet from the garage, and we are proposing to average a 6-foot side yard setback on both sides of the home, which will result in 12-foot spacing between homes. This is similar to what was approved in Mississippi Landing (52.5-foot-wide lots with 6.25-foot side yard setbacks), another one of our developments in the City of Cottage Grove. The table below outlines the City's current lot standards for the zoning district in which this development is located as well as requested flexibility.

Standard	R-4 Zoning Standard	Proposed Standards
Minimum Lot Size	None outlined	6,665 square feet
Minimum Lot Width	45 feet	52 feet
Minimum Lot Depth	120 feet	120 feet
Minimum Front Setback	25 feet	25 feet
Minimum Side Setback	7.5 feet	6 feet
Minimum Side Setback, Garage	5 feet	6 feet
Minimum Corner Side Setback	20 feet	20 feet
Rear Setback	25 feet	25 feet
Impervious Surface	50%	50%
Maximum Structure Height	35 feet	35 feet
Setbacks Between Buildings	15 feet between dwelling structures, 10 feet for residential garages	12 feet between dwelling structures and residential garages

Street Connections. There are three proposed street connections. Two connect to the north from the Cardinal Reserve neighborhood as a continuation of Janero and Jarvis Avenues and one connecting to Military Road. The site plan strategically avoids areas with significant karst bedrock to minimize excavation challenges. While the previous plan showed two connection points to Ravine Parkway, we have reduced this to one access point because of the location of the bedrock and because right turn lanes were constructed for only one access point. We have provided a traffic analysis that shows that reducing to the one access point will not negatively impact traffic patterns.

Tree Preservation and Landscaping. We have provided a tree preservation and landscape plan with the submittal of this application. We will be removing 988 trees, of which 491 require mitigation. Mitigation is required at 50%. We are proposing to provide a total of 404 trees - 264 lot trees, 100 mitigation trees and 40 additional buffer trees. The buffer trees provide screening along Jamaica Avenue and Ravine Parkway.

Parks and Trails. With development of this property, Military Road will be converted into a trail. There is a proposed 0.15-acre trail head park at the northwest corner of the development. Staff have indicated that this will be sufficient to provide trail access to the future trail that will be located in the place of Military Road.

PLANNED UNIT DEVELOPMENT

As previously mentioned, we are looking for flexibility on side yard setbacks and therefore are requesting that the property be developed as a PUD. We believe that the proposed development meets the intent and purpose of the City's PUD ordinance in the following ways:

A. To facilitate the economical and efficient provision of streets and public utilities and to prevent development that would burden the existing tax base or in areas without adequate public improvements;
   - *Development of the property will help redirect Ravine Parkway South traffic traveling north to the Cardinal Reserve development to the new connection made to Jarvis Avenue South, easing the burden of traffic on Jeffrey Avenue South.*

B. To facilitate developments that provide a benefit to the City as a whole, through, but not limited to, higher standards of architectural and site design, enhanced or innovative public infrastructure, sustainable design, provision of life-cycle and/or affordable housing, redevelopment or expanded transportation options;
   - *The homes in this proposed development will include our Smart Series homes, which provide homeowners with energy efficiency, design and warranty that come with building a new construction home at a lower price and within a shorter time frame. Additionally, the new connection point from Ravine Parkway South will help ease traffic on Jeffrey Avenue South.*

C. Preservation of valuable natural resources and amenities to ensure a higher quality of environmental conservation;
   - *While there are not necessarily natural resources on the property to preserve, the design of the community takes into account bedrock on the site, avoiding the need to excavate it as much as possible.*

D. To increase public open space to ensure concentration of open space into more usable areas and restoration of natural resources.
   - *The proposed site plan concentrates homes toward the center of the property, creating wide buffers from the Ravine Meadows neighborhood and Jamaica Avenue South.*

E. High quality of design and design compatible with surrounding land uses, including both existing and planned;
   - *As previously mentioned, the site plan provides a wide buffer from the Ravine Meadows neighborhood and Jamaica Avenue South and creates connectivity from the Cardinal Reserve neighborhood south across Ravine Parkway South to the Kingston Fields neighborhood.*

F. Sensitive development in transitional areas located between different land uses and along significant transportation or scenic corridors within the City; and
   - *As previously mentioned, the proposed development provides a buffer from Jamaica Avenue South.*

G. Development which is consistent with the Comprehensive Plan.
   - *The proposed development meets density and land use requirements set forth in the Comprehensive Plan.*

DENSITY

With 85 units on a 36.35-acre site, and netting out of the parkland of 0.15 acres (with a net area of 36.2 acres), the proposed density is 2.34 units per acre. The area of the proposed development is guided for the Low-Density Residential land use category, which allows two to four units per acre. The proposed density is within the allowed density of the Low-Density Residential land use.

NEIGHBORHOOD MEETING

A neighborhood meeting is tentatively scheduled for February 12, 2026. A list of property owners to invite to this meeting has been provided by City Staff. Notes of the meeting will be shared with staff.

ELEVATIONS

Example elevations of our OriGen Smart Series homes have been provided. These elevations will vary based on material and color and may be slightly modified with each buyer. We also have anti-monotony requirements to ensure that very similar elevations are not adjacent to one another within the community to preserve visual interest.

TIMING

We plan to begin grading the site in late spring/early summer after approval of preliminary plat and other applicable agency approvals. We understand a grading-only development agreement will be required in order to accomplish this and therefore request that this agreement be reviewed concurrently with this Preliminary Plat and PUD application. Installation of utilities will occur after final plat has been approved and all conditions of final plat approval have been met. A phasing plan has been provided and is in draft form.

RESTRICTIVE COVENANTS

The development will have an HOA that will provide for the maintenance of the overall common elements in the community, including landscaping of the common areas as applicable. Additionally, restrictions will be placed on outdoor storage and parking (no boats, campers, or trailers) in order to keep the community looking orderly and well maintained.

EXAMPLE ELEVATIONS – ORIGEN

Augustine



Kingston



Richmond



Waterbury



EXAMPLE COMMUNITIES WITH REDUCED SETBACKS (PLEASE NOTE: THESE HOMES ARE SETBACK 5 FEET FROM THE SIDE PROPERTY LINE, AND WE ARE REQUESTING A 6-FOOT SIDE YARD SETBACK)






Shakopee - Valley Crest
40-foot Lots
5-foot Setbacks on Villas
and Carriage


Farmington - North Creek
40- and 50-foot Lots
5-foot Setback

SSTS LLC
www.s2traffic.com

Date: **February 10, 2026**

To: **Emily Becker, M/I Homes of Minneapolis, LLC**

From: **Katie Schmidt, PE (MN PE License #47147)**

Re: **Traffic Review – McHattie Landing Development, Cottage Grove, MN**

SSTS has conducted a high-level traffic review related to changes in access and residential unit count for the proposed McHattie Landing development in the City of Cottage Grove, Washington County, MN. In 2021, the initial McHattie Landing preliminary plat was approved with two accesses on Ravine Pkwy (a westerly right-in/right-out only access and an easterly full access) with 79 single-family home lots. Further site study revealed geotechnical constraints making the westerly right-in/right-out access and roadway cost-prohibitive. As a result, the updated site layout proposes one full access on Ravine Parkway with 85 single-family home lots as detailed in Figure 1. The proposed full access is side-street stop-controlled using existing turn lanes on Ravine Pkwy. Traffic from the neighborhood to the north will likely use the Janero Ave and Jarvis Ave connections and travel through the site to use the proposed access.

This traffic review estimates the site-generated traffic for 85 single-family homes, considers access through the site for the neighborhood to the north and provides a high-level peak-hour operational analysis of the proposed full access on Ravine Pkwy. Recommendations to improve traffic operations and safety are included, as necessary.



