



NORTH BRANCH

—Minnesota—

Kevin Schieber
Mayor

Robert Canada
Councilmember/Acting Mayor

Travis Miles
Councilmember

Kelly Neider
Councilmember

Peter Schaps
Councilmember

**CITY COUNCIL
REGULAR AGENDA
TUESDAY, OCTOBER 22, 2024 @ 7:00 PM
CITY HALL, 6408 ELM STREET, NORTH
BRANCH, MN 55056**

1. CALL TO ORDER

2. PLEDGE OF ALLEGIANCE

3. ROLL CALL

4. AGENDA APPROVAL

a. Approve Agenda

ACTION

5. PRESENTATION & PROCLAMATION

6. PUBLIC COMMENT

Provides an opportunity for the public to address the Council on items that are not on the Agenda. Please raise your hand to be recognized. Please state your name and address for the record. This section is for the express purpose of addressing concerns of City services and operations. It shall not be used to clarify individual's views for political purposes.

7. CONSENT AGENDA

All matters listed under Consent Agenda are considered routine and/or non-controversial and will be approved by one motion. There will be no separate discussion of these items unless a Councilmember or citizen so requests, in which case the item will be removed from the Consent Agenda and considered in its normal sequence on the Agenda.

a. Claims

ACTION

b. Approve Resolution No. R-102-2024, Accepting the Offers of Dedication and Reducing Security for Westside Commons

ACTION

c. Approve Resolution R-103-2024 Approving Northwood Park Pickleball Court & Site Improvements

ACTION

8. PUBLIC HEARINGS

- a. Public Hearing - Meadows Ridge EAW (Environmental Review Worksheet) ACTION

9. STAFF REPORTS

- a. Compost Site Hours and Use VERBAL
UPDATE
- b. 2025 Budget and Levy VERBAL
UPDATE
- c. Request for information on contracting with Chisago County Sheriff's Department ACTION

10. MAYOR/CITY COUNCIL

- a. Clarification of Information for sale of electrical utility assets due to statements made by one or more members of the City Council in a public setting VERBAL
UPDATE

11. ADJOURNMENT

Since we do not have time to discuss every point presented, it may seem that decisions are preconceived. However, background information is provided to the City Council on each Agenda item in advance from Staff and appointed Commissions; and decisions are based on this information and past experiences. In addition some items may also have been discussed preliminarily at Council Work Sessions. If you are aware of information that has not been discussed, please raise your hand to be recognized. Comments that are pertinent are appreciated. Items requiring excessive time may be continued to another meeting.



Prepared By: Sharon Wright, Finance Director

Presenter: Sharon Wright, Finance Director

Date: 09/27/2024

Board & Commission: City Council

Subject: Claims

A

Voting Requirements:

Voting Options Simple Majority

City of North Branch

ACH Checks

5580 to 5594 - \$99,918.52

Checks

90240 to 90333 - \$453,050.32

Payroll

October 11, 2024 - \$105,184.70

Accounts Payable
Computer Check Proof List by Vendor

User: TiffaniFolstad
Printed: 10/10/2024 - 8:36AM
Batch: 00002.10.2024 - 10102024



Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
Vendor: 1646	Ameritas			Check Sequence: 1	ACH Enabled: False
1011 AMER	OTHER RETIREMENT	90.00	10/10/2024	101-00000-21705	
	Check Total:	90.00			
Vendor: 1025	Anderson and Koch Ford			Check Sequence: 2	ACH Enabled: False
1873	2025 FORD EXPLORER NEW SQUAD	46,741.94	10/10/2024	101-42110-50550	
	Check Total:	46,741.94			
Vendor: 1396	MN Peip - C/O MMB Fiscal Srvs			Check Sequence: 3	ACH Enabled: False
1444159	LIFE INS	2,007.56	10/10/2024	101-00000-21714	
1444159	HEALTH	37,861.38	10/10/2024	101-00000-21706	
1444159	DENTAL	659.70	10/10/2024	101-00000-21718	
	Check Total:	40,528.64			
	Total for Check Run:	87,360.58			
	Total of Number of Checks:	3			

Accounts Payable

Computer Check Proof List by Vendor

User: TiffaniFolstad
Printed: 10/11/2024 - 1:57PM
Batch: 00003.10.2024 - 10112024



Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
Vendor: 1036	AT & T Mobility			Check Sequence: 1	ACH Enabled: False
287294265529X10	WIRELESS COMMUNICATIONS	176.22	10/11/2024	602-49450-50321	
287294265529X10	WIRELESS COMMUNICATIONS	44.84	10/11/2024	609-48000-50321	
287294265529X10	WIRELESS COMMUNICATIONS	492.91	10/11/2024	101-43000-50321	
287294265529X10	WIRELESS COMMUNICATIONS	44.84	10/11/2024	101-41500-50321	
287294265529X10	WIRELESS COMMUNICATIONS	225.25	10/11/2024	615-49550-50321	
287294265529X10	WIRELESS COMMUNICATIONS	89.68	10/11/2024	609-49750-50321	
287294265529X10	WIRELESS COMMUNICATIONS	89.68	10/11/2024	101-42400-50321	
287294265529X10	WIRELESS COMMUNICATIONS	88.11	10/11/2024	101-41910-50321	
287294265529X10	WIRELESS COMMUNICATIONS	88.11	10/11/2024	620-49600-50321	
287294265529X10	WIRELESS COMMUNICATIONS	44.84	10/11/2024	101-41310-50320	
	Check Total:	1,384.48			
Vendor: 1899	BlueCross/Blue Shield Minnesota			Check Sequence: 2	ACH Enabled: False
241001396376	VISION INSURANCE	117.62	10/11/2024	101-00000-21706	
	Check Total:	117.62			
Vendor: 1268	IUOE Local #49			Check Sequence: 3	ACH Enabled: False
FOR NOV 2024	UNION DUES FOR NOV 2024	420.00	10/11/2024	101-00000-21708	
	Check Total:	420.00			
Vendor: 1292	Knife River			Check Sequence: 4	ACH Enabled: False
R-99-2024	R-99-2024 PAY REQUEST 1	145,652.30	10/11/2024	401-43100-50303	
R-99-2024	R-99-2024 PAY REQUEST 1	26,785.50	10/11/2024	458-43000-50303	
	Check Total:	172,437.80			

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
Vendor: 1353	Midcontinent			Check Sequence: 5	ACH Enabled: False
16640100114297	INTERNET	113.00	10/11/2024	602-49450-50243	
16640100114297	INTERNET	113.39	10/11/2024	620-49600-50243	
16640100114297	INTERNET	113.00	10/11/2024	609-48000-50243	
16640100114297	INTERNET	226.00	10/11/2024	615-49550-50243	
16640100114297	INTERNET	113.00	10/11/2024	101-43000-50243	
16640100114297	INTERNET	113.00	10/11/2024	609-49750-50243	
16640100114297	INTERNET	113.00	10/11/2024	101-42280-50243	
	Check Total:	904.39			
	Total for Check Run:	175,264.29			
	Total of Number of Checks:	5			

Accounts Payable

Computer Check Proof List by Vendor

User: TiffaniFolstad
Printed: 10/17/2024 - 1:36PM
Batch: 00004.10.2024 - 10182024



Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
Vendor: 1008	Agvise Laboratories, Inc.			Check Sequence: 1	ACH Enabled: False
51720	TESTING SERVICES 15 DAY CREDIT	-27.48	10/18/2024	602-49450-50315	
51720	TESTING SERVICES	183.20	10/18/2024	602-49450-50315	
	Check Total:	155.72			
Vendor: 1010	Alex Air Apparatus 2 LLC			Check Sequence: 2	ACH Enabled: False
50866	CUTTER KIT	165.00	10/18/2024	101-42280-50240	
	Check Total:	165.00			
Vendor: 2144	AT&T			Check Sequence: 3	ACH Enabled: False
931-001-3908-16	OFFICE AT HAND ACCOUNT	27.68	10/18/2024	101-43000-50321	
	Check Total:	27.68			
Vendor: 1040	Axon Enterprise, Inc.			Check Sequence: 4	ACH Enabled: False
288955	UNIFORM ITEMS	573.91	10/18/2024	101-42110-50237	
289142	UNIFORM ITEMS	1,738.63	10/18/2024	101-42110-50237	
289189	UNIFORM ITEMS	533.45	10/18/2024	101-42110-50237	
	Check Total:	2,845.99			
Vendor: 1047	BCA			Check Sequence: 5	ACH Enabled: False
37492	Labor Contracts and Arbitration for 2025	300.00	10/18/2024	101-00000-15500	
37546	Predatory Offender Training	25.00	10/18/2024	101-00000-15500	
823818	CJDN Access Fee (BCA)	600.00	10/18/2024	101-42110-50300	
	Check Total:	925.00			
Vendor: 1049	Bellboy Corporation			Check Sequence: 6	ACH Enabled: False

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
0108951600	LIQUOR	117.53	10/18/2024	609-49750-50251	
0108951700	OPERATING SUPPLIES	164.04	10/18/2024	609-48000-50210	
0108981000	ADVERTISING	91.00	10/18/2024	609-49750-50340	
0108981000	N/A SALES	325.71	10/18/2024	609-49750-50250	
0108981000	ADVERTISING	21.00	10/18/2024	609-48000-50340	
0108981000	OPERATING SUPPLIES	138.63	10/18/2024	609-49750-50210	
0108992500	N/A SALES CREDIT	-91.00	10/18/2024	609-49750-50250	
0108992500	ADVERTISING CREDIT	-28.00	10/18/2024	609-49750-50340	
0205229600	LIQUOR	414.00	10/18/2024	609-49750-50251	
0205245600	LIQUOR	844.35	10/18/2024	609-49750-50251	
0205245600	THC	110.25	10/18/2024	609-49750-50254	
0205245900	LIQUOR	1,266.30	10/18/2024	609-48000-50251	
0205334400	LIQUOR	685.05	10/18/2024	609-49750-50251	
0205427200	LIQUOR CREDIT	-127.65	10/18/2024	609-49750-50251	
	Check Total:	3,931.21			
Vendor: 1655	Bent Brewstillery			Check Sequence: 7	ACH Enabled: False
INV-014323	BEER	168.72	10/18/2024	609-49750-50252	
	Check Total:	168.72			
Vendor: 1052	Bernicks			Check Sequence: 8	ACH Enabled: False
10268291	BEER	1,869.99	10/18/2024	609-48000-50252	
10268291	N/A SALES	28.70	10/18/2024	609-48000-50250	
10270842	BEER	1,732.60	10/18/2024	609-48000-50252	
10270843	BEER	-4.80	10/18/2024	609-48000-50252	
10273764	THC	192.00	10/18/2024	609-49750-50254	
10273765	N/A SALES	86.10	10/18/2024	609-49750-50250	
10273765	LIQUOR	133.00	10/18/2024	609-49750-50251	
10273765	BEER	2,391.25	10/18/2024	609-49750-50252	
10276303	THC	85.00	10/18/2024	609-49750-50254	
10276304	N/A SALES	231.80	10/18/2024	609-49750-50250	
10276304	BEER	2,090.75	10/18/2024	609-49750-50252	
10276305	BEER CREDIT	-215.17	10/18/2024	609-49750-50252	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	8,621.22			
Vendor: 2185	BICKFORD OF NORTH BRANCH			Check Sequence: 9	ACH Enabled: False
PM CUST 9433	REISSUE VOIDED PM CK 14870 -REFUNDS	4,173.62	10/18/2024	620-00000-11550	
	Check Total:	4,173.62			
Vendor: 1066	Breakthru Beverage MN			Check Sequence: 10	ACH Enabled: False
118011403	LIQUOR	1,356.26	10/18/2024	609-48000-50251	
118013932	LIQUOR	1,400.45	10/18/2024	609-49750-50251	
118114785	LIQUOR	1,729.95	10/18/2024	609-49750-50251	
412756189	LIQUOR CREDIT	-109.25	10/18/2024	609-48000-50251	
	Check Total:	4,377.41			
Vendor: 2124	Steve Cich			Check Sequence: 11	ACH Enabled: False
Q2 PC ATT	Q2 PLANNING COMMISSION ATTEND.	50.00	10/18/2024	101-41110-50300	
Q3 PC ATT	Q3 PLANNING COMMISSION ATTEND.	75.00	10/18/2024	101-41110-50300	
	Check Total:	125.00			
Vendor: 1902	CivicPlus LLC			Check Sequence: 12	ACH Enabled: False
317634	MINICODE SELF PUBLISHING SOFTWARE	1,200.00	10/18/2024	101-41400-50300	
	Check Total:	1,200.00			
Vendor: 1122	Crystal Springs Ice			Check Sequence: 13	ACH Enabled: False
1344	N/A SALES	72.80	10/18/2024	609-49750-50250	
2011246	N/A SALES	102.48	10/18/2024	609-48000-50250	
2011413	N/A SALES	344.72	10/18/2024	609-49750-50250	
4010172	N/A SALES	73.28	10/18/2024	609-48000-50250	
	Check Total:	593.28			
Vendor: 1129	Dahlheimer Distributing			Check Sequence: 14	ACH Enabled: False
2294030	BEER	4,939.70	10/18/2024	609-48000-50252	
2294273	THC	165.00	10/18/2024	609-48000-50254	
2294274	N/A SALES	62.10	10/18/2024	609-48000-50250	
2298064	BEER	1,324.80	10/18/2024	609-49750-50252	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
2300015	THC	149.00	10/18/2024	609-49750-50254	
2300016	N/A SALES	153.70	10/18/2024	609-49750-50250	
2300017	LIQUOR	52.60	10/18/2024	609-49750-50251	
2300017	BEER	15,089.05	10/18/2024	609-49750-50252	
2305363	LIQUOR	544.00	10/18/2024	609-49750-50251	
2305363	BEER	5,315.25	10/18/2024	609-49750-50252	
2305720	THC	463.50	10/18/2024	609-49750-50254	
2305720	N/A SALES	345.90	10/18/2024	609-49750-50250	
2305789	BEER CREDIT	-634.80	10/18/2024	609-49750-50252	
	Check Total:	27,969.80			
Vendor: 1689	AMANDA DARWIN			Check Sequence: 15	ACH Enabled: False
CUST 7161	WATER/SEWER REFUND/CREDIT	-35.79	10/18/2024	602-00000-11500	
CUST 7161	WATER/SEWER REFUND/CREDIT	89.52	10/18/2024	612-00000-11500	
CUST 7161	WATER/SEWER REFUND/CREDIT	-31.31	10/18/2024	615-00000-11500	
	Check Total:	22.42			
Vendor: 1144	Dresser Trap Rock, Inc.			Check Sequence: 16	ACH Enabled: False
658755	EROSION ROCK 8TH AVE LIFT	821.06	10/18/2024	612-49700-50407	
	Check Total:	821.06			
Vendor: 1166	Enterprise FM Trust			Check Sequence: 17	ACH Enabled: False
508722-100424	2020 DURANGO LEASE 2024/10/01-10/31	455.33	10/18/2024	101-42110-50229	
	Check Total:	455.33			
Vendor: 1706	Flaherty & Hood, P.A.			Check Sequence: 18	ACH Enabled: False
FOR SEPT 2024	GENERAL LABOR MATTERS/UNION NEG	7,122.50	10/18/2024	101-41610-50304	
FOR SEPT 2024	GENERAL MATTERS	2,569.00	10/18/2024	101-41610-50304	
FOR SEPT 2024	GENERAL COUNCIL MATTERS	52.50	10/18/2024	101-41610-50304	
	Check Total:	9,744.00			
Vendor: 1206	Genesis Technology Communications, LLC			Check Sequence: 19	ACH Enabled: False
144820	NB PARKS WIFI	179.95	10/18/2024	101-45000-50321	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	179.95			
Vendor: 1224	Tammy Gimpl			Check Sequence: 20	ACH Enabled: False
SEPT 2024	SERVICES FOR SEPT	350.00	10/18/2024	101-42700-50310	
	Check Total:	350.00			
Vendor: 1237	Hasser Garage Doors			Check Sequence: 21	ACH Enabled: False
26839	PW EAST GARAGE DOOR REPAIR	230.00	10/18/2024	101-43000-50401	
	Check Total:	230.00			
Vendor: 1239	Hawkins, Inc.			Check Sequence: 22	ACH Enabled: False
6872673	WATER TREATMENT CHEMS	3,652.69	10/18/2024	615-49550-50210	
6883869	WW TREATMENT CHEMS	3,078.07	10/18/2024	602-49450-50210	
6890809	BIOSOLID CHEMS	5,922.30	10/18/2024	602-49450-50210	
6892246	WATER TREATMENT CHEMS	3,636.70	10/18/2024	615-49550-50210	
	Check Total:	16,289.76			
Vendor: 2190	VICTORIA HEALD			Check Sequence: 23	ACH Enabled: False
CUST 10527	WATER/SEWER REFUND/CREDIT	-8.24	10/18/2024	602-00000-11500	
CUST 10527	WATER/SEWER REFUND/CREDIT	122.47	10/18/2024	612-00000-11500	
CUST 10527	WATER/SEWER REFUND/CREDIT	-8.42	10/18/2024	615-00000-11500	
	Check Total:	105.81			
Vendor: 1998	HEWLETT-PACKARD FINANCIAL SERVICES COMPANY			Check Sequence: 24	ACH Enabled: False
100000524687	NETWORK SWITCHES/FIREWALL	162.04	10/18/2024	101-43000-50244	
100000524687	NETWORK SWITCHES/FIREWALL	509.56	10/18/2024	101-41940-50244	
100000524687	NETWORK SWITCHES/FIREWALL	391.68	10/18/2024	615-49550-50244	
100000524687	NETWORK SWITCHES/FIREWALL	155.69	10/18/2024	609-49750-50244	
100000524687	NETWORK SWITCHES/FIREWALL	329.58	10/18/2024	602-49450-50244	
100000524687	NETWORK SWITCHES/FIREWALL	149.12	10/18/2024	609-48000-50244	
100000524687	NETWORK SWITCHES/FIREWALL	152.11	10/18/2024	101-42280-50244	
	Check Total:	1,849.78			
Vendor: 1244	Lane Hischer			Check Sequence: 25	ACH Enabled: False

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
6132545039	WC 0.8 WKS TTD 10/1 -10/14	983.22	10/18/2024	101-43000-50151	
	Check Total:	983.22			
Vendor: 1246	Hohensteins, Inc.			Check Sequence: 26	ACH Enabled: False
758968	BEER	120.00	10/18/2024	609-49750-50252	
760880	BEER CREDIT	-13.50	10/18/2024	609-49750-50252	
	Check Total:	106.50			
Vendor: 1925	James Ibinger			Check Sequence: 27	ACH Enabled: False
Q2 PC ATT	PLANNING COMMISSION ATTENDANCE	50.00	10/18/2024	101-41110-50300	
Q3 PC ATT	PLANNING COMMISSION ATTENDANCE	100.00	10/18/2024	101-41110-50300	
	Check Total:	150.00			
Vendor: 1265	Isanti-Chisago County Star			Check Sequence: 28	ACH Enabled: False
1850163	ORDINANCE 381-24	2.52	10/18/2024	101-41910-50351	
1850164	ORDINANCE 384-24	46.20	10/18/2024	101-41910-50351	
1851488	PUBLIC HEARING LGI HOMES	9.03	10/18/2024	101-41910-50351	
815708	PLANN COMM ROSS	6.51	10/18/2024	101-41910-50351	
815710	ORDINANCE 382-24	9.45	10/18/2024	101-41910-50351	
815711	PUB HEAR GS2	9.45	10/18/2024	101-41910-50351	
815714	PUB HEAR NEW LIFE	8.72	10/18/2024	101-41910-50351	
815758	DOMESTIC FOWL	6.30	10/18/2024	101-41910-50351	
815759	PLAN COMM CANNABIS	6.30	10/18/2024	101-41910-50351	
	Check Total:	104.48			
Vendor: 1276	Kabao Jennrich			Check Sequence: 29	ACH Enabled: False
Q2 PC ATT	Q2 PLAN COMMISSION ATTEND.	25.00	10/18/2024	101-41110-50300	
Q3 PC ATT	Q3 PLAN COMMISSION ATTEND.	100.00	10/18/2024	101-41110-50300	
	Check Total:	125.00			
Vendor: 2191	JOSH & JENNIFER JENSEN			Check Sequence: 30	ACH Enabled: False
CUST 9391	WATER/SEWER REFUND/CREDIT	-5.67	10/18/2024	615-00000-11500	
CUST 9391	WATER/SEWER REFUND/CREDIT	-4.00	10/18/2024	602-00000-11500	
CUST 9391	WATER/SEWER REFUND/CREDIT	57.19	10/18/2024	612-00000-11500	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	47.52			
Vendor: 1954	Dennis Johnson			Check Sequence: 31	ACH Enabled: False
Q2 Q3 EDA ATT	Q2 1 MTG - Q3 3 MTG	100.00	10/18/2024	101-41110-50300	
	Check Total:	100.00			
Vendor: 1279	Johnson Brothers Liquor Co.			Check Sequence: 32	ACH Enabled: False
2632977	LIQUOR	734.27	10/18/2024	609-48000-50251	
2632982	LIQUOR	103.32	10/18/2024	609-48000-50251	
2632983	LIQUOR	626.10	10/18/2024	609-48000-50251	
2638054	WINE	80.44	10/18/2024	609-49750-50253	
2638055	LIQUOR	243.87	10/18/2024	609-49750-50251	
2638056	THC	322.90	10/18/2024	609-49750-50254	
2638057	LIQUOR	796.53	10/18/2024	609-49750-50251	
2638059	WINE	581.84	10/18/2024	609-49750-50253	
2638060	LIQUOR	1,705.74	10/18/2024	609-49750-50251	
	Check Total:	5,195.01			
Vendor: 2192	MICHAEL JONAS			Check Sequence: 33	ACH Enabled: False
CUST 2665	WATER/SEWER REFUND/CREDIT	-19.01	10/18/2024	615-00000-11500	
CUST 2665	WATER/SEWER REFUND/CREDIT	44.04	10/18/2024	612-00000-11500	
CUST 2665	WATER/SEWER REFUND/CREDIT	-14.02	10/18/2024	602-00000-11500	
	Check Total:	11.01			
Vendor: 2188	AARON & EMILY KENNING			Check Sequence: 34	ACH Enabled: False
CUST 11229	WATER/SEWER USAGE/REFUND	73.04	10/18/2024	612-00000-11500	
CUST 11229	WATER/SEWER USAGE/REFUND	-31.53	10/18/2024	602-00000-11500	
CUST 11229	WATER/SEWER USAGE/REFUND	-30.03	10/18/2024	615-00000-11500	
	Check Total:	11.48			
Vendor: 2187	ZACHARY M KUMMER			Check Sequence: 35	ACH Enabled: False
CUST 11373	WATER/SEWER USAGE/REFUND	-16.67	10/18/2024	602-00000-11500	
CUST 11373	WATER/SEWER USAGE/REFUND	-16.61	10/18/2024	615-00000-11500	
CUST 11373	WATER/SEWER USAGE/REFUND	66.82	10/18/2024	612-00000-11500	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	33.54			
Vendor: 1663	Kwik Trip			Check Sequence: 36	ACH Enabled: False
SEPT 2024	FUEL FOR SEPT 2024	41.57	10/18/2024	101-42280-50212	
	Check Total:	41.57			
Vendor: 1949	Farfum Ladroma			Check Sequence: 37	ACH Enabled: False
Q2 PTOS	Q2 PTOS	75.00	10/18/2024	101-41110-50300	
Q3 PTOS	Q3 PTOS	50.00	10/18/2024	101-41110-50300	
	Check Total:	125.00			
Vendor: 2125	Nyle LaGrange			Check Sequence: 38	ACH Enabled: False
Q2 Q3 EDA	Q3 EDA 3 MTG	75.00	10/18/2024	101-41110-50300	
Q2 Q3 EDA	Q2 EDA 1 MTG	25.00	10/18/2024	101-41110-50300	
	Check Total:	100.00			
Vendor: 1176	M Health Fairview			Check Sequence: 39	ACH Enabled: False
15007776872	9/16 EXAM VISIT 15007776872 JMS	574.00	10/18/2024	101-42110-50314	
	Check Total:	574.00			
Vendor: 1327	Macqueen Equipment Inc.			Check Sequence: 40	ACH Enabled: False
3300	ANNUAL SEWER LINE CLEAN	15,900.00	10/18/2024	602-49450-50407	
	Check Total:	15,900.00			
Vendor: 2189	NANCY MAULT			Check Sequence: 41	ACH Enabled: False
CUST 11042	WATER/SEWER USAGE/REFUND	60.12	10/18/2024	612-00000-11500	
CUST 11042	WATER/SEWER USAGE/REFUND	-7.88	10/18/2024	615-00000-11500	
CUST 11042	WATER/SEWER USAGE/REFUND	-7.40	10/18/2024	602-00000-11500	
	Check Total:	44.84			
Vendor: 1643	McDonald Distributing			Check Sequence: 42	ACH Enabled: False
769552	BEER	-387.00	10/18/2024	609-48000-50252	
769553	LIQUOR	119.00	10/18/2024	609-48000-50251	
769553	BEER	2,313.00	10/18/2024	609-48000-50252	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
770735	BEER	4,774.20	10/18/2024	609-48000-50252	
770735	LIQUOR	462.70	10/18/2024	609-48000-50251	
770737	BEER CREDIT	-31.80	10/18/2024	609-48000-50252	
770753	BEER	160.00	10/18/2024	609-48000-50252	
770829	LIQUOR	776.30	10/18/2024	609-49750-50251	
770830	LIQUOR	33.60	10/18/2024	609-49750-50251	
770830	BEER	3,164.15	10/18/2024	609-49750-50252	
770915	BEER CREDIT	-200.00	10/18/2024	609-49750-50252	
770925	BEER	784.00	10/18/2024	609-49750-50252	
771934	LIQUOR	33.60	10/18/2024	609-49750-50251	
771934	BEER	5,428.55	10/18/2024	609-49750-50252	
771934	THC	105.25	10/18/2024	609-49750-50254	
79711	BEER	-26.90	10/18/2024	609-48000-50252	
	Check Total:	17,508.65			
Vendor: 1339	Patrick Meacham			Check Sequence: 43	ACH Enabled: False
Q2 PC ATT	PLANNING COMMISSION ATTENDANCE	50.00	10/18/2024	101-41110-50300	
Q3 PC ATT	PLANNING COMMISSION ATTENDANCE	75.00	10/18/2024	101-41110-50300	
	Check Total:	125.00			
Vendor: 1364	Minnesota Elevator, Inc.			Check Sequence: 44	ACH Enabled: False
1095210	OCTOBER MONTHLY SERVICE	135.00	10/18/2024	101-41940-50300	
	Check Total:	135.00			
Vendor: 1392	MN Dept. of Transp.-Commissioner			Check Sequence: 45	ACH Enabled: False
19112	MATERIAL TESTING & INSPECTION	300.18	10/18/2024	401-43100-50303	
	Check Total:	300.18			
Vendor: 1415	MN Pollution Control Agency			Check Sequence: 46	ACH Enabled: False
	Type IV Refresher -SHAWW	195.00	10/18/2024	602-49450-50332	
	Check Total:	195.00			
Vendor: 1405	MN UI Fund - Unemployment			Check Sequence: 47	ACH Enabled: False
17405486	UNEMPLOYMENT BENEFIT PMT	578.30	10/18/2024	101-49990-50142	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	578.30			
Vendor: 1411 SB40-007	Moose Lake Brewing Co. LLC BEER	21.00	10/18/2024	Check Sequence: 48 609-48000-50252	ACH Enabled: False
	Check Total:	21.00			
Vendor: 1430 306122	Nardini Fire Equipt. Co., Inc. WW INSPECTION	414.00	10/18/2024	Check Sequence: 49 602-49450-50300	ACH Enabled: False
	Check Total:	414.00			
Vendor: 1432 FOR NOV 2024	NCPERS Group Life Ins. LIFE INSURANCE	64.00	10/18/2024	Check Sequence: 50 101-00000-21714	ACH Enabled: False
	Check Total:	64.00			
Vendor: 2145 66386	Nelson Electric Inc MAIN LIFT VFD FAILURE	362.50	10/18/2024	Check Sequence: 51 602-49450-50300	ACH Enabled: False
	Check Total:	362.50			
Vendor: 2047 2928	NEONLINK LLC ELECTRONIC TRANS/WEBPORTAL	283.52	10/18/2024	Check Sequence: 52 612-49700-50300	ACH Enabled: False
2928	ELECTRONIC TRANS/WEBPORTAL	283.54	10/18/2024	615-49550-50300	
2928	ELECTRONIC TRANS/WEBPORTAL	283.54	10/18/2024	602-49450-50300	
	Check Total:	850.60			
Vendor: 1486 15154	Jennifer Newman COTTON CAP-CB	32.50	10/18/2024	Check Sequence: 53 101-42110-50237	ACH Enabled: False
15305	PATCHES	230.00	10/18/2024	101-42110-50237	
15393	PATCHES-MN	48.00	10/18/2024	101-42110-50237	
	Check Total:	310.50			
Vendor: 1763 DV24090432	Office of MNIT Services-Accounts Receivable (WAN) SERVICES MONTHLY INVOICE	1,150.00	10/18/2024	Check Sequence: 54 101-41940-50243	ACH Enabled: False
	Check Total:	1,150.00			

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
Vendor: 1893 252118	Parman Energy Group, LLC TRUCK ENGINE OIL & GREASE	724.32	10/18/2024	Check Sequence: 55 101-43000-50210	ACH Enabled: False
	Check Total:	724.32			
Vendor: 2100 CUST 12391 CUST 12391 CUST 12391	Patriot Builders WATER/SEWER USAGE/REFUND CUST 12391 WATER/SEWER USAGE/REFUND CUST 12391 WATER/SEWER USAGE/REFUND CUST 12391	-154.17 -10.71 340.51	10/18/2024 10/18/2024 10/18/2024	Check Sequence: 56 615-00000-11500 602-00000-11500 612-00000-11500	ACH Enabled: False
	Check Total:	175.63			
Vendor: 1955 Q2 EDA ATT Q3 EDA ATT	Sara Paul EDA COMMISSION ATTENDANCE EDA COMMISSION ATTENDANCE	50.00 75.00	10/18/2024 10/18/2024	Check Sequence: 57 101-41110-50300 101-41110-50300	ACH Enabled: False
	Check Total:	125.00			
Vendor: 1465 234765 247314 248495	Paustis Wine Company WINE CREDIT WINE	-90.50 765.50 454.00	10/18/2024 10/18/2024 10/18/2024	Check Sequence: 58 609-48000-50253 609-48000-50253 609-49750-50253	ACH Enabled: False
	Check Total:	1,129.00			
Vendor: 1474 654360 6858250 6858251 6858251	Phillips Wine & Spirits, Inc. LIQUOR LIQUOR LIQUOR WINE	1,376.20 1,042.81 341.22 455.34	10/18/2024 10/18/2024 10/18/2024 10/18/2024	Check Sequence: 59 609-48000-50251 609-49750-50251 609-48000-50251 609-48000-50253	ACH Enabled: False
	Check Total:	3,215.57			
Vendor: 1482 134961	Post Haste Business Solutions BUSINESS CARDS/NAME PLATES -NS/MH	233.96	10/18/2024	Check Sequence: 60 101-41400-50210	ACH Enabled: False
	Check Total:	233.96			
Vendor: 1487 2025035	Prophoenix Corporation 2025 MAINTENANCE & SUPPORT	7,678.01	10/18/2024	Check Sequence: 61 101-00000-15500	ACH Enabled: False

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	7,678.01			
Vendor: 2066	RMB Environmental Laboratories, Inc.			Check Sequence: 62	ACH Enabled: False
12813	WEEKLY TESTING	17.50	10/18/2024	602-49450-50315	
14933	NEW DEV WATER LINE	122.50	10/18/2024	101-00000-21144	
15086	Monthly Bacteria Samples	70.00	10/18/2024	615-49550-50315	
15095	Weekly April - Oct	158.20	10/18/2024	602-49450-50315	
15151	New Tire Shop TEST	35.00	10/18/2024	101-00000-21154	
66688	BIOSOLIDS TESTING	667.80	10/18/2024	602-49450-50315	
	Check Total:	1,071.00			
Vendor: 2126	Marshall Saunders			Check Sequence: 63	ACH Enabled: False
Q2 Q3 EDA ATT	Q2 1 MTG - Q3 1 MTG	50.00	10/18/2024	101-41110-50300	
	Check Total:	50.00			
Vendor: 2163	SBI Rents Inc.			Check Sequence: 64	ACH Enabled: False
1541	Equipment Lease 20240702	24,125.00	10/18/2024	602-49450-50300	
	Check Total:	24,125.00			
Vendor: 1519	Schaefer, Gary			Check Sequence: 65	ACH Enabled: False
Q2 PC ATT	PLANNING COMMISSION ATTENDANCE	50.00	10/18/2024	101-41110-50300	
Q3 PC ATT	PLANNING COMMISSION ATTENDANCE	125.00	10/18/2024	101-41110-50300	
	Check Total:	175.00			
Vendor: 1760	Schaps, Peter			Check Sequence: 66	ACH Enabled: False
Q2 Q3 EDA ATT	Q2 2 MTG - Q3 2 MTG	100.00	10/18/2024	101-41110-50300	
	Check Total:	100.00			
Vendor: 1952	Kevin Schieber			Check Sequence: 67	ACH Enabled: False
Q2 Q3 EDA ATT	Q2 EDA 2 MTG - Q3 EDA 3 MTG	125.00	10/18/2024	101-41110-50300	
	Check Total:	125.00			
Vendor: 1534	Southern Glazers Wine & Spirits of Minnesota			Check Sequence: 68	ACH Enabled: False
2533391	LIQUOR	1,360.41	10/18/2024	609-48000-50251	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
2536646	LIQUOR	2,812.51	10/18/2024	609-49750-50251	
2536647	WINE	450.64	10/18/2024	609-49750-50253	
2539621	LIQUOR	333.55	10/18/2024	609-49750-50251	
2539622	WINE	184.17	10/18/2024	609-49750-50253	
5117412	LIQUOR	0.77	10/18/2024	609-49750-50251	
	Check Total:	5,142.05			
Vendor: 2186	STALLION GLOBAL TRADING GROUP			Check Sequence: 69	ACH Enabled: False
CUST 12401	WATER/SEWER USAGE/CREDIT CUST 1240	132.10	10/18/2024	612-00000-11500	
CUST 12401	WATER/SEWER USAGE/CREDIT CUST 1240	-9.41	10/18/2024	602-00000-11500	
CUST 12401	WATER/SEWER USAGE/CREDIT CUST 1240	-13.29	10/18/2024	615-00000-11500	
	Check Total:	109.40			
Vendor: 1682	Storm Combatives Training and Consult			Check Sequence: 70	ACH Enabled: False
78643974-0002	FIT2, January 6th - 9th, 2025	1,798.00	10/18/2024	101-00000-15500	
	Check Total:	1,798.00			
Vendor: 1550	Streichers			Check Sequence: 71	ACH Enabled: False
1721611	NEW HIRE GEAR	1,863.89	10/18/2024	101-42110-50201	
1722164	AMMO	13.99	10/18/2024	101-42110-50210	
1722804	UNIFORM ITEMS - AH	285.97	10/18/2024	101-42110-50237	
	Check Total:	2,163.85			
Vendor: 1552	Sun Life Assurance Company			Check Sequence: 72	ACH Enabled: False
FOR NOV 2024	STD/LTD	2,211.70	10/18/2024	101-00000-21715	
	Check Total:	2,211.70			
Vendor: 1698	Tactical Solutions			Check Sequence: 73	ACH Enabled: False
10488	RADAR/LASER CERTS	545.00	10/18/2024	101-42110-50404	
	Check Total:	545.00			
Vendor: 2193	THE BINDERY			Check Sequence: 74	ACH Enabled: False
CUST 2256	WATER/SEWER REFUND/CREDIT	163.03	10/18/2024	612-00000-11500	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	163.03			
Vendor: 1956	Jessica Thelander			Check Sequence: 75	ACH Enabled: False
Q2 Q3 EDA	Q2 EDA 1 MTG - Q3 0 MTG	25.00	10/18/2024	101-41110-50300	
	Check Total:	25.00			
Vendor: 2183	T-Mobile USA Inc.			Check Sequence: 76	ACH Enabled: False
9581636229	GPS LOCATE 8/28 TO 9/06	115.00	10/18/2024	101-42110-50300	
9581636230	GPS LOCATE 9/07 TO 9/13	115.00	10/18/2024	101-42110-50300	
	Check Total:	230.00			
Vendor: 1584	U.S. Bank Equipment Finance			Check Sequence: 77	ACH Enabled: False
540058443	COPY MACHINE LEASE	185.00	10/18/2024	101-41940-50219	
	Check Total:	185.00			
Vendor: 1583	U.S. Bank-CM9690			Check Sequence: 78	ACH Enabled: False
7370531	MN GO REF BONDS 2017B - 46802NS	500.00	10/18/2024	393-47000-50620	
7370532	MN GO TAX INC REF 2017C - 46804NS	500.00	10/18/2024	323-47000-50620	
	Check Total:	1,000.00			
Vendor: 1601	Vinocopia, Inc.			Check Sequence: 79	ACH Enabled: False
0359031-IN	LIQUOR	310.25	10/18/2024	609-48000-50251	
0359031-IN	WINE	700.00	10/18/2024	609-48000-50253	
0359083-IN	WINE	42.50	10/18/2024	609-48000-50253	
0359085-IN	LIQUOR	135.00	10/18/2024	609-48000-50251	
	Check Total:	1,187.75			
Vendor: 1611	Watson Company			Check Sequence: 80	ACH Enabled: False
145313	N/A SALES	1,526.41	10/18/2024	609-49750-50250	
	Check Total:	1,526.41			
Vendor: 2182	WESTERN STATES ENVELOPE COMPANY			Check Sequence: 81	ACH Enabled: False
229862	5000 ENVELOPES	388.65	10/18/2024	615-49550-50210	

Invoice No	Description	Amount	Pmt Date	Acct Number	Reference
	Check Total:	388.65			
Vendor: 1761	WEX BANK			Check Sequence: 82	ACH Enabled: False
100293754	MOTOR FUELS	33.04	10/18/2024	101-42110-50212	
	Check Total:	33.04			
Vendor: 1620	Wilson, Lynn			Check Sequence: 83	ACH Enabled: False
Q2 PTOS	Q2 PTOS	25.00	10/18/2024	101-41110-50300	
Q3 PTOS	Q3 PTOS	75.00	10/18/2024	101-41110-50300	
	Check Total:	100.00			
Vendor: 1630	XCEL Energy			Check Sequence: 84	ACH Enabled: False
51-7498295-5	LIBRARY UTILITY GAS	158.17	10/18/2024	101-45500-50380	
	Check Total:	158.17			
Vendor: 1635	Zarnoth Brush Works, Inc.			Check Sequence: 85	ACH Enabled: False
199599	68" Bobcat poly 1-1/2" recess	558.00	10/18/2024	101-45000-50404	
	Check Total:	558.00			
Vendor: 1637	Ziegler Cat			Check Sequence: 86	ACH Enabled: False
1633329	ADAPTER & SOFTWARE LICENSE	1,914.35	10/18/2024	101-43000-50404	
1652099	Wheel Loader Fork RENTAL	620.00	10/18/2024	602-49450-50415	
1662819	BATTERY	343.04	10/18/2024	101-42110-50404	
1663585	CABLE	99.86	10/18/2024	101-43000-50404	
	Check Total:	2,977.25			
	Total for Check Run:	190,425.45			
	Total of Number of Checks:	86			

Accounts Payable

Check Detail

User: TiffaniFolstad
Printed: 10/17/2024 - 1:45PM



Check Number	Check Date	Amount
1033 - Associated Bank		
5592	09/16/2024	
Inv Assoc Sept 2024		116.20
5592 Total:		116.20
1033 - Associated Bank Total:		116.20
1044 - Bank Charges, Miscellaneous		
5582	09/06/2024	
Inv RT 9-6-24		47.65
5582 Total:		47.65
1044 - Bank Charges, Miscellaneous Total:		47.65
1362 - Minnesota Dept of Revenue		
5590	09/26/2024	
Inv Tax 9/26/24		40,295.27
5590 Total:		40,295.27
5591	09/20/2024	
Inv Tax 9/20/24		2,631.00
5591 Total:		2,631.00
1362 - Minnesota Dept of Revenue Total:		42,926.27
1592 - US Postal Service		
5589	09/27/2024	
Inv USPS 9/27/24		1,006.15
5589 Total:		1,006.15
1592 - US Postal Service Total:		1,006.15
1886 - US Bank - Bond Pymts		
5580	09/27/2024	
Inv 2671101		37,459.50
5580 Total:		37,459.50

Check Number	Check Date	Amount
1886 - US Bank - Bond Pymts Total:		37,459.50
1941 - WEX, Inc.		
5583	09/16/2024	
Inv VEBA 9/16/2024		1,014.53
5583 Total:		1,014.53
5584	09/16/2024	
Inv ER HSA 9/16/24		106.46
5584 Total:		106.46
5585	09/16/2024	
Inv EE HSA 9/16/24		5,894.33
5585 Total:		5,894.33
5586	09/27/2024	
Inv EE HSA 9/27/24		5,544.33
5586 Total:		5,544.33
5587	09/03/2024	
Inv EE HSA 9/3/2024		5,044.33
5587 Total:		5,044.33
5588	09/25/2024	
Inv WEX Sept 2024		105.75
5588 Total:		105.75
1941 - WEX, Inc. Total:		17,709.73
2096 - Xpress Solutions Inc		
5593	09/06/2024	
Inv XBP Sept 2024		247.59
5593 Total:		247.59
2096 - Xpress Solutions Inc Total:		247.59
2146 - Bremer Bank		
5594	09/24/2024	
Inv Bremer Sept 24		168.59
5594 Total:		168.59
2146 - Bremer Bank Total:		168.59

Check Number	Check Date	Amount
2170 - Pathpoint Merchant Services LLC		
5581	09/03/2024	
Inv XBP Fee 9/3/24		236.84
5581 Total:		236.84
2170 - Pathpoint Merchant Services LLC Total:		236.84
Total:		99,918.52



Prepared By: Nathan Sondrol, Community Development Director

Presenter: Nathan Sondrol, Community Development Director

Date: 10/18/2024

Board & Commission: City Council

Subject: Approve Resolution No. R-102-2024, Accepting the Offers of Dedication and Reducing Security for Westside Commons

Overview / Background

GS2, LLC (Developer) has submitted an Offer of Dedication for the Public Improvements as required with the Westside Commons subdivision. City staff have reviewed the required improvements and have found them satisfactorily complete and is accepting of the offer to dedication. By this action, the City shall reduce the financial security to 25% of the total amount obligated with the developments and approve the Developer to enter the one (1) year warranty period for the improvements. Upon completion of the warranty period, and if no issues are identified with the public improvement items, the City can take action to accept the improvements, making them an official public asset. At that time, the remaining security would be released.

Requested Action

Approve Resolution No. R-102-2024 accepting the offer of dedication for public improvements for Westside Commons and reduce the letter of credit.

Voting Requirements:

Voting Options Simple Majority

STATE OF MINNESOTA

COUNTY OF CHISAGO

CITY OF NORTH BRANCH

CITY COUNCIL RESOLUTION NO. R-102-2024

A RESOLUTION OF THE NORTH BRANCH CITY COUNCIL ACCEPTING AN OFFER OF DEDICATION FOR PUBLIC IMPROVEMENTS & AUTHORIZING A FINANCIAL SECURITY REDUCTION FOR WESTSIDE COMMONS.

WHEREAS, , in accordance with Development Agreement (“Agreement”) for Westside Commons (“Development”), dated May 19, 2023, GS2, LLC (“Developer”), agreed to install certain public improvements (“Improvements”) for said Development, and provide Financial Guarantee (“Security”) covering the installation and construction of those “Improvements;” and

WHEREAS, the Developer has completed the Improvements as required by the Agreement for the Development, and hereby has made an Offer of Dedication for those Improvements; and

WHEREAS, as allowed by those Agreement, the Developer has also requested a reduction in Security to reflect the work completed.

NOW THEREFORE, BE IT RESOLVED BY THE NORTH BRANCH CITY COUNCIL OF THE CITY OF NORTH BRANCH, MINNESOTA, AS STATED IN THE ATTACHED EXHIBIT, THE OFFER OF DEDICATION FOR WESTSIDE COMMONS IS HEREBY ACCEPTED AND THE FINANCIAL GUARANTEE FOR WESTSIDE COMMONS IS HEREBY REDUCED.

OFFER OF DEDICATION

THE UNDERSIGNED, GS2, LLC, a Minnesota limited liability company. ("Developer") has executed this Offer of Dedication ("Offer") effective as of the 27 day of September 2024.

RECITALS

A. The Developer and the City of North Branch, a Minnesota municipal corporation ("City") are parties to a Development and Subdivision Agreement dated 5/19, 2023 (the "Agreement") according to the terms of which the Developer agreed to construct certain Improvements to the Property owned by the Developer including certain Public Improvements to be dedicated to the City.

B. Pursuant to the Agreement, the Developer has furnished the City with a Letter of Credit in the amount of \$ 427,442 issued by Cash and Stearns Bank.

C. The Agreement further provides that the Improvements may be offered to the City in no more than three (3) dedications and that, if the City accepts the dedication of such Improvements, the Letter of Credit may be reduced by an amount equal to 100% of the estimated costs of the Improvements to be dedicated as determined by the City Engineer (the "Reduction Amount").

D. The Developer has completed certain of the Improvements and now desires to offer to dedicate such improvements (the "Dedicated Improvements") to the City and, upon the City's acceptance of such offer to provide the City with a replacement Letter of Credit in a reduced amount as allowed by the Agreement.

OFFER OF DEDICATION

The following provisions are hereby submitted to the City by the Developer in connection with the Agreement regarding the development of the WESTSIDE COMMONS Development within the City limits:

1. Offer of Dedication. The Developer hereby offers to dedicate to the City the Dedicated Improvements completed by the Developer pursuant to the Agreement as of the date hereof and generally described on Exhibit A attached hereto and incorporated herein.

2. Cost of Dedicated Improvements. The Developer hereby submits that the estimated cost of the Dedicated Improvements as determined by the City's Engineer is \$ 341,953³³ and that therefore the Reduction Amount is \$ 341,953³³ Less \$277,442⁰⁰ *released equals requested release of remaining \$64,511³³ cash held by City.*

3. Letter of Credit. The Developer hereby requests that the City execute a certificate verifying its acceptance of the Dedicated Improvements and waiving its right to draw on the

Letter of Credit to the extent of the Reduction Amount and to allow the Developer to submit a replacement Letter of Credit in the amount of \$ 85,488⁶⁷ representing the difference between the original Letter of Credit amount and the Reduction Amount requested hereunder.

4. Developer's Acknowledgment. Developer hereby acknowledges that, the Improvements will not be formally dedicated to the City until the City's final acceptance of the Public Improvements required by the Development Agreement as evidenced by a Certificate of Completion issued by the City and therefore the City's acceptance of the Offer of the Dedicated Improvements hereunder is expressly made contingent upon and subject to such formal statutory dedication requirements, the City's final acceptance of the Public Improvements and in all other respects is contingent upon the Developer's continued compliance with the terms and conditions of the Agreement. The Developer further acknowledges that as to all Public Improvements, including the Dedicated Improvements, the Warranty Period defined in the Agreement, shall not commence until the City's final acceptance of the Public Improvements.

5. Definitions. Capitalized terms not otherwise defined herein shall have the meanings given them on the Agreement.

Respectfully Submitted,

DEVELOPER:
GS2, LLC

By: _____

Its: _____



Vice President

CERTIFICATE OF ACCEPTANCE

THE UNDERSIGNED, City of North Branch, a Minnesota municipal corporation ("City") hereby has executed this Certificate of Acceptance ("Certificate") on the 8th day of October, 2024.

RECITALS

A. GS2, LLC, a Minnesota limited liability company. ("Developer") and the City are parties to a Development and Subdivision Agreement dated May 19, 2023 (the "Agreement") according to the terms of which the Developer agreed to construct certain Public Improvements to the Property owned by the Developer including certain Public Improvements to be dedicated to the City.

B. Pursuant to the Agreement, the Developer has furnished the City with a Letter of Credit in the amount of **\$427,442** issued by Cash and Stearns Bank (the "Existing Letter of Credit").

C. The Agreement further provides that the City Administrator may consent to the reduction of the Letter of Credit based upon the City Engineer's Certificate of Completion of construction work on such Public Improvements.

D. The Agreement provides that the Public Improvements may be offered to the City in no more than three (3) dedications and that, if the City accepts such Improvements, the Existing Letter of Credit may be reduced by an amount equal to one hundred percent (100%) of the estimated cost of the Improvements to be dedicated as determined by the City Engineer (the "Reduction Amount").

E. The Developer has completed certain of the Public Improvements and pursuant to a final offer to dedicate such Improvements to the City (the "Dedicated Improvements") and, upon the City's acceptance of such Offer to accept a new Letter of Credit in an amount reduced by the Reduction Amount as allowed by the Agreement.

CERTIFICATE OF ACCEPTANCE

1. Conditional Acceptance. Based upon the Offer of Dedication submitted to the City, the City hereby accepts the Dedicated Improvements described therein with such acceptance being expressly made contingent upon the Developer's compliance with Minnesota Statutes Chapter 505, the Agreement and all other applicable rules and regulations applicable to the transactions contemplated by the Agreement.

2. Approval of Reduction in Security. The City hereby approves the City Administrator's consent to a reduction in the Existing Letter of Credit provided by the Developer in an amount equal to the Reduction Amount consisting of the estimated cost of the Dedicated Improvements as determined by the City Engineer and the City hereby agrees to surrender the

Existing Letter of Credit in exchange for a replacement Letter of Credit amount of not less than \$85,488.67_ and otherwise in all material respects acceptable to the City.

CITY OF NORTH BRANCH

By: _____
Its: Mayor

By: _____
Its: City Administrator



Prepared By: Nathan Sondrol, Community Development Director

Presenter: Nathan Sondrol, Community Development Director

Date: 10/18/2024

Board & Commission: City Council

Subject: Approve Resolution R-103-2024 Approving Northwood Park Pickleball Court & Site Improvements

Background

The City of North Branch received a \$140,000 MnDNR Outdoor Recreation Grant for the construction of four (4) pickleball courts, accessible paths, site amenities and associated landscaping in Northwood Park in March 2023 with the understanding that the city would provide a 50% cash match (\$140,000) for the project. The City Council approved the plans and specs for the project and authorized city staff to proceed to obtain bids at the January 23, 2024, meeting and awarded the low bid of \$149,453.00 plus alternate #1 \$18,040.05 and a 10% contingency \$167,493.05 to Winberg Companies, LLC for a total approved bid cost of \$184,242.34 for the pickleball courts and site improvements.

City staff have reviewed and accepted the improvements and recommending approval of payment of the retainer to Winberg Companies LLC.

Requested Action:

To approve the resolution for acceptance of the improvements and payment of the retainer for the Northwood Park Pickleball Court Project to Winberg Companies, LLC.

Voting Requirements:

Voting Options **Simple Majority**

STATE OF MINNESOTA

COUNTY OF CHISAGO

CITY OF NORTH BRANCH

CITY COUNCIL RESOLUTION NO. R-103-2024

A RESOLUTION APPROVING ACCEPTANCE OF IMPROVEMENTS AND FINAL PAYMENT FOR THE NORTHWOOD PARK PICKLEBALL COURT & SITE IMPROVEMENT PROJECT IN THE CITY OF NORTH BRANCH, MINNESOTA

WHEREAS, the City of North Branch received a DNR Outdoor Recreation grant in the amount of \$140,000 for the Northwood Park Pickleball & Site Improvement Project, with a 50 percent city match funding requirement towards the project, and Winberg Companies, LLC, the contractor has completed the work and city staff have approved the work; and

WHEREAS, a 50 percent city match funding requirement towards the project; and

WHEREAS, the city obtained bids and approved the contract to the low bid from Winberg Companies, LLC in the amount of \$149,453.00 plus alternate #1 \$18,040.05 and a 10% contingency of \$16,749.31 (\$184,242.36 total); and

WHEREAS, Winberg Companies, LLC has completed the work and have a retainage in the amount of \$9,088.16; and

WHEREAS, city staff have reviewed and verified the quantities as accurate and approve the pay request as presented.

NOW THEREFORE, BE IT RESOLVED BY THE City Council of North Branch, Minnesota, to accept the improvements and accept the improvements and pay the retainer for the Northwood Park pickleball & site improvements project in the amount of \$9,088.16 to Winberg Companies, LLC.

Northwood Park Pickleball & Site Improvements
Pay App 003 (09/22/2024)

Section Title	Line Item	Item Code	Item Description	UoM	Quantity	Unit Price	Extension	Build Quantity to Date	Extension
BASE BID	Required	Base Bid Section							
	1	2021.501	MOBILIZATION (5% MAX)	LS	1	2,200.00	\$ 2,200.00	1	\$ 2,200.00
	2	2106.501	EXCAVATION - COMMON	LS	1	34,000.00	\$ 34,000.00	1	\$ 34,000.00
	3	2360.504	4 INCH THICK BITUMINOUS COURT	SY	960	34.95	\$ 33,552.00	960	\$ 33,552.00
	4	2531.503	24" CONCRETE MAINTENANCE CURB	LF	412	30.5	\$ 12,566.00	412	\$ 12,566.00
	5	2540.602	PICKLEBALL NET SYSTEM	EACH	4	1,723.80	\$ 6,895.20	4	\$ 6,895.20
	6	2557.502	8' CHAIN LINK MAN GATE	EA	1	1,346.40	\$ 1,346.40	1	\$ 1,346.40
	7	2557.502	8x10 CHAIN LINK MAINTENANCE GATE	EACH	1	2,244.00	\$ 2,244.00	1	\$ 2,244.00
	8	2557.503	4' HIGH 2-RAIL CHAIN LINK FENCE	LF	96	72.22	\$ 6,933.12	96	\$ 6,933.12
	9	2557.503	8' HIGH 2-RAIL CHAIN LINK FENCE	LF	400	70.38	\$ 28,152.00	400	\$ 28,152.00
	10	2557.503	FENCE PROTECTOR	LF	96	13.87	\$ 1,331.52	96	\$ 1,331.52
	11	2573.501	CONSTRUCTION EXIT/MAT	LS	1	750	\$ 750.00	1	\$ 750.00
	12	2573.503	SILT FENCE, TYPE MS OR BIOROLL	LF	300	3	\$ 900.00	300	\$ 900.00
	13	2575.505	SEED W/ BLANKET	ACRE	0.3	7,000.00	\$ 2,100.00	0.3	\$ 2,100.00
	14	2582.504	ACRYLIC COLOR COAT & STRIPING	SY	960	17.17	\$ 16,483.20	960	\$ 16,483.20
	15		CHANGE ORDER 001 (Grade for Trails)	SF	15740	1.74	\$ 27,387.60	15740	\$ 27,387.60
	16		CHANGE ORDER 002 (4ft Man Gate)	LS	1	4,922.06	\$ 4,922.06	1	\$ 4,922.06

Total	\$181,763.10	Total to Date	\$181,763.10
		Retainage	
		Total Retainage	\$ 9,088.16
		Less Previous Applications	\$ 140,886.06
		Total Due Less Retainage	\$ 31,788.89
		Project Completion %	100%

Northwood Park
DNR Grant - OR24-008
\$31,788.89 - ok 9/6/24

Nate Sondrol



Prepared By: Nathan Sondrol, Community Development Director

Presenter: Nathan Sondrol, Community Development Director

Date: 10/18/2024

Board & Commission: City Council

Subject: Public Hearing - Meadows Ridge EAW (Environmental Review Worksheet)

Overview / Background

LGI Homes – Minnesota (Developer) has submitted applications for a Comprehensive Plan amendment, rezoning to PUD, and a Preliminary Plat for a subdivision of 342 unattached residential units known as Meadows Ridge (Development). State Statute requires an Environmental Assessment Worksheet (EAW) to be completed with a subdivision of more than 250 unattached units. The EAW form consists of 20 questions that provide the information needed to determine if the project will have significant environmental impacts and if further evaluation is needed. An EAW is not meant to approve or deny a project, but instead to serve as a resource to guide future review, approvals, and permitting. After the EAW is reviewed and comments received, the City Council will be asked to take action, tentatively at the November 12 meeting, to make a declaration on the EAW determining whether more study of environmental impact is needed.

All EAW documents are published on the MN Environmental Quality Board monitor and available for public comment for 30 days. The City Council has the option to host a public hearing to receive comments related to the EAW during this time period. During the October 22 meeting, the City Council is asked to hold a public hearing related to the EAW document and provide any feedback needed on the EAW.

At the July 9 Planning Commission meeting, the Planning Commission held a public hearing on the Comprehensive Plan amendment, rezoning to PUD, and Preliminary Plat. The Commission heard from many members of the public and most of the concerns were about the traffic impacts to the area. Some other concerns included loss of agricultural land, the size of the lots within the development, questioning the demand for this kind of development, and additional burden on public services. The Planning Commission recommended approval of all the requests. Per State Statute 4410.3100, no final government action can be made until a declaration has been made on the EAW. The City Council will be asked to review the Comprehensive Plan Amendment, PUD, and Preliminary Plat requests for the development also tentatively at the November 12, 2024, meeting after formal action on the EAW.

Topics for Review

1. Project Overview
2. Planning Alignment
3. Landcover and Trees
4. Traffic and Transportation

Analysis of Topics

1. Project Overview

The Meadows Ridge subdivision is proposed to contain 342 unattached residential units on 119.24 acres located on the northwest corner of Flink Avenue-400th Street intersection, including PIDs: 11.00143.00 and 11.00142.10. The Meadows Ridge subdivision will serve as a continuation of the Meadows North and Meadows North Townhomes developments.

The project will require an amendment to the 2018 Comprehensive Plan Land Use Map for that area. The Land Uses will remain the same post-approval – Low Density Residential, Medium Density Residential and Business (or Commercial). However, smaller Low Density Residential and Business areas are proposed to reduce in size and the Medium Density Residential area will increase. The northwest area of the development site falls within the City’s Shoreland Overlay District for Chain Lake, which requires an additional sub-set of zoning standards. The Developer is seeking to follow the zoning standards for R-1 and R-1 Shoreland rules for lots within the shoreland zone, and rezone the Medium Density areas to Planned Unit Development (PUD).

Planned Unit Development (PUD) zoning and the Shoreland Overlay District both require land to be set aside as open space. PUD areas require 15% of the land to be set aside as open space; shoreland areas require 50%. The latter is necessary to ensure protection of the lake (and streams). Based on those percentages and total acres for each area, the open space requirement for Meadows Ridge is as stated in the table, which exceeds minimum standards.

	PUD	Shoreland	Totals
Total Acres	62.47	15.46	77.93
Open Space % Required	15%	50%	
Open Space Acres Required	9.37	7.73	17.10
Open Space Provided	9.65	7.75	17.40

The far northwestern outlot is proposed as a future, smaller neighborhood park for the development, giving the area two (2) parks – this one and Meadows North Park off 399th Street. As part of the PUD request, the Developer plans to improve the walkability of the development by increasing pedestrian areas using typical sidewalks along City streets, per City policy, and enhancing the trail system.

1. Plan Alignment

The EAW analyzed the proposed project against the City's adopted plans, including: 2018 Comprehensive Plan, Surface Water Plan, Water System Plan, Sanitary Sewer Plan, Wellhead Protection Plan, Lower St. Croix Watershed Management Plan, and Chisago County Transportation Plan. In general, the proposed project is in alignment with these planning documents. The project area is designated for future development and expansion of the City's Urban Service Area. City sewer and water have been extended to the area, and the treatment plan has sufficient capacity to handle the additional development. The proposed project would meet the requirements for surface water management for a rate and quality control of runoff. As mentioned above, the Land Use map of the Comprehensive Plan would need to be amended for the specific boundaries of district lines, but the land uses would remain the same.

1. Land Cover and Trees

The EAW looks at the land cover and soils and discusses the impact of the changes. The project area is currently primarily row crops with small, wooded portions. Over the 119 acre site, 6.82 acres are currently covered in trees. Most of these trees serve as a forested windbreak with a small, forested section in the northwest portion of the site. The proposed project would remove 5.8 acres of trees, which would require special City Council approval, since it is greater than 50% of the site's tree cover. The developer is planning to plant a mix of deciduous and evergreen trees totaling 796, which is over double the 342 trees required.

1. Traffic and Transportation

A traffic study was completed as part of the EAW measuring the impact of the traffic from the development. The traffic study can be found on pages 709 - 726 of the EAW. The traffic study found that the residential portions of the development would add 3,272 trips and the retail components would add 3,376 daily trips. When considering the impact of the total building of the project, all intersections have a level of service of B or greater, except for Flink and MN-95 with a projected level of service of C. The EAW recommends that, in conjunction with the project, Flink is reconstructed from a 2-lane undivided roadway to a 3-lane roadway with a two-way left-turn lane. Additionally, right turn lanes are recommended to improve safety as well.

Table 6. Year 2040 Build Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Flink Avenue and North Access ⁽¹⁾	A/A	5 sec.	A/A	7 sec.
Flink Avenue and South Access ⁽¹⁾	A/A	6 sec.	A/A	8 sec.
Flink Avenue and Commercial Lot Access ⁽¹⁾	A/A	4 sec.	A/A	8 sec.
Flink Avenue and 400th Street ⁽¹⁾	A/A	4 sec.	A/B	15 sec.
Flink Avenue and 392nd Street ⁽¹⁾	A/A	6 sec.	A/B	13 sec.
Flink Avenue and MN-95 ⁽²⁾	C	20 sec.	C	23 sec.
400th Street and West Access/Meadows North ⁽¹⁾	A/A	5 sec.	A/A	7 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

(2) Signal timing assumed to be optimized.

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Flink Avenue and South Access ⁽¹⁾	A/A	6 sec.	A/A	8 sec.
Flink Avenue and Commercial Lot Access ⁽¹⁾	A/A	4 sec.	A/A	8 sec.
Flink Avenue and 400th Street ⁽¹⁾	A/A	4 sec.	A/B	15 sec.
Flink Avenue and 392nd Street ⁽¹⁾	A/A	6 sec.	A/B	13 sec.
Flink Avenue and MN-95 ⁽²⁾	C	20 sec.	C	23 sec.
400th Street and West Access/Meadows North ⁽¹⁾	A/A	5 sec.	A/A	7 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

(2) Signal timing assumed to be optimized.

Council Action

The City Council is asked to hold a public hearing related to the EAW. The comments will then be added to the record of decision and responded to at that time. After the 30-day comment period, staff will work with the developer to prepare a comment response letter. The comment response letter will be included in the declaration made by the City Council on the EAW.

Voting Requirements:

Voting Options Simple Majority

Meadows Ridge EAW Summary

Proposed Project

The Project includes the development of approximately 120 acres within the City of North Branch, Chisago County, Minnesota. The Project Area is located west of Interstate 35 and north of 400th Street, along Flink Avenue (County Road 64). The site is located northwest of the City of North Branch. The Project proposes 342 residential lots, several outlots, a trail, and a commercial parcel. An EAW was prepared pursuant to Minnesota Rules Part 4410.4300, Subp. 19 (D).

Site Description and Existing Conditions

Under existing conditions, the Project Area consists of two undeveloped cultivated fields, with a forested windbreak, and a small, forested section in the northwest corner. A portion of the existing trees and shrubs would be removed to conduct site grading.

1. **Cover Types.** The site has been consistently cropped since at least the 1930s. According to the U.S. Geologic Survey's National Land Cover Dataset, the project area currently consists of the following [119 acres total]; cultivated cropland (106.24 acres), deciduous forest (7.51 acres), mixed forest (0.30 acres), developed open space (1.01 acres; corresponds to 400th Street), and low-intensity developed land (3.94 acres; corresponds to Flink Avenue). The deciduous forest consists of bitternut hickory, sugar maple, white oak, and Siberian elm trees with an understory of common buckthorn and prickly ash shrubs. Based on the current Tree Preservation Plan, 5.80 acres of trees will be removed, and 796 trees will be planted as part of the site development.
2. **Shorelands and Floodplains.** The North Branch 2040 Comprehensive Plan identified the northwestern corner of the Project Area as within the Shoreline Management District. This portion of the site is located within 1,000 feet of a DNR Public Water (13-63-02 P (Chain (South Portion))). The Federal Emergency Management Area (FEMA) 100-year and 500-year floodplain zones for Chain Lake are 100 feet northwest of the site. There is no floodplain mapped within the Project Area. The Project will be in compliance with the terms of the City's and County's shoreland management ordinance.
3. **Land Use.** The Project Area is located within the Urban Service Area Boundary. The Project Area currently consists of cultivated fields and woodland. The City of North Branch currently has the Project Area zoned for "Single Family Residential" (northern half), "Medium Density Residential" (southwest), and "Business Neighborhood" (southeast). The future land use is designated as "LUR-1 – Single Family Residential", "LUR-2 – Medium Density Residential", and "LUB – Business." The Project concept Plan is aligned with the guided land uses. It plans to offer a mixture of residential units, service retail, and a trail connection. Meadows North Park is located in the Meadows North development on the south side of 400th Street adjacent to the Project Area. There is an existing trail on the west side of Flink Avenue adjacent to the Meadows North development with an extension along Flink Avenue planned for 2025.
4. **Geology and Soils.** The Project Area is primarily flat with steeper slopes along the road ditches. Grading of the site would be required during construction. Soils within the Project Area limits are not overly susceptible to erosion and are suitable for the proposed uses. The soil borings documented soils with moderate infiltration rates and water transmission. Mitigation based on typical erosion control and sedimentation regulations will be provided.
5. **Water Quality.** Runoff currently drains to Chain Lake and likely contains pollutants like sediment, pesticides, fertilizers, and other nutrients due to the current agricultural operation. No permanent surface waters are present within the Project Area. DNR Public Water (13-63-02 P (Chain (South Portion))) is 350 feet northwest of the Project Area. The North Branch of the Sunrise River is listed as an impaired water by the MPCA and within one mile of the Project Area. The Project Area is not

within a Wellhead Protection Area. During construction compliance with an approved Stormwater Management Plan and the National Pollutant Discharge Elimination System (NPDES) permit will minimize adverse impacts on Chain Lake and other receiving waters. The Project would increase impervious surface area compared to existing conditions by constructing homes, interior roads, sidewalks, and a trail. Compliance with stormwater requirements will minimize and mitigate potential adverse effects on receiving waters. The Project will be designed to meet the stormwater quantity and quality standards and requirements set by the City of North Branch. The site will be graded to promote surface water drainage and to maximize the runoff that is treated before leaving the site.

6. **Wetlands and Surface Waters.** No permanent waters (lakes, streams, or wetlands) are present within the Project Area. The south portion of Chain Lake (DNR Public Water Basin (13-063 P)) is 350 feet northwest of the site. There are no County ditches within 8,000 feet of the Project Area. In 2021 the Project Area was reviewed for the presence and extent of wetlands; no features were delineated. The Local Government Unit (Chisago County Environmental Services) concurred on the no-wetland determination on October 27th, 2021.
7. **Wastewater.** The current sanitary sewer system extends to the intersection of Flink Avenue and 400th Street. The development intends to extend a public sanitary sewer from the existing stub. The Project Area is located within the northwest major sanitary sewer district, specifically the NW-100 subdistrict. The City's treatment plant currently has the capacity for 0.715 million gallons per day (mgd) and a current rate of 0.44 mgd. Project wastewater flows appear to be appropriate for the planning of local infrastructure planning needs. The waste loading from the development is expected to closely match the composition of the existing wastewater loading to the treatment plant. The treatment plant discharges to the North Branch of the Sunrise River. The plant utilizes activated sludge extended aeration with aerated ash holding tanks and sludge storage tanks to remove pollutants before discharging. This wastewater treatment plant has a capacity of .275 million gallons per day. Pretreatment measures only consist of those pretreatment measures prior to treatment at the wastewater treatment facility.
8. **Water Appropriation.** The existing water supply system consists of six wells, two water treatment plants, one ground reservoir, and three water towers. The system has one million gallons of elevated storage capacity and one million gallons of ground storage capacity. The total capacity of the six North Branch wells is approximately 3,850 million gallons per minute. A 20-inch watermain is currently present at the intersection of Flink Avenue and 400th Street that continues east on 400th St under I35 into the city's industrial park. This line is anticipated to be extended for the development. Planned future 12-inch watermain crossing I-35 at the north end of the proposed development south of 406th Street. The 12-inch watermain crossing of I-35 is shown on Figure 8 of the Comprehensive Water System Plan. This crossing will provide redundant transmission under I-35 in the event of a watermain break at one of the other crossings. The development will require a DNR water appropriation permit for temporary dewatering and groundwater appropriation if withdrawal exceeds 10,000 gallons per day or one million gallons per year. The current extent of dewatering is not known at this time. Due to the lack of surface water features onsite and topography, it is not anticipated that dewatering will continue long enough to affect nearby domestic water wells.
9. **Hazardous Materials.** A Phase 1 Environmental Site Assessment was completed in June 2022. The assessment revealed no evidence of recognized environmental conditions or controlled recognized environmental conditions in connection with the Project Area. The current site configuration has been present since at least 1938. Both the Minnesota Pollution Control Agency and the Minnesota Department of Agriculture "What's in My Neighborhood" databases were reviewed to identify active hazardous waste generators and sources of agricultural chemical soil/groundwater contamination within one mile of the Project area. No instances of existing contamination or potential environmental hazards were identified in the Project Area. Past land use activities may have included the application of pesticides and herbicides; however, no soil or groundwater contamination is anticipated.
10. **Ecological Resources.** The Project Area is primarily row crops with a small, wooded portion. The wildlife habitat has been diminished due to historic cultivation and annual tillage. While no aquatic resources are onsite, offsite Chain Lake does provide habitat for fish. The surrounding cultivated fields and rural/low-density residential areas provide some wildlife habitat for deer, birds, and small

mammals. The industrial and commercial areas nearby along with roads (I-35, Flink Avenue, and 400th Street) create limitations for wildlife. The Minnesota DNR shows the northwestern corner of the Project Area as within a Metro Conservation Corridor.

A review of the DNR Natural Heritage Information System (NHIS) database was conducted to determine if any rare natural features could be impacted by the Project. Correspondence dated March 6th, 2024 (Correspondence MCE No. 2023-00942) required a Blanding's turtle avoidance plan. Similarly, because all seven of Minnesota's bats, including the federally listed endangered northern long-eared bat, can be found throughout the state, the DNR recommended that tree removal be avoided during the active season (June 1st through August 15th) to minimize impacts. The northern long-eared bat is a federally listed species, see the discussion below.

The U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) tool was used to identify other potential sensitive resources near the project. The IPaC identifies the northern long-eared bat (*Myotis septentrionalis*) (NLEB), the tricolored bat (*Perimyotis subflavus*), the whooping crane (*Grus Americana*), salamander mussel (*Simpsonaias ambrigua*) and the monarch butterfly (*Danaus plexippus*) as potentially being within the vicinity of the Project Area. The NLEB Range wide Determination Key was completed and it was determined the Project is not likely to result in unauthorized take of the northern long-eared bat". This determination was made on December 29th, 2023, and specified unless the service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, "this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat." No follow-up communication was received by the USFWS. Based on the MN-WI determination key evaluations, it was determined that the Project will have no effect on the tricolored bat, monarch butterfly, salamander mussel, or the whooping crane.

11. **Historic Resources.** A project review request was submitted to the State Historic Preservation Office (SHPO) on December 11th, 2023. Based on the nature and location of the Project Area, a Phase 1 archeological survey was recommended by SHPO. In Situ Archaeological Consulting was contracted to complete the Phase 1 assessment. The review of previous studies concluded no previous cultural resource surveys and recorded archeological sites within the Project Area boundaries. Two previously recorded resources identified within one mile of the project area were not eligible for the National Register of Historic Places (NRHP).

The wooded portion of the Project Area was subject to shovel testing. No cultural materials were observed or recorded during the archaeological assessment. Additional field work was completed after the fields were tilled to achieve optimal residue cover. One newly recorded cultural resource was observed and recorded but it was deemed unlikely to yield any important information from the past. In Situ recommended a 'findings of No Historic Properties Affected for the proposed project.'

12. **Visual Resources.** Any change from undeveloped to developed land will have an impact on the visual look of the property, but the Meadows Ridge development is not anticipated to have an impact on specific scenic views or vistas within the community. The potential visual effects consist of tree removal and the loss of open space. The Proposer is committed to adhering to the tree replacement requirements. The project is not anticipated to produce any intense lights (glare) or include industries that would emit vapor plumes.
13. **Air.** The development is not anticipated to include any stationary source emissions from sources such as boilers or exhaust stacks. Hazardous air pollutants are not anticipated to be generated onsite post development. The residential homes will include natural gas heating and cooling systems. These systems may result in direct or indirect sources of stationary greenhouse gas emissions, but emissions will be in alignment with the planned future land use outlined in the City's Comprehensive Plan.

Minor emissions generated from construction equipment will occur during the construction phase. Contractors will be responsible for ensuring equipment is properly maintained and not contributing to excess emissions. Following project completion, vehicle-related air emissions in the area - including

carbon monoxide levels - will see a relatively small increase due to the increase in traffic to and from the site.

The Project will not generate significant odors during construction or operation. Odors generated during construction will be mitigated by maintenance of the construction equipment to the manufacturers' specifications and by using appropriate fuel additives when necessary. Grading and construction will temporarily generate dust. BMPs and other standard construction methods will be used to reduce construction impacts such as intermittent applications of water to exposed soils as needed to reduce dust during dry weather.

14. **Greenhouse Gas Emissions (GHG)/ Carbon Footprint.** Average annual GHG emissions were calculated for construction and operation phases of the Project. Three types of emissions were evaluated; direct emissions released from the property, emissions associated with offsite generation of purchased electricity, and emissions from offsite provision of waste management.
15. **Noise.** A noise study was not completed for the preparation of this EAW. Project construction will result in a temporary increase in noise levels. The different phases of development will result in varying noise levels depending on the amount of construction that occurs simultaneously, the time of operation, and the distance between construction equipment and receptors. Development would adhere to the City Code (Section 30-120) limits construction activities to specific times/days. The project is expected to minimize disturbances caused by construction noise and conform to Minnesota noise rule and standards (Minnesota State Statute 7030.0030). Construction equipment will be properly muffled and maintained in working order. The development will consist of multi-level apartment buildings and commercial space that would not emit noise levels exceeding state noise standards and is in alignment with the planned future land use.
16. **Transportation.** A Traffic Study was completed for the Project that evaluated a No-Build and Build condition for two design years, the existing conditions and 2040 as the long-range planning horizon. The traffic operation analysis suggests there is sufficient capacity on the surrounding roadways to accommodate the traffic from this development. The Traffic Study recommended that Flink Avenue be converted from a 2-lane undivided to a 3-lane roadway with a two-way left-turn lane, from 392nd Street to the north residential access. While the recommended improvement is primarily intended for long-term development and may not be needed in the immediate term. Other improvements such as roadway shoulders, right-turn lanes, and pedestrian/bicycle facilities were also identified for consideration. Finally, a westbound right turn lane at 400th Street/west access/Meadows North access was identified for consideration to provide safety and operational benefits.
17. **Cumulative Effects.** The Chain Lake Shores residential development is planned for the parcel directly west of the project area. This development is still in the concept plan phase. The development timeline is dependent on the extension of City trunk water and sewer lines west on 400th Street. The 79+ acre site is anticipated to have 102 residential units and 6,690 linear feet of interior roads.

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at: <https://www.eqb.state.mn.us/> The EAW form provides information about a project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the EQB Monitor. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project Title: **Meadows Ridge**

2. Proposer:

LGI Homes - Minnesota, LLC

Contact Person: **Jay Roos**

Title: **VP of Land Acquisition and Development**

Address: **2850 Cutters Grove Avenue, Suite 207**

City, State, ZIP: **Anoka, MN 55303**

Phone: **(612) 840-3438**

Email: **jay.roos@lgihomes.com**

3. RGU:

City of North Branch

Contact Person: **Nathan Sondrol**

Title: **GIS Specialist/Parks Director**

Address: **6408 Elm Street**

City, State, ZIP: **North Branch, MN 55056**

Phone: **(651) 277-5226**

Email: **nathans@ci.north-branch.mn.us**

4. Reason for EAW Preparation:

☐ Discretionary

☐ EIS Scooping

☒ Mandatory EAW

☐ Citizen Petition

☐ RGU Discretion

☐ Proposer Initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and names(s):

- **4100.4300, Subp. 19 (D): Residential Development**

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Appendices

- Appendix A: Site Plan
- Appendix B: Stormwater Management Plan
- Appendix C: Wetland Delineation
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- Appendix H: MnDNR Natural Heritage Review Letter
- Appendix I: USFWS IPaC Results
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5. Project Location:

- County: [Chisago](#)
- City/Township: [North Branch](#)
- PLS Location (1/4, 1/4, Section, Township, Range): [SW 1/4, W 1/2 & NE 1/4, Section 8, Township 35N, Range 21W](#)
- Watershed (81 major watershed scale): [Lower St. Croix River](#)
- GPS Coordinates: [\(45.530356, -93.001639\)](#)
- Tax Parcel Number: [110014300 \(Address unassigned; 80-acres\)](#)
[110014210 \(Address unassigned; 40-acres\)](#)

6. Project Description:

- a) Provide the brief project summary to be published in the EBQ Monitor, (approximately 50 words).

The Meadows Ridge residential/commercial development project is proposed on approximately 120 acres of cultivated land northwest of North Branch, Chisago County, Minnesota. The project will include 342 residential lots and a commercial parcel. Development will consist of an extension of City trunk water and sewer lines, installation of minor utilities, and construction of interior roads, storm ponds, infiltration basins, and new homes.

- b) Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

LGI Homes – Minnesota, LLC, the project proposer, is planning a residential/commercial development currently referred to as “Meadows Ridge” northwest of North Branch, Chisago County, Minnesota (**Figure 1**). The project area is west of Interstate 35 and north of 400th Street, along Flink Avenue (County Road 64). The project area consists of two currently undeveloped and cultivated fields, with a forested windbreak, and a small, forested section in the northwest corner.

The City currently has both parcels zoned as “Rural Residential” (**Figure 5**) (1). The City’s Comprehensive Plan includes the project area within the urban service area boundary and shows the future land use as single-family/medium-density residential, and business (**Figure 6**) (1).

The 119.00± acre development is planned to consist of 342 residential units, commercial space, several outlots, and a trail. See **Table 1** below for a breakdown of the different lots (‘Shoreland’, ‘Standard R-1’, and ‘PUD’). The development will also include the construction of several interior roads, municipal utilities, and stormwater features. The current Meadows Ridge site plan is included in **Appendix A**. The most updated stormwater management plan is included as **Appendix B**. Construction is anticipated to take place in four or five phases (subject to change due to market conditions) using standard construction methods. It is anticipated that project construction will be completed in several phases in approximately 6-8 years beginning in the spring of 2025.

The project will require mass-grading (115-acre grading area). Mass grading will physically manipulate the vegetation, soil, and topography of the site. No known significant natural communities are present as the site is primarily cropland. No surface water features will be impacted by project development. The 2021 wetland delineation did not identify any wetlands onsite, and the Chisago County (Local Government Unit) concurred based on the October 27th, 2021 Notice of Decision (**Appendix C**).

c) Project magnitude:

Table 1. Project Magnitude

Description	Number
Total Project Acreage	119.00± acres
Linear Project Length	Trails • 9,747± linear feet Interior Roads • 13,969± linear feet
Number and Type of Residential Units	342 Total
Residential Building Area (sqft)	Total Lot Area = ±70.33 acres (3,063,575 sqft) • PUD Lots ○ 42-ft, 47-ft, 52-ft, and 62-ft wide lots • Shoreland Lots ○ 15,000 sqft (minimum) ○ 75-ft wide • Standard R-1 Lots ○ 12,000 sqft (minimum) ○ 80-ft wide
Commercial Building Area (sqft) (Outlot D)	Total Area = ±5.27 acres (229,561 sqft) Ghost Plan Estimate: • 44,867 sqft Buildings • 84,506 sqft Parking Lots/Sidewalks
Structure Height(s)	Residential Maximum 2 Stories

- d) Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The project is proposed by LGI Homes – Minnesota, LLC (“the proposer”) and will be carried out by a private entity. North Branch is a growing community with, “outstanding natural and recreational amenities and opportunities for all and well-maintained infrastructure, vibrant business districts and neighborhoods, and provides residents with an excellent quality of life” (1). The purpose is to provide residential development in North Branch to meet market demand within the City’s urban service area boundary.

- e) Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes ☒ No
- f) Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No

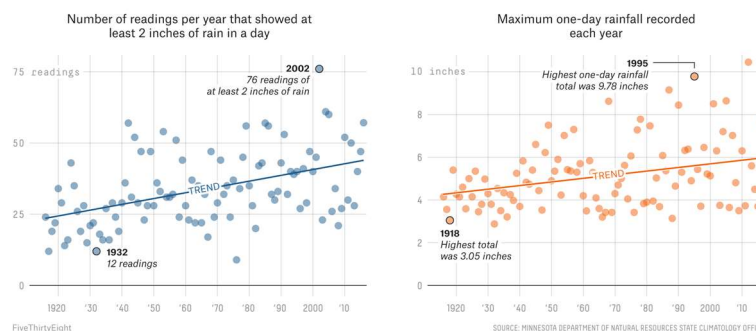
7. Climate Adaptation and Resilience:

- a) Describe the climate trends in the general location of the project (see guidance: Climate Adaptation and Resilience) and how climate change is anticipated to affect that location during the life of the project.

As a result of climate change, Minnesota’s climate is expected to see an increase in temperature, precipitation, and extreme weather events. Between 1895 and 2020, average annual temperatures have increased by 3⁰ F and annual precipitation has increased by 3.4 inches. These warmer and wetter trends have been concentrated in the past several decades (2). Minnesota’s increase in average annual temperature is 25% greater than the global average (3). In addition to the accelerated average annual temperature, the state is also experiencing more frequent storms (4). The frequency of heavy rain events is expected to double by 2100 and smaller rain events will become less frequent (5). **Exhibit 1** from the Minnesota Department of Natural Resources outlines not only the increased one-day precipitation totals but also the number of 2” + precipitation event readings over a 40-year term (1916-2016).

Exhibit 1. Minnesota is Getting More and Bigger Rainstorms

Rainfall measured at 40 long-term precipitation stations, 1916-2016



More specifically, within the Lower St. Croix River Watershed where the project is located, historic and projected trends are similar to that of the state. According to the Minnesota Department of Natural Resources' (MnDNR) *Minnesota Climate Explorer* tool, annual average temperature and precipitation has increased between 1895 and 2023 within the watershed (**Table 2**).

Table 2. Minnesota Climate Explorer Historic Data¹, Lower St. Croix River Watershed

Annual	Mean	Trend
Precipitation	29.44"	+0.32" per decade
Minimum Temperature	32.59°F	+0.30°F per decade
Average Temperature	42.92°F	+0.22°F per decade
Maximum Temperature	53.24°F	+0.13°F per decade
Palmer Drought Severity Index (PDSI)	0.29	+0.18 per decade

¹Historic (1895 to 2023)

Beyond the trends, projected future data for the Lower St. Croix River Watershed was evaluated using the MnDNR's *Minnesota Climate Explorer* tool. The mid-century (2040-2059) and late-century (2080-2099) projections were evaluated based on the estimated life span of the project (50-years), see **Table 3**. The late-century projection has two different modeled scenarios, an intermediary where emissions decline after peaking in 2040 and an extreme where emissions continue rising through the 21st century. Metrics for temperature and precipitation were evaluated by eight government institutions, laboratories, and alliances. The mean from the eight models is shown below for the various projections and scenarios. Graphs showing all eight models and both scenarios are included in **Appendix D**. Comparing the historic and projected precipitation and average temperature values, it is clear the average annual precipitation totals and average annual temperature will rise within Minnesota and the Lower St. Croix River Watershed as well.

Table 3. Minnesota Climate Explorer Projected Data, Lower St. Croix River Watershed¹

	Mid-Century (2040-2059)			Late-Century (2080-2099) Intermediate Scenario			Late-Century (2080-2099) Extreme Scenario		
Annual	Lower Range	Mean	Upper Range	Lower Range	Mean	Upper Range	Lower Range	Mean	Upper Range
Precipitation (inches)	18.04	32.40	65.37	16.62	33.17	70.83	18.00	35.42	76.87
Minimum Temperature (°F)	36.48	40.79	45.12	39.86	43.63	47.24	44.74	47.80	51.01
Average Temperature (°F)	44.26	47.72	51.63	46.36	50.15	53.96	50.65	53.86	57.28
Maximum Temperature (°F)	51.75	54.86	58.65	53.01	56.98	61.18	56.85	60.47	64.19

¹Based on the model mean

- b) For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.

Table 4. Resource Categories, Climate Considerations, and Adaptations

Resource Category	Climate Considerations	Project Information	Adaptations
Project Design	Aspects of the building architecture/materials choices and site design that may negatively affect urban heat island conditions in the area considering changing climate zones, temperature trends, and potential for extended heat waves.	Dark roofing materials and asphalt absorb heat during the day and radiate it at night, which increases the urban heat island effect and amplifies the warming temperatures of climate change.	Landscaping, greenspace, and stormwater management systems will reduce runoff and urban heat island effect.
Land Use	The land use conversion will increase the amount of impervious surfaces and therefore could potentially increase the localized flood risk. Heavier rainfall will also increase the risk of localized flooding	No Federal Emergency Management Area (FEMA) 100-year or 500-year floodplains are located within the project area boundaries, but Chain Lake's 100-year floodplain is 100-feet west of the project area boundary.	The project area includes three stormwater ponds designed in accordance with the Shoreland Management Ordinance and North Branch City Code (minimizing runoff velocities, erosion potential, and reducing/delaying runoff volumes).
Water Resources	Address in Question 12		
Contamination/ Hazardous Materials/ Wastes	For example, how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the potential environmental effects of generation/use/storage of hazardous waste and materials	Construction and the creation of residential homes will generate increased emissions, particulate matter, and waste.	Any hazardous waste products generated or stored within the project area will be registered and kept in accordance with the Minnesota Pollution Control Agency (MPCA) requirements.
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Address in Question 14		

8. Cover Types: Cover Types:

- a) Estimate the acreage of the site with each of the following cover types before and after development:

Table 5. Cover Types Pre- & Post-Development

Cover Types	Before (acres)	After (acres)
Wetlands and shallow lakes (<2m deep)	N/A	N/A
Deep lakes (>2m deep)	N/A	N/A
Wooded/Forest	6.82	1.02 ²
Rivers/Streams	N/A	N/A
Brush/Grassland	N/A	N/A
Cropland	107.23	N/A
Livestock rangeland/pastureland	N/A	N/A
Lawn/landscaping	N/A	70.04 ⁴
Green infrastructure TOTAL (from table below*)	N/A	6.49
Impervious surface	4.95 ¹	41.25 ³
TOTAL	119.00	119.00

¹ Based on NLCD land cover (Figure 4).

² Based on Tree Preservation Plan (Appendix A).

³ From site plan (Appendix A), includes 2.92 acres of commercial ghost plan.

⁴ Lawn/Landscaping estimate = 119 – 41.25 – 6.49 – 1.02

Table 6. Green Infrastructure Pre- & Post-Development

Green Infrastructure	Before (acres)	After (acres)
Constructed infiltration systems (Two stormwater ponds (one with an infiltration bench) and two infiltration basins)	0.00	6.49
Constructed tree trenches and tree boxes	0.00	0.00
Constructed wetlands	0.00	0.00
Constructed green roofs	0.00	0.00
Constructed permeable pavements	0.00	0.00
Other (describe)	0.00	0.00
TOTAL	0.00	6.49

Table 7. Tree Removal and Planting

Trees	Percent/Number
Percent tree canopy removed during development	85%
Number of new trees planted	796

¹ Total Tree Area = 6.82 acres

² Tree Area Removed = 5.80 acres (5.80 / 6.82 = 0.85)

³ 64% Deciduous, 36% Conifer (Excludes 16 ornamental trees)

9. Permits and approvals required:

- a) List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Table 8. Permit Approvals, Applications, and Certifications

Unit of Government	Type of Application	Status
Federal		
U.S. Army Corps of Engineers	Wetland Delineation Concurrence	Approved- No wetlands delineated onsite
State		
Minnesota Department of Natural Resources (MnDNR)	Water Appropriation Permit	To be obtained, if needed.
	Blanding's Turtle Avoidance Plan	To be submitted
Minnesota Pollution Control Agency (MPCA)	National Pollution Discharge Elimination System (NPDES) Permit	To be applied for
MPCA	Sewer Extension Permit	To be applied for
Minnesota Department of Health (MDH)	Watermain Extension Permit	To be applied for
County		
Chicago County	County Road Access Permit	To be applied for
	Wetland Conservation Act (Boundary Approval)	Approved
Local		
City of North Branch	EAW/EIS Need Decision	Pending
	Preliminary and Final Plat	Pending
	Development Application/Land Disturbance Permit	To be applied for
	Building Permits	To be applied for

- b) Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 10-20, or the RGU can address all cumulative potential effects in response to EAW Item No.22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21

10. Land Use:

a) Describe:

- i) Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.

Existing Land Use

Currently, the project area consists of cultivated fields, a forested wind break, and a small woodland portion. The site has been consistently cropped since at least the late 1930s. At the time of the wetland delineation (2021), the deciduous forest was dominated by bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), white oak (*Quercus alba*), and Siberian elm (*Ulmus pumila*) trees with an understory of common buckthorn (*Rhamnus cathartica*) and prickly ash (*Zanthoxylum americanum*) shrubs. A portion of Flink Avenue (CR 64) runs north/south between the two parcels.

The U.S. Geological Survey's National Land Cover Database (NLCD) identified primarily cultivated cropland and lesser amounts of deciduous forest, mixed forest, developed low intensity (Flink Avenue), and developed open space (400th Street) (**Figure 4**). The U.S. Department of Agriculture's Soil Survey Geographic Database (SSURGO) identified approximately 34 acres of farmland of statewide importance within the site boundaries (**Figure 15**). Surrounding the site is cropland, single-family, medium- and high-density residential, and commercial/industrial facilities (**Figure 5**).

Parks

- No parks are located within the site boundaries.
- Meadows North Park, Roger Johnson Memorial Park, Northwood Park, Tower Fields, Harder Park, Branch Acres Park, Central Park, Wildridge Park, Clayton Anderson Family Memorial Nature Park and Riverwalk Park are within 2.50 miles of the project area.

Trails

- The Sunrise Prairie Regional Trail is 0.84 miles east of the project area. The master plan for the trail outlines a continuation through North Branch, Harris, and Rush City to the northern boundary of Chisago County and connecting to the Hardwood Creek Trail to the south and Willard Munger Trail to the north (6).
- There is an existing trail on the west side of Flink Avenue adjacent to the Meadows North development and a large lot development to the south (400th Street and 392nd Street) and a trail along the south side of 400th Street adjacent to the currently developing Meadows North development. An extension of the trail along Flink Avenue from 392nd Street heading south to the existing trail/sidewalk network at the North Branch Marketplace development is scheduled for construction in 2025.
- The Meadows Ridge development will include an additional 7,255 feet of trail.

Cemeteries

- No cemeteries are located within the site boundaries.
- Trinity Lutheran Cemetery is 1 mile to the southwest, Oak Hill Cemetery is 1.30

miles to the southwest, Oak Grove Cemetery is 1.95 miles to the northeast, and Spring Lake Cemetery is 2.80 miles northwest of the project area.

Natural Resources

- The Minnesota DNR shows the northwest corner of the western parcel as partially within a Metro Conservation Corridor (**Figure 7**). Specifically, this Metro Wildlife Corridor project protects a greenway corridor along the North Branch of the Sunrise River (1). These corridors were identified by conservation organizations due to their ecological importance throughout the greater Twin Cities area. The corridors were created to provide guidance for development while prioritizing ecological connection.
 - The project area does not include any conservation lands such as Wildlife Management Areas (WMA), Scientific and Natural Areas (SNA), waterfowl production areas, wildlife refuges, or conservation easements.
 - Wildlife Management Areas
 - Janet Johnson Memorial WMA: Main Unit; 3 miles southeast
 - Scientific and Natural Areas (SNA)
 - Twin Lakes SNA; 5.60 miles southwest
 - U.S. Fish and Wildlife Service Waterfowl Production Areas
 - None near the project area
 - Chisago County Wildlife Corridor
 - 1 mile to the east
 - City of North Branch Open Space/Wildlife Corridor
 - 375 feet west of the development
 - Conservation Easements
 - None near the project area
- ii) Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

North Branch's 2018 Comprehensive Plan

Based on the North Branch 2040 Comprehensive Plan, the project area is currently zoned for rural residential (RR) and the northwest corner of the site is partially within the Shoreline Management District (SL) (**Figure 5**).

The Comprehensive Plan also outlines future land uses with the northern half of the project area designated as single-family residential (LUR-1). The southwest portion of the project area will be designated as medium density residential (LUR-2) and business (LUB) in the future. The Future Land Use plan also shows the project area within the Urban Service Area boundary (**Figure 6**).

Per the Comprehensive Plan, the surrounding future land uses include single-family residential (LUR-1) to the west/southwest, high-density residential (LUR-3) to the south, business (LUB) and medium-density residential (LUR-2) to the southeast, industrial (LUI) to the east, and rural

residential (LURR) to the north (**Figure 6**). The Urban Service Area boundary separates single-family and rural residential along the northern project area boundary.

Chapter 7 of the plan also outlines the City’s municipal water system. The six municipal water supply wells and the aquifers they draw water from are further discussed in **Question 12**. In response to the 2003 Comprehensive Water System Plan study, two new water treatment plants were built “adding new wells and raw water lines to the water system and storage capacity in order to meet the needs of the growing community” (1). The anticipated Trunk Water Main location and phasing is included in the following subpart. Chapter 7 also outlines the existing wastewater system. The included Existing Sanitary Sewer Map which showed the existing sanitary sewer system south of the North Branch of the Sunrise River west of Interstate 35 and south of 403th Street east of Interstate 35. (Figure 7-5; dated August 6th, 2018). Chapter 8 includes an inventory of the City’s natural resources, parks, and trails. This inventory includes a map of the Metro Wildlife Corridors that seeks to “protect and restore key natural lands in the metro area” (1). The plan also highlights the City’s tree preservation ordinance and the GreenStep City status.

City of North Branch Comprehensive Surface Water Management Plan

The Comprehensive Surface Water Management Plan (dated August 2006) developed a number of goals and policies to preserve and use natural water storage and retention systems. These goals and policies work to limit public capital expenditures necessary to control excessive volumes and rates of runoff, improve water quality, prevent erosion, promote ground water recharge, protect and enhance fish and wildlife habitat and water recreation facilities and secure the other benefits associated with the proper management of surface water.

The City of North Branch Comprehensive Water System Plan

The Comprehensive Water Management Plan prepared by the City of North Branch (dated December 18th, 2020) outlines the existing water supply system, treatment methods, current and future demand. The urban service area was developed by delineating gross developable acres in terms of those that are most likely to develop and predicting when development will take place. The urban service area is divided by development expected to occur in 0-20 years and development expected to occur in 20+ years and by residential and non-residential. The site is located within the urban service area and more specifically identified as an area anticipated to be developed in the next 20 years.

City of North Branch Comprehensive Sanitary Sewer Plan

The Comprehensive Sanitary Sewer Plan (dated January 2004) was prepared for the City of North Branch by WSB. The plan serves as a guide to completing the future sanitary sewer trunk system and inventorying the existing facilities.

The City of North Branch Wellhead Protection Plan

The Wellhead Protection Plan was developed for the City of North Branch (dated August 2012) and includes a delineation of the Wellhead Protection Area (WHPA) and the Drinking Water Supply Management Area (DWSMA) and assessments of well and DWSMA vulnerability. Part 2 (dated 2015) includes a review of data elements identified by the Minnesota Department of Health as applicable to the DWSMA, a review of changes/issues/problems/opportunities related to the public water supply and the identified potential contamination sources. Part 2 also includes management strategies, goals/objectives, and action plans for potential contamination sources as well as a review of North Branch's alternative water supply contingency strategy.

Lower St. Croix Comprehensive Watershed Management Plan

The Lower St. Croix Comprehensive Watershed Management Plan identifies/prioritizes resource areas and issues and establishes goals, outputs, and priority locations. The Sunrise River and tributaries were identified as a regionally significant river for pollutant reduction. The project area is within a "Priority Location #1" for vulnerable groundwater in agricultural areas, see

Question 12.

Chisago County 2013 Transportation Plan Update

The Chisago County Transportation Plan Update is divided into four sections, a review of existing conditions, an analysis of future transportation needs, an inventory of goals and objectives, and a roadway system plan. Public transit options such as the Heartland Express, the Park-and-Ride locations, and Park-and-Pool lots are also outlined in the plan update.

There are no additional known local, regional, state, or federal governmental management plans adopted for the project area.

- iii) Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

Overlay Districts

- City zoning is outlined above. As previously mentioned, the North Branch 2040 Comprehensive Plan identified the northwestern corner of the project area as within the Shoreline Management District.

Shoreland

- This portion of the project area also meets the shoreland definition in the Chisago County Shoreland Management Ordinance, located within 1,000-ft of a DNR Public Water (13-63-02 P (Chain (South Portion))) (**Figure 5 and 8**). The project will be in compliance with the terms of the City and County's shoreland management ordinance.

Floodplain

- The Federal Emergency Management Area (FEMA) 100-year and 500-year floodplain zones for Chain Lake are 100-ft northwest of the site (**Figure 8**). There is no floodplain mapped within the site boundaries.

Wild/Scenic Rivers

- No wild and scenic rivers are within or near the project area.

Natural Areas

- No Scientific and Natural Areas are within or near the project area.

Agricultural Preserves

- No agricultural preserves are within or near the project area.

- iv) If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity.

The proposed project does not include any critical facilities. The project area is outside the 100-year floodplain. The current offsite 100-year floodplain (910 ft MSL) is topographically disconnected from the site based on several peaks (922 ft MSL) along the north/west project boundary. As mentioned above, trends predict both state and local precipitation levels and intensities to increase. It is plausible that flood elevations could change as a result. Topography surrounding Chain Lake will likely impede any increased flood risk from impacting the project area. **Figure 3** outlines slopes greater than 18% and an offsite bluff adjacent to Chain Lake would impede a portion of the increased flood risk. Similarly, the National Wetlands Inventory identifies a PEM1A wetland adjacent to Chain Lake which should provide flood storage.

- b) Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

City of North Branch

The project is compatible with surrounding and planned future land uses as designated by the City of North Branch. The Meadow Ridge development project will comply with the zoning requirements required with plat approval. The proposed project has a gross density of 2.87 lots/acre, meeting the density requirements for the LUR-1 (1-4 dwelling units/acre) and LUR-2 (1-6 dwelling units/acre).

The project is also compatible with the City's Shoreline Management District. The site plan included in **Appendix A**, outlines the shoreland lots adherence to the City's setback requirements. Alteration of vegetation and topography within shoreland is regulated per City

Code Section 66-737, but vegetation alteration necessary for the construction of structures, sewage treatment systems, and roads is exempt (7).

As part of the Meadows Ridge development, both the watermain and sanitary sewer lines will be extended (**Appendix A**). **Question 12** addresses the ability of the existing infrastructure to handle the added water and waste loading.

Comprehensive Surface Water Management Plan

The project is aligned with the City's Comprehensive Surface Water Management Plan in the following ways:

- Runoff rates discharged will not exceed 0.05 cfs/acre.
- Drainage calculations will be submitted as part of development applications.
- Required easements will be established.
- Stormwater facilities will be designed using a 100-year critical event and design will consider the location of overflows that prevent property damage to adjacent properties from extreme water levels.
- The City requires developers to infiltrate stormwater runoff in areas where the risk to groundwater is minimal, land use is compatible, and soil is conducive to infiltration.
 - Per the Stormwater Management Plan, the stormwater ponds and infiltration basins are adequately sized for a 2.5-inch rainfall event. The proposed infiltration practices in the stormwater pond/infiltration basins will retain (and infiltrate the entire volume within 48 hours or less) more than the volume from 1.1 inches of runoff over all proposed impervious surfaces for the development (**Appendix B**).
- Plans for procedures for maintenance and funding will be submitted prior to approval of private infiltration basins.
- Pretreatment of stormwater runoff to Nationwide Urban Runoff Program (NURP) recommendations must be provided prior to discharge from the site and/or wetland/lake/stream.
- Use of phosphorous fertilizer in urban and residential uses is prohibited within the City unless being used for the establishment of a new lawn or a soil test indicates phosphorous is needed.
- Erosion control and grading plans will be submitted prior to the issuance of any grading or building permit for projects that disturb one acre of land or more. The preliminary grading and erosion control plan is included in **Appendix A**. Soil erosion will be prevented through the installation of erosion control practices in accordance with MPCA's best management practice handbook.

The City of North Branch Comprehensive Water System Plan

The Comprehensive Water Management Plan (dated December 18th, 2020) identifies the project area was within the Urban Service Area. The plan also identifies trunk water (20" watermain) and sanitary sewer lines present at the intersection of Flink Avenue and 400th Street North. Figure

8 of the Comprehensive Water System Plan shows a planned future 12” watermain along 400th Street and Flink Avenue. The preliminary site & utility plan included in **Appendix A** shows where the watermain and sanitary sewer lines are to be extended and stubbed at the property line/I-35 right of way. The 12” redundant loop extended under I-35 at the north edge of the property (approximately 2,600 feet north of 400th Street) to be looped with a future 20” watermain.

Sanitary Sewer Plan

The Comprehensive Sanitary Sewer Plan (dated January 2004) identifies the project area as located within the northwest major sanitary sewer district, specifically the NW-100 subdistrict. The NW-100 subdistrict has a total average subdistrict flow of 0.139 million gallons per day. The current sanitary sewer system extends to the intersection of Flink Avenue and 400th Street. The plan identified northwest area trunk sewer phase 3 as a trunk system improvement project anticipated in the next 20 years (2024). The preliminary site & utility plan included in **Appendix A** shows the sanitary sewer main stubbed along the western site boundary for future expansion currently outside the 20-year service area.

Wellhead Protection Plan

The Wellhead Protection Plan does not identify the project area as within the Drinking Water Supply Management Area or the composite 10-year wellhead protection area.

Chisago County

This portion of the project area also meets the shoreland definition in the Chisago County Shoreland Management Ordinance, located within 1,000-ft of a DNR Public Water (13-63-02 P (Chain (South Portion))). Similar to the City’s shoreland requirements, the County ordinance regulates the size/shape of lots, use/location of structures, installation/maintenance of water supply and sewage treatment systems, grading/filling, cutting of vegetation, and subdivision. The project will be in compliance with the terms of the County’s Shoreland Management Ordinance. Where the conditions imposed by the City or County differ, the more restrictive standard or requirements shall prevail.

Chisago County Transportation Plan

The Chisago County Transportation Plan outlines transportation issues and opportunities (Figure 2-11). The project area is identified within a ‘State Aid City’ (North Branch) and is northeast of the intersection between Interstate 35 and 400th Street which is identified with, “interchange or overpass need” (48). The review of existing conditions included reviewing Chisago County’s historical population trends. Notably the County’s population has doubled since 1980, the population primarily consisted of age cohorts between 5-19 and 40-54, and the average travel time to work was 32 minutes.

The plan update also included a review of current traffic volumes and patterns on major roadways within the county. The majority of the roadways currently exhibiting congestion or

approaching congestion were located on trunk highways, specifically TH 95, 61, and 8.

Appendix K and **Question 20** outline SRF's traffic study. **Question 20** also outlines additional alternate transportation methods.

Chisago County also has two primary regional trails, the Swedish Immigrant Trail and Sunrise Prairie Trail. "Currently the Sunrise Prairie Trail offers 24 miles of paved multi-use trails within the County, connecting the Cities of Wyoming and North Branch. The Swedish Immigrant Trail is planned as a 20-mile, multi-use trail that will connect the Cities of Wyoming and Taylor Falls" (48).

Lower St. Croix Watershed

The local priorities/concerns identified in the plan include:

- Sensitive and relative pristine natural areas including lakes, wetlands, uplands, and riparian areas exist in the watershed and need protection.
- Reducing non-point source pollution from agricultural areas is critical to improving conditions in local water resources and the St. Croix River.
- Standards and requirements are needed for development and redevelopment to reduce the impact on natural resources.

The Meadows Ridge development is aligned with the Lower St. Croix Watershed Management Plan as no 'sensitive' or 'pristine natural areas' will be impacted. Similarly, the development will include a stormwater management plan and the nearby waters will be receiving less non-point source pollution (**Appendix B**). Finally, the development will adhere to local and federal requirements for redevelopment.

- c) Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.

The proposed plan abides by the City's Shoreland Management District setback requirements, no structures are to be placed within the 100-year floodplain of Chain Lake. The proposer has also designed the shoreland lots to maximize open space. To minimize the effects of development on adjacent properties, the commercial portion of the site is intentionally located at the intersection of Flink Avenue and 400th Street.

11. Geology, Soils, and Topography/Landforms:

- a) Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

The surficial geology within the project area is identified as sand facies on the Chisago County Geologic Atlas (**Figure 9**) (8). Similarly, the Chisago County Geologic Atlas identified the bedrock geology as Eau Claire Formation (Middle to Late Cambrian) (**Figure 10**). The estimated depth to bedrock within the project area ranges from 100 to 150 feet below the surface. The bedrock topographic contour was 800 ft MSL.

Surficial Geology

- The “Qbs” quaternary map unit is described as, “very fine- to medium-grained sand; silty in places; scattered lenses of silt to silty clay occur at depth, mainly at the base. Pattern indicates where the fine-grained sand of the New Brighton formation (unit Qbs) covers stream-deposited sand, gravelly sand, and gravel of the New Ulm Formation (unit Qno) by less than 15 feet (5 meters). Gravelly sand occurs locally near the surface, especially where adjacent to glacial or fluvial sediment, and at depth in places. Following drainage of glacial Lake Anoka, the surface became pitted primarily due to melting of buried stagnant ice. The upper few feet (1 meter) of sand has commonly been reworked by wind” (8).

Bedrock Geology

- The formation is composed of “yellowish-gray to pale olive-gray, fine- to very fine-grained, feldspathic sandstone, siltstone, and shale. White and brown linguliform brachiopod shells are common. The Eau Claire Formation gradually coarsens to the north across Chisago County, and as a result is composed dominantly of very fine- to fine-grained sandstone in the northern one-half of the County. The formation ranges from 60 to 90 feet (18 to 27 meters) in thickness, except where it pinches out in unconformable contact against knobs of Keweenaw basalt near Taylors Falls. The contact with the Mt. Simon Sandstone is conformable” (9).

Sinkholes and karst lands are not commonly found in Chisago County. The Minnesota Department of Natural Resources (DNR), Karst Feature Inventory, does not identify either anywhere near the project area. Based on the Chisago County Geologic Atlas it is not anticipated the proposed project will have any environmental effects on the geological features of the project area (9).

- b) Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.

The project area includes primarily fine sand with lesser amounts of loamy fine sand. The site is primarily flat with steeper slopes along the road ditches (**Figure 3**). The United States

Department of Agriculture (USDA) Natural Resources Conservation Service’s (NRCS) Web Soil Survey shows three soil mapping units within the project area (**Table 9** and **Figure 11**). The primary hydrologic soil group mapped within the project area is Group A. “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” (10). Group A soils have 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. The soil borings primarily show Group B soils present onsite. Group B soils are characterized by having a moderate infiltration rate when thoroughly wet and have a moderate rate of water transmission (10.) The Stormwater Management Plan, included in **Appendix B**, uses Group B soils for stormwater modeling.

- *Note: “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” (10). Drainage tile is not known to be present onsite.*

Table 9. Soils Mapped within the Project Area

Symbol	Map unit name	% of Area	% Hydric	Hydric Category	Hydrologic Soil Group	Farmland Classification
158B	Zimmerman fine sand, 1 to 6 percent slopes	69.60%	2%	Predominantly Non-Hydric	Group A	Not Prime Farmland
158C	Zimmerman fine sand, 6 to 12 percent slopes	2.50%	4%	Predominantly Non-Hydric	Group A	Not Prime Farmland
162	Lino loamy fine sand	28.00%	3%	Predominantly Non-Hydric	Group A/D	Farmland of Statewide Importance

Soil borings were drilled on December 28th, 2023. Geotechnical material descriptions for the 21-foot boreholes are included in **Appendix E**. Topography onsite is primarily flat, peaks at 926 ft MSL, and is lowest along the western project boundary (912 ft MSL). Based on the Digital Elevation Model (DEM), narrow bands of $\geq 18\%$ slopes are present along Flink Avenue (**Figure 3**). No bluffs are within the project boundaries. According to the Minnesota Hydrogeology Atlas, within the majority of the project area the groundwater is within 0 to 10 feet of the soil surface (**Figure 12**) (9). The Phase 1 Environmental Assessment sites, “the regional groundwater gradient in the vicinity of the project area is southeast towards the North Branch of the Sunrise River with a depth to groundwater approximately 5 to 15 feet bgs” (below ground surface) (**Appendix F**).

Based on the mapped soil types and topography onsite there are several limitations for dwellings with/without basements, lawns/landscaping, local roads/streets, and small commercial buildings. Dwellings (“single-family homes with three stories or less” as described by Web Soil Survey

(10)) with/without basements are very limited based on the depth to the saturated zone on 28% of the site. Similarly, dwellings are somewhat limited on 2.5% of the site due to slope and the depth to saturated zone. The development will also include small commercial buildings, (“structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper” (10)). The commercial development is planned for the southeast corner of the project area where Flink Avenue and 400th Street intersect. Within the southeast corner, 52.3% is very limited for commercial buildings due to the depth to saturated zone and 47.7% is somewhat limited due to slope and depth to saturated zone (**Appendix G**). Soil corrections for the commercial site will be completed with the future commercial construction. Please note that this is a concept plan and does not necessarily reflect the final commercial layout.

To address the limitations of the soils regarding structures, the project area will be mass graded, and all homes will have the required separation from the water table. Similarly, the commercial lot is relatively flat and the groundwater was not encountered during soil borings in the southeast corner. Similarly, nearby wells have a static water level elevation (878-910 ft MSL) at least ten feet below the elevations present in the southeast corner (922-926 ft MSL).

The ability to establish and maintain lawns/landscaping is somewhat limited on 72% of the site due to the sandy, droughty, permeable soils, depth to saturated zone, and slope. A smaller portion of the project area (28%) is very limited. Per the preliminary landscaping plan, the soils will be prepared for landscaping (de-compacted and tilled) and once planted, a water scheduling will be implemented (**Appendix A**).

Several local roads and streets are planned as part of the development. Web soil survey describes local roads/streets as having, “all-weather surface and carry automobile and light truck traffic all year” and the ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. Much of the site (69.6%) is not limited while 28% is very limited due to the depth to saturated zone and frost action (10).

The grading area is anticipated to be 115± acres and the project engineer estimated that 350,000 cubic yards of soil will be graded for the development of roads, building pads, stormwater features, and commercial buildings. Due to the fact more than one acre of land will be disturbed, the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) General Permit will need to be granted by the Minnesota Pollution Control Agency (MPCA) prior to initiation of earthwork. The proposer will then be required to implement best management practices (BMPs) to reduce erosion and sedimentation and stabilize exposed soils after construction (**Question 12**).

12. Water Resources:

-
- a) Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

- i) Surface water – lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Surface Waters

No permanent surface waters (lakes, streams, or wetlands) are present within the project area. The 2021 no wetland determination was approved by Chisago County Environmental Services (Local Government Unit) on October 27th, 2021 (**Appendix C**). There are no County ditches within 8,000 ft or judicial ditches within 10,000 ft of the project area. Chain Lake (Public Water Basin (13-063P)) is within 1,000ft of the site and the northwest corner of the project area is within shoreland. **Table 10** outlines all Minnesota Department of Natural Resources (MnDNR) Public Water Basins, Wetlands, and Watercourses within one mile of the project area.

Table 10. DNR Public Waters within One Mile of the Site

Waterway	Public Water ID	Type	Distance
13-63-01 P	Chain (North Portion)	Public Water Basin	4,000-ft
13-63-02 P	Chain (South Portion)	Public Water Basin	350-ft
13-126 W	Unnamed	Public Water Wetland	2,500-ft
13-147 W	Unnamed	Public Water Wetland	2,200-ft
13-148 W	Unnamed	Public Water Wetland	850-ft
30-17 P	Grass	Public Water Basin	5,250-ft
13-66 P	Mud Lake	Public Water Basin	4,500-ft
M-050-034-002	Sunrise River, North Branch	Public Watercourse	4,750-ft

No Federal Emergency Management Area (FEMA) floodplain is within the project area boundary. No trout streams/lakes are present within or near the project area. No wildlife lakes (shallow lakes designated as high-value wildlife habitat) have been identified by the MnDNR within or near the project area. Similarly, the MnDNR has not identified any Migratory Waterfowl Feeding and Resting Areas within or near the project area.

Impaired Waters

As required by the Clean Water Act, the Minnesota Pollution Control Agency (MPCA) assesses all waters of the state and creates a list of impaired waters every two years. This list includes waters that fail to meet water quality standards and uphold that water body's designated use. Both the 2022 and drafted 2024 list designate the Sunrise River, North Branch as impaired and within one mile of the project area. Similarly, Beaver Creek (County Ditch 3) is impaired and within 8,600 ft of the project area (**Table 11**).

Table 11. Impaired Waters Near the Project Area.

Within One Mile				
Water Body Name	Assessment Unit Identified (AUID)	Affected Designated Use	Pollutant or Stressor	Total Maximum Daily Load (TMDL) ID
Sunrise River, North Branch	07030005-797	Aquatic Life	Fish bioassessments	Impaired and a TMDL study is required ¹
Within Two Miles				
Beaver Creek (County Ditch 3)	07030005-546	Aquatic Life	Benthic macroinvertebrates bioassessments	Impaired and a TMDL study is required ¹

¹ TMDL studies were not required or connected to the proposed development

- ii) Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

There are no known springs, seeps, or karst features present within the project area.

Depth to Groundwater

Based on the Minnesota Hydrogeologic Atlas, the water table is primarily within 10 feet of the surface, along the northern project area boundary, the water table is within 10-20 feet (9). The Minnesota Well Index documents the nearby wells (within 1 mile) have static water level elevations between 876 ft MSL and 912 ft MSL. The majority are within the QBAA (Quat. buried artes.) aquifer, QWTA (Quat. Water Table) aquifer, and CEMS (Eau Claire-Mt.Simon) aquifer (11). The majority of the 21-foot geotechnical borings taken on December 28th, 2023 did not encounter groundwater, boring number “SB-6” found the water table at 10 feet below the ground surface (bgs) and boring “SB-7” identified it at 12.5 feet bgs (**Appendix E**). The Phase 1 Environmental Assessment sites, “the regional groundwater gradient in the vicinity of the project area is southeast towards the North Branch of the Sunrise River with a depth to groundwater approximately 5 to 15 feet bgs” (**Appendix F**).

Wellhead Protection Area

The project area is outside a Wellhead Protection Area developed by the Minnesota Department of Health. Wellhead Protection Areas are the surface and subsurface areas surrounding a public water supply well or well field in which contaminants are likely to flow towards the well or well field. They are managed to ensure a safe and reliable source of drinking water (12). The Lower St. Croix Comprehensive Watershed Management Plan showed the project area within a “Priority Location #1” for vulnerable groundwater in agricultural areas. The City of North Branch Wellhead Protection Plan does not identify the project area as within the Drinking Water Supply Management Area or the composite 10-year wellhead protection area.

Onsite/Nearby Wells

The Chisago County Well Index (developed by the Minnesota Department of Health and the U.S. Geological Survey) identified a total of 122 wells within one mile of the project boundary. Nine of the identified wells were unverified. **Table 12** lists the fifteen wells identified within 500 feet of the project boundary. One unverified well was identified within the project area.

Table 12. Wells Identified Within 500 feet of the Project Boundary

Well #	Surface Elevation (ft msl)	Depth (ft)	Casing Depth (ft)	Static Water Level Elevation (ft msl)	Depth to Bedrock (ft)	Aquifer
692370	917.00	80.00	77.00	897.00	N/A	QBAA
565210	925.00	61.00	57.00	905.00	N/A	QBAA
455695	925.00	80.00	76.00	890.00	N/A	QWTA
691744	912.00	70.00	70.00	889.00	N/A	QBAA
697883	917.00	80.00	77.00	897.00	N/A	QBAA
684572	917.00	80.00	77.00	897.00	N/A	QBAA
692371	917.00	80.00	77.00	897.00	N/A	QBAA
663163	918.00	96.00	86.00	878.00	N/A	QBAA
629937	918.00	74.00	71.00	888.00	N/A	QBAA
680422	915.00	70.00	60.00	890.00	N/A	QWTA
674153	919.00	80.00	76.00	889.00	N/A	QWTA
660974	918.00	72.00	69.00	882.00	N/A	QBAA
626904	917.00	80.00	70.00	882.00	N/A	QBAA
670299	925.00	70.00	60.00	910.00	N/A	QBAA
688025	Unknown ¹	86.00	76.00	Unknown ¹	Unknown ¹	Unknown ¹

¹Unverified well

- iii) Wastewater – For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.
- (1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

North Branch's sanitary sewer system totals 40 miles, ranges from 8 to 30 inches in diameter, and contains twelve wet well lift stations. These wet well lift stations collect and pump wastewater but most importantly, control the capacity of the existing system along with the City's wastewater treatment plant. The treatment plant currently has the capacity for 0.815 million gallons per day (mgd) and a current rate of 0.420 mgd.

Per North Branch's 2004 Comprehensive Sanitary Sewer Plan, the project area is located within the northwest major sanitary sewer district, specifically the NW-100 subdistrict. The plan lists the ultimate wastewater flow projection for the northwest district of an average 0.752 mgd and a peak flow of 2.48 mgd. The gross developable acreage in each subdistrict was converted to a net

developable acreage for calculating wastewater flow. For example, the single-family residential zone is based on a three unit per net acre (based on the minimum lot size but not including actual gross acreage when considering roads, parks, etc.). The flows are based on the ultimate developed conditions for the City of North Branch, which shows the project area as “LU1-Single-Family” (13).

The current sanitary sewer system extends to the intersection of Flink Avenue and 400th Street. To meet the demands of the residential/commercial development the system is to be extended onsite. This is in alignment with North Branch’s Comprehensive Plan policy 1.1.1, “implement the expansion of the trunk watermain system within the urban service area through orderly development” (1). Wastewater is expected to be of typical domestic strength and character so, pretreatment is not required.

- (2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.

Wastewater will not discharge to a subsurface sewage treatment (septic) system. No known septic systems are within the project area based on the current/historic land use.

- (3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.

As previously mentioned, the City’s wastewater treatment plant discharges to the North Branch of the Sunrise River. The treatment plant currently has a capacity for 0.815 million gallons per day and a current rate of 0.420 mgd. The average daily wastewater flow is the total annual volume of wastewater collected within the City of North Branch and pumped to the wastewater treatment plant divided by 365 days, see current and projected totals in **Table 13** (1). The plant utilizes activated sludge extended aeration with aerated ash holding tanks and sludge storage tanks to remove pollutants before discharging to the North Branch of the Sunrise River. The effluent phosphorus limit is 1mg/L and the effluent is disinfected before discharging to the river.

Table 13. Current & Projected Wastewater Flows Pumped to the North Branch Wastewater Treatment Plant

Timeline	Flows (million gallons/day)
Current	0.30
2025	0.60
2035	1.10

- iv) Stormwater – Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.

Pre-Construction Site Runoff

All soils mapped onsite are predominantly non-hydric, well drained, and highly permeable allowing the majority of precipitation received to infiltrate (10). **Table 14** outlines several factors indicating the susceptibility of the soils to erosion. For example, the K Factor measures the susceptibility to sheet/rill erosion and ranges from 0.02 to 0.69, with the higher values indicating more susceptibility. Similarly, the Wind Erodibility Group categorizes soils in cultivated areas susceptible to wind erosion. Group 1 is most susceptible, and group 8 is least susceptible. The T Factor combines both erosion caused by wind and water and estimates the maximum average annual rate (tons/acre/year) that can occur without affecting crop productivity. Runoff currently drains to Chain Lake and likely contains pollutants like sediment, pesticides, fertilizers, and other nutrients due to the current agricultural operation.

Table 14. Soil Factors Effecting Erosion

Map Unit	% of Project Area	K Factor (0.02-0.69)	T Factor (Tons/Acre/ Year)	Wind Erodibility Group (1-8)
Zimmerman fine sand, 1-6% slopes	69.6%	0.1	5	1
Zimmerman fine sand, 6-12% slopes	2.5%	0.1		1
Lino Loamy fine sand	28.0%	0.24		2

Construction Site Runoff

During construction, compliance with the approved Stormwater Management Plan and the National Pollutant Discharge Elimination System (NPDES) permit will minimize adverse impacts on Chain Lake and other receiving waters. Temporary BMPs such as bio-rolls, inlet protection, erosion control blankets, dust control, sweeping and rock construction entrance will be utilized during the construction phase. Disturbed areas will be tilled, seeded and mulched or sodded after construction is complete.

Post-Construction Site Runoff

The project would increase the amount of impervious surface and the volume of stormwater within the project area. Based on the current site plan, the roads, residential homes, commercial buildings (ghost plan accounts for 2.92 acres of impervious surface), and trails will account for approximately 41.25 acres of impervious surface (**Appendix A**). Post-development stormwater runoff will be typical of a suburban development. The site will be graded to promote surface water drainage and to maximize the runoff that is treated before leaving the site.

Per the North Branch City Code, the Stormwater Management Plan must outline “all stormwater management facilities necessary to manage increased runoff so that the two-year, ten-year, and 100-year storm peak discharge rates existing before the proposed development shall not be increased and accelerated channel erosion will not occur as a result of the proposed land disturbing or development activities” (7). Stormwater from the residential and commercial development will be directed to two stormwater ponds (one of which will have an infiltration bench) and two infiltration basins. These structures will control the rate of stormwater runoff discharged to comply with local and state requirements.

“In terms of current Minnesota climate trends and anticipated climate change, 20 years ago the urban storm sewer pipe design recommended by the MnDOT on County State Aid Highways for cities the size of North Branch was a 3.5-inch rainfall. Intensities appear to be increasing and construction costs are increasing faster than material costs, the recommended design is for the pipe to handle a 10-year storm while ensuring the overflow spillways routes prevent damage for larger storms” (1). The City’s Comprehensive Plan cites stormwater retention basins (storm ponds) as one of the best methods to mitigating the effects of increased stormwater on downstream systems (1).

Moreover, because of the current Minnesota climate trends, the water quality regulations for stormwater are ever changing. The City's Comprehensive Plan states, per the "Construction Stormwater Permit, municipalities and developers are required to reduce the runoff volume from new construction sites by removing the first 1-inch of runoff. To accomplish this, each new construction site having more than 1-acre of new impervious surface must take all appropriate measures to reduce the additional runoff volume created by the proposed new impervious surfaces" (1). The City of North Branch requires the water quality standards to meet the Nationwide Urban Runoff Program (NURP) requirements before discharging from the site.

The most recent Stormwater Management Plan prepared by Carlson McCain is included in **Appendix B** (dated September 23rd, 2024).

- The NURP recommendations for the design of stormwater treatment basins are being met.
- The NPDES design requirements for the design of Wet Sedimentation Basins are also being met.
- The stormwater ponds have been sized to have a permanent pool volume greater than or equal to the inflow volume from a 2.5-inch rainfall event.
- The ponds are all between 4 and 10 feet in depth from the NWL to bottom.
- The City of North Branch EOF separation requirements are being met.
- The ponds are designed with a 10' safety bench at the NWL and slopes above the NWL are 4:1 maximum.
- The outlets are positioned to prevent short-circuiting from the storm sewer inlets.
- The live storage is provided for water quality volume.
- The water quality volume discharge is less than 5.66 cfs per acre of the ponds surface area.
- Maintenance access paths to the ponds are provided.
- The proposed infiltration practices will retain (and infiltrate the entire volume within 48 hours or less) more than the volume from 1.1 inches of runoff over all proposed impervious surfaces for the housing development and concept commercial outlot.

The majority of the site is being directed to the west discharge point (Chain Lake). Chain Lake is a MnDNR Public Water. Discharging stormwater to a Public Water may require a Public Water Work Permit. The remaining runoff flows as follows:

- The runoff to the north flows to the low landlocked basins between the proposed development and existing homes.
- The runoff to the east flows to Interstate I-35.
- The discharge to the southeast flows to an existing landlocked low spot on an acreage lot.

- v) Water appropriation – Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required

expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.

City trunk water (20" watermain) and sewer lines are currently present at the intersection of Flink Avenue and 400th Street North and are anticipated to be extended for the development. Planned future 12" watermain crossing I-35 at the north end of the proposed development south of 406th Street. The 12" trunk watermain crossing of I-35 is shown in Figure 8 of the Comprehensive Water System Plan. This crossing will provide redundant transmission under I-35 in the event of a watermain break at one of the other crossings. The North Branch Comprehensive Plan outlines the City's commitment to significant investment in its existing public utilities systems. The plan states, "in general the existing infrastructure system is well-positioned and of adequate size to support expansion" (1).

The Comprehensive Water System Plan (dated December 18th, 2020) states the existing water supply system consists of six wells, two water treatment plants (WTP), one ground reservoir at WTP #2, and three water towers. The system has one million gallons of elevated storage capacity and one million gallons of ground storage capacity, for a total system storage of two million gallons. More specifically, "the existing area with water service is approximately 1,610 acres and consists of ductile iron and C900 polyvinyl chloride (PVC) watermains ranging in size from 4-inch to 20-inch diameter. From 2015 to 2019, the water demand was 510,000 gpd on an average day and 905,000 gpd on a peak day" (45). The urban service area delineates gross developable acres in terms of those that are most likely to develop and when development is anticipated. The urban service area is divided by development expected to occur in 0-20 years and development expected to occur in 20+ years and by residential and non-residential. The site is located within the urban service area and within the area expected to develop in 0-20 years.

The City of North Branch has six municipal water supply wells that pump water from the Mount Simon – Fond du Lac, Mount Simon – Hinckley, Quaternary, and Middle Proterozoic aquifers (**Table 15**). The total capacity of the six North Branch "wells is approximately 3,850 gpm. The firm capacity of the six wells, with the largest (Well #5) out of service, is approximately 1,850 gpm. The firm capacity decreases to 1,450 gpm in the summer when Well #6 is dedicated to golf course irrigation" (45). Wells number 1, 2, and 6 are treated for iron and manganese removal at Water Treatment Plant (WTP) 1, "which includes chemical application of chlorine for disinfection and fluoride for dental prophylaxis" (45). Wells number 3, 4, and 5 are treated for iron and manganese removal at WTP 2 which includes chemical application of chlorine for disinfection, fluoride for dental prophylaxis, and orthophosphate to sequester iron and manganese.

Table 15. Existing Wells Serving the City of North Branch

Well #	Unique Well ID	Year Constructed	Aquifer	Depth (ft.)	Capacity (gpm)	To WTP
1	217922	1947	Mt. Simon – Fond du Lac	762	300	1
2	112244	1978	Mt. Simon – Fond du Lac	360	200	1
3	522767	1993	Mt. Simon – Hinckley	304	550	2
4	706844	2004	Quaternary	240	400	2
5	749383	2007	Mt. Simon – Hinckley	467	2,000	2
6	593584	1999/2008	Mid. Proterozoic	410	400	1

“The population served has increased about eight percent (8%) in the past five years” driven by recent development which is anticipated to continue (45). **Table 16** outlines North Branch’s annual water demand according to residential, non-residential, water supplier, and total water usage (sales) data from 2013 to 2019. “Historically from 2015 to 2019, the total per capita water use was 70 gallons per capita per day (gpcd)” (45). “The average day water demand from 2015 to 2019 was 510,000 gallons per day (gpd), and the maximum day demand was 905,000 gpd” (45). “A peak day to average day demand ratio of 1.8 was used based on historical water use data from 2015 to 2019. The projected average water demand is 0.61 million gallons per day (MGD) in 2030 and 0.68 MGD in 2040. These estimates include future industrial users and some existing areas that are presently on individual wells joining the water system” (45).

Table 17 outlines North Branch’s usage (sales), volume pumped, percent unaccounted, average day demand, maximum day demand, and total per capita demand during the same time period (2013-2019).

Table 16. Historic Water Demand by Use

Year	Population Served	Connections	Residential Use ¹	Non-Residential Use ¹	Water Supplier Use ¹	Total Use ¹
2013	6,819	1,843	119.7	46.5	0.0	166.3
2014	6,934	1,874	113.3	43.5	0.0	156.8
2015	7,019	1,897	99.9	54.1	4.0	158.0
2016	7,148	1,932	99.1	54.2	6.0	159.3
2017	7,256	1,961	100.2	52.6	6.0	158.9
2018	7,400	2,000	101.7	52.8	6.0	160.5
2019	7,520	2,055	98.4	59.2	2.3	159.9
Average 2015-2019	N/A	N/A	99.9	54.6	4.9	159.3

¹ Residential, non-residential, water supplier, and total use reported in million gallons.

Table 17. Historic Water Demand

Year	Total Use¹	Water Pumped¹	Percent Unaccounted	Average Demand²	Maximum Demand²	Total Per Capita Demand³
2013	166.3	183.1	9%	0.502	1.257	74
2014	156.8	194.0	19%	0.532	1.584	77
2015	158.0	184.9	15%	0.507	0.943	72
2016	159.3	190.1	16%	0.521	0.895	73
2017	158.9	192.7	18%	0.528	1.074	73
2018	160.5	182.3	12%	0.499	0.796	67
2019	159.9	181.6	12%	0.497	0.817	66
Average 2015-2019	159.3	186.3	14%	0.510	0.905	70

¹ Million of gallons² Million of gallons per day³ Gallons per capita per day

Chapter 7 of the North Branch Comprehensive Plan Update also included average well withdrawal rates and pumpage as well as projected average water demand estimates (1).

Table 18. City of North Branch Water Appropriation

Well #	Average Annual % of Withdrawal	Projected Well Pumpage Based on % (gal/yr)
1	36.0%	105,372,000
2	8.6%	25,172,200
3	30.7%	89,858,900
4	23.5%	68,784,500
5	1.2%	3,512,400
6	0.0%	0
Projected Average Water Demand		
10 Years		1.9 mg/d
20 Years		3.3 mg/d
40 Years		7.2 mg/d
Current Treatment Capacity		3,500 g/m
Storage Capacity		2,000,000 gallons
Average Residential Customer Use (2016)		4220 gallons/month

The development will require a Minnesota Department of Natural Resources water appropriation permit for temporary dewatering and groundwater appropriation if withdrawal exceeds 10,000 gallons/day or 1 million gallons/year. The extent/duration of dewatering needs is not known at this time. Due to the lack of surface water features onsite and topography, it is not anticipated that dewatering will continue long enough to affect nearby domestic water wells. Climate change trends may result in local and regional surface/groundwater interactions that create long-term uncertainty related to surface water and groundwater levels, availability, quality, and quantity. While the City and the NWBL have taken measures to quantify historic and future water needs,

if climate trends were to suddenly change the water availability, the City would be able to impose contingency plans for diminished water supply in the appropriations permit.

The Minnesota Well Index identified one unverified well within the project area boundaries. If there is a well within the project area, it will be sealed and abandoned in compliance with the Minnesota Department of Health regulations prior to development.

vi) Surface Waters

- (1) Wetlands – Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

A site assessment for wetlands was conducted in September 2021 by Anderson Engineering of Minnesota, LLC to determine if wetlands were present throughout the project area. Based on an offsite hydrology analysis and field verification, wetland hydrology was not present and therefore no area met the wetland criteria outlined by the United States Army Corps of Engineers 1987 Wetland Delineation Manual. The Minnesota Wetland Conservation Act (WCA) Local Government Unit (LGU), Chisago County, concurred with a no-loss decision on October 27th, 2021. A representative from Kjolhaug Environmental Services followed up with the LGU to confirm the no-loss decision included concurrence on the no-wetland determination. The email correspondence and the Notice of Decision are included in **Appendix C**.

This is consistent with the MnDNR's Wetlands Inventory which does not identify any wetlands within the project area. Similarly, the United States Department of Agriculture's soil survey does not include any mapped hydric soils within the project area. Finally, the National Hydrography Database does not identify any surface waters within the project area.

- (2) Other Surface Waters – Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate

environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The proposed project is not expected to affect any surface water features such as lakes, streams, ponds, intermittent channels, or County/judicial ditches. Best management practices will be utilized to avoid and minimize sedimentation to offsite waterbodies. The proposed project is not anticipated to change the number or type of watercraft on any local waterbodies.

13. Contamination/Hazardous Materials/Wastes:

- a) Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

A Phase 1 Environmental Site Assessment was completed by American Engineering Testing for both parcels (Koehnen 80-acre parcel and the Rehbein 40-acre parcel) in June 2022. The assessment revealed no evidence of recognized environmental conditions (REC) or controlled recognized environmental conditions (CRECs) in connection with the sites. The current configuration of the project area has been present since at least 1938 (**Appendix F**). **Table 19** outlines the database searched for environmental records as part of the Phase 1 assessment. The properties identified are not likely to have an impact on the site as they are primarily located cross or down groundwater gradient and/or sufficiently distant from the project area, except for Chain Lake Preserve. The Minnesota Pollution Control Agency identified Chain Lake Preserve under the “Agency Interests” based on its “subject to environmental regulators” and “environmental interest associated with construction stormwater”. Ultimately it was determined that “due to the distance and lack of groundwater contamination, AET does not consider the construction storm water in association with the Chain Lake Preserve a suspect REC in connection with the site” (**Appendix F**).

Table 19. Phase 1 Standard Environmental Record Sources for Surrounding Properties

Regulatory Database	Search Distance (miles)	Federal	State/Tribal Equivalent
National Priority List (NPL) (federal Superfund)	1.0	0	0
NPL (Delisted)	0.5	0	0
Comprehensive Environmental Response, Compensation, Liability Information System (CERCLIS)	0.5	0	0
CERCLIS- No Further Remedial Action Planned (NFRAP)	0.5	0	N/A ¹
Resource Conservation Recovery Act (RCRA) Corrective Actions Information Systems (CORRACTS)	1.0	0	N/A ¹
RCRA- Transportation Storage and Disposal Inventory (TSD)	0.5	0	N/A ¹
RCRA Generators	Adjoining Properties	0	N/A ¹
Landfill/Solid Waste Disposal Site	0.5	N/A ¹	0
Registered Leaking Storage Tanks	0.5	N/A ¹	1
Registered Storage Tanks	Adjoining Properties	N/A ¹	1
Voluntary Cleanup Sites	0.5	N/A ¹	0
Brownfields Site	0.5	0	0

¹ Not applicable- this database is not included in the ASTM standard

The Phase 1 Environmental Assessment also included a historical use analysis to determine whether hazardous substances or petroleum products have been used at the site/adjoining properties and potentially introduced to the subsurface. No petroleum pipelines were found to be extending through or adjoining the site. There is no documented groundwater contamination associated with a superfund site in the vicinity. During site reconnaissance no evidence of indiscriminate dumping or solid waste disposal was observed.

The Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Agriculture (MDA) “What’s in My Neighborhood” (WIMN) map identifies active hazardous waste generators and sources of agricultural chemical soil/groundwater contamination. **Table 20** and **Figure 16** summarize MPCA potentially contaminated sites within one-half mile of the project area (14). The MDA WIMN did not identify any records of potentially contaminated sites within one-half mile of the project area (15).

Table 20. Hazardous Waste Generators 0.5 Miles from the Project Area

Site ID	Name	Activities	MPCA ID	Status
125842	Environmental Stoneworks	Industrial Stormwater	MNR0537J3, MNR053BNG	Active
6431	Chain Lake Preserve	Construction Stormwater	C00005629	Active
228631	Meadows North 2nd Addition	Construction Stormwater	C000053081	Active
229768	2019 Flink Avenue Watermain & Sanitary Trunk Project	Construction Stormwater	C000053904	Active
194710	Bauer Residence	Petroleum Remediation, Leak Site	LS0015455	Active
227945	Cherokee Place	Construction Stormwater	C000052664	Active

- b) Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

Neither the construction process nor the development are anticipated to generate/store substantial hazardous waste. The construction phase will generate solid waste typical of a residential development. Construction contractors will be required to dispose of waste generated at the project area during construction. Contractors will be expected to minimize and mitigate adverse effects from solid waste generation and storage by recycling construction waste to the degree practicable. According to the Chisago County Comprehensive Plan, no municipal solid waste or industrial solid waste landfills are located within its boundaries for disposal of residential and commercial solid waste (16). The County is a member of East Central Solid Waste Commission (ECSWC) that operates a large municipal solid waste management facility (landfill with methane recovery) in Mora, Minnesota (17).

There are several private recycling facilities in Chisago County that process curbside recycling and/or problem materials (appliances, tires, electronics, and mattresses) that may be generated during the developments expected lifetime. In addition, there is a privately owned and operated construction and demolition landfill located just east of Rush City. Chisago County Integrated Solid Waste Management Master Plan aims to meet a statutory waste recycling rate of 35% (17).

The County imposes a waste management fee on every property that supports County efforts to promote recycling, reduce waste and protect soil and water against waste contamination. The County also operates a Household Hazardous Waste Facility in North Branch for residents to dispose of hazardous waste in an environmentally responsible way.

- c) Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

The construction phase may require temporary storage of fuel for equipment and will be in compliance with local and state regulations. The development is not anticipated to require substantial amounts of chemical/hazardous material storage. Petroleum tanks are not currently proposed as part of the development and there are no tanks currently located within the project area. If accidental spills/releases of hazardous materials occur during the construction or development phase, the Minnesota Duty Officer will be notified, and they will be cleaned up in accordance with local and state regulations.

- d) Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

The development will require fuel for construction equipment and construction materials consistent with a standard development (paint, stains, herbicides, pesticides, etc.) will be used. Again, spills are not anticipated to occur but if a substantial spill occurred, the Minnesota Duty Officer would be notified and cleanup will be in accordance with local and state regulations. Construction crews will be responsible for proper disposal of hazardous waste. After the project area is fully developed, individual homeowners would be responsible for management/disposal of hazardous waste.

14. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features):

-
- a) Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

According to the Minnesota Department of Natural Resources and the U.S. Forest Service's ecological classification system, the project area is within the Eastern Broadleaf Forest Province, the Minnesota and Northeast Iowa Morainal section, and the Anoka Sand Plain subsection (18).

Eastern Broadleaf Forest

- Covers nearly 12 million acres in Minnesota that separates the historical prairie and semi-humid mixed conifer-deciduous forests. In this portion of the state, precipitation approximately equals evapotranspiration.

Minnesota and Northeast Iowa Morainal Section

- A ‘long band’ of deciduous forest, woodland, and prairie within Minnesota.

Anoka Sand Plain Subsection

- Categorized by flat, sandy lake plain and terraces along the Mississippi River. The rolling topography is dominated by excessively well drained sandy soils (78%). The dominant vegetation pre-settlement included bur oak, northern pin oak, and jack pine. Today, urban development is rapidly expanding, and oak openings and oak barrens are becoming less common (20).

The project area is primarily row crops with small, wooded portions (**Figure 4**). The wildlife habitat has diminished due to historic cultivation and annual tillage. In 2023, both parcels were planted with soybeans. After harvest about 30% residue cover was present. The wooded portions were dominated by bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), white oak (*Quercus alba*), and Siberian elm (*Ulmus pumila*) trees with an understory of common buckthorn (*Rhamnus cathartica*), and prickly ash (*Zanthoxylum americanum*) shrubs. While no aquatic resources are onsite, offsite Chain Lake does provide habitat for fish. The surrounding cultivated fields and rural/low-density residential areas provide some wildlife habitat for deer, birds, and small mammals. The industrial and commercial areas nearby along with roads (I-35, Flink Avenue, and 400th Street) create limitations for wildlife habitat.

- b) Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-) and/or correspondence number (**MCE 2023-00942**) from which the data were obtained and attach the Natural Heritage Review letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

Utilizing the MnDNR’s *Minnesota Conservation Explorer* tool, a Natural Heritage Review was requested (21). A drafted NHIS letter was issued on December 14th, 2023. The final letter (MCE 2023-00942) was issued on March 6th, 2024 and is included as **Appendix H**. The automated results deemed no further review required for Ecological Significant Areas and State-Listed Species of Special Concern. Further review was required for State-Listed Endangered or Threatened Species and Federally Listed Species.

The final NHIS letter required a Blanding’s turtle avoidance plan given the potential take of a Blanding’s turtle. The state-listed threatened species has been “documented in the direct vicinity of the proposed project” and the MnDNR determined the project has the potential to impact this rare turtle through direct fatalities and habitat disturbances/destruction due to excavation, fill,

and other construction activities. Similarly, because all seven of Minnesota's bats, including the federally endangered northern long-eared bat, can be found throughout the state, the MnDNR recommended that tree removal be avoided during the active season to minimize impacts. The MnDNR recommends that tree removal be avoided from June 1st through August 15th. The northern long-eared bat is a federally regulated species, see discussion below.

Based on the comments from the NHIS letter, a review of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) was completed on December 29th, 2023 to identify federally listed species that have the potential to occur within the project area. The identified species on the IPaC generated letter are outlined in **Table 21 (Appendix I)**. No critical habitat was present within the project area (23).

Table 21. USFWS IPaC Listed Species

Common Name	Scientific Name	Status	Critical Habitat Present ²
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Endangered	No
Tricolored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	No
Whooping Crane	<i>Grus americana</i>	Experimental Population, Non-Essentl ¹	No
Salamander Mussel	<i>Simpsonaias ambrigua</i>	Proposed Endangered	No
Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	No

¹ For the purposes of consultation, non-essential experimental populations are treated as a proposed species on private land (no section 7(a)(2) requirements).

² The USFWS has not yet designated critical habitat for some of these species.

- c) Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

State-Listed Endangered or Threatened Species

- The blanding's turtle (*Emydoidea blandingii*) typically overwinter in deep marshes, ponds, and streams, and utilize seasonally flooded wetlands for basking and mating opportunities. Sparsely vegetated sandy uplands are utilized for nesting typically in May-July (22). There are no wetlands within the project area. Sparsely vegetated sandy uplands are present after cultivation and fall tillage have taken place prior to spring planting but this does not correspond to when the blanding turtles are typically nesting. It can be assumed the window of opportunity for the species to utilize the site is quite narrow (based on frequent disturbance associated with agriculture activities); therefore, no long-term adverse impacts to the species

are anticipated. Similarly, after development while much of the sparsely vegetated sandy soils will be planted with turf grass and other landscaping, the newly established storm ponds may provide some overwintering habitat.

Federally-Listed Species

- Northern Long-Eared Bat (*Myotis septentrionalis*)
 - Roost (singly or in colonies) underneath bark, in cavities, or in crevices of live/dead trees during the summer. The bats overwinter in caves and mines with consistent temperatures and high humidity (24). Currently there is limited roosting habitat in the small, forested sections. No caves or mines are present within the project area.
 - Based on the limited habitat pre-development, no long-term adverse effects are anticipated. This aligns with the determination from IPaC, “the Action is not likely to result in unauthorized take of the northern long-eared bat” (**Appendix I**).
- Tricolored Bat (*Perimyotis subflavus*) (25)
- Whooping Crane (*Grus americana*) (26)
- Salamander Mussel (*Simpsonaias ambrigua*) (27)
- Monarch Butterfly (*Danaus plexippus*) (28)
 - Utilizing the IPaC Minnesota-Wisconsin decision key, it was determined the project will have no effect (**Appendix I**)

- d) Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.

While there is limited habitat onsite, the northwest corner will be partially left as open space and is not included in the 115-acre grading area. Per North Branch City Code, no more than 50% of existing tree cover (trees of six-inch diameter or larger) may be removed without City council approval and each single-family home will be required to have one tree per dwelling (7). The MnDNR recommends that tree removal be avoided from June 1st through August 15th. The proposer will consider tree removal during the winter (November 15th to March 31st) to avoid impacts to the federally listed northern long-eared bat. The preliminary landscaping plan and tree preservation plan is included in **Appendix A**. The preliminary landscaping plan includes the intent to protect existing trees within the extent of the drip line and will be marked off by construction fencing. The preliminary plan also includes one or more native plant seed mixes consisting of a variety of grasses, sedges, and flowering forbs. The native mix will be companion seeded with a cover crop species to provide temporary cover and establishment. All non-native species/weeds shall be spot sprayed no less than three times a year with a herbicide by a licensed applicator for at least the first three years of establishment. Within the northwest corner, 1.02 acres of trees will be preserved and after the final phase, 796 trees will be provided (342 required). As required by the MnDNR, as Blanding’s turtle avoidance plan will be submitted to the MnDNR to avoid take and minimize disturbance to the species.

Turf grass and other ornamental landscape plants will create additional habitat for insects, birds, and small mammals. If rare/endangered species are identified during construction/operation of the development, it will be reported to the MnDNR Nongame Wildlife specialist.

15. Historic Properties:

- a) Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

A request for project review by the State Historic Preservation Office (SHPO) was submitted by Kjolhaug Environmental on December 11th, 2023 (SHPO #2024-0588). The Minnesota Department of Administration SHPO completed this request, the January 19th, 2024 letter is included in **Appendix J**. Based on the nature and location of the proposed project, a Phase 1 archaeological survey was recommended. The survey must meet the requirements of the Secretary of the Interior's Standards for identification and evaluation and should include an evaluation of National Register eligible properties that are identified.

In Situ Archaeological Consulting was contracted to complete the Phase 1 assessment, their February 2nd, 2024 report is included in **Appendix J**. This assessment included a literature review within a 1-mile study area surrounding the proposed project area utilizing previous inventory files maintained by Minnesota SHPO and Minnesota OSA. This revealed no previous cultural resource surveys and recorded archaeological sites within the project area boundaries. Two previously recorded archaeological resources within 1-mile of the project area were identified. Both sites (XX-ROD-00012 and XX-ROD-00019) were identified in relation to Trunk Highway 61 work and were not eligible for the National Register of Historic Places (NRHP).

In addition to the literature review, visual inspection and shovel testing was conducted on January 3rd, 2024. At the time of the survey, field conditions within the cultivated fields were not conducive to the pedestrian survey methods (ground visibility was under 25%). Due to the field conditions and project time constraints, the survey was not completed in the agricultural fields at this time and the pedestrian survey will take place in spring of 2024.

Approximately 3.2 acres of the project area were subject to shovel testing. No cultural materials were observed or recorded during the archaeological assessment. A total of 61 shovel test units were conducted during the survey, all of which were negative for cultural resources, see the report included in **Appendix J**.

The Phase 1 report requests a preliminary concurrence of *No Historic Properties Affected* within the current surveyed areas and clearance to proceed with the EAW submittal and approval for the proposed project. This concurrence and clearance will take place under the condition that the remainder of the survey area is subject to archaeological survey and that all of the survey areas and findings are documented in a final report to be submitted to SHPO at a later date.

In Situ Archaeological Consulting completed additional work in the spring of 2024 after the fields were tilled to achieve optimal residue cover. One newly recorded cultural resource was observed and recording during the subsequent site visit. In Situ concluded that, “due to the paucity of artifacts, the site is unlikely to yield any important information from the past, and the recordation of the site exhausts research potential” (**Appendix J**). In Situ recommends “a finding of *No Historic Properties Affected* for the proposed project. If the agencies agree with these findings, a recommendation of ‘no further work’ is considered appropriate,” see the full report included in **Appendix J**.

16. Visual:

- a) Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects. the brief project summary to be published in the EBQ Monitor, (approximately 50 words).

There are no designated scenic views or vistas within or near the project area. The project consists of a residential/commercial development with interior roads, stormwater ponds, trails, and open space. The project is not anticipated to produce any intense lights (glare) or include industries that would emit vapor plumes. The potential visual effects consist of removing trees in the current windbreak (removal shall not exceed more than 50% of existing cover, or as approved by the City Council (7). Substantial visual effects are not anticipated, mainly the transition from open agricultural land to residential development. Per the City’s landscaping requirement, at least one tree will be planted per dwelling (7). Tree plantings will distribute trees throughout the entire development to mitigate removal. The project area sits above Chain Lake and the northwest corner would serve as a viewpoint for the surrounding area and lake but it is densely wooded and thus much of the view is currently cut off. This relative highpoint will be maintained and the potential viewshed will be minimally altered.

17. Air

- a) Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project’s effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

The development is not anticipated to include any stationary source emissions from sources such as boilers or exhaust stacks. Hazardous air pollutants are not anticipated to be generated onsite post development. The residential homes included in the development will include natural gas heating and cooling systems. These systems may result in direct or indirect sources of stationary greenhouse gas emissions, see **Question 18**. The emissions produced will be in alignment with the planned future land use outlined in the City's Comprehensive Plan (**Figure 6**).

- b) Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Vehicle traffic contributes to an increase in carbon monoxide, carbon dioxide, nitrogen oxides, particulate matter, and ozone. No cities/townships in Chisago County are identified as carbon dioxide maintenance areas as defined by the U.S. Environmental Protection Agency (US EPA), exceeding the 1971 air quality standard for carbon monoxide (as of 12/31/2023) (29). Similarly, particulate matter does not exceed the 2012 National Ambient Air Quality Standards (NAAQS) (30), nitrogen dioxide does not exceed the 1971 NAAQS (31), or the 8-hour ozone 2015 NAAQS (32).

Based on the Minnesota Department of Transportation screening methodology, intersections with a total daily traffic volume exceeding 82,300 vehicles per day may result in air quality that exceeds the carbon monoxide standard. A traffic study was conducted by SRF Consulting, the March 15th, 2024 report is included in **Appendix K**. The existing traffic volumes at the intersections of Flink Avenue and 400th Street, 392nd Street, and MN-95 were assessed on February 21st, 2024 (**Table 22**). A trip generation estimate was developed for the weekday morning and evening peak hours using the *ITE Trip Generation Manual, 11th Edition*. The proposed development is expected to generate approximately 6,648 daily trips. It is not anticipated that the development will result in air quality that exceeds the carbon monoxide standard.

Table 22. Existing Roadway Characteristics

Roadway	Classification	General Configuration	Posted Speed Limit
Flink Avenue	Major Collector	4-lane divided/2-lane undivided	30/55 (mph)
400 th Street	Local Roadway	2-lane undivided	Unposted ¹
392 nd Street	Local Roadway	2-lane undivided	30 (mph)
MN-95	Minor Arterial	4-lane divided	45 (mph)

¹ Speed limit assumed to be 55-mph

- c) Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Dust and odor production during and post development will be on par with a typical residential/commercial development. Nearby sensitive receptors include the residential homes south, north, and southeast of the project area. During construction, temporary odor from gas machinery and fuel storage may occur but it is not expected to impact the quality of life for the nearby sensitive receptors. Dust production will be elevated during construction. Dust will be minimized by standard dust control methods (ex. wetting exposed soils). Disturbed areas will be tilled, seeded and mulched or sodded after construction is complete.

No dust/odors are expected to be produced after construction ends. The single-family residents will be subject to North Branch's City code section 66-942, requiring, "home occupants shall have no adverse impact to building aesthetics, traffic volume, noise, smoke, dust, odor or any other activity that adversely affects the health, safety and welfare or is detrimental to the residential nature of nearby properties" (7).

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

- a) GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.
- b) GHG Assessment
 - i) Describe any mitigation considered to reduce the project's GHG emissions.
 - ii) Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.
 - iii) Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

Two phases of the project need to be quantified, the construction phase and the homeowner annual operation phase. Greenhouse gases (GHGs) commonly include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), fluorinated gases (chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃)). The GHGs to be quantified include carbon dioxide, methane, and nitrous oxide. There are three types of emissions: Scope 1, 2, and 3. All estimated/projected GHG emissions are provided on an average lifetime (50-year) annualized basis using the CO₂ equivalent (CO₂eq).

Scope 1: Direct emissions released from the property.

Scope 2: Emissions associated with offsite generation of purchased electricity.

Scope 3: Emissions from offsite provision of waste management services.

Land-Use – Scope 1

There are emissions associated with the conversion of cultivated land. The U.S. Environmental Protection Agency’s report inventoried anthropogenic sources and sinks of greenhouse gas emissions and removals from 1990-2021 and was used to calculate the emissions due to land use changes (33). The exchange of CO₂ to and from the atmosphere is defined as a ‘flux’ where a negative value indicates carbon sequestration. The EPA’s report does not have readily available carbon sequestration rates for every land-use type. The sequestration rate of 2.6 metric tons of CO₂ per acre per year was based on rates for a forested community as a best-case scenario ‘high-end estimate’. These emissions were considered direct scope 1 emissions, see **Table 23**.

Table 23. Land Use Associated Emissions (Loss of Carbon Sequestration Potential)

Land Use	Area Pre-/Post-Development		Carbon Sequestration Pre-/Post-Development		Sequestration Potential Lost
	Acres		Metric tons CO ₂ /year		
Cropland	107.23	0.00	278.80	--	-278.80
Impervious Surface	4.95 ²	41.25 ³	--	--	--
Lawns/Landscaping	--	70.04 ⁴	--	182.62	--
Woodland	6.82	1.02	17.73	2.65	-15.08
Stormwater Pond	--	6.49	--	16.87	--
Totals	119.00	119.00		202.14	293.88
Annual Carbon Sequestration Potential Lost				91.74 tons of CO₂eq⁵	
Total Lifecycle Estimate¹				4,587 tons of CO₂eq¹	

¹ Lifecycle emissions were multiplied by the expected lifecycle (50-year)

² Represent the existing portions of Flink Avenue and 400th Street (Based on NLCD – **Figure 4**)

³ Based on estimates of final impervious surface (includes 2.92 acres from commercial ghost plan).

⁴ Lawns/Landscaping estimate = 119.00 – 41.25 – 6.49 – 1.02

⁵ Annual carbon sequestration potential lost (91.74) = 293.88 – 202.14

Construction Emissions – Scope 1

GHGs emitted during the construction phase are primarily from mobile equipment (passenger cars, trucks, and construction equipment). The U.S. EPA’s Emission Factors for GHG inventories (Tables 2, 3, and 4; last modified February 13th, 2024) was used to calculate emissions from ‘mobile sources’ during the construction phase. It was assumed the construction would last for approximately 150 working days (30, 5-day weeks). Vehicles were estimated to travel at least 30 miles per day. Emissions were multiplied by the expected construction period of four years and divided by the project timeline (50 years) to get annualized emissions.

Contributions to GHGs from on-road vehicles (commuting construction workers, dump trucks, semi-trucks) were based on estimated vehicle year, fuel usage, and miles traveled. Average mile per gallon values selected based off the EPA’s Center for Climate Leadership, Simplified GHG Emission Calculator (from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2020 (November 2022)) for gasoline powered passenger vehicles and diesel powered dump/semi-trucks (35). Emission factors for gasoline powered passenger vehicles were based on the average for model year 2015 and 2020 to incorporate

varying vehicle ages. Similarly, diesel powered medium- and heavy-duty vehicles (dump and semi-trucks) emission rates were based on the model year range “2007-2021” see **Table 24**.

Table 24. Construction Emissions – On-Road Vehicles

Table 2-1. Construction Emissions - On-Road Vehicles									
Vehicle	Vehicle/ Day	Days	Miles/ Day	Miles	Miles/ Gal.	Est. Gal	Emission Factor		
							CO ₂	CH ₄	N ₂ O
Passenger Cars	20	150	30	90,000	25.3	2,277,00	8.78 kg CO ₂ /gal	0.0059 g CH ₄ /vehicle-mile	0.0028 g N ₂ O/vehicle-mile
Dump Trucks	6		30	27,000	7.6	205,200	10.21 kg/CO ₂ /gal	0.0095 g CH ₄ /vehicle-mile	0.0431 g N ₂ O/vehicle-mile
Semi-Trucks	3		30	13,500	6.2	83,700			
Vehicle		Metric Tons CO ₂ eq					Annual Emissions		
		CO ₂		CH ₄		N ₂ O			
Passenger Cars		31.2332		0.0158		0.0688		2,208.7827 metric tons CO ₂ eq	
Dump Trucks		2095.0920		0.0076		0.3177		2095.4173 metric tons CO ₂ eq	
Semi-Trucks		854.5770		0.0038		0.1588		854.7397 metrics tons CO ₂ eq	
Construction Phase Emissions (7 years)							20,870.3238 metric tons CO ₂ eq		
Lifecycle Annualized Emissions (50 years)							417.4065 metric tons CO ₂ eq		

Similarly, contributions to GHGs from off-road vehicles (construction equipment) was estimated. As previously stated, the phasing will be partially market driven and the duration of equipment usage and type are estimates. It was assumed that eight diesel-powered off-road construction vehicles (3 earth movers, 3 excavators, and 2 skid steers) would be in operation during the construction phase. The default diesel fuel consumption rate of 0.05 gallons per horsepower-hour was used to determine fuel usage for all equipment. The estimated construction season of 150 10-hour days (1,500 hours total). Emission factors were based again on U.S. EPA’s Emission Factors for GHG inventories (Tables 2 and 5; last modified 13th, 2024), see **Table 25**.

Table 25. Construction Emissions – Off-Road Vehicles

Table 25: Construction Emissions - Off Road Vehicles								
Vehicle	Vehicle/ Day	Hours	Consumption Rate	Engine Size (hp)	Total Gallons	Emission Factor		
						CO ₂	CH ₄	N ₂ O
Loader/ Bulldozer	3	1500	0.05 gal/hour per hp-hr	125	28,125	10.21 kg CO ₂ /gal	0.91 g CH ₄ /gal	0.56 g N ₂ O/gal
Excavator	3			250	56,250			
Skid Steer	2			50	7,500			
Vehicle		Metric Tons of CO ₂ eq						
		CO ₂		CH ₄	N ₂ O		Annual Emissions	
Loader/ Bulldozer		287.1563		0.7627	4.2998		292.2187	
Excavator		574.3125		1.5254	8.5995		584.4374	
Skid Steer		76.5750		0.2034	1.1466		77.9250	
Construction Phase Emissions (7 years)							6682.0675 metric tons CO ₂ eq	
Lifecycle Annualized Emissions (50 years)							133.6413 metric tons CO ₂ eq	

Operation Emission – Mobile Sources – Scope 1

To estimate traffic emissions, it was assumed there will be 2.0 vehicles per household, and that each vehicle travels 12,000 miles per year (38). The fuel efficiency of said vehicles was estimated

at 25.3 miles per gallon (based on the average for model year 2015 and 2020 to incorporate varying vehicle ages). It was also assumed future residents drive gasoline-powered, light duty vehicles. Additionally, it is assumed that the future retailer occupying the commercial space will receive a delivery at least three times a week and each single-family unit receives a delivery truck every third day. Delivery trucks are estimated to travel 20 miles per day per vehicle for 365 days, equating to 7,300 miles per year. The U.S. Department of Transportation's Federal Highway Administration 2019 Highway Statistics Series was used to estimate the fuel efficiency of heavy-duty vehicles (7.5 miles per gallon) (36).

Table 26. Operation Emissions – Traffic Emissions

Table 26: Operation Emissions										
Vehicle	Vehicle/ Day	Miles/ Day	Miles/ Gallon	Fuel Usage (gal/day), all vehicles	Days/ Year	Miles/ Year	Fuel Usage (gal/year), all vehicles	Emission Factor		
								CO ₂	CH ₄	N ₂ O
Gasoline Light Duty	684	32.88 ¹	25.3	888.84	365	12,000	324,426.88	8.78 kg CO ₂ /gal	0.0079 g CH ₄ /mile	0.0012 g N ₂ O/mile
Diesel Heavy Duty	1.33	20	7.5	3.5467		7,300	1,294.5333	10.21 kg CO ₂ /gal	0.0095 g CH ₄ /mile	0.0431 g N ₂ O/mile
Vehicle		Metric Tons CO ₂ eq						Annual Emissions		
		CO ₂		CH ₄		N ₂ O				
Gasoline Light Duty		2,898.4411		0.0767		0.1081		2,848.6497 metric tons CO ₂ eq		
Diesel Heavy Duty		13.2172		0.0004		0.0152		13.2328 metric tons CO ₂ eq		
Construction Phase Emissions (7 years)								20,033.1772 metric tons CO ₂ eq		
Lifecycle Annualized Emissions (50 years)								400.6635 metric tons CO ₂ eq		

¹ Average 12,000 miles/year expressed in miles/day

Off-site Electricity Production – Scope 2

Emissions from electricity production offsite were based on the U.S. EPA's Emission Factors for GHG Inventories (Table 6 – Electricity; last modified February 13th, 2024) based on the upper Midwest (MRO West) Emissions and Generation Resource Integrated Database (eGRID) subregion. To estimate annual energy usage, data from the U.S. Energy Information Administration's (EIA) 2020 Residential Energy Consumption Survey (RECS) was utilized (37). Annual household fuel consumption in the Midwest was reported at 11.1953 MWh for electricity and 25.3799 MWh for natural gas.

Table 27. Off-Site Energy Production

GHG	Emission Factor ¹		Annual Household Energy Consumption		Annual Emissions	
			Electricity	Natural Gas	Electricity	Natural Gas
CO ₂	936.5 lbs. CO ₂ /MWh	0.4683 tons CO ₂ /MWh	11.1953 MWh	25.3799 MWh	4.7558 tons CO ₂ eq	10.7814 tons CO ₂ eq
CH ₄	0.1020 lbs. CH ₄ /MWh	0.0015 tons CO ₂ eq/MWh			0.4671 tons CO ₂ eq	1.0588 tons CO ₂ eq
N ₂ O	0.0150 lbs. N ₂ O/MWh	0.0020 tons CO ₂ eq/MWh			5.8070 tons CO ₂ eq	13.1646 tons CO ₂ eq
Total Annual Emissions (342 units)					3,772.2030	8,551.6365
Total Lifecycle Estimate ² (tons CO ₂ eq)					188,610.1523	427,581.8248

¹ The annual household site fuel consumption in the Midwest was reported in million British thermal units (Btu) per household. The consumption rates reported below were converted to megawatt hour (MWh).

² Based on 50-year expected lifecycle

Note: The survey included electricity consumption from solar panels in the consumption/expenditures rate, the extent of solar panel installation onsite within the development's lifetime is unknown but expected to be similar to adoption across the Midwest. On-site energy production from solar was not included in the above calculation.

Off-site Waste Management – Scope 3

Emission factors from U.S. EPA's Center for Corporate Climate Leadership (CCCL) GHG Emission Hub were utilized to provide estimates of offsite waste management emissions. Specifically, the rates from Table 9 – Scope 3 Category 5: Waste Generated in Operations and Category 12: End of Life Treatment of Sold Products (updated February 13th, 2024). As previously stated, the County is a member of East Central Solid Waste Commission (ECSWC) that operates a large municipal solid waste management facility (landfill with methane recovery) in Mora, Minnesota. Utilizing the average for all the materials landfilled a conversion factor of 0.36 tons of CO₂eq per 2,000 lbs. of material was used. According to the U.S. EPA, in 2018 292.4 million short tons of municipal solid waste was generated (4.9 pounds per person per day) (38). The Meadows Ridge residential development will include 342 homes and house approximately 1,218 people.

Table 28. Off-site Waste Management

Estimated Population	Municipal Solid Waste Generation	Emission Factor	Total
1,197 Residents ¹	4.9 lbs./day	0.36 tons of CO ₂ eq/ 2,000lbs.	385.35 tons of CO ₂ eq/year
Total Lifecycle Estimate²		19,267.5105 tons of CO₂eq	

¹ Assuming 3.5 people per household

² Expected lifecycle (50-year)

Note: Although several private recycling facilities in Chisago County process curbside recycling and/or problem materials (appliances, tires, electronics, and mattresses), the extent of successful recycling and information on the methods used at individual recycling facilities is not extensive and therefore was not included in this calculation.

Similarly, the City of North Branch operates a compost site for residents to drop-off leaves/grass, but the extent of use is not known and therefore not included in the calculation.

Atmospheric Removals – Scope 1

Carbon removals from the atmosphere act to offset the emissions of CO₂ to the atmosphere. Utilizing the U.S. EPA's Best Practices for Including Carbon Sinks in GHG Inventories, carbon sequestration rates for forest preservation and afforestation (planting trees on lands previously not in forestry) (40). Based on the preliminary landscaping and tree preservation plan, 796 trees will be provided, and 1.02 acres of trees will be preserved. In an effort to convert the number of trees planted to an acreage, it was estimated that the planted trees equate to at least three acres. The estimated carbon sequestration rate in the U.S. is estimated between 0.7-2.87 tons of CO₂/acre/year. Similarly, the preserved portion in the northwest corner of the project area is planned to remain as open space and therefore CO₂ emissions are avoided by conserving the existing carbon stock. The carbon sequestration rate in the U.S. is dependent of the existing carbon stock and because a tree survey has not been completed and the status of the woodland is unknown, the 0.66 tons of CO₂/acre/year rate was utilized.

Table 29. Atmospheric Removals

Forestry Practice	Carbon Sequestration Rate	Trees Provided/Preserved ¹	Annual Atmospheric Removal
Afforestation ²	0.66-2.87 tons of CO ₂ /acre/year	~3 acres of trees planted	1.98-8.61 tons of CO ₂ /acre/year
Forest Preservation ²	0.66 tons of CO ₂ /acre/year	1.02 acres of trees preserved	0.67 tons of CO ₂ /acre/year
Total Lifecycle Estimate		132.50 – 464.00 tons of CO₂eq	

¹ Based on estimates of tree planting/preservation.

19.Noise

-
- a) Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including:
 - i) Existing noise levels/sources in the area
 - ii) Nearby sensitive receptors
 - iii) Conformance to state noise standards
 - iv) Quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

A noise study was not completed for the preparation of this EAW. The current development plans do not meet the Minnesota Department of Transportations (MN DOT) Type 1 project criteria and therefore only evaluation of construction noise is required (41)(42). Existing noise sources on site consist of noise from agricultural machinery. Offsite, vehicle traffic from Flink

Avenue and 400th Street generate noise and the nearby commercial businesses such as Lampert Lumber, Full Throttle Autocare, and Lake Region EMS (an ambulance service that services the Chisago County Health Department east of the project area) also impact the nearby sensitive receptors (residential areas immediately north, southeast, and south of the project area). Additional commercial/industrial businesses will likely be located near the project area in the future based on the surrounding future land uses (**Figure 6**).

Project construction will result in a temporary increase in noise levels. The different phases of development will result in varying noise levels depending on the amount of construction that occurs simultaneously, the time of operation, and the distance between construction equipment and receptors for example, grading will require heavy machinery. Development would adhere to the North Branch City Code (Section 30-120) and erection, excavation, demolition, alteration, or repair of any building would only occur between 7:00 AM and 10:00 PM, except in the case of urgent necessity in the interest of public safety and then only with a permit from the City clerk. More specifically, construction activities would abide by the following, “No person shall engage in or permit construction activities involving the use of any kind of electric, diesel or gas-powered machine or other power equipment except between the hours of 7:00 AM and 10:00 AM Monday through Friday or between the hours of 9:00 AM and 9:00 PM on a Saturday” (7). The project is expected to minimize disturbances caused by construction noise and conform to Minnesota noise rule and standards (Minnesota State Statute 7030.0030). Construction equipment will be properly muffled and maintained in working order.

The development will consist of residential homes and commercial space that would not emit noise levels exceeding state noise standards and is in alignment with the planned future land use (single-family residential). The project is not expected to affect the quality of life for nearby residents despite anticipated local noise volume/quantity to increase after development. Once development is complete the properties will be subject to City noise requirements.

20. Transportation

-
- a) Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

The proposed development is generally located in the north quadrants of the Flink Avenue and 400th Street intersection. The proposed development consists of a total of 342 single-family detached housing units and an approximately 255,000-sf commercial lot.

The proposed development will include paved internal roadways. The streets will provide parking along the roadway. The proposed project includes on-street parking on the new internal roadways and off-street parking within the private driveways of the residential homes (2 per

home) within the project area. The current site plan shows a concept commercial layout with 229 stalls. Please note that this is a concept plan and does not necessarily reflect the final commercial layout.

To account for traffic impacts associated with the proposed development, a trip generation estimate was developed for the weekday a.m. and p.m. peak hours and a daily basis. The estimates, shown in **Table 30**, were developed using the ITE Trip Generation Manual, 11th Edition. The 255,000-square foot commercial lot development timeline and specific land uses are currently unknown. Therefore, general retail was assumed based on a floor-area-ratio of approximately 20 percent. Note in addition to the Meadow Ridge Development, trip generation estimates were also estimated for adjacent developments such as the Larry Beach development (to the west) and Meadow North development (to the south). The Meadows North development is expected to account for approximately 286 a.m. and 340 p.m. peak hour trips within the study area, whereas the Larry Beach development is expected to generate approximately 71 a.m. and 96 p.m. peak hour trips within the study area. These developments were all accounted for in the traffic study analysis completed by SRF, which is provided in **Appendix K**.

Table 30. Proposed Development Trip Generation Estimate

Land Use Type (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily Trips
		In	Out	In	Out	
Single-Family Housing (210)	347 DU	61	182	205	121	3,272
Retail (821)	50 KSF	54	33	127	133	3,376
Total Site Trips		115	215	332	254	6,648

Per the Chisago County 2013 Transit Plan Update, the County is served by Heartland Express transit service, which provides area residents curb-to-curb service. This rural transit provider operated Monday through Friday (6:00 am to 5:30 pm) by reservation. The thirteen bus fleet is dispatched from Cambridge or North Branch Transit Centers. Ridership averages 4,000 riders per year. There is a park and ride location at the “southeast corner of I-35 and CR 17 in North Branch. The lots provide shuttle services to Running Aces in Columbus, where riders can access Metro Transit commuter routes to downtown St. Paul and Minneapolis” (48). Two park-and-pool lots are also located in Wyoming and Taylor Falls.

- b) Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project’s impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation’s Access Management Manual, Chapter 5 (available at: <http://www.dot.state.mn.us/accessmanagement/resources.html>) or a similar local guidance.

SRF Consulting was contracted to conduct a traffic study in conjunction with this EAW. The study evaluated existing operations within the study area, identified any transportation impacts associated with the proposed development, and recommended improvements to address any issues, if necessary. The full report is included as **Appendix K**.

The study evaluated existing, 2040 no build, and 2040 build conditions to identify the impacts associated with the proposed development. It should be noted that the future (i.e. 2040) analysis assumes the Flink Avenue resurfacing project and signal optimization at the Flink Avenue/MN-95 intersection. However, as noted in the study, it does not include improvements such as an interchange at I-35/400th Street or roundabouts at the Flink Avenue/392nd Street and Flink Avenue/400th Street intersections. Results of the analysis, summarized in **Table 31**, indicate that all study intersections are expected to operate at an acceptable overall LOS C or better during the weekday a.m. and p.m. peak hours. No significant side-street stop delay or queuing issues are expected.

Table 31. Year 2040 Build Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Flink Avenue and North Access	A/A	5 sec.	A/A	7 sec.
Flink Avenue and South Access	A/A	6 sec.	A/A	8 sec.
Flink Avenue and Commercial Lot Access	A/A	4 sec.	A/A	8 sec.
Flink Avenue and 400 th Street	A/A	4 sec.	A/B	15 sec.
Flink Avenue and 392 nd Street	A/A	6 sec.	A/B	13 sec.
Flink Avenue and MN-95	C	20 sec.	C	23 sec.
400 th Street and West Access/Meadows North	A/A	5 sec.	A/A	7 sec.

- c) Identify measures that will be taken to minimize or mitigate project related transportation effects.

The traffic study identified that while no operational or queuing issues are expected at the study intersections along Flink Avenue, the Meadows North and Meadows Ridge developments are anticipated to construct six (6) or more full access locations along Flink Avenue within a one-mile span. In addition, most site trips are expected to be destined to/from the South, and some intersections are expected to have over 100 northbound left-turn movements within a peak hour. This increase in northbound left-turning vehicles along the high-speed roadway (i.e. 55-mph) could present safety issues as area development occurs. Therefore, the traffic study recommended that Flink Avenue be converted from a 2-lane undivided to a 3-lane roadway with a two-way left-turn lane, from 392nd Street to the North Residential Access. While the recommended improvement is primarily intended for long-term development, and may not be needed in the immediate term, if possible. Other improvements, such as roadway shoulders, right-turn lanes, and pedestrian/bicycle facilities were also identified for consideration. Similarly, a westbound

right-turn lane at 400th Street/West Access/Meadows North Access was identified for consideration to provide safety and operational benefits.

21. Cumulative Potential Effects

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

- a) Provide Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.
- b) Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.
- c) Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

The Chain Lake Shores residential development is planned for the parcel directly west of the project area. This development is still in the concept plan phase. The development timeline is dependent on the extension of City trunk water and sewer lines west on 400th Street. The 79.39± acre site is anticipated to have 102 residential units and 6,690 linear feet of internal roads.

22. Other Potential Environmental Effects

- a) If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

RGU Certification.

*(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

- a. I hereby certify that:
- i. The information contained in this document is accurate and complete to the best of my knowledge.
 - ii. The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
 - iii. Copies of this EAW are being sent to the entire EQB distribution list.