Figure 1. Proposed Site Layout

1. Trip Generation

Site generated trips for the proposed 85 single-family homes in McHattie Landing have been estimated for typical weekday AM and PM peak hours and on a daily basis using the data and methodology described in the Institute of Transportation Engineers' ***Trip Generation Manual***[1], which is a standard industry reference used by public agencies to estimate traffic generated by specific land uses. Residents in the neighborhood to the north are likely to travel through the McHattie Landing site for access. Figure 1 shows the potential area of 81 homes that could choose this travel route.

Table 1 summarizes the trip generation estimates for McHattie Landing and the homes in the neighborhood to the north that might use the proposed access.

Table 1. Trip Generation

Land Use	Land Use Code	Size	Trips Generated:				
			AM Peak		PM Peak		Weekday ADT
			Enter	Exit	Enter	Exit	
McHattie Landing Trips							
Single-Family Detached Housing	210	85 units	16	43	49	30	773
Neighborhood To The North Trips							
Single-Family Detached Housing	210	81 units	15	41	47	29	736
Totals			31	84	96	59	1,509
			115		155		

The McHattie Landing development is estimated to generate the following traffic:

- 59 new trips (16 entering and 43 exiting) during the morning traffic peak hour,
- 79 new trips (49 entering and 30 exiting) during the evening traffic peak hour, and
- 773 daily trips.

Traffic assumed to use the Ravine Pkwy/Proposed Access (McHattie Landing + Neighborhood to the north) is as follows:

- 115 trips (31 entering and 84 exiting) during the morning traffic peak hour,
- 155 trips (96 entering and 59 exiting) during the evening traffic peak hour, and
- 1,509 daily trips.

2. Traffic Volumes

2.1 Existing Traffic Volumes

Existing peak hour traffic volumes were estimated for the Ravine Pkwy and 66th St S/Access intersection from existing available data. Ravine Pkwy has an existing average daily traffic volume of 1,303 vehicles/day just east of Jamaica Ave (2024 ADT per MnDOT's Traffic Viewer Application). Peak hour traffic volumes are typically 10% of the ADT. This would equate to 130 total peak hour vehicles on Ravine Pkwy traveling east and west through the intersection. The AM peak hour split is assumed to be 60% westbound and 40% eastbound, and the PM peak hour split is the opposite with 40% westbound and 60% eastbound. Trip generation for 61 existing homes to/from the south on 66th St S is also assumed in the existing volume estimate on the south leg of the intersection. 61 homes is a high/conservative estimate based on lot locations in the neighborhood to the south.

2.2 Build Traffic Volumes

Distribution of new traffic (McHattie Landing + neighborhood to the north) on Ravine Pkwy is assumed to be 70% to/from Jamaica Ave and 30% to/from Keats Ave. These volumes were added to the north leg of the intersection. Figures 2 and 3 show the estimated Build traffic volumes for the AM and PM peak hours.

[1] ***Trip Generation Manual***, Institute of Transportation Engineers (ITE), 12th Edition



Figure 2 - AM Peak Hour Build Volumes



Figure 3 - PM Peak Hour Build Volumes

3. Traffic Operations Review

Operating conditions of intersections are evaluated based on the capacity versus the actual traffic volume. Industry standards for evaluating capacity are contained in the ***Highway Capacity Manual***[2]. Operating conditions are described in terms of driver delay represented as a Level of Service (LOS) grade with "A" as the best conditions and "F" as the worst. Typically, LOS "D" represents the threshold for acceptable overall intersection operations, and LOS "E" represents the acceptable individual movement threshold operating during a peak hour. Table 2 summarizes the LOS and delay criteria for unsignalized intersections.

Table 2. Level of Service Criteria – Unsignalized Intersections

LOS	A	B	C	D	E	F
Delay	0-10 seconds	>10-15 seconds	>15-25 seconds	>25-35 seconds	>35-50 seconds	>50 seconds
Description	*Free-flow operation*	*Unimpeded operation*	*Stable operation*	*Less stable & more delay*	*Unstable & high delay*	*Congested & back-ups*

Another component of operational analyses is a study of queuing. An intersection can operate with acceptable LOS, but if queues extend back to block adjacent intersections and/or entrances to turn lanes, unsafe conditions could result. The industry design standard 95th Percentile Queue Length is reported. Synchro software (12th Edition) was used for the operational analyses. LOS, delay, and queues are reported for each approach lane at the intersection. Synchro's HCM 7th Edition reports were used.

Operational analyses were completed for the estimated build volumes noted on Figure 2 and Figure 3 and for a future condition with Ravine Pkwy eastbound and westbound through traffic volumes increased by 50% to account for future traffic growth. Table 3 details the operational results. Operations are acceptable as LOS is B or better for all approach lanes, and queuing is minimal. Side-street delay increases as volumes on Ravine Pkwy increase, but operations remain acceptable with the longest delay of 11.3 seconds for the northbound shared left/through/right turn lane during the PM peak hour.

[2] ***Highway Capacity Manual (HCM)***, Transportation Research Board, 7th Edition

Table 3. Build Conditions Operational Results

Intersection	Lane	Build Volumes						Build Volumes w/50% Mainline Increase					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		LOS	Delay	Queue	LOS	Delay	Queue	LOS	Delay	Queue	LOS	Delay	Queue
Ravine Pkwy & 66th St/Access	*EBL*	A	7.4	0	A	7.5	5	A	7.5	3	A	7.6	5
	EBT	A	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0
	EBR	A	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0
	WBL	A	7.3	0	A	7.5	0	A	7.4	0	A	7.5	0
	WBT	A	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0
	WBR	A	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0
	NBLTR	A	9.9	3	B	10.7	3	B	10.4	5	B	11.3	3
	SBLTR	A	9.5	8	A	9.7	5	A	9.9	10	A	10.0	8

- Delay in seconds and queue in feet. Results from Synchro's HCM 7 TWSC Reports.

4. Summary & Recommendations

★ The number of new vehicle trips estimated to be generated by the McHattie Landing development is 59 AM peak hour trips, 79 PM peak hour trips, and 773 daily trips. The peak hour intensity is minimal, with around 1 additional vehicle anticipated every minute during the AM peak hour and 1.3 additional vehicles every minute during the PM peak hour.

★ Traffic operations at the Ravine Pkwy and 66th St S/Access intersection were reviewed with McHattie Landing development traffic and traffic from the neighborhood to the north. Operations are predicted to be acceptable in terms of vehicle delay and queuing during typical weekday AM and PM peak traffic hours. Additionally, traffic operations are predicted to be acceptable as background traffic volumes increase on Ravine Pkwy.

★ Development traffic is not expected to divert north via the 62nd St/Jeffery Ave route as an alternative to using the Ravine Pkwy and 66th St S/Access intersection.

SOUTH WASHINGTON WATERSHED DISTRICT

01/12/2024

Robert J. McHattie, MBA, CRPC
Financial Advisor* - Rob McHattie Financial
1412 Almond Avenue
St. Paul, Minnesota 55108-2536

RE: Wetland Review McHattie Cottge Grove property.

Dear Mr. McHattie:

The South Washington Watershed District has conducted an aireal photograph review of the property located in Cottage Grove, MN. Staff is familiar with the property and is confident in review with the Washington Conservation District that there are no wetland signatures on the property in question.

While there is some signatures during wet years there is not enough evidence to indicate that a Level 2 wetland invesigation is not required. Therefore we are confident that there are no wetlands on this property.

If you have any questions feel free to contact me at 651-249-7096 or matt.moore@woodburymn.gov.

Sincerely,

Matt Moore
SWWD Administrator

cc: Mr. Jay Riggs, Washington Conservation District

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3507 High Point Drive North
Bldg. 1 Suite E130
Oakdale, MN 55128

Ph: (651) 704-9970
Bolton-Menk.com

MEMORANDUM

Date: 02/17/2026

To: Paul Sponholz, PE

From: Mike Boex, PE

Subject: McHattie Landing Plan Review
City of Cottage Grove, MN
Project No.: 26X.142253.000

This memo summarizes the review of the Mchattie Landing Preliminary Plat Submittal, submitted by Hill Incorporated, dated 1/28/2026.