Signature 

Date 9/24/24

Title GIS/PARKS DIRECTOR

Meadows Ridge

Environmental Assessment Worksheet

Figures:

- 1.) Site Location
- 2.) USGS Topography
- 3.) Site Topography & Slopes
- 4.) Existing Land Use Cover Types
- 5.) Existing Zoning Districts
- 6.) Surrounding Future Land Use
- 7.) Metro Conservation Corridors
- 8.) Floodplain, Wetlands, Shoreland & Public Waters
- 9.) Surficial Geology
- 10.) Bedrock Geology
- 11.) Soil Survey
- 12.) Depth to Water Table
- 13.) Surface Waters & National Wetlands Inventory
- 14.) Impaired Waters
- 15.) Prime Farmland
- 16.) Hazardous Waste Generators

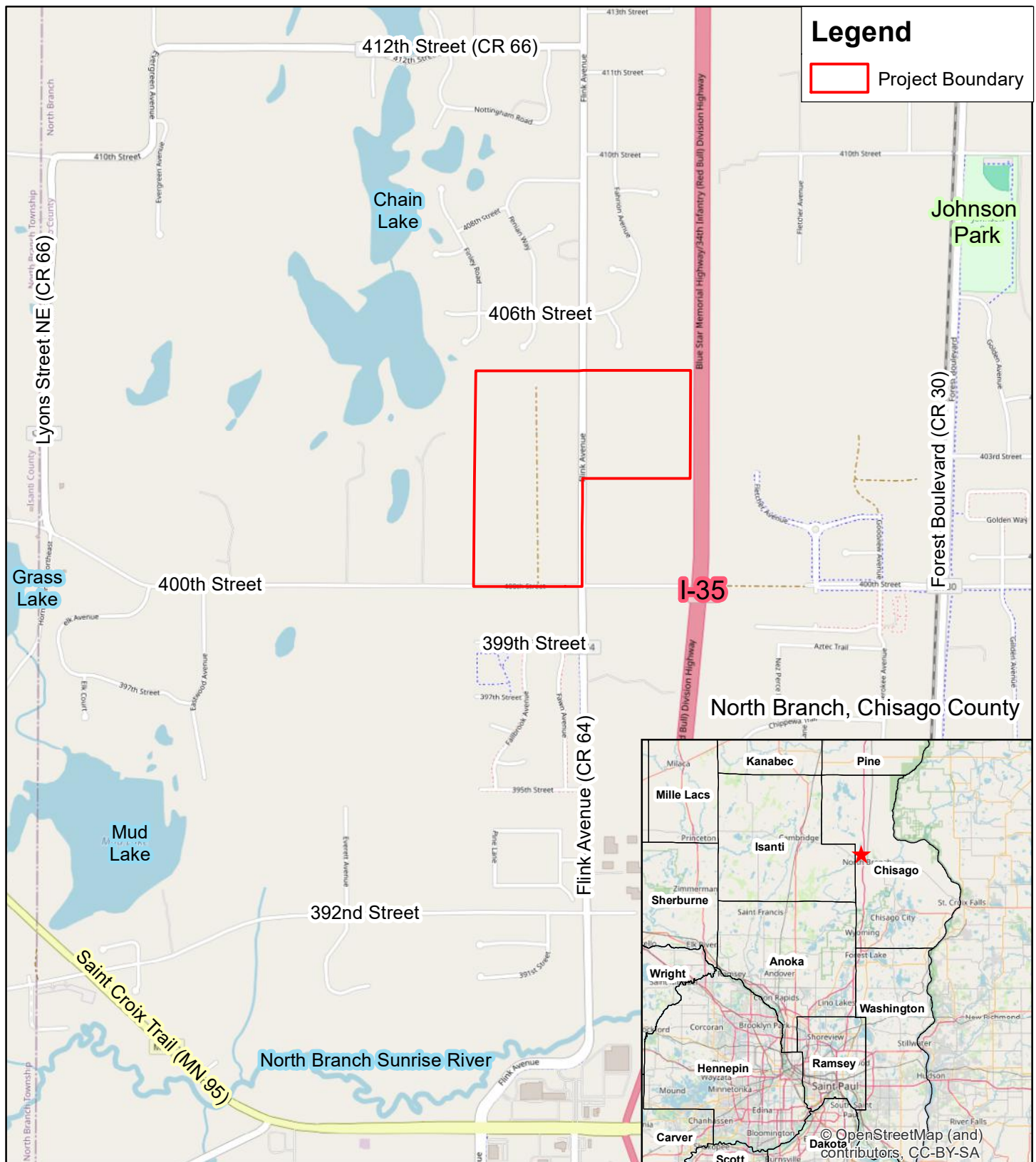


Figure 1 - Site Location



KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: ESRI Streets Basemap

N



0 2,000 Feet



Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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

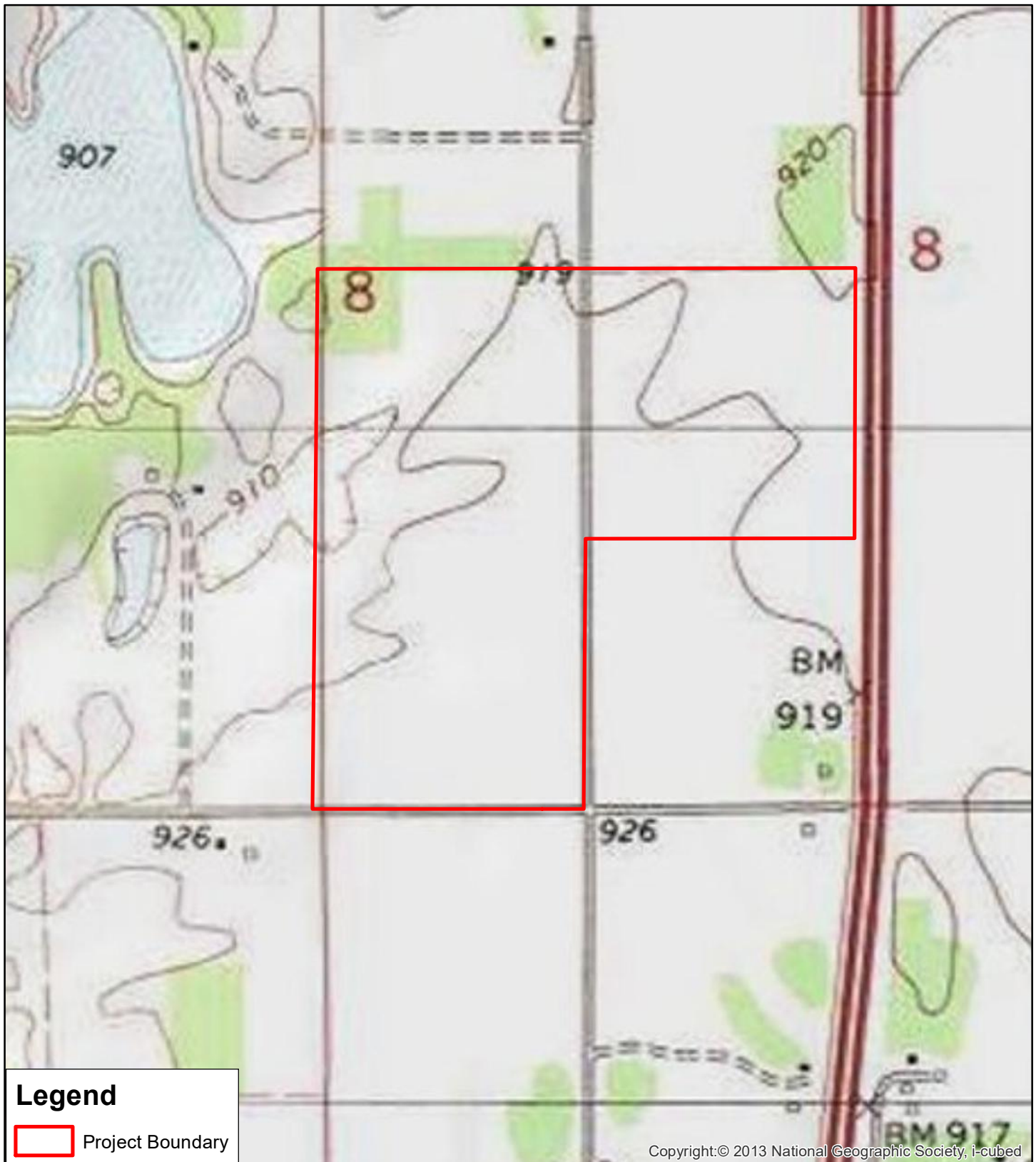
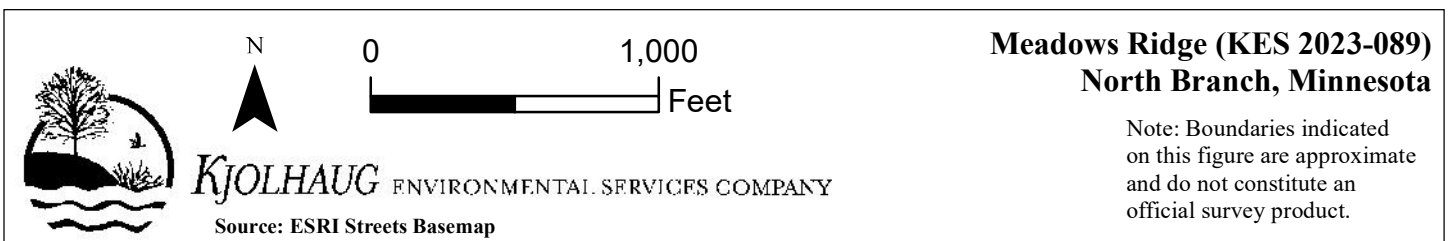


Figure 2 - USGS Topography



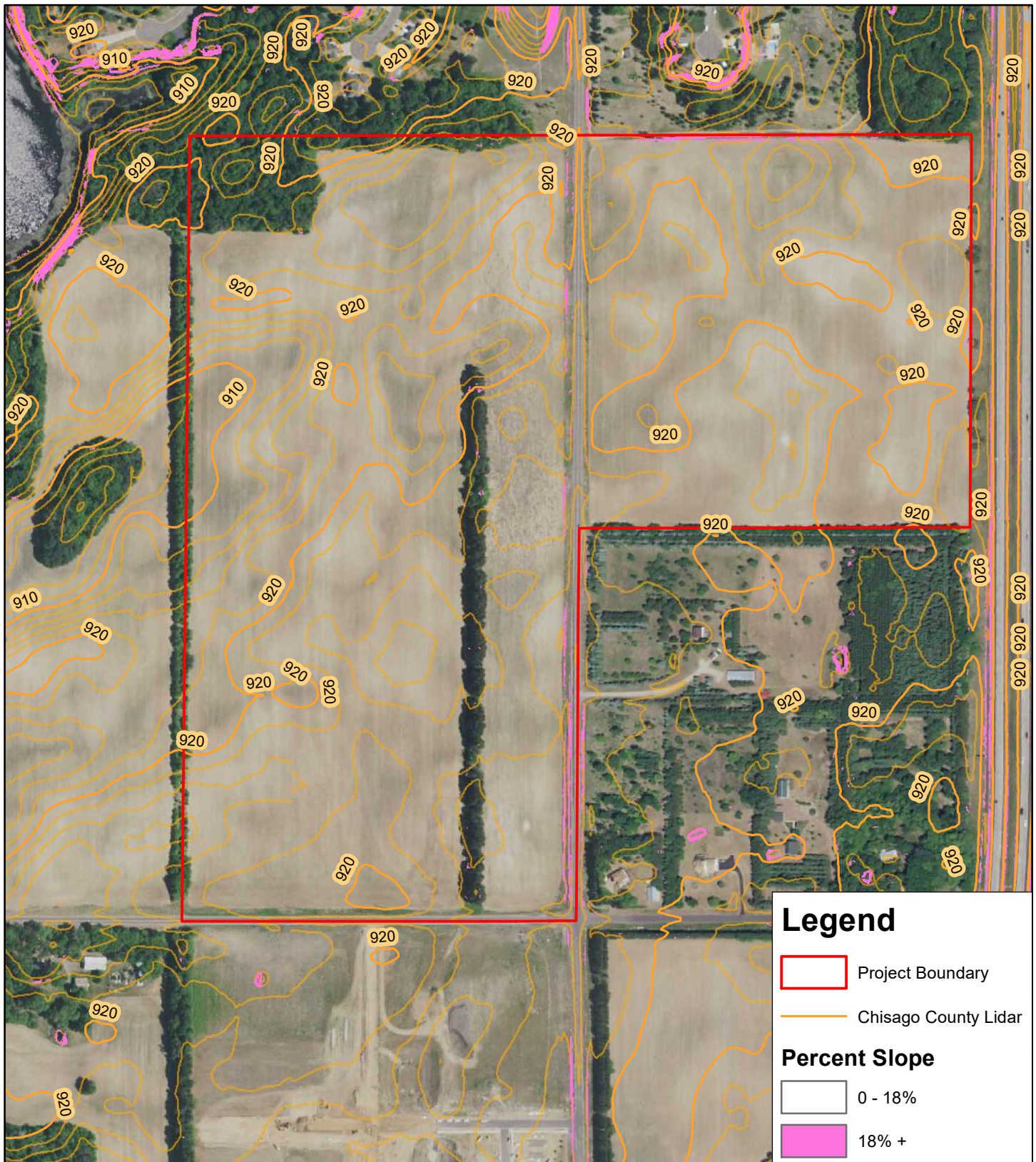


Figure 3 - Site Topography & Slopes



KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MnTopo, Wright Co GIS

N



0 1,000

Feet

Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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

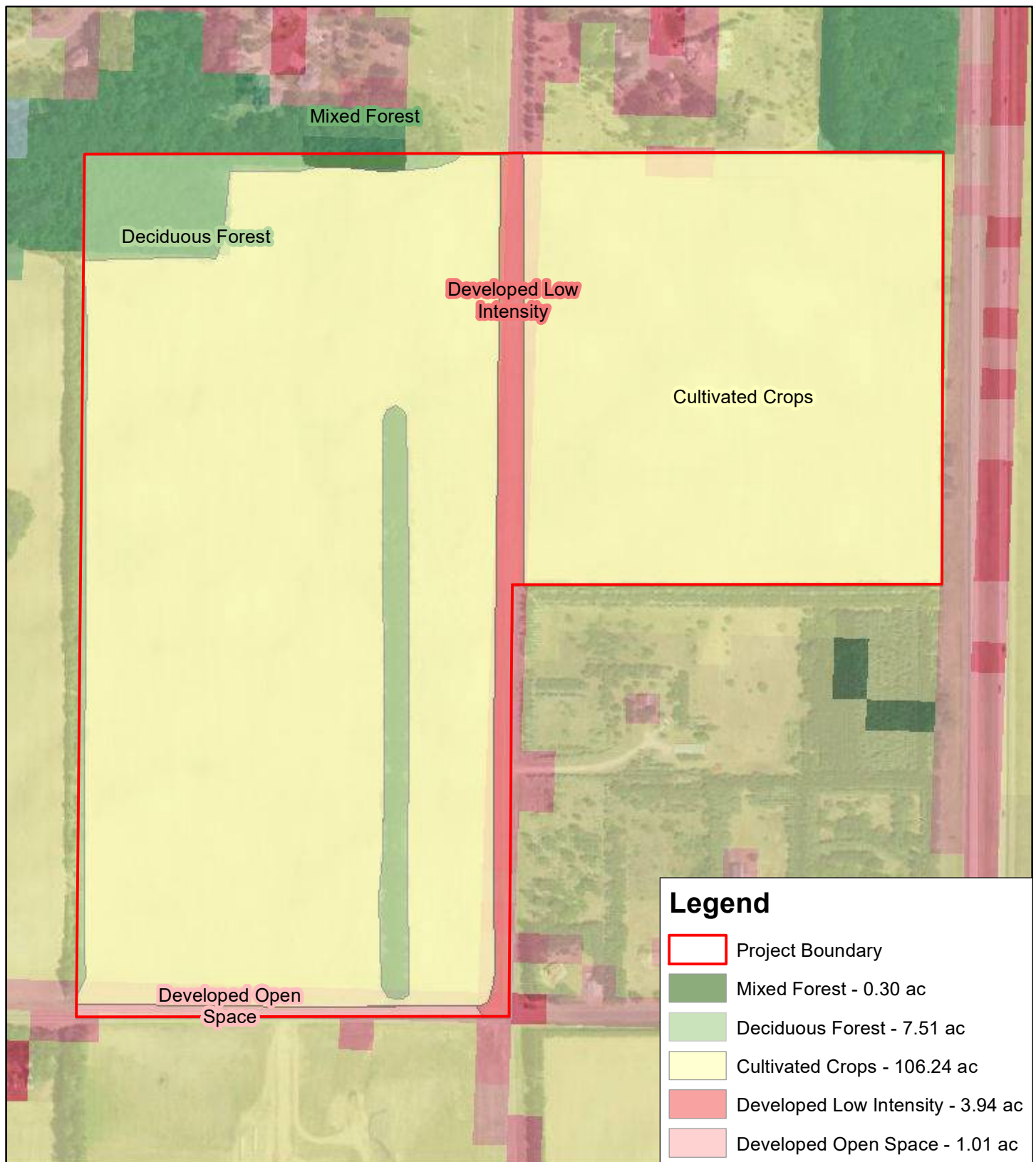


Figure 4 - Existing Land Cover Types



KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: ESRI Streets Basemap, NLCD Land Cover

N



0 500 Feet



Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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

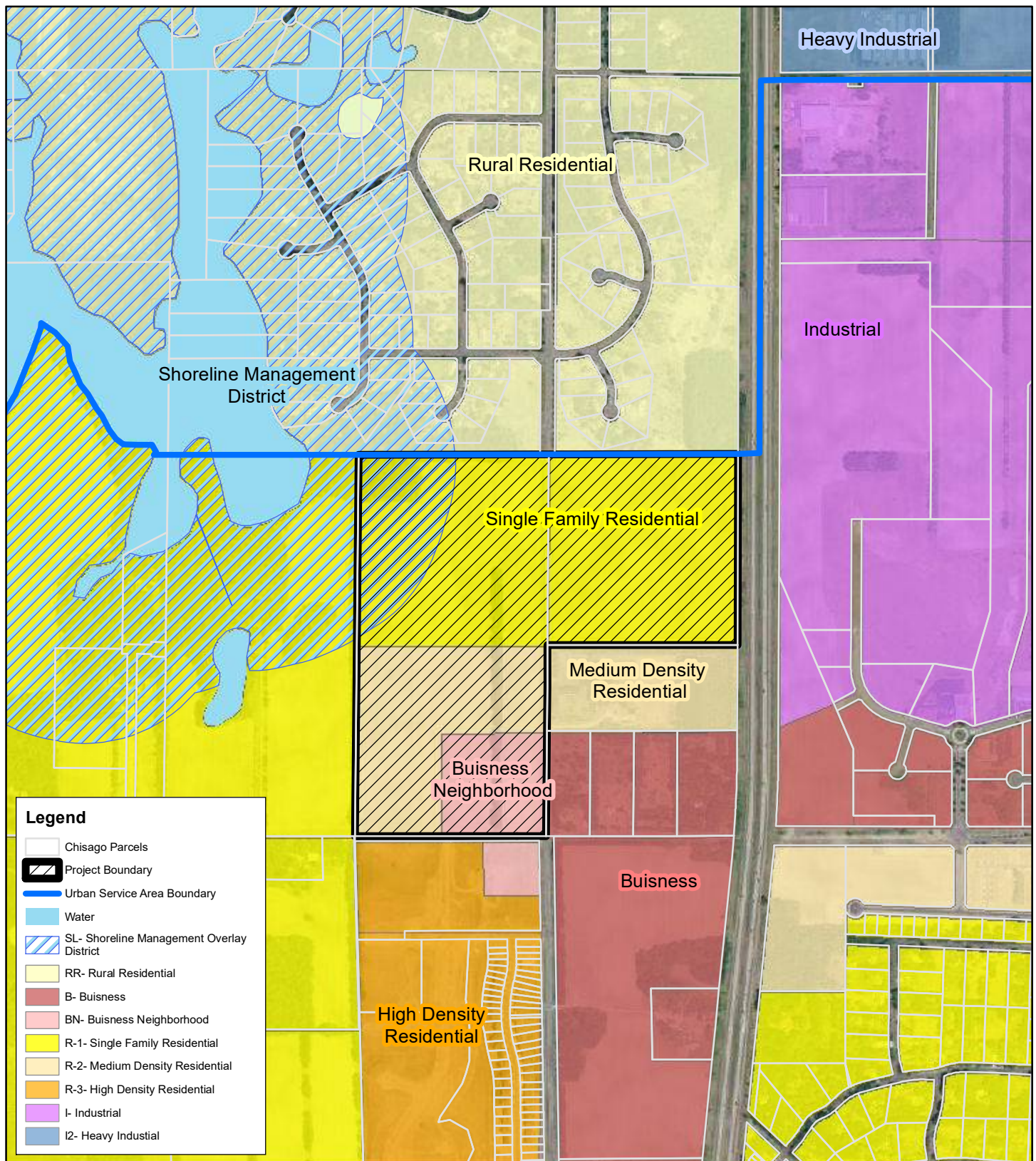


Figure 5 - Existing Zoning Districts

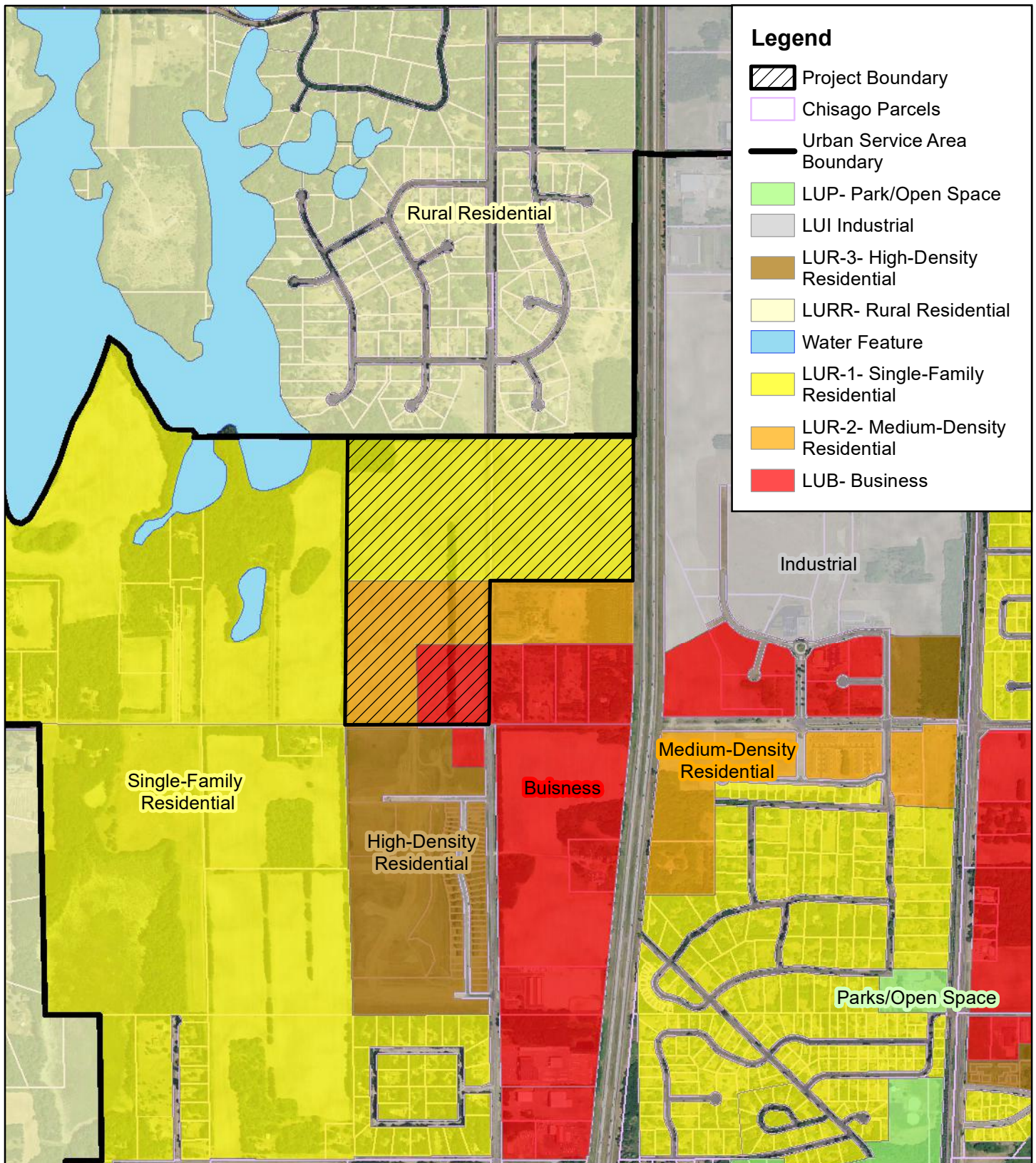


Figure 6 - Surrounding Future Land Use



KJØLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons, USFWS

N



0 2,000 Feet

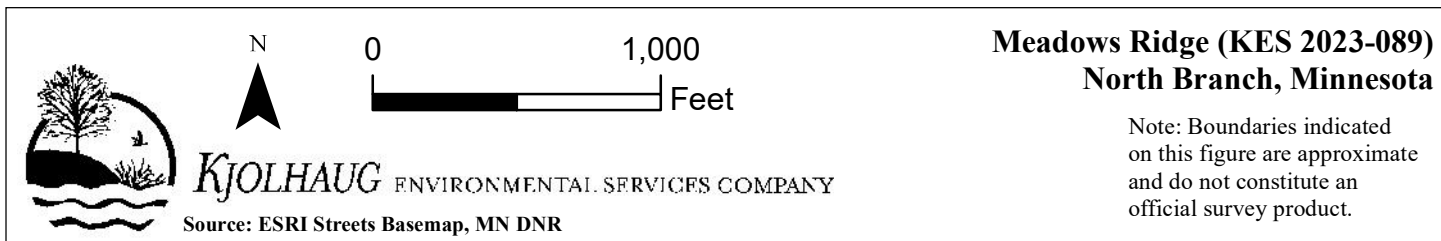


Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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



Figure 7 - Metro Conservation Corridor



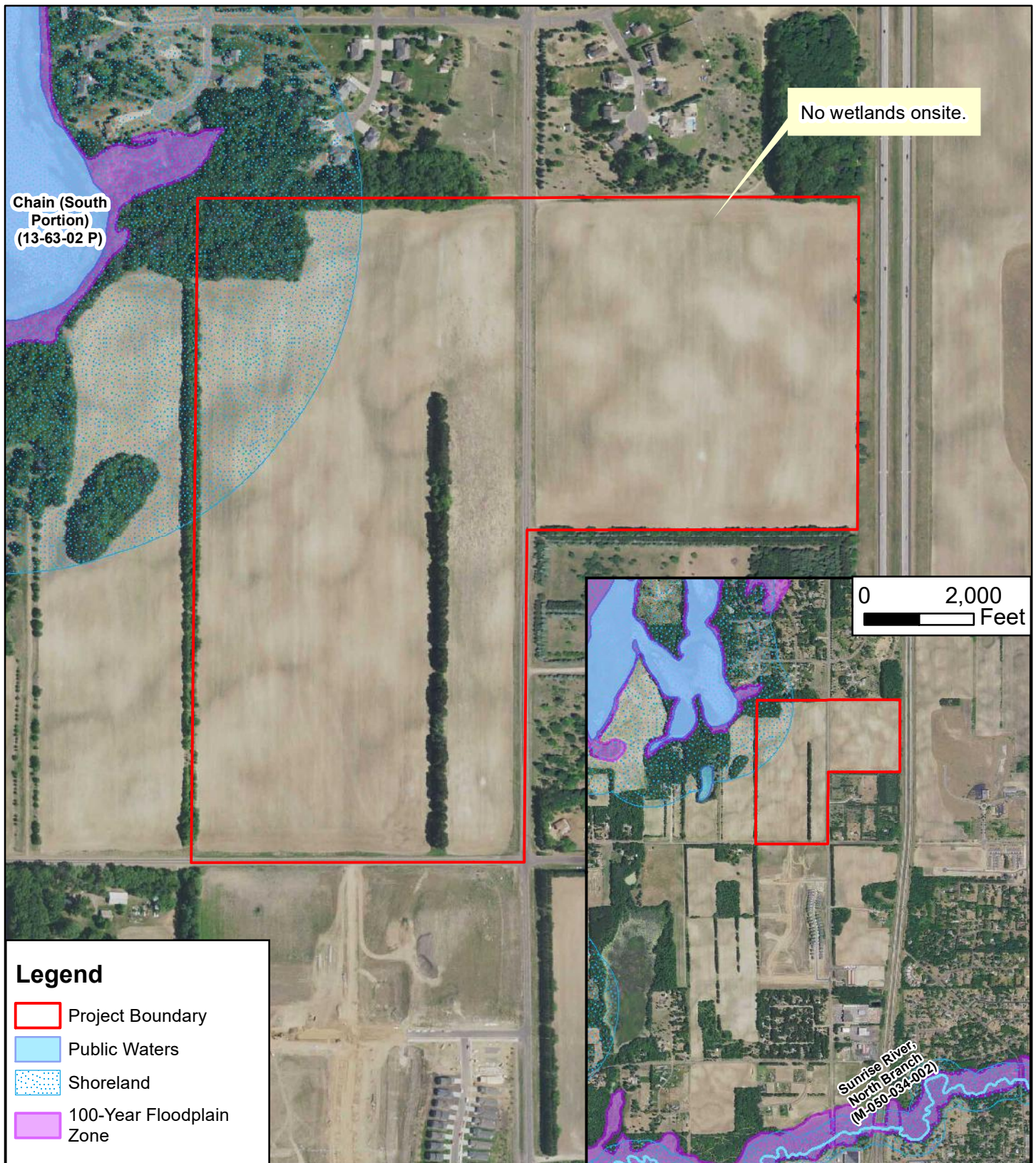
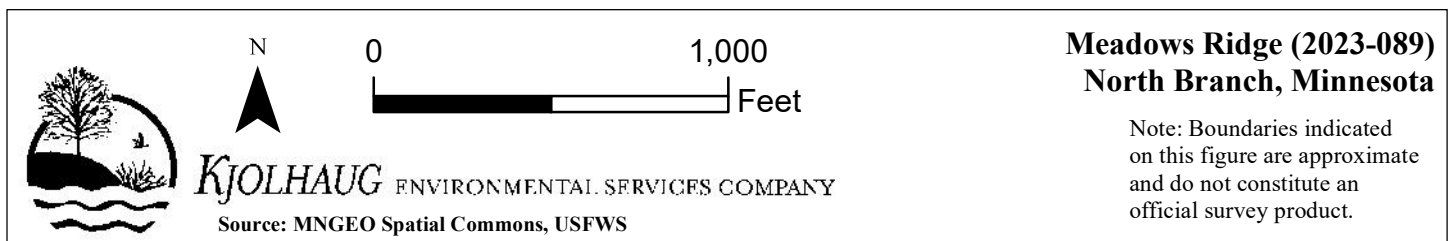


Figure 8 - Floodplain, Wetlands, Shoreland, & Public Waters



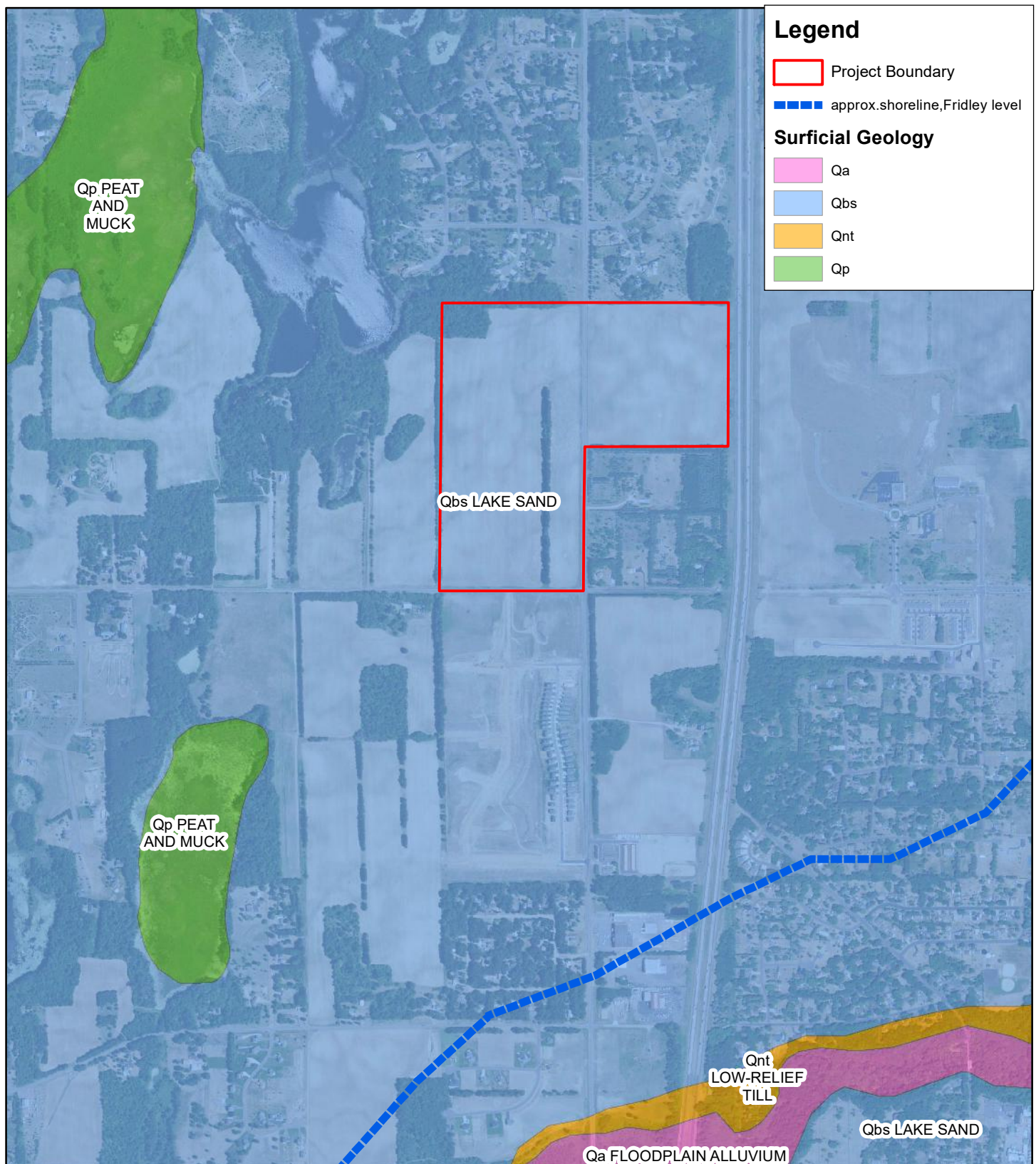


Figure 9 - Surficial Geology



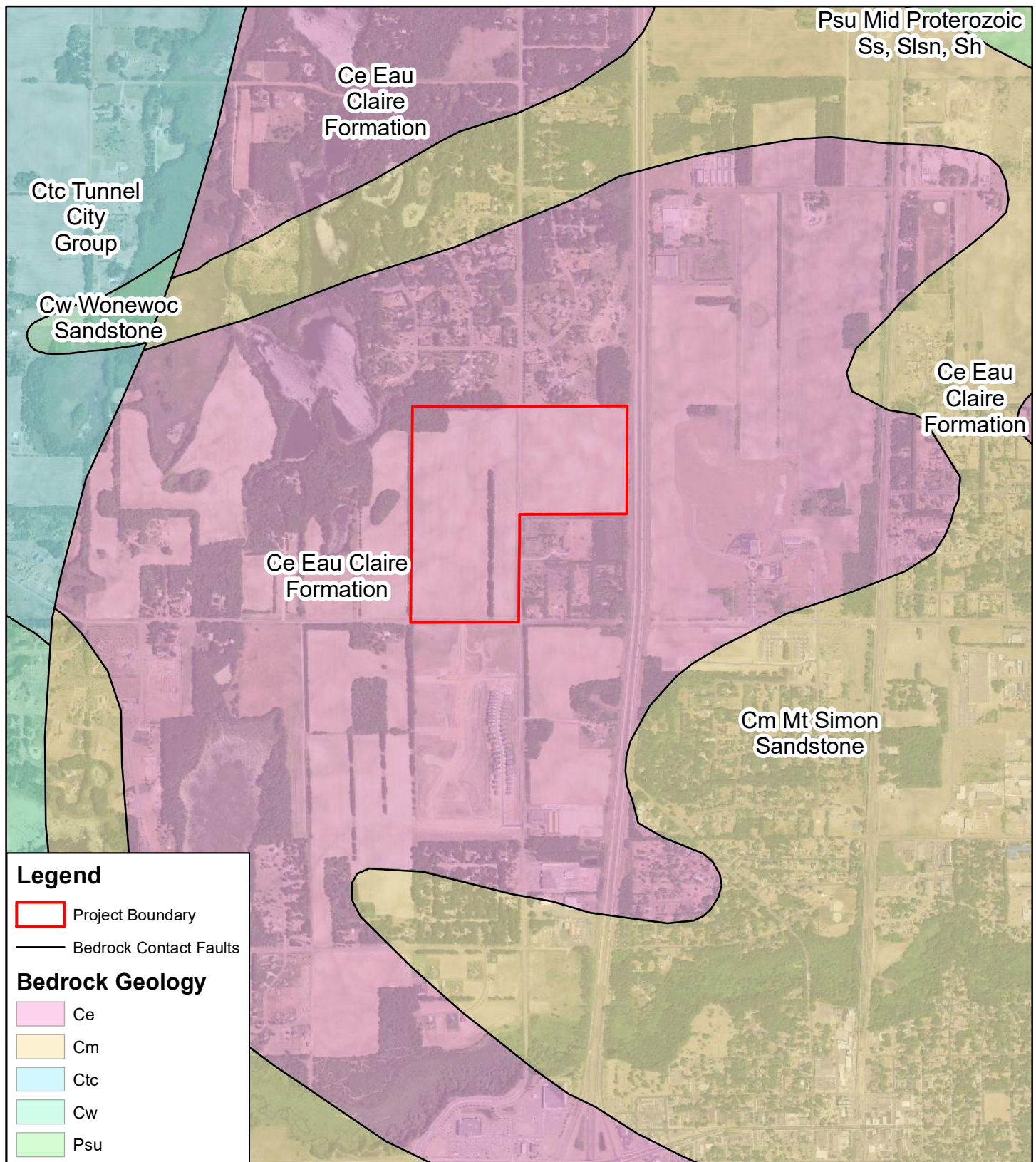


Figure 10 - Bedrock Geology



KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: ESRI Streets Basemap

N



0 2,000 Feet



Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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

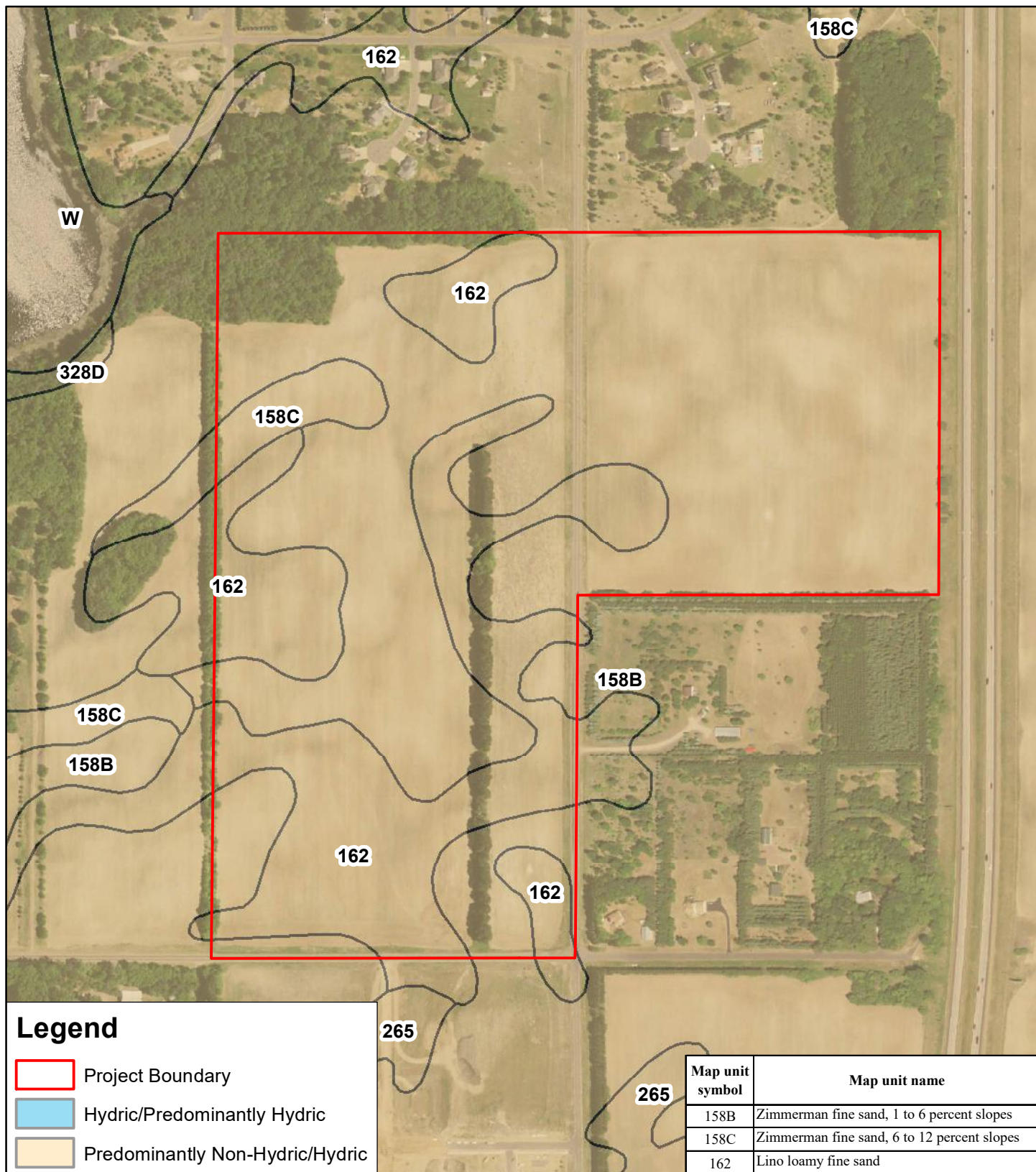


Figure 11 - Soil Survey

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: ESRI Streets Basemap

N

0 500 Feet

Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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

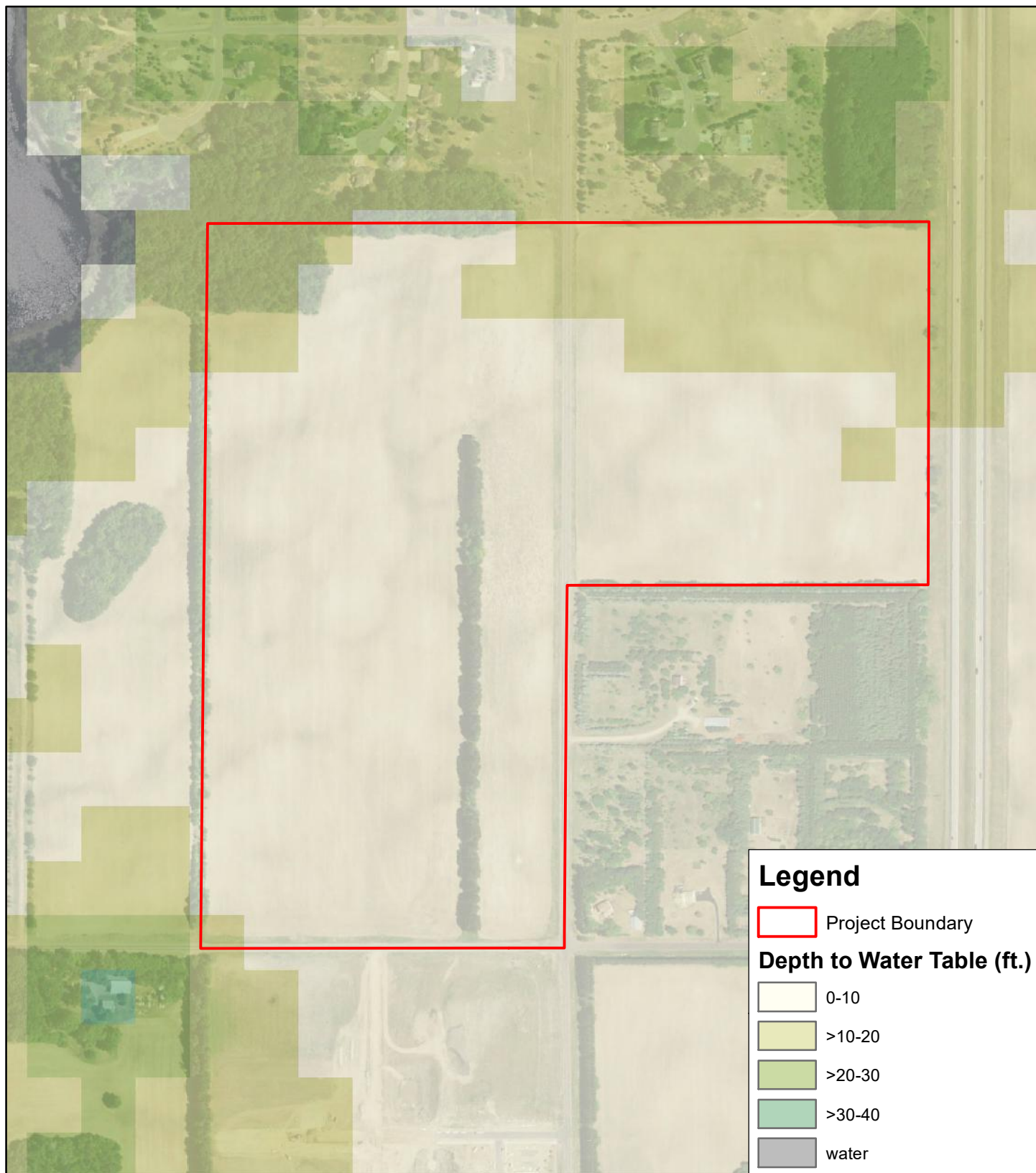


Figure 12 - Depth to Water Table

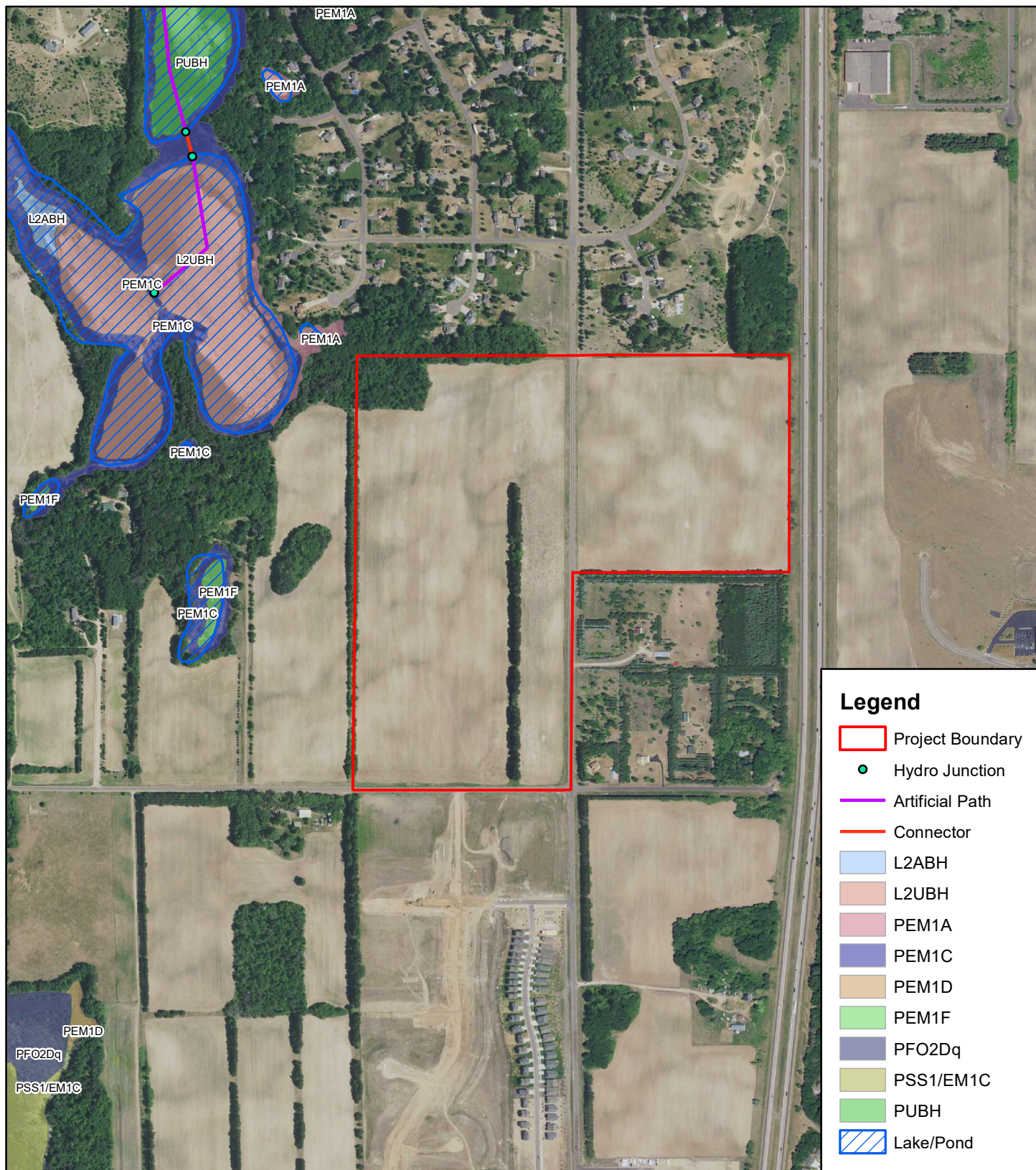


Figure 13 - Surface Waters & NWI

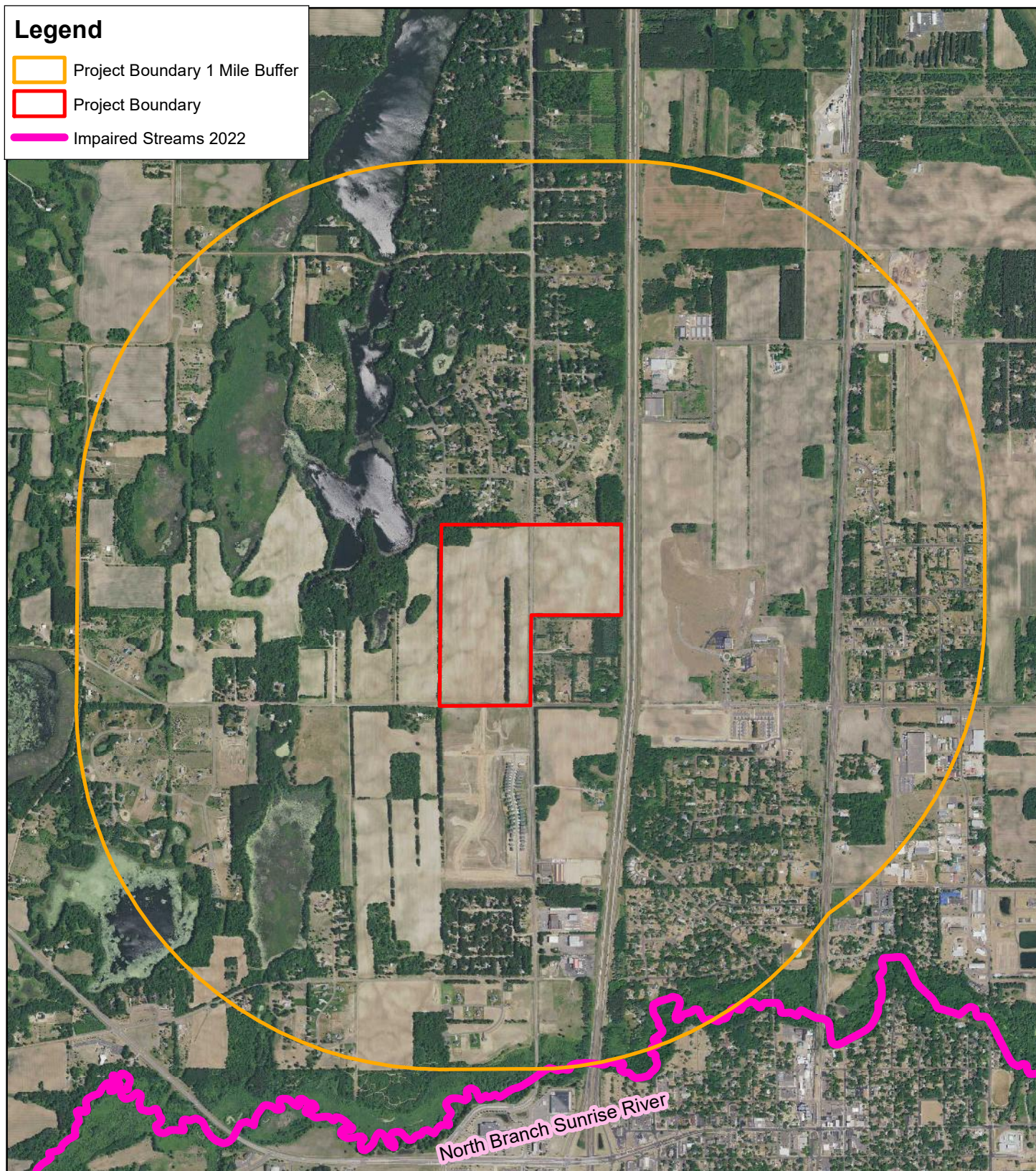
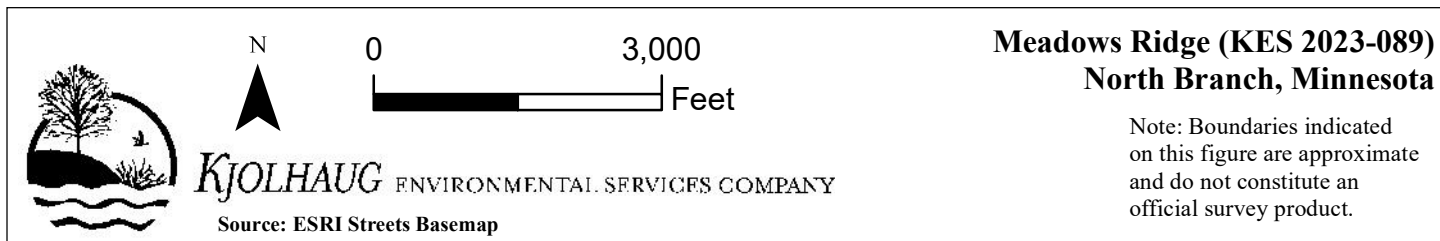


Figure 14 - Impaired Waters



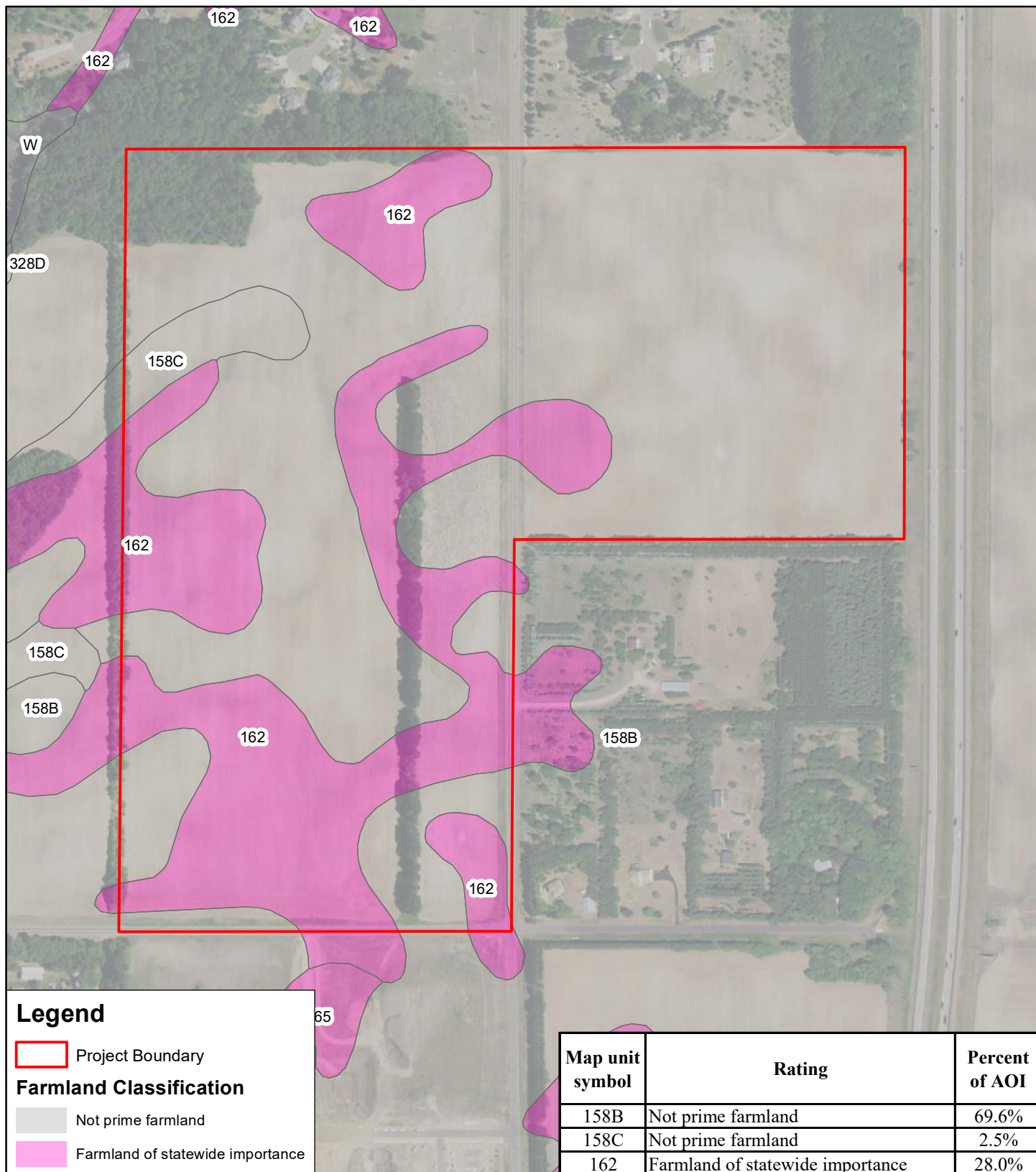
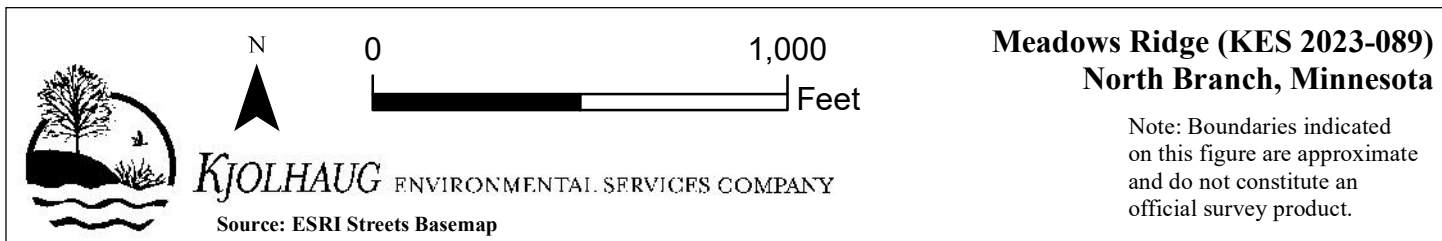


Figure 15 - Prime and Unique Farmland



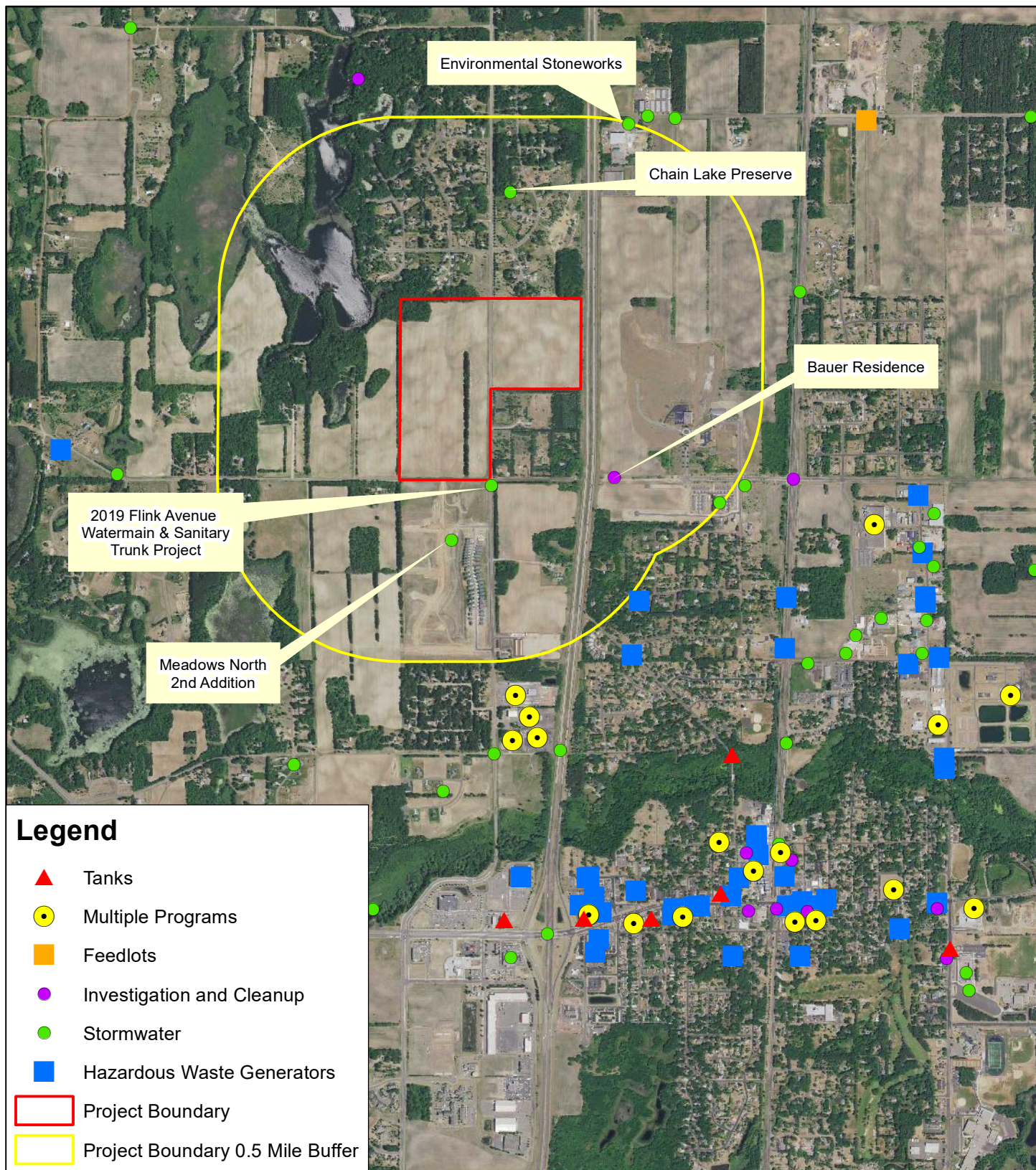
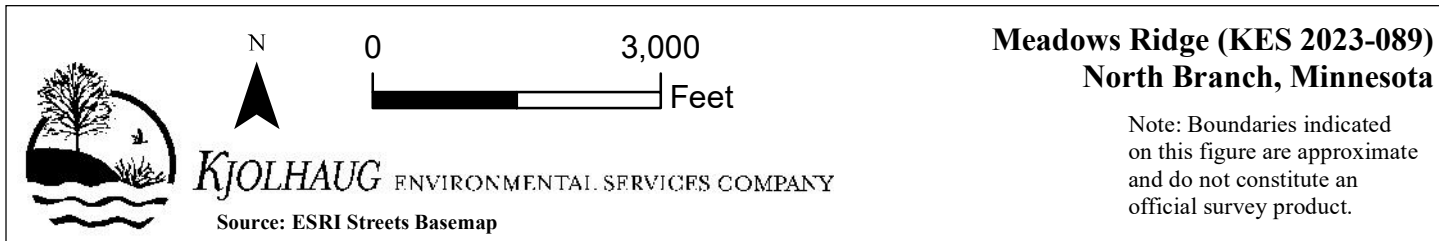
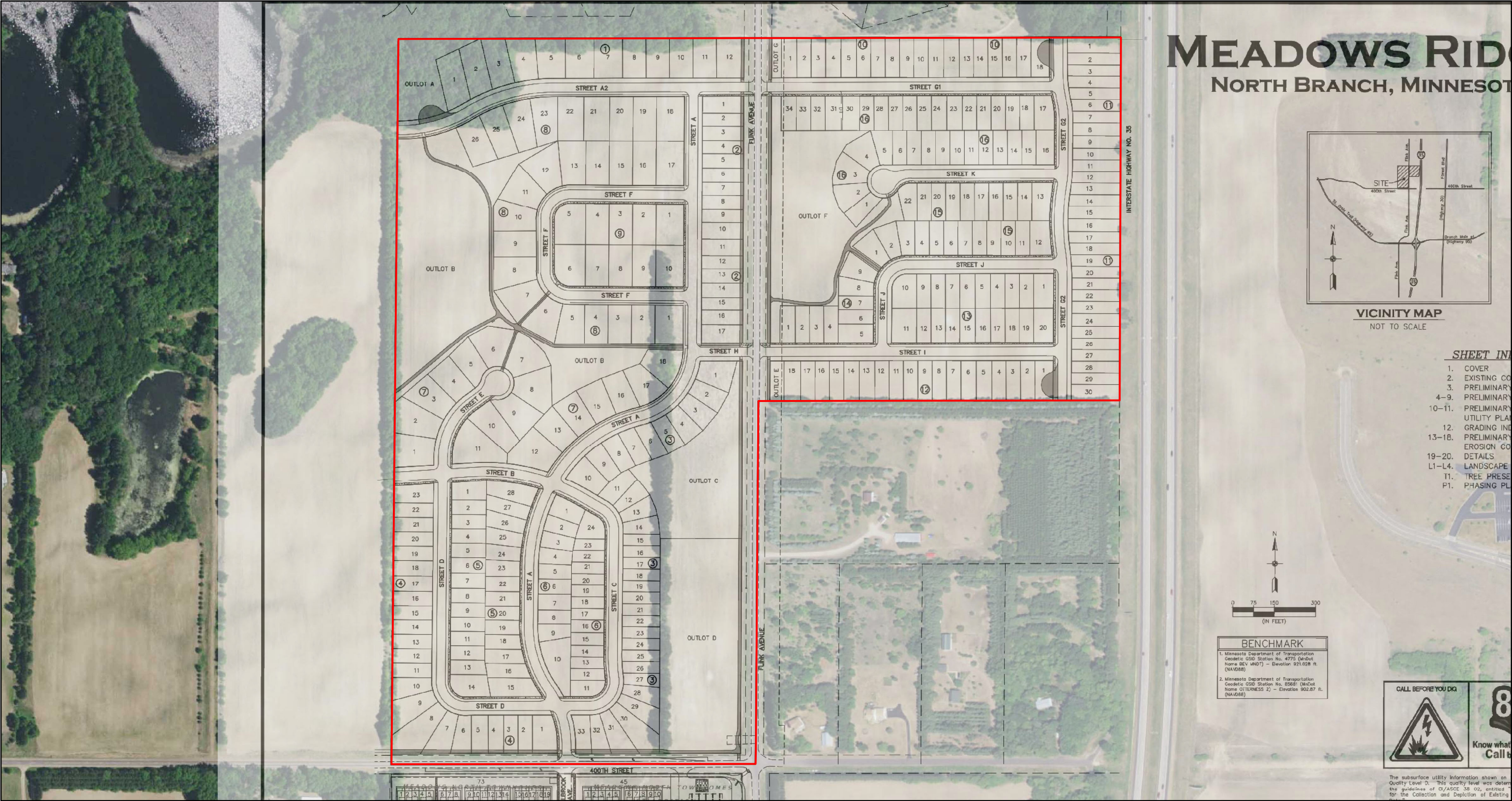


Figure 16 - Hazardous Waste Generators



Meadows Ridge
Environmental Assessment Worksheet
Appendix A

Site Plan



Site Plan



KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

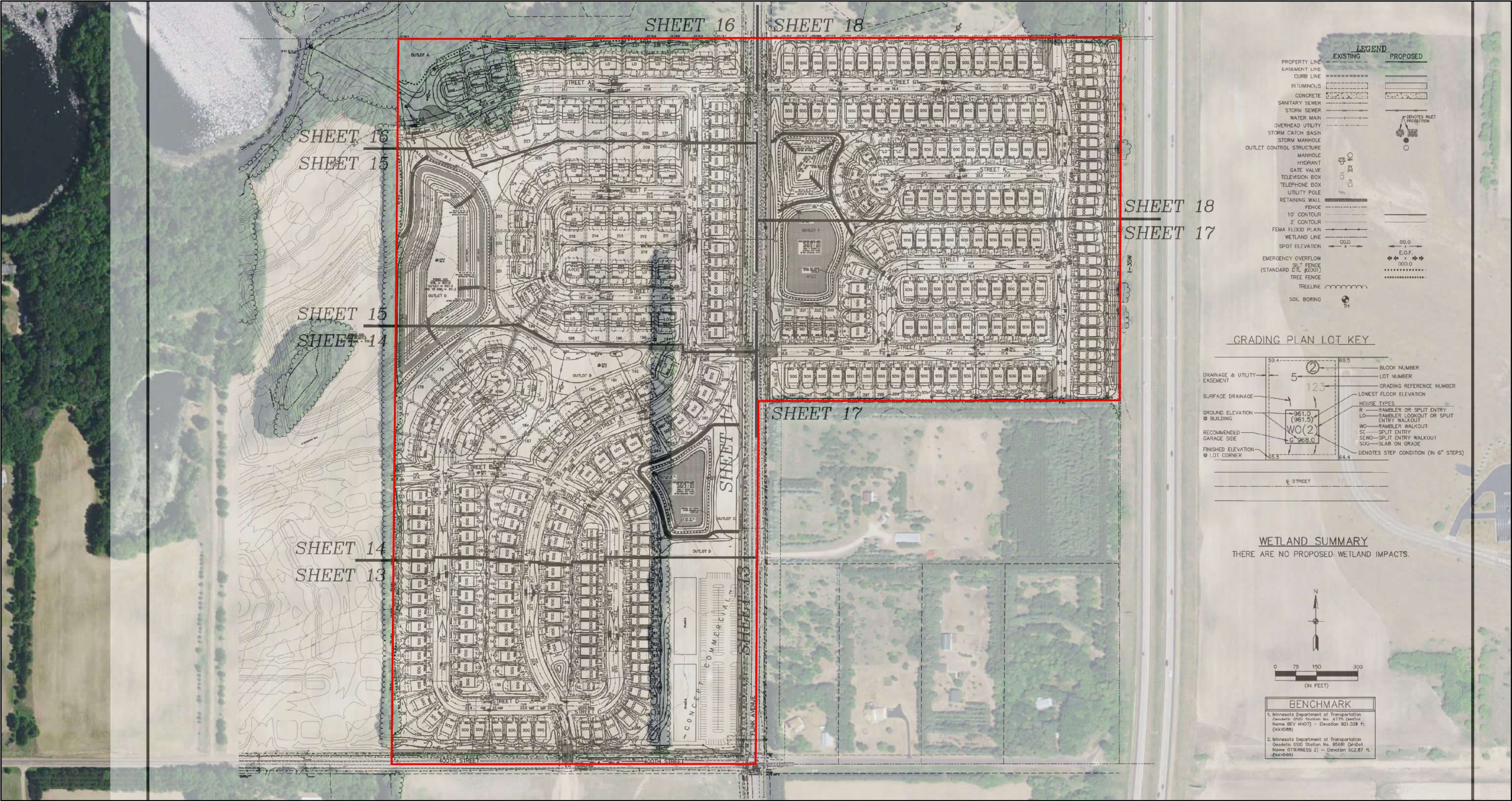
0 2,000 Feet

Legend

Project Boundary

Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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



Site Plan



0 2,000 Feet

Legend

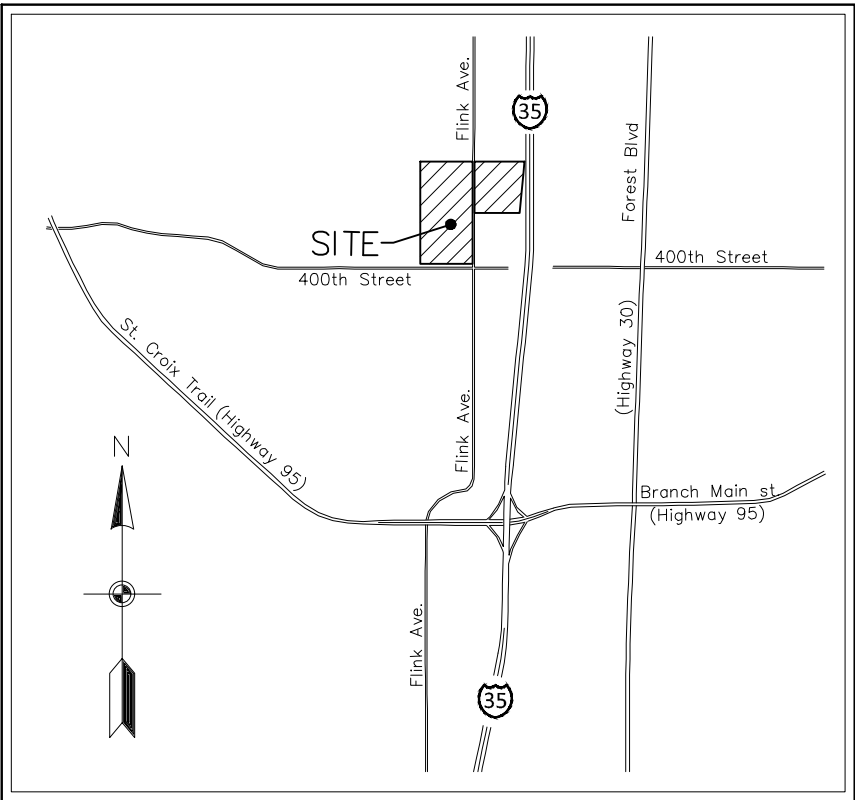
Project Boundary

Meadows Ridge (KES 2023-089)
North Branch, Minnesota

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

MEADOWS RIDGE

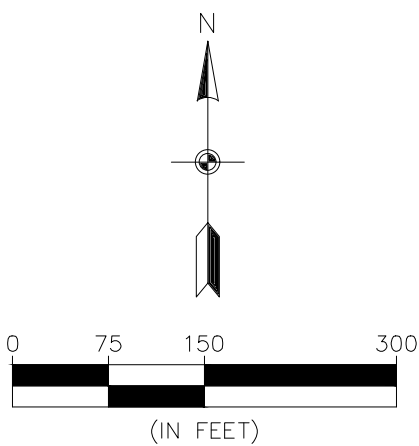
NORTH BRANCH, MINNESOTA



VICINITY MAP
NOT TO SCALE

SHEET INDEX

- 1. COVER
- 2. EXISTING CONDITIONS
- 3. PRELIMINARY PLAT INDEX
- 4-9. PRELIMINARY PLAT
- 10-11. PRELIMINARY SITE & UTILITY PLAN
- 12. GRADING INDEX
- 13-18. PRELIMINARY GRADING & EROSION CONTROL PLANS
- 19-20. DETAILS
- L1-L4. LANDSCAPE PLANS
- T1. TREE PRESERVATION PLAN
- P1. PHASING PLAN

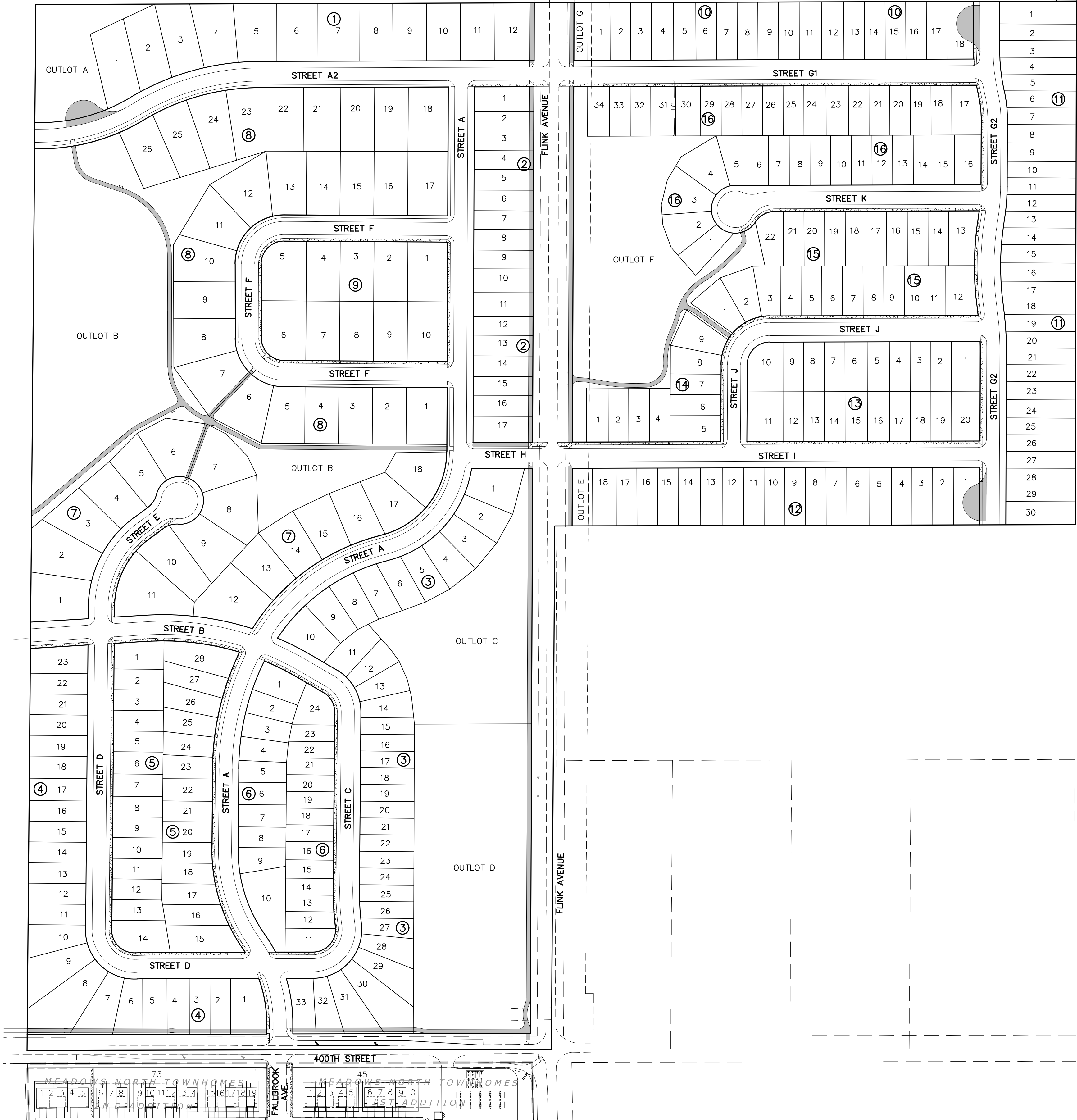


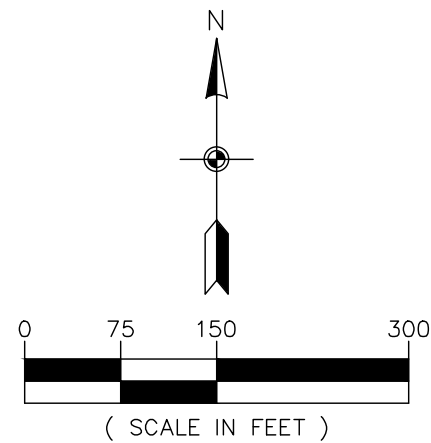
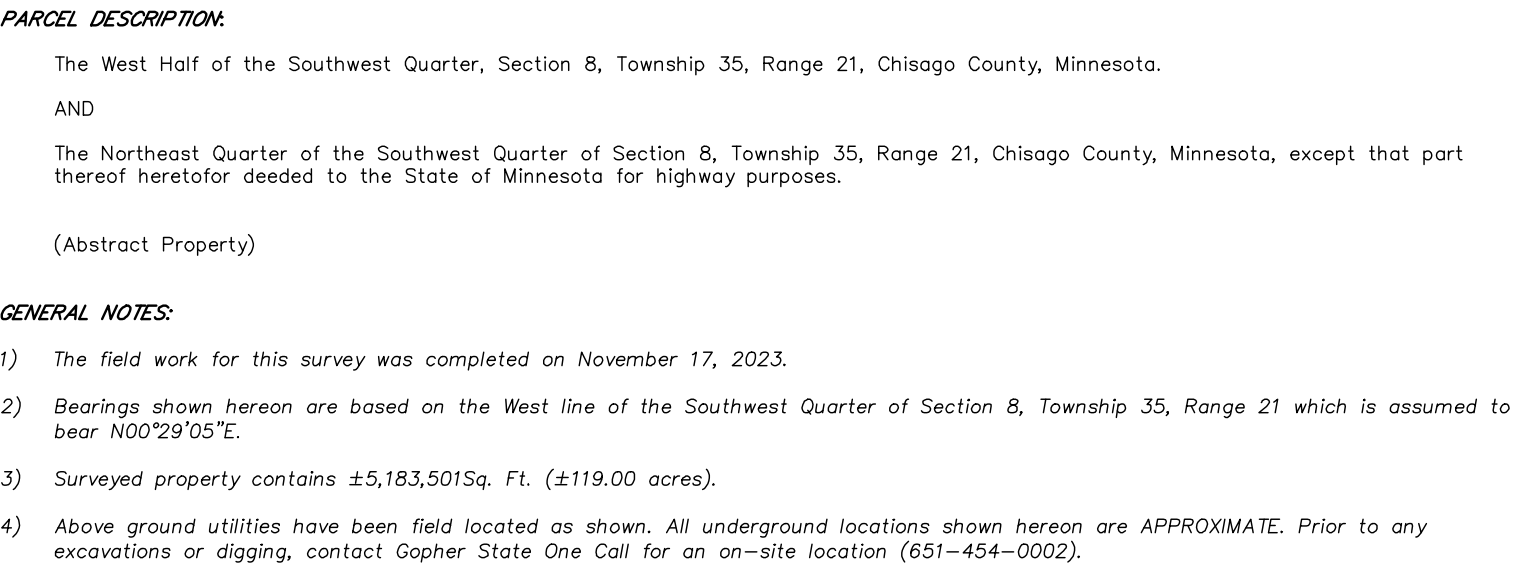
BENCHMARK	
1. Minnesota Department of Transportation Geodetic GSID Station No. 4775 (MnDot Name BEV MNDT) - Elevation 921.028 ft. (NAVD88)	
2. Minnesota Department of Transportation Geodetic GSID Station No. 85681 (MnDot Name OTTERNESS 2) - Elevation 902.87 ft. (NAVD88)	

CALL BEFORE YOU DIG

Know what's below.
Call before you dig.

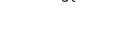
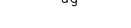
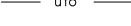
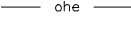
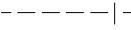
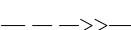
The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

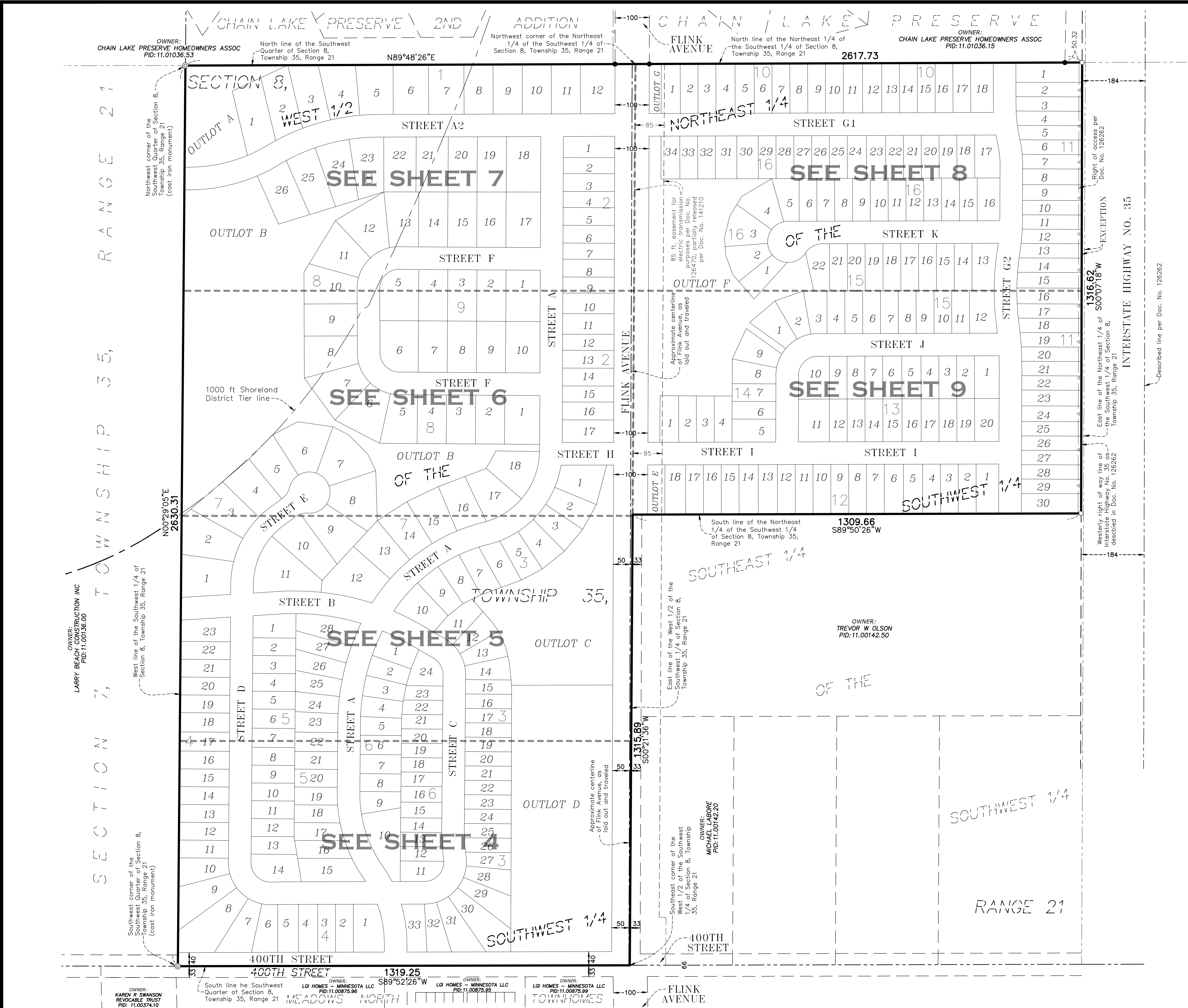




BENCHMARK	
1.	Minnesota Department of Transportation Geodetic GSID Station No. 4775 (MnDot Name BEV MNDT) – Elevation 921.028 ft. (NAVD88)
2.	Minnesota Department of Transportation Geodetic GSID Station No. 85681 (MnDot Name OTTERNESS 2) – Elevation 902.87 ft. (NAVD88)

LEGEND

	- Denotes Chisago County Section Monument, as noted
	- Denotes Found Iron Monument
	- Denotes 5/8 inch by 14 inch rebar, marked with RLS 40361
	- Denotes Miscellaneous Sign
$\times$ 000.0	- Denotes Existing Spot Elevation
	- Denotes Sanitary Manhole
	- Denotes Guy Wire
	- Denotes Utility Pole
	- Denotes Telephone Box
	- Denotes Television Box
	- Denotes Hand Hole
	- Denotes Soil Boring/Test Hole
	- Denotes Underground Telephone
	- Denotes Underground Gas
	- Denotes Underground Fiber Optic
	- Denotes Overhead Utility Line(s)
	- Denotes Watermain
	- Denotes Sanitary Sewer
	- Denotes Storm Sewer
	- Denotes Right of Access Line
	- Denotes Existing Fence as noted
	- Denotes Gravel Surface
	- Denotes Bituminous Surface
	- Denotes Existing 2 Ft. Contour
	- Denotes Existing 10 Ft. Contour



PARCEL DESCRIPTION:

The West Half of the Southwest Quarter, Section 8, Township 35, Range 21, Chisago County, Minnesota.

AND

The Northeast Quarter of the Southwest Quarter of Section 8, Township 35, Range 21, Chisago County, Minnesota, except that part thereof heretofor deeded to the State of Minnesota for highway purposes.

(Abstract Property)

SITE DATA

TOTAL SITE AREA	±119.00 AC.
TOTAL ROW AREA	±26.42 AC.
TOTAL OUTLOT AREA	±22.25 AC.
OUTLOT A	±1.17 AC.
OUTLOT B	±8.02 AC.
OUTLOT C	±3.11 AC.
OUTLOT D (COMMERCIAL)	±5.27 AC.
OUTLOT E	±0.17 AC.
OUTLOT F	±4.39 AC.
OUTLOT G	±0.12 AC.

TOTAL LOT AREA	±70.33 AC.
SMALLEST LOT	±4,667 S.F.
LARGEST LOT	±19,660 S.F.
AVERAGE LOT	±8,958 S.F.
TOTAL NUMBER OF LOTS	342

GROSS DENSITY	2.87 LOTS/AC. (342 LOTS/119.00 AC.)
---------------	--

EXISTING ZONING	COMM./SHORELAND/R1
PROP. ZONING	COMM./SHORELAND/R1/PUD

UTILITIES	AVAILABLE
-----------	-----------

BUILDING SETBACK DATA

SHORELAND LOTS

LOTS 1-7, BLOCK 1; LOTS 8-13	
LOTS 21-26, BLOCK 8	
FRONT	30 FT.
SIDE	6 FT.
SIDE CORNER	30 FT.
REAR SETBACK	30 FT.
MIN. AREA	15,000 SQ.FT.
MIN. LOT WIDTH	75 FT.

STANDARD R-1 LOTS

LOTS 8-12, BLOCK 1; BLOCK 7; LOTS 1-7	
& LOTS 14-21, BLOCK 8; BLOCK 9	
FRONT	30 FT.
SIDE	6 FT.
SIDE CORNER	30 FT.
REAR SETBACK	30 FT.
MIN. AREA	12,000 SQ.FT.
MIN. LOT WIDTH	80 FT.