Preliminary Plat Plans

Sheet C1.0:

1. On the final plans, identify the vertical datum of the benchmarks used on the project.
2. On the final plans, please add a note on the cover sheet that the City of Cottage Grove's Standard Specifications for Street and Utility Construction shall govern for all improvements within the public right-of-way, public easement, or public parcels.

Sheet C2.0:

3. Monument:
    a. The monument sign on Sheet L3.0 will require a separate HOA outlot to be dedicated. Similar to the adjacent lots, the monument outlot should have drainage and utility easement to allow for consistent private utility installation outside of right-of-way.
4. Denote ownership of the proposed outlots in the site data table (e.g. Outlot C = HOA).
5. Easement widths to be confirmed with final plan and profile sheets. The minimum easement width should be twice as wide as the maximum pipe depth to invert.

Sheet C2.1:

6. Remove the sidewalk around Outlot C. Pedestrian ramps should remain.
7. Where trails intersect, provide 10-ft min. radii.

Sheet C2.2:

8. City pond outlots should be graded to 4:1 or less steep. Non-ponding outlots would then be owned and maintained by the HOA (e.g. the area along Jamaica Avenue north of the pondFor homes along Ravine Parkway, extend the lots to right-of-way and obtain a vegetative buffer easement to the HOA to ensure property owners don't remove the necessary vegetative buffer.

Sheet C3.7:

Bolton & Menk is an equal opportunity employer.

9. To clarify, the developer shall coordinate with private utilities and remove overhead utilities along the Military Road corridor and relocate underground, if needed. Relocation/replacement of overhead facilities will not be allowed. Please update notes accordingly.
10. Add a note to provide well sealing records to the city once complete.
11. Remove and replace the remaining section of trail (35-lf) by Jeffery Avenue to the existing pedestrian ramp.
12. Depict street and curb impacts of the proposed storm sewer connections to Ravine Parkway. Street patches should extend to lane lines or median.

Sheet C4.1:

13. Maximum intersection approach grade (all streets): provide a 2% maximum grade for the first 100-ft approaching an intersection (at a yield or stop condition), as measured from the intersecting street's curb line. This will be checked with final plans and profiles.
14. Depict driveway locations; the City would like to understand what is proposed for areas such as Lots 1 and 7 Block 1.
15. Public ponds should be designed to an 8-ft max. depth for maintenance.

Sheet C4.2:

16. Provide a 5-ft minimum horizontal distance at a 6H:1V maximum slope immediately adjacent to a pedestrian facility (trail) if the adjacent slopes are steeper than 4H:1V.
    a. Please confirm the trail along Ravie Parkway meets this standard relative to all the proposed pond grading. A separate detail in the final plans or additional notes would help clarify this.
17. It is acknowledged that the proposed 3H:1V slopes adjacent to ponds are proposed due to site constraints, however access to some storm structures will be difficult as depicted. Provide a secondary 10-ft maintenance bench at a higher elevation to access upper storm structures. The bench should run approximately as shown on the sketch attached to this memo, between STM-8/STRM-9, and along STM-36, STM-40, etc. The same maintenance bench grades should be provided (10H:1V max. cross slope, 6H:1V max. longitudinal slope).

Sheet C4.4:

18. MnDOT Seed Mix Mesic Inslope (MI), formerly 25-141 should be used within Military Road right-of-way along the Military trail corridor.

Sheet C4.8:

19. The city would prefer that the topsoil stockpile in Outlot C be moved over some lots to hopefully minimize the need to cross curb with equipment.

Sheet C5.1:

20. Where needed, irrigation services shall conform to city standard detail SER-12 (4" DIP and gate valve), such as Outlot C.
21. Attached are the as-built plans for irrigation along Ravine Parkway. An irrigation service should be provided to run the system adjacent to the development. The HOA will be responsible for irrigating this section of the boulevard and maintaining the system.

Sheet C6.0:

22. Avoid placing storm pipe behind the curb as that location typically conflicts with streetlight bases, signs, etc. This may require structures to be moved or additional structures to be added;

storm manholes can be used as necessary if catch basins aren't needed for drainage. This comment applies to all sheets.

23. Rear-yard storm sewer:
    a. Per the City's engineering standards, rear yard storm sewer should be limited to 300-lf maximum lengths as straight as possible, from the street for jetting.
        i. When modifying, there should only be a maximum overland drainage distance of 3-4 lots before providing a catch basin.

Sheet C6.3:

24. Evaluate options to reduce potential short-circuiting of treatment in Pond 1B by creating more separation between STM-43 and FES-101/OCS-102.
25. The city will allow submerged outlet pipes on this project to better fit outlet structures into pond slopes. The top of pipe should be 1-vf (min.) below the NWL, and the invert should be 2-ft (min.) above the bottom of the pond. A minimum adverse grade of 1% from submerged invert to outlet structure should be provided. It appears that the submitted design generally follows this guidance. Outlet structure location will be further reviewed with final plans.

Sheet C7.0:

26. With the removal of Military Rd, relocate the existing streetlights at Cardinal Reserve the 30 to 40-lf from the existing street intersection to the new trail crossing.
27. Pavement Markings: On Ravine Parkway only, message arrows and crosswalks shall be ground-in paint.
28. Midblock Crossings:
    a. Trail crossing signs (W11-2 & W16-7P) should be placed on both sides of the posts and visible from both directions.
    b. Per city standards, painted 12" crosswalk markings are no longer needed on typical residential streets.
29. The existing crosswalk across Ravine Parkway at 66th Street should be depicted to understand if the existing crosswalk will work with the new pedestrian ramp location. The ramp depicted on the east side of Street A should allow for a crossing to 66th Street as it does today.
30. In addition to the depicted right turn lane, restripe and sign for the eastbound left turn lane on Ravine Parkway to Jarvis Avenue/Street A.
31. Open space marker locations (city detail STR-40) have been determined by the City; please see location map attached to this memo.

Sheet C9.4:

32. The city forester has reviewed the tree preservation; please remove all Ash and Box Elder trees from the project.

Sheet L1.1:

33. Landscaping plans are identifying ornamental trees in the rear lot as the third tree on each lot greater than 60' wide. The three trees required per lot must be overstory deciduous or substituted with a coniferous tree. The landscape plans should also make note alongside the other landscaping standards listed on Sheet L1.1 that there must be one overstory coniferous tree as the front yard tree.

34. There are a couple trees near the entrance on Janero which will need to be moved outside of the drainage and utility easement.
35. No trees will be allowed in the public outlots.
36. The scalebar is incorrect; the text below the scale is correct, but the values above the bar are incorrect.

Sheet L1.4:

37. As previously mentioned, the proposed monument will require a separate HOA outlot to be dedicated.
    a. A maximum of 2 entrance monuments no more than 25 square feet per sign, may be permitted at each project entrance or subdivision entrance.

Traffic Study:

38. The following comments and edits are identified to provide clarification and further support the content shown in the report.
    a. Page 3: 3. Traffic Operations Review. Provide the existing operations for comparison to the proposed.
    b. Page 3: 3. Traffic Operations Review. Table 3. Build Conditions Operational Results.
        i. Identify if the queues are average, 95th percentile, or maximum. Provide average and 95th percentile queues.