PUD LOTS

(42 FT, 47 FT, 52 FT, & 62 FT WIDE LOTS)

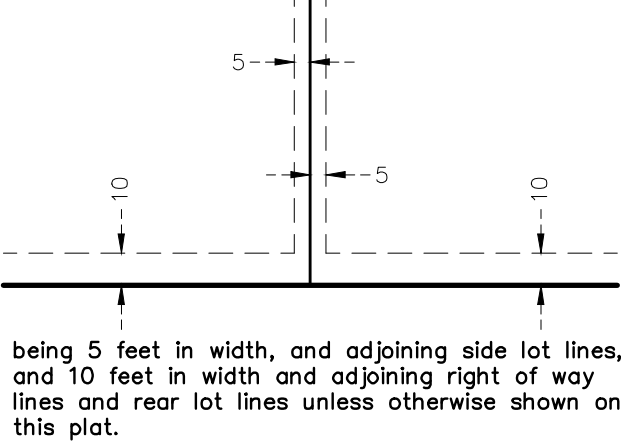
BLOCK 2	
FRONT	25 FT.
SIDE	6 FT.
SIDE CORNER	20 FT.
REAR SETBACK (FLINK AVE)	50 FT.

LOTS 30-33, BLOCK 3 & LOTS 1-8, BLOCK 4	
FRONT	25 FT.
SIDE	6 FT.
SIDE CORNER	20 FT.
REAR SETBACK (400TH STREET)	50 FT.

LOTS 1-29, BLOCK 3; LOTS 9-23, BLOCK 4;	
BLOCKS 5, 6, 10, 12, 13, 14, 15, 16	
FRONT	25 FT.
SIDE	6 FT.
SIDE CORNER	20 FT.
REAR SETBACK	30 FT.

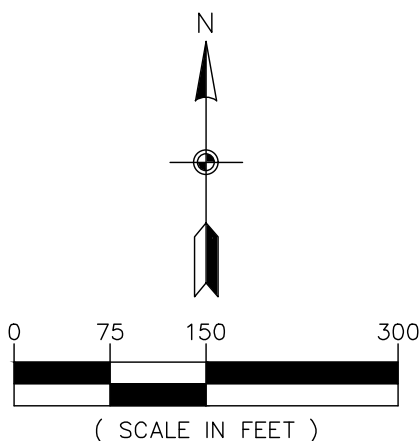
BLOCK 11	
FRONT	25 FT.
SIDE	6 FT.
SIDE CORNER	20 FT.
REAR SETBACK (INTERSTATE 35)	50 FT.

PROPOSED DRAINAGE AND UTILITY EASEMENTS ARE SHOWN THUS: (NOT TO SCALE)



LEGEND

- - Denotes Chisago County Section Monument, as noted
- - Denotes Found Iron Monument, marked with RLS 20262
- - Denotes 5/8 inch by 14 inch rebar, marked with RLS 40361



CARLSON McCAIN
ENGINEERING
SURVEYING
ENVIRONMENTAL

3890 PHEASANT RIDGE DR NE
SUITE 100
BLAINE, MN 55449
TEL 763.489.7900
FAX 763.489.7959
CARLSONMCCAIN.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

Print Name: Thomas R. Balluff, L.S.
Signature: *Thomas R. Balluff*
Date: 5/3/24 License #: 40361

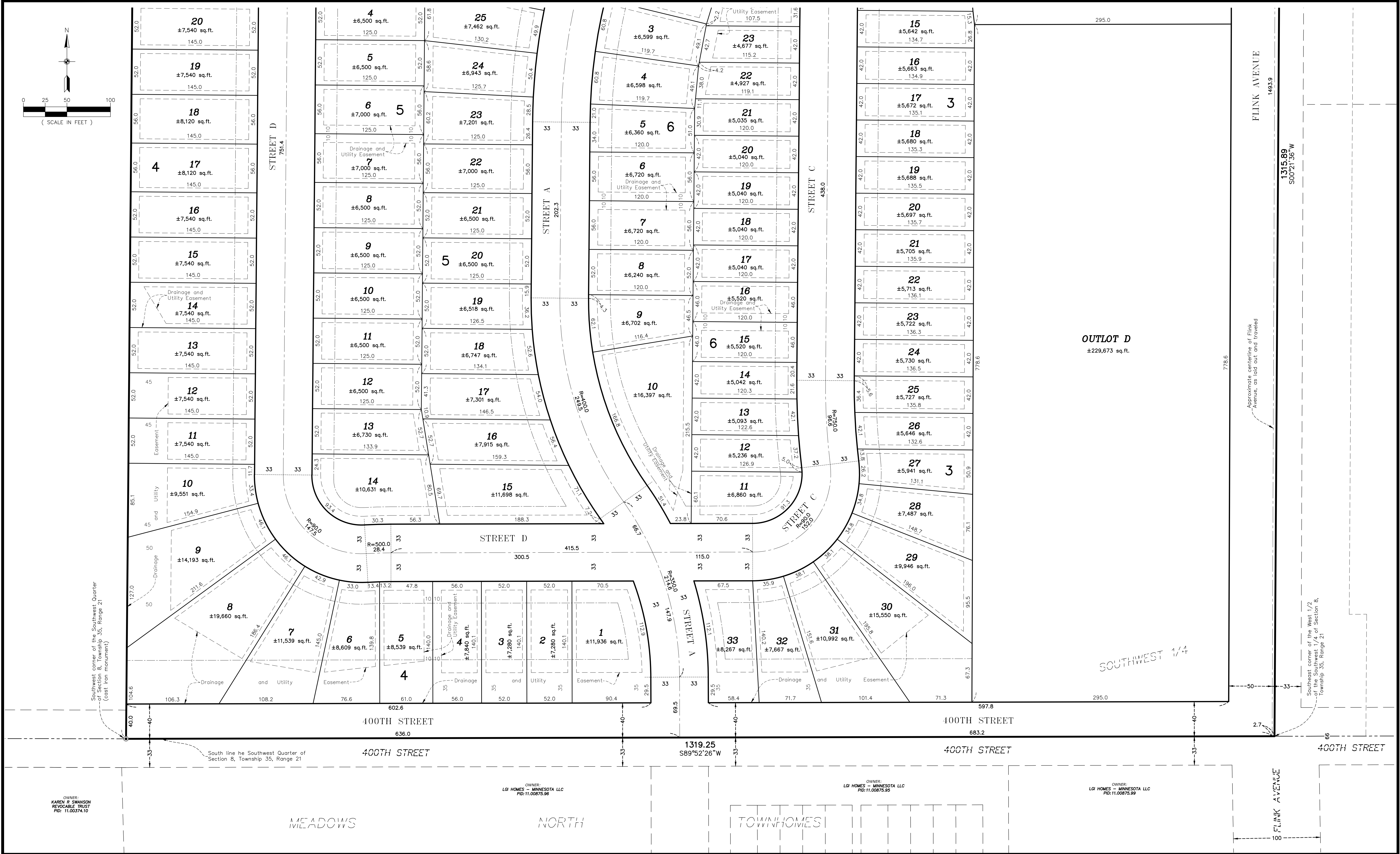
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ISSUE DATE: 5/3/24
FILE NO: 1619

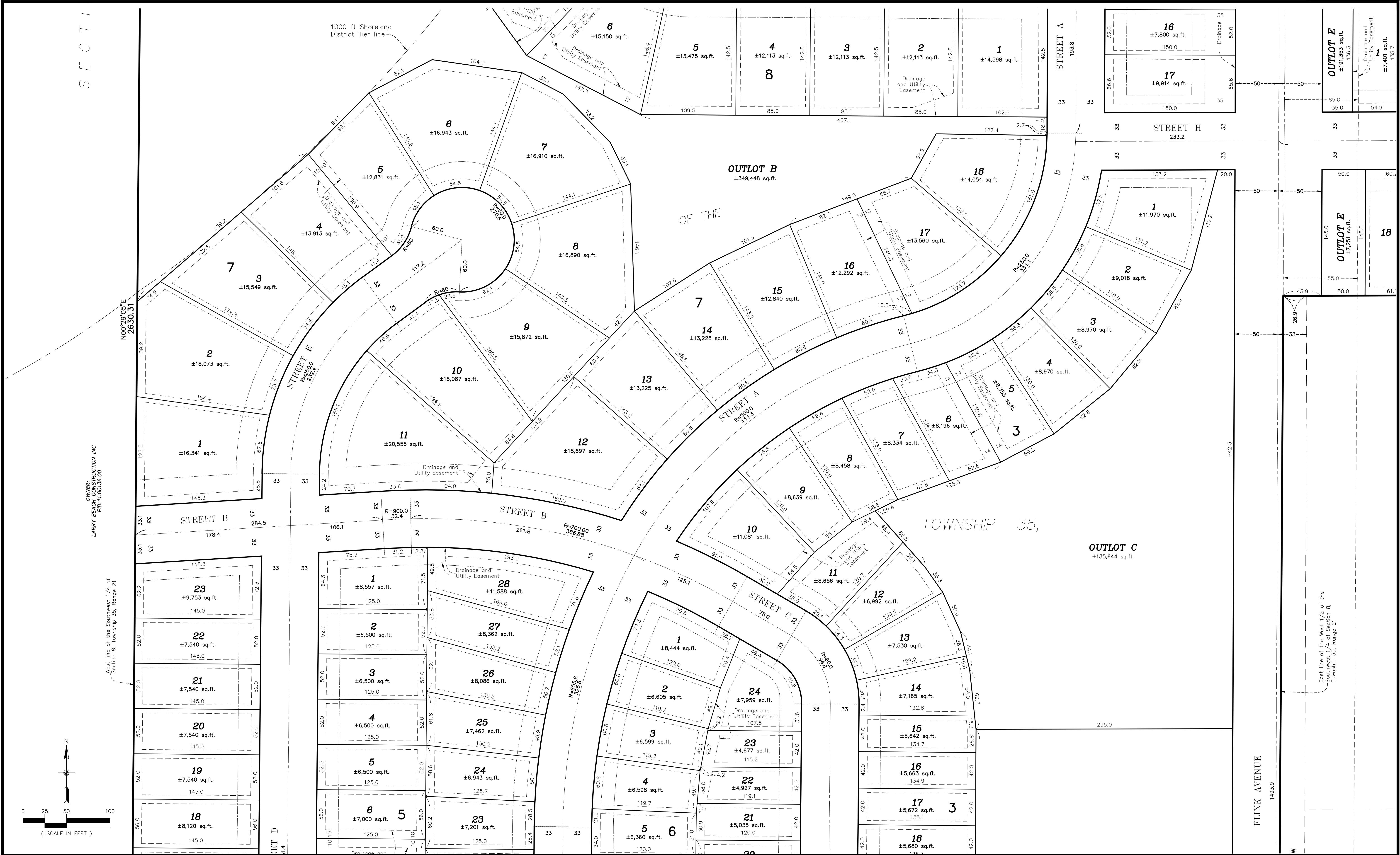
Revisions:
1. 8/19/24 per City Comments
2. 9/23/24 per City Comments

LGI HOMES - MINNESOTA, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

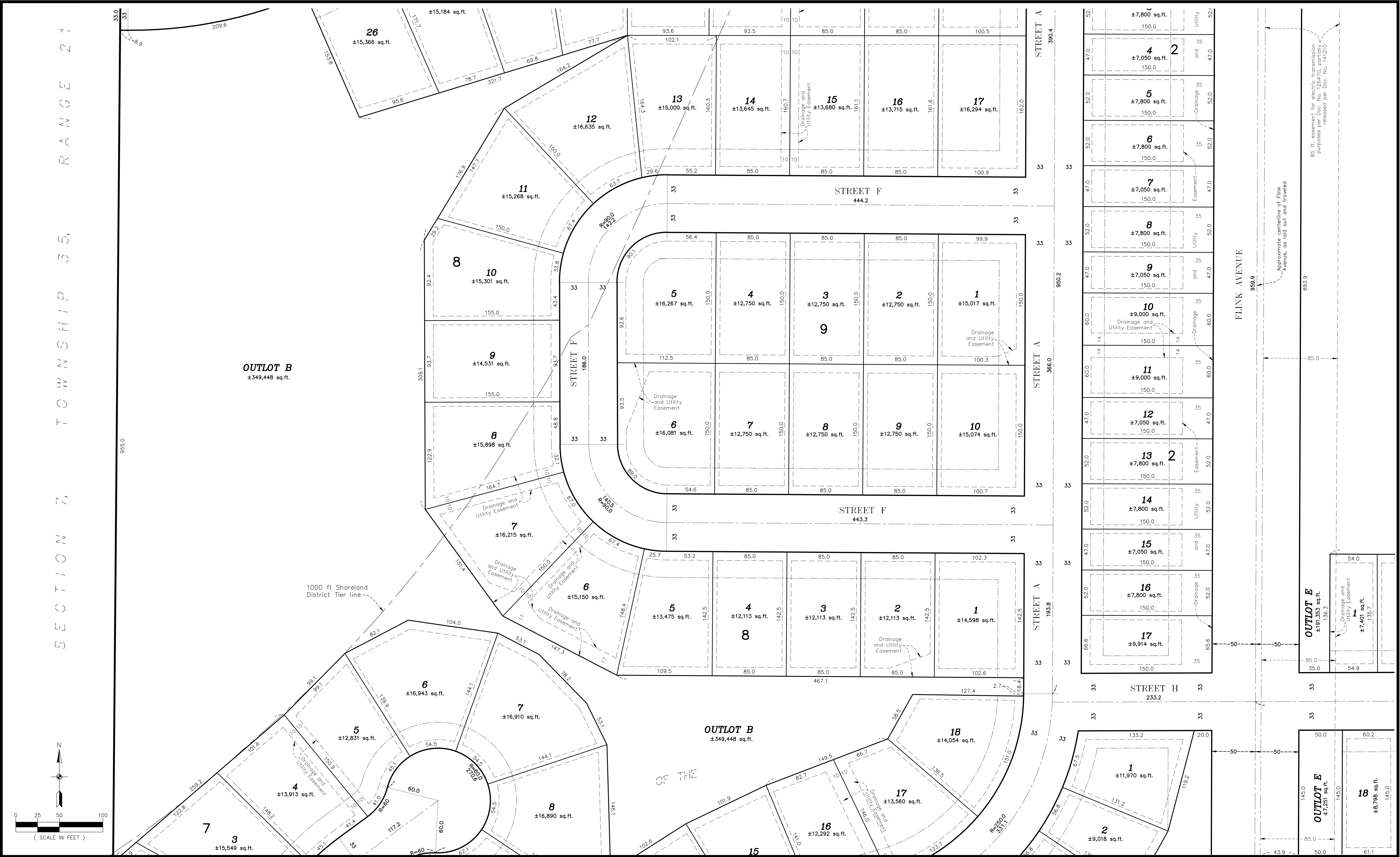
MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

PRELIMINARY PLAT INDEX





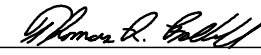
 CARLSON MCCAIN ENGINEERING SURVEYING ENVIRONMENTAL	3890 PHEASANT RIDGE DR NE SUITE 100 BLAINE, MN 55449 TEL 763.489.7900 FAX 763.489.7959 CARLSONMCCAIN.COM	I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota Print Name: Thomas R. Balluff, L.S. Signature: <i>Thomas R. Balluff</i> Date: 5/3/24 License #: 40361	DRAWN BY: NJS ISSUE DATE: 5/3/24 FILE NO: 1619	Revisions: 1. 8/19/24 per City Comments 2. 9/23/24 per City Comments	LGI HOMES - MINNESOTA, LLC 2850 Cutters Grove Avenue, Suite 207 Anoka, Minnesota 55303	MEADOWS RIDGE NORTH BRANCH, MINNESOTA	PRELIMINARY PLAT	5 of 20
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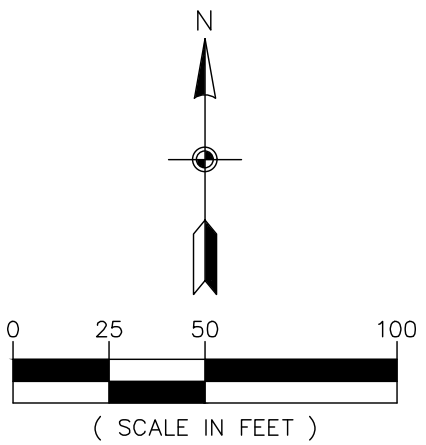


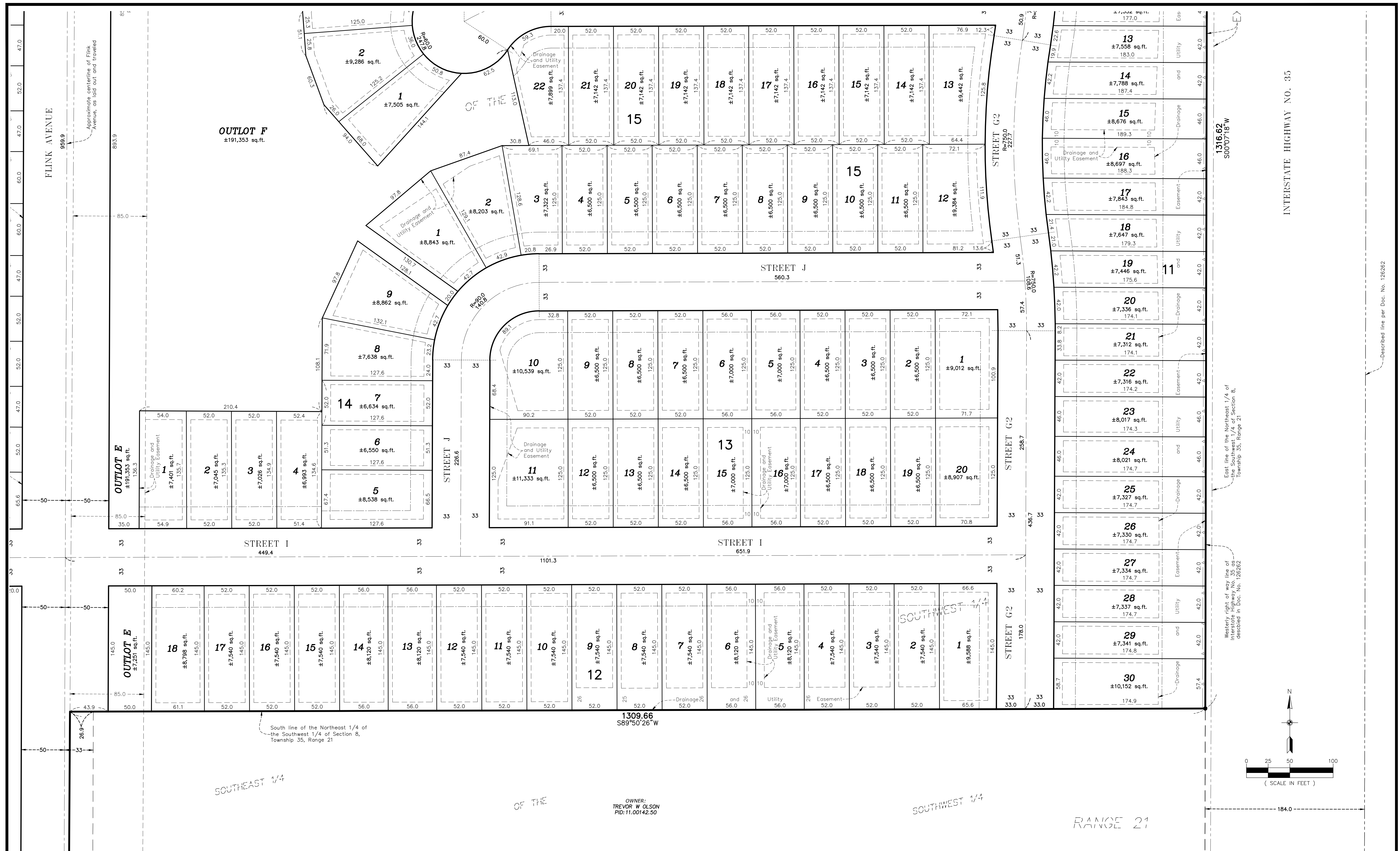
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 CARLSON MCCAIN ENGINEERING SURVEYING ENVIRONMENTAL	3890 PHEASANT RIDGE DR NE SUITE 100 BLAINE, MN 55449 TEL 763.489.7900 FAX 763.489.7959 CARLSONMCCAIN.COM	I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota Print Name: Thomas R. Balluff, L.S. Signature:  Date: 5/3/24 License #: 40361	DRAWN BY: NJS ISSUE DATE: 5/3/24 FILE NO: 1619	Revisions: 1. 8/19/24 per City Comments 2. 9/23/24 per City Comments	LGI HOMES - MINNESOTA, LLC 2850 Cutters Grove Avenue, Suite 207 Anoka, Minnesota 55303	MEADOWS RIDGE NORTH BRANCH, MINNESOTA	PRELIMINARY PLAT	7 of 20
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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

Print Name: Thomas R. Balluff, L.S.
Signature: 
Date: 5/3/24 License #: 40361

DRAWN BY: _____ NJS
ISSUE DATE: _____ 5/3/24
FILE NO: _____ 1619

Revisions:
1. 8/19/24 per City Comments
2. 9/23/24 per City Comments

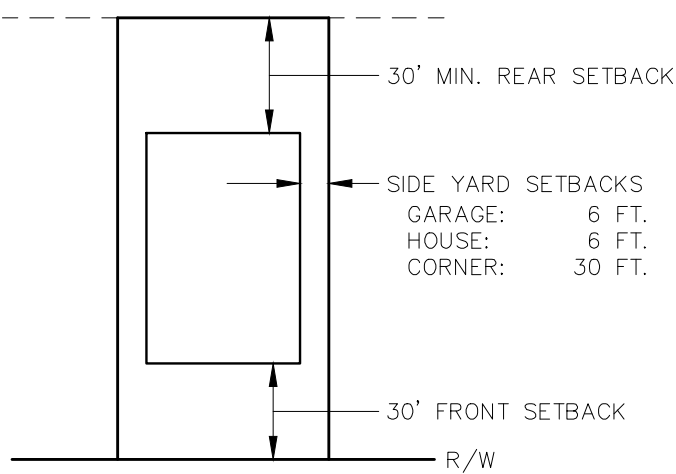
LGI HOMES - MINNESOTA, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

PRELIMINARY PLAT 9 of 20

SHORELAND & STANDARD R1 LOTS

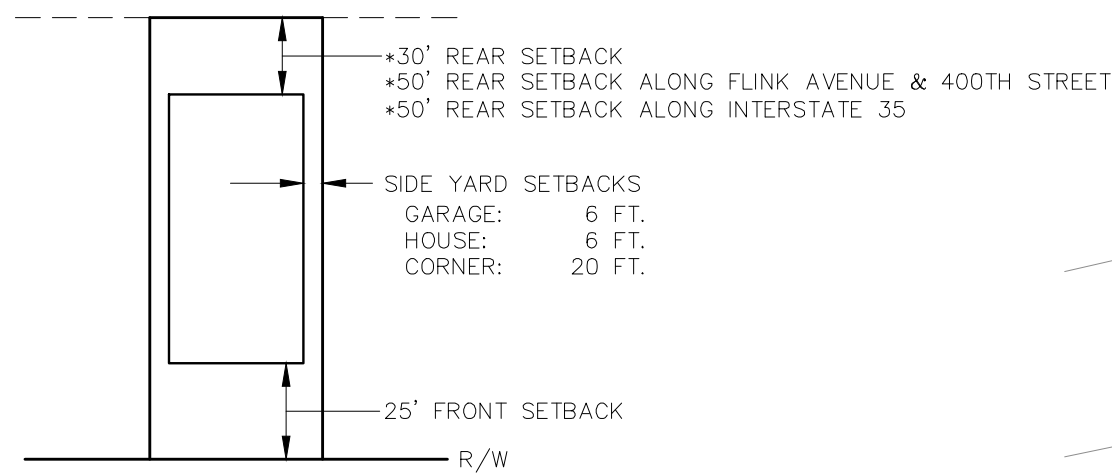
SHORELAND: (MIN LOT WIDTH 75', MIN LOT AREA 15,000 S.F.)
STANDARD R1: (MIN LOT WIDTH 80', MIN LOT AREA 12,000 S.F.)



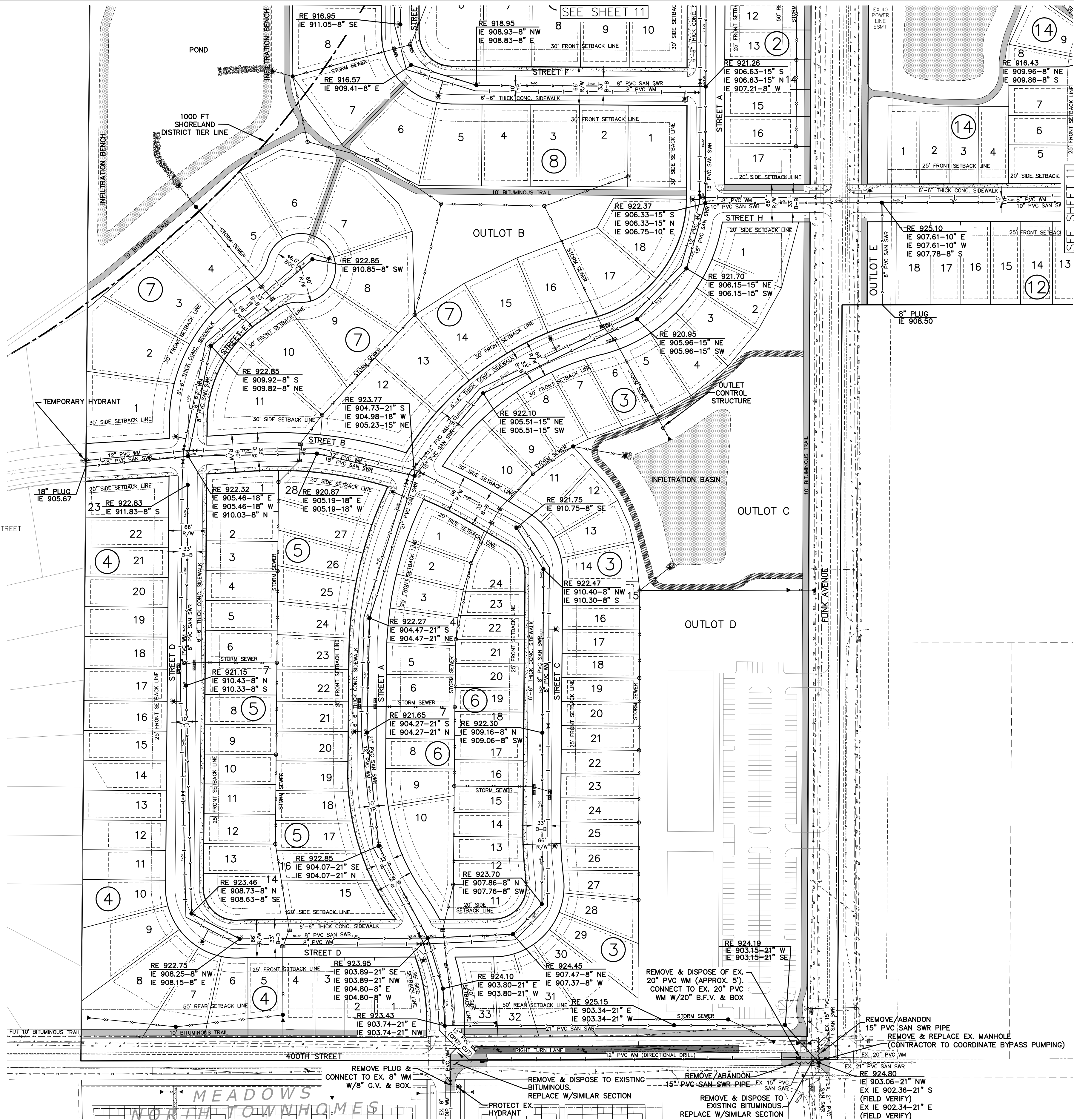
TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

PUD LOTS

(42', 47', 52', & 62' WIDE LOTS)

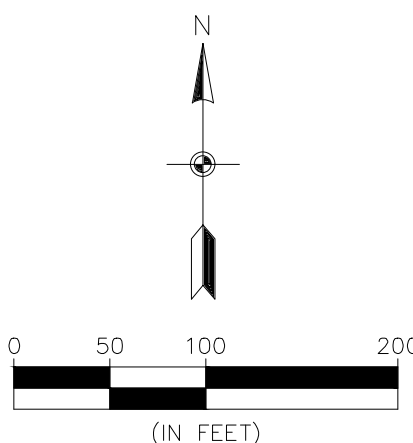


TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W



SITE PLAN LEGEND

	EXISTING	PROPOSED
LIGHT POLE		
SANITARY MANHOLE		
MISCELLANEOUS SIGN		
EXISTING SPOT ELEVATION		
EXISTING TREE		
TELEVISION BOX		
FIRE HYDRANT		
FLUSHING HYDRANT		
GATE VALVE		
CLEANOUT		
ELECTRIC BOX		
GAS METER		
CATCH BASIN		
RAIN GUARDIAN		
ELECTRIC METER		
TELEPHONE BOX		
UTILITY POLE		
FLARED END SECTION		
STORM MANHOLE		
SERVICE		
SOIL BORING/TEST HOLE		
RETAINING WALL		
WATERMAIN		
SANITARY SEWER		
FORCEMAIN		
STORM SEWER		
PROPERTY LINE		
SETBACK LINE		
CURB		
WETLAND		
DITCH		
UNDERGROUND TELEPHONE		
UNDERGROUND ELECTRIC		
UNDERGROUND GAS		
UNDERGROUND FIBEROPTIC		
FENCE		
OVERHEAD ELECTRIC		
CONCRETE SURFACE		
BITUMINOUS SURFACE		



BENCHMARK
1. Minnesota Department of Transportation Geodetic GSD Station No. 4775 (MnDot Name BEV MND1) - Elevation 921.028 ft. (NAVD88)
2. Minnesota Department of Transportation Geodetic GSD Station No. 65691 (MnDot Name OTTERNESS 2) - Elevation 902.87 ft. (NAVD88)



3890 PHEASANT RIDGE DR NE
SUITE 100
BLAINE, MN 55449
TEL 763.489.7900
FAX 763.489.7959
CARLSONMCCAIN.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

Print Name: Brian J. Krystofski, P.E.
Signature:
Date: 5/3/24 License #: 25063

Drawn: LOC
Designed: BJK
Date: 5/3/24

Revisions:
1. 8/19/24 per City Comments.
2. 9/23/24 per City Comments.

LGI HOMES - MINNESOTA, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

PRELIMINARY SITE
& UTILITY PLAN

10
of
20

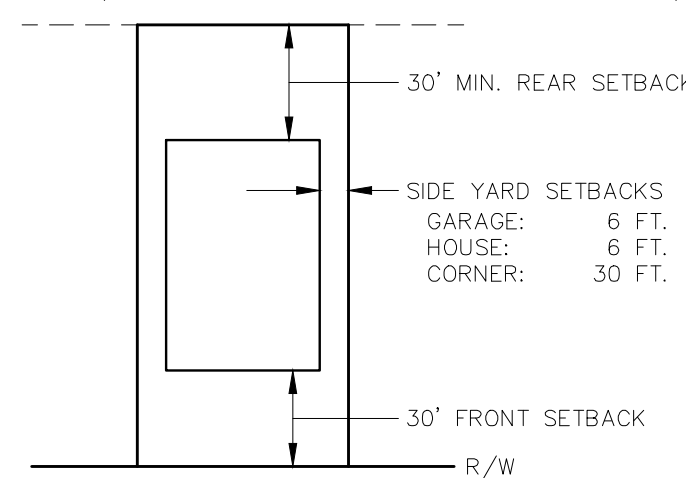
#7226-03

SITE PLAN LEGEND

EXISTING	PROPOSED

SHORELAND & STANDARD R1 LOTS

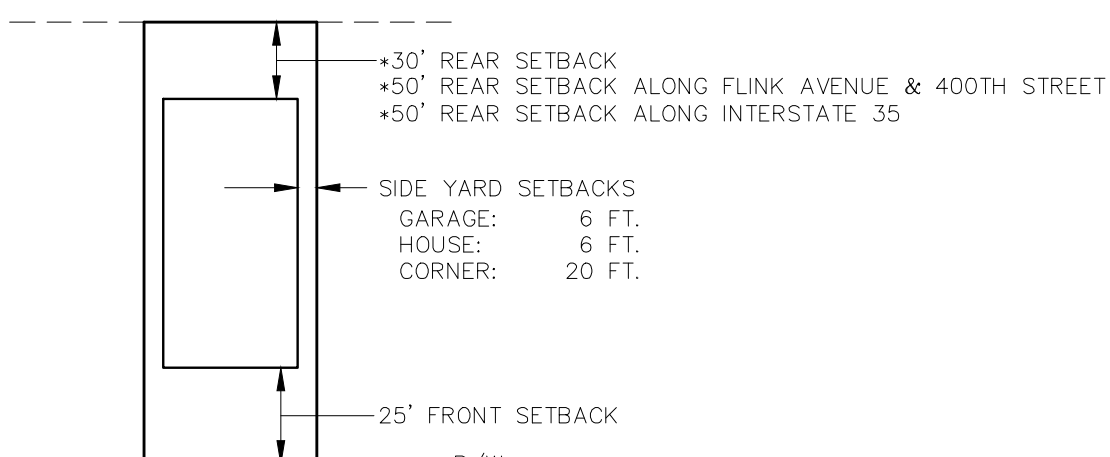
SHORELAND: (MIN LOT WIDTH 75', MIN LOT AREA 15,000 S.F.)
STANDARD R1: (MIN LOT WIDTH 80', MIN LOT AREA 12,000 S.F.)



TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

PUD LOTS

(42', 47', 52', & 62' WIDE LOTS)



TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

CARLSON McCAIN
ENGINEERING
SURVEYING
ENVIRONMENTAL

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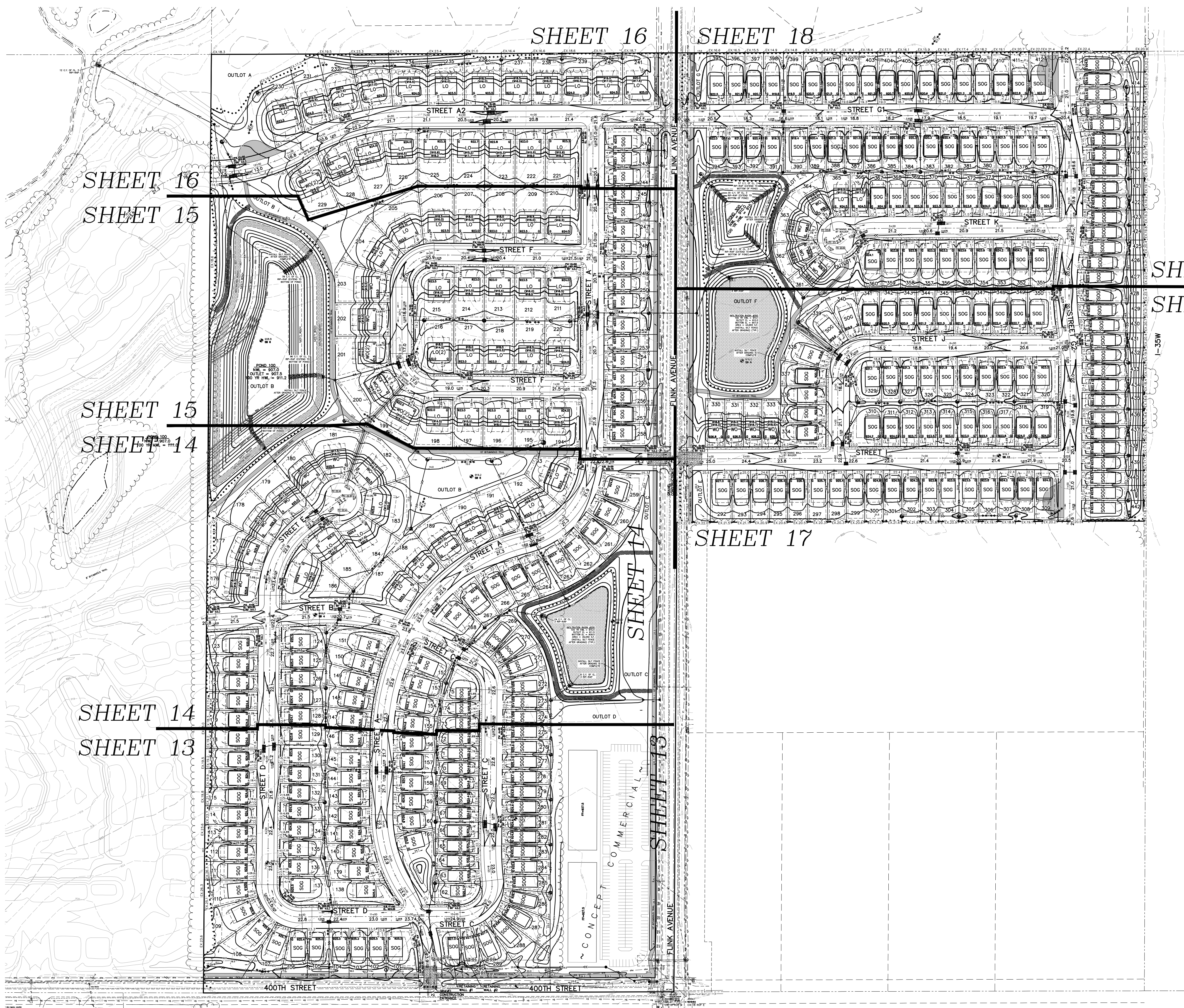
MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

**PRELIMINARY SITE
& UTILITY PLAN**

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of
20

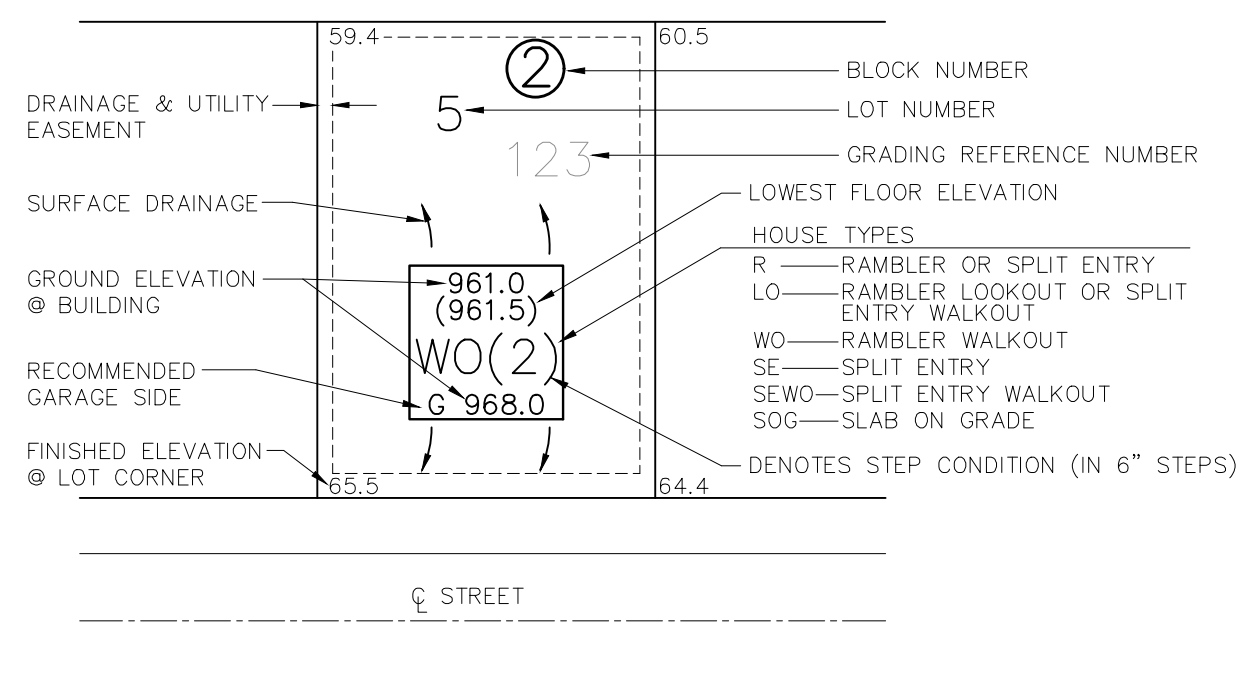
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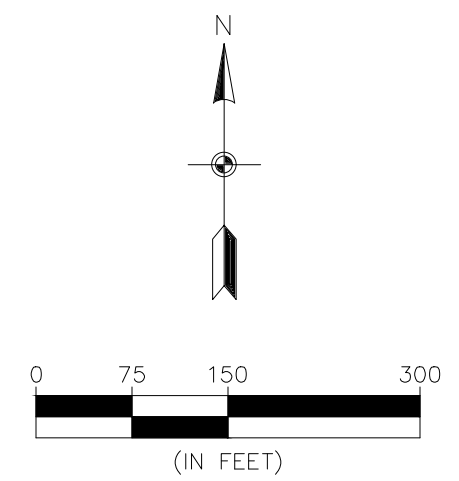
LEGEND	
EXISTING	PROPOSED
PROPERTY LINE	-----
EASEMENT LINE	-----
CURB LINE	=====
BITUMINOUS	=====
CONCRETE	=====
SANITARY SEWER	-----
STORM SEWER	-----
WATER MAIN	-----
OVERHEAD UTILITY	-----
STORM CATCH BASIN	-----
STORM MANHOLE	-----
OUTLET CONTROL STRUCTURE	-----
MANHOLE	-----
HYDRANT	-----
GATE VALVE	-----
TELEVISION BOX	-----
TELEPHONE BOX	-----
UTILITY POLE	-----
RETAINING WALL	-----
FENCE	-----
10' CONTOUR	-----
2' CONTOUR	-----
FEMA FLOOD PLAIN	-----
WETLAND LINE	-----
SPOT ELEVATION	-----
EMERGENCY OVERFLOW	-----
SILT FENCE (STANDARD DTL #2001)	-----
TREE FENCE	-----
TREELINE	-----
SOIL BORING	-----

GRADING PLAN LOT KEY



WETLAND SUMMARY

THERE ARE NO PROPOSED WETLAND IMPACTS.



BENCHMARK
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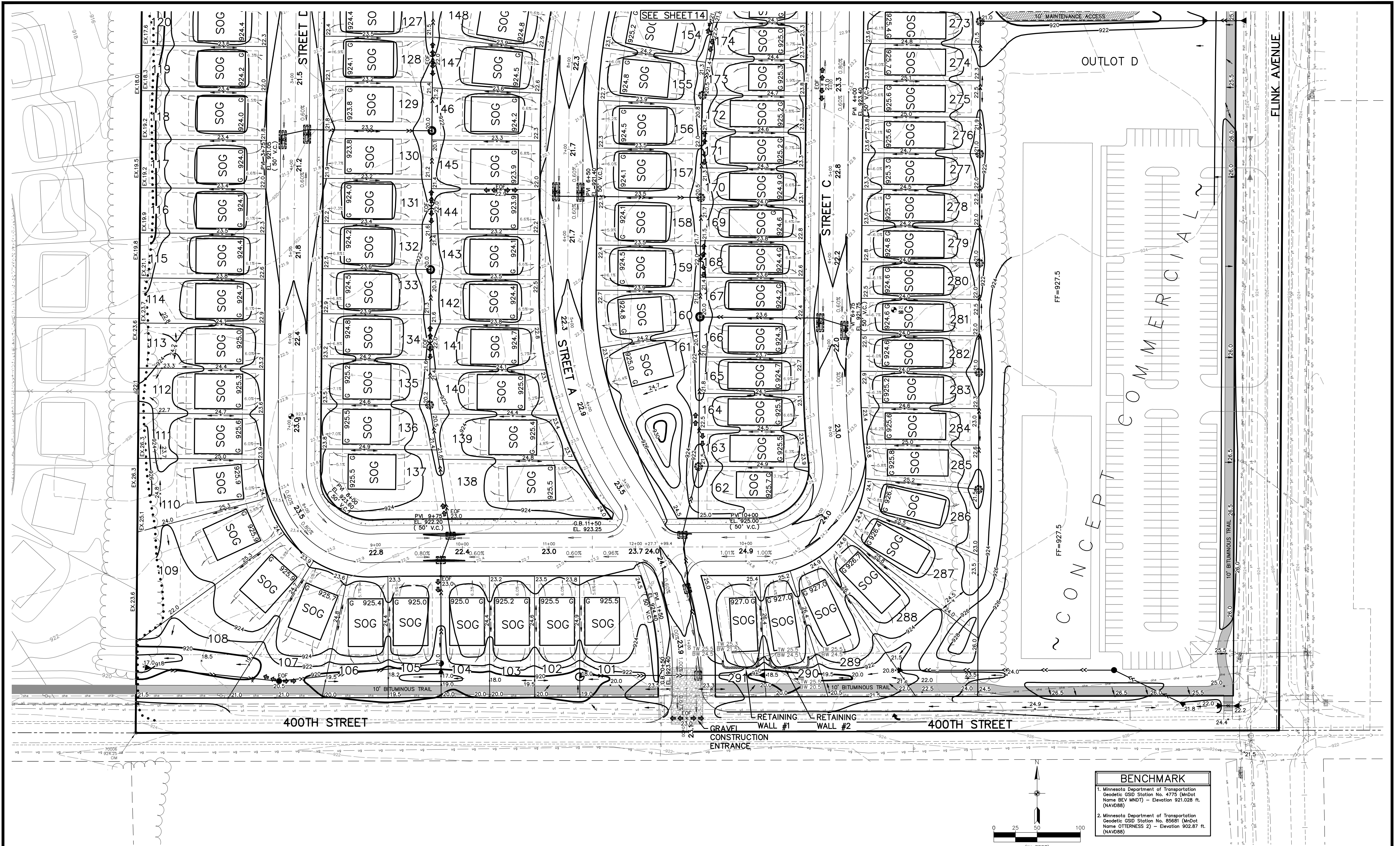
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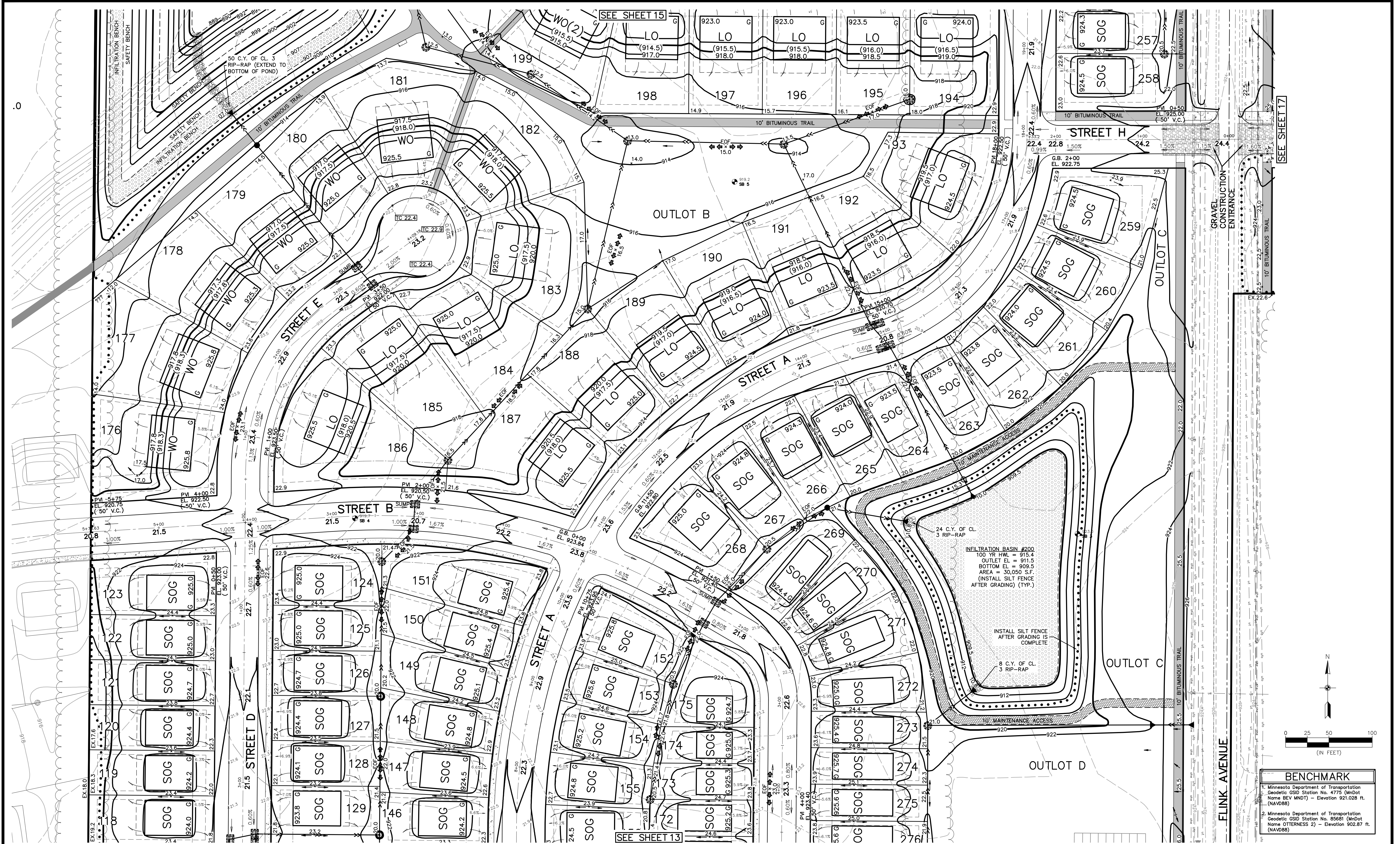
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2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

GRADING INDEX

12 of 20





CARLSON MCCAIN
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ENVIRONMENTAL

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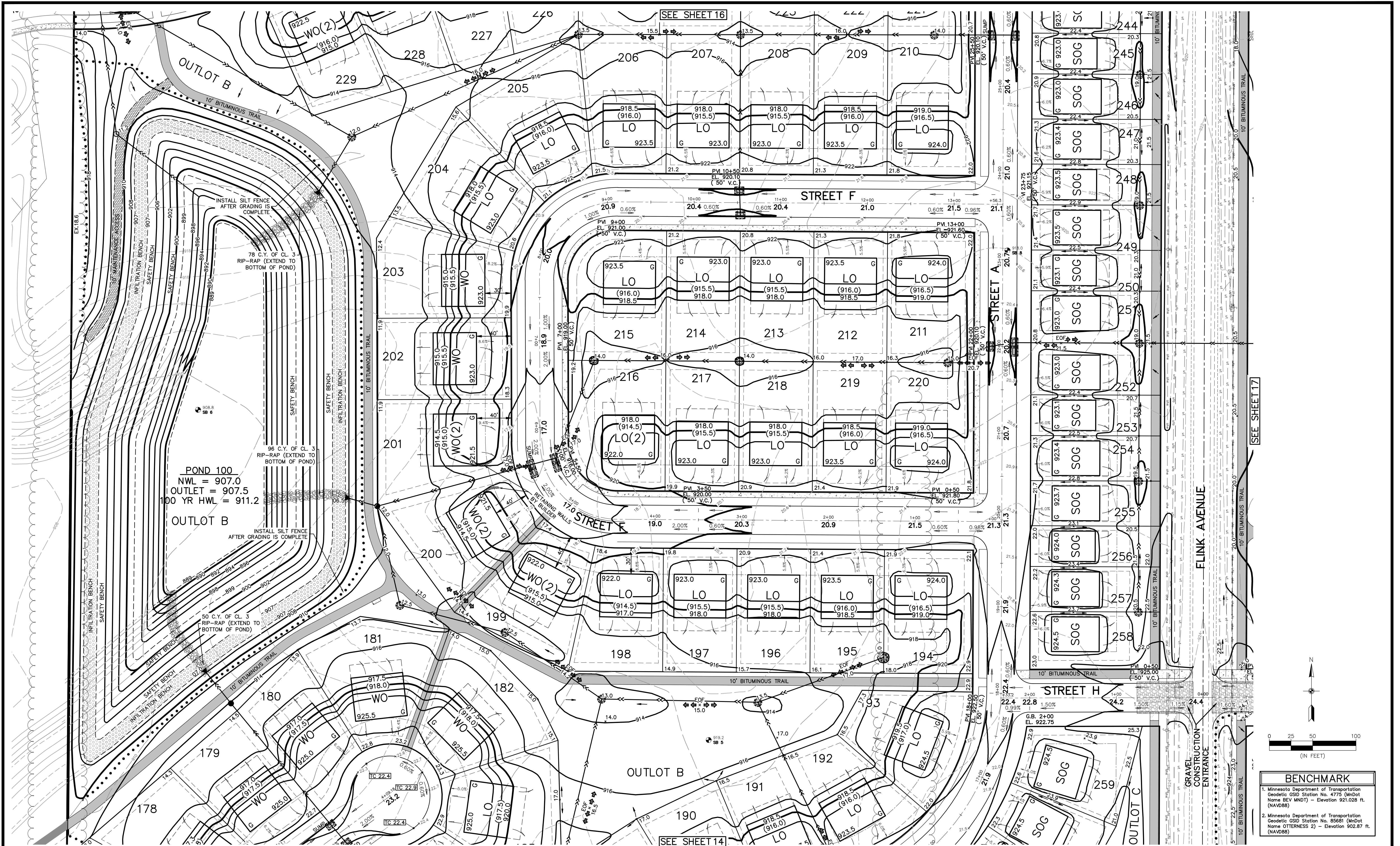
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MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

**PRELIMINARY GRADING
& EROSION CONTROL PLAN**





**CARLSON
McCain**
ENGINEERING
SURVEYING
ENVIRONMENTAL

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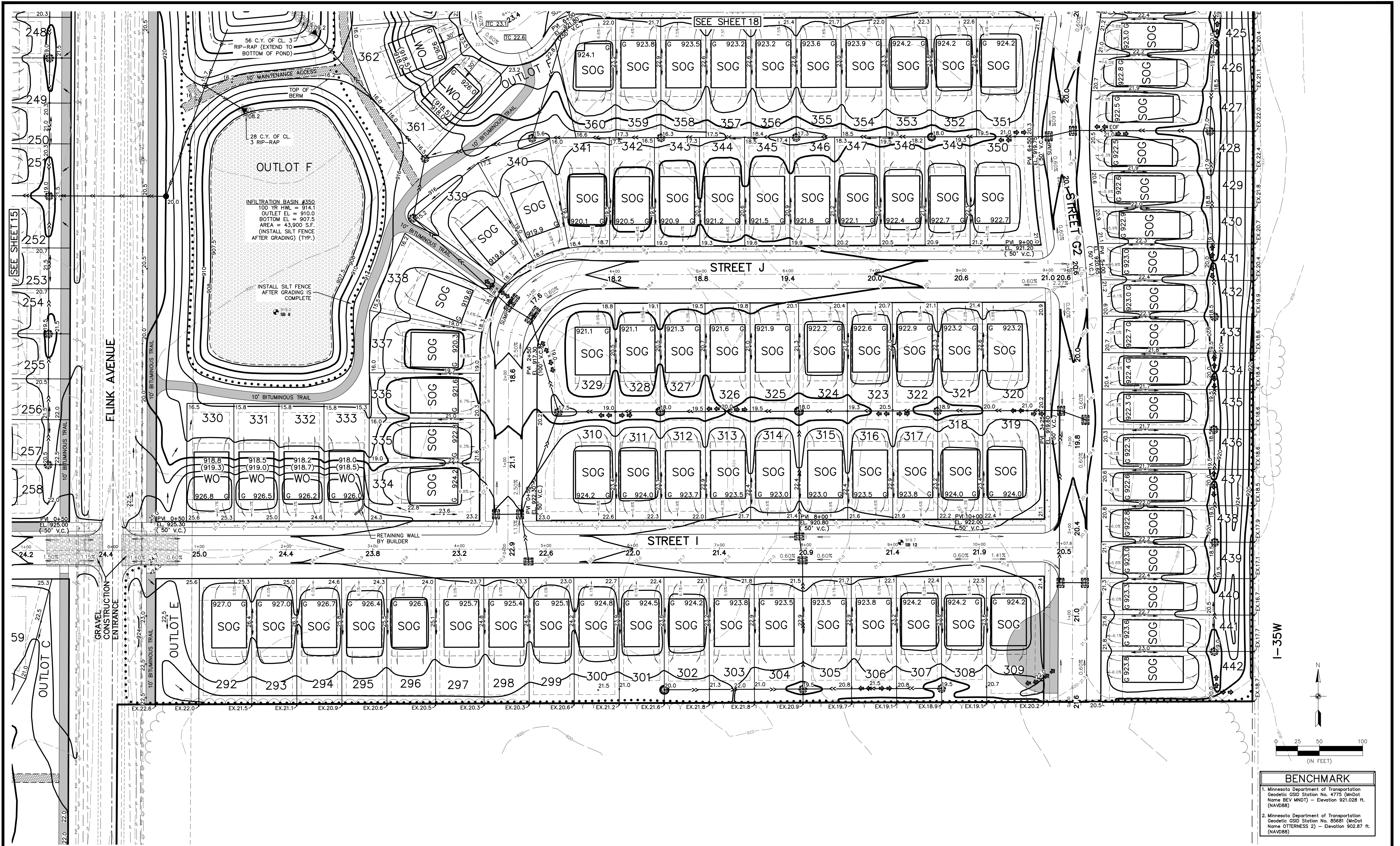
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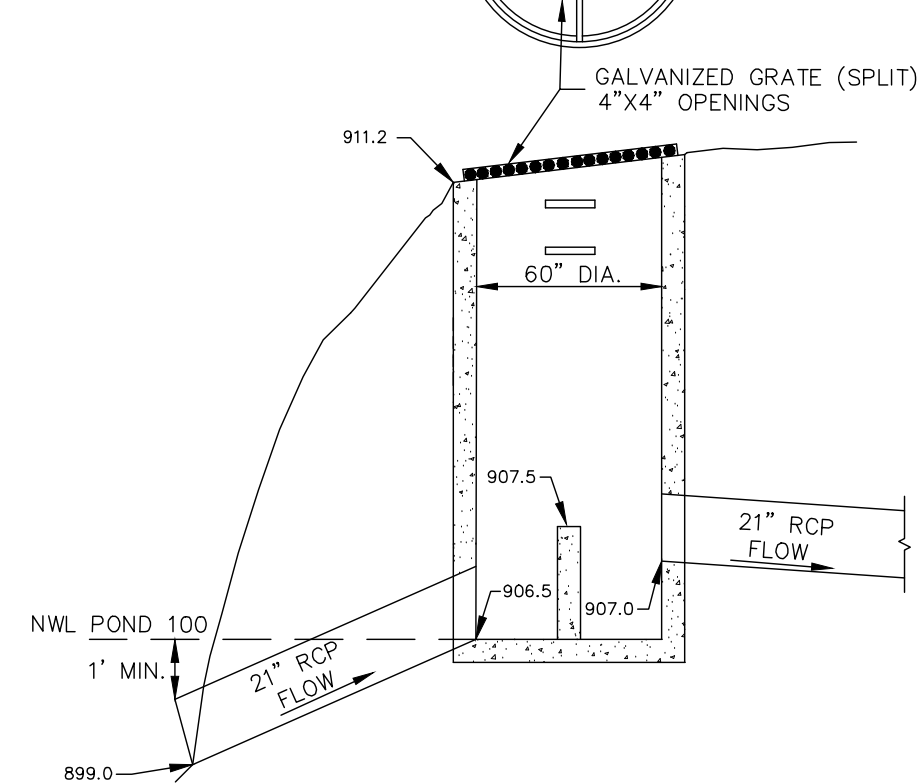
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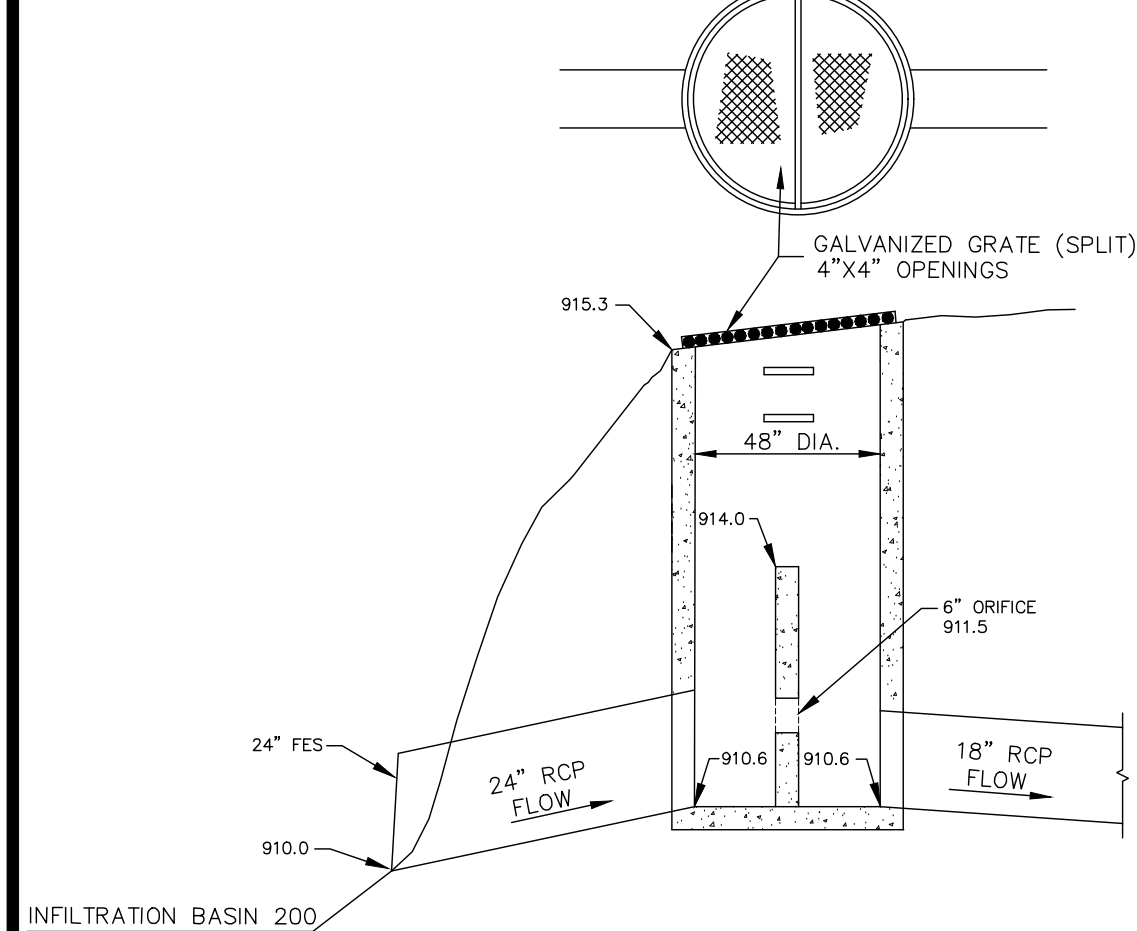
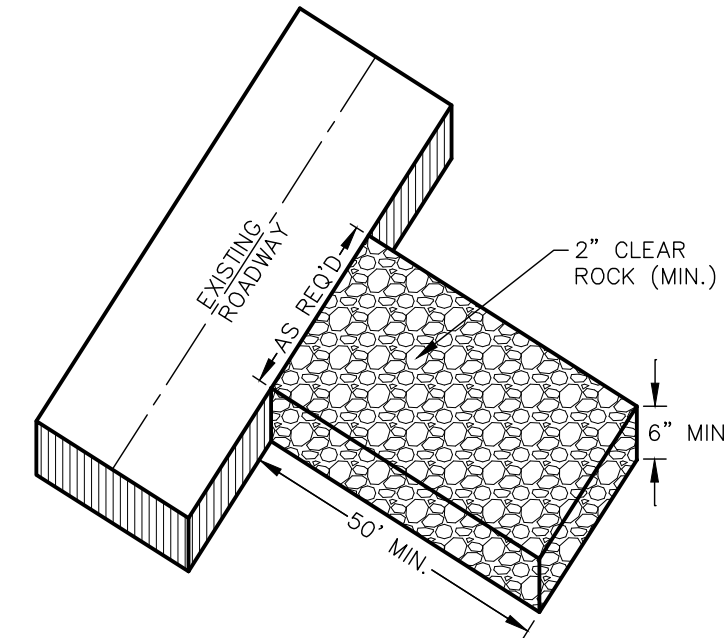
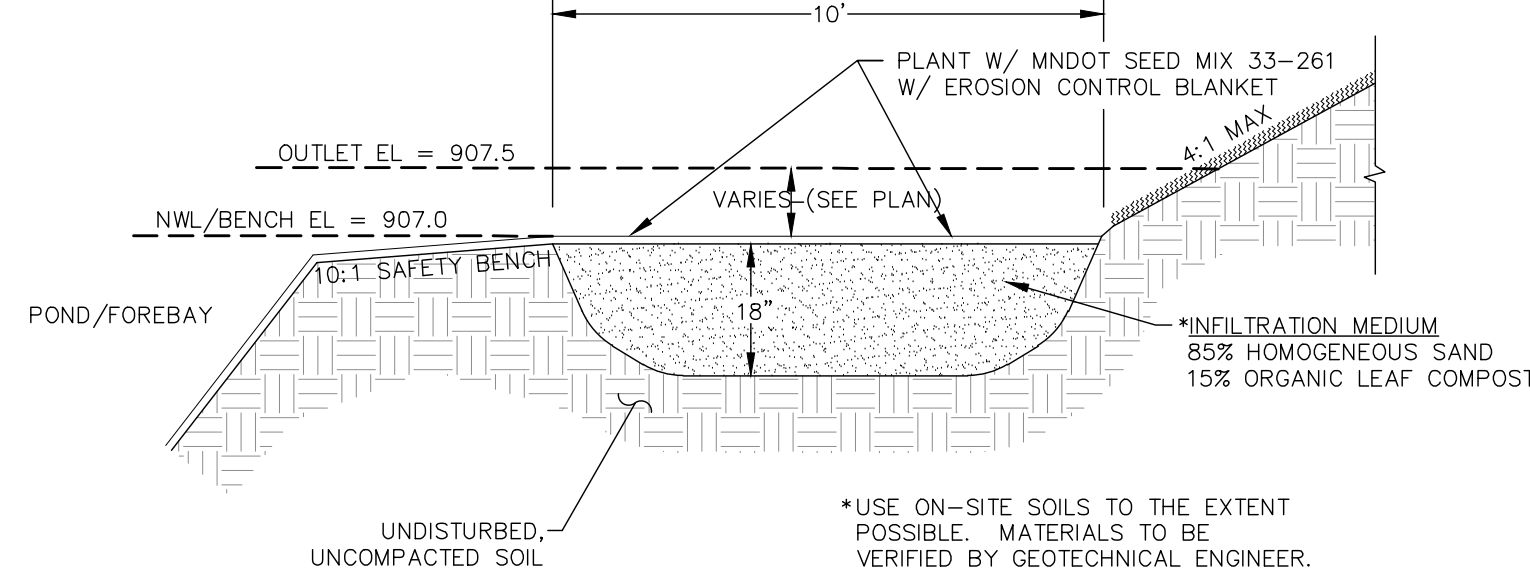
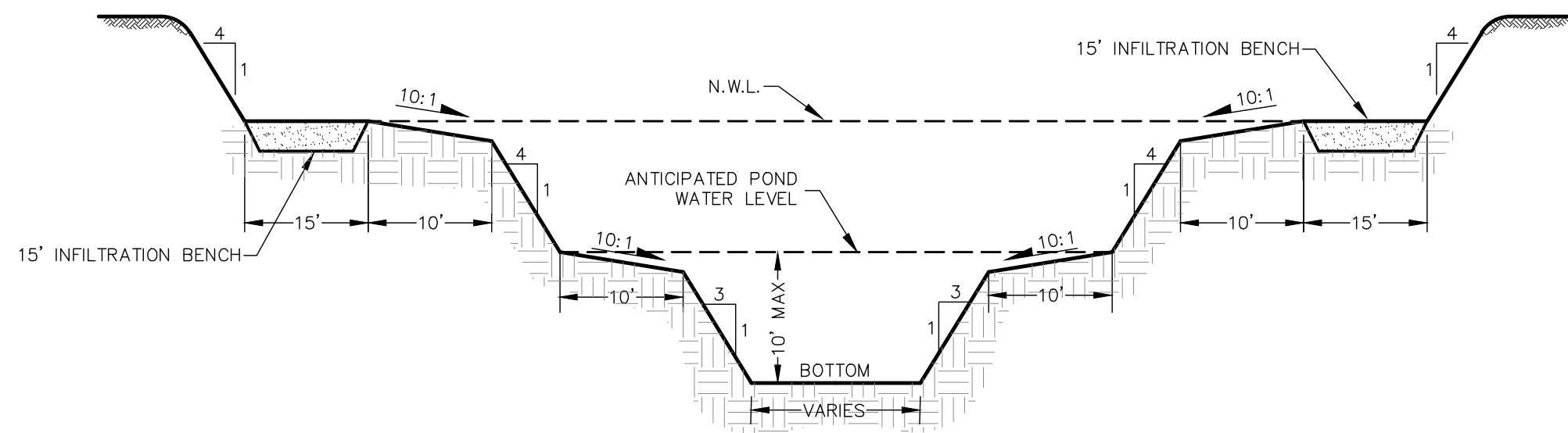
MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

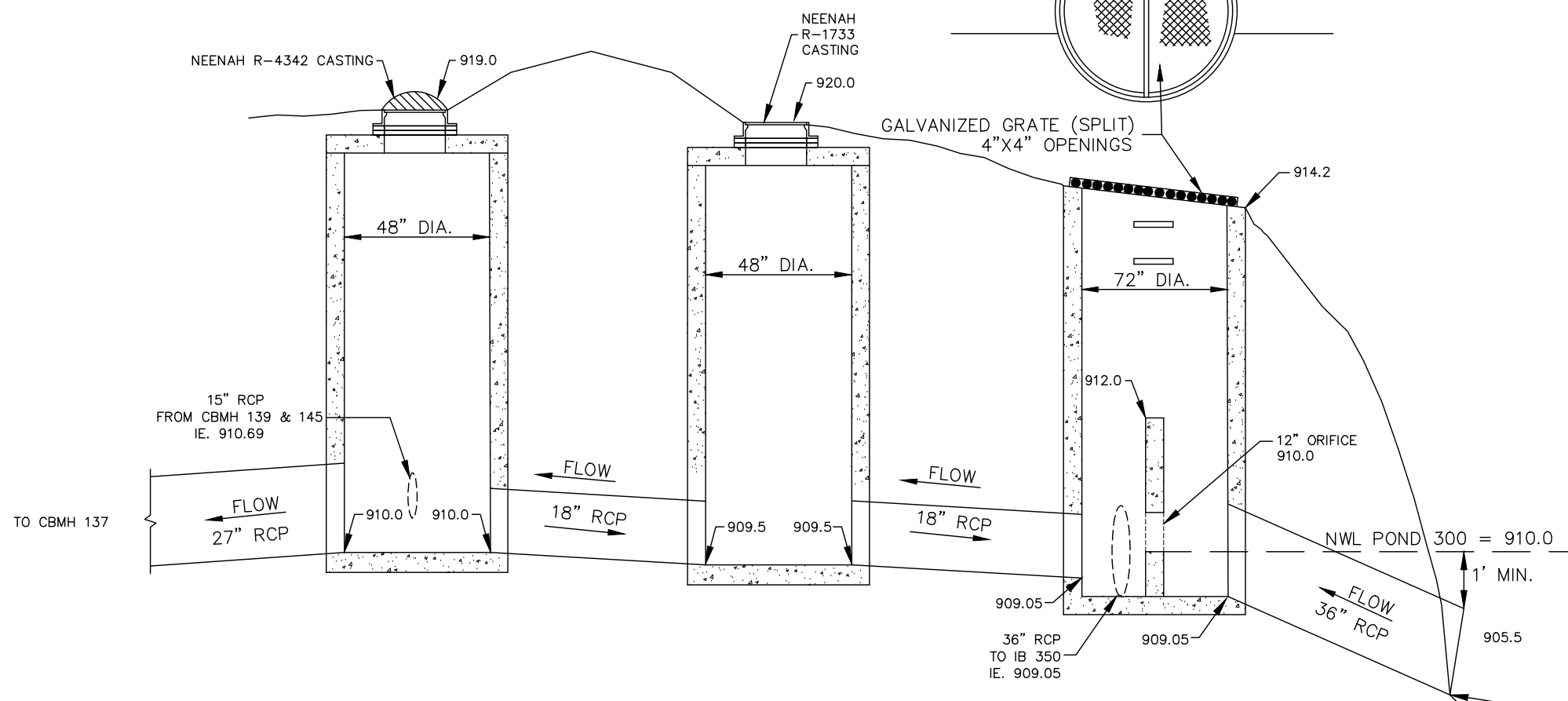
**PRELIMINARY GRADING
& EROSION CONTROL PLAN**

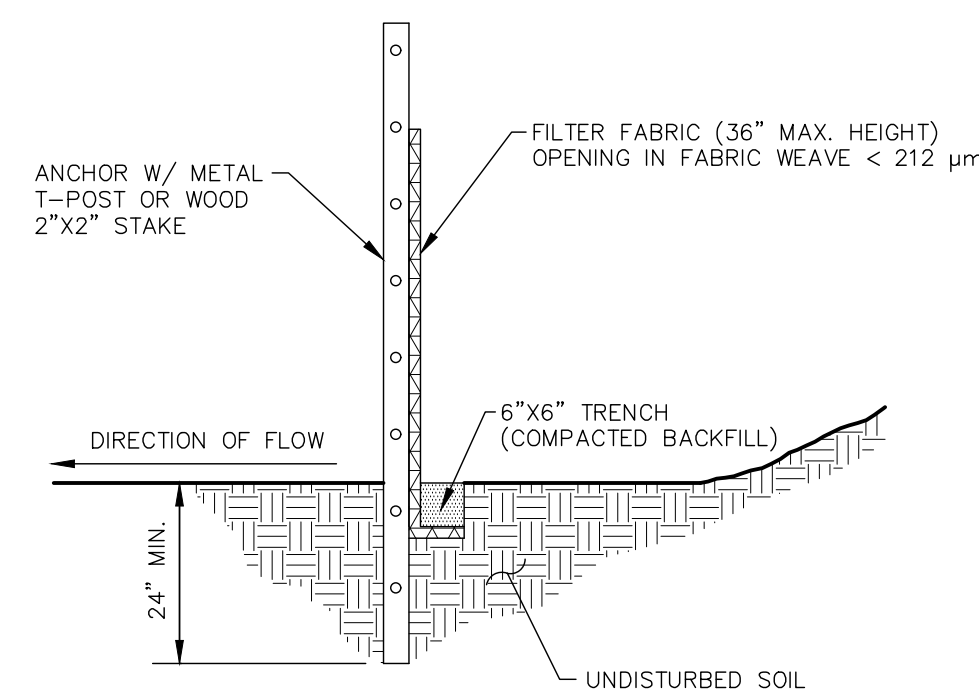
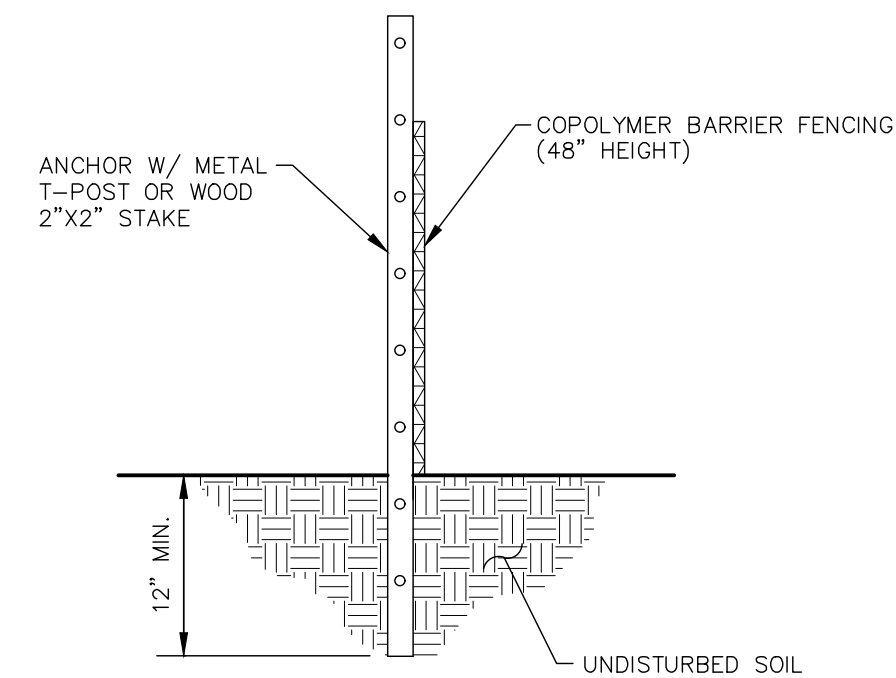
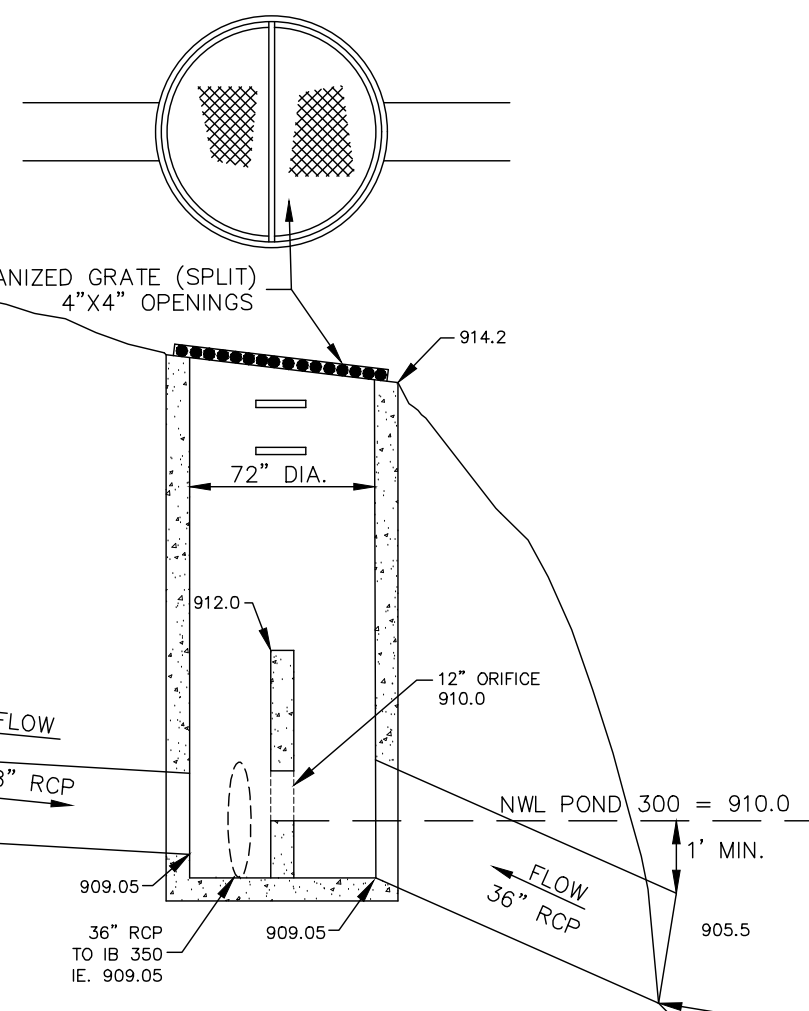




POND 100 (WITH INFILTRATION)

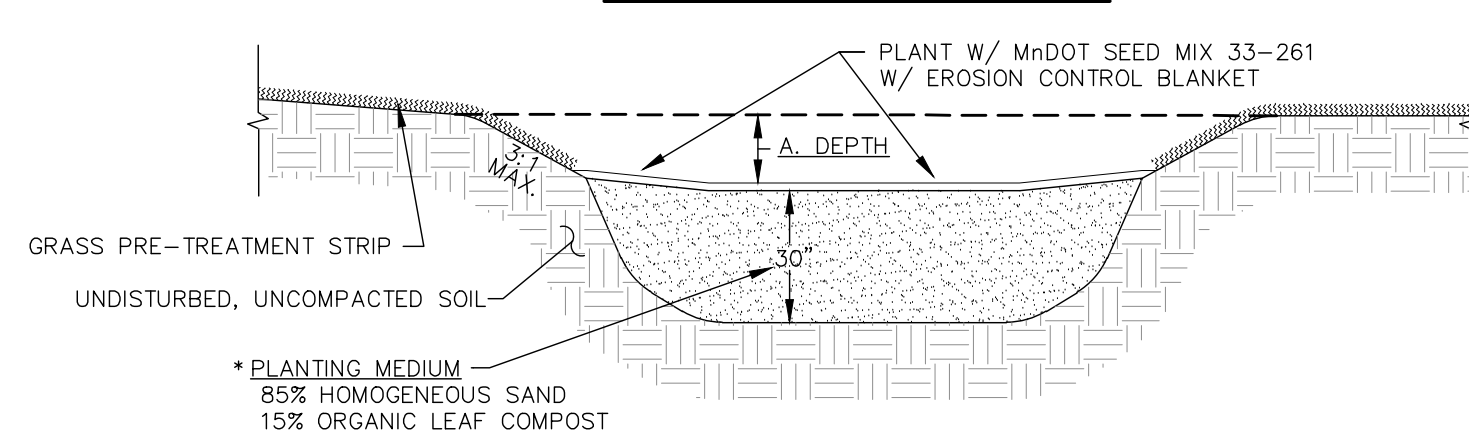






- NOTES:
1. TREE FENCING SHALL BE PLACED A MINIMUM OF 1 FOOT PER CALIPER INCH OF TREE DIAMETER FROM TREE(S) THAT IS/ARE TO BE SAVED.
 2. ANCHOR POST MAY BE SPACED UP TO 10 FEET APART.
 3. SECURELY ATTACH TREE FENCE TO ANCHOR POSTS W/ MINIMUM OF TWO ATTACHMENTS PER POST.
 4. SEE MNDOT SPECIFICATION 2572.

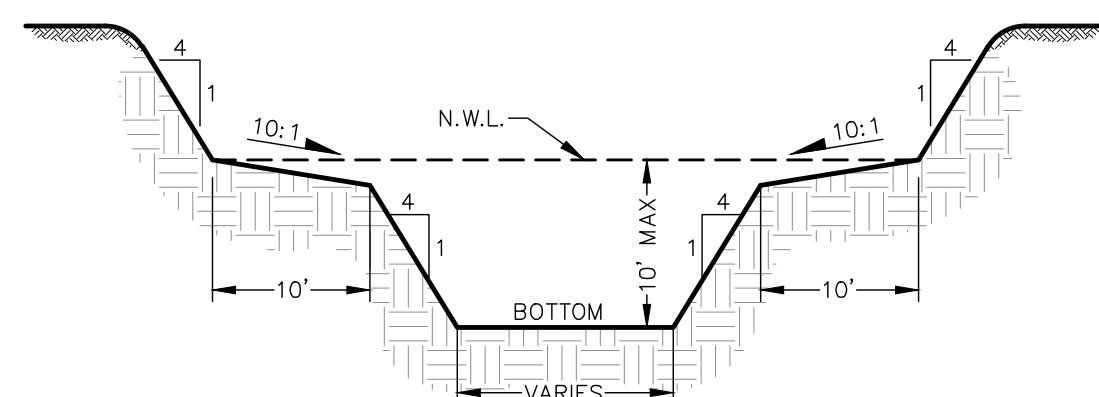
- NOTES:**
1. DIG A 6"x6" TRENCH ALONG THE INTENDED SILT FENCE LINE.
 2. DRIVE ALL ANCHOR POSTS INTO THE GROUND AT THE DOWNHILL SIDE OF THE TRENCH.
 3. POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART.
 4. LAY OUT SILT FENCE ALONG THE UPHILL SIDE OF THE ANCHOR POSTS AND BACK FILL 6"x6" TRENCH.
 5. SECURELY ATTACH SILT FENCE TO ANCHOR POSTS W/ MINIMUM OF THREE ATTACHMENTS PER POST.
 6. SEE MNDOT SPECIFICATIONS 2573 & 3886.



	I.B. 200	I.B. 350
<u>A. DEPTH</u>	24 IN.	30 IN.

*USE ON-SITE SOILS TO THE EXTENT POSSIBLE. MATERIALS TO BE VERIFIED BY GEOTECHNICAL ENGINEER

POND 300



TURF ESTABLISHMENT SHALL APPLY TO ALL DISTURBED AREAS AND SHALL BE ACCORDING TO MnDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION (LATEST EDITION) EXCEPT AS MODIFIED BELOW.

TURF ESTABLISHMENT SHALL OCCUR AS SOON AS POSSIBLE BUT IN NO CASE MORE THAN 14 DAYS.

SEED: MnDOT MIXTURE 25-141 AT 60 POUNDS PER ACRE.

DORMANT SEED: SHALL BE APPLIED AT TWICE THE NORMAL RATE AFTER NOVEMBER 1ST.

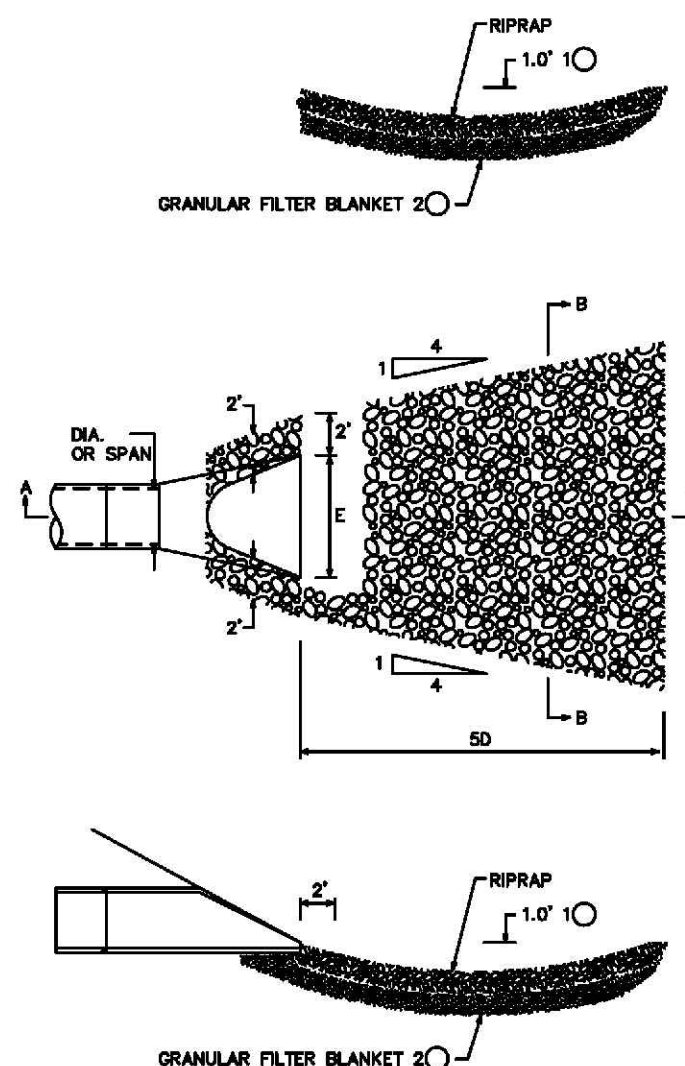
MULCH: TYPE 1 AT 2 TONS PER ACRE (DISK ANCHORED).

FERTILIZER: TYPE 1 10-10-10 AT 200 POUNDS PER ACRE.

DIA ROUND PIPE	CLASS III D ₉₀ = 9"			CLASS IV D ₉₀ = 12"			CLASS V D ₉₀ = 15"		
	15" DEPTH RIFRAP		7.5" DEPTH GRAVEL FILTER	18" DEPTH RIFRAP		9" DEPTH GRAVEL FILTER	24" DEPTH RIFRAP		12" DEPTH GRAVEL FILTER
	(IN)	(CU YD)	(CU YD)	(CU YD)	(CU YD)	(CU YD)	(CU YD)	(CU YD)	(CU YD)
12	2.1	1.1	2.8	1.3	3.4	1.7			
15	2.9	1.4	3.5	1.7	4.6	2.3			
18	3.6	1.8	4.4	2.2	5.8	2.9			
21	4.6	2.3	5.8	2.8	7.4	3.7			
24	5.9	2.9	7.6	3.5	9.2	4.6			
42	13.8	6.9	18.3	8.3	21.1	11.0			
30	8.3	4.1	9.9	5.0	13.2	6.6			
36	11.0	5.5	13.2	6.6	17.6	8.8			
48	13.8	6.9	18.3	8.3	21.1	11.0			
48	18.8	8.4	20.1	10.1	26.8	13.4			
54	19.8	8.9	23.7	11.9	31.8	15.8			
66	23.0	11.5	27.3	13.8	36.8	18.4			
80	27.0	13.5	32.4	16.2	43.2	21.6			
96	32	16.1	36.8	18.4	49.8	24.9			
108	40.0	20.0	48.0	24.0	60.0	30.0			
120	44.0	22.0	52.0	26.0	66.0	33.0			
144	52.0	26.0	60.0	30.0	78.0	39.0			

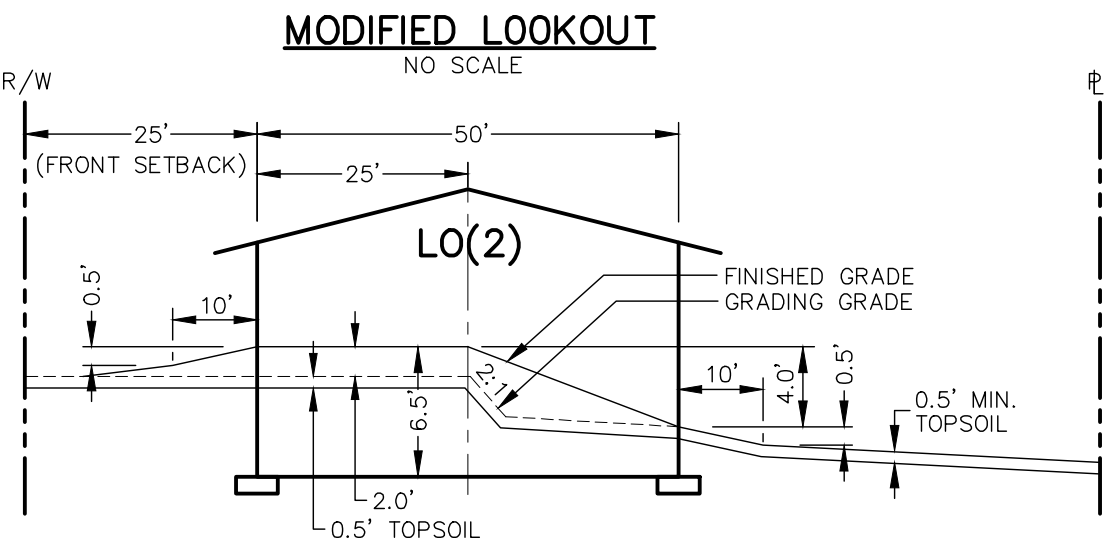
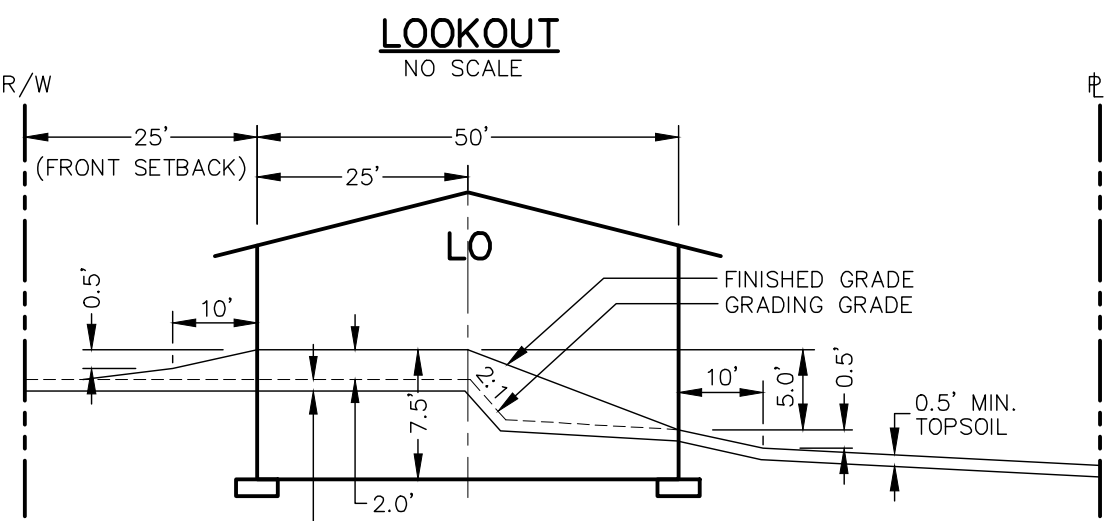
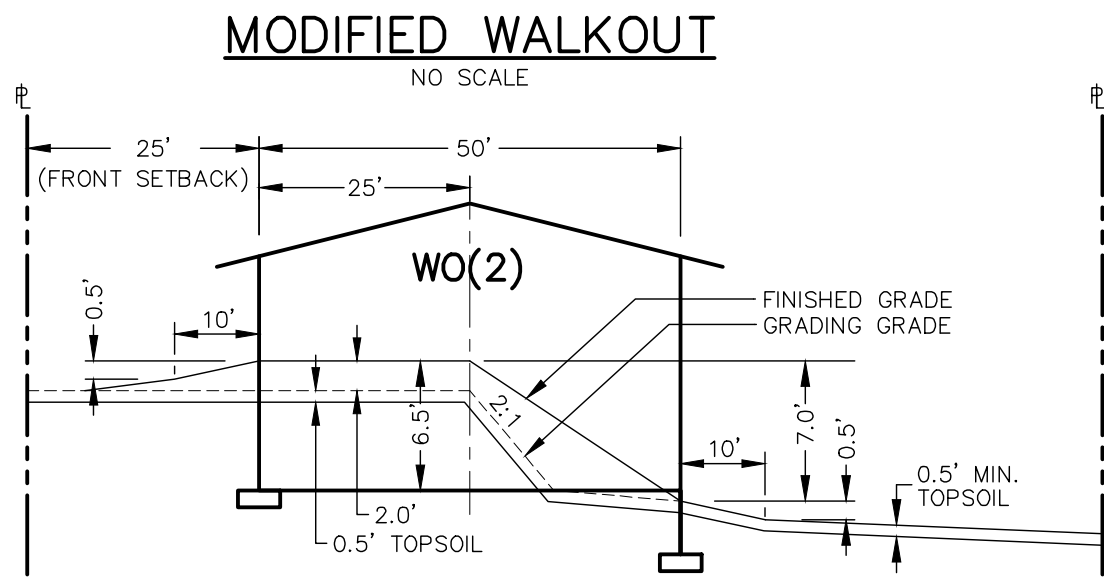
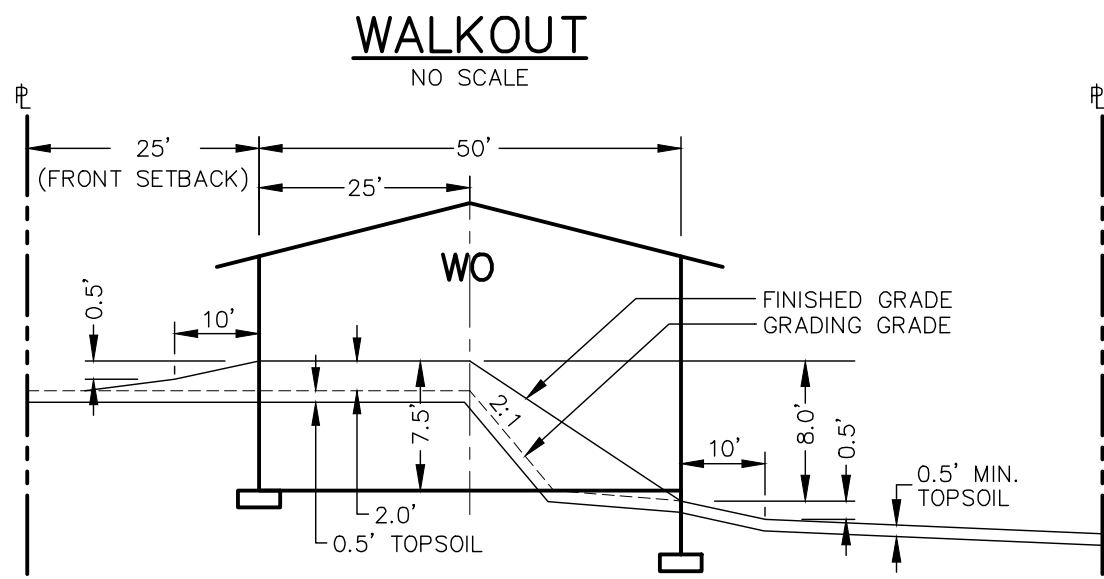
SPAN ROUND PIPE	CLASS III D ₉₀ = 9"			CLASS IV D ₉₀ = 12"			CLASS V D ₉₀ = 15"		
	15" DEPTH RIPRAP		7.5" DEPTH GRANULAR RIPRAP	18" DEPTH RIPRAP		9" DEPTH GRANULAR RIPRAP	24" DEPTH RIPRAP		12" DEPTH GRANULAR RIPRAP
	(in)	(cu yd)	(cu yd)	(in)	(cu yd)	(cu yd)	(cu yd)	(cu yd)	(cu yd)
22	3.6	1.8	1.8	4.4	2.2	5.6	2.9	1.5	1.5
26	5.8	2.9	2.9	6.3	3.2	8.5	4.2	2.1	2.1
36	8.1	4.1	4.1	9.8	4.9	13.0	6.5	3.3	3.3
43	11.0	5.5	5.5	13.2	6.6	17.6	8.8	4.4	4.4
51	13.6	6.8	6.8	16.2	8.1	21.2	10.6	5.3	5.3
58	16.5	8.3	8.3	19.6	9.8	26.4	13.2	6.6	6.6
65	19.8	9.9	9.9	23.7	11.9	31.6	15.8	7.9	7.9
73	23.3	11.7	11.7	27.4	13.7	36.0	18.0	9.0	9.0
86	32.4	16.2	16.2	38.9	19.4	51.8	25.9	13.0	13.0
102	43.5	21.8	21.8	52.9	26.4	69.8	34.8	17.4	17.4
115	44.0	22.0	22.0	52.6	26.4	69.4	34.7	17.4	17.4
122	49.3	24.6	24.6	59.1	29.6	78.8	39.4	19.7	19.7
138	81.3	40.6	40.6	75.5	36.8	98.0	49.0	24.5	24.5
144	74.4	37.2	37.2	68.4	34.2	89.6	44.8	22.4	22.4

NOTE: REQUIREMENTS FOR RIPRAP SIZE, THICKNESS, AND FILTER
BLANKET WILL BE DESIGNATED IN PLANS.

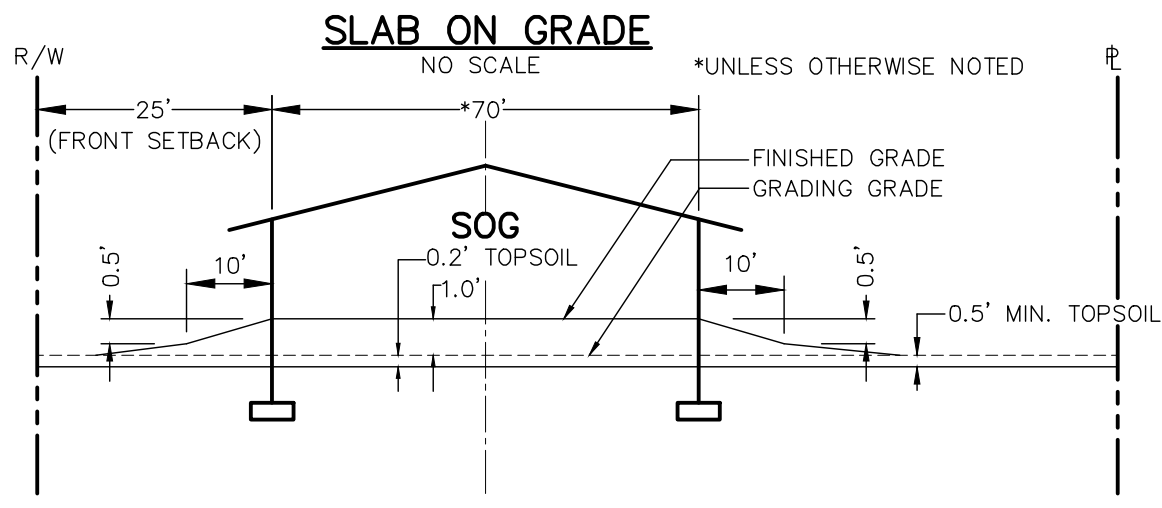


- ① FOR PIPES GREATER THAN OR EQUAL TO 48", USE 2.0'
- ② THE CONTRACTOR, AT HIS OPTION, MAY SUBSTITUTE A GEOTEXTILE FABRIC, SPEC 3601 FOR THE GRANULAR FILTER BLANKET UNLESS OTHERWISE SPECIFIED IN THE PLANS. THE FABRIC SHOULD COVER THE AREA OF THE RIPRAP AND EXTEND UNDER THE CULVERT APRON 3 FEET

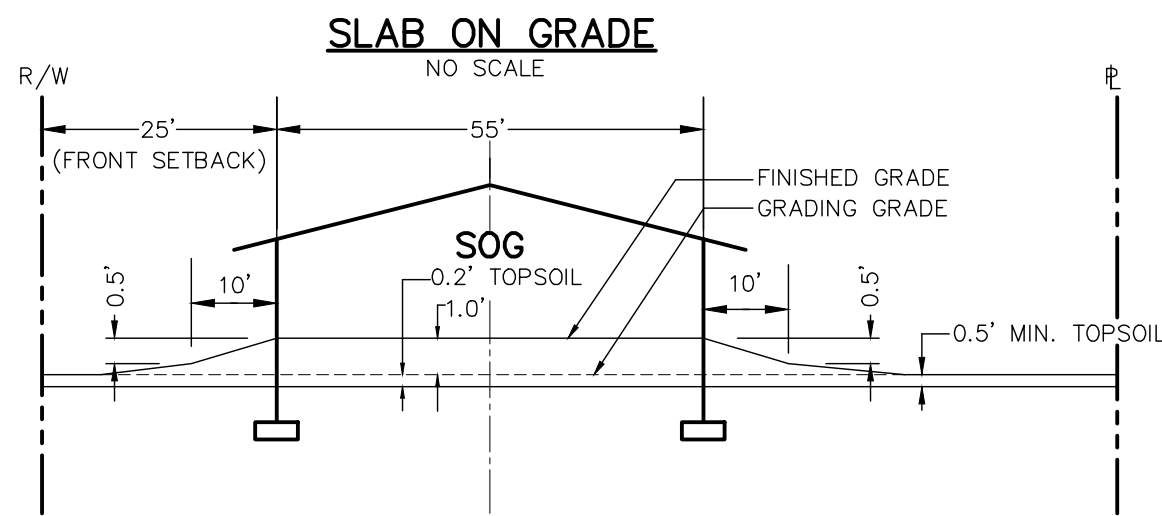
SHORELAND & R1 LOTS



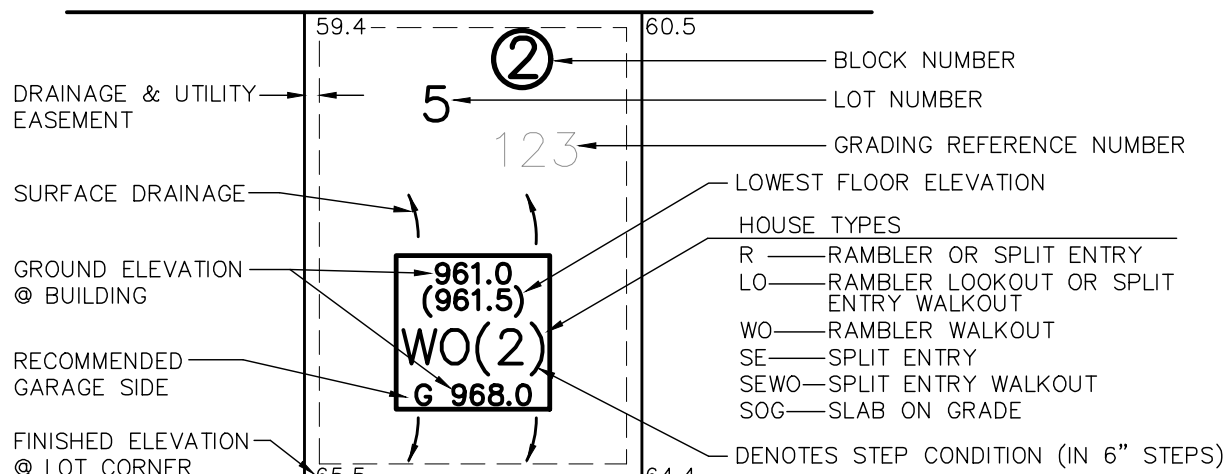
42' LOTS



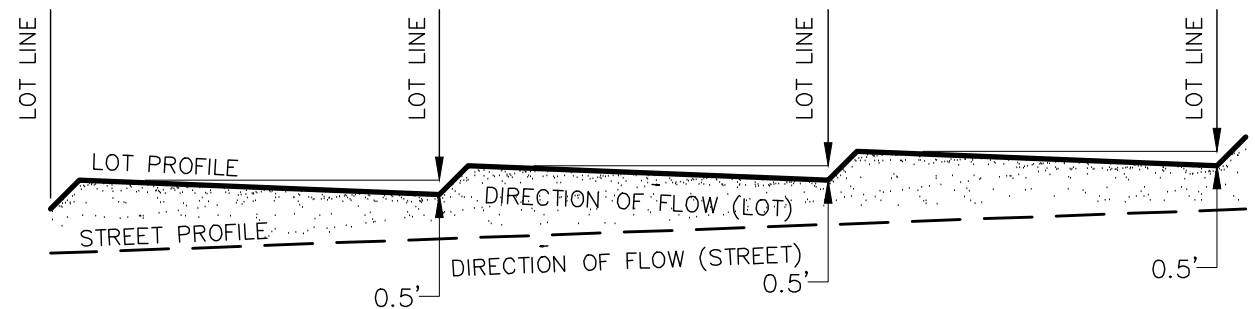
47', 52', & 62' LOTS



GRADING PLAN LOT KEY

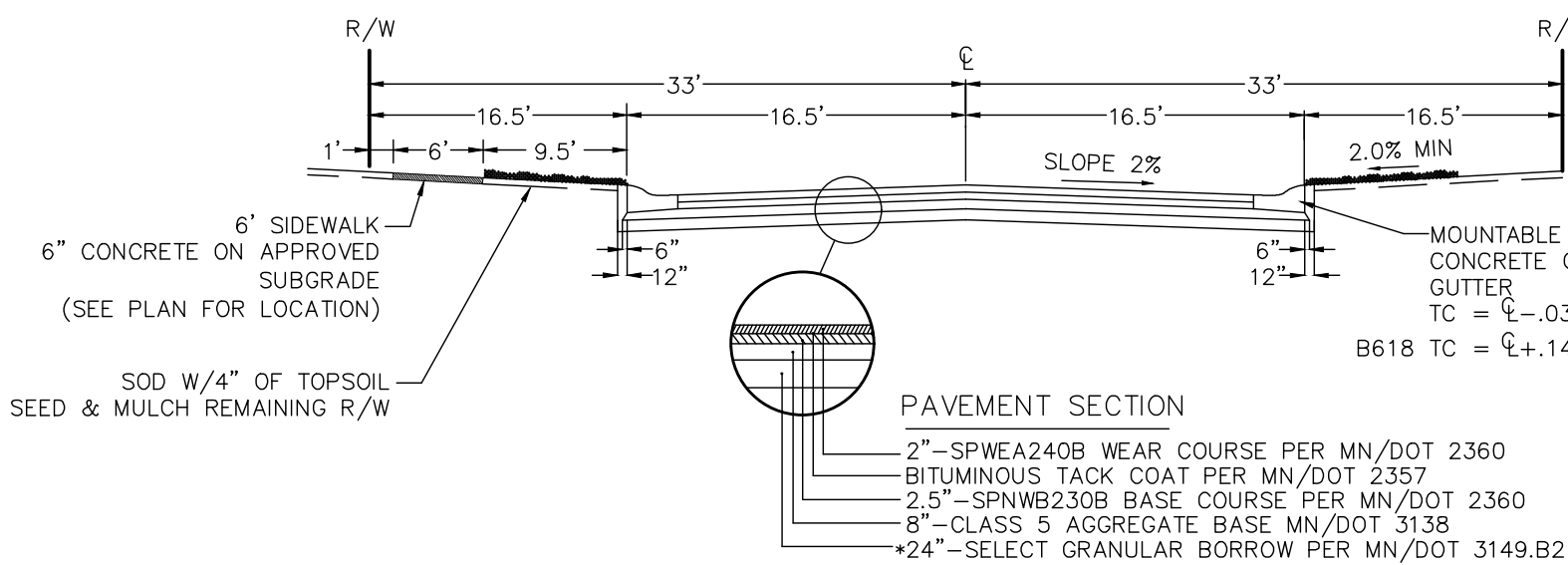


LOT BENCHING DETAIL



TYPICAL STREET SECTION

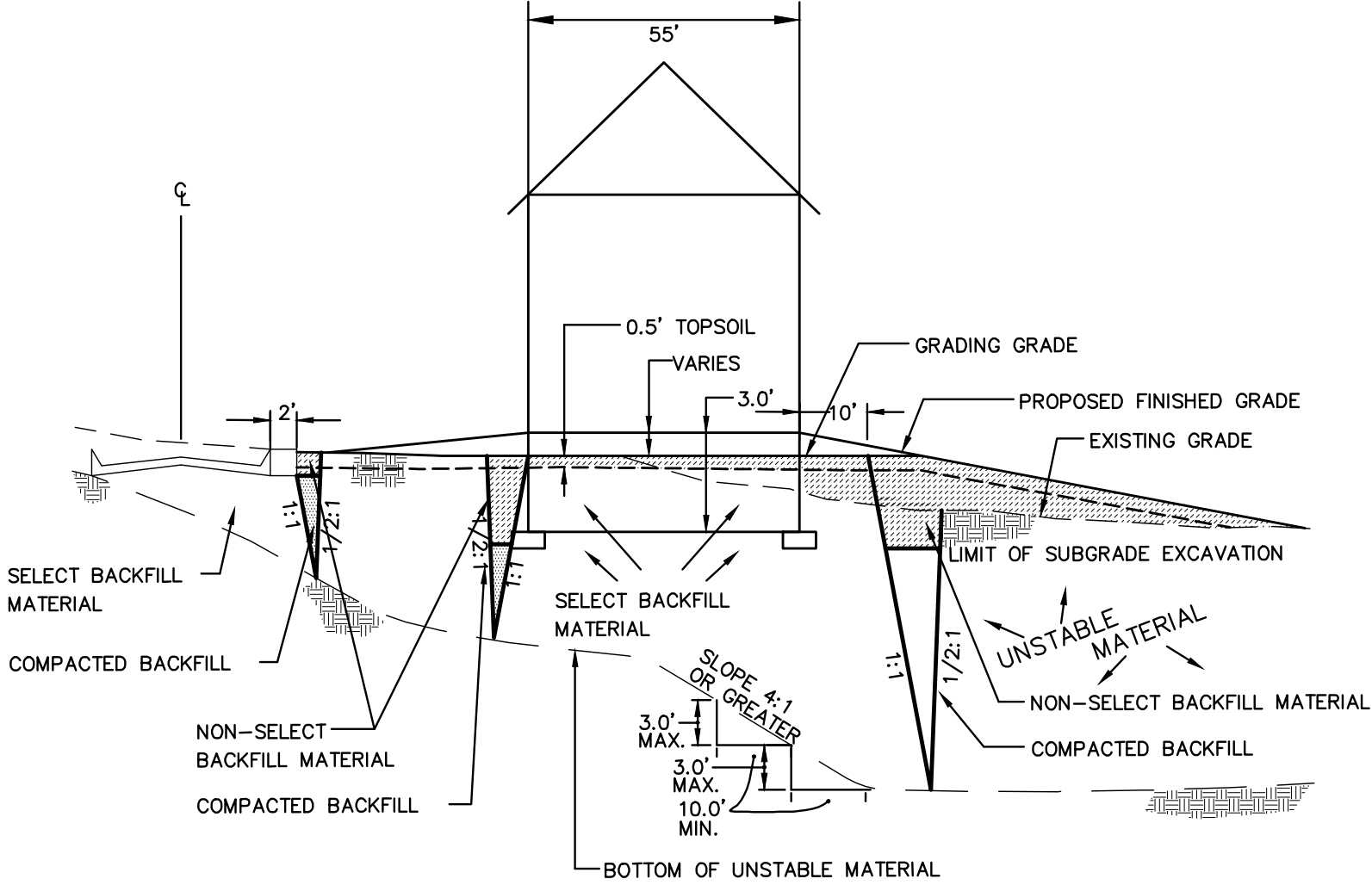
66' R/W - 33' B/B



NOTE: SECTION TO BE VERIFIED BY CITY ENGINEER

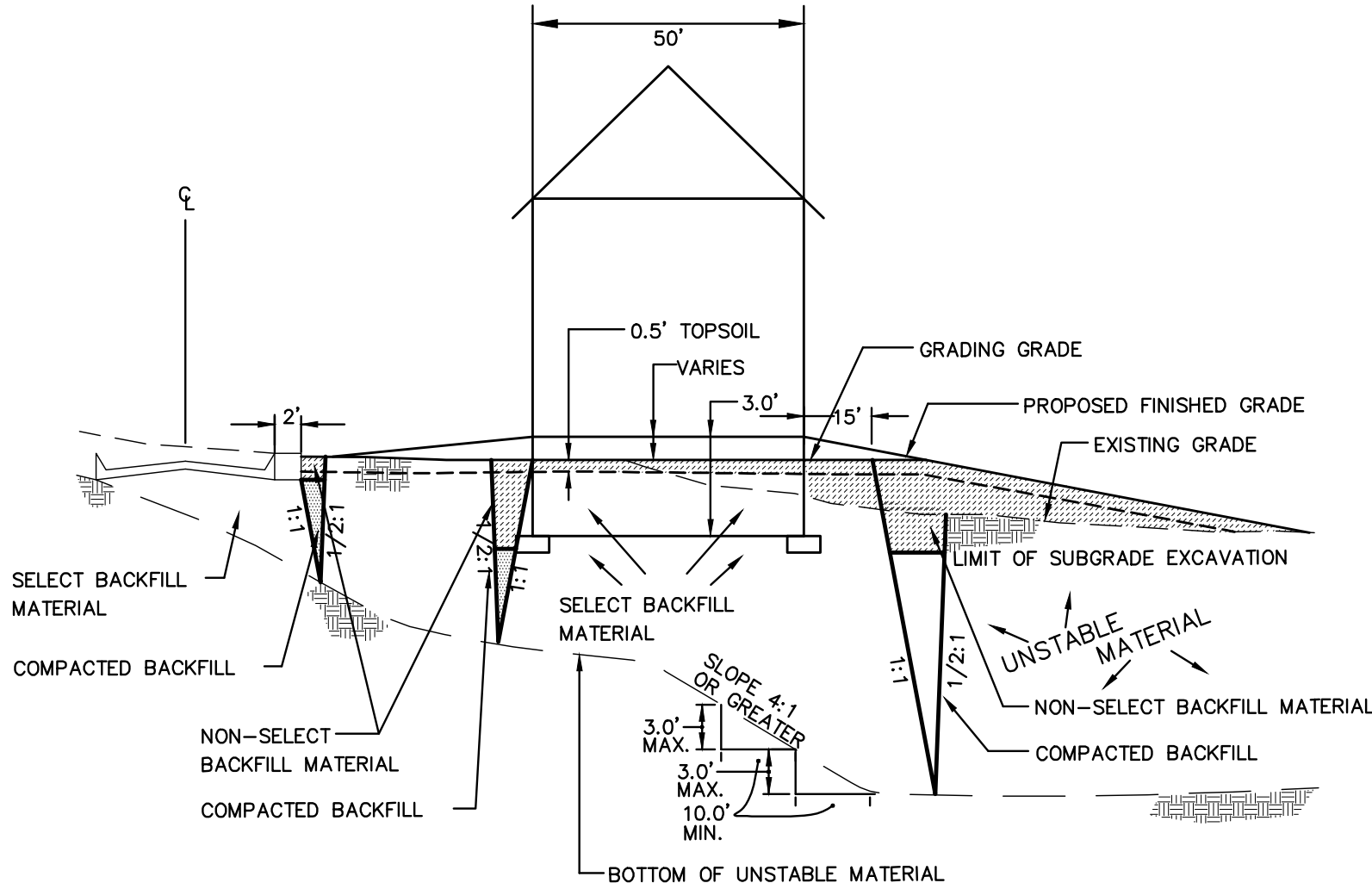
SUBGRADE CORRECTION

(47', 52' & 62' LOTS)



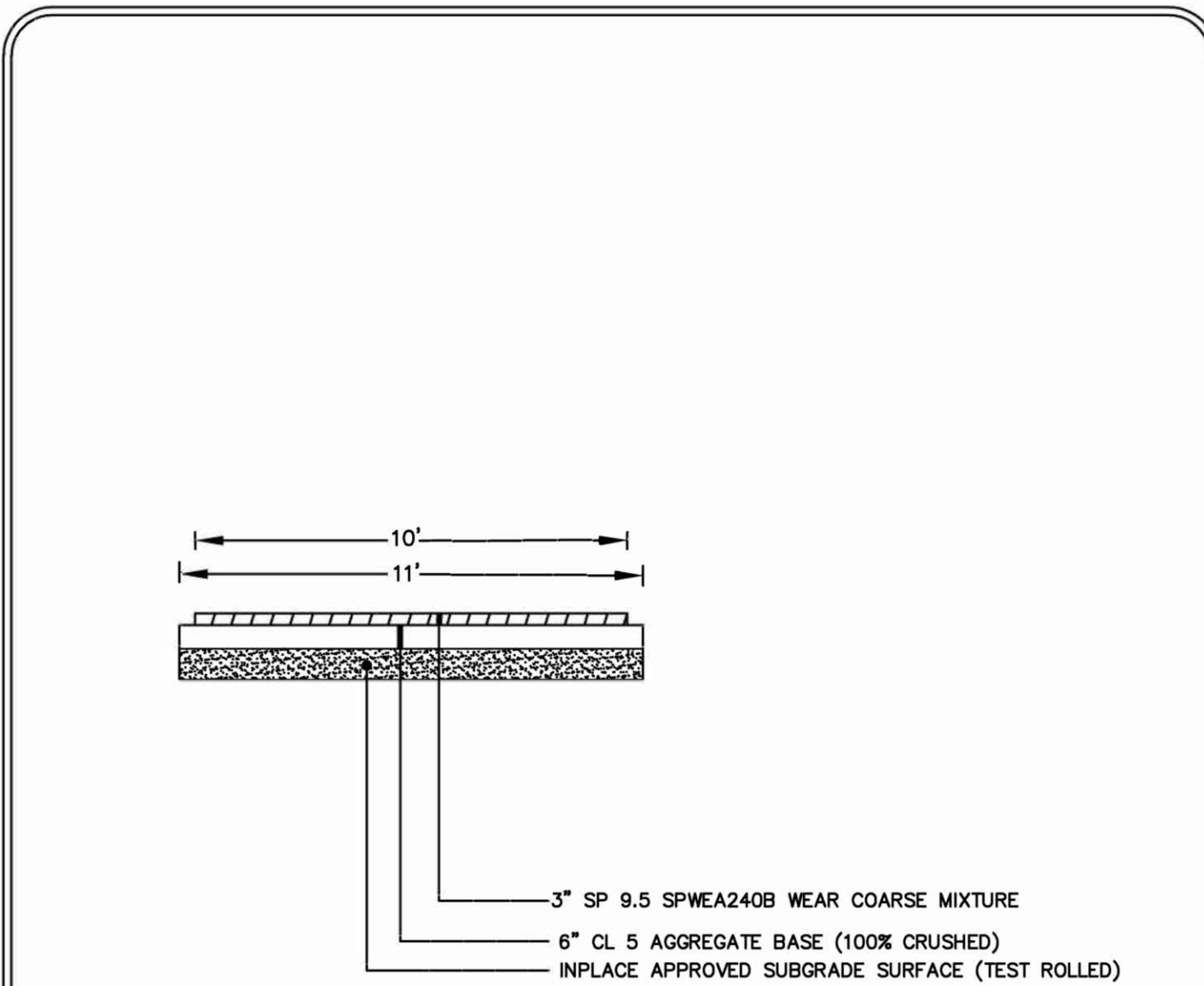
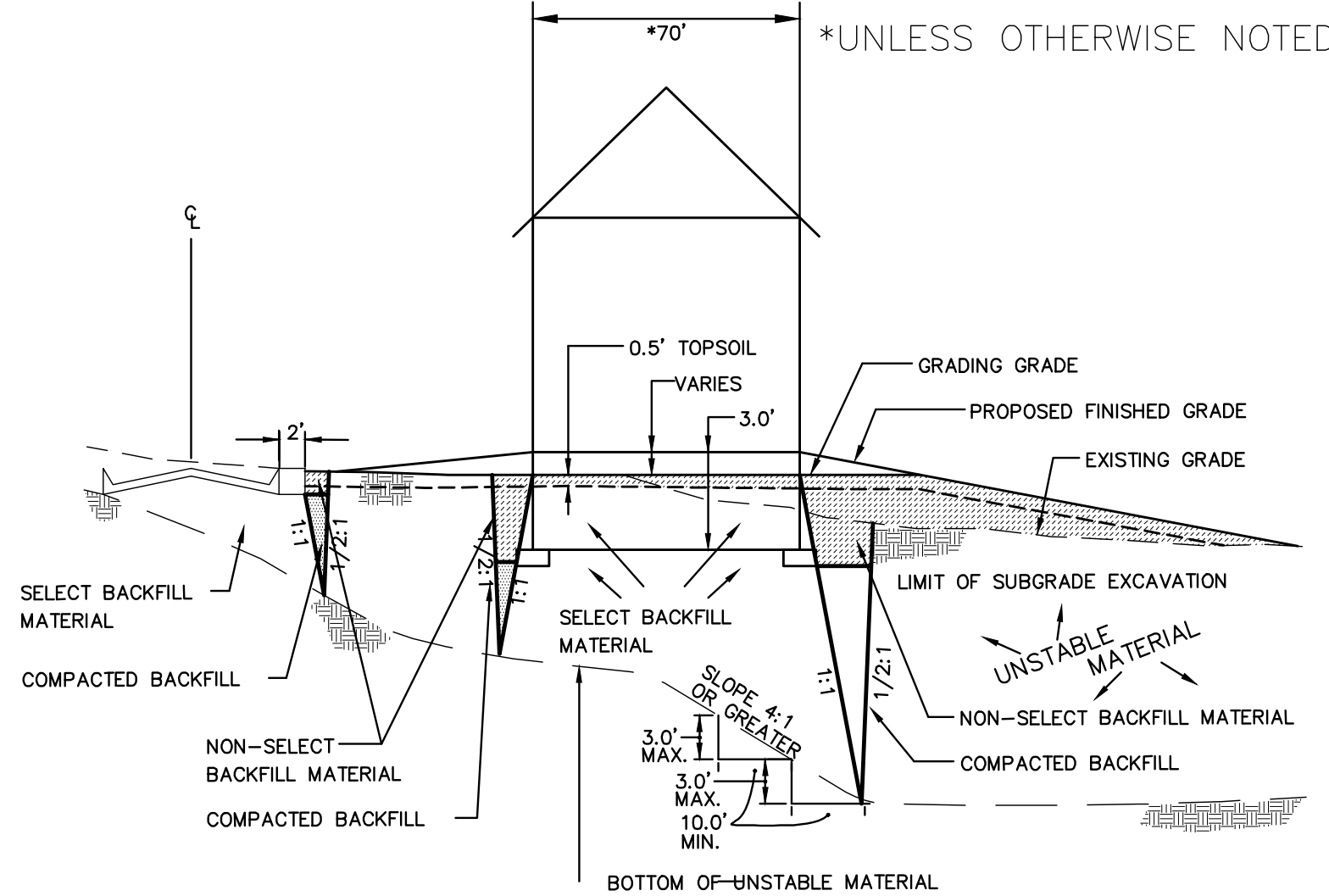
SUBGRADE CORRECTION

(SHORELAND & R1 LOTS)

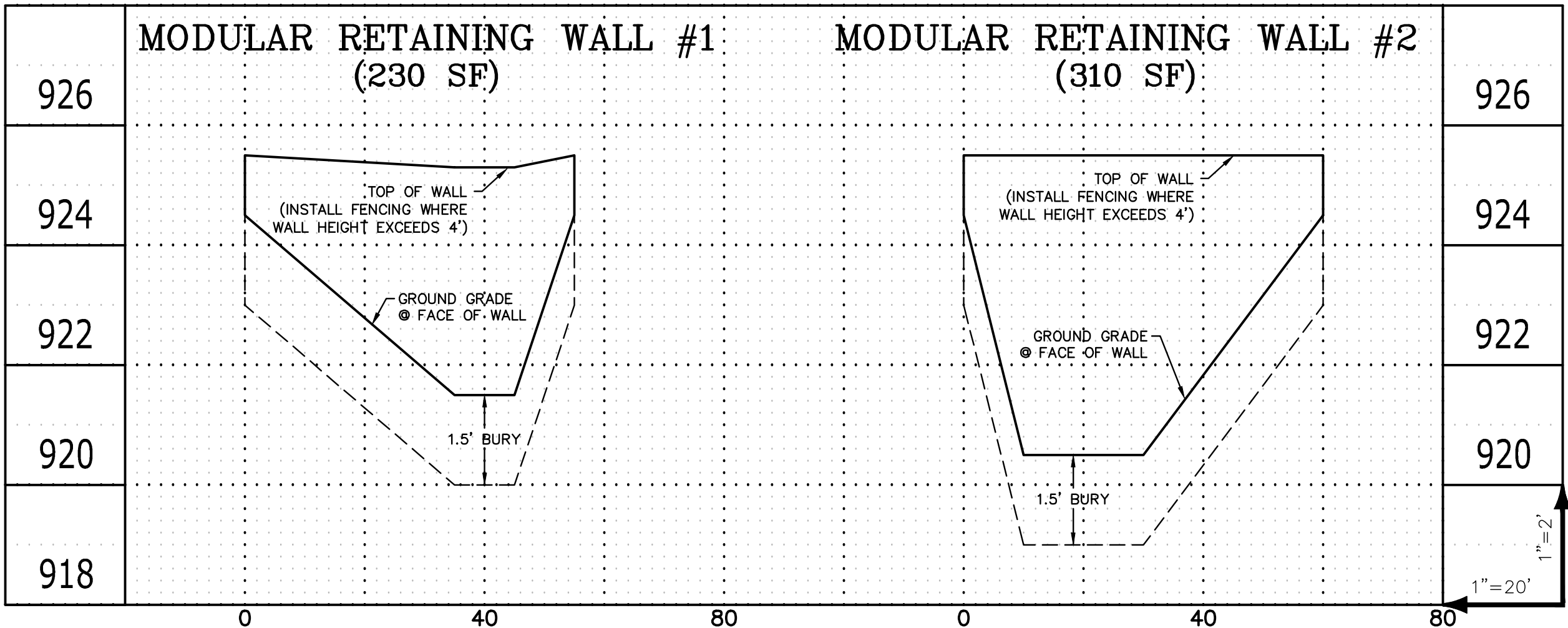


SUBGRADE CORRECTION

(42' LOTS)



10' WIDE TRAIL TYPICAL SECTION



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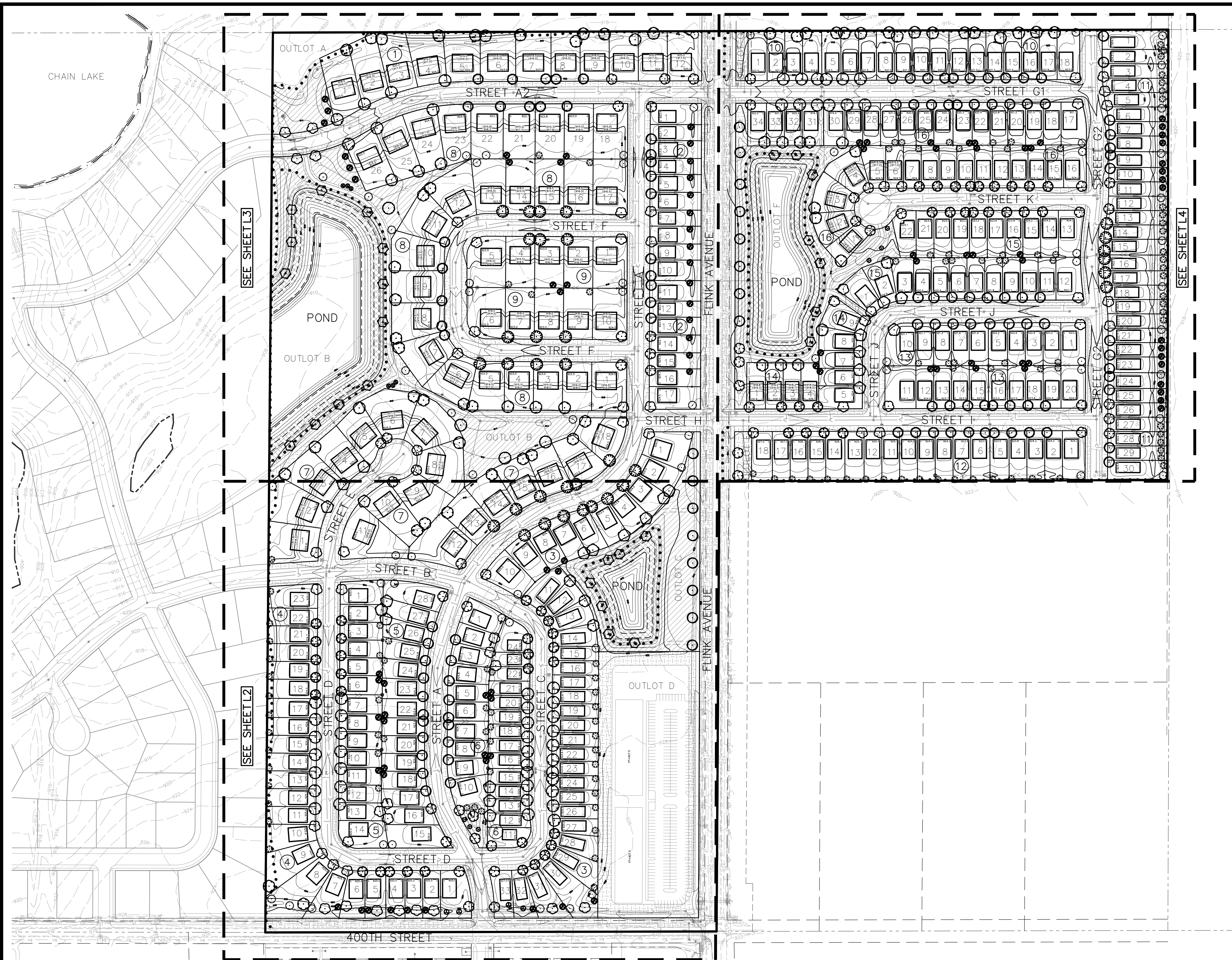
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MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

DETAILS

20
of
20

#7226-03



NORTH BRANCH LANDSCAPE REQUIREMENTS

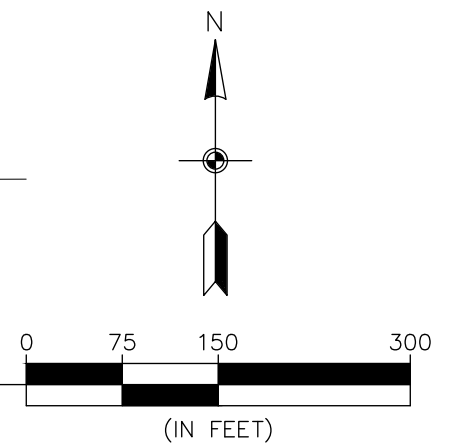
1. TREES. MINIMUM ONE (1) OVERSTORY DECIDUOUS OR CONIFEROUS TREE PER DWELLING UNIT REQUIRED. THE COMPLEMENT OF TREES FULFILLING THE REQUIREMENTS OF THIS SECTION SHALL BE NOT LESS THAN 25 PERCENT DECIDUOUS AND NOT LESS THAN 25 PERCENT CONIFEROUS.

TREES REQUIRED = 342 (342 UNITS)
TREES PROVIDED = 796 (64% DEC. / 36% CON. - EXCLUDES 16 ORNAMENTAL TREES)

LANDSCAPE PLAN NOTES

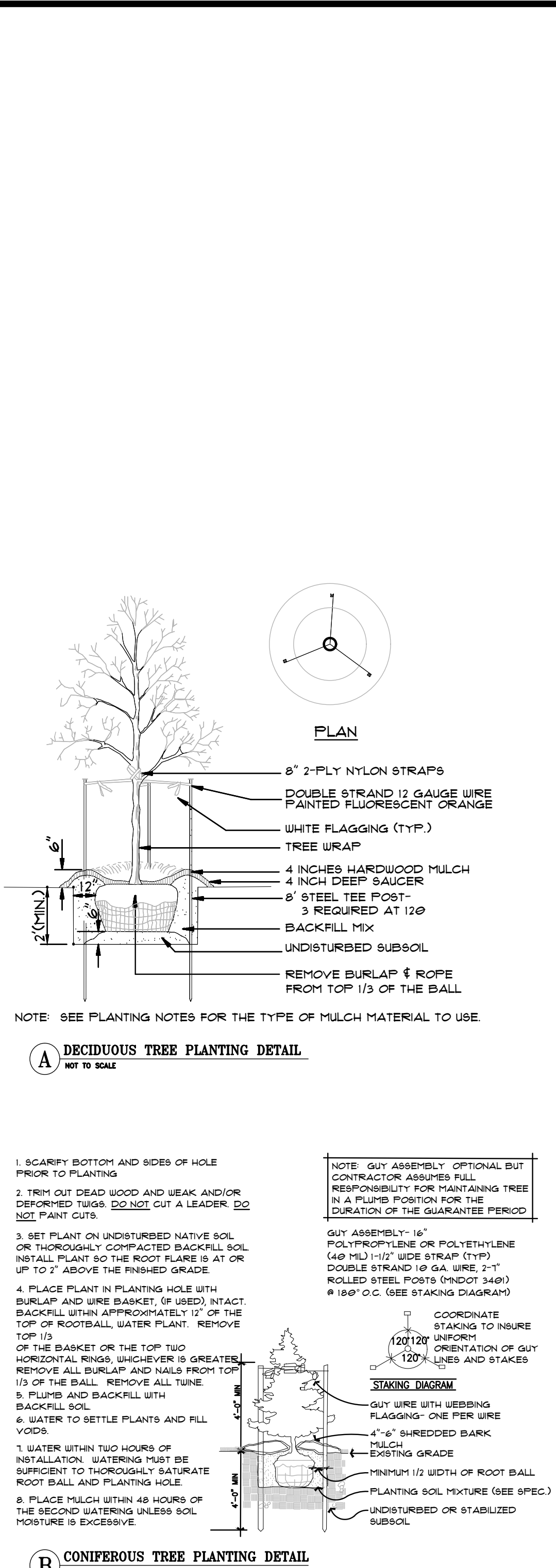
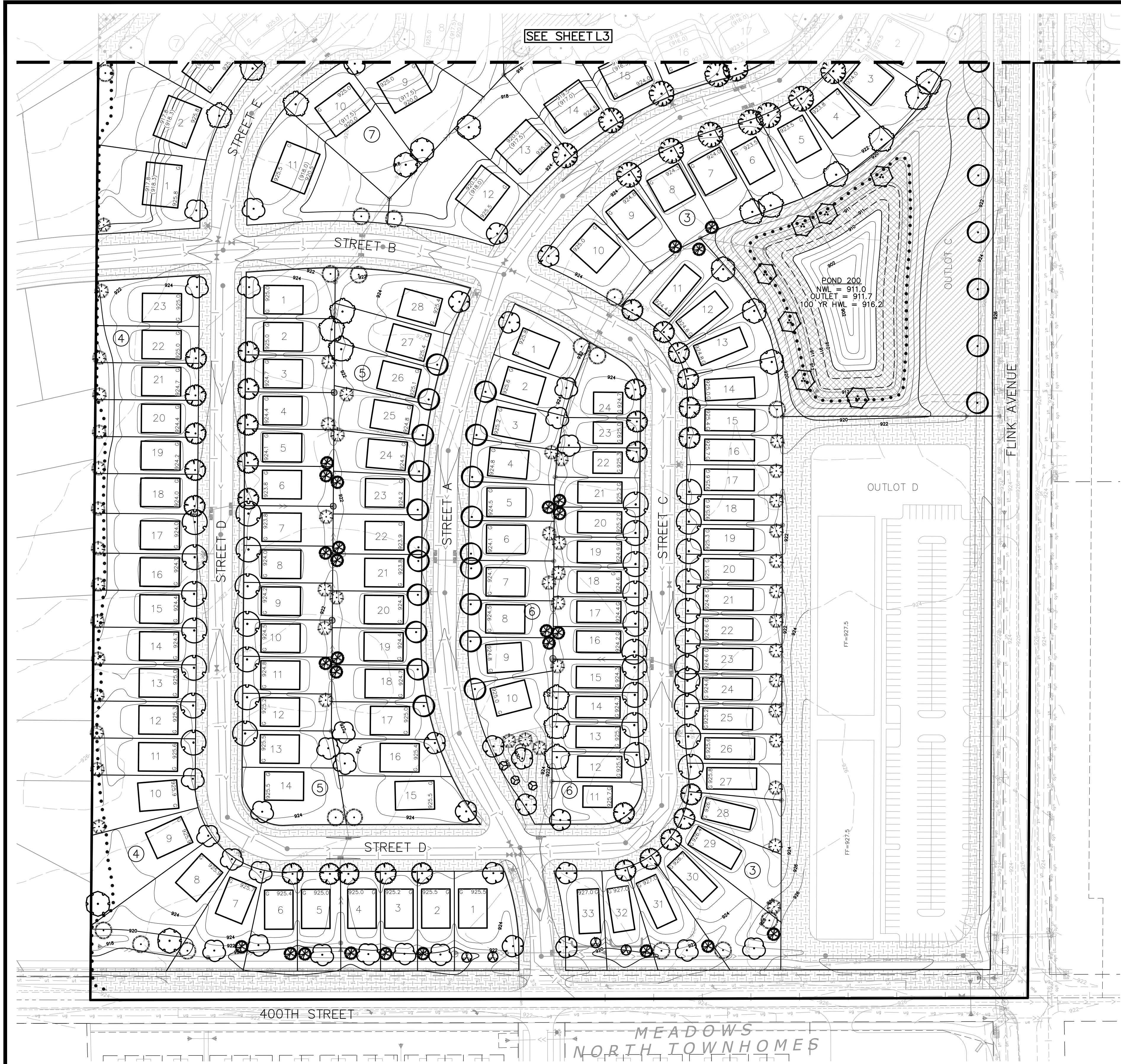
1. **EXISTING CONDITIONS.** CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO BIDDING AND CONSTRUCTION START. ANY DISCREPANCIES FOUND THAT AFFECT THE WORK SHALL BE REPORTED TO THE OWNER/LANDSCAPE ARCHITECT FOR CLARIFICATION PRIOR TO BIDDING OR APPROVING ANY ADDITIONAL WORK REQUIRED.
2. **UTILITY LOCATES.** CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND VERIFYING ALL PUBLIC AND PRIVATE UTILITIES, INCLUDING IRRIGATION LINES, AT LEAST 48 HOURS BEFORE EXCAVATING OR IN ACCORDANCE WITH STATE LAW. IN MINNESOTA, CALL Gopher State ONE-CALL AT 651-454-0002 FOR FIELD LOCATION OF PUBLIC UNDERGROUND UTILITY LINES. ALL LOCATES AND ITEMS NOTED AS 'FIELD VERIFY' ON THE PLANS SHALL BE VERIFIED BY THE CONTRACTOR AT THEIR EXPENSE.
3. **PERMITS.** CONTRACTOR SHALL VERIFY WITH THE OWNER/LANDSCAPE ARCHITECT THAT THE REQUIRED PERMITS HAVE BEEN OBTAINED PRIOR TO CONSTRUCTION START. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE CODES, REGULATIONS, AND PERMITS GOVERNING THE WORK.
4. **EXISTING ITEMS TO REMAIN.** CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING PAVEMENT, STRUCTURES, UTILITIES, TREES, SITE AMENITIES, ETC. THAT ARE TO REMAIN FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING ANY DAMAGE (AT CONTRACTOR'S EXPENSE) TO EXISTING ITEMS TO REMAIN.
5. **CONSTRUCTION STAGING AND ACCESS.** CONTRACTOR SHALL VERIFY THE LOCATION FOR CONSTRUCTION STAGING AND SITE ACCESS WITH THE OWNER/LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION START. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING PEDESTRIAN AND VEHICLE ACCESS WITHIN AND ADJACENT TO THE SITE THROUGHOUT THE CONSTRUCTION PERIOD UNLESS OTHERWISE NOTED. LONG-TERM STORAGE OF MATERIALS OR SUPPLIES ON-SITE WILL NOT BE PERMITTED. ALL WASTE AND/OR UNUSED MATERIAL SHALL BE PROMPTLY REMOVED FROM THE SITE.
6. **SITE REMOVALS.** REFER TO CIVIL PLANS FOR GENERAL SITE REMOVALS. ALL ITEMS NOTED TO BE REMOVED SHALL BE COMPLETED BY THE CONTRACTOR AND IMMEDIATELY DISPOSED OF OFF-SITE, IN ACCORDANCE WITH LOCAL REGULATIONS, UNLESS OTHERWISE NOTED. COORDINATE WITH OWNER/LANDSCAPE ARCHITECT FOR ANY ITEMS NOTED AS 'REMOVED BY OTHERS' OR 'REMOVE AND SALVAGE.'
7. **UTILITY COORDINATION.** REFER TO CIVIL PLAN SHEETS FOR INFORMATION RELATED TO PROPOSED UTILITIES. COORDINATE WITH ELECTRICAL CONTRACTORS FOR SITE ELECTRICAL WORK AND SITE LIGHTING.
8. **CONSTRUCTION STAKING.** UNLESS OTHERWISE NOTED, CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING CONTROL POINTS AND ALL CONSTRUCTION FIELD STAKING DURING THE COURSE OF THE PROJECT.
9. **DIMENSIONS.** DIMENSIONS TAKE PRECEDENCE OVER SCALE. DIMENSIONS ARE TO FACE OF CURB, EDGE OF PAVEMENT/WALKWAY, OR OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
10. **PLAN QUANTITIES.** CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL MATERIAL QUANTITIES PER PLAN. MATERIAL SCHEDULES ARE PROVIDED SOLELY FOR CONTRACTOR'S CONVENIENCE.
11. **REFERENCE SPECIFICATIONS.** THE FOLLOWING SPECIFICATIONS SHALL GOVERN THIS PROJECT ACCORDING TO THE FOLLOWING ORDER:
 1. ADDENDA, WITH THOSE OF A LATER DATE, HAVING PRECEDENCE OVER THOSE OF AN EARLIER DATE.
 2. LANDSCAPE SPECIFICATIONS.
 3. PLAN DRAWINGS.
 4. PLANT / MATERIAL SCHEDULES.
 5. CITY STANDARD SPECIFICATIONS AND DETAILS.
 6. MNDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, LATEST EDITION.

1 OVERALL LANDSCAPE PLAN
L1

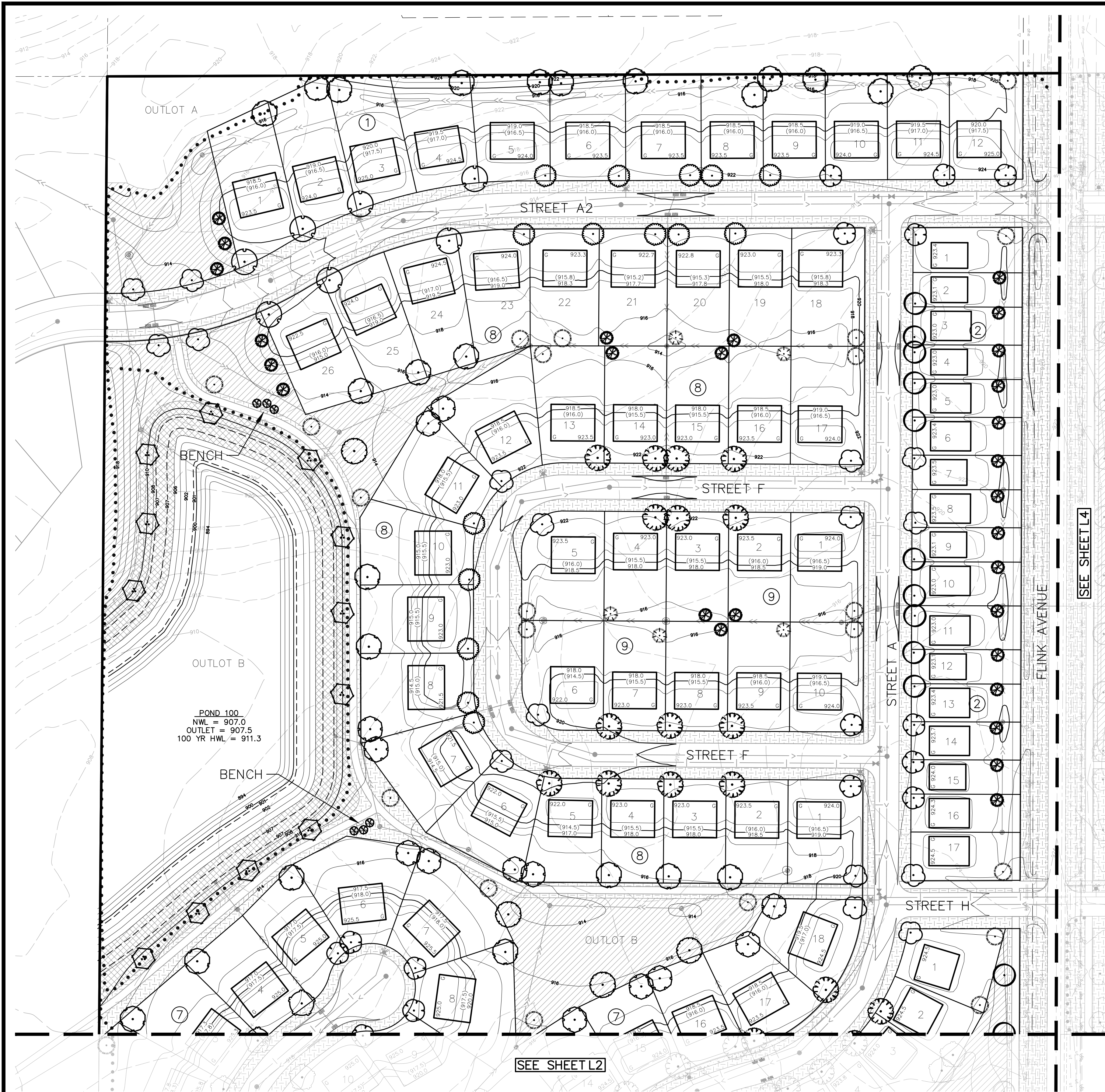


CALL BEFORE YOU DIG

Know what's below.
Call before you dig.



LANDSCAPE LEGEND	
SYMBOL	COMMON NAME
TREES	
	Northwood Red Maple
	Sienna Glen Maple
	River Birch Multi-Trunk
	Common Hackberry
	Northern Acclaim Thornless Honey Locust
	Kentucky Coffeetree
	Swamp White Oak
	Northern Pin Oak
	Red Oak
	Heritage Oak
	Boulevard Linden
	American Elm
CONIFERO	
	Balsam Fir
	Black Hills Spruce
	White Pine
ORNAMEN	
	Autumn Brilliance Serviceberry
	Marilee Crabapple
	Ivory Silk Japanese Tree Lilac
GROUND C	
	MnDOT Seed Mix 25-151
	BWSR Stormwater Pond Pollinator NE
	MnDOT Seed Mix 35-241



LANDSCAPE SPECIFICATIONS

- TREE PROTECTION.** ALL TREES NOT SPECIFICALLY NOTED OR MARKED ON SITE FOR REMOVAL SHALL REMAIN PROTECTED AND UNDISTURBED DURING CONSTRUCTION. TREE PROTECTION SHALL EXTEND TO THE DRIP LINE, WITHIN WHICH NO CONSTRUCTION ACTIVITY, MATERIAL STORAGE, OR VEHICLE PARKING SHALL BE PERMITTED. TREE PROTECTION FENCING SHALL BE ERECTED PRIOR TO CONSTRUCTION START PER PLANS OR AS DIRECTED BY OWNER/LANDSCAPE ARCHITECT AND SHALL CONSIST OF 4' TALL HEAVY DUTY ORANGE CONSTRUCTION FENCING WITH 6' STEEL FENCE POSTS SPACED 6' O.C. MAX.
- EROSION CONTROL.** REFER TO CIVIL PLAN SHEETS FOR STORMWATER POLLUTION PREVENTION PLAN (SWPPP), AND TEMPORARY AND PERMANENT STORMWATER BMPs, INCLUDING SILT FENCE, BIO-ROLLS, INLET PROTECTION, EROSION CONTROL BLANKETING, DUST CONTROL, SWEEPING AND ROCK CONSTRUCTION ENTRANCE. ALL DISTURBED AREAS SHALL RECEIVE PERMANENT STABILIZATION IN ACCORDANCE WITH THE LANDSCAPE PLAN WITHIN 7 DAYS AFTER CONSTRUCTION ACTIVITY IN THE DISTURBED AREA HAS CEASED. IN THE EVENT PERMANENT STABILIZATION CANNOT BE IMPLEMENTED WITHIN 7 DAYS, TEMPORARY STABILIZATION BMPs MUST BE IMPLEMENTED WITHIN 7 DAYS USING.
- CLEARING AND GRUBBING.** CONTRACTOR SHALL BE RESPONSIBLE FOR CLEARING AND GRUBBING ALL AREAS INDICATED AS BEING DISTURBED OR OTHERWISE SHOWN ON PLANS. CLEARING AND GRUBBING SHALL INCLUDE REMOVAL AND DISPOSAL OF ALL TREES, STUMPS, BRUSH, GRASS, ROOTS AND OTHER ORGANIC MATERIAL AT AN APPROVED OFF-SITE DISPOSAL LOCATION.
- SOIL PREPARATION.** REFER TO GEOTECHNICAL REPORT FOR ANY REQUIRED SOIL CORRECTIONS, AMENDMENTS OR ADDITIONAL INFORMATION (IF APPLICABLE). EXISTING TOPSOIL SHALL BE STRIPPED FROM ALL DISTURBED AREAS AND STOCKPILED IN AN APPROVED LOCATION FOR RE-SPREAD. ALL AREAS WHERE SOIL HAS BEEN COMPACTED BY CONSTRUCTION ACTIVITY AND THAT ARE INDICATED TO BE SODDED, SEEDED OR PLANTING BED SHALL BE DE-COMPACTED TO A MINIMUM DEPTH OF 12 INCHES BY SOIL RIPPING, TILLING OR OTHER APPROVED SOIL LOOSENING METHOD.
- TOPSOIL MATERIAL.** ALL EXISTING, AMENDED OR IMPORTED TOPSOIL SHALL MEET THE REQUIREMENTS OF MNDOT TOPSOIL TYPE A. A MINIMUM 4 INCH DEPTH OF TOPSOIL SHALL BE PLACED ON ALL AREAS TO BE SODDED OR SEEDED. A MINIMUM 12 INCH DEPTH OF TOPSOIL SHALL BE PLACED WITHIN ALL PLANTING BED AREAS. ALL TOPSOIL SHALL BE FINE GRADED, RAKED AND DRAGGED TO PROVIDE A SMOOTH, UNIFORM SURFACE. TOPSOIL GRADES SHALL BE WITHIN .1 FEET OF INDICATED FINISHED GRADE AND SHALL BE TRUE TO GRADIENTS SHOWN ON PLANS. REFER TO CIVIL PLAN SHEETS FOR FILTRATION BASIN SOIL REQUIREMENTS.
- SEEDING AND TURF ESTABLISHMENT.** CONTRACTOR SHALL OBTAIN OWNER/LANDSCAPE ARCHITECT'S APPROVAL OF FINAL GRADES AND TOPSOIL PREP PRIOR TO SEEDING. APPLY 12-12-12 GRANULAR STARTER FERTILIZER AT A RATE OF 250 LBS PER ACRE PRIOR TO SEEDING. SEEDS SHALL BE SOWN IN 2 PERPENDICULAR PASSES, EACH PASS AT ONE-HALF THE INDICATED RATE, VIA BROADCAST SPREADER, DROP SEEDER, OR HAND SEEDER. FOLLOWING SEEDING, INSTALL TYPE 34 EROSION CONTROL BLANKET ON ALL DISTURBED SLOPES GREATER THAN 4:1. IN ALL OTHER AREAS, APPLY HYDROMULCH COVER (MUST BE A SEPARATE OPERATION FROM SEEDING) AT A TARGETED DRY WEIGHT RATE OF 3500 LBS PER ACRE. SOIL SHALL BE KEPT MOIST DURING ESTABLISHMENT WITH ADDITIONAL RE-SEEDING AS NECESSARY TO ACHIEVE A HEALTHY, UNIFORM STAND OF GRASS, FREE OF WEEDS AND WITH COVERAGE EXCEEDING 75% IN ANY 10'x10' AREA PRIOR TO FINAL ACCEPTANCE.
- SODDING.** CONTRACTOR SHALL OBTAIN OWNER/LANDSCAPE ARCHITECT'S APPROVAL OF FINAL GRADES AND TOPSOIL PREP PRIOR TO SODDING. APPLY 12-12-12 GRANULAR STARTER FERTILIZER AT A RATE OF 250 LBS PER ACRE PRIOR TO SODDING AND ROLL TOPSOIL TO CREATE A UNIFORM SURFACE FOR LAYING SOD. SOD SHALL NOT BE CUT MORE THAN 24-HOURS IN ADVANCE OF INSTALLATION. CONTRACTOR SHALL KEEP SOD MOIST FOR A MINIMUM OF 30 DAYS AND SHALL BE RESPONSIBLE FOR MAINTAINING THE SOD UNTIL FINAL ACCEPTANCE.
- PLANT MATERIAL.** ALL PLANTING STOCK SHALL CONFORM TO THE "AMERICAN STANDARD FOR NURSERY STOCK," ANSI-Z60, LATEST EDITION, OF THE AMERICAN ASSOCIATION OF NURSEYMEN, INC. AND SHALL CONSTITUTE MINIMUM QUALITY REQUIREMENTS FOR PLANT MATERIALS. OWNER/LANDSCAPE ARCHITECT RESERVE THE RIGHT TO REJECT ANY PLANTS WHICH ARE DEEMED UNSATISFACTORY. BEFORE, DURING, OR AFTER INSTALLATION, NO SUBSTITUTE OF PLANT MATERIAL SHALL BE ACCEPTED UNLESS APPROVED IN WRITING BY THE OWNER/LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
- PLANT MATERIAL SUBSTITUTIONS.** ALL REQUESTS FOR PLANT SUBSTITUTIONS SHALL BE MADE IN WRITING TO THE OWNER/LANDSCAPE ARCHITECT AND MUST BE APPROVED BY THE CITY.
- PLANT INSTALLATION AND ESTABLISHMENT.** REFER TO STANDARD PLANTING DETAILS. CONTRACTOR SHALL STAKE TREE LOCATIONS FOR APPROVAL BY OWNER/LANDSCAPE ARCHITECT PRIOR TO PLANTING. ANY PLANT MATERIAL WHICH DIES, TURNS BROWN, OR DEFOLIATES (PRIOR TO TOTAL ACCEPTANCE OF THE WORK) SHALL BE PROMPTLY REMOVED FROM THE SITE AND REPLACED WITH MATERIAL OF THE SAME SPECIES, QUANTITY, AND SIZE.
- MULCH MATERIAL.** DOUBLE SHREDDED HARDWOOD MULCH OR ROCK MULCH AS INDICATED ON PLANS. ALL MULCH SHALL BE CLEAN AND FREE OF NOXIOUS WEEDS, SOIL, OR OTHER DELETERIOUS MATERIAL, AND SHALL BE INSTALLED OVER A NON-WOVEN GEOTEXTILE FABRIC (INCIDENTAL) OR OTHER APPROVED WEED BARRIER TO A MINIMUM SETTLED DEPTH OF 4". MULCH SHALL BE HELD BACK FROM PLANT STEMS/TRUNKS A MINIMUM OF 3". WOOD MULCH SHALL BE PLACED AROUND INDIVIDUAL TREES TO A 4" MINIMUM DIAMETER. MULCH SHALL BE INSTALLED WITHIN 48-HOURS OF PLANT INSTALLATION.
- LANDSCAPE EDGING.** INSTALL LANDSCAPE EDGING BETWEEN ALL MULCH AREAS AND TURF. EDGING SHALL BE COMMERCIAL GRADE BLACK POLYETHYLENE OR VINYL EDGING, 0.1 INCH THICK BY 5 INCHES DEEP, V-LIPPED BOTTOM, HORIZONTALLY GROOVED, 1-INCH ROUND TOP, EXTRUDED IN STANDARD LENGTHS, WITH 9-INCH STEEL ANGLE STAKES.
- IRRIGATION.** DESIGN, FURNISH AND INSTALL A COMPLETE UNDERGROUND IRRIGATION SYSTEM FROM APPROVED POINT(S)-OF-CONNECTION WITHIN THE SITE COVERING ALL TURF AND PLANTING AREAS AS SHOWN ON THE LANDSCAPE PLAN. INCLUDES FLOW/PRESSURE TESTING, PLANS WITH DESIGN CALCULATIONS, AS-BUILT DRAWINGS, LABOR, MATERIALS, EQUIPMENT, AND SERVICES FOR THE TESTING, ADJUSTING, RETESTING AND READJUSTING AS REQUIRED TO PLACE THE SYSTEM IN AN APPROVED OPERATING CONDITION. THE IRRIGATION SYSTEM SHALL INCLUDE THE DESIGN AND INSTALLATION OF THE FOLLOWING: PIPING, METER AND BACKFLOW ASSEMBLIES, SPRINKLER HEADS, CABINETS, VALVES AND VALVE BOXES, CONTROLLERS, CONTROL WIRING, FITTINGS, ELECTRICAL CONNECTIONS, QUICK-COUPERS, ALL OTHER NECESSARY ACCESSORIES, SYSTEM MANUALS, 1-YEAR MAINTENANCE PERIOD INCLUDING 1 FALL WINTERIZATION AND 1 SPRING START-UP. IRRIGATION PLANS TO BE PREPARED BY A QUALIFIED IRRIGATION DESIGNER AND SUBMITTED TO OWNER/LANDSCAPE ARCHITECT FOR APPROVAL.
- MAINTENANCE.** MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER EACH PORTION OF THE WORK IS IN PLACE. PLANT MATERIAL SHALL BE PROTECTED AND MAINTAINED UNTIL THE INSTALLATION OF THE PLANTS IS COMPLETE. INSPECTION HAS BEEN MADE, AND PLANTINGS ARE ACCEPTED EXCLUSIVE OF THE GUARANTEE. MAINTENANCE SHALL INCLUDE MOWING, TRIMMING, WATERING, FERTILIZING, WEED AND PESTICIDE CONTROL, MULCHING, REMOVAL OF DEAD MATERIALS, RE-SETTING PLANTS TO PROPER GRADE AND KEEPING PLANTS IN A PLUMB POSITION. AFTER ACCEPTANCE, THE OWNER SHALL ASSUME MAINTENANCE RESPONSIBILITIES, HOWEVER, THE CONTRACTOR SHALL RETAIN RESPONSIBILITY FOR ALL PLANT MATERIAL THROUGH THE COMPLETION OF THE WARRANTY PERIOD.
- WATERING.** UPON ESTABLISHMENT OF SEED AND INSTALLATION OF PLANTS, CONTRACTOR SHALL MAINTAIN A WATERING SCHEDULE WHICH WILL THOROUGHLY WATER ALL PLANTS AND TURF AREAS A MINIMUM OF ONCE A WEEK. MORE FREQUENT WATERING MAY BE REQUIRED DURING PERIODS OF HOT, DRY WEATHER. CONTRACTOR SHALL MAKE THE NECESSARY ARRANGEMENTS FOR WATER. IN THE ABSENCE OF PERMANENT IRRIGATION, TEMPORARY IRRIGATION, TREE WATERING BAGS, OR HAND-WATERING ARE ACCEPTABLE.
- NATIVE PLANT ESTABLISHMENT.** THIS PROJECT INCLUDES ONE OR MORE NATIVE PLANT SEED MIXES CONSISTING OF A VARIETY OF GRASSES, SEDGES AND FLOWERING FORBS. BECAUSE THESE PLANTS TYPICALLY HAVE A LONGER GERMINATION PERIOD, A COVER CROP SPECIES IS REQUIRED TO PROVIDE TEMPORARY COVER AND STABILIZATION. MAINTENANCE OF THESE SEEDED AREAS IS CRITICAL DURING THE FIRST SEVERAL YEARS TO ESTABLISH A SUCCESSFUL NATIVE PLANT COMMUNITY. SEEDED AREAS SHALL BE MOWED / WEED-WHIPPED TO A HEIGHT OF 6-10 INCHES IN MID-JULY AND EARLY SEPTEMBER DURING THE FIRST 2-3 YEARS OF ESTABLISHMENT. IN ADDITION, ALL NON-NATIVE SPECIES / WEEDS SHALL BE SPOT SPRAYED NO LESS THAN 3 TIMES A YEAR WITH HERBICIDE BY A LICENSED APPLICATOR. RE-SEEDING AS NECESSARY SHALL OCCUR IN MAY. A NATIVE PLANT COMMUNITY SHALL BE CONSIDERED SUCCESSFULLY ESTABLISHED NO SOONER THAN 3 YEARS AFTER INITIAL SEEDING - ONCE THE COVER CROP HAS BEEN SUFFICIENTLY REPLACED BY NATIVE PLANTS AND THE AREA IS FREE OF ALL NON-NATIVE AND INVASIVE SPECIES. AT THIS TIME, MAINTENANCE CAN BE REDUCED TO MOWING / WEED-WHIPPING TO A HEIGHT OF 6-10 INCHES ONCE A YEAR IN EARLY SEPTEMBER AND SPOT SPRAYING OF HERBACIDE ONLY AS NEEDED.
- FINAL ACCEPTANCE.** UPON SUBSTANTIAL COMPLETION OF THE WORK, CONTRACTOR SHALL REQUEST FINAL ACCEPTANCE OF THE WORK IN WRITING BY THE OWNER/LANDSCAPE ARCHITECT. IF ANY WORK IS FOUND TO BE INCOMPLETE OR UNSATISFACTORY IN THE OPINION OF THE OWNER/LANDSCAPE ARCHITECT, A WRITTEN PUNCH LIST WILL BE PREPARED LISTING ALL ITEMS THAT REQUIRE COMPLETING OR CORRECTING BEFORE FINAL ACCEPTANCE.
- WARRANTY.** ALL PLANTS, MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE, UNLESS OTHERWISE SPECIFIED. THE GUARANTEE SHALL COVER THE FULL COST OF REPLACEMENT INCLUDING LABOR AND MATERIAL.

LANDSCAPE LEGEND

SYMBOL	COMMON NAME
TREES	
	Northwood Red Maple
	Sienna Glen Maple
	River Birch Multi-Trunk
	Common Hackberry
	Northern Acclaim Thornless Honey Locust
	Kentucky Coffeetree
	Swamp White Oak
	Northern Pin Oak
	Red Oak
	Heritage Oak
	Boulevard Linden
	American Elm
CONIFERO	
	Balsam Fir
	Black Hills Spruce
	White Pine
ORNAMENT	
	Autumn Brilliance Serviceberry
	Marilee Crabapple
	Ivory Silk Japanese Tree Lilac
GROUND COVER	
	MnDOT Seed Mix 25-151
	BWSR Stormwater Pond Pollinator NE
	MnDOT Seed Mix 35-241

1 LANDSCAPE PLAN - NORTHWEST
L3



3890 PHEASANT RIDGE DR NE
SUITE 100
BLAINE, MN 55449
TEL 763.489.7900
FAX 763.489.7959
CARLSONMCCAIN.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 Landscape Architect under the laws of the State of Minnesota

Print Name: Ryan J. Ruttger, RLA
Signature:
Date: 5/3/24 License #: 56346

Drawn: RJR
Designed: RJR
Date: 5/3/24

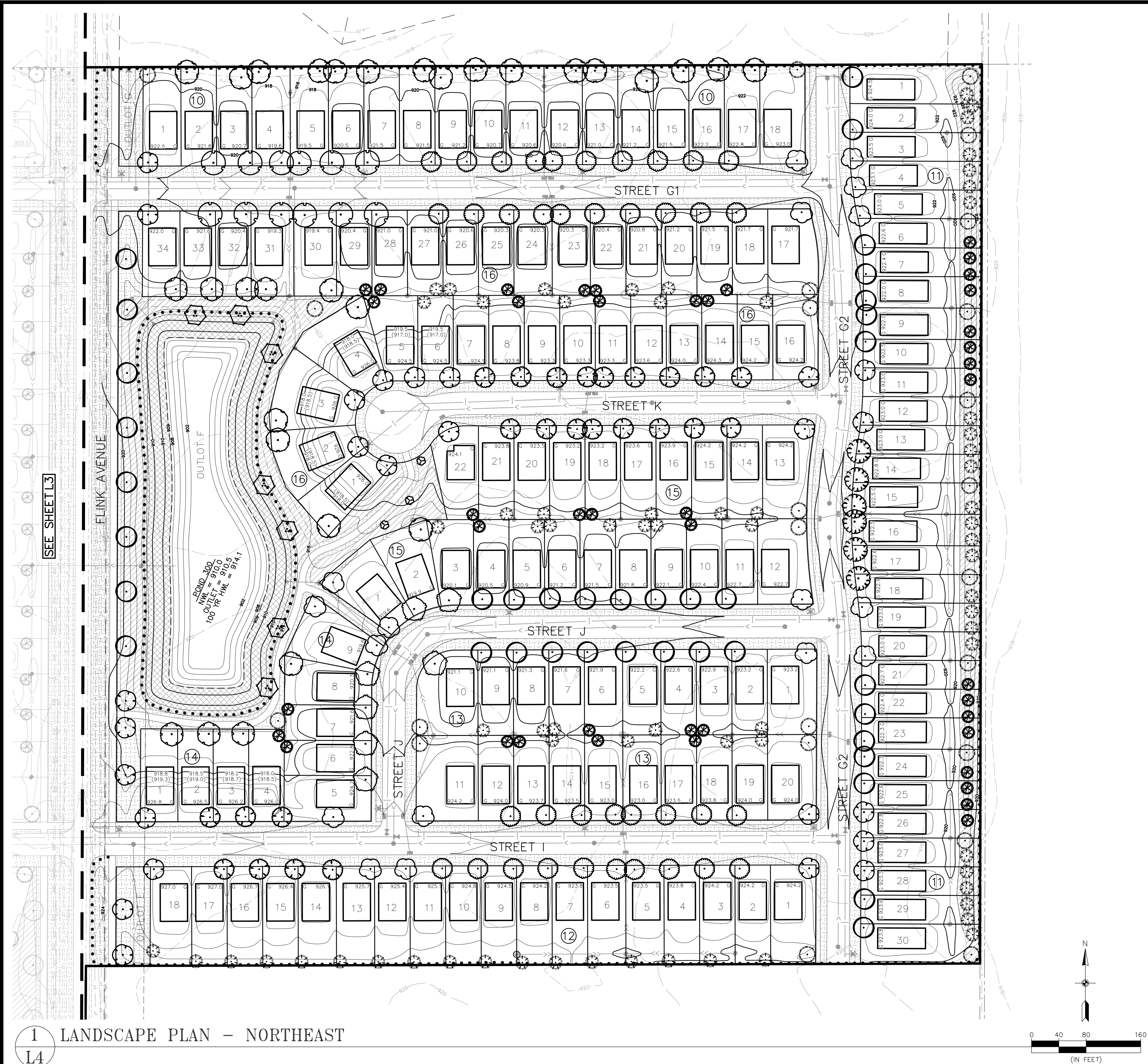
Revisions:
1.

LGI HOMES - MINNESOTA, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

PRELIMINARY
LANDSCAPE PLAN

L3
of
4



PLANT SCHEDULE

SYMBOL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
TREES						
	RM	56	Acer rubrum 'Northwood'	Northwood Red Maple	2.5" Cal.	B&B
	FM	54	Acer x freemanii 'Sienna'	Sienna Glen Maple	2.5" Cal.	B&B
	RB	26	Betula nigra Clump Form, 1.5" Cal Equivalent	River Birch Multi-Trunk	8' Ht.	B&B
	HB	23	Celtis occidentalis	Common Hackberry	2.5" Cal.	B&B
	HL	54	Gleditsia triacanthos inermis 'Harve'	Northern Acclaim Thornless Honey Locust	2.5" Cal.	B&B
	KC	53	Gymnocladus dioica 'Espresso'	Kentucky Coffeetree	2.5" Cal.	B&B
	WO	28	Quercus bicolor	Swamp White Oak	2.5" Cal.	B&B
	PO	34	Quercus ellipsoidalis	Northern Pin Oak	2.5" Cal.	B&B
	RO	47	Quercus rubra	Red Oak	2.5" Cal.	B&B
	HO	4	Quercus x macdanielii 'Clemons' TM	Heritage Oak	2.5" Cal.	B&B
	BL	76	Tilia americana 'Boulevard'	Boulevard Linden	2.5" Cal.	B&B
	AE	54	Ulmus americana 'Princeton'	American Elm	2.5" Cal.	B&B
CONIFEROUS TREES						
	BF	98	Abies balsamea	Balsam Fir	6' Ht.	B&B
	BH	127	Picea glauca densata	Black Hills Spruce	6' Ht.	B&B
	WP	62	Pinus strobus	White Pine	6' Ht.	B&B
ORNAMENTAL TREES						
	SB	4	Amelanchier x grandiflora 'Autumn Brilliance' Clump Form, 1.5" Cal Equivalent	Autumn Brilliance Serviceberry	7' Ht.	B&B
	CA	6	Malus x 'Jamin' White Flowers, Upright, Fruitless	Marilee Crabapple	1.5" Cal.	B&B
	JL	6	Syringa reticulata 'Ivory Silk' White Flowers	Ivory Silk Japanese Tree Lilac	1.5" Cal.	B&B
GROUND COVERS						
	TI	640,897 sf	Type I - Turf Seed Mix Refer to notes for acceptable seeding methods Seeding Rate 180 lb/ac	MnDOT Seed Mix 25-151	seed	
	TII	153,304 sf	Type II - Stormwater Pond Pollinator Seed Mix Refer to notes for acceptable seeding methods. Seeding Rate 47.5 lb/ac	BWSR Stormwater Pond Pollinator NE	seed	
	TIII	283,980 sf	Type III - Native Seed Mix Refer to notes for acceptable seeding methods. Seeding Rate 50.0 lb/ac	MnDOT Seed Mix 35-241	seed	

1 LANDSCAPE PLAN - NORTHEAST
L4

CARLSON MCCAIN
ENGINEERING
SURVEYING
ENVIRONMENTAL

**3890 PHEASANT RIDGE DR NE
SUITE 100
BLAINE, MN 55449
TEL 763.489.7900
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Signature:
Date: 5/3/24 License #: 56346

Drawn: RJR
Designed: RJR
Date: 5/3/24

Revisions:
1.

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2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

**PRELIMINARY
LANDSCAPE PLAN**

L4 of 4

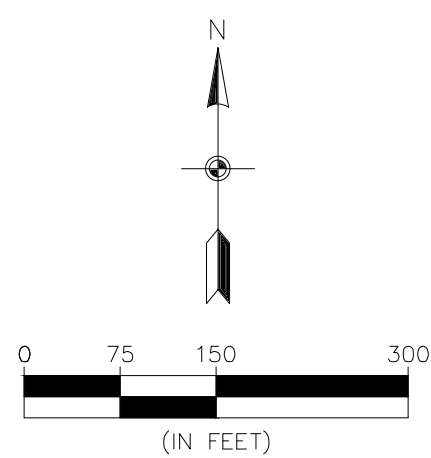


LEGEND

	EXISTING	PROPOSED
PROPERTY LINE	---	---
CURB	---	---
BUILDING SETBACK LINE	---	---
BITUMINOUS	---	---
GRAVEL	---	---
CONCRETE	---	---
10' CONTOUR	890	890
2' CONTOUR	892	892
SILT FENCE	---	---
TREE FENCE	---	---
TREE LINE	---	---
TREE SAVE AREA		---
TREE REMOVE AREA		---
TREE (CONIF./DECID.)	---	---

TREE TOTALS

TOTAL TREE AREA REMOVED	5.80 AC
TOTAL TREE AREA SAVED	1.02 AC
TOTAL TREE AREA	6.82 AC



BENCHMARK

- Minnesota Department of Transportation
Geodetic GSD Station No. 4775 (MnDot)
Name BEV MNDT) — Elevation 921.028 ft.
(NAVD88)
- Minnesota Department of Transportation
Geodetic GSD Station No. 85681 (MnDot)
Name OTTERNESS 2) — Elevation 902.87 ft.
(NAVD88)



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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

Print Name: Brian J. Krystofiak, P.E.
Signature: *Brian J. Krystofiak*
Date: 5/3/24 License #: 25063

Drawn: LOC
Designed: BJK
Date: 5/3/24

Revisions:
1. 8/19/24 per City Comments.
2. 9/23/24 per City Comments.