Stormwater:

39. Drainage Areas and Impervious Surfaces:
    a. The proposed condition HydroCAD model simulates a drainage area of 37.43 acres including 12.61 acres of impervious surfaces. The proposed condition MIDS model simulates a drainage area of 35.53 acres including 10.71 acres of impervious surfaces. Sheet C3.4 lists the total platted area as 36.35 acres, the total disturbed area as 33.55 acres and existing and proposed impervious areas of 2.71 and 9.80 acres. Please label the acreages on the drainage area map (Sheet C1.2) and explain the differences in drainage areas and impervious surfaces between the models and platted areas (off-site areas for example).
    b. The Proposed Drainage Area Map of subwatershed 1A includes the area of the Jamaica Avenue South highway corridor extending from Old Military Road to the Ravine Parkway intersection. Please show the existing and proposed pervious and impervious acreages from the highway corridor right-of-way on the drainage area map and include these areas separately within the HydroCAD model and hydrologic design calculations (i.e. split into a separate subwatershed draining to Pond 1AP) for future reference by the City and County.
40. HydroCAD:
    a. The HydroCAD models simulate 6" Horizontal Orifices in Ponds A, B and C. Please update the model so these orifices are simulated as vertical orifices as shown on Sheets C6.2 and C6.3.
    b. Please include the inflow and outflow hydrograph plots in the HydroCAD report so we can review the model routings and stability.

c. Time of concentrations of 1, 2, 4 and 5 minutes are used in the HydroCAD model (Subwatershed 1CDIR, 1C, 1BDIR, 1ADIR). The City's surface water management plan recommends a minimum time of concentration of 8 minutes. Please consider revising the model Time of Concentrations.

41. MIDS Water Quality Model:

    a. MIDS model results were submitted for Proposed Conditions. Proposed Ponds were simulated as Design Level 2 with TSS 84% removal and TP 50% removal which seems appropriate and is compliant with City 50% and 80% TP and TSS removal requirements.

    b. The proposed condition MIDS model results indicate that the proposed TP Load is 15.58 lbs./year. To demonstrate SWWD compliance please provide an Existing Conditions MIDS model or other water quality estimate for comparison to the proposed load to demonstrate that the project is "maintaining existing" TP load. In this manner, identify whether the proposed conditions maintain the existing TP load from the project area or whether additional BMPs and/or purchase of mitigation credits will be required to achieve compliance.

42. Rational Stormdrain Design: Maximum storm sewer velocities should be kept at 10 feet per second or less. Several pipe reaches have design velocities of 12, 17, and 22 ft/s. Please work to reduce the design velocities.

43. Models and CAD Files: Please note that digital copies of the final version stormwater models (HydroCAD and MIDS) and shapefiles or CAD drawings of existing and proposed drainage areas are to be submitted to the city once the review and revision process is complete.

COTTAGE GROVE PLANNING COMMISSION **December 15, 2025**
12800 Ravine Parkway South
Cottage Grove, MN 55016
COUNCIL CHAMBER - 7:00 P.M.

The Regular Meeting of the Planning Commission was held in the Council Chamber and telecast on Local Government Cable Channel 16.

1. CALL TO ORDER

Brittain called the Planning Commission meeting to order at 7:00 p.m.

2. ROLL CALL

Pradeep Bhat-Here; Ken Brittain-Here; Jessica Fisher-Here; Evan Frazier-Excused Absence; Eric Knable-Unexcused Absence; John Stechmann-Here; Terrence Woodman-Excused Absence.

Members Absent: Evan Frazier, Eric Knable, Terry Woodman

Staff Present: Emily Schmitz, Community Development Director; Samantha Pierret, Senior Planner; Kelly Becker, Associate Planner; Paul Sponholz, City Engineer; Crystal Raleigh, Assistant City Engineer; Justin Olsen, City Council Liaison.

3. APPROVAL OF AGENDA

Stechmann made a motion to approve the agenda. Fisher seconded. The motion was approved unanimously (4-to-0 vote).

4. OPEN FORUM

Brittain opened the Open Forum and asked if anyone wished to address the Planning Commission on any non-agenda item. No one spoke. Brittain closed the Open Forum.

5. CHAIR'S EXPLANATION OF THE PUBLIC HEARING PROCESS

Brittain explained the purpose of the Planning Commission, which serves in an advisory capacity to the City Council, and that the City Council makes all final decisions. In addition, he explained the process of conducting a public hearing and requested that any person wishing to speak should go to the podium and state their full name and address for the public record.

6. PUBLIC HEARINGS AND APPLICATIONS

A. 7430 80th Street Cannabis Retail Sales - CUP/V2025-032
Venus Creations LLC has applied for a Conditional Use Permit to engage in cannabis retail sales and a Variance to be less than 1,000 feet from another cannabis or lower potency hemp edible retail establishment.

Pierret summarized the staff report and recommended denial based on the findings of fact stipulated in the staff report.

Brittain asked if there were any questions for staff.

Fisher asked what is the actual distance between this shop and the MoonSoon Tobacco shop, because I see that it's less than 1,000 feet, but what is the actual distance? Did that get measured? Pierret replied on the map shown on the screen, it is

approximately 930 feet to that property line. Fisher said my second question is it has to be more than 500 feet from an attraction within a public park that is regularly used by minors; so, I'd like to know how you decide what is an attraction, first of all, and secondly, how you determine if it's one that's used by minors or not, because that's a disc golf course, too. I just thought it was odd that the hammock post was called out as an attraction that minors use. Pierret replied that in our City Code it does specify certain things, such as public park, restrooms, pavilions, picnic shelters, and also disc golf nets are also included that we measure from. In this case, when we're thinking about that hammock area, this was at staff's discretion where the hammock area would be a place where children or minors could congregate at times, and it would be what the ordinance was kind of meant to buffer us from.

Brittan asked if the applicant had anything they'd like to add, and said please state your name and address for the record.

Matt Leisen, 17870 Jaguar Circle, Lakeville, MN, 55044, said I'm appearing on behalf of Venus Creations LLC for the owner, Ms. Rebecca Hildalgo, who cannot be here tonight. I just want to read a statement that was prepared on her behalf:

"Venus Creations LLC seeks a Conditional Use Permit and Variance to operate a cannabis retail store at 7430 80th Street South, Suite 105, within an existing multi-tenant retail building in a Mixed-Use District. The company is owned by Ms. Rebecca Hidalgo, who has long aspired to responsibly operate her own retail cannabis store that is compliant, secure, and community minded. As was mentioned, in particular tonight, Ms. Hidalgo respectfully submits a Variance request to be allowed the operation of a cannabis retail dispensary here, at this location. This Variance is necessary because City Code requires a minimum separation of 1,000 feet between cannabis and lower-potency hemp edible uses, measured from storefront to property line. The proposed location of Ms. Hidalgo's store is approximately 930 feet from the nearest store line of the closest low-potency hemp retailer. The Variance is consistent with the City of Cottage Grove's 2040 Comprehensive Plan for the future use of Mixed-Use Districts, which at the time of its adoption, cannabis use and legalization was not yet being considered. In this case, cannabis retail aligns with the vision of Mixed-Use intended to allow complementary uses to support economic development goals. Furthermore, the proposal complies with all other distance requirements, such as being 500+ feet from any parks or daycares, etc. Granting the Variance will also not harm public welfare or adjacent properties. The applicant must obtain local licensure and pass a comprehensive State inspection, ensuring compliance with stringent security measures, including 24/7 surveillance, alarms, and restricted access volts. Lastly, the Variance will not impair air or light to adjacent properties nor will the increased traffic congestion require risk or endanger public safety. So, in summary, the requested Variance is consistent with the City's Comprehensive Plan, it allows reasonable use of the property, and it will not harm public welfare or adjacent properties. For these reasons, Venus Creations respectfully requests that the approval of the Variance be granted and the Conditional Use Permit also be granted. Thank you for your time."

Brittain asked if there were any questions for the applicant, none were asked. Brittain said thank you, sir.

Brittain opened the Public Hearing. No one spoke. Brittain closed the Public Hearing.

Brittain asked if there was further discussion from the commission.

Stechmann said thank you, Board Chair. So, I don't have any concern about the subject matter, that this is a store that would sell recreational use marijuana, but it seems to me that the proximity to the MoonSoon one could be problematic, and that's why we have these rules in place. I note that MoonSoon achieved approval just weeks before this one came before us, so it's almost a race to the City Hall, but the fact is that MoonSoon did come here first and did get the approval first. So, at this point, I would say that I'm inclined to not approve or not recommend an approval of this request.

Fisher said I have maybe a clarification question. So, when you're measuring, you said something about storefront to property line vs. storefront to storefront. So, when you're measuring the distance from this potential establishment to MoonSoon, you're going from property line to property line? Did I understand that right? Sorry, I'm getting confused. Pierret replied no, that's okay, Commissioner Fisher, Mr. Chair. So, we are measuring from the opposed storefront; on the map in front of you, it would be approximately where that green dot is to the property line of the MoonSoon Tobacco store; so, their property line ends at the line where the blue circle is. So, that's where we're measuring that distance from. Fisher said okay, and 70 feet is really what we're missing here. So, theoretically speaking, if they were to get a suite maybe down at like where Tom Moy's used to be, they potentially could have this granted. Or if they had, in that area, they would need a Variance. Pierret replied running the calculations, getting closer, down towards where Tom Moy used to be, actually gets them about too close to the hammock area.

Fisher said I forgot about those. Okay, gotcha. I agree with Commissioner Stechmann, you know we have these rules in place for a reason; I feel this one may be splitting hairs a little bit, but ultimately following the guidelines that we've set forth makes the most sense to me. So, thank you.

Brittain said okay, I'll add that I know this is relatively new for the community and for a lot of communities, and I would agree with Commissioner Stechmann and Fisher's comments. My concern would be we don't have enough data to try and determine whether 70 feet is close enough, 80 feet is close enough. So, until we have more experience to determine what kind of challenges these businesses may or may not have, you know I would err on the side of following the letter of our rules, which is 1,000 feet; and, you know, maybe sometime in the future that distance may change, but for now, I would recommend and support denial based on the findings of fact.

Brittain asked if there was any further discussion, there was not. He said seeing none, I'll look for a motion.

Stechmann made a motion to deny the Variance and Conditional Use Permit, as outlined in the application materials. Fisher seconded. The motion was approved unanimously (4-to-0 vote).

Brittain noted that item will on the January 21 meeting of the City Council.

B. Van Meter Expansion - SP/V2025-031
Van Meter Inc. has applied for a Site Plan Review for additions onto their existing building at 7450 95th Street South. The additions are comprised of two expansion areas: Expansion B is approximately 86,720 square feet to be used for receiving, warehousing, and will-call operations. Expansion A is approximately 38,220 square feet to be used for warehousing. The applicant has also applied for a Variance to allow Expansion A to expand into the required 100-foot property line setback from the residential-zoned property to the north.

C. Van Meter Exterior Storage - CUP2025-032
Van Meter Inc. has applied for a Conditional Use Permit to allow for the exterior storage of materials within a 10,000 square foot enclosed with 8- to 10-foot tall vinyl fencing.

Becker summarized the staff report and recommended approval subject to the conditions stipulated in this staff report.

Brittain asked if there were any questions for staff.

Bhat asked so the parking space requirement, is it for the general public or is it just a total number, and it could be divided any way the applicant wants? Could those be additional parking spots from several users? Becker replied yes, Commissioner Bhat, that is based on the total warehouse square footage, so for warehouse needs. Bhat asked so, there's no requirement, per se, that need to be opened up for the public or general use? Becker replied yes.

Brittain asked if there was anything the applicant wanted to add, they declined.

Brittain opened the Public Hearing for the Site Plan Review and Variance for the expansion at their existing location. No one spoke. Brittain closed the Public Hearing.

Brittain asked if there was further discussion from the commission.

Fisher said I think that the Variance should be granted on this one, just considering that it makes sense and it falls in line with the existing building and because our setbacks have changed over the years. It makes sense that this Variance should be granted, so that's all I really have to say. It seems like Van Meter is growing and growing and growing, and I think that's awesome for our community to have such a business that's growing and needing more space, again. So, that's my thought.

Stechmann said I wish I would've gone first because that's exactly what I would have said. I'm grateful and I'm inclined to say yes, also.

Bhat said I have a question for the applicant. Brittain replied certainly, would the applicant please approach the podium and state their name and address for the record. Good Evening, my name is Nate Jensema, I'm the C.O.O. at Van Meter, my personal address if you're looking for that, 470 Wilder Drive, Cedar Rapids, Iowa. Bhat said so my question is regarding the requirement

for this additional outdoor warehousing. Since we have already these new buildings coming up in this other location, what drives you for this additional outdoor warehousing? Jensema replied good question, commissioner. So, the permit for the additional space, the outside storage that your question is about, the request for that is really a result of the fact that we are going to be operating at our existing facility, fully supporting our customers, while expanding. And, so, that's going to take up the outside storage at our existing facility as trucks are coming in and out. So, we aren't going to have the ability to store our outside material at our existing facility while the construction is going on. So, we're asking for the ability to store outside material at our leased space, at our Wire Center today, while the construction is going on, and then eventually, we will move all of our operations back to 95th Street once the construction is complete. Bhat said thank you.

Brittain said okay, just to clarify, that particular outdoor storage space is Portion B, and right now, we're talking about Portion A, so it's okay. Just as we look for a motion and take a vote, we are voting on A, which is the Site Plan Review and the Variance for the building setback.

Brittain said and I will agree with comments from Commissioners Fisher and Stechmann that the continuity of the building, to extend that in an area that they are and what they're requesting a Variance for makes total sense. We haven't seen any negative impacts from the building being any closer to that side setback so far. So, having it linearly continue in the same way, I see no negative impact, plus it's a non-buildable area out in that direction anyway, so I really see no concerns with that at all.

Fisher made a motion to approve the Site Plan Review and Variance at 7450 95th Street South, based on the findings of fact and subject to the conditions stipulated in the staff report. Stechmann seconded. The motion was approved unanimously (4-to-0 vote).

Brittain opened the Public Hearing for the exterior storage Conditional Use Permit. No one spoke. Brittain closed the Public Hearing.

Brittain asked if there was any further discussion.

Fisher said I will just say one thing. We've had other CUPs for storage on that property, so this seems pretty straightforward, that we would allow this one as well.

Brittain said thank you, I would agree. We already have outdoor storage in that area, this is an Industrial base, its not adjacent to any other residential use. So, I also agree that the Conditional Use Permit would be acceptable in this case.

Bhat made a motion to approve the Conditional Use Permit to allow exterior storage at 7601 100th Street South, subject to the conditions stipulated in the staff report. Fisher seconded. The motion was approved unanimously (4-to-0 vote).

Brittain said that will be on the January 21, 2026 City Council Agenda.

D. Yellow Tree Apartments – PUD/SP/PP2025-030
Yellow Tree Development has applied for a Site Plan Review and Planned Unit Development (PUD) for a proposed 186-unit, market-rate apartment building to be located on East Point Douglas Road. A Preliminary Plat application has also been submitted for Everwood 6th Addition.

Pierret summarized the staff report and recommended approval subject to the conditions stipulated in this staff report.

Brittain asked if commissioner had questions for staff.

Stechmann said thank you, I appreciate the presentation. I do have some curiosity about some aspects of it that I'd like to convey, and maybe you can help enlighten me a little bit. First of all, with respect to the Planned Unit Development (PUD) aspect of this, so I think I heard you say that is being considered in this case because of the unique topography or the location of this application. So, my first question is, is it commonplace these days for the City of Cottage Grove to grant PUDs, something along these lines? Pierret replied Commissioner Stechmann, Mr. Chair, so I would say a PUD is intended to be rarely used, similar to like a Variance situation where we've kind of spoken about Variances. It's a unique situation, unique to each property, and this PUD is used where they can meet our Code and meet the intent and the goals of the City and of the Council just with a little bit of give and take in some areas. Stechmann said and to continue along those lines, is the necessity born out of the size of the proposed project, or is there some other aspect? Is it the topography or is it a combination of both or something else that I haven't

mentioned so far? Pierret replied Commissioner Stechmann, that's a good question. So, what I will say is there have been several other developers who have looked at this site in the past; as I mentioned, it was platted in 2007; these developers could not make the numbers pencil out when we were talking about where that conservation easement is, the trail easement, and existing topography on site. Then, just the sheer costs of when we have a restricted buildable area like this, there's not room for exterior parking, so we're having to do the covered parking, which is an additional expense of course. So, I would say this particular parcel has been looked at several times, and it is definitely a unique one that this developer has found a way to meet most of our Codes and Ordinances. Stechmann said okay. If it wasn't being used for a family or a multiunit type of property, would it be suitable for a different type of use that would not require a PUD? Pierret replied good question. If a developer were to come in and request anything that's also permitted in the Mixed-Use District, so we're talking retail or other sorts of commercial ventures, of course they would be more than welcome to do that, and if they can do that without a PUD, that would be great. However, when I look at this property just as a planner and everything, I don't see how anybody would be able to avoid the PUD in this case, just given the status of the site.