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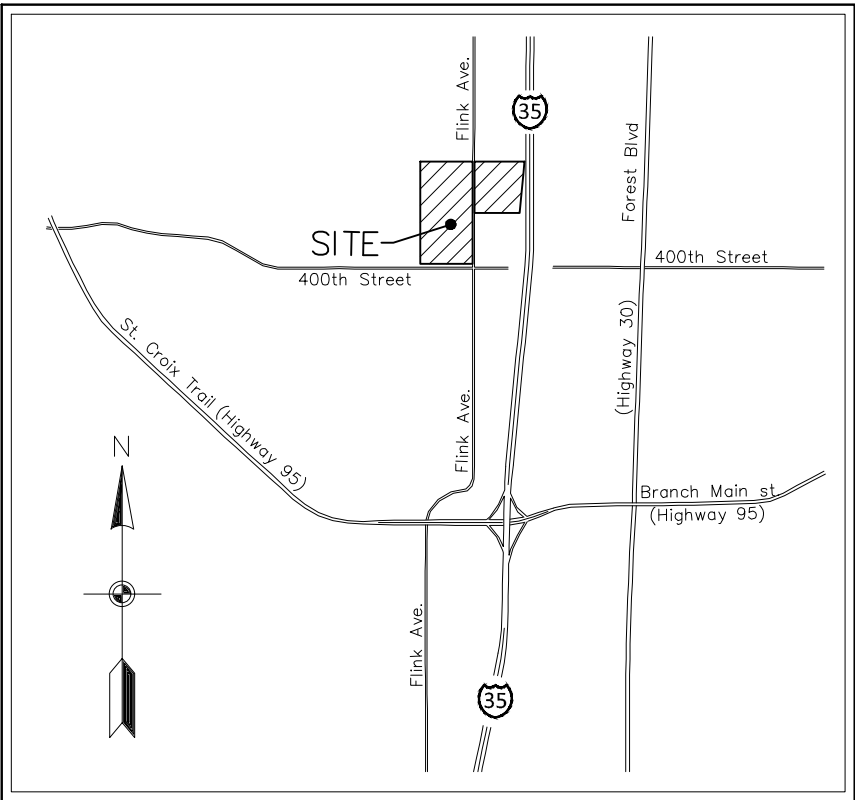
MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

TREE PRESERVATION PLAN

T1
of
T1

MEADOWS RIDGE

NORTH BRANCH, MINNESOTA

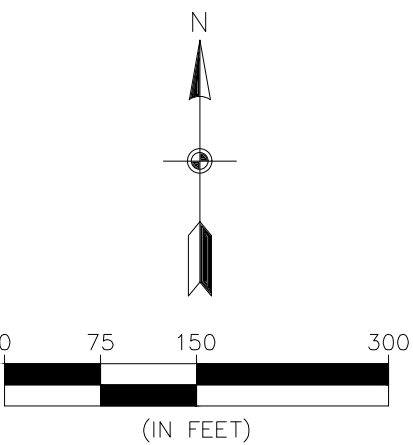


VICINITY MAP
NOT TO SCALE

SUMMARY

PHASE I	7 SHORELAND/R-1 LOTS
	108 PUD LOTS
PHASE I TOTAL:	115 LOTS
PHASE II	11 SHORELAND/R-1 LOTS
	71 PUD LOTS
PHASE II TOTAL:	82 LOTS
PHASE III	27 SHORELAND/R-1 LOTS
	50 PUD LOTS
PHASE III TOTAL:	77 LOTS
PHASE IV	21 SHORELAND/R-1 LOTS
	47 PUD LOTS
PHASE IV TOTAL:	68 LOTS
DEVELOPMENT TOTAL:	66 SHORELAND/R-1 LOTS
	276 PUD LOTS
	342 TOTAL LOTS

- NOTE:
- 1.) PHASING SUBJECT TO CHANGE DUE TO MARKET CONDITIONS
 - 2.) TEMPORARY CUL-DE-SACS SHALL BE INSTALLED AS REQUIRED AT PHASE LIMITS



BENCHMARK

1. Minnesota Department of Transportation
Geodetic GSID Station No. 4775 (MnDot
Name BEV MNDT) - Elevation 921.028 ft.
(NAVD88)
2. Minnesota Department of Transportation
Geodetic GSID Station No. 85681 (MnDot
Name OTTERNESS 2) - Elevation 902.87 ft.
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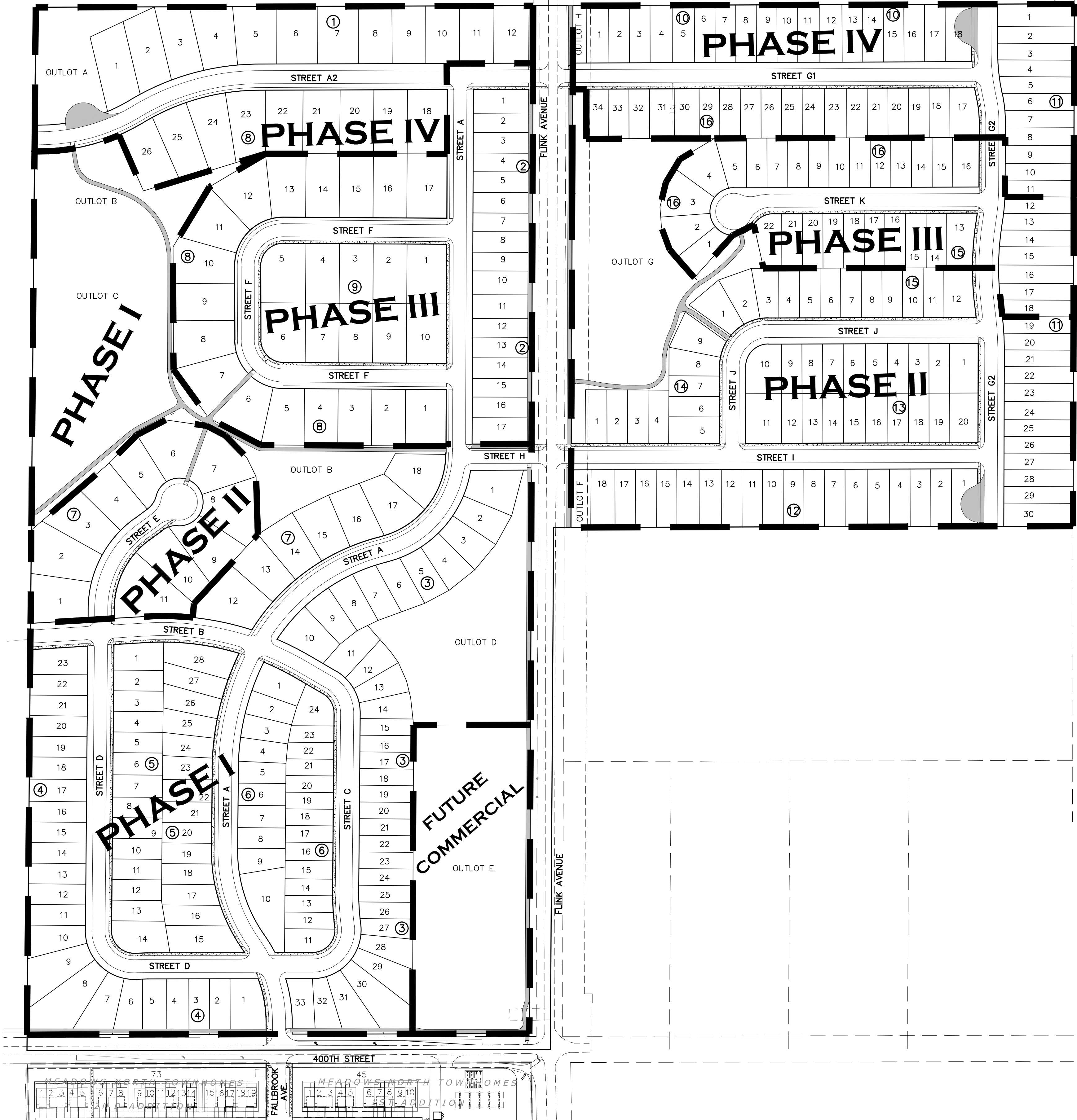
CALL BEFORE YOU DIG



811

Know what's below.
Call before you dig.

The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."



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2. 9/23/24 per City Comments.

LGI HOMES - MINNESOTA, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

MEADOWS RIDGE
NORTH BRANCH, MINNESOTA

PHASING PLAN

P1
of
P1

Meadows Ridge
Environmental Assessment Worksheet
Appendix B

Stormwater Management Plan

STORMWATER MANAGEMENT PLAN

Meadow Ridge
North Branch, Minnesota
Carlson McCain Project No.: 7226-03

Prepared for:

LGI Homes - Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, MN 55303

May 3, 2024
Rev. 1.0 – 8/19/2024
Rev. 2.0 – 9/23/2024



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APPENDICES

Appendix A	Existing HydroCAD Model
Appendix B	Proposed HydroCAD Model
Appendix C	Pond Design Calculations
Appendix D	Soil Information

1.0 INTRODUCTION

This document provides detailed information on the surface water management for the proposed Meadow Ridge housing development in North Branch, Chisago County, Minnesota. Included in this document are peak elevations for the proposed stormwater features, a rate control analysis, and a water quality analysis. See Figure 1 for a site location map.

1.1 Existing Conditions

The site is currently row crop farmland with some woods along the edges of the fields. Flink Avenue runs through the middle of the proposed development. The western boundary of the site is existing farmland (this adjacent property is currently in the concept planning stages for future residential development). To the north the boundary is existing wooded lots. The east boundary is Interstate I-35 and Flink Avenue. The southern boundary is 400th Street and an existing acreage lot.

The site boundary of the proposed development is an area of approximately 119 acres. For the purpose of this report, the drainage boundary being considered is 152.544 acres, which includes approximately 2.33 acres of existing onsite and offsite impervious surface.

The site has a gentle rolling topography with elevations ranging from approximately 908 to 925. The majority of the site is made up of low areas that do not discharge for any of the modeled events. Portions of the site discharge to the north, east, west and southeast. See Figure 2 for an existing conditions drainage map.

1.2 Proposed Conditions

The developer plans on constructing 342 single-family homes with corresponding street and utilities and two stormwater ponds, two infiltration basins and an infiltration bench in one of the stormwater ponds. There is a 5.25 acre concept commercial lot that is considered for runoff and water quality calculations. The infiltration volume for this commercial is also provided by the proposed infiltration practices. The site will be graded to promote surface water drainage and to maximize the amount of runoff that is treated before leaving the site. The proposed construction will result in 38.33 acres of new impervious surfaces, in addition 2.915 acres of impervious surface was assumed for the concept commercial lot. Disturbed areas will be tilled, seeded and mulched or sodded after construction is complete. See Figure 3 for a proposed conditions drainage map.

1.3 Soil Information

Haugo Geotechnical Services completed 12 soil borings within the proposed development. The soil borings indicated a layer of topsoil approximately 1' to 5' in depth. The soils below the topsoil are predominantly a layer of silty sand or sand with silt (SM or SP-SM). Below that layer is typically poorly graded sand (SP). Boring #5 indicates an approximate 3.5' layer of clayey sand just below the topsoil. The soils below this clayey sand layer are the same poorly graded sand with silt found in the other borings. The geotechnical report is provided in Appendix D.

1.4 Groundwater Information

Groundwater was observed in 2 of the 12 soil borings. The groundwater was observed approximately 10' below the surface at an elevation around 900.0. The water level of the adjacent lake and the wetland in the adjacent wetland to the west were observed around an elevation of 901.0. Groundwater for the site is assumed to be around 901.0. It is anticipated the normal water level of Pond 100 will normalize a few feet below the anticipated groundwater, an elevation of 899 is anticipated. The geotechnical report is provided in Appendix D.

1.5 Curve Numbers

Curve Numbers (CN) for the HydroCAD models were based on the geotechnical report. The silty topsoil onsite is consistent with an HSG B Soil. The wetland/lowland areas were modeled as HSG D Soil. The curve numbers are included in the HydroCAD models in Appendix A & B.

1.6 Time of Concentration

The times of concentration were calculated using a combination of sheet flow and shallow concentrated flow. These methods require the length, slope of the water course and the water course characteristics for calculating the time of concentration, which were measured from the existing and proposed topography. Per the SCS Technical Release 55, a minimum time of concentration of 6 minutes was used for the analysis. See HydroCAD models in Appendix A and B.

2.0 STORMWATER ANALYSIS

The surface water analysis was completed using HydroCAD software, based on the SCS methodologies with Atlas 14 – 24 hour storms. The peak elevations and runoff rates were modeled for the 2-year (2.80”), 10-year (4.10”), 100-year (6.62”) storms and 10-day (10”) snowmelt. See Appendix A & B for the HydroCAD models.

2.1 Peak Elevations

The high-water levels for the pond and basin have been calculated for the 2-year, 10-year and 100-year, 24-hour rainfall events. Basin water levels are presented in Table 1.

Table 1
High Water Elevation
Meadow Ridge
North Branch, MN
Project #7226-03

Pond	NWL	Outlet	2-Year HWL	10-Year HWL	100-Year HWL	10-Day Snowmelt
Pond 100*	907.0	907.5	908.0	909.1	911.2	910.8
Pond 300	910.0	910.0	912.3	913.5	915.7	912.7

*Pond 100 has a bench proposed at an elevation of 901.0 as it is the anticipated groundwater level

Infiltration Basin	Bottom	Outlet	2-Year HWL	10-Year HWL	100-Year HWL	10-Day Snowmelt
Basin 200	909.5	911.5	911.8	913.4	915.4	914.8
Basin 350	907.5	910.0	910.6	911.6	914.1	912.8

Wetland	2-Year HWL	10-Year HWL	100-Year HWL	10-Day Snowmelt
Wetland 10	904.4	905.1	908.7	908.8

Wetland 10 is located within the adjacent property to the west of the Meadow Ridge development. As previously mentioned, this property is in the concept planning stages for future residential development.

2.2 Rate Control Analysis

The runoff from the site discharges to the north, east, southeast, and west. The majority of the site is being directed to the West discharge point which is Chain Lake. The runoff to the north flows to low landlocked basins between the proposed development and existing homes. The runoff to the east flows to Interstate I-35. The discharge southeast flows to an existing landlocked low spot on an acreage lot. Existing and proposed total discharge rates are shown in Table 2.

Table 2
Discharge Comparison
Meadow Ridge
North Branch, MN
Project #7226-03

Location	Conditions	2-Year	10-Year	100-Year
North	Existing (cfs)	1.84	3.99	12.03
	Proposed (cfs)	0.00	0.00	0.00
East	Existing (cfs)	0.90	3.07	7.91
	Proposed (cfs)	0.58	1.50	3.66
Southeast	Existing (cfs)	2.58	6.10	15.24
	Proposed (cfs)	2.21	4.55	9.56
West	Existing (cfs)	0.05	0.16	0.43
	Proposed (cfs)	3.14	9.12	14.12
Site Total	Existing (cfs)	4.59	12.39	33.37
	Proposed (cfs)	3.18	9.22	18.60

In aggregate, the peak runoff rate decreases for all modeled events. The increase in runoff rate to the west is due to this being the outlet location for the proposed stormwater pond system. The model assumes the ponds are starting at the NWL elevation as a conservative approach. Due to the granular soils found onsite it is anticipated the pond water level will normalize at the anticipated groundwater level. This elevation is far below the pond outlets so there will be minimal discharge flowing from the stormwater ponds.

2.3 Stormwater Retention Analysis

The total new impervious surface proposed is approximately 38.33 acres. There is also an additional 2.915 acres of impervious surface from the concept commercial is being considered in the stormwater retention analysis. A total of 41.25 acres of new and concept impervious surface is being considered in this analysis.

The total retention volume required is 3.78 acre-feet based on 1.1" of runoff over the proposed 41.25 acres of new and concept impervious surfaces. The retention volume for the site will be achieved through two infiltration basins and an infiltration bench in one of the stormwater ponds. The total infiltration volume provided is 6.199 acre-feet. Based on the sandy soils present onsite the infiltration rate of 0.8 in/hr is anticipated. The adjusted infiltration rate for the Pond 100 Infiltration Bench is based on the pond surface to infiltration bench size ratio:

$$\text{Adjusted Infiltration Rate} = 0.8 \text{ in/hr} \times \frac{(\text{Infiltration Bench} + \text{NWL}) - \text{NWL}}{(\text{Infiltration Bench} + \text{NWL})}$$

$$\text{Pond 100 Adjusted Infiltration Rate} = 0.8 \text{ in/hr} \times \frac{3.771 \text{ Ac.} - 3.176 \text{ Ac.}}{3.771 \text{ Ac.}} = \mathbf{0.126 \text{ in / hr}}$$

The outlet for Pond 100 is 0.5' above the NWL/Bench, the outlet for Infiltration Basin 200 is 2.0' above the basin bottom and, the outlet for Infiltration Basin 350 is 2.5' above the basin bottom. Based on the adjusted infiltration rate for Pond 100 (0.126 in/hr) and the design depth (0.5 feet), the anticipated drawdown time is 47.6 hours. Based on the anticipated infiltration rate for Infiltration Basin 200 (0.8 in/hr) and the design depth (2.0 feet), the anticipated drawdown time is 30 hours. Based on the anticipated infiltration rate for Infiltration Basin 350 (0.8 in/hr) and the design depth is (2.5 feet), the anticipated drawdown time is 37.5 hours. The 48-hour drawdown time is being met for all of the proposed infiltration practices. Pond sizing calculations are provided in Appendix C.

2.4 Pretreatment

Pretreatment for the stormwater ponds will be provided by the inclusion of sumps (4' depth). For the ease of maintenance, the sumps will be included in the last storm sewer structure in the roadway prior to discharging to the ponds.

2.5 Storm Sewer Design

Storm sewer design will be based on the City of North Branch storm sewer design requirements. The storm sewer design spreadsheet and catchment map will be provided to the city to review.

2.6 Stormwater Pond Design & Water Quality Analysis

The City of North Branch requires the water quality standards to meet the Nationwide Urban Runoff Program (NURP) recommendations before discharging from the site. The NURP recommendations for the design of stormwater treatment basins are being met. The NPDES design requirements for the design of Wet Sedimentation Basins are also being met. These calculations are shown in Appendix C.

In summary:

- The stormwater ponds have been sized to have a permanent pool volume greater than or equal to the inflow volume from a 2.5-inch rainfall event.
- The ponds are all between 4 and 10 feet in depth from the NWL to bottom.
- The city of North Branch EOF separation requirements are being met.
- The ponds are designed with a 10' safety bench at the NWL and slopes above the NWL are 4:1 maximum.
- The outlets are positioned to prevent short-circuiting from the storm sewer inlets.
- The live storage is provided for the water quality volume
- The water quality volume discharge is less than 5.66 cfs per acre of the ponds surface area.
- Maintenance access paths to the ponds are provided.

2.7 Conclusion

The site is designed to reduce the peak runoff rates for all of the modeled 24-hour rainfall events for the site as a whole. The increase in runoff rate to the west is due to this being the outlet location for the proposed stormwater pond system. The model assumes the ponds are starting at the NWL elevation as a conservative approach. It is anticipated the ponds water level will normalize at the anticipated groundwater level due to the granular soils found onsite. This water level is far below the pond outlets so there will be minimal discharge flowing from the stormwater ponds. Pretreatment of the stormwater runoff flowing to the proposed stormwater ponds is provided by sump structures provided in the storm sewer system. The stormwater ponds are adequately sized for a 2.5-inch rainfall event, the water quality standards are being met for the stormwater ponds. The proposed infiltration practices will retain (and infiltrate the entire volume within 48 hours or less) more than the volume from 1.1 inches of runoff over all proposed impervious surfaces for the housing development and concept commercial outlot.

3.0 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.

This Stormwater Management Plan was prepared by:

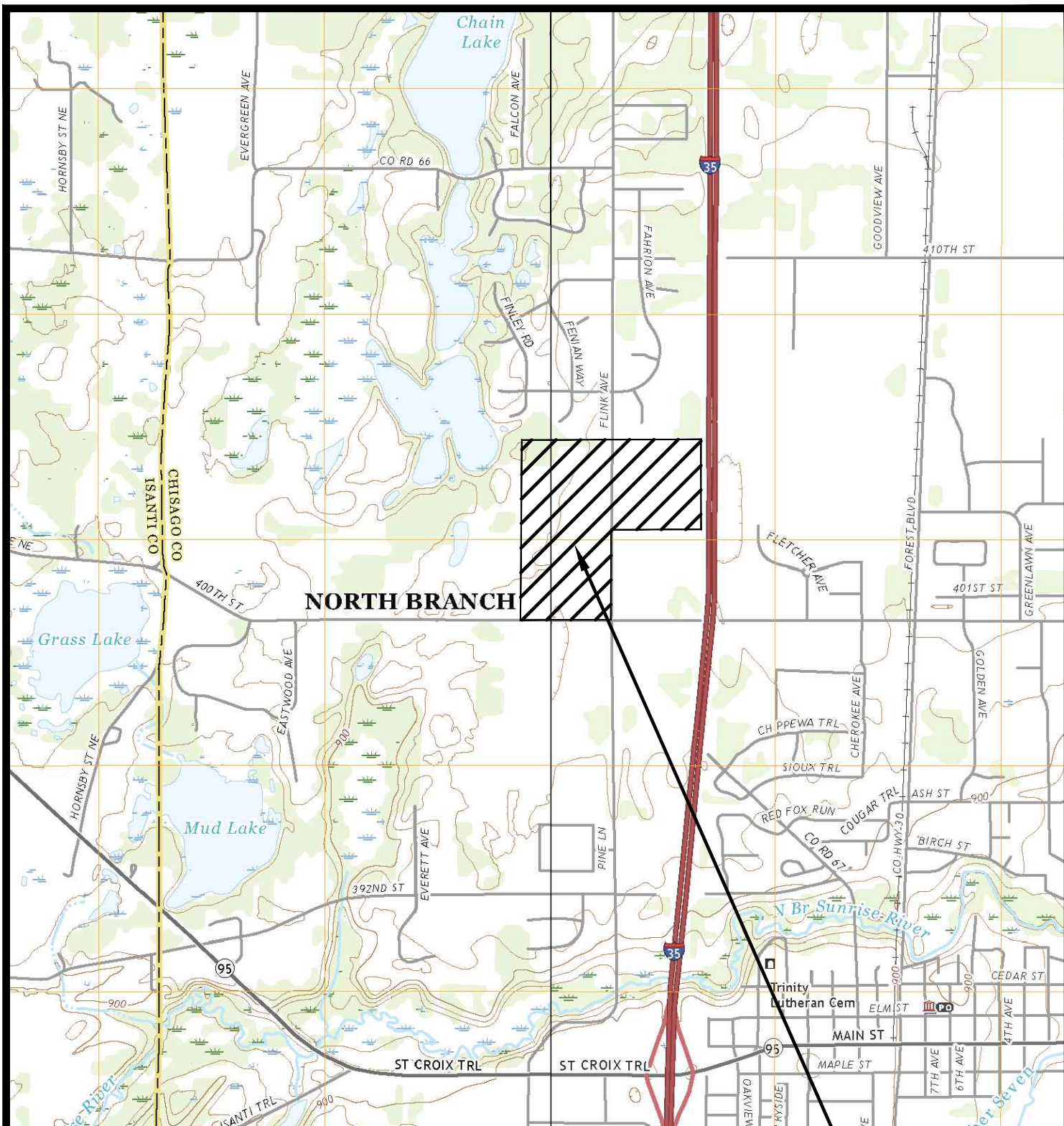


Aaron D. Briski, P.E.
License #: 57811

9/18/2024

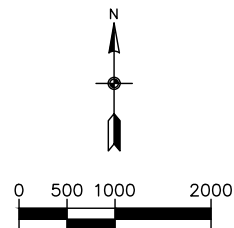
Date

FIGURES



SOURCE: USGS NORTH BRANCH & STARK 7.5 MIN. QUADRANGLE

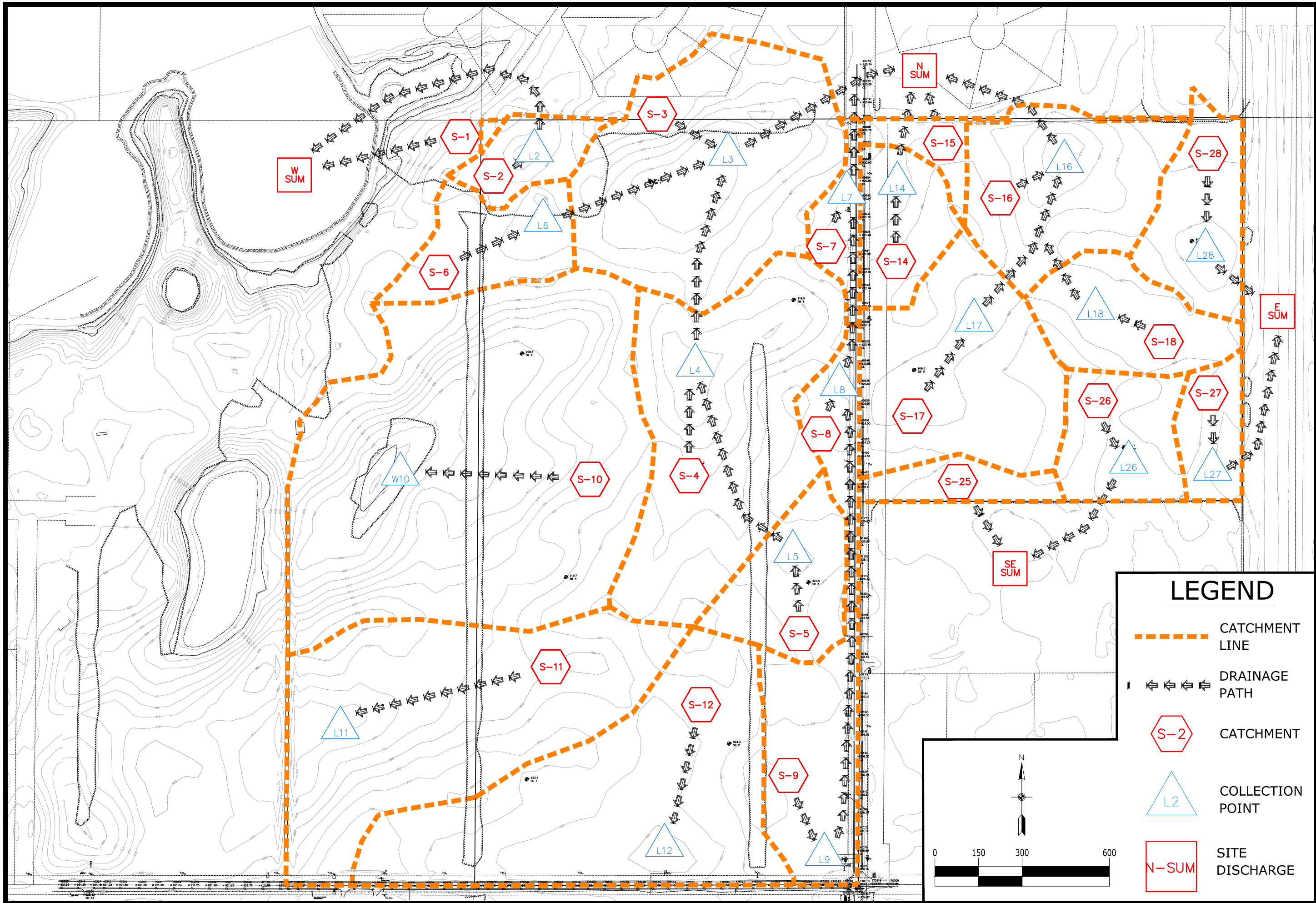
SITE LOCATION



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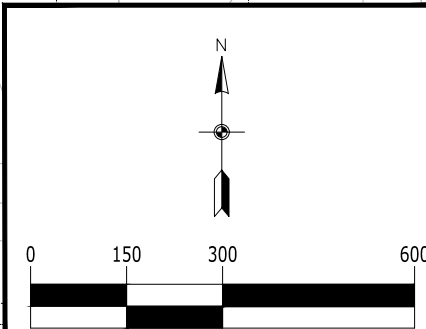
MEADOWS RIDGE
North Branch, MN

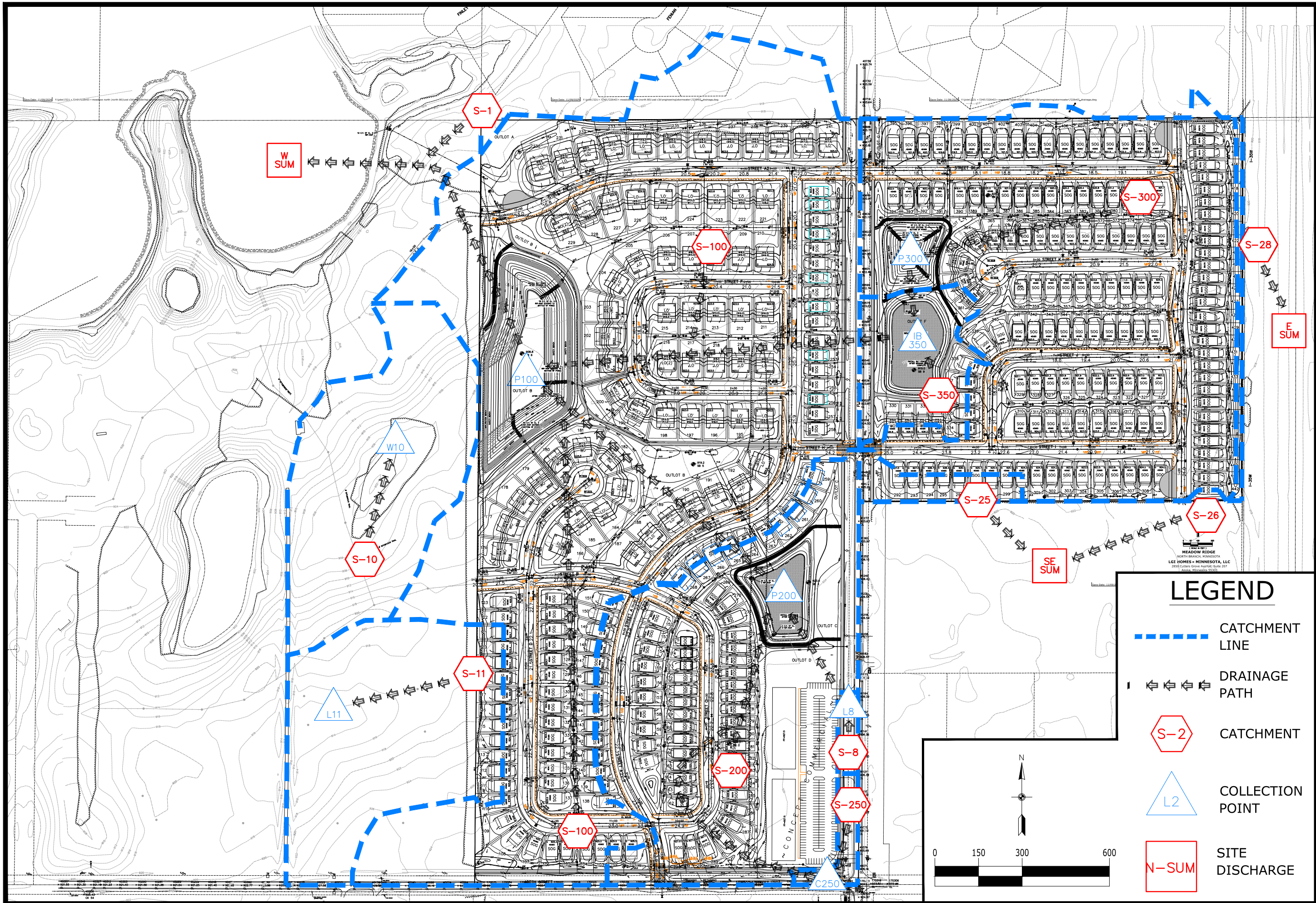
FIGURE 1
SITE LOCATION MAP



LEGEND

- CATCHMENT LINE
- DRAINAGE PATH
- CATCHMENT
- COLLECTION POINT
- SITE DISCHARGE

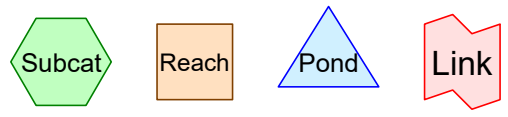
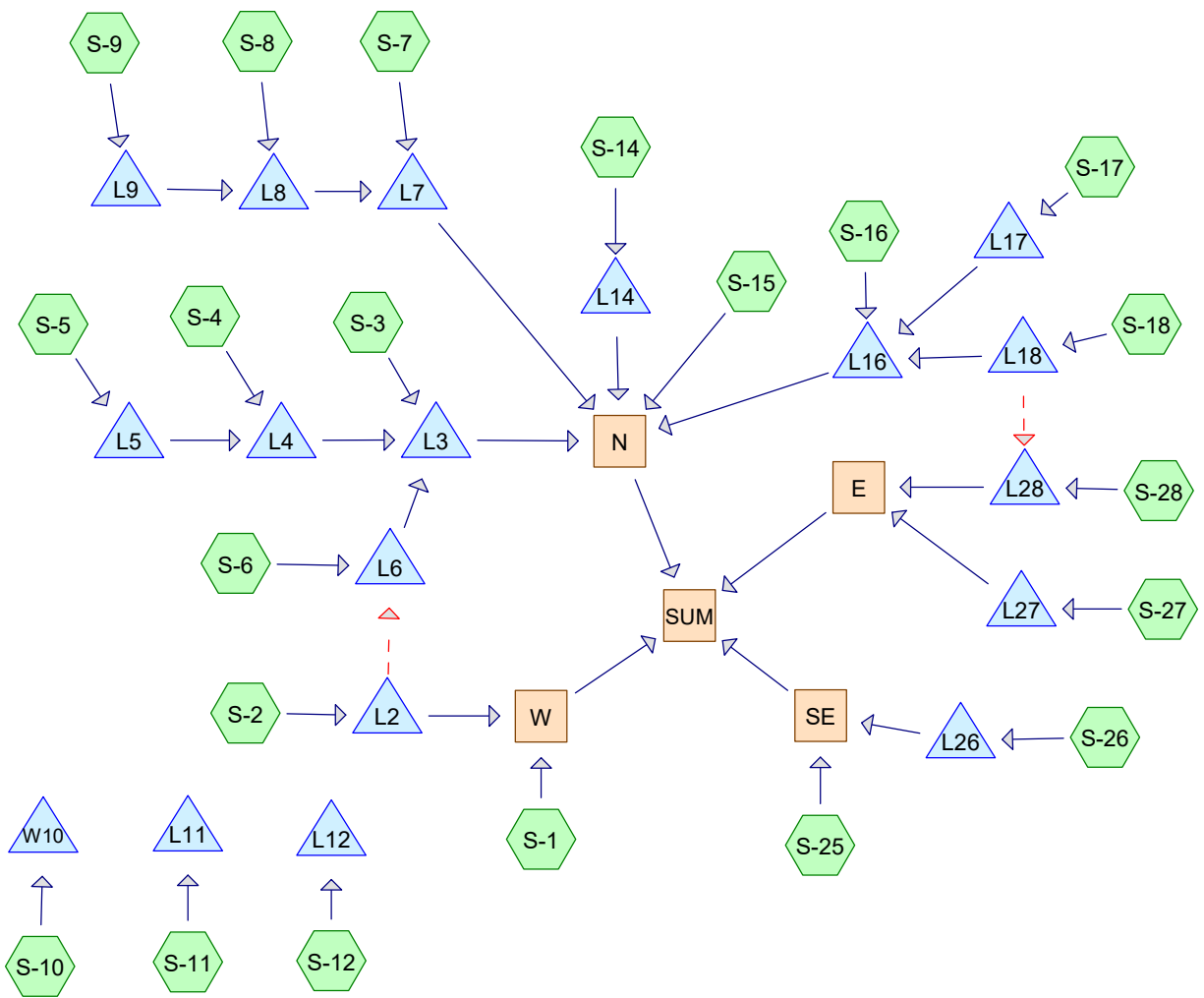




LEGEND

- CATCHMENT LINE
- DRAINAGE PATH
- CATCHMENT
- COLLECTION POINT
- SITE DISCHARGE

APPENDIX A



Routing Diagram for 7226-03_EX
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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
10.173	69	50-75% Grass cover, Fair, HSG B (S-10, S-11, S-12, S-14, S-15, S-16, S-17, S-18, S-25, S-26, S-27, S-28, S-3, S-4, S-5, S-6, S-7, S-8, S-9)
2.330	98	Ex. Impervious (S-10, S-11, S-12, S-14, S-15, S-17, S-25, S-3, S-7, S-8, S-9)
126.663	75	Row Crops, HSG B (S-10, S-11, S-12, S-14, S-15, S-16, S-17, S-18, S-25, S-26, S-27, S-28, S-3, S-4, S-5, S-6, S-7, S-8, S-9)
13.067	65	Woods/grass comb., Fair, HSG B (S-1, S-10, S-11, S-12, S-15, S-16, S-2, S-28, S-3, S-4, S-5, S-6, S-9)
0.311	82	Woods/grass comb., Fair, HSG D (S-10)
152.544	74	TOTAL AREA

7226-03_EX

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Meadow Ridge

MSE 24-hr 3 2-Year Rainfall=2.80"

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Page 3

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 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 S-1:	Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=0.42" Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.05 cfs 0.004 af
Subcatchment S-10:	Runoff Area=29.152 ac 0.39% Impervious Runoff Depth=0.78" Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=27.16 cfs 1.905 af
Subcatchment S-11:	Runoff Area=17.105 ac 0.84% Impervious Runoff Depth=0.83" Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=75 Runoff=15.09 cfs 1.187 af
Subcatchment S-12:	Runoff Area=16.495 ac 2.98% Impervious Runoff Depth=0.83" Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=75 Runoff=14.55 cfs 1.144 af
Subcatchment S-14:	Runoff Area=3.416 ac 5.77% Impervious Runoff Depth=0.88" Flow Length=150' Tc=10.1 min CN=76 Runoff=4.54 cfs 0.251 af
Subcatchment S-15:	Runoff Area=1.419 ac 4.65% Impervious Runoff Depth=0.83" Flow Length=250' Slope=0.0200 '/' Tc=9.2 min CN=75 Runoff=1.84 cfs 0.098 af
Subcatchment S-16:	Runoff Area=7.820 ac 0.00% Impervious Runoff Depth=0.83" Flow Length=300' Slope=0.0150 '/' Tc=11.3 min CN=75 Runoff=9.21 cfs 0.543 af
Subcatchment S-17:	Runoff Area=9.896 ac 2.05% Impervious Runoff Depth=0.83" Flow Length=450' Slope=0.0100 '/' Tc=16.2 min CN=75 Runoff=9.71 cfs 0.687 af
Subcatchment S-18:	Runoff Area=4.835 ac 0.00% Impervious Runoff Depth=0.83" Flow Length=300' Slope=0.0100 '/' Tc=13.4 min CN=75 Runoff=5.22 cfs 0.335 af
Subcatchment S-2:	Runoff Area=2.191 ac 0.00% Impervious Runoff Depth=0.42" Flow Length=150' Tc=14.9 min CN=65 Runoff=0.87 cfs 0.076 af
Subcatchment S-25:	Runoff Area=1.874 ac 1.44% Impervious Runoff Depth=0.83" Flow Length=150' Slope=0.0200 '/' Tc=7.9 min CN=75 Runoff=2.58 cfs 0.130 af
Subcatchment S-26:	Runoff Area=4.110 ac 0.00% Impervious Runoff Depth=0.83" Flow Length=250' Slope=0.0150 '/' Tc=10.5 min CN=75 Runoff=5.00 cfs 0.285 af
Subcatchment S-27:	Runoff Area=2.265 ac 0.00% Impervious Runoff Depth=0.83" Flow Length=150' Slope=0.0200 '/' Tc=7.9 min CN=75 Runoff=3.12 cfs 0.157 af
Subcatchment S-28:	Runoff Area=4.458 ac 0.00% Impervious Runoff Depth=0.78" Flow Length=400' Tc=18.5 min CN=74 Runoff=3.78 cfs 0.291 af
Subcatchment S-3:	Runoff Area=14.438 ac 0.46% Impervious Runoff Depth=0.69" Flow Length=275' Tc=15.0 min CN=72 Runoff=11.77 cfs 0.832 af
Subcatchment S-4:	Runoff Area=14.606 ac 0.00% Impervious Runoff Depth=0.78" Flow Length=300' Slope=0.0200 '/' Tc=16.5 min CN=74 Runoff=13.21 cfs 0.954 af

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Meadow Ridge

MSE 24-hr 3 2-Year Rainfall=2.80"

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Subcatchment S-5: Runoff Area=4.385 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=250' Slope=0.0200 '/' Tc=15.8 min CN=74 Runoff=4.05 cfs 0.286 af

Subcatchment S-6: Runoff Area=4.152 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=275' Slope=0.0200 '/' Tc=16.1 min CN=72 Runoff=3.24 cfs 0.239 af

Subcatchment S-7: Runoff Area=1.639 ac 14.70% Impervious Runoff Depth=0.88"
Flow Length=100' Tc=7.2 min CN=76 Runoff=2.50 cfs 0.121 af

Subcatchment S-8: Runoff Area=2.322 ac 14.86% Impervious Runoff Depth=0.88"
Flow Length=225' Tc=8.5 min CN=76 Runoff=3.31 cfs 0.171 af

Subcatchment S-9: Runoff Area=5.853 ac 7.45% Impervious Runoff Depth=0.88"
Flow Length=750' Slope=0.0100 '/' Tc=16.8 min CN=76 Runoff=6.03 cfs 0.431 af

Reach E: Inflow=0.90 cfs 0.131 af
Outflow=0.90 cfs 0.131 af

Reach N: Inflow=1.84 cfs 0.303 af
Outflow=1.84 cfs 0.303 af

Reach SE: Inflow=2.58 cfs 0.350 af
Outflow=2.58 cfs 0.350 af

Reach SUM: Inflow=4.59 cfs 0.788 af
Outflow=4.59 cfs 0.788 af

Reach W: Inflow=0.05 cfs 0.004 af
Outflow=0.05 cfs 0.004 af

Pond L11: Peak Elev=914.69' Storage=1.187 af Inflow=15.09 cfs 1.187 af
Outflow=0.00 cfs 0.000 af

Pond L12: Peak Elev=920.64' Storage=1.144 af Inflow=14.55 cfs 1.144 af
Outflow=0.00 cfs 0.000 af

Pond L14: Peak Elev=917.36' Storage=0.251 af Inflow=4.54 cfs 0.251 af
Outflow=0.00 cfs 0.000 af

Pond L16: Peak Elev=914.68' Storage=0.542 af Inflow=9.21 cfs 0.543 af
Outflow=0.00 cfs 0.000 af

Pond L17: Peak Elev=919.16' Storage=0.687 af Inflow=9.71 cfs 0.687 af
Outflow=0.00 cfs 0.000 af

Pond L18: Peak Elev=918.73' Storage=0.335 af Inflow=5.22 cfs 0.335 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond L2: Peak Elev=915.44' Storage=0.076 af Inflow=0.87 cfs 0.076 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

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Meadow Ridge

MSE 24-hr 3 2-Year Rainfall=2.80"

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Pond L26:	Peak Elev=919.24' Storage=0.138 af Inflow=5.00 cfs 0.285 af Outflow=0.61 cfs 0.220 af
Pond L27:	Peak Elev=916.98' Storage=0.055 af Inflow=3.12 cfs 0.157 af Outflow=0.90 cfs 0.131 af
Pond L28:	Peak Elev=917.54' Storage=0.291 af Inflow=3.78 cfs 0.291 af Outflow=0.00 cfs 0.000 af
Pond L3:	Peak Elev=913.32' Storage=0.832 af Inflow=11.77 cfs 0.832 af Outflow=0.00 cfs 0.000 af
Pond L4:	Peak Elev=916.19' Storage=0.954 af Inflow=13.21 cfs 0.954 af Outflow=0.00 cfs 0.000 af
Pond L5:	Peak Elev=922.55' Storage=0.286 af Inflow=4.05 cfs 0.286 af Outflow=0.00 cfs 0.000 af
Pond L6:	Peak Elev=916.83' Storage=0.239 af Inflow=3.24 cfs 0.239 af Outflow=0.00 cfs 0.000 af
Pond L7:	Peak Elev=919.39' Storage=0.217 af Inflow=2.50 cfs 0.396 af Outflow=0.31 cfs 0.205 af
Pond L8:	Peak Elev=921.16' Storage=0.070 af Inflow=3.31 cfs 0.319 af Outflow=0.77 cfs 0.276 af
Pond L9:	Peak Elev=924.17' Storage=0.321 af Inflow=6.03 cfs 0.431 af Outflow=0.23 cfs 0.148 af
Pond W10:	Peak Elev=905.29' Storage=1.904 af Inflow=27.16 cfs 1.905 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 152.544 ac Runoff Volume = 10.128 af Average Runoff Depth = 0.80"
98.47% Pervious = 150.214 ac 1.53% Impervious = 2.330 ac

7226-03_EX

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Meadow Ridge
MSE 24-hr 3 2-Year Rainfall=2.80"

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Summary for Subcatchment S-1:

Runoff = 0.05 cfs @ 12.25 hrs, Volume= 0.004 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 27.16 cfs @ 12.26 hrs, Volume= 1.905 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
2.644	65	Woods/grass comb., Fair, HSG B
* 24.552	75	Row Crops, HSG B
1.532	69	50-75% Grass cover, Fair, HSG B
29.152	74	Weighted Average
29.039		99.61% Pervious Area
0.113		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-11:

Runoff = 15.09 cfs @ 12.32 hrs, Volume= 1.187 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

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Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.605	65	Woods/grass comb., Fair, HSG B
* 15.530	75	Row Crops, HSG B
0.827	69	50-75% Grass cover, Fair, HSG B
17.105	75	Weighted Average
16.962		99.16% Pervious Area
0.143		0.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

Summary for Subcatchment S-12:

Runoff = 14.55 cfs @ 12.32 hrs, Volume= 1.144 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.492	98	Ex. Impervious
1.047	65	Woods/grass comb., Fair, HSG B
* 13.492	75	Row Crops, HSG B
1.464	69	50-75% Grass cover, Fair, HSG B
16.495	75	Weighted Average
16.003		97.02% Pervious Area
0.492		2.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

Summary for Subcatchment S-14:

Runoff = 4.54 cfs @ 12.18 hrs, Volume= 0.251 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

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Area (ac)	CN	Description
* 0.197	98	Ex. Impervious
* 2.992	75	Row Crops, HSG B
0.227	69	50-75% Grass cover, Fair, HSG B
3.416	76	Weighted Average
3.219		94.23% Pervious Area
0.197		5.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
10.1	150	Total			

Summary for Subcatchment S-15:

Runoff = 1.84 cfs @ 12.17 hrs, Volume= 0.098 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.066	98	Ex. Impervious
0.021	65	Woods/grass comb., Fair, HSG B
* 1.077	75	Row Crops, HSG B
0.255	69	50-75% Grass cover, Fair, HSG B
1.419	75	Weighted Average
1.353		95.35% Pervious Area
0.066		4.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
2.6	200	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
9.2	250	Total			

Summary for Subcatchment S-16:

Runoff = 9.21 cfs @ 12.20 hrs, Volume= 0.543 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
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Area (ac)	CN	Description
0.016	65	Woods/grass comb., Fair, HSG B
* 7.413	75	Row Crops, HSG B
0.391	69	50-75% Grass cover, Fair, HSG B
7.820	75	Weighted Average
7.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0150	0.11		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
3.8	250	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
11.3	300	Total			

Summary for Subcatchment S-17:

Runoff = 9.71 cfs @ 12.26 hrs, Volume= 0.687 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.203	98	Ex. Impervious
* 9.440	75	Row Crops, HSG B
0.253	69	50-75% Grass cover, Fair, HSG B
9.896	75	Weighted Average
9.693		97.95% Pervious Area
0.203		2.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
7.4	400	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.2	450	Total			

Summary for Subcatchment S-18:

Runoff = 5.22 cfs @ 12.23 hrs, Volume= 0.335 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

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Area (ac)	CN	Description
* 4.818	75	Row Crops, HSG B
0.017	69	50-75% Grass cover, Fair, HSG B
4.835	75	Weighted Average
4.835		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
4.6	250	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
13.4	300	Total			

Summary for Subcatchment S-2:

Runoff = 0.87 cfs @ 12.28 hrs, Volume= 0.076 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
2.191	65	Woods/grass comb., Fair, HSG B
2.191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.7	100	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	150	Total			

Summary for Subcatchment S-25:

Runoff = 2.58 cfs @ 12.16 hrs, Volume= 0.130 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.027	98	Ex. Impervious
* 1.656	75	Row Crops, HSG B
0.191	69	50-75% Grass cover, Fair, HSG B
1.874	75	Weighted Average
1.847		98.56% Pervious Area
0.027		1.44% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
7.9	150	Total			

Summary for Subcatchment S-26:

Runoff = 5.00 cfs @ 12.19 hrs, Volume= 0.285 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 3.990	75	Row Crops, HSG B
0.120	69	50-75% Grass cover, Fair, HSG B
4.110	75	Weighted Average
4.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0150	0.11		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
3.0	200	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
10.5	250	Total			

Summary for Subcatchment S-27:

Runoff = 3.12 cfs @ 12.16 hrs, Volume= 0.157 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 2.085	75	Row Crops, HSG B
0.180	69	50-75% Grass cover, Fair, HSG B
2.265	75	Weighted Average
2.265		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
7.9	150	Total			

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Summary for Subcatchment S-28:

Runoff = 3.78 cfs @ 12.31 hrs, Volume= 0.291 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
0.177	65	Woods/grass comb., Fair, HSG B
* 4.074	75	Row Crops, HSG B
0.207	69	50-75% Grass cover, Fair, HSG B
4.458	74	Weighted Average
4.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
5.3	350	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
18.5	400	Total			

Summary for Subcatchment S-3:

Runoff = 11.77 cfs @ 12.25 hrs, Volume= 0.832 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.067	98	Ex. Impervious
3.716	65	Woods/grass comb., Fair, HSG B
* 9.326	75	Row Crops, HSG B
1.329	69	50-75% Grass cover, Fair, HSG B
14.438	72	Weighted Average
14.371		99.54% Pervious Area
0.067		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.0	125	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.8	100	0.0600	2.20		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
15.0	275	Total			

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Summary for Subcatchment S-4:

Runoff = 13.21 cfs @ 12.27 hrs, Volume= 0.954 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
0.868	65	Woods/grass comb., Fair, HSG B
* 13.311	75	Row Crops, HSG B
0.427	69	50-75% Grass cover, Fair, HSG B
14.606	74	Weighted Average
14.606		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
3.3	250	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.5	300	Total			

Summary for Subcatchment S-5:

Runoff = 4.05 cfs @ 12.27 hrs, Volume= 0.286 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
0.391	65	Woods/grass comb., Fair, HSG B
* 3.833	75	Row Crops, HSG B
0.161	69	50-75% Grass cover, Fair, HSG B
4.385	74	Weighted Average
4.385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.6	200	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
15.8	250	Total			

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Summary for Subcatchment S-6:

Runoff = 3.24 cfs @ 12.27 hrs, Volume= 0.239 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
1.167	65	Woods/grass comb., Fair, HSG B
* 2.796	75	Row Crops, HSG B
0.189	69	50-75% Grass cover, Fair, HSG B
4.152	72	Weighted Average
4.152		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.9	225	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.1	275	Total			

Summary for Subcatchment S-7:

Runoff = 2.50 cfs @ 12.15 hrs, Volume= 0.121 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.241	98	Ex. Impervious
* 0.731	75	Row Crops, HSG B
0.667	69	50-75% Grass cover, Fair, HSG B
1.639	76	Weighted Average
1.398		85.30% Pervious Area
0.241		14.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
0.6	50	0.0100	1.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
7.2	100	Total			

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Summary for Subcatchment S-8:

Runoff = 3.31 cfs @ 12.17 hrs, Volume= 0.171 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.345	98	Ex. Impervious
* 1.176	75	Row Crops, HSG B
0.801	69	50-75% Grass cover, Fair, HSG B
2.322	76	Weighted Average
1.977		85.14% Pervious Area
0.345		14.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.9	175	0.0100	1.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.5	225	Total			

Summary for Subcatchment S-9:

Runoff = 6.03 cfs @ 12.27 hrs, Volume= 0.431 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.436	98	Ex. Impervious
0.111	65	Woods/grass comb., Fair, HSG B
* 4.371	75	Row Crops, HSG B
0.935	69	50-75% Grass cover, Fair, HSG B
5.853	76	Weighted Average
5.417		92.55% Pervious Area
0.436		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0100	0.22		Sheet Flow, Cultivated: Residue<=20% n= 0.060 P2= 2.80"
13.0	700	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.8	750	Total			

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Summary for Reach E:

Inflow Area = 6.723 ac, 0.00% Impervious, Inflow Depth = 0.23" for 2-Year event
Inflow = 0.90 cfs @ 12.43 hrs, Volume= 0.131 af
Outflow = 0.90 cfs @ 12.43 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach N:

Inflow Area = 74.781 ac, 2.08% Impervious, Inflow Depth = 0.05" for 2-Year event
Inflow = 1.84 cfs @ 12.17 hrs, Volume= 0.303 af
Outflow = 1.84 cfs @ 12.17 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 5.984 ac, 0.45% Impervious, Inflow Depth = 0.70" for 2-Year event
Inflow = 2.58 cfs @ 12.16 hrs, Volume= 0.350 af
Outflow = 2.58 cfs @ 12.16 hrs, Volume= 0.350 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SUM:

Inflow Area = 89.792 ac, 1.76% Impervious, Inflow Depth = 0.11" for 2-Year event
Inflow = 4.59 cfs @ 12.17 hrs, Volume= 0.788 af
Outflow = 4.59 cfs @ 12.17 hrs, Volume= 0.788 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 2.304 ac, 0.00% Impervious, Inflow Depth = 0.02" for 2-Year event
Inflow = 0.05 cfs @ 12.25 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 12.25 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Pond L11:

Inflow Area = 17.105 ac, 0.84% Impervious, Inflow Depth = 0.83" for 2-Year event
Inflow = 15.09 cfs @ 12.32 hrs, Volume= 1.187 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

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Peak Elev= 914.69' @ 25.14 hrs Surf.Area= 1.091 ac Storage= 1.187 af

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	912.30'	10.079 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.073	6.953	10.079

Summary for Pond L12:

Inflow Area = 16.495 ac, 2.98% Impervious, Inflow Depth = 0.83" for 2-Year event
 Inflow = 14.55 cfs @ 12.32 hrs, Volume= 1.144 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 920.64' @ 25.14 hrs Surf.Area= 1.987 ac Storage= 1.144 af

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	918.70'	5.987 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.70	0.005	0.000	0.000
920.00	0.525	0.344	0.344
922.00	5.118	5.643	5.987

Summary for Pond L14:

Inflow Area = 3.416 ac, 5.77% Impervious, Inflow Depth = 0.88" for 2-Year event
 Inflow = 4.54 cfs @ 12.18 hrs, Volume= 0.251 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.36' @ 24.59 hrs Surf.Area= 0.470 ac Storage= 0.251 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

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Volume	Invert	Avail.Storage	Storage Description
#1	916.30'	2.945 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.30	0.003	0.000	0.000
918.00	0.750	0.640	0.640
920.00	1.555	2.305	2.945

Device	Routing	Invert	Outlet Devices
#1	Primary	917.90'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.30' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L16:

Inflow Area = 22.551 ac, 0.90% Impervious, Inflow Depth = 0.29" for 2-Year event
 Inflow = 9.21 cfs @ 12.20 hrs, Volume= 0.543 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 914.68' @ 24.64 hrs Surf.Area= 0.655 ac Storage= 0.542 af

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	912.80'	6.054 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.80	0.001	0.000	0.000
914.00	0.340	0.205	0.205
916.00	1.267	1.607	1.812
918.00	2.975	4.242	6.054

Device	Routing	Invert	Outlet Devices
#1	Primary	916.40'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

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Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.80' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L17:

Inflow Area = 9.896 ac, 2.05% Impervious, Inflow Depth = 0.83" for 2-Year event
 Inflow = 9.71 cfs @ 12.26 hrs, Volume= 0.687 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.16' @ 24.92 hrs Surf.Area= 1.407 ac Storage= 0.687 af

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	918.20'	2.379 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.20	0.025	0.000	0.000
920.00	2.618	2.379	2.379

Device	Routing	Invert	Outlet Devices
#1	Primary	919.60'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=918.20' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L18:

Inflow Area = 4.835 ac, 0.00% Impervious, Inflow Depth = 0.83" for 2-Year event
 Inflow = 5.22 cfs @ 12.23 hrs, Volume= 0.335 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.73' @ 24.76 hrs Surf.Area= 1.060 ac Storage= 0.335 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

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Volume	Invert	Avail.Storage	Storage Description
#1	918.10'	3.028 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.10	0.001	0.000	0.000
920.00	3.186	3.028	3.028

Device	Routing	Invert	Outlet Devices
#1	Primary	919.20'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Secondary	919.50'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=918.10' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=918.10' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L2:

Inflow Area = 2.191 ac, 0.00% Impervious, Inflow Depth = 0.42" for 2-Year event
 Inflow = 0.87 cfs @ 12.28 hrs, Volume= 0.076 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 915.44' @ 24.84 hrs Surf.Area= 0.103 ac Storage= 0.076 af

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	913.80'	3.066 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
913.80	0.001	0.000	0.000
914.00	0.002	0.000	0.000
916.00	0.143	0.145	0.145
918.00	0.620	0.763	0.908
920.00	1.538	2.158	3.066

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Device	Routing	Invert	Outlet Devices
#1	Primary	917.70'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Secondary	918.50'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=913.80' (Free Discharge)↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=913.80' (Free Discharge)↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond L26:**

Inflow Area = 4.110 ac, 0.00% Impervious, Inflow Depth = 0.83" for 2-Year event
 Inflow = 5.00 cfs @ 12.19 hrs, Volume= 0.285 af
 Outflow = 0.61 cfs @ 13.08 hrs, Volume= 0.220 af, Atten= 88%, Lag= 53.2 min
 Primary = 0.61 cfs @ 13.08 hrs, Volume= 0.220 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.24' @ 13.08 hrs Surf.Area= 0.618 ac Storage= 0.138 af

Plug-Flow detention time= 222.0 min calculated for 0.220 af (77% of inflow)
 Center-of-Mass det. time= 145.2 min (981.7 - 836.5)

Volume	Invert	Avail.Storage	Storage Description
#1	918.80'	1.007 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.80	0.011	0.000	0.000
920.00	1.667	1.007	1.007

Device	Routing	Invert	Outlet Devices
#1	Primary	919.10'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.61 cfs @ 13.08 hrs HW=919.24' (Free Discharge)↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.61 cfs @ 0.87 fps)

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Summary for Pond L27:

Inflow Area = 2.265 ac, 0.00% Impervious, Inflow Depth = 0.83" for 2-Year event
 Inflow = 3.12 cfs @ 12.16 hrs, Volume= 0.157 af
 Outflow = 0.90 cfs @ 12.43 hrs, Volume= 0.131 af, Atten= 71%, Lag= 16.3 min
 Primary = 0.90 cfs @ 12.43 hrs, Volume= 0.131 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 916.98' @ 12.43 hrs Surf.Area= 0.189 ac Storage= 0.055 af

Plug-Flow detention time= 121.7 min calculated for 0.131 af (83% of inflow)
 Center-of-Mass det. time= 57.3 min (891.3 - 834.1)

Volume	Invert	Avail.Storage	Storage Description
#1	916.40'	0.417 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.40	0.001	0.000	0.000
918.00	0.520	0.417	0.417

Device	Routing	Invert	Outlet Devices
#1	Primary	916.80'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.90 cfs @ 12.43 hrs HW=916.98' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.90 cfs @ 1.00 fps)

Summary for Pond L28:

Inflow Area = 4.458 ac, 0.00% Impervious, Inflow Depth = 0.78" for 2-Year event
 Inflow = 3.78 cfs @ 12.31 hrs, Volume= 0.291 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.54' @ 25.05 hrs Surf.Area= 0.557 ac Storage= 0.291 af

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	916.50'	4.505 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.50	0.003	0.000	0.000
918.00	0.802	0.604	0.604
920.00	3.099	3.901	4.505

Device	Routing	Invert	Outlet Devices
#1	Primary	919.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.50' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L3:

Inflow Area = 37.581 ac, 0.18% Impervious, Inflow Depth = 0.27" for 2-Year event
 Inflow = 11.77 cfs @ 12.25 hrs, Volume= 0.832 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.32' @ 24.84 hrs Surf.Area= 1.233 ac Storage= 0.832 af

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	912.00'	37.227 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.00	0.023	0.000	0.000
914.00	1.849	1.872	1.872
916.00	4.421	6.270	8.142
918.00	7.245	11.666	19.808
920.00	10.174	17.419	37.227

Device	Routing	Invert	Outlet Devices
#1	Primary	919.20'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond L4:

Inflow Area = 18.991 ac, 0.00% Impervious, Inflow Depth = 0.60" for 2-Year event
 Inflow = 13.21 cfs @ 12.27 hrs, Volume= 0.954 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 916.19' @ 24.94 hrs Surf.Area= 1.165 ac Storage= 0.954 af

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	914.40'	14.276 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.40	0.001	0.000	0.000
916.00	0.945	0.757	0.757
918.00	3.295	4.240	4.997
920.00	5.984	9.279	14.276

Device	Routing	Invert	Outlet Devices
#1	Primary	918.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=914.40' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond L5:

Inflow Area = 4.385 ac, 0.00% Impervious, Inflow Depth = 0.78" for 2-Year event
 Inflow = 4.05 cfs @ 12.27 hrs, Volume= 0.286 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.55' @ 24.90 hrs Surf.Area= 0.747 ac Storage= 0.286 af

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	921.70'	2.426 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.70	0.001	0.000	0.000
922.00	0.185	0.028	0.028
924.00	2.213	2.398	2.426

Device	Routing	Invert	Outlet Devices
#1	Primary	922.70'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=921.70' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L6:

Inflow Area = 4.152 ac, 0.00% Impervious, Inflow Depth = 0.69" for 2-Year event
 Inflow = 3.24 cfs @ 12.27 hrs, Volume= 0.239 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 916.83' @ 24.91 hrs Surf.Area= 0.437 ac Storage= 0.239 af

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	914.40'	1.067 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.40	0.001	0.000	0.000
916.00	0.046	0.038	0.038
918.00	0.983	1.029	1.067

Device	Routing	Invert	Outlet Devices
#1	Primary	917.40'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=914.40' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond L7:

Inflow Area = 9.814 ac, 10.41% Impervious, Inflow Depth = 0.48" for 2-Year event
 Inflow = 2.50 cfs @ 12.15 hrs, Volume= 0.396 af
 Outflow = 0.31 cfs @ 17.56 hrs, Volume= 0.205 af, Atten= 88%, Lag= 324.7 min
 Primary = 0.31 cfs @ 17.56 hrs, Volume= 0.205 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.39' @ 17.56 hrs Surf.Area= 0.309 ac Storage= 0.217 af

Plug-Flow detention time= 466.7 min calculated for 0.205 af (52% of inflow)
 Center-of-Mass det. time= 268.2 min (1,257.0 - 988.8)

Volume	Invert	Avail.Storage	Storage Description
#1	917.80'	2.215 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
917.80	0.001	0.000	0.000
918.00	0.004	0.001	0.001
920.00	0.443	0.447	0.448
922.00	1.324	1.767	2.215

Device	Routing	Invert	Outlet Devices
#1	Primary	919.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.30 cfs @ 17.56 hrs HW=919.39' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 0.69 fps)

Summary for Pond L8:

Inflow Area = 8.175 ac, 9.55% Impervious, Inflow Depth = 0.47" for 2-Year event
 Inflow = 3.31 cfs @ 12.17 hrs, Volume= 0.319 af
 Outflow = 0.77 cfs @ 12.52 hrs, Volume= 0.276 af, Atten= 77%, Lag= 21.1 min
 Primary = 0.77 cfs @ 12.52 hrs, Volume= 0.276 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 921.16' @ 12.52 hrs Surf.Area= 0.178 ac Storage= 0.070 af

Plug-Flow detention time= 152.0 min calculated for 0.276 af (86% of inflow)
 Center-of-Mass det. time= 75.9 min (1,058.0 - 982.1)

Volume	Invert	Avail.Storage	Storage Description
#1	920.40'	0.298 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
920.40	0.005	0.000	0.000
922.00	0.367	0.298	0.298

Device	Routing	Invert	Outlet Devices
#1	Primary	921.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.77 cfs @ 12.52 hrs HW=921.16' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.77 cfs @ 0.95 fps)

Summary for Pond L9:

Inflow Area = 5.853 ac, 7.45% Impervious, Inflow Depth = 0.88" for 2-Year event
 Inflow = 6.03 cfs @ 12.27 hrs, Volume= 0.431 af
 Outflow = 0.23 cfs @ 15.35 hrs, Volume= 0.148 af, Atten= 96%, Lag= 184.7 min
 Primary = 0.23 cfs @ 15.35 hrs, Volume= 0.148 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 924.17' @ 15.35 hrs Surf.Area= 0.611 ac Storage= 0.321 af

Plug-Flow detention time= 421.2 min calculated for 0.148 af (34% of inflow)
 Center-of-Mass det. time= 315.2 min (1,154.8 - 839.7)

Volume	Invert	Avail.Storage	Storage Description
#1	922.40'	4.501 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.40	0.006	0.000	0.000
924.00	0.298	0.243	0.243
926.00	3.960	4.258	4.501

Device	Routing	Invert	Outlet Devices
#1	Primary	924.10'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.22 cfs @ 15.35 hrs HW=924.17' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.22 cfs @ 0.62 fps)

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Summary for Pond W10:

Inflow Area = 29.152 ac, 0.39% Impervious, Inflow Depth = 0.78" for 2-Year event
 Inflow = 27.16 cfs @ 12.26 hrs, Volume= 1.905 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 905.29' @ 24.90 hrs Surf.Area= 1.642 ac Storage= 1.904 af

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	901.60'	9.716 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 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 S-1: Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=1.09"
Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.16 cfs 0.010 af

Subcatchment S-10: Runoff Area=29.152 ac 0.39% Impervious Runoff Depth=1.67"
Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=61.35 cfs 4.057 af

Subcatchment S-11: Runoff Area=17.105 ac 0.84% Impervious Runoff Depth=1.74"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=75 Runoff=33.21 cfs 2.483 af

Subcatchment S-12: Runoff Area=16.495 ac 2.98% Impervious Runoff Depth=1.74"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=75 Runoff=32.02 cfs 2.395 af

Subcatchment S-14: Runoff Area=3.416 ac 5.77% Impervious Runoff Depth=1.82"
Flow Length=150' Tc=10.1 min CN=76 Runoff=9.63 cfs 0.517 af

Subcatchment S-15: Runoff Area=1.419 ac 4.65% Impervious Runoff Depth=1.74"
Flow Length=250' Slope=0.0200 '/' Tc=9.2 min CN=75 Runoff=3.99 cfs 0.206 af

Subcatchment S-16: Runoff Area=7.820 ac 0.00% Impervious Runoff Depth=1.74"
Flow Length=300' Slope=0.0150 '/' Tc=11.3 min CN=75 Runoff=20.11 cfs 1.135 af

Subcatchment S-17: Runoff Area=9.896 ac 2.05% Impervious Runoff Depth=1.74"
Flow Length=450' Slope=0.0100 '/' Tc=16.2 min CN=75 Runoff=21.35 cfs 1.437 af

Subcatchment S-18: Runoff Area=4.835 ac 0.00% Impervious Runoff Depth=1.74"
Flow Length=300' Slope=0.0100 '/' Tc=13.4 min CN=75 Runoff=11.44 cfs 0.702 af

Subcatchment S-2: Runoff Area=2.191 ac 0.00% Impervious Runoff Depth=1.09"
Flow Length=150' Tc=14.9 min CN=65 Runoff=2.84 cfs 0.198 af

Subcatchment S-25: Runoff Area=1.874 ac 1.44% Impervious Runoff Depth=1.74"
Flow Length=150' Slope=0.0200 '/' Tc=7.9 min CN=75 Runoff=5.57 cfs 0.272 af

Subcatchment S-26: Runoff Area=4.110 ac 0.00% Impervious Runoff Depth=1.74"
Flow Length=250' Slope=0.0150 '/' Tc=10.5 min CN=75 Runoff=10.88 cfs 0.597 af

Subcatchment S-27: Runoff Area=2.265 ac 0.00% Impervious Runoff Depth=1.74"
Flow Length=150' Slope=0.0200 '/' Tc=7.9 min CN=75 Runoff=6.74 cfs 0.329 af

Subcatchment S-28: Runoff Area=4.458 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=400' Tc=18.5 min CN=74 Runoff=8.54 cfs 0.620 af

Subcatchment S-3: Runoff Area=14.438 ac 0.46% Impervious Runoff Depth=1.53"
Flow Length=275' Tc=15.0 min CN=72 Runoff=28.22 cfs 1.842 af

Subcatchment S-4: Runoff Area=14.606 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=300' Slope=0.0200 '/' Tc=16.5 min CN=74 Runoff=29.87 cfs 2.033 af

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Subcatchment S-5: Runoff Area=4.385 ac 0.00% Impervious Runoff Depth=1.67"
Flow Length=250' Slope=0.0200 '/' Tc=15.8 min CN=74 Runoff=9.12 cfs 0.610 af

Subcatchment S-6: Runoff Area=4.152 ac 0.00% Impervious Runoff Depth=1.53"
Flow Length=275' Slope=0.0200 '/' Tc=16.1 min CN=72 Runoff=7.78 cfs 0.530 af

Subcatchment S-7: Runoff Area=1.639 ac 14.70% Impervious Runoff Depth=1.82"
Flow Length=100' Tc=7.2 min CN=76 Runoff=5.26 cfs 0.248 af

Subcatchment S-8: Runoff Area=2.322 ac 14.86% Impervious Runoff Depth=1.82"
Flow Length=225' Tc=8.5 min CN=76 Runoff=7.00 cfs 0.351 af

Subcatchment S-9: Runoff Area=5.853 ac 7.45% Impervious Runoff Depth=1.82"
Flow Length=750' Slope=0.0100 '/' Tc=16.8 min CN=76 Runoff=12.95 cfs 0.886 af

Reach E: Inflow=3.07 cfs 0.302 af
Outflow=3.07 cfs 0.302 af

Reach N: Inflow=3.99 cfs 1.174 af
Outflow=3.99 cfs 1.174 af

Reach SE: Inflow=6.10 cfs 0.803 af
Outflow=6.10 cfs 0.803 af

Reach SUM: Inflow=12.39 cfs 2.290 af
Outflow=12.39 cfs 2.290 af

Reach W: Inflow=0.16 cfs 0.010 af
Outflow=0.16 cfs 0.010 af

Pond L11: Peak Elev=915.64' Storage=2.483 af Inflow=33.21 cfs 2.483 af
Outflow=0.00 cfs 0.000 af

Pond L12: Peak Elev=921.13' Storage=2.394 af Inflow=32.02 cfs 2.395 af
Outflow=0.00 cfs 0.000 af

Pond L14: Peak Elev=917.83' Storage=0.517 af Inflow=9.63 cfs 0.517 af
Outflow=0.00 cfs 0.000 af

Pond L16: Peak Elev=915.40' Storage=1.135 af Inflow=20.11 cfs 1.135 af
Outflow=0.00 cfs 0.000 af

Pond L17: Peak Elev=919.60' Storage=1.437 af Inflow=21.35 cfs 1.437 af
Outflow=0.00 cfs 0.000 af

Pond L18: Peak Elev=919.01' Storage=0.702 af Inflow=11.44 cfs 0.702 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond L2: Peak Elev=916.30' Storage=0.198 af Inflow=2.84 cfs 0.198 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

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Pond L26:	Peak Elev=919.42' Storage=0.271 af Inflow=10.88 cfs 0.597 af Outflow=2.19 cfs 0.531 af
Pond L27:	Peak Elev=917.19' Storage=0.103 af Inflow=6.74 cfs 0.329 af Outflow=3.07 cfs 0.302 af
Pond L28:	Peak Elev=918.02' Storage=0.620 af Inflow=8.54 cfs 0.620 af Outflow=0.00 cfs 0.000 af
Pond L3:	Peak Elev=913.98' Storage=1.841 af Inflow=28.22 cfs 1.842 af Outflow=0.00 cfs 0.000 af
Pond L4:	Peak Elev=916.98' Storage=2.237 af Inflow=29.87 cfs 2.237 af Outflow=0.00 cfs 0.000 af
Pond L5:	Peak Elev=922.78' Storage=0.476 af Inflow=9.12 cfs 0.610 af Outflow=0.24 cfs 0.204 af
Pond L6:	Peak Elev=917.35' Storage=0.530 af Inflow=7.78 cfs 0.530 af Outflow=0.00 cfs 0.000 af
Pond L7:	Peak Elev=919.66' Storage=0.309 af Inflow=6.84 cfs 1.159 af Outflow=2.64 cfs 0.968 af
Pond L8:	Peak Elev=921.40' Storage=0.118 af Inflow=7.00 cfs 0.955 af Outflow=3.18 cfs 0.911 af
Pond L9:	Peak Elev=924.38' Storage=0.489 af Inflow=12.95 cfs 0.886 af Outflow=1.78 cfs 0.603 af
Pond W10:	Peak Elev=906.32' Storage=4.057 af Inflow=61.35 cfs 4.057 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 152.544 ac Runoff Volume = 21.457 af Average Runoff Depth = 1.69"
98.47% Pervious = 150.214 ac 1.53% Impervious = 2.330 ac

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Summary for Subcatchment S-1:

Runoff = 0.16 cfs @ 12.23 hrs, Volume= 0.010 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 61.35 cfs @ 12.25 hrs, Volume= 4.057 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
2.644	65	Woods/grass comb., Fair, HSG B
* 24.552	75	Row Crops, HSG B
1.532	69	50-75% Grass cover, Fair, HSG B
29.152	74	Weighted Average
29.039		99.61% Pervious Area
0.113		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-11:

Runoff = 33.21 cfs @ 12.30 hrs, Volume= 2.483 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

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Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.605	65	Woods/grass comb., Fair, HSG B
* 15.530	75	Row Crops, HSG B
0.827	69	50-75% Grass cover, Fair, HSG B
17.105	75	Weighted Average
16.962		99.16% Pervious Area
0.143		0.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

Summary for Subcatchment S-12:

Runoff = 32.02 cfs @ 12.30 hrs, Volume= 2.395 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.492	98	Ex. Impervious
1.047	65	Woods/grass comb., Fair, HSG B
* 13.492	75	Row Crops, HSG B
1.464	69	50-75% Grass cover, Fair, HSG B
16.495	75	Weighted Average
16.003		97.02% Pervious Area
0.492		2.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

Summary for Subcatchment S-14:

Runoff = 9.63 cfs @ 12.18 hrs, Volume= 0.517 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

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Area (ac)	CN	Description
* 0.197	98	Ex. Impervious
* 2.992	75	Row Crops, HSG B
0.227	69	50-75% Grass cover, Fair, HSG B
3.416	76	Weighted Average
3.219		94.23% Pervious Area
0.197		5.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
10.1	150	Total			

Summary for Subcatchment S-15:

Runoff = 3.99 cfs @ 12.17 hrs, Volume= 0.206 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.066	98	Ex. Impervious
0.021	65	Woods/grass comb., Fair, HSG B
* 1.077	75	Row Crops, HSG B
0.255	69	50-75% Grass cover, Fair, HSG B
1.419	75	Weighted Average
1.353		95.35% Pervious Area
0.066		4.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
2.6	200	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
9.2	250	Total			

Summary for Subcatchment S-16:

Runoff = 20.11 cfs @ 12.19 hrs, Volume= 1.135 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

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Area (ac)	CN	Description
0.016	65	Woods/grass comb., Fair, HSG B
* 7.413	75	Row Crops, HSG B
0.391	69	50-75% Grass cover, Fair, HSG B
7.820	75	Weighted Average
7.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0150	0.11		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
3.8	250	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
11.3	300	Total			

Summary for Subcatchment S-17:

Runoff = 21.35 cfs @ 12.26 hrs, Volume= 1.437 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.203	98	Ex. Impervious
* 9.440	75	Row Crops, HSG B
0.253	69	50-75% Grass cover, Fair, HSG B
9.896	75	Weighted Average
9.693		97.95% Pervious Area
0.203		2.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
7.4	400	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.2	450	Total			

Summary for Subcatchment S-18:

Runoff = 11.44 cfs @ 12.22 hrs, Volume= 0.702 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

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Area (ac)	CN	Description
* 4.818	75	Row Crops, HSG B
0.017	69	50-75% Grass cover, Fair, HSG B
4.835	75	Weighted Average
4.835		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
4.6	250	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
13.4	300	Total			

Summary for Subcatchment S-2:

Runoff = 2.84 cfs @ 12.25 hrs, Volume= 0.198 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
2.191	65	Woods/grass comb., Fair, HSG B
2.191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.7	100	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	150	Total			

Summary for Subcatchment S-25:

Runoff = 5.57 cfs @ 12.16 hrs, Volume= 0.272 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.027	98	Ex. Impervious
* 1.656	75	Row Crops, HSG B
0.191	69	50-75% Grass cover, Fair, HSG B
1.874	75	Weighted Average
1.847		98.56% Pervious Area
0.027		1.44% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
7.9	150	Total			

Summary for Subcatchment S-26:

Runoff = 10.88 cfs @ 12.19 hrs, Volume= 0.597 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 3.990	75	Row Crops, HSG B
0.120	69	50-75% Grass cover, Fair, HSG B
4.110	75	Weighted Average
4.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0150	0.11		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
3.0	200	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
10.5	250	Total			

Summary for Subcatchment S-27:

Runoff = 6.74 cfs @ 12.16 hrs, Volume= 0.329 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 2.085	75	Row Crops, HSG B
0.180	69	50-75% Grass cover, Fair, HSG B
2.265	75	Weighted Average
2.265		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
7.9	150	Total			

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Summary for Subcatchment S-28:

Runoff = 8.54 cfs @ 12.29 hrs, Volume= 0.620 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
0.177	65	Woods/grass comb., Fair, HSG B
* 4.074	75	Row Crops, HSG B
0.207	69	50-75% Grass cover, Fair, HSG B
4.458	74	Weighted Average
4.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
5.3	350	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
18.5	400	Total			

Summary for Subcatchment S-3:

Runoff = 28.22 cfs @ 12.25 hrs, Volume= 1.842 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.067	98	Ex. Impervious
3.716	65	Woods/grass comb., Fair, HSG B
* 9.326	75	Row Crops, HSG B
1.329	69	50-75% Grass cover, Fair, HSG B
14.438	72	Weighted Average
14.371		99.54% Pervious Area
0.067		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.0	125	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.8	100	0.0600	2.20		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
15.0	275	Total			

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Summary for Subcatchment S-4:

Runoff = 29.87 cfs @ 12.26 hrs, Volume= 2.033 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
0.868	65	Woods/grass comb., Fair, HSG B
* 13.311	75	Row Crops, HSG B
0.427	69	50-75% Grass cover, Fair, HSG B
14.606	74	Weighted Average
14.606		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
3.3	250	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.5	300	Total			

Summary for Subcatchment S-5:

Runoff = 9.12 cfs @ 12.25 hrs, Volume= 0.610 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
0.391	65	Woods/grass comb., Fair, HSG B
* 3.833	75	Row Crops, HSG B
0.161	69	50-75% Grass cover, Fair, HSG B
4.385	74	Weighted Average
4.385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.6	200	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
15.8	250	Total			

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Summary for Subcatchment S-6:

Runoff = 7.78 cfs @ 12.26 hrs, Volume= 0.530 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
1.167	65	Woods/grass comb., Fair, HSG B
* 2.796	75	Row Crops, HSG B
0.189	69	50-75% Grass cover, Fair, HSG B
4.152	72	Weighted Average
4.152		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.9	225	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.1	275	Total			

Summary for Subcatchment S-7:

Runoff = 5.26 cfs @ 12.15 hrs, Volume= 0.248 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.241	98	Ex. Impervious
* 0.731	75	Row Crops, HSG B
0.667	69	50-75% Grass cover, Fair, HSG B
1.639	76	Weighted Average
1.398		85.30% Pervious Area
0.241		14.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
0.6	50	0.0100	1.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
7.2	100	Total			

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Summary for Subcatchment S-8:

Runoff = 7.00 cfs @ 12.16 hrs, Volume= 0.351 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.345	98	Ex. Impervious
* 1.176	75	Row Crops, HSG B
0.801	69	50-75% Grass cover, Fair, HSG B
2.322	76	Weighted Average
1.977		85.14% Pervious Area
0.345		14.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.9	175	0.0100	1.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.5	225	Total			

Summary for Subcatchment S-9:

Runoff = 12.95 cfs @ 12.26 hrs, Volume= 0.886 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.436	98	Ex. Impervious
0.111	65	Woods/grass comb., Fair, HSG B
* 4.371	75	Row Crops, HSG B
0.935	69	50-75% Grass cover, Fair, HSG B
5.853	76	Weighted Average
5.417		92.55% Pervious Area
0.436		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0100	0.22		Sheet Flow, Cultivated: Residue<=20% n= 0.060 P2= 2.80"
13.0	700	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.8	750	Total			

Summary for Reach E:

Inflow Area = 6.723 ac, 0.00% Impervious, Inflow Depth = 0.54" for 10-Year event
Inflow = 3.07 cfs @ 12.29 hrs, Volume= 0.302 af
Outflow = 3.07 cfs @ 12.29 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach N:

Inflow Area = 74.781 ac, 2.08% Impervious, Inflow Depth = 0.19" for 10-Year event
Inflow = 3.99 cfs @ 12.17 hrs, Volume= 1.174 af
Outflow = 3.99 cfs @ 12.17 hrs, Volume= 1.174 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 5.984 ac, 0.45% Impervious, Inflow Depth = 1.61" for 10-Year event
Inflow = 6.10 cfs @ 12.16 hrs, Volume= 0.803 af
Outflow = 6.10 cfs @ 12.16 hrs, Volume= 0.803 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SUM:

Inflow Area = 89.792 ac, 1.76% Impervious, Inflow Depth = 0.31" for 10-Year event
Inflow = 12.39 cfs @ 12.18 hrs, Volume= 2.290 af
Outflow = 12.39 cfs @ 12.18 hrs, Volume= 2.290 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 2.304 ac, 0.00% Impervious, Inflow Depth = 0.05" for 10-Year event
Inflow = 0.16 cfs @ 12.23 hrs, Volume= 0.010 af
Outflow = 0.16 cfs @ 12.23 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Pond L11:

Inflow Area = 17.105 ac, 0.84% Impervious, Inflow Depth = 1.74" for 10-Year event
Inflow = 33.21 cfs @ 12.30 hrs, Volume= 2.483 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

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Peak Elev= 915.64' @ 25.14 hrs Surf.Area= 1.661 ac Storage= 2.483 af

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	912.30'	10.079 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.073	6.953	10.079

Summary for Pond L12:

Inflow Area = 16.495 ac, 2.98% Impervious, Inflow Depth = 1.74" for 10-Year event

Inflow = 32.02 cfs @ 12.30 hrs, Volume= 2.395 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 921.13' @ 25.14 hrs Surf.Area= 3.113 ac Storage= 2.394 af

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	918.70'	5.987 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.70	0.005	0.000	0.000
920.00	0.525	0.344	0.344
922.00	5.118	5.643	5.987

Summary for Pond L14:

Inflow Area = 3.416 ac, 5.77% Impervious, Inflow Depth = 1.82" for 10-Year event

Inflow = 9.63 cfs @ 12.18 hrs, Volume= 0.517 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 917.83' @ 24.59 hrs Surf.Area= 0.674 ac Storage= 0.517 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

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Volume	Invert	Avail.Storage	Storage Description
#1	916.30'	2.945 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.30	0.003	0.000	0.000
918.00	0.750	0.640	0.640
920.00	1.555	2.305	2.945

Device	Routing	Invert	Outlet Devices
#1	Primary	917.90'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.30' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond L16:

Inflow Area = 22.551 ac, 0.90% Impervious, Inflow Depth = 0.60" for 10-Year event
 Inflow = 20.11 cfs @ 12.19 hrs, Volume= 1.135 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 915.40' @ 24.64 hrs Surf.Area= 0.989 ac Storage= 1.135 af

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	912.80'	6.054 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.80	0.001	0.000	0.000
914.00	0.340	0.205	0.205
916.00	1.267	1.607	1.812
918.00	2.975	4.242	6.054

Device	Routing	Invert	Outlet Devices
#1	Primary	916.40'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

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Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.80' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L17:

Inflow Area = 9.896 ac, 2.05% Impervious, Inflow Depth = 1.74" for 10-Year event
 Inflow = 21.35 cfs @ 12.26 hrs, Volume= 1.437 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.60' @ 24.92 hrs Surf.Area= 2.035 ac Storage= 1.437 af

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	918.20'	2.379 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.20	0.025	0.000	0.000
920.00	2.618	2.379	2.379

Device	Routing	Invert	Outlet Devices
#1	Primary	919.60'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=918.20' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L18:

Inflow Area = 4.835 ac, 0.00% Impervious, Inflow Depth = 1.74" for 10-Year event
 Inflow = 11.44 cfs @ 12.22 hrs, Volume= 0.702 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.01' @ 24.76 hrs Surf.Area= 1.534 ac Storage= 0.702 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

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Volume	Invert	Avail.Storage	Storage Description
#1	918.10'	3.028 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.10	0.001	0.000	0.000
920.00	3.186	3.028	3.028

Device	Routing	Invert	Outlet Devices
#1	Primary	919.20'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Secondary	919.50'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=918.10' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=918.10' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L2:

Inflow Area = 2.191 ac, 0.00% Impervious, Inflow Depth = 1.09" for 10-Year event
 Inflow = 2.84 cfs @ 12.25 hrs, Volume= 0.198 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 916.30' @ 24.84 hrs Surf.Area= 0.214 ac Storage= 0.198 af

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	913.80'	3.066 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
913.80	0.001	0.000	0.000
914.00	0.002	0.000	0.000
916.00	0.143	0.145	0.145
918.00	0.620	0.763	0.908
920.00	1.538	2.158	3.066

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Device	Routing	Invert	Outlet Devices
#1	Primary	917.70'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Secondary	918.50'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=913.80' (Free Discharge)↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=913.80' (Free Discharge)↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond L26:**

Inflow Area = 4.110 ac, 0.00% Impervious, Inflow Depth = 1.74" for 10-Year event
 Inflow = 10.88 cfs @ 12.19 hrs, Volume= 0.597 af
 Outflow = 2.19 cfs @ 12.60 hrs, Volume= 0.531 af, Atten= 80%, Lag= 24.8 min
 Primary = 2.19 cfs @ 12.60 hrs, Volume= 0.531 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.42' @ 12.60 hrs Surf.Area= 0.864 ac Storage= 0.271 af

Plug-Flow detention time= 148.0 min calculated for 0.531 af (89% of inflow)
 Center-of-Mass det. time= 101.4 min (921.4 - 820.0)

Volume	Invert	Avail.Storage	Storage Description
#1	918.80'	1.007 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.80	0.011	0.000	0.000
920.00	1.667	1.007	1.007

Device	Routing	Invert	Outlet Devices
#1	Primary	919.10'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.19 cfs @ 12.60 hrs HW=919.42' (Free Discharge)↑1=**Broad-Crested Rectangular Weir** (Weir Controls 2.19 cfs @ 1.37 fps)

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Summary for Pond L27:

Inflow Area = 2.265 ac, 0.00% Impervious, Inflow Depth = 1.74" for 10-Year event
 Inflow = 6.74 cfs @ 12.16 hrs, Volume= 0.329 af
 Outflow = 3.07 cfs @ 12.29 hrs, Volume= 0.302 af, Atten= 54%, Lag= 8.2 min
 Primary = 3.07 cfs @ 12.29 hrs, Volume= 0.302 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.19' @ 12.29 hrs Surf.Area= 0.258 ac Storage= 0.103 af

Plug-Flow detention time= 73.8 min calculated for 0.302 af (92% of inflow)
 Center-of-Mass det. time= 36.8 min (854.3 - 817.6)

Volume	Invert	Avail.Storage	Storage Description
#1	916.40'	0.417 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.40	0.001	0.000	0.000
918.00	0.520	0.417	0.417

Device	Routing	Invert	Outlet Devices
#1	Primary	916.80'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=3.07 cfs @ 12.29 hrs HW=917.19' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 3.07 cfs @ 1.56 fps)

Summary for Pond L28:

Inflow Area = 4.458 ac, 0.00% Impervious, Inflow Depth = 1.67" for 10-Year event
 Inflow = 8.54 cfs @ 12.29 hrs, Volume= 0.620 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.02' @ 25.05 hrs Surf.Area= 0.825 ac Storage= 0.620 af

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	916.50'	4.505 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.50	0.003	0.000	0.000
918.00	0.802	0.604	0.604
920.00	3.099	3.901	4.505

Device	Routing	Invert	Outlet Devices
#1	Primary	919.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.50' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L3:

Inflow Area = 37.581 ac, 0.18% Impervious, Inflow Depth = 0.59" for 10-Year event
 Inflow = 28.22 cfs @ 12.25 hrs, Volume= 1.842 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.98' @ 24.84 hrs Surf.Area= 1.834 ac Storage= 1.841 af

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	912.00'	37.227 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.00	0.023	0.000	0.000
914.00	1.849	1.872	1.872
916.00	4.421	6.270	8.142
918.00	7.245	11.666	19.808
920.00	10.174	17.419	37.227

Device	Routing	Invert	Outlet Devices
#1	Primary	919.20'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond L4:

Inflow Area = 18.991 ac, 0.00% Impervious, Inflow Depth = 1.41" for 10-Year event
 Inflow = 29.87 cfs @ 12.26 hrs, Volume= 2.237 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 916.98' @ 100.00 hrs Surf.Area= 2.091 ac Storage= 2.237 af

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	914.40'	14.276 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.40	0.001	0.000	0.000
916.00	0.945	0.757	0.757
918.00	3.295	4.240	4.997
920.00	5.984	9.279	14.276

Device	Routing	Invert	Outlet Devices
#1	Primary	918.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=914.40' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond L5:

Inflow Area = 4.385 ac, 0.00% Impervious, Inflow Depth = 1.67" for 10-Year event
 Inflow = 9.12 cfs @ 12.25 hrs, Volume= 0.610 af
 Outflow = 0.24 cfs @ 16.00 hrs, Volume= 0.204 af, Atten= 97%, Lag= 225.2 min
 Primary = 0.24 cfs @ 16.00 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.78' @ 16.00 hrs Surf.Area= 0.971 ac Storage= 0.476 af