Stechmann said following up a little bit more, if you don't mind? Brittain asked do your follow-up questions have to do with something that's appropriate to the Ordinances, or is it specific to the PUD? Stechmann replied it's the PUD. Brittain said okay, just if you could focus on what would be a condition of approval or denial, not necessarily the tools the staff is using to accomplish the application.

Stechmann said okay, all right. Well, I guess there's this question, and I know that there was consideration or thinking about the vehicular traffic, but was there something that was along the pedestrian traffic? Is that an appropriate question, Mr. Chair? Brittain replied yes. Pierret replied so regarding the pedestrian traffic, I am going to bring up our Assistant City Engineer, Crystal Raleigh. She has provided me with all of this wonderful information that I talked about. Raleigh said Good Evening, Commissioner Stechmann, the pedestrians were considered in the application here. The characteristics of Hardwood Avenue through this area are very challenging as it related to pedestrian crossings. I'm going to take you back to this drawing; these curves that are currently on Hardwood Avenue do not provide adequate sight distance or safe pedestrian crossings, so we struggle with having our pedestrians cross at those locations. We did construct a traffic signal at Hardwood and Hardwood, down on the southeast corner of this image, and with that intersection, we have really safe pedestrian crossings. Now, according to Minnesota Statute, pedestrians can cross at any intersection, and so while pedestrians could cross Hardwood, we do not want to mark that as a pedestrian crossing due to the safety concerns that we have as staff. We don't want to provide pedestrians with a false sense of security in those other crossing locations; so, we would like to promote crossing at that safer location with the traffic signal. Does that answer your questions? Stechmann replied it does, but it does also prompt another one. So, for example, if somebody were living at the proposed development and wanted to visit the Sushi Café, for example, under this particular proposal, they would have to kind of trek all the way down to the Hardwood Court crossover there, then come back up and head that way. I'm just wondering is there any other way to mitigate that? I don't know if there would be some kind of a little additional way to have them cross over into the parking lot, just south of the building of Kohl's, or if there would be something else that could be done? Raleigh replied Commissioner Stechmann, Mr. Chair, when The Legends apartment building went in, there was consideration made for a sidewalk connection onto the Kohl's parking lot from East Point Douglas Road, and Kohl's was not excited about that proposal, and also, there's a really steep hill there. It's hard to see on a flat image here, but there's not a way to make that ADA accessible with a sidewalk piece between East Point Douglas and Kohl's. Another issue is we would have to cross people from the north side of East Point Douglas to the south side, and at that curve, again the sight distance isn't great. So, that's another reason we wouldn't want to cross folks right there. Stechmann said thank you.

Fisher said I want to continue on with Commissioner Stechmann's question. So, this particular intersection has given me pause in the past. I'm wondering, as you talk about the traffic study and the additional trips, which is more than doubling the trips per day going down into this area. What is the threshold for having some sort of signal there, and how close are we to that threshold? Because my office is in this area, I am on this road all the time, and people are nuts; no offense, but people go fast around those curves. It's just not a great road to travel on, and I'm just curious what the threshold is and how close we are to it because we've got to be close to it for that particular intersection. Raleigh replied Commissioner Fisher, Mr. Chair, I don't have those exact numbers about how close we are. I know in that previous traffic study, we were talking about 5,000-6,000 vehicles per day as what East Point Douglas can handle. A traffic study at the intersection is what would be needed to verify if those intersection controls are correct. The studies that have been done so far show that with the amount of traffic on Hardwood Avenue, it wouldn't be reasonable to stop Hardwood traffic, and the relatively small amount of traffic that we're adding with this development wouldn't be enough to warrant additional traffic controls at that intersection. Yes, there will be additional queuing, you will have to wait a little bit longer to take a left out of there, but that intersection isn't warranted for controls at this point. Fisher said okay, I was just curious. Raleigh said and we do traffic counts continually, annually, so if things change in the future, perhaps the City will need to reconsider, but at this point, we don't anticipate any changes at that intersection. Fisher said I will

say I do appreciate the new stoplight because taking a left off of Hardwood Court was sometimes impossible. So, I do appreciate that, but maybe there'll be another one in the future, maybe I'll get a light there someday, I don't know. Thank you very much.

Bhat said so my question goes to one of the stipulations that you have, which is a requirement to hold that neighborhood meeting. So, my question is why haven't we done that already? Pierret said Commissioner Bhat, that is a very good question. So, we have required that the applicant hold that neighborhood meeting. When they first applied, the timeline was really tight, and we are actually, this meeting we're having tonight is actually a week earlier than our traditional Planning Commission meeting. So, the timeline was tight and the applicant has reached out to staff at The Legends to hold that meeting; it's also a matter of getting hold of them and figuring out a date and time that will work for everyone who lives at The Legends. Bhat said so, my follow up then is if, after that meeting, would it come back with some modifications, and do we need to consider this application again? Pierret replied so, it would not come back unless something came out of that that drastically changed the Site Plan in some way from what you're considering tonight. Any comments or concerns should be able to be added to the report for the City Council, and they would take that into consideration when they make the final decision. Bhat said okay, my last question. So, did it in any way hinder the participation of public for this meeting here? I mean, did the people at The Legends knew that it was being considered at the meeting today and they had ample opportunity to voice any concerns that they had prior to the neighborhood meeting? Pierret replied so, Commissioner Bhat, we did send out the Public Notice; obviously, that does not go to everyone who lives at The Legends. I'm not sure what their process is for sending out Public Notices, the notice was actually sent out two times because we were going to consider this at your November meeting. Then I did actually have a phone call with a resident at The Legends last Friday, and in the duration of our conversation I let her know what we were considering tonight, too, and that she could come and bring all her friends with her to make their comments heard; but there would also be a meeting at The Legends that they would be able to participate in, and she sounded like she was looking forward to that meeting on site. Bhat said okay, thank you.

Fisher said I just, I guess wanted to underline that we as Planning Commissioners have questions that we ask to make sure that we understand the proposal in front of us, and I would just really like to make sure that Commissioner Stechmann's questions were all answered when he was stopped before. I think it's important that we all get our questions answered appropriately. Stechmann said thank you, and thank you for your concern. My questions I think are answered. I have some hesitations that I'll explain in my appropriate comments section, but for now, I have no further questions. So, thank you.

Brittain asked does the applicant have anything they'd like to add; please state your name and address for the public record.

Good Evening, Members of the Commission, I'm Robb Lubenow with Yellow Tree development at 1834 East 38th Street in Minneapolis. I'm also joined by Patrick Sarver with Civil Site Group, so he handled a lot of the concerns and complexities of the site, we're basically building in the side of a hill. It is truly the most difficult project I've worked on in my career, without question. I think we're on eight iterations of how we could manage a lot of the complexities on the site, Sam did a great job explaining those. I'm open to answering any questions, I think it kind of comes down to the three concerns: The site, parking, and cladding, the way I see it. I'll answer your questions, but quickly, the site: If this was across the street or on any flat lot, we'd be under 50 feet. So, just on the side of a hill, the back of our building, its a four-story building, and we're exposed where the parking levels are, so, I'm willing to go more in depth on that. The same with parking, we are very comfortable with parking requirements, we have other operating buildings, we manage our own buildings; it is actually in excess of what I think we actually need, but I'm comfortable and really, as you can see, we're over almost our entire amount of parking, which is not typical for any type of development outside of the urban core. Last, the cladding, that is very difficult. I know we're working on how we'd like this building to look. You do have your cladding requirements that we respect, and I do think this is a good compromise of what is esthetically pleasing and very quality materials. So, our concealed fastener metal panel that looks like the real wood is more durable than wood. We stand behind those products, and I think it does provide a great visual interest for the building that otherwise we don't want to look at a, no offense, but a glass and brick building from like the 1970s; we're adding undulations on the exterior and also working with the cladding materials. So, I'm happy to answer any more questions and if there are Civil questions, Patrick is here as well.

Brittain said okay, are there questions for the applicant?

Fisher said so just talking about the materials and kind of using certain materials on certain sides, is that also a significant cost savings, or are you just strictly choosing those materials because you feel that they perform better? Lubenow replied both, there certainly is both, there are immense cost impacts to your required materials. So, in a typical building like this, what we have in our general parameters for this type of in-hill development, we're about $1 million over budget just on the cladding materials. So, with that being said, there's, we're not having vinyl siding, we're not having a cheap wood product, or even I think the

concrete board is our cheapest material. But that wood like and metal siding is certainly cheaper than brick. There are also concerns about how high you go with brick and the relief angles and everything else that come into play, so yes. Fisher said gotcha, I was just looking for the actual like percentage. I think it was like just a few percentage points less, so okay, thank you very much.

Brittain said just out of curiosity, we haven't had an apartment building with a double level underground parking. How do you get to each of those levels from outside? Lubenow replied in this case, we're handling it by an interior ramp. So, you'll access the rear of the building where some more retaining walls and that public pathway goes. Then you'll have the option to veer off on Level 1 or stay on your current level and ramp up to the second level. So, at first glance, we did not think a two-level parking, precast, would be the most cost effective, but it turned out to be. We are building into stone and that stone is self supporting, so we're not required to have shoring there, so that kind of works with us in this case; we have to get rid of it, we have to get rid of the stone, but we also don't have to put in shoring, so that helps. Brittain said okay, thank you.

Bhat said I'm just following up on the parking question. So, my initial understanding was that both levels were underground, but are they? Lubenow replied it would be on a typical lot. They would be, they are the type of parking that's typically subterranean parking, but on the back of our building and most of the sides, it is underground; but as the lot falls off at a very steep angle, the front of the building its exposed. So, that's one of the difficulties we've been working with is building into that hill and taking that triangle out, and then we can't go down another 20 feet into more bedrock, and then the units on the back of our building would be on the side of a hill. So, we'd lose all the back of the units on a double corridor. So, that's not practical. Bhat said okay, so when you enter the parking lot, you would be below level, and then you would have the option to go up? Lubenow replied yep, that's correct. Bhat said okay, thank you.

Fisher said so, you'll be taking some rock out, obviously; you'll be blasting, I would assume? Lubenow confirmed that. Fisher asked are there considerations for neighbors, how does? I mean, we don't hear of blasting often here, so what does that all entail and what does that look like? Lubenow replied I agree all types of construction is very intrusive, that is certainly intrusive. We had one contractor reach out to us as to what is allowed in the City for blasting. That is one option, we don't know if it's the most cost effective, it's a light sandstone. So, most likely most of it can be removed by just a small-toothed bucket, chipping away at it. That is our preferred method, but there might be areas where the type of rock changes slightly that there'd be the need for some blasting. Fisher asked does the City require a specific permit or anything like that to blast bedrock? Raleigh replied Commissioner Fisher, Mr. Chair, we do have a process for blasting permits. It's not necessarily a permit, but there's a very close back and forth with the Engineering Department. There are a lot of requirements for monitoring around the site when blasting is required. They have to put together a very detailed Blasting Plan, we do televise utilities that are underground before blasting and after blasting to ensure there are no impacts to the existing utilities on site. All those things are covered in that Blasting Plan that gets submitted to us for review. Once that's approved, we can move forward with it. Fisher said thank you. Lubenow said and one note, in a brief conversation with the contractor, they said it is similar, if not less intrusive, than pounding piles because at least that energy can go upward with the stone. So, it's probably pretty similar, I'm not sure if Rohrs is putting any shoring in, but there's certainly impacts to pounding piles for shoring as well.

Brittain asked if there were any additional questions for the applicant, none were asked.

Brittain opened the Public Hearing. No one spoke. Brittain closed the Public Hearing.

Brittain asked if there was any further discussion.

Stechmann said okay, I've read this portion of the packet a couple times, and I've tried to do my best to come to terms with what is being asked and my response. As a member of the Planning Commission, I do have some concerns. So, for example, about the traffic, so I know that in an ideal world, we would encourage the pedestrians to go the appropriate route all the way down to the signal crossing area, and then cross back and make their way back up to Sushi Café or any of those other restaurants that are up that way. As being a former prosecutor for 15 years, I know that is often an unrelated breach, and most people would simply disregard the safe ways to cross the streets. If we add 186 units in this area, which is market rate, so it's not like designed for senior living or other places, there will be youngsters, people who are not fully appreciating the safety concerns that they would have. Instead, they would want to cross across Hardwood Avenue, especially with respect to that intersection with East Point Douglas Road. For me, if a person is crossing over that, perhaps at night, and certainly without the benefit of a crosswalk or flashing lights or any other thing to help indicate to vehicular traffic that there may be pedestrians in this road crossing five lanes, it seems to me that that is a risk worth considering. I did not see sufficient mitigation in terms of that part. I understand that other things can be done, but at least at this point in time, I do have concerns about the pedestrian traffic in this area. I know

that vehicular traffic is expected to about double, it's not going to reach the capacity for this type of street, but if additional developments come down the road, then it will be; so, then there will be a need for additional types of whatever type of traffic control to lessen the risk for pedestrians getting hurt. That's one of my concerns that I have about this. Another one is when it comes to the Planned Unit Development; so, I understand again this is used as a tool in a unique situation, and probably both sides benefit from having these types of tools being used, and there are proper times I think for a PUD to be used. My concern is could it be the case where this particular applicant or this particular project could find a home someplace else in the City of Cottage Grove that does not require a PUD. I don't know, I don't know if that's an appropriate question for us to ask at this point in time, but it is something that has weighed on my mind again as a volunteer member of this Planning Commission. I also wonder like would there be another use for this real estate, if something that was less ambitious would come along, either in size, complexity, or purpose that would not require the granting of a PUD? Now, I don't know if that is the case, I don't know if it's been studied in the past, and there have been multiple applicants in the past, and for whatever reason, if the numbers didn't work, that's fine. But I'm just wondering if maybe somebody moving forward would then find a workable solution for this real estate, for it to be developed and be a productive part of our community, with respect to its character and also to the safety concerns that I've raised earlier today. Finally, I would like to say that I sincerely do appreciate the enormous amount of time and energy that has been placed into the multiple iterations of this proposal. I understand it was the most difficult one that was undertaken ever or in your career or what have you. I get that, and I do welcome the idea of having additional housing come to Cottage Grove. There is a surplus of 3-bedrooms, I get that, and a deficit of smaller units, 2-bedroom and 1-bedroom or a studio; maybe that could be mitigated by finding another location or reducing the size or what have you, but at this point in time, I'm thinking that this one might not be the appropriate use for this particular location.

Fisher said I'm going to chime in. I appreciate Commissioner Stechmann's thought process. One thing I'll weigh in is I mean this is a willing buyer, willing seller situation, though when you have a piece of real estate for sale, or somebody wants to sell it, and we have a willing buyer, who wants to buy it and wants to put something in that. We've had multiple studies with population and our housing needs in the community, and this is something that would help serve some of those needs. A PUD is not a scary thing. It's not something that's rare or that's something we don't see very often, and maybe I've just been here too long because I've seen several. So it's not something that I think needs to be shied away from or needs to be avoided in lieu of some other use, right? So, I think ultimately it boils down to there's a willing seller that is ready to sell this parcel and a willing buyer, ready to develop it and to meet some needs of our community. So, that being said, I don't know if it's our job or our, I don't know what the word is, to find a better spot for this particular building or for this particular parcel to develop into something different. I do agree with you about the traffic concerns and pedestrian concerns at that corner, and like I was saying before, I've griped about that corner before with other applications, too. So, I appreciate your comments, I will just underline we have a willing buyer and a willing seller and that PUD is a really useful way to use unique parcels.

Bhat said my concern is with regard to having, I don't know if we have allowed for enough public participation because this was not discussed with or considered with the Immediate neighborhood. So, if we had done that, perhaps regarding concerns regarding traffic, either neighborhood traffic or even foot traffic, would have come up more strongly. I don't know, maybe not that strongly. So, that's one of my concerns, what we have here, I'm not sure if we had, if there has been enough advertisement so that we considered all options or all opinions. That's my concern.

Brittain said Director Schmitz. Schmitz said Mr. Chair, Members of the Commission, I'll just add a couple additional thoughts onto your thoughts:

1. I'll indicate we always send a Public Hearing notice to all residents within 500 feet of an application. So, Commissioner Bhat, to your concern that the neighborhood has not been informed, they absolutely have, and that's the Public Hearing held this evening to give them an opportunity. The neighborhood meeting is an addition to that notice of this application, obviously, to hear any concerns with that. So, with any application, we're sending that notice out to those within 500 feet.
2. And then I'll add maybe just a little bit of history on a Planned Unit Development. In the past, yes, we had seen quite a few Planned Unit Developments. Typically, we'd see them with Single Family Residential projects, and that was well before we amended our 1974 Zoning Code which, for lack of a better way to put it, was out of date, right? It didn't align with market trends, we were having to find ways to support development in Cottage Grove that didn't necessarily align with our Code; it was completely out of trend, out of date, out of marketability, and to be able to support those developments. Now, when we rewrote our entire Ordinance, understanding full well that we had in the past defined quite a bit of the flexibility, we ensured that there was clarity in our Planned Unit Development Section of our Code: That if a project was to support the community as a whole, aligned with Strategic Goals of our Council and our Comprehensive Plan, and of course did not have a negative impact to the tax base of the community, by allowing for those flexibilities as a part of a project, that's when a Planned Unit Development was an appropriate tool to use with a development, whether residential, commercial, or industrial. And, so, just an additional thought

process as you contemplate that Planned Unit Development as a tool, yes, in unique instances, but our Code is quite clear when we are able to implement and when we aren't. So, we've certainly evaluated that as clearly as we could with this particular project. So, I'll just add those.

Fisher said I think it's great that you are having a community meeting at The Legends because I think a lot of those people are older and maybe don't like to travel later at night or in the cold. So, I appreciate you giving them the opportunity to voice their opinions, even if it's not right here, right now. I know I have full confidence that you guys will take notes and that will be presented with the packet to the City Council when they're deciding what to do. So, thank you for doing that.

Brittain said I just want to clarify something. So, when the community meeting happens, any responses that would be gained from the community meeting would be included in the packet for the City Council to review; is that correct? Schmitz replied Mr. Chair, Members of the Commission, we'll absolutely ensure that we will include an overview of any concerns that are raised as a part of that neighborhood meeting. Brittain said so, if there's some type of significant thing that comes up in that community meeting, then it can be addressed by the City Council. Schmitz replied absolutely, Mr. Chair, the Council will be aware of those conversations. Brittain said thanks.

Brittain said also, I'd like to comment on the use of the PUD is a standard tool that the City uses, if it's not frequent. In this particular instance, we would have had some Variances and a few other things to consider if we were doing it in a very different format, and from looking at the staff report, I don't find any of the Variances that would have been requested in a more complex manner to be out of scope for what this project is asking for. So, even if it wasn't a PUD, I'd support the application based upon what they're asking for and what Variances they would have needed, based on the information in the report. And with regards to the safety, there could be a single-family home on this lot with one person that's walking down that street, and they're going to have the same safety concerns that 168 residents are going to have. Anybody walking down that street is going to have to follow the rules or as a community, we're going to need to make it safer. I see that as this develops, if there is a concern that the City can note and justify that you do have an intersection there that you could put a light. So, even if we're not doing it now, there would be opportunities in the future, if warranted, to increase the safety. So, while I agree that there are some safety concerns, I think that under the circumstances, this particular development or any development going in there, isn't going to make that better or worse; they are what they are from what I'm seeing. So, I would support this application and hope that as safety concerns were identified, beyond what they appear to be today, that we could mitigate those with the normal tools that we have. So, those would be my comments for the discussion.

Fisher made a motion to approve the PUD, Site Plan Review, and Preliminary Plat, subject to the conditions stipulated in the staff report. Bhat seconded. The motion was approved on a 3-to-1 vote (Nay vote by Stechmann).

Brittain said this item will be on the February 18, 2026 City Council agenda.

7. APPROVAL OF MINUTES

A. Approval of the November 24, 2025, Planning Commission Meeting Minutes

Stechmann made a motion to approve the November 24, 2025, Planning Commission Meeting Minutes. Bhat seconded. Motion passed unanimously (4-to-0 vote).

8. REPORTS

A. RECAP OF DECEMBER 2025 CITY COUNCIL MEETINGS

Schmitz summarized the actions taken at the December 3, 2025 City Council Meeting.

Schmitz said Council Member Olsen is here to add any details and is always happy to answer questions.

Council Member Olsen said hi, if you have any questions for me, I'm happy to answer those for you. I think Emily did a bang-up job of sharing what we covered in our first meeting in December. Of course, this meeting being a week early, you already got to hear about November, in November. We did pass our budget for 2026; we had a 3-1 vote on that budget. As we went through the budget process, and we ended up passing our preliminary budget, we had unanimous consent on the budget; but when it

came time to actually vote for the budget at the first meeting in December, one of our Council Members was absent, unfortunately, and then we had another Council Member who didn't feel comfortable with the budget. For those who may not be aware, the budget has to pass with a super majority, so we made that happen. It may have been easier if all five were present, similar to what you're dealing with this evening, you have four of you here instead of seven of you. That makes things a little more challenging sometimes. I would like to state, for the folks watching at home, that I appreciated the vigorous debate tonight. I think it's important to note that as Planning Commissioners, we expect that from you. Your job is to really inform the City Council as to your thoughts and concerns or approvals or whatever the case might be, for some of the projects that we then have to go on to consider. When you have the vigorous debate like you did tonight, it certainly plants the seed for some additional thoughts and questions that we may come to pass when it lands on our table. So, don't stop doing that. I don't ever want anybody on the Planning Commission, and you're going to be stuck with me next year, too, unfortunately, provided that passes, but I don't ever want anybody on the Planning Commission or any commission to think that they are being pigeonholed or pushed into a corner and you don't have options. I want you to vote your conscience every time. And, yes, there are rules and purview to what each of you do, depending on which commission you're on, but again, when it comes to the City Council, we read, believe it or not, the entire packet when we get it, and your commentary carries a lot of weight. What you do matters, so never lose sight of that.

Do you have any questions for me this evening? None were asked. Well, then let me be the second person at this desk to wish you all a very Happy Holiday season. I know that it's a challenging time for people, so don't forget to do your part to make everybody else's life a little easier, if you get a chance. It is the season of giving, and I would encourage everybody to give what they can when they can. Maybe lift up a neighbor who's having a tough time, or think about somebody even within your own family, who maybe is struggling. It's a rough time of year for some people, so count your blessings and share them if you get the opportunity would be my advice. And with that, Mr. Chair, I'll turn it back to you.

Brittain said thank you, Council Member Olsen.

B. RESPONSE TO PLANNING COMMISSION INQUIRIES - None.

C. PLANNING COMMISSION REQUESTS - None.

9. ADJOURNMENT

Fisher made a motion to adjourn the meeting. Bhat seconded. Motion passed unanimously (4-to-0 vote). The meeting was adjourned at 8:30 p.m.