Plug-Flow detention time= 521.8 min calculated for 0.204 af (33% of inflow)
 Center-of-Mass det. time= 423.3 min (1,250.2 - 826.9)

Volume	Invert	Avail.Storage	Storage Description
#1	921.70'	2.426 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.70	0.001	0.000	0.000
922.00	0.185	0.028	0.028
924.00	2.213	2.398	2.426

Device	Routing	Invert	Outlet Devices
#1	Primary	922.70'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.24 cfs @ 16.00 hrs HW=922.78' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 0.24 cfs @ 0.64 fps)

Summary for Pond L6:

Inflow Area = 4.152 ac, 0.00% Impervious, Inflow Depth = 1.53" for 10-Year event
 Inflow = 7.78 cfs @ 12.26 hrs, Volume= 0.530 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.35' @ 24.91 hrs Surf.Area= 0.681 ac Storage= 0.530 af

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	914.40'	1.067 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.40	0.001	0.000	0.000
916.00	0.046	0.038	0.038
918.00	0.983	1.029	1.067

Device	Routing	Invert	Outlet Devices
#1	Primary	917.40'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=914.40' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond L7:

Inflow Area = 9.814 ac, 10.41% Impervious, Inflow Depth = 1.42" for 10-Year event
 Inflow = 6.84 cfs @ 12.17 hrs, Volume= 1.159 af
 Outflow = 2.64 cfs @ 13.46 hrs, Volume= 0.968 af, Atten= 61%, Lag= 77.6 min
 Primary = 2.64 cfs @ 13.46 hrs, Volume= 0.968 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.66' @ 13.46 hrs Surf.Area= 0.368 ac Storage= 0.309 af

Plug-Flow detention time= 160.7 min calculated for 0.968 af (83% of inflow)
 Center-of-Mass det. time= 82.3 min (1,001.1 - 918.8)

Volume	Invert	Avail.Storage	Storage Description
#1	917.80'	2.215 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
917.80	0.001	0.000	0.000
918.00	0.004	0.001	0.001
920.00	0.443	0.447	0.448
922.00	1.324	1.767	2.215

Device	Routing	Invert	Outlet Devices
#1	Primary	919.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.64 cfs @ 13.46 hrs HW=919.66' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 2.64 cfs @ 1.48 fps)

Summary for Pond L8:

Inflow Area = 8.175 ac, 9.55% Impervious, Inflow Depth = 1.40" for 10-Year event
 Inflow = 7.00 cfs @ 12.16 hrs, Volume= 0.955 af
 Outflow = 3.18 cfs @ 12.31 hrs, Volume= 0.911 af, Atten= 55%, Lag= 8.8 min
 Primary = 3.18 cfs @ 12.31 hrs, Volume= 0.911 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 921.40' @ 12.31 hrs Surf.Area= 0.231 ac Storage= 0.118 af

Plug-Flow detention time= 62.5 min calculated for 0.911 af (95% of inflow)
 Center-of-Mass det. time= 33.3 min (947.1 - 913.8)

Volume	Invert	Avail.Storage	Storage Description
#1	920.40'	0.298 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
920.40	0.005	0.000	0.000
922.00	0.367	0.298	0.298

Device	Routing	Invert	Outlet Devices
#1	Primary	921.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=3.18 cfs @ 12.31 hrs HW=921.40' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 3.18 cfs @ 1.58 fps)

Summary for Pond L9:

Inflow Area = 5.853 ac, 7.45% Impervious, Inflow Depth = 1.82" for 10-Year event
 Inflow = 12.95 cfs @ 12.26 hrs, Volume= 0.886 af
 Outflow = 1.78 cfs @ 13.10 hrs, Volume= 0.603 af, Atten= 86%, Lag= 50.3 min
 Primary = 1.78 cfs @ 13.10 hrs, Volume= 0.603 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 924.38' @ 13.10 hrs Surf.Area= 0.994 ac Storage= 0.489 af

Plug-Flow detention time= 228.0 min calculated for 0.603 af (68% of inflow)
 Center-of-Mass det. time= 147.0 min (970.8 - 823.8)

Volume	Invert	Avail.Storage	Storage Description
#1	922.40'	4.501 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.40	0.006	0.000	0.000
924.00	0.298	0.243	0.243
926.00	3.960	4.258	4.501

Device	Routing	Invert	Outlet Devices
#1	Primary	924.10'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.78 cfs @ 13.10 hrs HW=924.38' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 1.78 cfs @ 1.27 fps)

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Summary for Pond W10:

Inflow Area = 29.152 ac, 0.39% Impervious, Inflow Depth = 1.67" for 10-Year event
 Inflow = 61.35 cfs @ 12.25 hrs, Volume= 4.057 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 906.32' @ 24.90 hrs Surf.Area= 2.570 ac Storage= 4.057 af

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	901.60'	9.716 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 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 S-1: Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=2.81"
Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.43 cfs 0.026 af

Subcatchment S-10: Runoff Area=29.152 ac 0.39% Impervious Runoff Depth=3.71"
Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=137.94 cfs 9.020 af

Subcatchment S-11: Runoff Area=17.105 ac 0.84% Impervious Runoff Depth=3.82"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=75 Runoff=73.58 cfs 5.440 af

Subcatchment S-12: Runoff Area=16.495 ac 2.98% Impervious Runoff Depth=3.82"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=75 Runoff=70.96 cfs 5.246 af

Subcatchment S-14: Runoff Area=3.416 ac 5.77% Impervious Runoff Depth=3.92"
Flow Length=150' Tc=10.1 min CN=76 Runoff=20.70 cfs 1.116 af

Subcatchment S-15: Runoff Area=1.419 ac 4.65% Impervious Runoff Depth=3.82"
Flow Length=250' Slope=0.0200 '/' Tc=9.2 min CN=75 Runoff=8.72 cfs 0.451 af

Subcatchment S-16: Runoff Area=7.820 ac 0.00% Impervious Runoff Depth=3.82"
Flow Length=300' Slope=0.0150 '/' Tc=11.3 min CN=75 Runoff=44.13 cfs 2.487 af

Subcatchment S-17: Runoff Area=9.896 ac 2.05% Impervious Runoff Depth=3.82"
Flow Length=450' Slope=0.0100 '/' Tc=16.2 min CN=75 Runoff=47.09 cfs 3.147 af

Subcatchment S-18: Runoff Area=4.835 ac 0.00% Impervious Runoff Depth=3.82"
Flow Length=300' Slope=0.0100 '/' Tc=13.4 min CN=75 Runoff=25.18 cfs 1.538 af

Subcatchment S-2: Runoff Area=2.191 ac 0.00% Impervious Runoff Depth=2.81"
Flow Length=150' Tc=14.9 min CN=65 Runoff=7.92 cfs 0.513 af

Subcatchment S-25: Runoff Area=1.874 ac 1.44% Impervious Runoff Depth=3.82"
Flow Length=150' Slope=0.0200 '/' Tc=7.9 min CN=75 Runoff=12.13 cfs 0.596 af

Subcatchment S-26: Runoff Area=4.110 ac 0.00% Impervious Runoff Depth=3.82"
Flow Length=250' Slope=0.0150 '/' Tc=10.5 min CN=75 Runoff=23.81 cfs 1.307 af

Subcatchment S-27: Runoff Area=2.265 ac 0.00% Impervious Runoff Depth=3.82"
Flow Length=150' Slope=0.0200 '/' Tc=7.9 min CN=75 Runoff=14.66 cfs 0.720 af

Subcatchment S-28: Runoff Area=4.458 ac 0.00% Impervious Runoff Depth=3.71"
Flow Length=400' Tc=18.5 min CN=74 Runoff=19.31 cfs 1.379 af

Subcatchment S-3: Runoff Area=14.438 ac 0.46% Impervious Runoff Depth=3.51"
Flow Length=275' Tc=15.0 min CN=72 Runoff=65.98 cfs 4.220 af

Subcatchment S-4: Runoff Area=14.606 ac 0.00% Impervious Runoff Depth=3.71"
Flow Length=300' Slope=0.0200 '/' Tc=16.5 min CN=74 Runoff=67.24 cfs 4.519 af

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Subcatchment S-5: Runoff Area=4.385 ac 0.00% Impervious Runoff Depth=3.71"
Flow Length=250' Slope=0.0200 '/' Tc=15.8 min CN=74 Runoff=20.55 cfs 1.357 af

Subcatchment S-6: Runoff Area=4.152 ac 0.00% Impervious Runoff Depth=3.51"
Flow Length=275' Slope=0.0200 '/' Tc=16.1 min CN=72 Runoff=18.23 cfs 1.214 af

Subcatchment S-7: Runoff Area=1.639 ac 14.70% Impervious Runoff Depth=3.92"
Flow Length=100' Tc=7.2 min CN=76 Runoff=11.24 cfs 0.536 af

Subcatchment S-8: Runoff Area=2.322 ac 14.86% Impervious Runoff Depth=3.92"
Flow Length=225' Tc=8.5 min CN=76 Runoff=14.99 cfs 0.759 af

Subcatchment S-9: Runoff Area=5.853 ac 7.45% Impervious Runoff Depth=3.92"
Flow Length=750' Slope=0.0100 '/' Tc=16.8 min CN=76 Runoff=28.10 cfs 1.912 af

Reach E: Inflow=7.91 cfs 0.694 af
Outflow=7.91 cfs 0.694 af

Reach N: Inflow=12.03 cfs 6.005 af
Outflow=12.03 cfs 6.005 af

Reach SE: Inflow=15.24 cfs 1.838 af
Outflow=15.24 cfs 1.838 af

Reach SUM: Inflow=33.37 cfs 8.563 af
Outflow=33.37 cfs 8.563 af

Reach W: Inflow=0.43 cfs 0.026 af
Outflow=0.43 cfs 0.026 af

Pond L11: Peak Elev=916.89' Storage=5.439 af Inflow=73.58 cfs 5.440 af
Outflow=0.00 cfs 0.000 af

Pond L12: Peak Elev=921.85' Storage=5.246 af Inflow=70.96 cfs 5.246 af
Outflow=0.00 cfs 0.000 af

Pond L14: Peak Elev=918.14' Storage=0.747 af Inflow=20.70 cfs 1.116 af
Outflow=1.37 cfs 0.549 af

Pond L16: Peak Elev=916.73' Storage=2.965 af Inflow=44.13 cfs 4.704 af
Outflow=2.33 cfs 2.315 af

Pond L17: Peak Elev=919.94' Storage=2.223 af Inflow=47.09 cfs 3.147 af
Outflow=2.43 cfs 1.697 af

Pond L18: Peak Elev=919.32' Storage=1.249 af Inflow=25.18 cfs 1.538 af
Primary=0.49 cfs 0.520 af Secondary=0.00 cfs 0.000 af Outflow=0.49 cfs 0.520 af

Pond L2: Peak Elev=917.26' Storage=0.513 af Inflow=7.92 cfs 0.513 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

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Pond L26:	Peak Elev=919.71'	Storage=0.576 af	Inflow=23.81 cfs	1.307 af	Outflow=6.36 cfs	1.242 af
Pond L27:	Peak Elev=917.50'	Storage=0.198 af	Inflow=14.66 cfs	0.720 af	Outflow=7.91 cfs	0.694 af
Pond L28:	Peak Elev=918.66'	Storage=1.379 af	Inflow=19.31 cfs	1.379 af	Outflow=0.00 cfs	0.000 af
Pond L3:	Peak Elev=915.29'	Storage=5.341 af	Inflow=65.98 cfs	5.342 af	Outflow=0.00 cfs	0.000 af
Pond L4:	Peak Elev=918.10'	Storage=5.319 af	Inflow=67.28 cfs	5.470 af	Outflow=0.35 cfs	0.469 af
Pond L5:	Peak Elev=923.06'	Storage=0.793 af	Inflow=20.55 cfs	1.357 af	Outflow=2.66 cfs	0.951 af
Pond L6:	Peak Elev=917.68'	Storage=0.772 af	Inflow=18.23 cfs	1.214 af	Outflow=1.74 cfs	0.652 af
Pond L7:	Peak Elev=920.12'	Storage=0.506 af	Inflow=17.99 cfs	2.881 af	Outflow=10.04 cfs	2.690 af
Pond L8:	Peak Elev=921.81'	Storage=0.233 af	Inflow=15.89 cfs	2.389 af	Outflow=9.84 cfs	2.345 af
Pond L9:	Peak Elev=924.73'	Storage=0.956 af	Inflow=28.10 cfs	1.912 af	Outflow=6.81 cfs	1.630 af
Pond W10:	Peak Elev=907.83'	Storage=9.019 af	Inflow=137.94 cfs	9.020 af	Outflow=0.00 cfs	0.000 af

Total Runoff Area = 152.544 ac Runoff Volume = 47.504 af Average Runoff Depth = 3.74"
98.47% Pervious = 150.214 ac 1.53% Impervious = 2.330 ac

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Summary for Subcatchment S-1:

Runoff = 0.43 cfs @ 12.22 hrs, Volume= 0.026 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 137.94 cfs @ 12.24 hrs, Volume= 9.020 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
2.644	65	Woods/grass comb., Fair, HSG B
* 24.552	75	Row Crops, HSG B
1.532	69	50-75% Grass cover, Fair, HSG B
29.152	74	Weighted Average
29.039		99.61% Pervious Area
0.113		0.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-11:

Runoff = 73.58 cfs @ 12.29 hrs, Volume= 5.440 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
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Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.605	65	Woods/grass comb., Fair, HSG B
* 15.530	75	Row Crops, HSG B
0.827	69	50-75% Grass cover, Fair, HSG B
17.105	75	Weighted Average
16.962		99.16% Pervious Area
0.143		0.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

Summary for Subcatchment S-12:

Runoff = 70.96 cfs @ 12.29 hrs, Volume= 5.246 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.492	98	Ex. Impervious
1.047	65	Woods/grass comb., Fair, HSG B
* 13.492	75	Row Crops, HSG B
1.464	69	50-75% Grass cover, Fair, HSG B
16.495	75	Weighted Average
16.003		97.02% Pervious Area
0.492		2.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

Summary for Subcatchment S-14:

Runoff = 20.70 cfs @ 12.18 hrs, Volume= 1.116 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

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Area (ac)	CN	Description
* 0.197	98	Ex. Impervious
* 2.992	75	Row Crops, HSG B
0.227	69	50-75% Grass cover, Fair, HSG B
3.416	76	Weighted Average
3.219		94.23% Pervious Area
0.197		5.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
10.1	150	Total			

Summary for Subcatchment S-15:

Runoff = 8.72 cfs @ 12.17 hrs, Volume= 0.451 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.066	98	Ex. Impervious
0.021	65	Woods/grass comb., Fair, HSG B
* 1.077	75	Row Crops, HSG B
0.255	69	50-75% Grass cover, Fair, HSG B
1.419	75	Weighted Average
1.353		95.35% Pervious Area
0.066		4.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
2.6	200	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
9.2	250	Total			

Summary for Subcatchment S-16:

Runoff = 44.13 cfs @ 12.19 hrs, Volume= 2.487 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

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Area (ac)	CN	Description
0.016	65	Woods/grass comb., Fair, HSG B
* 7.413	75	Row Crops, HSG B
0.391	69	50-75% Grass cover, Fair, HSG B
7.820	75	Weighted Average
7.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0150	0.11		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
3.8	250	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
11.3	300	Total			

Summary for Subcatchment S-17:

Runoff = 47.09 cfs @ 12.25 hrs, Volume= 3.147 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.203	98	Ex. Impervious
* 9.440	75	Row Crops, HSG B
0.253	69	50-75% Grass cover, Fair, HSG B
9.896	75	Weighted Average
9.693		97.95% Pervious Area
0.203		2.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
7.4	400	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.2	450	Total			

Summary for Subcatchment S-18:

Runoff = 25.18 cfs @ 12.22 hrs, Volume= 1.538 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
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Area (ac)	CN	Description
* 4.818	75	Row Crops, HSG B
0.017	69	50-75% Grass cover, Fair, HSG B
4.835	75	Weighted Average
4.835		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0100	0.09		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
4.6	250	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
13.4	300	Total			

Summary for Subcatchment S-2:

Runoff = 7.92 cfs @ 12.24 hrs, Volume= 0.513 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
2.191	65	Woods/grass comb., Fair, HSG B
2.191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.7	100	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	150	Total			

Summary for Subcatchment S-25:

Runoff = 12.13 cfs @ 12.15 hrs, Volume= 0.596 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.027	98	Ex. Impervious
* 1.656	75	Row Crops, HSG B
0.191	69	50-75% Grass cover, Fair, HSG B
1.874	75	Weighted Average
1.847		98.56% Pervious Area
0.027		1.44% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
7.9	150	Total			

Summary for Subcatchment S-26:

Runoff = 23.81 cfs @ 12.18 hrs, Volume= 1.307 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 3.990	75	Row Crops, HSG B
0.120	69	50-75% Grass cover, Fair, HSG B
4.110	75	Weighted Average
4.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0150	0.11		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
3.0	200	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
10.5	250	Total			

Summary for Subcatchment S-27:

Runoff = 14.66 cfs @ 12.15 hrs, Volume= 0.720 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 2.085	75	Row Crops, HSG B
0.180	69	50-75% Grass cover, Fair, HSG B
2.265	75	Weighted Average
2.265		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.3	100	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
7.9	150	Total			

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Summary for Subcatchment S-28:

Runoff = 19.31 cfs @ 12.27 hrs, Volume= 1.379 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
0.177	65	Woods/grass comb., Fair, HSG B
* 4.074	75	Row Crops, HSG B
0.207	69	50-75% Grass cover, Fair, HSG B
4.458	74	Weighted Average
4.458		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
5.3	350	0.0150	1.10		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
18.5	400	Total			

Summary for Subcatchment S-3:

Runoff = 65.98 cfs @ 12.23 hrs, Volume= 4.220 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.067	98	Ex. Impervious
3.716	65	Woods/grass comb., Fair, HSG B
* 9.326	75	Row Crops, HSG B
1.329	69	50-75% Grass cover, Fair, HSG B
14.438	72	Weighted Average
14.371		99.54% Pervious Area
0.067		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.0	125	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.8	100	0.0600	2.20		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
15.0	275	Total			

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Summary for Subcatchment S-4:

Runoff = 67.24 cfs @ 12.25 hrs, Volume= 4.519 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
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Area (ac)	CN	Description
0.868	65	Woods/grass comb., Fair, HSG B
* 13.311	75	Row Crops, HSG B
0.427	69	50-75% Grass cover, Fair, HSG B
14.606	74	Weighted Average
14.606		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
3.3	250	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.5	300	Total			

Summary for Subcatchment S-5:

Runoff = 20.55 cfs @ 12.24 hrs, Volume= 1.357 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
0.391	65	Woods/grass comb., Fair, HSG B
* 3.833	75	Row Crops, HSG B
0.161	69	50-75% Grass cover, Fair, HSG B
4.385	74	Weighted Average
4.385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.6	200	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
15.8	250	Total			

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Summary for Subcatchment S-6:

Runoff = 18.23 cfs @ 12.25 hrs, Volume= 1.214 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
1.167	65	Woods/grass comb., Fair, HSG B
* 2.796	75	Row Crops, HSG B
0.189	69	50-75% Grass cover, Fair, HSG B
4.152	72	Weighted Average
4.152		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.9	225	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.1	275	Total			

Summary for Subcatchment S-7:

Runoff = 11.24 cfs @ 12.15 hrs, Volume= 0.536 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.241	98	Ex. Impervious
* 0.731	75	Row Crops, HSG B
0.667	69	50-75% Grass cover, Fair, HSG B
1.639	76	Weighted Average
1.398		85.30% Pervious Area
0.241		14.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
0.6	50	0.0100	1.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
7.2	100	Total			

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Summary for Subcatchment S-8:

Runoff = 14.99 cfs @ 12.16 hrs, Volume= 0.759 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.345	98	Ex. Impervious
* 1.176	75	Row Crops, HSG B
0.801	69	50-75% Grass cover, Fair, HSG B
2.322	76	Weighted Average
1.977		85.14% Pervious Area
0.345		14.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0200	0.13		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.80"
1.9	175	0.0100	1.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.5	225	Total			

Summary for Subcatchment S-9:

Runoff = 28.10 cfs @ 12.26 hrs, Volume= 1.912 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.436	98	Ex. Impervious
0.111	65	Woods/grass comb., Fair, HSG B
* 4.371	75	Row Crops, HSG B
0.935	69	50-75% Grass cover, Fair, HSG B
5.853	76	Weighted Average
5.417		92.55% Pervious Area
0.436		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0100	0.22		Sheet Flow, Cultivated: Residue<=20% n= 0.060 P2= 2.80"
13.0	700	0.0100	0.90		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
16.8	750	Total			

Summary for Reach E:

Inflow Area = 6.723 ac, 0.00% Impervious, Inflow Depth = 1.24" for 100-Year event
Inflow = 7.91 cfs @ 12.26 hrs, Volume= 0.694 af
Outflow = 7.91 cfs @ 12.26 hrs, Volume= 0.694 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach N:

Inflow Area = 74.781 ac, 2.08% Impervious, Inflow Depth > 0.96" for 100-Year event
Inflow = 12.03 cfs @ 12.79 hrs, Volume= 6.005 af
Outflow = 12.03 cfs @ 12.79 hrs, Volume= 6.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 5.984 ac, 0.45% Impervious, Inflow Depth = 3.69" for 100-Year event
Inflow = 15.24 cfs @ 12.16 hrs, Volume= 1.838 af
Outflow = 15.24 cfs @ 12.16 hrs, Volume= 1.838 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SUM:

Inflow Area = 89.792 ac, 1.76% Impervious, Inflow Depth = 1.14" for 100-Year event
Inflow = 33.37 cfs @ 12.19 hrs, Volume= 8.563 af
Outflow = 33.37 cfs @ 12.19 hrs, Volume= 8.563 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 2.304 ac, 0.00% Impervious, Inflow Depth = 0.14" for 100-Year event
Inflow = 0.43 cfs @ 12.22 hrs, Volume= 0.026 af
Outflow = 0.43 cfs @ 12.22 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Pond L11:

Inflow Area = 17.105 ac, 0.84% Impervious, Inflow Depth = 3.82" for 100-Year event
Inflow = 73.58 cfs @ 12.29 hrs, Volume= 5.440 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

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Peak Elev= 916.89' @ 25.14 hrs Surf.Area= 3.305 ac Storage= 5.439 af

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	912.30'	10.079 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.073	6.953	10.079

Summary for Pond L12:

Inflow Area = 16.495 ac, 2.98% Impervious, Inflow Depth = 3.82" for 100-Year event

Inflow = 70.96 cfs @ 12.29 hrs, Volume= 5.246 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 921.85' @ 25.14 hrs Surf.Area= 4.774 ac Storage= 5.246 af

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	918.70'	5.987 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.70	0.005	0.000	0.000
920.00	0.525	0.344	0.344
922.00	5.118	5.643	5.987

Summary for Pond L14:

Inflow Area = 3.416 ac, 5.77% Impervious, Inflow Depth = 3.92" for 100-Year event

Inflow = 20.70 cfs @ 12.18 hrs, Volume= 1.116 af

Outflow = 1.37 cfs @ 13.42 hrs, Volume= 0.549 af, Atten= 93%, Lag= 74.8 min

Primary = 1.37 cfs @ 13.42 hrs, Volume= 0.549 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 918.14' @ 13.42 hrs Surf.Area= 0.805 ac Storage= 0.747 af

Plug-Flow detention time= 298.8 min calculated for 0.549 af (49% of inflow)

Center-of-Mass det. time= 215.3 min (1,017.2 - 801.9)

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Volume	Invert	Avail.Storage	Storage Description
#1	916.30'	2.945 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.30	0.003	0.000	0.000
918.00	0.750	0.640	0.640
920.00	1.555	2.305	2.945

Device	Routing	Invert	Outlet Devices
#1	Primary	917.90'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.37 cfs @ 13.42 hrs HW=918.14' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.37 cfs @ 1.15 fps)**Summary for Pond L16:**

Inflow Area = 22.551 ac, 0.90% Impervious, Inflow Depth = 2.50" for 100-Year event
 Inflow = 44.13 cfs @ 12.19 hrs, Volume= 4.704 af
 Outflow = 2.33 cfs @ 18.94 hrs, Volume= 2.315 af, Atten= 95%, Lag= 405.2 min
 Primary = 2.33 cfs @ 18.94 hrs, Volume= 2.315 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 916.73' @ 18.94 hrs Surf.Area= 1.891 ac Storage= 2.965 af

Plug-Flow detention time= 754.1 min calculated for 2.315 af (49% of inflow)
 Center-of-Mass det. time= 496.2 min (1,505.2 - 1,009.0)

Volume	Invert	Avail.Storage	Storage Description
#1	912.80'	6.054 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.80	0.001	0.000	0.000
914.00	0.340	0.205	0.205
916.00	1.267	1.607	1.812
918.00	2.975	4.242	6.054

Device	Routing	Invert	Outlet Devices
#1	Primary	916.40'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

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Primary OutFlow Max=2.32 cfs @ 18.94 hrs HW=916.73' (Free Discharge)↑1=**Broad-Crested Rectangular Weir** (Weir Controls 2.32 cfs @ 1.41 fps)**Summary for Pond L17:**

Inflow Area = 9.896 ac, 2.05% Impervious, Inflow Depth = 3.82" for 100-Year event
 Inflow = 47.09 cfs @ 12.25 hrs, Volume= 3.147 af
 Outflow = 2.43 cfs @ 13.82 hrs, Volume= 1.697 af, Atten= 95%, Lag= 94.0 min
 Primary = 2.43 cfs @ 13.82 hrs, Volume= 1.697 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.94' @ 13.82 hrs Surf.Area= 2.531 ac Storage= 2.223 af

Plug-Flow detention time= 467.6 min calculated for 1.697 af (54% of inflow)
 Center-of-Mass det. time= 384.9 min (1,194.1 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1	918.20'	2.379 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.20	0.025	0.000	0.000
920.00	2.618	2.379	2.379

Device	Routing	Invert	Outlet Devices
#1	Primary	919.60'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.43 cfs @ 13.82 hrs HW=919.94' (Free Discharge)↑1=**Broad-Crested Rectangular Weir** (Weir Controls 2.43 cfs @ 1.43 fps)**Summary for Pond L18:**

Inflow Area = 4.835 ac, 0.00% Impervious, Inflow Depth = 3.82" for 100-Year event
 Inflow = 25.18 cfs @ 12.22 hrs, Volume= 1.538 af
 Outflow = 0.49 cfs @ 16.58 hrs, Volume= 0.520 af, Atten= 98%, Lag= 261.9 min
 Primary = 0.49 cfs @ 16.58 hrs, Volume= 0.520 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.32' @ 16.58 hrs Surf.Area= 2.046 ac Storage= 1.249 af

Plug-Flow detention time= 666.9 min calculated for 0.520 af (34% of inflow)
 Center-of-Mass det. time= 575.7 min (1,382.3 - 806.6)

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Volume	Invert	Avail.Storage	Storage Description
#1	918.10'	3.028 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.10	0.001	0.000	0.000
920.00	3.186	3.028	3.028

Device	Routing	Invert	Outlet Devices
#1	Primary	919.20'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Secondary	919.50'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.49 cfs @ 16.58 hrs HW=919.32' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 0.81 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=918.10' (Free Discharge)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond L2:**

Inflow Area = 2.191 ac, 0.00% Impervious, Inflow Depth = 2.81" for 100-Year event
 Inflow = 7.92 cfs @ 12.24 hrs, Volume= 0.513 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.26' @ 24.84 hrs Surf.Area= 0.443 ac Storage= 0.513 af

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	913.80'	3.066 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
913.80	0.001	0.000	0.000
914.00	0.002	0.000	0.000
916.00	0.143	0.145	0.145
918.00	0.620	0.763	0.908
920.00	1.538	2.158	3.066

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Device	Routing	Invert	Outlet Devices
#1	Primary	917.70'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Secondary	918.50'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=913.80' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=913.80' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L26:

Inflow Area = 4.110 ac, 0.00% Impervious, Inflow Depth = 3.82" for 100-Year event
 Inflow = 23.81 cfs @ 12.18 hrs, Volume= 1.307 af
 Outflow = 6.36 cfs @ 12.48 hrs, Volume= 1.242 af, Atten= 73%, Lag= 18.1 min
 Primary = 6.36 cfs @ 12.48 hrs, Volume= 1.242 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 919.71' @ 12.48 hrs Surf.Area= 1.260 ac Storage= 0.576 af

Plug-Flow detention time= 105.4 min calculated for 1.242 af (95% of inflow)
 Center-of-Mass det. time= 80.2 min (884.1 - 803.9)

Volume	Invert	Avail.Storage	Storage Description
#1	918.80'	1.007 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
918.80	0.011	0.000	0.000
920.00	1.667	1.007	1.007

Device	Routing	Invert	Outlet Devices
#1	Primary	919.10'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.36 cfs @ 12.48 hrs HW=919.71' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 6.36 cfs @ 2.10 fps)

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Summary for Pond L27:

Inflow Area = 2.265 ac, 0.00% Impervious, Inflow Depth = 3.82" for 100-Year event
 Inflow = 14.66 cfs @ 12.15 hrs, Volume= 0.720 af
 Outflow = 7.91 cfs @ 12.26 hrs, Volume= 0.694 af, Atten= 46%, Lag= 6.2 min
 Primary = 7.91 cfs @ 12.26 hrs, Volume= 0.694 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.50' @ 12.26 hrs Surf.Area= 0.358 ac Storage= 0.198 af

Plug-Flow detention time= 47.0 min calculated for 0.694 af (96% of inflow)
 Center-of-Mass det. time= 27.7 min (829.2 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1	916.40'	0.417 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.40	0.001	0.000	0.000
918.00	0.520	0.417	0.417

Device	Routing	Invert	Outlet Devices
#1	Primary	916.80'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=7.91 cfs @ 12.26 hrs HW=917.50' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 7.91 cfs @ 2.25 fps)

Summary for Pond L28:

Inflow Area = 4.458 ac, 0.00% Impervious, Inflow Depth = 3.71" for 100-Year event
 Inflow = 19.31 cfs @ 12.27 hrs, Volume= 1.379 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.66' @ 25.05 hrs Surf.Area= 1.557 ac Storage= 1.379 af

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	916.50'	4.505 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
916.50	0.003	0.000	0.000
918.00	0.802	0.604	0.604
920.00	3.099	3.901	4.505

Device	Routing	Invert	Outlet Devices
#1	Primary	919.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.50' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond L3:

Inflow Area = 37.581 ac, 0.18% Impervious, Inflow Depth = 1.71" for 100-Year event
 Inflow = 65.98 cfs @ 12.23 hrs, Volume= 5.342 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 915.29' @ 100.00 hrs Surf.Area= 3.513 ac Storage= 5.341 af

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	912.00'	37.227 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.00	0.023	0.000	0.000
914.00	1.849	1.872	1.872
916.00	4.421	6.270	8.142
918.00	7.245	11.666	19.808
920.00	10.174	17.419	37.227

Device	Routing	Invert	Outlet Devices
#1	Primary	919.20'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond L4:

Inflow Area = 18.991 ac, 0.00% Impervious, Inflow Depth = 3.46" for 100-Year event
 Inflow = 67.28 cfs @ 12.25 hrs, Volume= 5.470 af
 Outflow = 0.35 cfs @ 24.19 hrs, Volume= 0.469 af, Atten= 99%, Lag= 716.3 min
 Primary = 0.35 cfs @ 24.19 hrs, Volume= 0.469 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.10' @ 24.19 hrs Surf.Area= 3.424 ac Storage= 5.319 af

Plug-Flow detention time= 1,436.9 min calculated for 0.469 af (9% of inflow)
 Center-of-Mass det. time= 1,286.2 min (2,129.8 - 843.6)

Volume	Invert	Avail.Storage	Storage Description
#1	914.40'	14.276 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.40	0.001	0.000	0.000
916.00	0.945	0.757	0.757
918.00	3.295	4.240	4.997
920.00	5.984	9.279	14.276

Device	Routing	Invert	Outlet Devices
#1	Primary	918.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.35 cfs @ 24.19 hrs HW=918.10' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.35 cfs @ 0.72 fps)

Summary for Pond L5:

Inflow Area = 4.385 ac, 0.00% Impervious, Inflow Depth = 3.71" for 100-Year event
 Inflow = 20.55 cfs @ 12.24 hrs, Volume= 1.357 af
 Outflow = 2.66 cfs @ 13.00 hrs, Volume= 0.951 af, Atten= 87%, Lag= 45.7 min
 Primary = 2.66 cfs @ 13.00 hrs, Volume= 0.951 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 923.06' @ 13.00 hrs Surf.Area= 1.260 ac Storage= 0.793 af

Plug-Flow detention time= 262.3 min calculated for 0.951 af (70% of inflow)
 Center-of-Mass det. time= 188.0 min (998.4 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	921.70'	2.426 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.70	0.001	0.000	0.000
922.00	0.185	0.028	0.028
924.00	2.213	2.398	2.426

Device	Routing	Invert	Outlet Devices
#1	Primary	922.70'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2.66 cfs @ 13.00 hrs HW=923.06' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 2.66 cfs @ 1.48 fps)

Summary for Pond L6:

Inflow Area = 4.152 ac, 0.00% Impervious, Inflow Depth = 3.51" for 100-Year event
 Inflow = 18.23 cfs @ 12.25 hrs, Volume= 1.214 af
 Outflow = 1.74 cfs @ 13.42 hrs, Volume= 0.652 af, Atten= 90%, Lag= 70.0 min
 Primary = 1.74 cfs @ 13.42 hrs, Volume= 0.652 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.68' @ 13.42 hrs Surf.Area= 0.831 ac Storage= 0.772 af

Plug-Flow detention time= 282.0 min calculated for 0.652 af (54% of inflow)
 Center-of-Mass det. time= 197.6 min (1,011.5 - 813.9)

Volume	Invert	Avail.Storage	Storage Description
#1	914.40'	1.067 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.40	0.001	0.000	0.000
916.00	0.046	0.038	0.038
918.00	0.983	1.029	1.067

Device	Routing	Invert	Outlet Devices
#1	Primary	917.40'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.73 cfs @ 13.42 hrs HW=917.68' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 1.73 cfs @ 1.26 fps)

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Summary for Pond L7:

Inflow Area = 9.814 ac, 10.41% Impervious, Inflow Depth = 3.52" for 100-Year event
 Inflow = 17.99 cfs @ 12.16 hrs, Volume= 2.881 af
 Outflow = 10.04 cfs @ 12.78 hrs, Volume= 2.690 af, Atten= 44%, Lag= 36.8 min
 Primary = 10.04 cfs @ 12.78 hrs, Volume= 2.690 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 920.12' @ 12.78 hrs Surf.Area= 0.498 ac Storage= 0.506 af

Plug-Flow detention time= 80.8 min calculated for 2.690 af (93% of inflow)
 Center-of-Mass det. time= 43.4 min (922.8 - 879.4)

Volume	Invert	Avail.Storage	Storage Description
#1	917.80'	2.215 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
917.80	0.001	0.000	0.000
918.00	0.004	0.001	0.001
920.00	0.443	0.447	0.448
922.00	1.324	1.767	2.215

Device	Routing	Invert	Outlet Devices
#1	Primary	919.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=10.03 cfs @ 12.78 hrs HW=920.12' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 10.03 cfs @ 2.43 fps)

Summary for Pond L8:

Inflow Area = 8.175 ac, 9.55% Impervious, Inflow Depth = 3.51" for 100-Year event
 Inflow = 15.89 cfs @ 12.17 hrs, Volume= 2.389 af
 Outflow = 9.84 cfs @ 12.37 hrs, Volume= 2.345 af, Atten= 38%, Lag= 12.5 min
 Primary = 9.84 cfs @ 12.37 hrs, Volume= 2.345 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 921.81' @ 12.37 hrs Surf.Area= 0.325 ac Storage= 0.233 af

Plug-Flow detention time= 35.3 min calculated for 2.345 af (98% of inflow)
 Center-of-Mass det. time= 21.9 min (897.7 - 875.8)

Volume	Invert	Avail.Storage	Storage Description
#1	920.40'	0.298 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
920.40	0.005	0.000	0.000
922.00	0.367	0.298	0.298

Device	Routing	Invert	Outlet Devices
#1	Primary	921.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=9.84 cfs @ 12.37 hrs HW=921.81' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 9.84 cfs @ 2.42 fps)

Summary for Pond L9:

Inflow Area = 5.853 ac, 7.45% Impervious, Inflow Depth = 3.92" for 100-Year event
 Inflow = 28.10 cfs @ 12.26 hrs, Volume= 1.912 af
 Outflow = 6.81 cfs @ 12.70 hrs, Volume= 1.630 af, Atten= 76%, Lag= 26.5 min
 Primary = 6.81 cfs @ 12.70 hrs, Volume= 1.630 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 924.73' @ 12.70 hrs Surf.Area= 1.643 ac Storage= 0.956 af

Plug-Flow detention time= 157.3 min calculated for 1.630 af (85% of inflow)
 Center-of-Mass det. time= 102.7 min (910.9 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	922.40'	4.501 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.40	0.006	0.000	0.000
924.00	0.298	0.243	0.243
926.00	3.960	4.258	4.501

Device	Routing	Invert	Outlet Devices
#1	Primary	924.10'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.81 cfs @ 12.70 hrs HW=924.73' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 6.81 cfs @ 2.15 fps)

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Summary for Pond W10:

Inflow Area = 29.152 ac, 0.39% Impervious, Inflow Depth = 3.71" for 100-Year event
 Inflow = 137.94 cfs @ 12.24 hrs, Volume= 9.020 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 907.83' @ 24.90 hrs Surf.Area= 3.998 ac Storage= 9.019 af

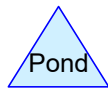
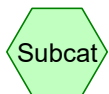
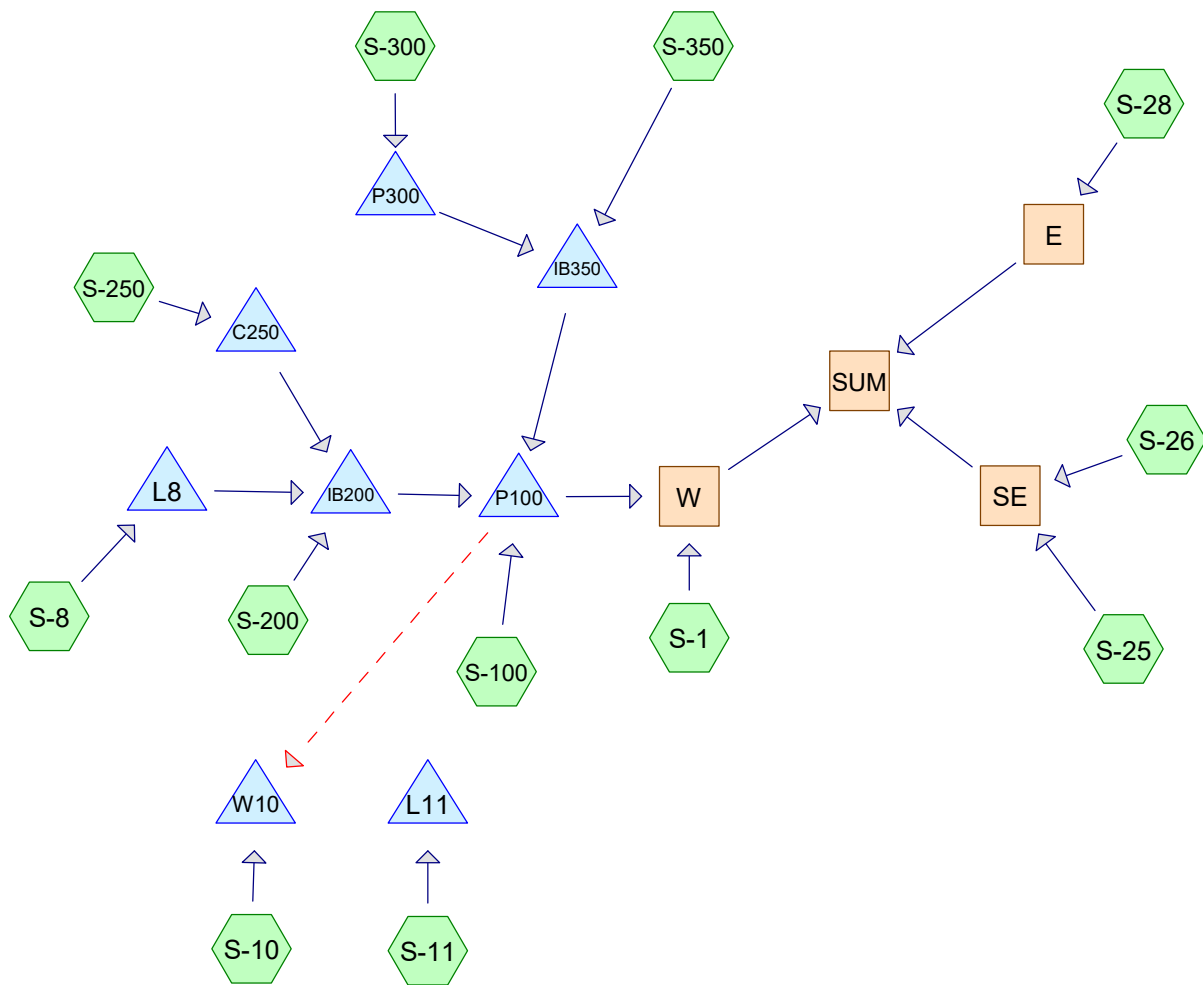
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	901.60'	9.716 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716

APPENDIX B



Routing Diagram for 7226-03_PRP
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
74.347	69	50-75% Grass cover, Fair, HSG B (S-10, S-100, S-11, S-200, S-25, S-250, S-26, S-28, S-300, S-350, S-8)
2.293	98	Ex. Impervious (S-10, S-100, S-11, S-200, S-25, S-250, S-300, S-350, S-8)
38.331	98	Impervious (S-100, S-200, S-25, S-250, S-26, S-300, S-350, S-8)
2.915	98	Impervious (Concept Commercial) (S-200)
22.844	75	Row Crops, HSG B (S-10, S-100, S-11)
3.849	98	Water Surface, 0% imp, HSG B (S-100, S-300)
7.654	65	Woods/grass comb., Fair, HSG B (S-1, S-10, S-100, S-11, S-200, S-300)
0.311	82	Woods/grass comb., Fair, HSG D (S-10)
152.544	79	TOTAL AREA

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1:	Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=0.42" Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.05 cfs 0.004 af
Subcatchment S-10:	Runoff Area=11.980 ac 0.94% Impervious Runoff Depth=0.78" Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=11.16 cfs 0.783 af
Subcatchment S-100:	Runoff Area=64.686 ac 26.06% Impervious Runoff Depth=0.99" Flow Length=250' Slope=0.0200 '/' Tc=14.8 min CN=78 Runoff=81.37 cfs 5.330 af
Subcatchment S-11:	Runoff Area=12.016 ac 1.19% Impervious Runoff Depth=0.78" Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=74 Runoff=9.85 cfs 0.785 af
Subcatchment S-200:	Runoff Area=22.410 ac 43.56% Impervious Runoff Depth=1.22" Flow Length=150' Slope=0.0200 '/' Tc=9.6 min CN=82 Runoff=43.42 cfs 2.285 af
Subcatchment S-25:	Runoff Area=1.367 ac 25.90% Impervious Runoff Depth=0.93" Flow Length=50' Slope=0.0200 '/' Tc=8.8 min CN=77 Runoff=2.05 cfs 0.106 af
Subcatchment S-250:	Runoff Area=0.799 ac 45.93% Impervious Runoff Depth=1.22" Tc=6.0 min CN=82 Runoff=1.83 cfs 0.081 af
Subcatchment S-26:	Runoff Area=0.089 ac 38.20% Impervious Runoff Depth=1.10" Tc=6.0 min CN=80 Runoff=0.18 cfs 0.008 af
Subcatchment S-28:	Runoff Area=0.613 ac 0.00% Impervious Runoff Depth=0.57" Tc=6.0 min CN=69 Runoff=0.58 cfs 0.029 af
Subcatchment S-300:	Runoff Area=33.829 ac 44.41% Impervious Runoff Depth=1.22" Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=82 Runoff=64.33 cfs 3.449 af
Subcatchment S-350:	Runoff Area=4.194 ac 16.43% Impervious Runoff Depth=0.78" Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=74 Runoff=4.86 cfs 0.274 af
Subcatchment S-8:	Runoff Area=0.448 ac 43.75% Impervious Runoff Depth=1.22" Tc=6.0 min CN=82 Runoff=1.02 cfs 0.046 af
Reach E:	Inflow=0.58 cfs 0.029 af Outflow=0.58 cfs 0.029 af
Reach SE:	Inflow=2.21 cfs 0.115 af Outflow=2.21 cfs 0.115 af
Reach SUM:	Inflow=3.18 cfs 4.627 af Outflow=3.18 cfs 4.627 af
Reach W:	Inflow=3.14 cfs 4.483 af Outflow=3.14 cfs 4.483 af

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Pond C250: Peak Elev=922.42' Storage=0.013 af Inflow=1.83 cfs 0.081 af
18.0" Round Culvert n=0.013 L=340.0' S=0.0030 ' Outflow=1.19 cfs 0.081 af

Pond IB200: Peak Elev=911.82' Storage=1.794 af Inflow=45.34 cfs 2.412 af
Discarded=0.70 cfs 2.395 af Primary=0.04 cfs 0.017 af Outflow=0.74 cfs 2.412 af

Pond IB350: Peak Elev=910.61' Storage=3.520 af Inflow=9.57 cfs 3.707 af
Discarded=1.01 cfs 5.346 af Primary=1.80 cfs 1.129 af Outflow=2.82 cfs 6.474 af

Pond L11: Peak Elev=914.28' Storage=0.785 af Inflow=9.85 cfs 0.785 af
Outflow=0.00 cfs 0.000 af

Pond L8: Peak Elev=922.94' Storage=0.006 af Inflow=1.02 cfs 0.046 af
18.0" Round Culvert n=0.013 L=50.0' S=0.0060 ' Outflow=0.76 cfs 0.046 af

Pond P100: Peak Elev=908.03' Storage=23.108 af Inflow=81.37 cfs 6.475 af
Discarded=0.02 cfs 0.092 af Primary=3.14 cfs 4.479 af Secondary=0.00 cfs 0.000 af Outflow=3.16 cfs 4.572 af

Pond P300: Peak Elev=912.33' Storage=1.748 af Inflow=64.33 cfs 3.449 af
Outflow=8.74 cfs 3.433 af

Pond W10: Peak Elev=904.39' Storage=0.783 af Inflow=11.16 cfs 0.783 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 152.544 ac Runoff Volume = 13.180 af Average Runoff Depth = 1.04"
71.46% Pervious = 109.005 ac 28.54% Impervious = 43.539 ac

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Summary for Subcatchment S-1:

Runoff = 0.05 cfs @ 12.25 hrs, Volume= 0.004 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 11.16 cfs @ 12.26 hrs, Volume= 0.783 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
1.522	65	Woods/grass comb., Fair, HSG B
* 8.808	75	Row Crops, HSG B
1.226	69	50-75% Grass cover, Fair, HSG B
11.980	74	Weighted Average
11.867		99.06% Pervious Area
0.113		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-100:

Runoff = 81.37 cfs @ 12.24 hrs, Volume= 5.330 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

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Area (ac)	CN	Description
* 16.129	98	Impervious
* 0.730	98	Ex. Impervious
3.176	98	Water Surface, 0% imp, HSG B
5.279	65	Woods/grass comb., Fair, HSG B
* 4.615	75	Row Crops, HSG B
34.757	69	50-75% Grass cover, Fair, HSG B
64.686	78	Weighted Average
47.827		73.94% Pervious Area
16.859		26.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.6	200	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
14.8	250	Total			

Summary for Subcatchment S-11:

Runoff = 9.85 cfs @ 12.32 hrs, Volume= 0.785 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.543	65	Woods/grass comb., Fair, HSG B
* 9.421	75	Row Crops, HSG B
1.909	69	50-75% Grass cover, Fair, HSG B
12.016	74	Weighted Average
11.873		98.81% Pervious Area
0.143		1.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

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Summary for Subcatchment S-200:

Runoff = 43.42 cfs @ 12.17 hrs, Volume= 2.285 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 6.330	98	Impervious
* 2.915	98	Impervious (Concept Commercial)
* 0.516	98	Ex. Impervious
0.031	65	Woods/grass comb., Fair, HSG B
12.618	69	50-75% Grass cover, Fair, HSG B
22.410	82	Weighted Average
12.649		56.44% Pervious Area
9.761		43.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
0.8	100	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
9.6	150	Total			

Summary for Subcatchment S-25:

Runoff = 2.05 cfs @ 12.17 hrs, Volume= 0.106 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.293	98	Impervious
* 0.061	98	Ex. Impervious
1.013	69	50-75% Grass cover, Fair, HSG B
1.367	77	Weighted Average
1.013		74.10% Pervious Area
0.354		25.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"

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Summary for Subcatchment S-250:

Runoff = 1.83 cfs @ 12.14 hrs, Volume= 0.081 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.139	98	Impervious
* 0.228	98	Ex. Impervious
0.432	69	50-75% Grass cover, Fair, HSG B
0.799	82	Weighted Average
0.432		54.07% Pervious Area
0.367		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-26:

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 0.008 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.034	98	Impervious
0.055	69	50-75% Grass cover, Fair, HSG B
0.089	80	Weighted Average
0.055		61.80% Pervious Area
0.034		38.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-28:

Runoff = 0.58 cfs @ 12.14 hrs, Volume= 0.029 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
0.613	69	50-75% Grass cover, Fair, HSG B
0.613		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-300:

Runoff = 64.33 cfs @ 12.18 hrs, Volume= 3.449 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 14.809	98	Impervious
* 0.214	98	Ex. Impervious
0.673	98	Water Surface, 0% imp, HSG B
0.166	65	Woods/grass comb., Fair, HSG B
17.967	69	50-75% Grass cover, Fair, HSG B
33.829	82	Weighted Average
18.806		55.59% Pervious Area
15.023		44.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow,
					Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-350:

Runoff = 4.86 cfs @ 12.19 hrs, Volume= 0.274 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.505	98	Impervious
* 0.184	98	Ex. Impervious
3.505	69	50-75% Grass cover, Fair, HSG B
4.194	74	Weighted Average
3.505		83.57% Pervious Area
0.689		16.43% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-8:

Runoff = 1.02 cfs @ 12.14 hrs, Volume= 0.046 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.80"

Area (ac)	CN	Description
* 0.092	98	Impervious
* 0.104	98	Ex. Impervious
0.252	69	50-75% Grass cover, Fair, HSG B
0.448	82	Weighted Average
0.252		56.25% Pervious Area
0.196		43.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Reach E:

Inflow Area = 0.613 ac, 0.00% Impervious, Inflow Depth = 0.57" for 2-Year event
 Inflow = 0.58 cfs @ 12.14 hrs, Volume= 0.029 af
 Outflow = 0.58 cfs @ 12.14 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 1.456 ac, 26.65% Impervious, Inflow Depth = 0.95" for 2-Year event
 Inflow = 2.21 cfs @ 12.17 hrs, Volume= 0.115 af
 Outflow = 2.21 cfs @ 12.17 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

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Summary for Reach SUM:

Inflow Area = 128.548 ac, 33.67% Impervious, Inflow Depth = 0.43" for 2-Year event
 Inflow = 3.18 cfs @ 19.27 hrs, Volume= 4.627 af
 Outflow = 3.18 cfs @ 19.27 hrs, Volume= 4.627 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 126.479 ac, 33.91% Impervious, Inflow Depth = 0.43" for 2-Year event
 Inflow = 3.14 cfs @ 19.46 hrs, Volume= 4.483 af
 Outflow = 3.14 cfs @ 19.46 hrs, Volume= 4.483 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Pond C250:

Inflow Area = 0.799 ac, 45.93% Impervious, Inflow Depth = 1.22" for 2-Year event
 Inflow = 1.83 cfs @ 12.14 hrs, Volume= 0.081 af
 Outflow = 1.19 cfs @ 12.20 hrs, Volume= 0.081 af, Atten= 35%, Lag= 3.7 min
 Primary = 1.19 cfs @ 12.20 hrs, Volume= 0.081 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.42' @ 12.20 hrs Surf.Area= 0.041 ac Storage= 0.013 af

Plug-Flow detention time= 9.1 min calculated for 0.081 af (100% of inflow)
 Center-of-Mass det. time= 9.1 min (823.6 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	921.80'	0.161 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.80	0.001	0.000	0.000
924.00	0.145	0.161	0.161

Device	Routing	Invert	Outlet Devices
#1	Primary	921.80'	18.0" Round Culvert L= 340.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 921.80' / 920.78' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.19 cfs @ 12.20 hrs HW=922.42' TW=910.42' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 1.19 cfs @ 2.57 fps)

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Summary for Pond IB200:

Inflow Area = 23.657 ac, 43.64% Impervious, Inflow Depth = 1.22" for 2-Year event
 Inflow = 45.34 cfs @ 12.17 hrs, Volume= 2.412 af
 Outflow = 0.74 cfs @ 18.03 hrs, Volume= 2.412 af, Atten= 98%, Lag= 351.2 min
 Discarded = 0.70 cfs @ 18.03 hrs, Volume= 2.395 af
 Primary = 0.04 cfs @ 18.03 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 911.82' @ 18.03 hrs Surf.Area= 0.863 ac Storage= 1.794 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1,151.7 min (1,969.7 - 818.0)

Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	8.858 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	0.690	0.000	0.000
910.00	0.724	0.353	0.353
912.00	0.877	1.601	1.954
914.00	1.053	1.930	3.885
916.00	1.233	2.286	6.170
918.00	1.455	2.688	8.858

Device	Routing	Invert	Outlet Devices
#1	Primary	910.61'	18.0" Round Culvert L= 175.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 910.61' / 910.00' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	911.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	914.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	909.50'	0.800 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.70 cfs @ 18.03 hrs HW=911.82' (Free Discharge)

↑ **4=Exfiltration** (Exfiltration Controls 0.70 cfs)

Primary OutFlow Max=0.04 cfs @ 18.03 hrs HW=911.82' TW=908.02' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.04 cfs of 4.12 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.16 fps)
 ↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond IB350:

Inflow Area = 38.023 ac, 41.32% Impervious, Inflow Depth > 1.17" for 2-Year event
 Inflow = 9.57 cfs @ 12.66 hrs, Volume= 3.707 af
 Outflow = 2.82 cfs @ 17.97 hrs, Volume= 6.474 af, Atten= 71%, Lag= 318.8 min
 Discarded = 1.01 cfs @ 17.97 hrs, Volume= 5.346 af
 Primary = 1.80 cfs @ 17.97 hrs, Volume= 1.129 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Starting Elev= 910.00' Surf.Area= 1.206 ac Storage= 2.767 af

Peak Elev= 910.61' @ 17.97 hrs Surf.Area= 1.258 ac Storage= 3.520 af (0.754 af above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 838.8 min (1,880.6 - 1,041.8)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	11.794 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
907.50	1.008	0.000	0.000
908.00	1.047	0.514	0.514
910.00	1.206	2.253	2.767
912.00	1.375	2.581	5.348
914.00	1.555	2.930	8.278
916.00	1.961	3.516	11.794

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	18.0" Round Culvert L= 270.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 910.00' S= -0.0035 ' ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Discarded	907.50'	0.800 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.01 cfs @ 17.97 hrs HW=910.61' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 1.01 cfs)**Primary OutFlow** Max=1.80 cfs @ 17.97 hrs HW=910.61' TW=908.02' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.80 cfs @ 2.66 fps)**Summary for Pond L11:**

Inflow Area = 12.016 ac, 1.19% Impervious, Inflow Depth = 0.78" for 2-Year event
 Inflow = 9.85 cfs @ 12.32 hrs, Volume= 0.785 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 914.28' @ 25.14 hrs Surf.Area= 0.839 ac Storage= 0.785 af

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	912.30'	10.027 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.021	6.901	10.027

Summary for Pond L8:

Inflow Area = 0.448 ac, 43.75% Impervious, Inflow Depth = 1.22" for 2-Year event
 Inflow = 1.02 cfs @ 12.14 hrs, Volume= 0.046 af
 Outflow = 0.76 cfs @ 12.18 hrs, Volume= 0.046 af, Atten= 25%, Lag= 2.9 min
 Primary = 0.76 cfs @ 12.18 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 922.94' @ 12.18 hrs Surf.Area= 0.025 ac Storage= 0.006 af

Plug-Flow detention time= 6.5 min calculated for 0.046 af (100% of inflow)

Center-of-Mass det. time= 6.6 min (821.0 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	922.50'	0.064 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.50	0.001	0.000	0.000
924.00	0.084	0.064	0.064

Device	Routing	Invert	Outlet Devices
#1	Primary	922.50'	18.0" Round Culvert L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 922.50' / 922.20' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.76 cfs @ 12.18 hrs HW=922.94' TW=910.36' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.76 cfs @ 2.68 fps)**Summary for Pond P100:**

Inflow Area = 126.366 ac, 33.95% Impervious, Inflow Depth = 0.61" for 2-Year event
 Inflow = 81.37 cfs @ 12.24 hrs, Volume= 6.475 af
 Outflow = 3.16 cfs @ 19.46 hrs, Volume= 4.572 af, Atten= 96%, Lag= 433.2 min
 Discarded = 0.02 cfs @ 19.46 hrs, Volume= 0.092 af
 Primary = 3.14 cfs @ 19.46 hrs, Volume= 4.479 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Starting Elev= 907.00' Surf.Area= 3.771 ac Storage= 19.143 af

Peak Elev= 908.03' @ 19.46 hrs Surf.Area= 3.941 ac Storage= 23.108 af (3.965 af above start)

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Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 550.1 min (1,443.2 - 893.1)

Volume	Invert	Avail.Storage	Storage Description
#1	899.00'	40.975 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
899.00	1.735	0.000	0.000
900.00	1.978	1.856	1.856
902.00	2.242	4.220	6.077
904.00	2.515	4.757	10.833
906.00	2.801	5.316	16.149
906.99	3.176	2.959	19.108
907.00	3.771	0.035	19.143
908.00	3.936	3.854	22.996
910.00	4.292	8.228	31.224
912.00	5.459	9.751	40.975

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	21.0" Round Culvert L= 290.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.33' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	907.50'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Discarded	907.00'	0.126 in/hr Exfiltration over Surface area above 907.00' Excluded Surface area = 3.771 ac
#4	Secondary	910.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 19.46 hrs HW=908.03' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.02 cfs)**Primary OutFlow** Max=3.14 cfs @ 19.46 hrs HW=908.03' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 3.14 cfs @ 3.07 fps)↑ **2=Sharp-Crested Rectangular Weir** (Passes 3.14 cfs of 6.15 cfs potential flow)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=907.00' TW=901.60' (Dynamic Tailwater)↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond P300:**

Inflow Area = 33.829 ac, 44.41% Impervious, Inflow Depth = 1.22" for 2-Year event
 Inflow = 64.33 cfs @ 12.18 hrs, Volume= 3.449 af
 Outflow = 8.74 cfs @ 12.72 hrs, Volume= 3.433 af, Atten= 86%, Lag= 32.5 min
 Primary = 8.74 cfs @ 12.72 hrs, Volume= 3.433 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 912.33' @ 12.72 hrs Surf.Area= 0.832 ac Storage= 1.748 af

Plug-Flow detention time= 242.2 min calculated for 3.433 af (100% of inflow)

Center-of-Mass det. time= 239.9 min (1,058.0 - 818.1)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5.575 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.00	0.673	0.000	0.000
912.00	0.807	1.480	1.480
914.00	0.960	1.767	3.247
916.00	1.368	2.328	5.575

Device	Routing	Invert	Outlet Devices
#1	Primary	909.05'	36.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 908.23' S= 0.0149 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	912.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Device 1	910.00'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=8.74 cfs @ 12.72 hrs HW=912.33' TW=909.55' (Dynamic Tailwater)

1=Culvert (Passes 8.74 cfs of 45.37 cfs potential flow)

2=Sharp-Crested Rectangular Weir (Weir Controls 3.63 cfs @ 1.87 fps)

3=Orifice/Grate (Orifice Controls 5.11 cfs @ 6.51 fps)

Summary for Pond W10:

Inflow Area = 11.980 ac, 0.94% Impervious, Inflow Depth = 0.78" for 2-Year event
 Inflow = 11.16 cfs @ 12.26 hrs, Volume= 0.783 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 904.39' @ 24.90 hrs Surf.Area= 0.842 ac Storage= 0.783 af

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	901.60'	19.694 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716
910.00	5.818	9.978	19.694

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1: Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=1.09"
Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.16 cfs 0.010 af

Subcatchment S-10: Runoff Area=11.980 ac 0.94% Impervious Runoff Depth=1.67"
Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=25.21 cfs 1.667 af

Subcatchment S-100: Runoff Area=64.686 ac 26.06% Impervious Runoff Depth=1.97"
Flow Length=250' Slope=0.0200 '/' Tc=14.8 min CN=78 Runoff=166.06 cfs 10.603 af

Subcatchment S-11: Runoff Area=12.016 ac 1.19% Impervious Runoff Depth=1.67"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=74 Runoff=22.28 cfs 1.672 af

Subcatchment S-200: Runoff Area=22.410 ac 43.56% Impervious Runoff Depth=2.29"
Flow Length=150' Slope=0.0200 '/' Tc=9.6 min CN=82 Runoff=81.15 cfs 4.274 af

Subcatchment S-25: Runoff Area=1.367 ac 25.90% Impervious Runoff Depth=1.89"
Flow Length=50' Slope=0.0200 '/' Tc=8.8 min CN=77 Runoff=4.24 cfs 0.215 af

Subcatchment S-250: Runoff Area=0.799 ac 45.93% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=82 Runoff=3.38 cfs 0.152 af

Subcatchment S-26: Runoff Area=0.089 ac 38.20% Impervious Runoff Depth=2.12"
Tc=6.0 min CN=80 Runoff=0.35 cfs 0.016 af

Subcatchment S-28: Runoff Area=0.613 ac 0.00% Impervious Runoff Depth=1.33"
Tc=6.0 min CN=69 Runoff=1.50 cfs 0.068 af

Subcatchment S-300: Runoff Area=33.829 ac 44.41% Impervious Runoff Depth=2.29"
Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=82 Runoff=120.29 cfs 6.452 af

Subcatchment S-350: Runoff Area=4.194 ac 16.43% Impervious Runoff Depth=1.67"
Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=74 Runoff=10.85 cfs 0.584 af

Subcatchment S-8: Runoff Area=0.448 ac 43.75% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=82 Runoff=1.90 cfs 0.085 af

Reach E: Inflow=1.50 cfs 0.068 af
Outflow=1.50 cfs 0.068 af

Reach SE: Inflow=4.55 cfs 0.231 af
Outflow=4.55 cfs 0.231 af

Reach SUM: Inflow=9.22 cfs 14.343 af
Outflow=9.22 cfs 14.343 af

Reach W: Inflow=9.12 cfs 14.044 af
Outflow=9.12 cfs 14.044 af

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Pond C250:Peak Elev=922.66' Storage=0.025 af Inflow=3.38 cfs 0.152 af
18.0" Round Culvert n=0.013 L=340.0' S=0.0030 ' Outflow=2.21 cfs 0.152 af**Pond IB200:**Peak Elev=913.39' Storage=3.262 af Inflow=84.71 cfs 4.512 af
Discarded=0.81 cfs 3.190 af Primary=1.14 cfs 1.322 af Outflow=1.94 cfs 4.512 af**Pond IB350:**Peak Elev=911.61' Storage=4.822 af Inflow=43.99 cfs 7.019 af
Discarded=1.08 cfs 5.636 af Primary=5.76 cfs 4.151 af Outflow=6.85 cfs 9.787 af**Pond L11:**Peak Elev=915.10' Storage=1.672 af Inflow=22.28 cfs 1.672 af
Outflow=0.00 cfs 0.000 af**Pond L8:**Peak Elev=923.11' Storage=0.011 af Inflow=1.90 cfs 0.085 af
18.0" Round Culvert n=0.013 L=50.0' S=0.0060 ' Outflow=1.42 cfs 0.085 af**Pond P100:**Peak Elev=909.13' Storage=27.568 af Inflow=166.06 cfs 16.076 af
Discarded=0.05 cfs 0.130 af Primary=9.12 cfs 14.034 af Secondary=0.00 cfs 0.000 af Outflow=9.16 cfs 14.163 af**Pond P300:**Peak Elev=913.47' Storage=2.752 af Inflow=120.29 cfs 6.452 af
Outflow=39.87 cfs 6.436 af**Pond W10:**Peak Elev=905.14' Storage=1.667 af Inflow=25.21 cfs 1.667 af
Outflow=0.00 cfs 0.000 af**Total Runoff Area = 152.544 ac Runoff Volume = 25.799 af Average Runoff Depth = 2.03"**
71.46% Pervious = 109.005 ac 28.54% Impervious = 43.539 ac

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Summary for Subcatchment S-1:

Runoff = 0.16 cfs @ 12.23 hrs, Volume= 0.010 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 25.21 cfs @ 12.25 hrs, Volume= 1.667 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
1.522	65	Woods/grass comb., Fair, HSG B
* 8.808	75	Row Crops, HSG B
1.226	69	50-75% Grass cover, Fair, HSG B
11.980	74	Weighted Average
11.867		99.06% Pervious Area
0.113		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-100:

Runoff = 166.06 cfs @ 12.23 hrs, Volume= 10.603 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

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Area (ac)	CN	Description
* 16.129	98	Impervious
* 0.730	98	Ex. Impervious
3.176	98	Water Surface, 0% imp, HSG B
5.279	65	Woods/grass comb., Fair, HSG B
* 4.615	75	Row Crops, HSG B
34.757	69	50-75% Grass cover, Fair, HSG B
64.686	78	Weighted Average
47.827		73.94% Pervious Area
16.859		26.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.6	200	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
14.8	250	Total			

Summary for Subcatchment S-11:

Runoff = 22.28 cfs @ 12.30 hrs, Volume= 1.672 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.543	65	Woods/grass comb., Fair, HSG B
* 9.421	75	Row Crops, HSG B
1.909	69	50-75% Grass cover, Fair, HSG B
12.016	74	Weighted Average
11.873		98.81% Pervious Area
0.143		1.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

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Summary for Subcatchment S-200:

Runoff = 81.15 cfs @ 12.17 hrs, Volume= 4.274 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 6.330	98	Impervious
* 2.915	98	Impervious (Concept Commercial)
* 0.516	98	Ex. Impervious
0.031	65	Woods/grass comb., Fair, HSG B
12.618	69	50-75% Grass cover, Fair, HSG B
22.410	82	Weighted Average
12.649		56.44% Pervious Area
9.761		43.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
0.8	100	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
9.6	150	Total			

Summary for Subcatchment S-25:

Runoff = 4.24 cfs @ 12.17 hrs, Volume= 0.215 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.293	98	Impervious
* 0.061	98	Ex. Impervious
1.013	69	50-75% Grass cover, Fair, HSG B
1.367	77	Weighted Average
1.013		74.10% Pervious Area
0.354		25.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"

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Summary for Subcatchment S-250:

Runoff = 3.38 cfs @ 12.13 hrs, Volume= 0.152 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.139	98	Impervious
* 0.228	98	Ex. Impervious
0.432	69	50-75% Grass cover, Fair, HSG B
0.799	82	Weighted Average
0.432		54.07% Pervious Area
0.367		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-26:

Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.016 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.034	98	Impervious
0.055	69	50-75% Grass cover, Fair, HSG B
0.089	80	Weighted Average
0.055		61.80% Pervious Area
0.034		38.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-28:

Runoff = 1.50 cfs @ 12.14 hrs, Volume= 0.068 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
0.613	69	50-75% Grass cover, Fair, HSG B
0.613		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-300:

Runoff = 120.29 cfs @ 12.18 hrs, Volume= 6.452 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 14.809	98	Impervious
* 0.214	98	Ex. Impervious
0.673	98	Water Surface, 0% imp, HSG B
0.166	65	Woods/grass comb., Fair, HSG B
17.967	69	50-75% Grass cover, Fair, HSG B
33.829	82	Weighted Average
18.806		55.59% Pervious Area
15.023		44.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-350:

Runoff = 10.85 cfs @ 12.18 hrs, Volume= 0.584 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.505	98	Impervious
* 0.184	98	Ex. Impervious
3.505	69	50-75% Grass cover, Fair, HSG B
4.194	74	Weighted Average
3.505		83.57% Pervious Area
0.689		16.43% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-8:

Runoff = 1.90 cfs @ 12.13 hrs, Volume= 0.085 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.10"

Area (ac)	CN	Description
* 0.092	98	Impervious
* 0.104	98	Ex. Impervious
0.252	69	50-75% Grass cover, Fair, HSG B
0.448	82	Weighted Average
0.252		56.25% Pervious Area
0.196		43.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Reach E:

Inflow Area = 0.613 ac, 0.00% Impervious, Inflow Depth = 1.33" for 10-Year event
 Inflow = 1.50 cfs @ 12.14 hrs, Volume= 0.068 af
 Outflow = 1.50 cfs @ 12.14 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 1.456 ac, 26.65% Impervious, Inflow Depth = 1.90" for 10-Year event
 Inflow = 4.55 cfs @ 12.16 hrs, Volume= 0.231 af
 Outflow = 4.55 cfs @ 12.16 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

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Summary for Reach SUM:

Inflow Area = 128.548 ac, 33.67% Impervious, Inflow Depth > 1.34" for 10-Year event
 Inflow = 9.22 cfs @ 16.94 hrs, Volume= 14.343 af
 Outflow = 9.22 cfs @ 16.94 hrs, Volume= 14.343 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 126.479 ac, 33.91% Impervious, Inflow Depth > 1.33" for 10-Year event
 Inflow = 9.12 cfs @ 17.17 hrs, Volume= 14.044 af
 Outflow = 9.12 cfs @ 17.17 hrs, Volume= 14.044 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Pond C250:

Inflow Area = 0.799 ac, 45.93% Impervious, Inflow Depth = 2.29" for 10-Year event
 Inflow = 3.38 cfs @ 12.13 hrs, Volume= 0.152 af
 Outflow = 2.21 cfs @ 12.19 hrs, Volume= 0.152 af, Atten= 35%, Lag= 3.7 min
 Primary = 2.21 cfs @ 12.19 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.66' @ 12.19 hrs Surf.Area= 0.057 ac Storage= 0.025 af

Plug-Flow detention time= 9.0 min calculated for 0.152 af (100% of inflow)
 Center-of-Mass det. time= 8.8 min (810.4 - 801.6)

Volume	Invert	Avail.Storage	Storage Description
#1	921.80'	0.161 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.80	0.001	0.000	0.000
924.00	0.145	0.161	0.161

Device	Routing	Invert	Outlet Devices
#1	Primary	921.80'	18.0" Round Culvert L= 340.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 921.80' / 920.78' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.20 cfs @ 12.19 hrs HW=922.66' TW=911.45' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 2.20 cfs @ 3.04 fps)

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Summary for Pond IB200:

Inflow Area = 23.657 ac, 43.64% Impervious, Inflow Depth = 2.29" for 10-Year event
 Inflow = 84.71 cfs @ 12.17 hrs, Volume= 4.512 af
 Outflow = 1.94 cfs @ 15.18 hrs, Volume= 4.512 af, Atten= 98%, Lag= 180.2 min
 Discarded = 0.81 cfs @ 15.18 hrs, Volume= 3.190 af
 Primary = 1.14 cfs @ 15.18 hrs, Volume= 1.322 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.39' @ 15.18 hrs Surf.Area= 1.000 ac Storage= 3.262 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 1,125.8 min (1,930.9 - 805.2)

Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	8.858 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	0.690	0.000	0.000
910.00	0.724	0.353	0.353
912.00	0.877	1.601	1.954
914.00	1.053	1.930	3.885
916.00	1.233	2.286	6.170
918.00	1.455	2.688	8.858

Device	Routing	Invert	Outlet Devices
#1	Primary	910.61'	18.0" Round Culvert L= 175.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 910.61' / 910.00' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	911.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	914.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	909.50'	0.800 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.81 cfs @ 15.18 hrs HW=913.39' (Free Discharge)↑ **4=Exfiltration** (Exfiltration Controls 0.81 cfs)**Primary OutFlow** Max=1.14 cfs @ 15.18 hrs HW=913.39' TW=909.09' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 1.14 cfs of 9.00 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 1.14 cfs @ 5.78 fps)
 ↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond IB350:

Inflow Area = 38.023 ac, 41.32% Impervious, Inflow Depth = 2.22" for 10-Year event
 Inflow = 43.99 cfs @ 12.38 hrs, Volume= 7.019 af
 Outflow = 6.85 cfs @ 14.20 hrs, Volume= 9.787 af, Atten= 84%, Lag= 109.4 min
 Discarded = 1.08 cfs @ 14.20 hrs, Volume= 5.636 af
 Primary = 5.76 cfs @ 14.20 hrs, Volume= 4.151 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Starting Elev= 910.00' Surf.Area= 1.206 ac Storage= 2.767 af

Peak Elev= 911.61' @ 14.20 hrs Surf.Area= 1.342 ac Storage= 4.822 af (2.055 af above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 695.6 min (1,676.2 - 980.6)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	11.794 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
907.50	1.008	0.000	0.000
908.00	1.047	0.514	0.514
910.00	1.206	2.253	2.767
912.00	1.375	2.581	5.348
914.00	1.555	2.930	8.278
916.00	1.961	3.516	11.794

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	18.0" Round Culvert L= 270.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 910.00' S= -0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Discarded	907.50'	0.800 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.08 cfs @ 14.20 hrs HW=911.61' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 1.08 cfs)**Primary OutFlow** Max=5.76 cfs @ 14.20 hrs HW=911.61' TW=908.99' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 5.76 cfs @ 3.26 fps)**Summary for Pond L11:**

Inflow Area = 12.016 ac, 1.19% Impervious, Inflow Depth = 1.67" for 10-Year event
 Inflow = 22.28 cfs @ 12.30 hrs, Volume= 1.672 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 915.10' @ 25.14 hrs Surf.Area= 1.333 ac Storage= 1.672 af

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	912.30'	10.027 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.021	6.901	10.027

Summary for Pond L8:

Inflow Area = 0.448 ac, 43.75% Impervious, Inflow Depth = 2.29" for 10-Year event
 Inflow = 1.90 cfs @ 12.13 hrs, Volume= 0.085 af
 Outflow = 1.42 cfs @ 12.18 hrs, Volume= 0.085 af, Atten= 25%, Lag= 2.9 min
 Primary = 1.42 cfs @ 12.18 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 923.11' @ 12.18 hrs Surf.Area= 0.035 ac Storage= 0.011 af

Plug-Flow detention time= 6.4 min calculated for 0.085 af (100% of inflow)
 Center-of-Mass det. time= 6.2 min (807.8 - 801.6)

Volume	Invert	Avail.Storage	Storage Description
#1	922.50'	0.064 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.50	0.001	0.000	0.000
924.00	0.084	0.064	0.064

Device	Routing	Invert	Outlet Devices
#1	Primary	922.50'	18.0" Round Culvert L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 922.50' / 922.20' S= 0.0060 ' S= 0.0060 ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.41 cfs @ 12.18 hrs HW=923.11' TW=911.35' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 1.41 cfs @ 3.12 fps)

Summary for Pond P100:

Inflow Area = 126.366 ac, 33.95% Impervious, Inflow Depth = 1.53" for 10-Year event
 Inflow = 166.06 cfs @ 12.23 hrs, Volume= 16.076 af
 Outflow = 9.16 cfs @ 17.18 hrs, Volume= 14.163 af, Atten= 94%, Lag= 296.6 min
 Discarded = 0.05 cfs @ 17.18 hrs, Volume= 0.130 af
 Primary = 9.12 cfs @ 17.18 hrs, Volume= 14.034 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Starting Elev= 907.00' Surf.Area= 3.771 ac Storage= 19.143 af
 Peak Elev= 909.13' @ 17.18 hrs Surf.Area= 4.138 ac Storage= 27.568 af (8.425 af above start)

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Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 521.3 min (1,442.8 - 921.5)

Volume	Invert	Avail.Storage	Storage Description
#1	899.00'	40.975 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
899.00	1.735	0.000	0.000
900.00	1.978	1.856	1.856
902.00	2.242	4.220	6.077
904.00	2.515	4.757	10.833
906.00	2.801	5.316	16.149
906.99	3.176	2.959	19.108
907.00	3.771	0.035	19.143
908.00	3.936	3.854	22.996
910.00	4.292	8.228	31.224
912.00	5.459	9.751	40.975

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	21.0" Round Culvert L= 290.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.33' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	907.50'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Discarded	907.00'	0.126 in/hr Exfiltration over Surface area above 907.00' Excluded Surface area = 3.771 ac
#4	Secondary	910.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.05 cfs @ 17.18 hrs HW=909.13' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.05 cfs)**Primary OutFlow** Max=9.12 cfs @ 17.18 hrs HW=909.13' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 9.12 cfs @ 3.95 fps)↑ **2=Sharp-Crested Rectangular Weir** (Passes 9.12 cfs of 31.88 cfs potential flow)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=907.00' TW=901.60' (Dynamic Tailwater)↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond P300:**

Inflow Area = 33.829 ac, 44.41% Impervious, Inflow Depth = 2.29" for 10-Year event
 Inflow = 120.29 cfs @ 12.18 hrs, Volume= 6.452 af
 Outflow = 39.87 cfs @ 12.41 hrs, Volume= 6.436 af, Atten= 67%, Lag= 14.1 min
 Primary = 39.87 cfs @ 12.41 hrs, Volume= 6.436 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 913.47' @ 12.41 hrs Surf.Area= 0.920 ac Storage= 2.752 af

Plug-Flow detention time= 190.9 min calculated for 6.435 af (100% of inflow)

Center-of-Mass det. time= 189.8 min (995.1 - 805.3)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5.575 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.00	0.673	0.000	0.000
912.00	0.807	1.480	1.480
914.00	0.960	1.767	3.247
916.00	1.368	2.328	5.575

Device	Routing	Invert	Outlet Devices
#1	Primary	909.05'	36.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 908.23' S= 0.0149 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	912.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Device 1	910.00'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=39.86 cfs @ 12.41 hrs HW=913.47' TW=910.06' (Dynamic Tailwater)

1=Culvert (Passes 39.86 cfs of 58.19 cfs potential flow)

2=Sharp-Crested Rectangular Weir (Weir Controls 33.34 cfs @ 3.97 fps)

3=Orifice/Grate (Orifice Controls 6.52 cfs @ 8.30 fps)

Summary for Pond W10:

Inflow Area = 11.980 ac, 0.94% Impervious, Inflow Depth = 1.67" for 10-Year event

Inflow = 25.21 cfs @ 12.25 hrs, Volume= 1.667 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 905.14' @ 24.90 hrs Surf.Area= 1.509 ac Storage= 1.667 af

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	901.60'	19.694 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716
910.00	5.818	9.978	19.694

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S-1: Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=2.81"
Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.43 cfs 0.026 af

Subcatchment S-10: Runoff Area=11.980 ac 0.94% Impervious Runoff Depth=3.71"
Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=56.69 cfs 3.707 af

Subcatchment S-100: Runoff Area=64.686 ac 26.06% Impervious Runoff Depth=4.13"
Flow Length=250' Slope=0.0200 '/' Tc=14.8 min CN=78 Runoff=347.42 cfs 22.271 af

Subcatchment S-11: Runoff Area=12.016 ac 1.19% Impervious Runoff Depth=3.71"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=74 Runoff=50.30 cfs 3.718 af

Subcatchment S-200: Runoff Area=22.410 ac 43.56% Impervious Runoff Depth=4.56"
Flow Length=150' Slope=0.0200 '/' Tc=9.6 min CN=82 Runoff=158.11 cfs 8.518 af

Subcatchment S-25: Runoff Area=1.367 ac 25.90% Impervious Runoff Depth=4.03"
Flow Length=50' Slope=0.0200 '/' Tc=8.8 min CN=77 Runoff=8.93 cfs 0.459 af

Subcatchment S-250: Runoff Area=0.799 ac 45.93% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=82 Runoff=6.54 cfs 0.304 af

Subcatchment S-26: Runoff Area=0.089 ac 38.20% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=80 Runoff=0.70 cfs 0.032 af

Subcatchment S-28: Runoff Area=0.613 ac 0.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=69 Runoff=3.66 cfs 0.164 af

Subcatchment S-300: Runoff Area=33.829 ac 44.41% Impervious Runoff Depth=4.56"
Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=82 Runoff=234.60 cfs 12.858 af

Subcatchment S-350: Runoff Area=4.194 ac 16.43% Impervious Runoff Depth=3.71"
Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=74 Runoff=24.19 cfs 1.298 af

Subcatchment S-8: Runoff Area=0.448 ac 43.75% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=82 Runoff=3.67 cfs 0.170 af

Reach E: Inflow=3.66 cfs 0.164 af
Outflow=3.66 cfs 0.164 af

Reach SE: Inflow=9.56 cfs 0.491 af
Outflow=9.56 cfs 0.491 af

Reach SUM: Inflow=18.60 cfs 27.746 af
Outflow=18.60 cfs 27.746 af

Reach W: Inflow=14.12 cfs 27.091 af
Outflow=14.12 cfs 27.091 af

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Pond C250:Peak Elev=923.04' Storage=0.052 af Inflow=6.54 cfs 0.304 af
18.0" Round Culvert n=0.013 L=340.0' S=0.0030 '/' Outflow=4.09 cfs 0.304 af**Pond IB200:**Peak Elev=915.44' Storage=5.495 af Inflow=164.77 cfs 8.992 af
Discarded=0.95 cfs 3.749 af Primary=12.99 cfs 5.243 af Outflow=13.94 cfs 8.992 af**Pond IB350:**Peak Elev=914.08' Storage=8.406 af Inflow=93.97 cfs 14.138 af
Discarded=1.27 cfs 6.292 af Primary=9.62 cfs 10.613 af Outflow=10.88 cfs 16.905 af**Pond L11:**Peak Elev=916.28' Storage=3.718 af Inflow=50.30 cfs 3.718 af
Outflow=0.00 cfs 0.000 af**Pond L8:**Peak Elev=923.37' Storage=0.022 af Inflow=3.67 cfs 0.170 af
18.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=2.69 cfs 0.170 af**Pond P100:**Peak Elev=911.19' Storage=36.722 af Inflow=350.98 cfs 38.128 af
Discarded=0.15 cfs 0.248 af Primary=14.10 cfs 27.065 af Secondary=17.18 cfs 8.892 af Outflow=31.43 cfs 36.205 af**Pond P300:**Peak Elev=915.73' Storage=5.215 af Inflow=234.60 cfs 12.858 af
Outflow=72.61 cfs 12.840 af**Pond W10:**Peak Elev=908.65' Storage=12.599 af Inflow=56.69 cfs 12.599 af
Outflow=0.00 cfs 0.000 af**Total Runoff Area = 152.544 ac Runoff Volume = 53.524 af Average Runoff Depth = 4.21"**
71.46% Pervious = 109.005 ac 28.54% Impervious = 43.539 ac

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Summary for Subcatchment S-1:

Runoff = 0.43 cfs @ 12.22 hrs, Volume= 0.026 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 56.69 cfs @ 12.24 hrs, Volume= 3.707 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
1.522	65	Woods/grass comb., Fair, HSG B
* 8.808	75	Row Crops, HSG B
1.226	69	50-75% Grass cover, Fair, HSG B
11.980	74	Weighted Average
11.867		99.06% Pervious Area
0.113		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-100:

Runoff = 347.42 cfs @ 12.23 hrs, Volume= 22.271 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

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Area (ac)	CN	Description
* 16.129	98	Impervious
* 0.730	98	Ex. Impervious
3.176	98	Water Surface, 0% imp, HSG B
5.279	65	Woods/grass comb., Fair, HSG B
* 4.615	75	Row Crops, HSG B
34.757	69	50-75% Grass cover, Fair, HSG B
64.686	78	Weighted Average
47.827		73.94% Pervious Area
16.859		26.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.6	200	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
14.8	250	Total			

Summary for Subcatchment S-11:

Runoff = 50.30 cfs @ 12.29 hrs, Volume= 3.718 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
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Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.543	65	Woods/grass comb., Fair, HSG B
* 9.421	75	Row Crops, HSG B
1.909	69	50-75% Grass cover, Fair, HSG B
12.016	74	Weighted Average
11.873		98.81% Pervious Area
0.143		1.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

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Summary for Subcatchment S-200:

Runoff = 158.11 cfs @ 12.17 hrs, Volume= 8.518 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 6.330	98	Impervious
* 2.915	98	Impervious (Concept Commercial)
* 0.516	98	Ex. Impervious
0.031	65	Woods/grass comb., Fair, HSG B
12.618	69	50-75% Grass cover, Fair, HSG B
22.410	82	Weighted Average
12.649		56.44% Pervious Area
9.761		43.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
0.8	100	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
9.6	150	Total			

Summary for Subcatchment S-25:

Runoff = 8.93 cfs @ 12.16 hrs, Volume= 0.459 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.293	98	Impervious
* 0.061	98	Ex. Impervious
1.013	69	50-75% Grass cover, Fair, HSG B
1.367	77	Weighted Average
1.013		74.10% Pervious Area
0.354		25.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"

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Summary for Subcatchment S-250:

Runoff = 6.54 cfs @ 12.13 hrs, Volume= 0.304 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.139	98	Impervious
* 0.228	98	Ex. Impervious
0.432	69	50-75% Grass cover, Fair, HSG B
0.799	82	Weighted Average
0.432		54.07% Pervious Area
0.367		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-26:

Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.032 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.034	98	Impervious
0.055	69	50-75% Grass cover, Fair, HSG B
0.089	80	Weighted Average
0.055		61.80% Pervious Area
0.034		38.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-28:

Runoff = 3.66 cfs @ 12.13 hrs, Volume= 0.164 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
0.613	69	50-75% Grass cover, Fair, HSG B
0.613		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-300:

Runoff = 234.60 cfs @ 12.17 hrs, Volume= 12.858 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 14.809	98	Impervious
* 0.214	98	Ex. Impervious
0.673	98	Water Surface, 0% imp, HSG B
0.166	65	Woods/grass comb., Fair, HSG B
17.967	69	50-75% Grass cover, Fair, HSG B
33.829	82	Weighted Average
18.806		55.59% Pervious Area
15.023		44.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-350:

Runoff = 24.19 cfs @ 12.18 hrs, Volume= 1.298 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.505	98	Impervious
* 0.184	98	Ex. Impervious
3.505	69	50-75% Grass cover, Fair, HSG B
4.194	74	Weighted Average
3.505		83.57% Pervious Area
0.689		16.43% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-8:

Runoff = 3.67 cfs @ 12.13 hrs, Volume= 0.170 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.62"

Area (ac)	CN	Description
* 0.092	98	Impervious
* 0.104	98	Ex. Impervious
0.252	69	50-75% Grass cover, Fair, HSG B
0.448	82	Weighted Average
0.252		56.25% Pervious Area
0.196		43.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Reach E:

Inflow Area = 0.613 ac, 0.00% Impervious, Inflow Depth = 3.20" for 100-Year event
 Inflow = 3.66 cfs @ 12.13 hrs, Volume= 0.164 af
 Outflow = 3.66 cfs @ 12.13 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 1.456 ac, 26.65% Impervious, Inflow Depth = 4.05" for 100-Year event
 Inflow = 9.56 cfs @ 12.16 hrs, Volume= 0.491 af
 Outflow = 9.56 cfs @ 12.16 hrs, Volume= 0.491 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

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Summary for Reach SUM:

Inflow Area = 128.548 ac, 33.67% Impervious, Inflow Depth > 2.59" for 100-Year event
 Inflow = 18.60 cfs @ 12.17 hrs, Volume= 27.746 af
 Outflow = 18.60 cfs @ 12.17 hrs, Volume= 27.746 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 126.479 ac, 33.91% Impervious, Inflow Depth > 2.57" for 100-Year event
 Inflow = 14.12 cfs @ 14.79 hrs, Volume= 27.091 af
 Outflow = 14.12 cfs @ 14.79 hrs, Volume= 27.091 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Summary for Pond C250:

Inflow Area = 0.799 ac, 45.93% Impervious, Inflow Depth = 4.56" for 100-Year event
 Inflow = 6.54 cfs @ 12.13 hrs, Volume= 0.304 af
 Outflow = 4.09 cfs @ 12.20 hrs, Volume= 0.304 af, Atten= 38%, Lag= 3.9 min
 Primary = 4.09 cfs @ 12.20 hrs, Volume= 0.304 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 923.04' @ 12.20 hrs Surf.Area= 0.082 ac Storage= 0.052 af

Plug-Flow detention time= 9.0 min calculated for 0.304 af (100% of inflow)
 Center-of-Mass det. time= 8.7 min (796.6 - 787.8)

Volume	Invert	Avail.Storage	Storage Description
#1	921.80'	0.161 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.80	0.001	0.000	0.000
924.00	0.145	0.161	0.161

Device	Routing	Invert	Outlet Devices
#1	Primary	921.80'	18.0" Round Culvert L= 340.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 921.80' / 920.78' S= 0.0030 '/ Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.09 cfs @ 12.20 hrs HW=923.04' TW=913.62' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 4.09 cfs @ 3.55 fps)

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Summary for Pond IB200:

Inflow Area = 23.657 ac, 43.64% Impervious, Inflow Depth = 4.56" for 100-Year event
 Inflow = 164.77 cfs @ 12.17 hrs, Volume= 8.992 af
 Outflow = 13.94 cfs @ 13.07 hrs, Volume= 8.992 af, Atten= 92%, Lag= 54.2 min
 Discarded = 0.95 cfs @ 13.07 hrs, Volume= 3.749 af
 Primary = 12.99 cfs @ 13.07 hrs, Volume= 5.243 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 915.44' @ 13.07 hrs Surf.Area= 1.183 ac Storage= 5.495 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 788.8 min (1,580.1 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	8.858 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	0.690	0.000	0.000
910.00	0.724	0.353	0.353
912.00	0.877	1.601	1.954
914.00	1.053	1.930	3.885
916.00	1.233	2.286	6.170
918.00	1.455	2.688	8.858

Device	Routing	Invert	Outlet Devices
#1	Primary	910.61'	18.0" Round Culvert L= 175.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 910.61' / 910.00' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	911.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	914.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	909.50'	0.800 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.95 cfs @ 13.07 hrs HW=915.44' (Free Discharge)

↑ **4=Exfiltration** (Exfiltration Controls 0.95 cfs)

Primary OutFlow Max=12.99 cfs @ 13.07 hrs HW=915.44' TW=910.83' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 12.99 cfs @ 7.35 fps)

↑ **2=Orifice/Grate** (Passes < 1.77 cfs potential flow)

↑ **3=Sharp-Crested Rectangular Weir** (Passes < 20.99 cfs potential flow)

Summary for Pond IB350:

Inflow Area = 38.023 ac, 41.32% Impervious, Inflow Depth = 4.46" for 100-Year event
 Inflow = 93.97 cfs @ 12.21 hrs, Volume= 14.138 af
 Outflow = 10.88 cfs @ 13.77 hrs, Volume= 16.905 af, Atten= 88%, Lag= 93.9 min
 Discarded = 1.27 cfs @ 13.93 hrs, Volume= 6.292 af
 Primary = 9.62 cfs @ 13.75 hrs, Volume= 10.613 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Starting Elev= 910.00' Surf.Area= 1.206 ac Storage= 2.767 af

Peak Elev= 914.08' @ 13.93 hrs Surf.Area= 1.572 ac Storage= 8.406 af (5.639 af above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 611.7 min (1,590.9 - 979.2)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	11.794 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
907.50	1.008	0.000	0.000
908.00	1.047	0.514	0.514
910.00	1.206	2.253	2.767
912.00	1.375	2.581	5.348
914.00	1.555	2.930	8.278
916.00	1.961	3.516	11.794

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	18.0" Round Culvert L= 270.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 910.00' S= -0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Discarded	907.50'	0.800 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.27 cfs @ 13.93 hrs HW=914.08' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 1.27 cfs)**Primary OutFlow** Max=9.62 cfs @ 13.75 hrs HW=914.07' TW=911.11' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 9.62 cfs @ 5.44 fps)**Summary for Pond L11:**

Inflow Area = 12.016 ac, 1.19% Impervious, Inflow Depth = 3.71" for 100-Year event
 Inflow = 50.30 cfs @ 12.29 hrs, Volume= 3.718 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 916.28' @ 25.14 hrs Surf.Area= 2.323 ac Storage= 3.718 af

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	912.30'	10.027 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.021	6.901	10.027

Summary for Pond L8:

Inflow Area = 0.448 ac, 43.75% Impervious, Inflow Depth = 4.56" for 100-Year event
 Inflow = 3.67 cfs @ 12.13 hrs, Volume= 0.170 af
 Outflow = 2.69 cfs @ 12.18 hrs, Volume= 0.170 af, Atten= 27%, Lag= 3.0 min
 Primary = 2.69 cfs @ 12.18 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 923.37' @ 12.18 hrs Surf.Area= 0.049 ac Storage= 0.022 af

Plug-Flow detention time= 6.0 min calculated for 0.170 af (100% of inflow)

Center-of-Mass det. time= 6.0 min (793.8 - 787.8)

Volume	Invert	Avail.Storage	Storage Description
#1	922.50'	0.064 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.50	0.001	0.000	0.000
924.00	0.084	0.064	0.064

Device	Routing	Invert	Outlet Devices
#1	Primary	922.50'	18.0" Round Culvert L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 922.50' / 922.20' S= 0.0060 ' S= 0.0060 ' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.69 cfs @ 12.18 hrs HW=923.37' TW=913.43' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 2.69 cfs @ 3.63 fps)**Summary for Pond P100:**

Inflow Area = 126.366 ac, 33.95% Impervious, Inflow Depth = 3.62" for 100-Year event
 Inflow = 350.98 cfs @ 12.23 hrs, Volume= 38.128 af
 Outflow = 31.43 cfs @ 14.79 hrs, Volume= 36.205 af, Atten= 91%, Lag= 153.8 min
 Discarded = 0.15 cfs @ 14.79 hrs, Volume= 0.248 af
 Primary = 14.10 cfs @ 14.79 hrs, Volume= 27.065 af
 Secondary = 17.18 cfs @ 14.79 hrs, Volume= 8.892 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Starting Elev= 907.00' Surf.Area= 3.771 ac Storage= 19.143 af

Peak Elev= 911.19' @ 14.79 hrs Surf.Area= 4.984 ac Storage= 36.722 af (17.580 af above start)

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Plug-Flow detention time= 1,216.1 min calculated for 17.062 af (45% of inflow)

Center-of-Mass det. time= 502.5 min (1,450.7 - 948.2)

Volume	Invert	Avail.Storage	Storage Description
#1	899.00'	40.975 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
899.00	1.735	0.000	0.000
900.00	1.978	1.856	1.856
902.00	2.242	4.220	6.077
904.00	2.515	4.757	10.833
906.00	2.801	5.316	16.149
906.99	3.176	2.959	19.108
907.00	3.771	0.035	19.143
908.00	3.936	3.854	22.996
910.00	4.292	8.228	31.224
912.00	5.459	9.751	40.975

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	21.0" Round Culvert L= 290.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.33' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	907.50'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Discarded	907.00'	0.126 in/hr Exfiltration over Surface area above 907.00' Excluded Surface area = 3.771 ac
#4	Secondary	910.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.15 cfs @ 14.79 hrs HW=911.19' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.15 cfs)**Primary OutFlow** Max=14.10 cfs @ 14.79 hrs HW=911.19' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 14.10 cfs @ 5.86 fps)↑**2=Sharp-Crested Rectangular Weir** (Passes 14.10 cfs of 98.63 cfs potential flow)**Secondary OutFlow** Max=17.18 cfs @ 14.79 hrs HW=911.19' TW=906.83' (Dynamic Tailwater)↑**4=Broad-Crested Rectangular Weir** (Weir Controls 17.18 cfs @ 2.90 fps)**Summary for Pond P300:**

Inflow Area = 33.829 ac, 44.41% Impervious, Inflow Depth = 4.56" for 100-Year event
 Inflow = 234.60 cfs @ 12.17 hrs, Volume= 12.858 af
 Outflow = 72.61 cfs @ 12.27 hrs, Volume= 12.840 af, Atten= 69%, Lag= 5.5 min
 Primary = 72.61 cfs @ 12.27 hrs, Volume= 12.840 af

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MSE 24-hr 3 100-Year Rainfall=6.62"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 915.73' @ 12.43 hrs Surf.Area= 1.313 ac Storage= 5.215 af

Plug-Flow detention time= 205.8 min calculated for 12.839 af (100% of inflow)

Center-of-Mass det. time= 205.3 min (996.8 - 791.5)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5.575 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.00	0.673	0.000	0.000
912.00	0.807	1.480	1.480
914.00	0.960	1.767	3.247
916.00	1.368	2.328	5.575

Device	Routing	Invert	Outlet Devices
#1	Primary	909.05'	36.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 908.23' S= 0.0149 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	912.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Device 1	910.00'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=72.17 cfs @ 12.27 hrs HW=915.40' TW=910.90' (Dynamic Tailwater)

1=Culvert (Inlet Controls 72.17 cfs @ 10.21 fps)

2=Sharp-Crested Rectangular Weir (Passes < 108.95 cfs potential flow)

3=Orifice/Grate (Passes < 8.02 cfs potential flow)

Summary for Pond W10:

Inflow Area = 11.980 ac, 0.94% Impervious, Inflow Depth = 12.62" for 100-Year event

Inflow = 56.69 cfs @ 12.24 hrs, Volume= 12.599 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 908.65' @ 26.51 hrs Surf.Area= 4.700 ac Storage= 12.599 af

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	901.60'	19.694 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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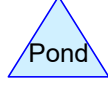
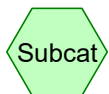
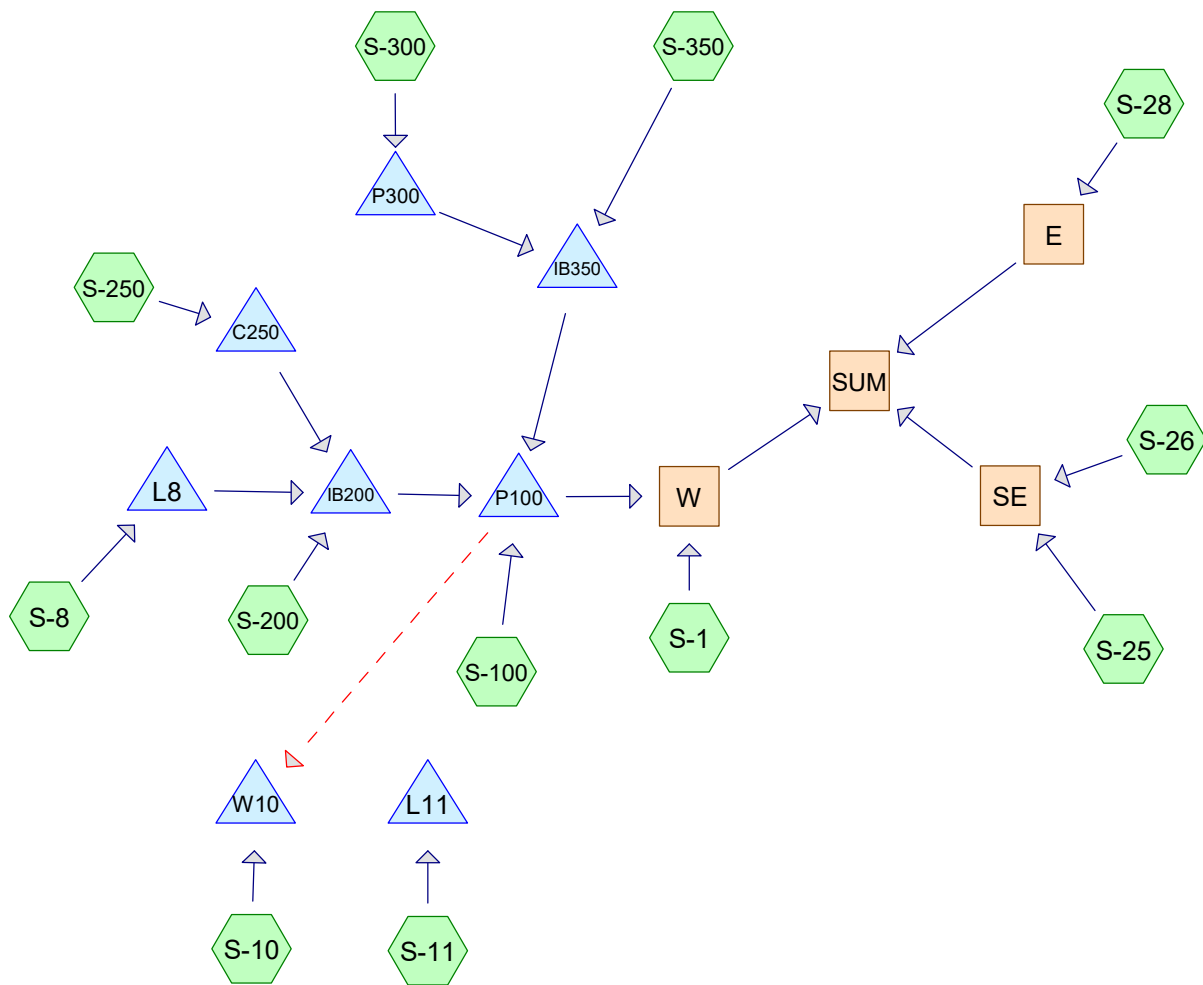
Meadows Ridge

MSE 24-hr 3 100-Year Rainfall=6.62"

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716
910.00	5.818	9.978	19.694



Routing Diagram for 7226-03_PRP_SNOW
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
74.347	69	50-75% Grass cover, Fair, HSG B (S-10, S-100, S-11, S-200, S-25, S-250, S-26, S-28, S-300, S-350, S-8)
2.293	98	Ex. Impervious (S-10, S-100, S-11, S-200, S-25, S-250, S-300, S-350, S-8)
38.331	98	Impervious (S-100, S-200, S-25, S-250, S-26, S-300, S-350, S-8)
2.915	98	Impervious (Concept Commercial) (S-200)
22.844	75	Row Crops, HSG B (S-10, S-100, S-11)
3.849	98	Water Surface, 0% imp, HSG B (S-100, S-300)
7.654	65	Woods/grass comb., Fair, HSG B (S-1, S-10, S-100, S-11, S-200, S-300)
0.311	82	Woods/grass comb., Fair, HSG D (S-10)
152.544	79	TOTAL AREA

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Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

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Time span=0.00-240.00 hrs, dt=0.01 hrs, 24001 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 S-1: Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=5.56"
Flow Length=50' Slope=0.0200 '/' Tc=13.2 min CN=65 Runoff=0.05 cfs 0.052 af

Subcatchment S-10: Runoff Area=11.980 ac 0.94% Impervious Runoff Depth=6.75"
Flow Length=150' Slope=0.0200 '/' Tc=15.6 min CN=74 Runoff=6.25 cfs 6.736 af

Subcatchment S-100: Runoff Area=64.686 ac 26.06% Impervious Runoff Depth=7.26"
Flow Length=250' Slope=0.0200 '/' Tc=14.8 min CN=78 Runoff=36.04 cfs 39.159 af

Subcatchment S-11: Runoff Area=12.016 ac 1.19% Impervious Runoff Depth>6.75"
Flow Length=550' Slope=0.0200 '/' Tc=19.7 min CN=74 Runoff=6.23 cfs 6.756 af

Subcatchment S-200: Runoff Area=22.410 ac 43.56% Impervious Runoff Depth=7.78"
Flow Length=150' Slope=0.0200 '/' Tc=9.6 min CN=82 Runoff=13.28 cfs 14.521 af

Subcatchment S-25: Runoff Area=1.367 ac 25.90% Impervious Runoff Depth=7.14"
Flow Length=50' Slope=0.0200 '/' Tc=8.8 min CN=77 Runoff=0.76 cfs 0.813 af

Subcatchment S-250: Runoff Area=0.799 ac 45.93% Impervious Runoff Depth=7.78"
Tc=6.0 min CN=82 Runoff=0.48 cfs 0.518 af

Subcatchment S-26: Runoff Area=0.089 ac 38.20% Impervious Runoff Depth=7.52"
Tc=6.0 min CN=80 Runoff=0.05 cfs 0.056 af

Subcatchment S-28: Runoff Area=0.613 ac 0.00% Impervious Runoff Depth=6.09"
Tc=6.0 min CN=69 Runoff=0.30 cfs 0.311 af

Subcatchment S-300: Runoff Area=33.829 ac 44.41% Impervious Runoff Depth=7.78"
Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=82 Runoff=20.04 cfs 21.920 af

Subcatchment S-350: Runoff Area=4.194 ac 16.43% Impervious Runoff Depth=6.75"
Flow Length=200' Slope=0.0200 '/' Tc=10.0 min CN=74 Runoff=2.21 cfs 2.358 af

Subcatchment S-8: Runoff Area=0.448 ac 43.75% Impervious Runoff Depth=7.78"
Tc=6.0 min CN=82 Runoff=0.27 cfs 0.290 af

Reach E: Inflow=0.30 cfs 0.311 af
Outflow=0.30 cfs 0.311 af

Reach SE: Inflow=0.81 cfs 0.869 af
Outflow=0.81 cfs 0.869 af

Reach SUM: Inflow=13.56 cfs 68.163 af
Outflow=13.56 cfs 68.163 af

Reach W: Inflow=13.25 cfs 66.983 af
Outflow=13.25 cfs 66.983 af

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Pond C250: Peak Elev=922.18' Storage=0.005 af Inflow=0.48 cfs 0.518 af
18.0" Round Culvert n=0.013 L=340.0' S=0.0030 '/' Outflow=0.47 cfs 0.518 af

Pond IB200: Peak Elev=914.78' Storage=4.735 af Inflow=14.01 cfs 15.329 af
Outflow=10.27 cfs 13.351 af

Pond IB350: Peak Elev=912.77' Storage=6.440 af Inflow=19.95 cfs 24.125 af
18.0" Round Culvert n=0.013 L=270.0' S=-0.0035 '/' Outflow=8.34 cfs 23.766 af

Pond L11: Peak Elev=917.26' Storage=6.756 af Inflow=6.23 cfs 6.756 af
Outflow=0.00 cfs 0.000 af

Pond L8: Peak Elev=922.75' Storage=0.002 af Inflow=0.27 cfs 0.290 af
18.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=0.26 cfs 0.290 af

Pond P100: Peak Elev=910.82' Storage=34.927 af Inflow=49.26 cfs 76.277 af
Primary=13.24 cfs 66.930 af Secondary=9.91 cfs 6.425 af Outflow=23.15 cfs 73.355 af

Pond P300: Peak Elev=912.74' Storage=2.101 af Inflow=20.04 cfs 21.920 af
Outflow=17.94 cfs 21.767 af

Pond W10: Peak Elev=908.77' Storage=13.160 af Inflow=11.72 cfs 13.161 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 152.544 ac Runoff Volume = 93.492 af Average Runoff Depth = 7.35"
71.46% Pervious = 109.005 ac 28.54% Impervious = 43.539 ac

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Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

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Summary for Subcatchment S-1:

Runoff = 0.05 cfs @ 121.43 hrs, Volume= 0.052 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
0.113	65	Woods/grass comb., Fair, HSG B
0.113		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"

Summary for Subcatchment S-10:

Runoff = 6.25 cfs @ 121.46 hrs, Volume= 6.736 af, Depth= 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.113	98	Ex. Impervious
0.311	82	Woods/grass comb., Fair, HSG D
1.522	65	Woods/grass comb., Fair, HSG B
* 8.808	75	Row Crops, HSG B
1.226	69	50-75% Grass cover, Fair, HSG B
11.980	74	Weighted Average
11.867		99.06% Pervious Area
0.113		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
2.4	100	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.6	150	Total			

Summary for Subcatchment S-100:

Runoff = 36.04 cfs @ 121.44 hrs, Volume= 39.159 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

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Area (ac)	CN	Description
* 16.129	98	Impervious
* 0.730	98	Ex. Impervious
3.176	98	Water Surface, 0% imp, HSG B
5.279	65	Woods/grass comb., Fair, HSG B
* 4.615	75	Row Crops, HSG B
34.757	69	50-75% Grass cover, Fair, HSG B
64.686	78	Weighted Average
47.827		73.94% Pervious Area
16.859		26.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.6	200	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
14.8	250	Total			

Summary for Subcatchment S-11:

Runoff = 6.23 cfs @ 121.51 hrs, Volume= 6.756 af, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.143	98	Ex. Impervious
0.543	65	Woods/grass comb., Fair, HSG B
* 9.421	75	Row Crops, HSG B
1.909	69	50-75% Grass cover, Fair, HSG B
12.016	74	Weighted Average
11.873		98.81% Pervious Area
0.143		1.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	50	0.0200	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
6.5	500	0.0200	1.27		Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps
19.7	550	Total			

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Summary for Subcatchment S-200:

Runoff = 13.28 cfs @ 121.36 hrs, Volume= 14.521 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 6.330	98	Impervious
* 2.915	98	Impervious (Concept Commercial)
* 0.516	98	Ex. Impervious
0.031	65	Woods/grass comb., Fair, HSG B
12.618	69	50-75% Grass cover, Fair, HSG B
22.410	82	Weighted Average
12.649		56.44% Pervious Area
9.761		43.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
0.8	100	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
9.6	150	Total			

Summary for Subcatchment S-25:

Runoff = 0.76 cfs @ 121.35 hrs, Volume= 0.813 af, Depth= 7.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.293	98	Impervious
* 0.061	98	Ex. Impervious
1.013	69	50-75% Grass cover, Fair, HSG B
1.367	77	Weighted Average
1.013		74.10% Pervious Area
0.354		25.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"

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Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

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Summary for Subcatchment S-250:

Runoff = 0.48 cfs @ 121.30 hrs, Volume= 0.518 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.139	98	Impervious
* 0.228	98	Ex. Impervious
0.432	69	50-75% Grass cover, Fair, HSG B
0.799	82	Weighted Average
0.432		54.07% Pervious Area
0.367		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-26:

Runoff = 0.05 cfs @ 121.30 hrs, Volume= 0.056 af, Depth= 7.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.034	98	Impervious
0.055	69	50-75% Grass cover, Fair, HSG B
0.089	80	Weighted Average
0.055		61.80% Pervious Area
0.034		38.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-28:

Runoff = 0.30 cfs @ 121.31 hrs, Volume= 0.311 af, Depth= 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
0.613	69	50-75% Grass cover, Fair, HSG B
0.613		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment S-300:

Runoff = 20.04 cfs @ 121.37 hrs, Volume= 21.920 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 14.809	98	Impervious
* 0.214	98	Ex. Impervious
0.673	98	Water Surface, 0% imp, HSG B
0.166	65	Woods/grass comb., Fair, HSG B
17.967	69	50-75% Grass cover, Fair, HSG B
33.829	82	Weighted Average
18.806		55.59% Pervious Area
15.023		44.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow,
					Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow,
					Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-350:

Runoff = 2.21 cfs @ 121.37 hrs, Volume= 2.358 af, Depth= 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.505	98	Impervious
* 0.184	98	Ex. Impervious
3.505	69	50-75% Grass cover, Fair, HSG B
4.194	74	Weighted Average
3.505		83.57% Pervious Area
0.689		16.43% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.80"
1.2	150	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.0	200	Total			

Summary for Subcatchment S-8:

Runoff = 0.27 cfs @ 121.30 hrs, Volume= 0.290 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
Spillway 1-day 10-day 10 Day Snow Rainfall=10.00"

Area (ac)	CN	Description
* 0.092	98	Impervious
* 0.104	98	Ex. Impervious
0.252	69	50-75% Grass cover, Fair, HSG B
0.448	82	Weighted Average
0.252		56.25% Pervious Area
0.196		43.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Reach E:

Inflow Area = 0.613 ac, 0.00% Impervious, Inflow Depth = 6.09" for 10 Day Snow event
 Inflow = 0.30 cfs @ 121.31 hrs, Volume= 0.311 af
 Outflow = 0.30 cfs @ 121.31 hrs, Volume= 0.311 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs

Summary for Reach SE:

Inflow Area = 1.456 ac, 26.65% Impervious, Inflow Depth = 7.16" for 10 Day Snow event
 Inflow = 0.81 cfs @ 121.35 hrs, Volume= 0.869 af
 Outflow = 0.81 cfs @ 121.35 hrs, Volume= 0.869 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs

Summary for Reach SUM:

Inflow Area = 128.548 ac, 33.67% Impervious, Inflow Depth > 6.36" for 10 Day Snow event
 Inflow = 13.56 cfs @ 124.66 hrs, Volume= 68.163 af
 Outflow = 13.56 cfs @ 124.66 hrs, Volume= 68.163 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs

Summary for Reach W:

Inflow Area = 126.479 ac, 33.91% Impervious, Inflow Depth > 6.36" for 10 Day Snow event
 Inflow = 13.25 cfs @ 125.03 hrs, Volume= 66.983 af
 Outflow = 13.25 cfs @ 125.03 hrs, Volume= 66.983 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs

Summary for Pond C250:

Inflow Area = 0.799 ac, 45.93% Impervious, Inflow Depth = 7.78" for 10 Day Snow event
 Inflow = 0.48 cfs @ 121.30 hrs, Volume= 0.518 af
 Outflow = 0.47 cfs @ 121.42 hrs, Volume= 0.518 af, Atten= 2%, Lag= 7.1 min
 Primary = 0.47 cfs @ 121.42 hrs, Volume= 0.518 af

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.18' @ 121.42 hrs Surf.Area= 0.026 ac Storage= 0.005 af

Plug-Flow detention time= 10.5 min calculated for 0.518 af (100% of inflow)
 Center-of-Mass det. time= 10.5 min (8,051.9 - 8,041.5)

Volume	Invert	Avail.Storage	Storage Description
#1	921.80'	0.161 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
921.80	0.001	0.000	0.000
924.00	0.145	0.161	0.161

Device	Routing	Invert	Outlet Devices
#1	Primary	921.80'	18.0" Round Culvert L= 340.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 921.80' / 920.78' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.47 cfs @ 121.42 hrs HW=922.18' (Free Discharge)
 ↑1=Culvert (Barrel Controls 0.47 cfs @ 1.96 fps)

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Summary for Pond IB200:

Inflow Area = 23.657 ac, 43.64% Impervious, Inflow Depth = 7.78" for 10 Day Snow event
 Inflow = 14.01 cfs @ 121.36 hrs, Volume= 15.329 af
 Outflow = 10.27 cfs @ 122.40 hrs, Volume= 13.351 af, Atten= 27%, Lag= 62.7 min
 Primary = 10.27 cfs @ 122.40 hrs, Volume= 13.351 af

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Peak Elev= 914.78' @ 122.40 hrs Surf.Area= 1.123 ac Storage= 4.735 af

Plug-Flow detention time= 1,723.8 min calculated for 13.351 af (87% of inflow)
 Center-of-Mass det. time= 1,064.1 min (9,109.2 - 8,045.1)

Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	8.858 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	0.690	0.000	0.000
910.00	0.724	0.353	0.353
912.00	0.877	1.601	1.954
914.00	1.053	1.930	3.885
916.00	1.233	2.286	6.170
918.00	1.455	2.688	8.858

Device	Routing	Invert	Outlet Devices
#1	Primary	910.61'	18.0" Round Culvert L= 175.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 910.61' / 910.00' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	911.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	914.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=10.27 cfs @ 122.40 hrs HW=914.78' (Free Discharge)

1=Culvert (Passes 10.27 cfs of 11.85 cfs potential flow)

2=Orifice/Grate (Orifice Controls 1.59 cfs @ 8.10 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 8.68 cfs @ 2.89 fps)

Summary for Pond IB350:

Inflow Area = 38.023 ac, 41.32% Impervious, Inflow Depth > 7.61" for 10 Day Snow event
 Inflow = 19.95 cfs @ 121.79 hrs, Volume= 24.125 af
 Outflow = 8.34 cfs @ 124.31 hrs, Volume= 23.766 af, Atten= 58%, Lag= 151.1 min
 Primary = 8.34 cfs @ 124.31 hrs, Volume= 23.766 af

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Starting Elev= 910.00' Surf.Area= 1.206 ac Storage= 2.767 af
 Peak Elev= 912.77' @ 124.31 hrs Surf.Area= 1.445 ac Storage= 6.440 af (3.674 af above start)

Plug-Flow detention time= 1,325.6 min calculated for 21.000 af (87% of inflow)

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Center-of-Mass det. time= 247.4 min (8,478.6 - 8,231.2)

Volume	Invert	Avail.Storage	Storage Description
#1	907.50'	11.794 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
907.50	1.008	0.000	0.000
908.00	1.047	0.514	0.514
910.00	1.206	2.253	2.767
912.00	1.375	2.581	5.348
914.00	1.555	2.930	8.278
916.00	1.961	3.516	11.794

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	18.0" Round Culvert L= 270.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 910.00' S= -0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=8.34 cfs @ 124.31 hrs HW=912.77' (Free Discharge)↑**1=Culvert** (Barrel Controls 8.34 cfs @ 4.72 fps)**Summary for Pond L11:**

Inflow Area = 12.016 ac, 1.19% Impervious, Inflow Depth > 6.75" for 10 Day Snow event
 Inflow = 6.23 cfs @ 121.51 hrs, Volume= 6.756 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.26' @ 240.00 hrs Surf.Area= 3.865 ac Storage= 6.756 af

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	912.30'	10.027 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
912.30	0.005	0.000	0.000
914.00	0.671	0.575	0.575
916.00	1.880	2.551	3.126
918.00	5.021	6.901	10.027

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Summary for Pond L8:

Inflow Area = 0.448 ac, 43.75% Impervious, Inflow Depth = 7.78" for 10 Day Snow event
 Inflow = 0.27 cfs @ 121.30 hrs, Volume= 0.290 af
 Outflow = 0.26 cfs @ 121.39 hrs, Volume= 0.290 af, Atten= 1%, Lag= 5.0 min
 Primary = 0.26 cfs @ 121.39 hrs, Volume= 0.290 af

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.75' @ 121.39 hrs Surf.Area= 0.015 ac Storage= 0.002 af

Plug-Flow detention time= 7.9 min calculated for 0.290 af (100% of inflow)
 Center-of-Mass det. time= 7.9 min (8,049.3 - 8,041.5)

Volume	Invert	Avail.Storage	Storage Description
#1	922.50'	0.064 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.50	0.001	0.000	0.000
924.00	0.084	0.064	0.064

Device	Routing	Invert	Outlet Devices
#1	Primary	922.50'	18.0" Round Culvert L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 922.50' / 922.20' S= 0.0060 ' / Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.26 cfs @ 121.39 hrs HW=922.75' (Free Discharge)↑**1=Culvert** (Barrel Controls 0.26 cfs @ 2.02 fps)**Summary for Pond P100:**

Inflow Area = 126.366 ac, 33.95% Impervious, Inflow Depth > 7.24" for 10 Day Snow event
 Inflow = 49.26 cfs @ 121.64 hrs, Volume= 76.277 af
 Outflow = 23.15 cfs @ 125.06 hrs, Volume= 73.355 af, Atten= 53%, Lag= 205.1 min
 Primary = 13.24 cfs @ 125.06 hrs, Volume= 66.930 af
 Secondary = 9.91 cfs @ 125.06 hrs, Volume= 6.425 af

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Starting Elev= 907.00' Surf.Area= 3.771 ac Storage= 19.143 af
 Peak Elev= 910.82' @ 125.06 hrs Surf.Area= 4.769 ac Storage= 34.927 af (15.784 af above start)

Plug-Flow detention time= 2,477.9 min calculated for 54.212 af (71% of inflow)
 Center-of-Mass det. time= 552.6 min (8,986.1 - 8,433.5)

Volume	Invert	Avail.Storage	Storage Description
#1	899.00'	40.975 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
899.00	1.735	0.000	0.000
900.00	1.978	1.856	1.856
902.00	2.242	4.220	6.077
904.00	2.515	4.757	10.833
906.00	2.801	5.316	16.149
906.99	3.176	2.959	19.108
907.00	3.771	0.035	19.143
908.00	3.936	3.854	22.996
910.00	4.292	8.228	31.224
912.00	5.459	9.751	40.975

Device	Routing	Invert	Outlet Devices
#1	Primary	907.00'	21.0" Round Culvert L= 290.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 907.00' / 906.33' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#2	Device 1	907.50'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Secondary	910.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=13.24 cfs @ 125.06 hrs HW=910.82' (Free Discharge)↑ **1=Culvert** (Barrel Controls 13.24 cfs @ 5.50 fps)↑ **2=Sharp-Crested Rectangular Weir** (Passes 13.24 cfs of 85.67 cfs potential flow)**Secondary OutFlow** Max=9.90 cfs @ 125.06 hrs HW=910.82' (Free Discharge)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 9.90 cfs @ 2.42 fps)**Summary for Pond P300:**

Inflow Area = 33.829 ac, 44.41% Impervious, Inflow Depth = 7.78" for 10 Day Snow event
 Inflow = 20.04 cfs @ 121.37 hrs, Volume= 21.920 af
 Outflow = 17.94 cfs @ 121.82 hrs, Volume= 21.767 af, Atten= 11%, Lag= 27.3 min
 Primary = 17.94 cfs @ 121.82 hrs, Volume= 21.767 af

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs
 Peak Elev= 912.74' @ 121.82 hrs Surf.Area= 0.864 ac Storage= 2.101 af

Plug-Flow detention time= 222.3 min calculated for 21.767 af (99% of inflow)
 Center-of-Mass det. time= 179.6 min (8,224.8 - 8,045.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5.575 af	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.00	0.673	0.000	0.000
912.00	0.807	1.480	1.480
914.00	0.960	1.767	3.247
916.00	1.368	2.328	5.575

Device	Routing	Invert	Outlet Devices
#1	Primary	909.05'	36.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 909.05' / 908.23' S= 0.0149 ' / Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	912.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Device 1	910.00'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=17.93 cfs @ 121.82 hrs HW=912.74' (Free Discharge)

1=Culvert (Passes 17.93 cfs of 50.41 cfs potential flow)

2=Sharp-Crested Rectangular Weir (Weir Controls 12.27 cfs @ 2.82 fps)

3=Orifice/Grate (Orifice Controls 5.66 cfs @ 7.21 fps)

Summary for Pond W10:

Inflow Area = 11.980 ac, 0.94% Impervious, Inflow Depth = 13.18" for 10 Day Snow event
 Inflow = 11.72 cfs @ 124.75 hrs, Volume= 13.161 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-240.00 hrs, dt= 0.01 hrs

Peak Elev= 908.77' @ 240.00 hrs Surf.Area= 4.797 ac Storage= 13.160 af

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	901.60'	19.694 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
901.60	0.004	0.000	0.000
902.00	0.021	0.005	0.005
904.00	0.496	0.517	0.522
906.00	2.269	2.765	3.287
908.00	4.160	6.429	9.716
910.00	5.818	9.978	19.694

APPENDIX C



PROJECT NAME: Meadows Ridge
 PROJECT LOCATION: North Branch, MN
 CARLSON PROJECT NO.: 7226-03
 DATE: 4/25/24 (Rev. 8/15/24)
 BY: ADB

Pond 100

DRAINAGE AREA CHARACTERISTICS

PROPOSED COVER	CN	AREA (AC.)
Impervious	98	16.129
Existing Impervious	98	0.730
Grass (HSG B)	69	34.757
Trees (HSG B)	65	5.279
Crops (HSG B)	75	4.615
NWL	98	3.176
Totals		64.686
Weighted CN	78	
2.5" Total Runoff	0.792	

REQUIRED POND TREATMENT VOLUME

(2.5" Runoff - Total Area)	4.269	acre-feet
Infiltration Volume (1.1" Runoff - Impervious Area)	1.478	acre-feet
Water Quality Volume (1.0" Runoff - Impervious Area)	1.405	acre-feet

	Elevation	Pond Volume Area (ac.)	Volume (af)
Bottom	889	0.769	
	890	0.835	0.802
	892	0.973	1.809
	894	1.120	2.094
	896	1.281	2.401
Bench	898	1.444	2.724
Anticipated Pond NWL	899	1.735	1.589
Total Permanent Pool		11.419	acre feet

	Elevation	Live Storage Area (ac.)	Volume (af)
Anticipated Pond NWL	899	1.735	
	900	1.978	1.856
	902	2.242	4.219
	904	2.515	4.757
Bench	906	2.801	5.316
NWL	907	3.176	2.988
Total Live Storage		19.137	acre feet

	Elevation	Area (ac.)	Volume (af)
Infiltration Bench + NWL	907	3.771	
Outlet	907.5	3.852	1.906
Total Infiltration Volume		1.906	acre feet

Water Level at Water Quality Volume:	907.46	feet
Surface Area at Water Quality Volume:	3.85	acre
Allowable Discharge at Water Quality Volume (5.66 cfs/ac)	21.77	cfs
Actual Discharge at Water Quality Volume	0.01	cfs



PROJECT NAME: Meadows Ridge
 PROJECT LOCATION: North Branch, MN
 CARLSON PROJECT NO.: 7226-03
 DATE: 4/25/24 (Rev. 9/11/24)
 BY: ADB

Infiltration Basin 200

DRAINAGE AREA CHARACTERISTICS

PROPOSED COVER	CN	AREA (AC.)
Impervious	98	6.561
Existing Impervious	98	0.848
Concept Commercial Impv.	98	2.915
Grass (HSG B)	69	13.302
Trees (HSG B)	65	0.031
Totals		23.657

Weighted CN	82
2.5" Total Runoff	0.978

REQUIRED POND TREATMENT VOLUME

Infiltration Volume (1.1" Runoff - New Impervious Area)	0.869	acre-feet	(Commercial Included)
Water Quality Volume (1.0" Runoff - Impervious Area)	0.860	acre-feet	(Commercial Included)

		Pond Volume	
	Elevation	Area (ac.)	Volume (af)
Bottom	909.5	0.690	
	910	0.724	0.354
NWL	911.5	0.839	1.172
Total Permanent Pool		1.526	acre feet
Water Level at Water Quality Volume:		910.68	feet
Surface Area at Water Quality Volume:		0.78	acre
Allowable Discharge at Water Quality Volume (5.66 cfs/ac)		4.39	cfs
Actual Discharge at Water Quality Volume		0.00	cfs



PROJECT NAME: Meadows Ridge
 PROJECT LOCATION: North Branch, MN
 CARLSON PROJECT NO.: 7226-03
 DATE: 4/25/24 (Rev. 9/11/24)
 BY: ADB

Pond 300

DRAINAGE AREA CHARACTERISTICS

PROPOSED COVER	CN	AREA (AC.)
Impervious	98	14.809
Existing Impervious	98	0.214
Grass (HSG B)	69	17.967
Trees (HSG B)	65	0.166
NWL	98	0.673
Totals		33.829
Weighted CN	82	
2.5" Total Runoff	1.023	

REQUIRED POND TREATMENT VOLUME

(2.5" Runoff - Total Area)	2.884	acre-feet
Water Quality Volume (1.0" Runoff - Impervious Area)	1.252	acre-feet

		<u>Pond Volume</u>	
	Elevation	Area (ac.)	Volume (af)
Bottom	900	0.133	
	902	0.198	0.331
	904	0.275	0.472
	906	0.364	0.639
	908	0.467	0.831
Bench	909	0.523	0.495
NWL	910	0.673	0.598
Total Permanent Pool		3.367	acre feet
		<u>Live Storage</u>	
NWL	910	0.673	
	912	0.807	1.480
	914	0.960	1.767
Top of Berm	916.2	1.397	2.592
Total Live Storage		5.839	acre feet
Water Level at Water Quality Volume:		911.72	feet
Surface Area at Water Quality Volume:		0.79	acre
Allowable Discharge at Water Quality Volume (5.66 cfs/ac)		4.46	cfs
Actual Discharge at Water Quality Volume		4.18	cfs



PROJECT NAME: Meadows Ridge
 PROJECT LOCATION: North Branch, MN
 CARLSON PROJECT NO.: 7226-03
 DATE: 4/25/24 (Rev. 8/15/24)
 BY: ADB

Infiltration Basin 350

DRAINAGE AREA CHARACTERISTICS

PROPOSED COVER	CN	AREA (AC.)
Impervious	98	0.505
Existing Impervious	98	0.184
Grass (HSG B)	69	3.505
Totals		4.194
Weighted CN	74	
2.5" Total Runoff	0.599	

New Impervious Surface Routed Through Pond 300 14.809 acres

REQUIRED POND TREATMENT VOLUME

Infiltration Volume (1.1" Runoff - New Impervious Area)	1.404	acre-feet	(Includes P300 Impv.)
Water Quality Volume (1.0" Runoff - Impervious Area)	0.057	acre-feet	

<u>Pond Volume</u>			
	Elevation	Area (ac.)	Volume (af)
Bottom	907.5	1.008	
	908	1.047	0.514
Outlet	910	1.206	2.253
Total Permanent Pool			2.767 acre feet
Water Level at Water Quality Volume:			907.56 feet
Surface Area at Water Quality Volume:			1.01 acre
Allowable Discharge at Water Quality Volume (5.66 cfs/ac)			5.73 cfs
Actual Discharge at Water Quality Volume			0.00 cfs

APPENDIX D

February 6, 2024

HGTS Project Number: 23-0871

Mr. Jay Roos
LGI Homes
2850 Cutters Grove Avenue, Suite 207
Anoka, MN 55303

**Re: Geotechnical Exploration Report, Proposed Residential Development,
Meadows Ridge, North Branch, Minnesota**

Dear Mr. Roos:

We have completed the geotechnical exploration report for the proposed residential development in North Branch, Minnesota. A brief summary of our results and recommendations is presented below. Specific details regarding our procedures, results and recommendations follow in the attached geotechnical exploration report.

Twelve (12) soil borings were completed for this project that encountered about 1 to 4 ½ feet of topsoil underlain by native alluvial soils that extended to the termination depths of the borings. Groundwater was encountered in borings SB-6 and SB-7 at depths of about 10 to 12 ½ feet below the ground surface, corresponding to elevations of about 899 to 900 ½ feet above mean sea level (MSL).

The vegetation and topsoil are not suitable for building, roadway or utility support and will need to be removed and replaced, as needed, with suitable compacted engineered fill. It is our opinion that the underlying native alluvial soils are suitable for foundation support.

With the building pads prepared as recommended it is our opinion that the foundations for the proposed buildings can be designed for a net allowable soil bearing capacity up to 2,000 pounds per square foot.

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

Sincerely,

Haugo GeoTechnical Services



Nic Alfonso, G.I.T.
Project Geologist



Paul Gionfriddo, P.E.
Senior Engineer

GEOTECHNICAL EXPLORATION REPORT

PROJECT:

Proposed Residential Development
Meadows Ridge
North Branch, Minnesota

PREPARED FOR:

LGI Homes
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

PREPARED BY:

Haugo GeoTechnical Services
2825 Cedar Avenue South
Minneapolis, Minnesota 55407

Haugo GeoTechnical Services Project: 23-0871

February 6, 2024

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



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



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APPENDIX

Boring Location Sketch, Figure 1

Soil Boring Logs, SB-1 thru SB-12

Descriptive Terminology

1.0 INTRODUCTION

1.1 Project Description

LGI Homes is proposing to construct a residential development located east of Interstate 35 and north of 400th Street in North Branch, Minnesota. LGI Homes retained Haugo GeoTechnical Services (HGTS) to perform a geotechnical exploration to evaluate the suitability of site soil conditions to support the proposed development.

We understand the project will include preparing lots and house pads for 83 townhomes, 198 single-family homes and 66 shoreland homes along with the associated streets, underground utilities and stormwater ponds.

1.2 Purpose

The purpose of this geotechnical exploration was to characterize subsurface soil and groundwater conditions and provide recommendations for foundation design and construction.

1.3 Site Description

The project site is located west of Interstate 35 and north of 400th Street in North Branch, Minnesota. The site is bisected by Flink Avenue in a north to south direction. The project site consists of two parcels approximately 120-acres in size. The site existed as agricultural land at the time of this assessment.

The site topography varied slightly across the project site with the elevations at the soil boring locations ranging from about 909 to 924 ½ feet above mean sea level (MSL).

1.4 Scope of Services

Our services were performed in accordance with the Haugo GeoTechnical Services proposal 23-0871 dated October 26, 2023. Our scope of services was performed under the terms of our General Conditions and were limited to the following tasks:

- Completing twelve (12) standard penetration test soil borings and extending each to nominal depths of 20 feet.
- Sealing the boring in accordance with Minnesota Department of Health requirements.
- Obtaining GPS coordinates and ground surface elevations at the soil boring location.
- Visually/manually classifying samples recovered from the soil boring.
- Performing laboratory tests on selected samples.
- Preparing soil boring logs describing the materials encountered and the results of groundwater level measurements.
- Preparing an engineering report describing soil and groundwater conditions and providing recommendations for foundation design and construction.

1.5 Documents Provided

We were provided a Concept Plan prepared by Carlson McCain and dated August 10, 2023. The plan provided a layout of the proposed development which showed the locations of the house lots, streets and stormwater ponds.

We were provided a plan sheet titled "Soil Boring Exhibit" that was prepared by Carlson McCain and dated February 6, 2024. The exhibit showed the location of the soil borings on the project site along with their GPS coordinates and ground surface elevations.

Additionally, we were provided a boring location document which showed the locations of the proposed soil borings on the project site. The document was not dated and had no author.

Other than the provided documents, specific architectural, structural or civil documents were not provided at the time of this assessment.

1.6 Locations and Elevations

The soil boring locations were selected by LGI Homes and/or Carlson McCain. Ground surface elevations at the soil boring locations were also provided by LGI Homes and/or Carlson McCain. The approximate locations of the soil borings are shown on Figure 1, "Soil Boring Location Sketch," in the Appendix. The sketch is the was prepared by HGTS using the provided soil boring exhibit as a base.

2.0 FIELD PROCEDURES

Twelve (12) standard penetration test borings were advanced on December 28th and 29th, 2023 by HGTS with a rotary drilling rig, using continuous flight augers to advance the boreholes. Representative samples were obtained from the borings, using the split-barrel sampling procedures in general accordance with ASTM Specification D-1586. In the split-barrel sampling procedure, a 2-inch O.D. split-barrel spoon is driven into the ground with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampling spoon the last 12 inches of an 18-inch penetration is recorded as the standard penetration resistance value, or "N" value. The results of the standard penetration tests are indicated on the boring logs. The samples were sealed in containers and provided to HGTS for testing and soil classification.

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

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

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

3.0 RESULTS

3.1 Soil Conditions

At the surface, the soil borings encountered about 1 to 4 ½ feet of topsoil consisting of silty sand and clayey sand that was dark brown to black in color and contained traces of roots and grass.

Below the topsoil, the soil borings encountered native alluvial soils that extended to the termination depths of the borings. The alluvial soils consisted mostly of poorly graded sand with silt and poorly graded sand with lesser amounts of silty sand and clayey sand. The soils were brown in color.

Penetration resistance values (N-Values), shown as blows per foot (bpf) on the boring logs, within the alluvial soils ranged from 2 to 20 bpf indicating a very loose to medium dense relative density.

3.2 Groundwater

Groundwater was encountered in borings SB-6 and SB-7 while drilling and sampling at depths of about 10 to 12 ½ feet below the ground surface corresponding to elevations of about 899 to 900 ½ feet above mean sea level (MSL). The observed water levels are summarized in Table 1.

Table 1. Summary of Groundwater Levels

Boring Number	Measured Surface Elevation (feet)	Estimated Depth to Groundwater (feet)*	Estimated Groundwater Elevation (feet)*
SB-1	923.4	NE	-
SB-2	924.3	NE	-
SB-3	923.0	NE	-
SB-4	919.7	NE	-
SB-5	919.2	NE	-
SB-6	908.8	10	899
SB-7	912.8	12 ½	900 ½
SB-8	918.0	NE	-
SB-9	919.0	NE	-
SB-10	920.2	NE	-
SB-11	917.2	NE	-
SB-12	919.7	NE	-

* = Depths and elevations were rounded to the nearest ½ foot. NE = Not Encountered

Water levels were measured on the dates as noted on the boring logs and the period of water level observations was relatively short. Groundwater monitoring wells or piezometers would

be required to more accurately determine water levels. Seasonal and annual fluctuations in the groundwater levels should be expected.

3.3 Laboratory Testing

Laboratory moisture content tests and percent passing the #200 sieve (P-200) tests were performed on selected samples recovered from the soil borings. Laboratory soil moisture contents ranged from about 7 ½ to 21 ½ percent indicating that the soils were likely above their assumed optimum moisture content based on the standard Proctor test. Laboratory tests results are summarized in Table 2 and are shown on the boring logs adjacent to the samples tested.

Table 2. Summary of Laboratory Tests

Boring Number	Sample Number	Depth (feet)	Moisture Content (%) *	P-200 Content (%) *
SB-1	SS-3	5	15	-
SB-2	SS-10	2 ½	15 ½	-
SB-3	SS-59	5	17 ½	12 ½
SB-3	SS-61	10	19 ½	5
SB-4	SS-43	5	9	-
SB-5	SS-18	2 ½	21 ½	38 ½
SB-5	SS-19	5	15 ½	12
SB-5	SS-21	10	15	5 ½
SB-6	SS-52	7 ½	10	7
SB-7	SS-26	2 ½	16	-
SB-8	SS-35	5	17	-
SB-9	SS-91	5	16	6
SB-9	SS-94	12 ½	7 ½	4 ½
SB-10	SS-66	2 ½	16 ½	-
SB-11	SS-75	5	15 ½	-
SB-12	SS-82	2 ½	12 ½	-

*Moisture content and P-200 values rounded to the nearest ½ percent.

3.4 OSHA Soil Classification

The soils encountered in the borings consisted of silty sand, clayey sand, poorly graded sand with silt and poorly graded sand meeting the ASTM classifications of SM, SC, SP-SM and SP. These soils will generally be Type C soils under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines.

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

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Proposed Construction

We understand the project will include preparing lots and house pads for 83 detached townhomes, 198 single family homes and 66 shoreland homes along with the associated streets, underground utilities and stormwater ponds. We were not provided specific architectural, structural or civil construction plans, but we assume the homes will include one or two stories above grade with walkout, lookout or full basements. We anticipate below grade construction to consist of cast-in-place concrete foundation walls supported on concrete spread footings. The above grade construction is assumed to consist of wood framing, a pitched roof and asphalt shingles.

Based on the assumed construction we estimate wall loadings will range from about 2 to 3 kips (2,000 to 3,000 pounds) per lineal foot and column loads, if any, will be on the order of 75 kips (75,000 pounds).

We anticipate the buildings will be constructed at or near existing site grades so that cuts or fill for permanent grade changes will generally be on the order of 5 feet or less.

We have attempted to describe our understanding of the project. If the proposed loads exceed these values or if the design or location of the proposed development changes, we should be informed. Additional analyses and revised recommendations may be necessary.

4.2 Discussion

The vegetation and topsoil are not suitable for foundation, roadway or utility support and will need to be removed from below the building pads, pavements, utilities and oversize areas and replaced with suitable compacted engineered fill.

It is our opinion that the underlying native alluvial soils are suitable for foundation, pavement and utility support. Prior to placing additional fill or foundations we recommend compacting any loose soils and any soils disturbed during excavation and grading activities.

Groundwater was encountered in borings SB-6 and SB-7 while drilling and sampling at depths of about 10 to 12 ½ feet below the ground surface corresponding to elevations of about 899 to 900 ½ feet above mean sea level (MSL). We generally do not anticipate that groundwater will be encountered during construction of the development.

The following sections provide recommendations for foundation design and construction.

4.3 Site Grading Recommendations

Excavation We recommend that all vegetation, topsoil and any other soft or otherwise unsuitable soils, if encountered, be removed from below the proposed building, roadway, utility and oversize areas. Table 3 summarizes the anticipated excavation depths at the soil boring locations. Excavation depths may vary and could be deeper.

Table 3. Anticipated Excavation Depths

Boring Number	Estimated Surface Elevation (feet)	Anticipated Excavation Depth (feet)*	Anticipated Excavation Elevation (feet)*	Approximate Groundwater Elevation (feet)*
SB-1	923.4	1	922 ½	NE
SB-2	924.3	1	923 ½	NE
SB-3	923.0	Pond	-	NE
SB-4	919.7	2	917 ½	NE
SB-5	919.2	Pond	-	NE
SB-6	908.8	Pond	-	899
SB-7	912.8	1	912	900 ½
SB-8	918.0	1	917	NE
SB-9	919.0	Pond	-	NE
SB-10	920.2	1	919	NE
SB-11	917.2	1	916	NE
SB-12	919.7	1	918 ½	NE

* = Excavation depths and elevations were rounded to nearest ½ foot.

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

Fill Material Additional fill required to attain design grades can consist of any mineral soil provided it is free of debris, organic soil and any soft or otherwise unsuitable materials. Except we recommend that fill or backfill placed in wet excavations or within 2 feet of the groundwater table, if encountered, consist of “clean coarse sand” with less than 5 percent passing the number 200 sieve and at least 50 percent retained on the number 40 sieve.

The on-site native alluvial soils appear to be suitable for reuse as structural fill or backfill provided it is free of debris, organic soils or other unsuitable materials. Soils that will be excavated and reused as fill and backfill will likely require some moisture conditioning (drying or wetting) to achieve the recommended compaction levels.

Topsoil or other soils that are black in color are not suitable for reuse as structural fill or backfill.

Backfilling Prior to placing additional fill or foundations we recommend compacting any loose soils and any soils disturbed during excavation and grading activities.

We recommend that backfill placed to attain site grades be compacted to a minimum of 95 percent of its standard Proctor density (ASTM D 698). Granular fill classified as SP or SP-SM should be placed within 65 percent to 105 percent of its optimum moisture content as determined by the standard Proctor. Other fill soils should be placed within 3 percentage

points above and 1 percentage point below its optimum moisture content as determined by the standard Proctor. All fill should be placed in thin lifts and be compacted with a large self-propelled vibratory compactor operating in vibratory mode.

In areas where fill depths will exceed 10 feet, if any, we recommend that compaction levels be increased to a minimum of 100 percent of standard Proctor density. Even with the increased compaction levels a construction delay may be required to allow for post settlement of the fill mass.

Fill and backfill placed on slopes, if any, must be “benched” into the underlying suitable soils to reduce the potential for slip places to develop between the fill and underlying soil. We recommend “benching” or excavating into the slope at 5 feet vertical intervals to key the fill into the slope. We recommend each bench be a minimum of 10 feet wide.

Foundations We recommend the perimeter footings bear a minimum of 42 inches below the exterior grade for frost protection. Interior footings may be placed immediately below the slab provided construction does not occur during below freezing weather conditions. Foundation elements in unheated areas (i.e., deck or porch footings) should bear at least 5 feet below exterior grade for frost protection.

We anticipate the foundations and floor slabs will bear on compacted engineered fill or native alluvial soils. With the building pads prepared as recommended, it is our opinion the footings can be designed for a net allowable bearing pressure up to 2,000 pounds per square foot (psf).

We anticipate total and differential settlement of the foundations will be less than 1 inch and ½ inch, respectively, across a 30-foot span.

4.4 Dewatering

Groundwater was encountered in borings SB-6 and SB-7 at depths of about 10 to 12 ½ feet below the ground surface, corresponding to elevations of about 899 to 900 ½ feet above mean sea level (MSL). We generally do not anticipate that groundwater will be encountered during foundation construction, however, groundwater could be encountered during utility construction.

In the event dewatering is required, we recommend the groundwater level be temporarily lowered to a minimum of 2 feet below the lowest anticipated excavation elevation to allow for construction. In sand soils, we do not recommend attempting to dewater from within the excavation. Upward seepage will loosen and disturb the excavation, resulting in a “quick condition.” Rather, we recommend groundwater to be drawn down below the anticipated excavation bottom.

If dewatering is required, it may be appropriate for a dewatering contractor to review the soil boring logs, develop a dewatering plan and evaluate the impact of dewatering on adjacent structures.

4.5 Interior Slabs

The anticipated floor subgrade will consist of compacted sandy engineered fill or sandy native alluvial soils. It is our opinion a modulus of subgrade reaction, k , of 100 pounds per square inch per inch of deflection (psi) may be used to design the floor.

If floor coverings or coatings less permeable than the concrete slab will be used, we recommend that a vapor retarder or vapor barrier be placed immediately beneath the slab. Some contractors prefer to bury the vapor barrier or vapor retarder beneath a layer of sand to reduce curling and shrinkage, but this practice often traps water between the slab and vapor retarder or barrier. Regardless of where the vapor retarder or vapor barrier is placed, we recommend consulting the floor covering manufacturer regarding the appropriate type, use and installation of the vapor retarder or vapor barrier to preserve the warranty.

We recommend following all state and local building codes with regards to a radon mitigation plan beneath interior slabs.

4.6 Below Grade Walls

We recommend general waterproofing of the below grade walls. We recommend either placing drainage composite against the backs of the exterior walls or backfilling adjacent to the walls with sand having less than 50 percent of the particles by weight passing the #40 sieve and less than 5 percent of the particles by weight passing the #200 sieve. The sand backfill should be placed within 2 feet horizontally of the wall. We recommend the balance of the backfill for the walls consist of sand however the sand may contain up to 20 percent of the particles by weight passing the #200 sieve.

We recommend installing drain tile behind the below grade walls, adjacent to the wall footing and below the slab elevation. Preferably the drain tile should consist of perforated pipe embedded in gravel. A geotextile filter fabric should encase the pipe and gravel. The drain tile should be routed to a storm sewer, sump pump or other suitable disposal site.

Foundation walls or below grade (basement) walls will have lateral loads from the surrounding soil transmitted to them. Active earth pressures can be used to design the below grade walls if the walls are allowed to rotate slightly. If wall rotation cannot be tolerated, then below grade wall design should be based on at-rest earth pressures. It is our opinion that the estimated soil parameters presented in Table 4 can be used for below grade wall design. These estimated parameters are based on the assumptions that the walls are drained, there are no surcharge loads within a horizontal distance equal to the height of the wall and the backfill is level.

Table 4. Estimated Soil Parameters

Soil Type	Estimated Unit Weight (pcf)	Estimated Friction Angle (degrees)	At-Rest Pressure (pcf)	Active Soil Pressure (pcf)	Passive Soil Pressure (pcf)
Sand (SP & SP-SM)	120	32	55	35	390
Other Soils (SM & SC)	135	28	70	50	375

Resistance to lateral earth pressures will be provided by passive resistance against the wall footings and by sliding resistance along the bottom of the wall footings. We recommend a sliding coefficient of 0.35. This value does not include a factor of safety.

4.7 Retaining Walls

We are not aware of any retaining walls proposed for this project and were not provided any information regarding any proposed retaining walls. Retaining wall designers/installers should be aware that soil borings for any retaining walls were not completed as part of this evaluation. Because of that, additional geotechnical explorations (soil borings) could be required to determine and evaluate the suitability and/or stability of site soil conditions to support their design(s). Retaining wall designers and/or installers will be solely responsible to conduct additional geotechnical evaluation(s) as needed.

In addition, HGTS does not practice in retaining wall design. Retaining wall designers will be solely responsible for retaining wall design and construction.

4.8 Exterior Slabs

Exterior slabs could be underlain by silty sand or clayey sand soils which are considered to be moderately to highly frost susceptible. If these soils become saturated and freeze, frost heave may occur. This heave can be a nuisance in front of doors and at other critical grade areas. One way to help reduce the potential for heaving is to remove the frost-susceptible soils below the slabs down to bottom of footing grades and replace them with non-frost-susceptible backfill consisting of sand having less than 5 percent of the particles by weight passing the number 200 sieve.

If this approach is used and the excavation bottoms terminate in non-free draining granular soil, we recommend a drain tile be installed along the bottom outer edges of the excavation to collect and remove any water that may accumulate within the sand. The bottom of the excavation should be graded away from the building.

If the banks of the excavations to remove the frost-susceptible soils are not sloped, abrupt transitions between the frost-susceptible and non-frost-susceptible backfill will exist along which unfavorable amounts of differential heaving may occur. Such transitions could exist between exterior slabs and sidewalks, between exterior slabs and pavements and along the slabs themselves if the excavations are confined to only the building entrances. To address

this issue, we recommend sloping the excavations to remove frost-susceptible soils at a minimum 3:1 (horizontal:vertical) gradient.

Another alternative for reducing frost heave is to support the slabs on frost depth footings. A void space of at least 4 inches should be provided between the slab and the underlying soil to allow the soil to heave without affecting the slabs.

4.9 Site Grading and Drainage

We recommend the site be graded to provide positive run-off away from the proposed buildings. We recommend landscaped areas be sloped a minimum of 6 inches within 10 feet of the building and slabs be sloped a minimum of 2 inches. In addition, we recommend downspouts with long splash blocks or extensions.

We recommend the lowest floor grades be constructed to meet City of North Branch requirements with respect to groundwater separation distances. In the absence of city requirements, we recommend maintaining at least a 4-foot separation between the lowest floor slab and the observed groundwater levels and at least a 2-foot separation between the lowest floor slab and the 100-year flood level of nearby wetlands, storm water ponds or other surface water features.

4.10 Utilities

We anticipate that new utilities will be installed as part of this project. We further anticipate that new utilities will bear at depths ranging from about 7 to 10 feet below the ground surface. At these depths, we anticipate that the pipes will bear on compacted engineered fill or native alluvial soils, which in our opinion are suitable for pipe support. We recommend removing all vegetation, topsoil and any other unsuitable soils, if any, beneath utilities prior to placement.

We recommend bedding material be thoroughly compacted around the pipes. We recommend trench backfill above the pipes be compacted to a minimum of 95 percent beneath slabs and pavements, the exception being within 3 feet of the proposed pavement subgrade, where 100 percent of standard Proctor density is required. In landscaped areas, we recommend a minimum compaction of 90 percent.

Groundwater was encountered 2 of the borings at about 10 to 12 ½ feet below the ground surface corresponding to elevations of about 899 to 900 ½ feet above mean sea level (MSL). We generally do not anticipate that groundwater will be encountered during utility construction. See section 4.4 for dewatering considerations.

4.11 Bituminous Pavements

General The City of North Branch may have standard plates that dictate pavement design and if so, we recommend that the pavements be designed and constructed in accordance with the City of North Branch standard plates. The following paragraphs provide general pavement recommendations in the absence of City of North Branch standard plates.

Traffic We were not provided any information regarding traffic volumes, such as Average Annual Daily Traffic (AADT) or vehicle distribution. We anticipate the streets will be used predominantly by automobiles, light trucks, school busses, garbage trucks and delivery vans (FEDEX, UPS etc.). Based on the anticipated number of homes in the development and assumed traffic types we estimate the roadways could be subjected to maximum Equivalent Single Axle Loads (ESAL's) ranging from about 75,000 to 100,000 over a 20-year design life. This does not account for any future growth.

Subgrade Preparation We recommend removing all vegetation, topsoil and any other unsuitable soils from beneath the pavement subgrade. Prior to placing the aggregate base, we recommend compacting and/or test rolling the subgrade soils to identify soft, weak, loose, or unstable areas that may require additional subcuts.

Backfill to attain pavement subgrade elevations can consist of any mineral soil provided it is free of organic material or other deleterious materials. We recommend placing and compacting fill and/or backfill as described in Section 4.3 except in paved areas where the upper 3 feet of fill and backfill should be compacted to a minimum of 100 percent of its standard Proctor maximum dry density.

R-Value R-Value testing was beyond the scope of this project. The near surface soils encountered in the soil borings consisted predominantly of poorly graded sand with silt with lesser amounts of silty sand and clayey sand corresponding to the ASTM Classifications of SP-SM, SM and SC. These soils can have R-Values ranging from 20 to 50 or more. It is our opinion an assumed R-Value of 30 can be used for pavement design.

Pavement Section Based on an estimated R-value of 30 and a maximum of 100,000 ESAL's we recommend pavement section consisting of a minimum of 3 ½ inches of bituminous underlain by a minimum of 6 inches of aggregate base. If a heavy-duty pavement section is required, we recommend a pavement section consisting of a minimum of 4 inches of bituminous underlain by a minimum of 8 inches of aggregate base.

4.12 Materials and Compaction

We recommend specifying aggregate base meeting MN/DOT Class 5 aggregate base. We recommend the aggregate base be compacted to 100 percent of its maximum standard Proctor.

We recommend that the bituminous wear and base courses meet the requirements of MN/DOT specification 2360. We recommend the bituminous pavements be compacted to at least 92 percent of the maximum theoretical density.

We recommend specifying concrete that has a minimum 28-day compressive strength of 4,000 psi, and a modulus of rupture of at least 600 psi. We recommend Type I cement meeting the requirements of ASTM C150. We recommend specifying 5 to 7 percent entrained air for exposed concrete to provide resistance to freeze-thaw deterioration. We also recommend using a water/cement ratio of 0.45 or less for concrete exposed to deicers.

4.13 Stormwater Ponds/Infiltration Basins

Based on the provided concept plan, the project will include constructing several storm water pond/infiltration basins on the project site. We were not provided any information regarding site grades and or pond bottom elevations. Soil borings SB-3, SB-5, SB-6 and SB-9 were complete within or near the proposed pond locations and encountered clayey sand, poorly graded sand with silt and poorly graded sand meeting the ASTM classifications of SC, SP-SM and SP. It is our opinion that the infiltration rates presented in Table 5 below, which were obtained from "Minnesota Storm Water Manual", can be used for stormwater pond design.

Table 5. Infiltration Rates

In-situ soils	Soil Description	Hydrologic Soil Group	Design Infiltration Rate (in/hr.)
SP & SP-SM	Poorly Graded Sand & Poorly Graded Sand with Silt	A	0.8
SM	Silty Sand	B	0.45
SC	Clayey Sand	D	0.06

It should be noted that soil infiltration rates can vary due to; soil moisture content, soil compaction, the placement or introduction of fine-grained soils, topsoil or biofiltration media and changes or variations in local groundwater levels. These variations may result in additional construction costs and it is suggested that a contingency be provided for this purpose.

Field tests (double ring infiltrometer) can be performed within the proposed infiltration basin area to verify infiltration rates of the in-situ soils. We would be pleased to provide these services if required or requested.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Excavation

The soils encountered in the borings consisted of silty sand, clayey sand, poorly graded sand with silt and poorly graded sand meeting the ASTM classifications of SM, SC, SP-SM and SP. These soils will generally be Type C soils under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines.

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

5.2 Observations

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

5.3 Backfill and Fills

The on-site soils appear to be below their assumed optimum soil moisture content. If these soils will be used or reused as structural fill or backfill, some wetting of the soils could be required to meet the recommend compaction levels. We recommend moisture conditioning all soils that will be used as fill or backfill in accordance with Section 4.3 above. We recommend that fill and backfill be placed in lifts not exceeding 4 to 12 inches, depending on the size of the compactor and materials used.

5.4 Testing

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

5.5 Winter Construction

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

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

6.0 PROCEDURES

6.1 Soil Classification

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

6.2 Groundwater Observations

Immediately after taking the final samples in the bottom of the boring, the hole was checked for the presence of groundwater. Immediately after removing the augers from the borehole the hole was once again checked and the depth to water and cave-in depths were noted.

7.0 GENERAL

7.1 Subsurface Variations

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

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

7.2 Review of Design

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

7.3 Groundwater Fluctuations

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

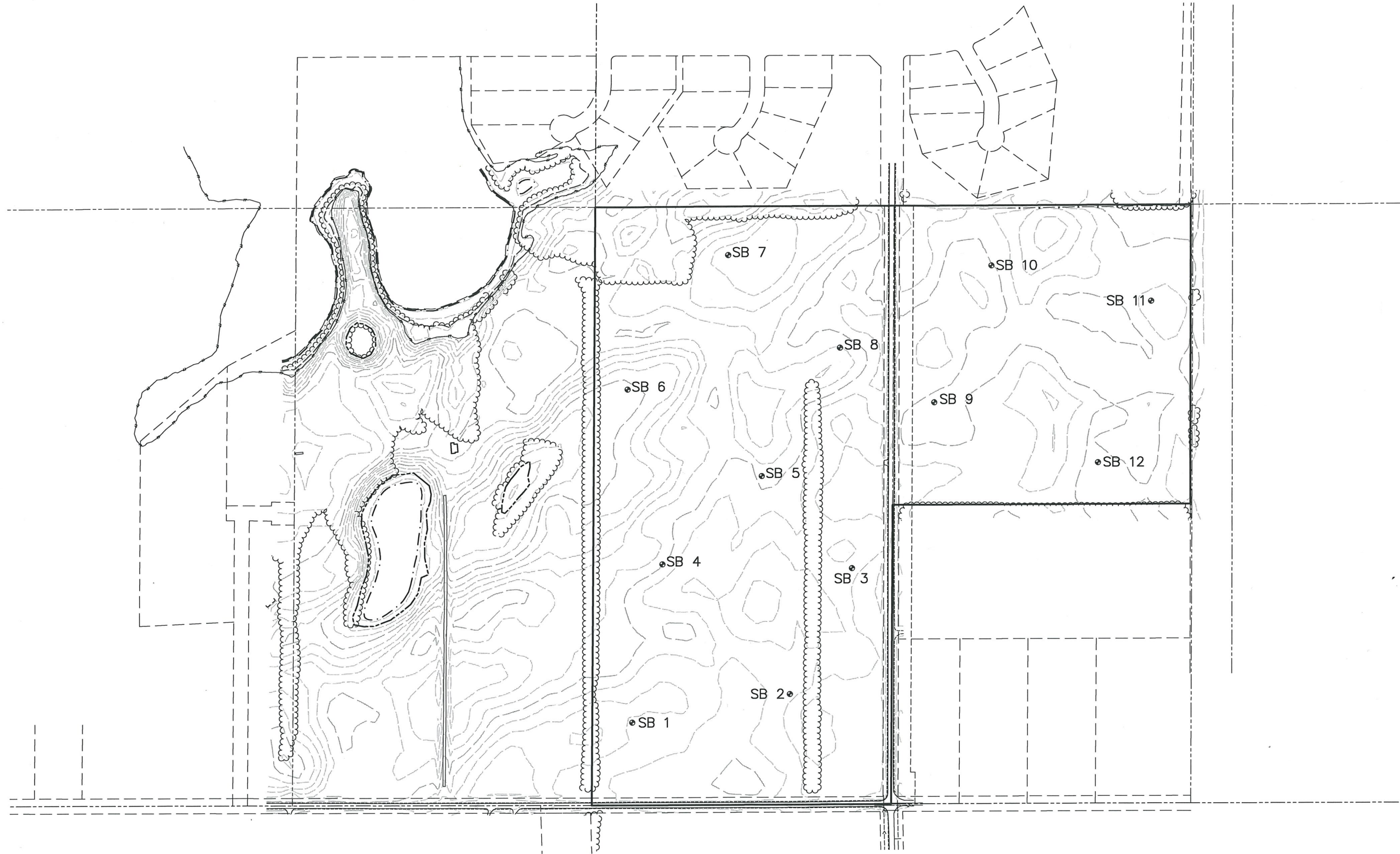
7.4 Use of Report

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

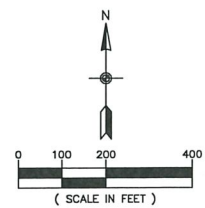
7.5 Level of Care

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

APPENDIX



Description	Northing	Easting	Elevation	Description	Northing	Easting	Elevation
SB 1	184951.8870'	521118.3650'	923.41'	SB 7	187006.0850'	521543.9880'	912.78'
SB 2	185074.7190'	521813.7780'	924.25'	SB 8	186598.9750'	522035.4320'	917.97'
SB 3	185628.4640'	522086.3420'	923.00'	SB 9	186358.2160'	522449.2660'	919.01'
SB 4	185646.4210'	521252.5700'	919.69'	SB 10	186958.4470'	522702.9710'	920.18'
SB 5	186034.4790'	521690.5980'	919.24'	SB 11	186801.5540'	523403.5980'	917.16'
SB 6	186415.1490'	521101.3490'	908.81'	SB 12	186092.5650'	523170.2600'	919.66'



**CARLSON
McCain**

ENGINEERING
SURVEYING
ENVIRONMENTAL

3890 PHEASANT RIDGE DRIVE NE, SUITE 100, BLAINE, MN 55449
TEL 763.489.7900 \ FAX 763.489.7959 \ CARLSONMCCAIN.COM

SOIL BORING EXHIBIT

KOEHNEN PROPERTY
North Branch, Minnesota

LGI Homes - Minnesota, LLC
2850 Cutters Grove Ave., Suite 207
Anoka, MN 55303

REVISIONS

1.

2.

3.

4.

5.

6.

DRAWN BY:

ISSUE DATE:

FILE NO:

NJS

2/6/2024

1619

1

of

1

Page 327 of 793



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Minneapolis, MN, 55407
Telephone: 612-729-2959
Fax: 763-445-2238

BORING NUMBER SB-1

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION 923.4 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

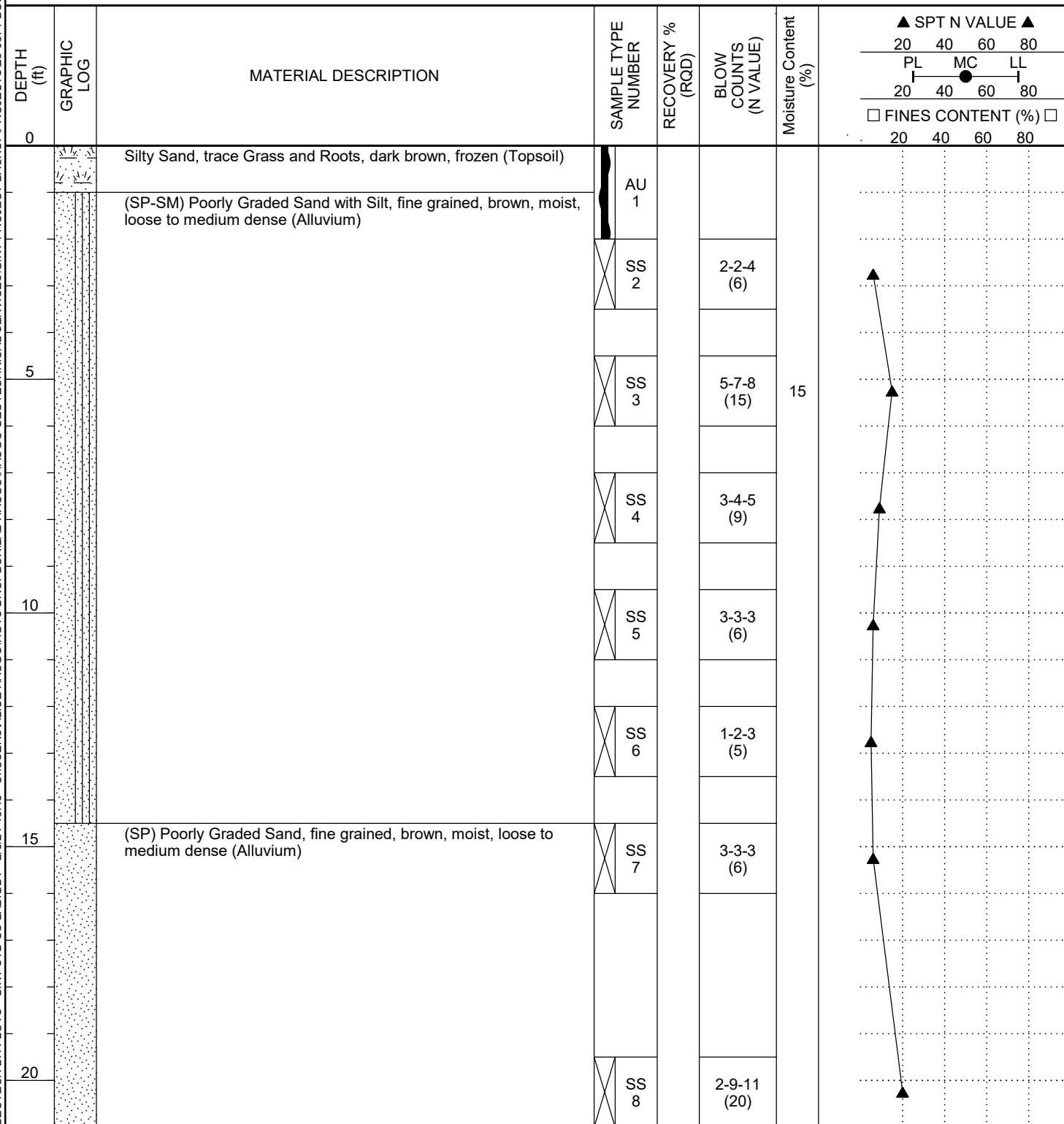
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AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-2

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION 924.3 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

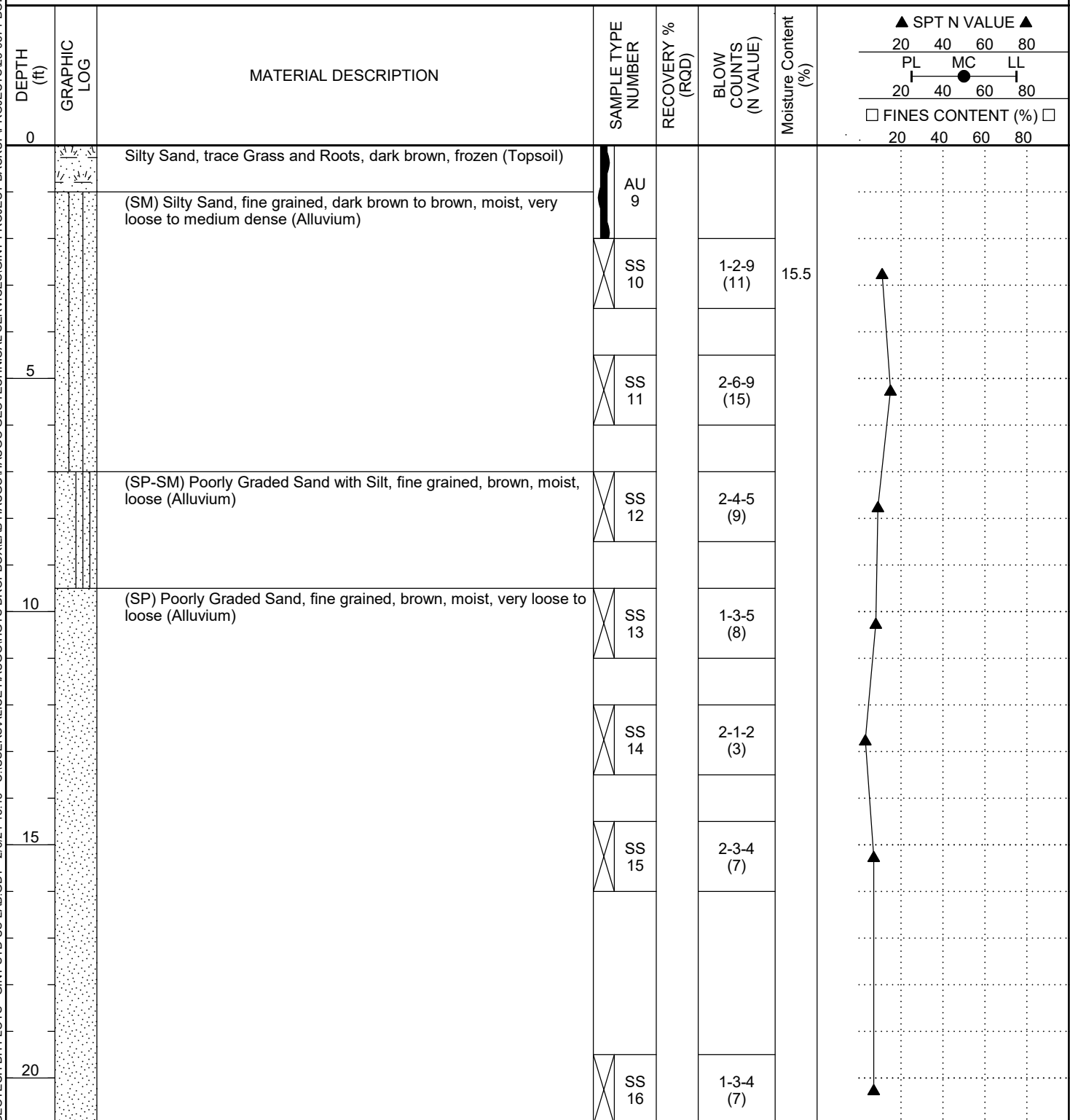
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AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-3

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION 923 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

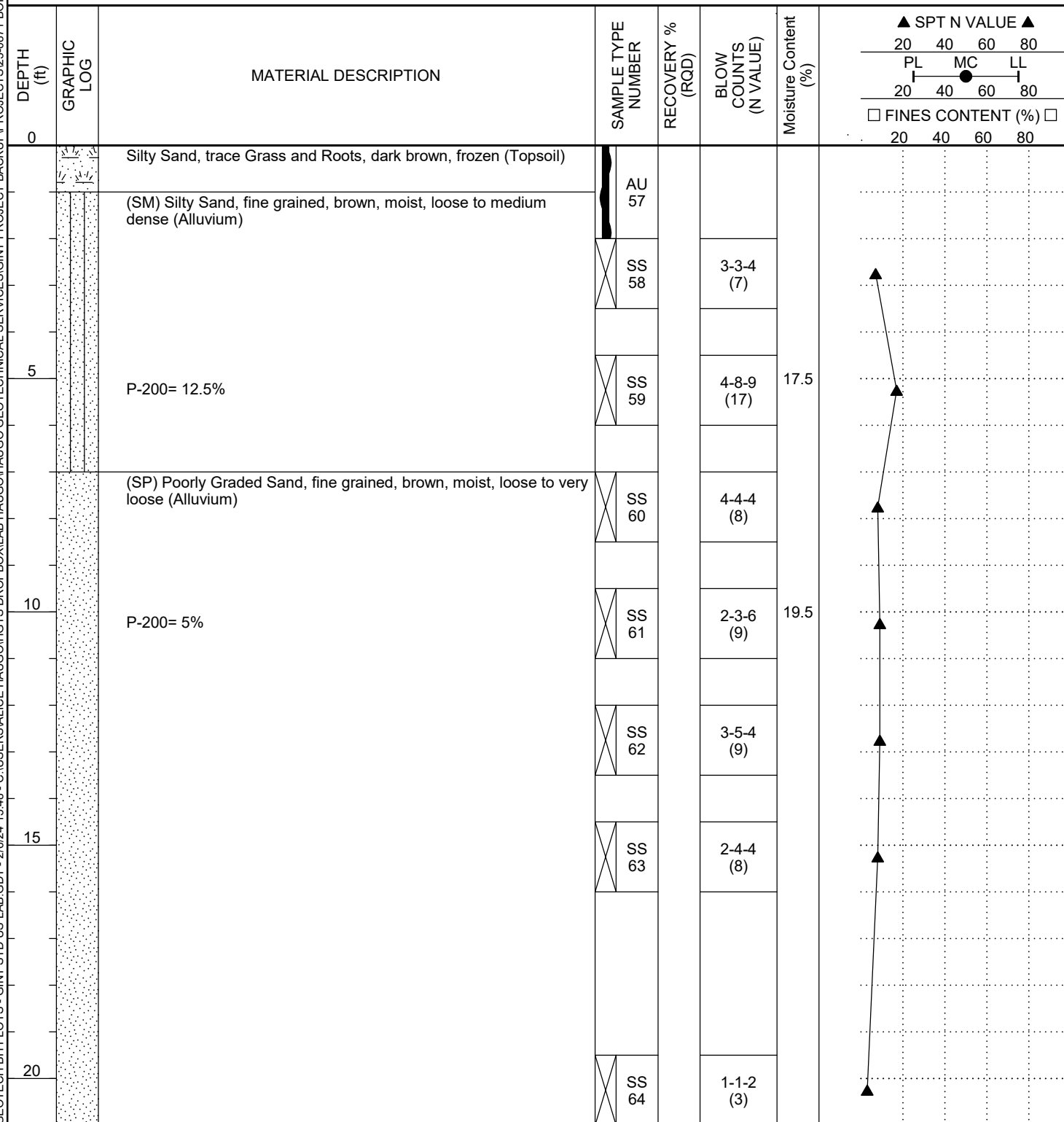
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

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AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 2/6/24 15:48 - C:\USERS\ALICE HAUGO\HGTS DROPOBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-4

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION 919.7 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

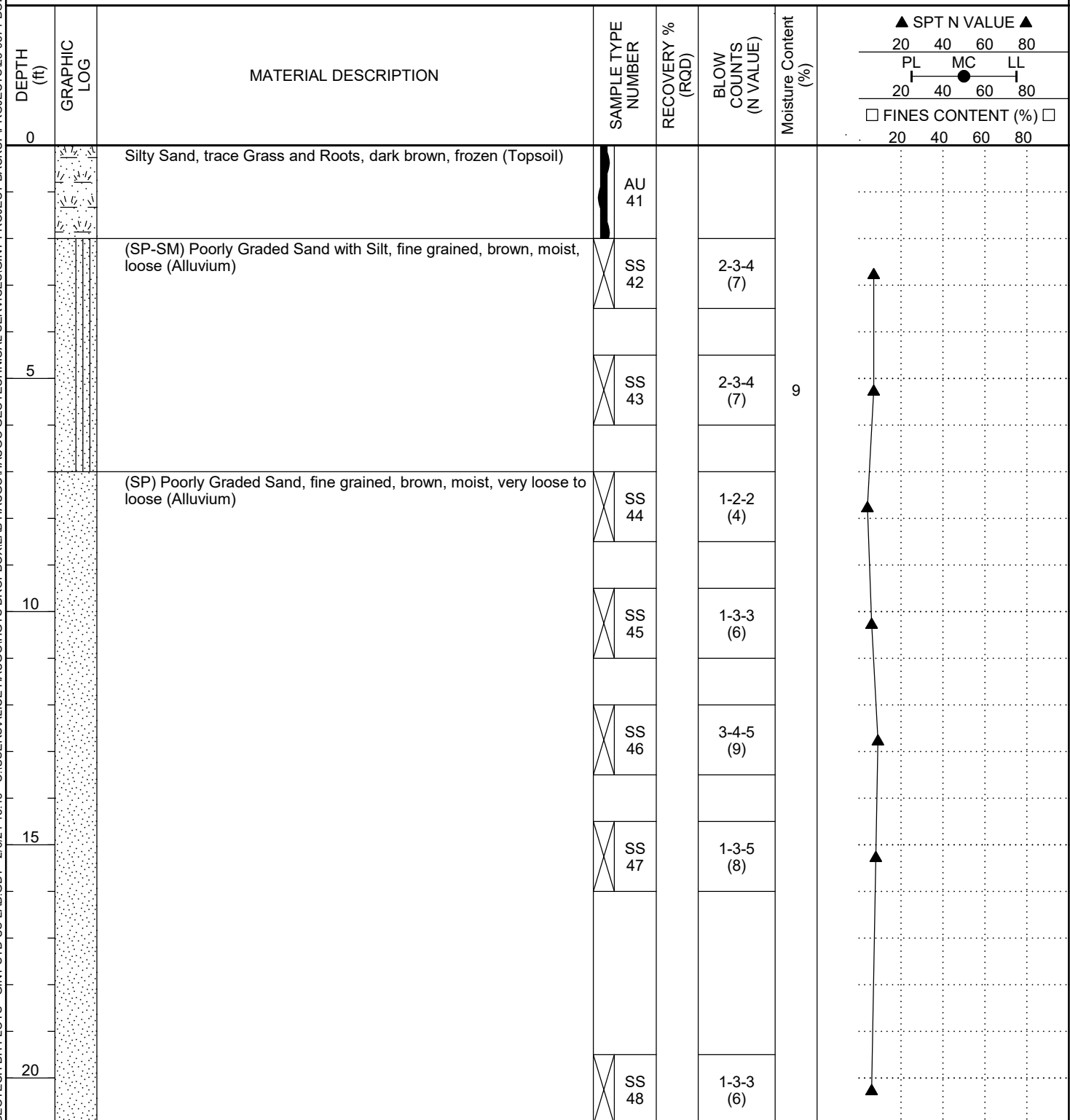
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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BORING NUMBER SB-5

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION 919.2 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

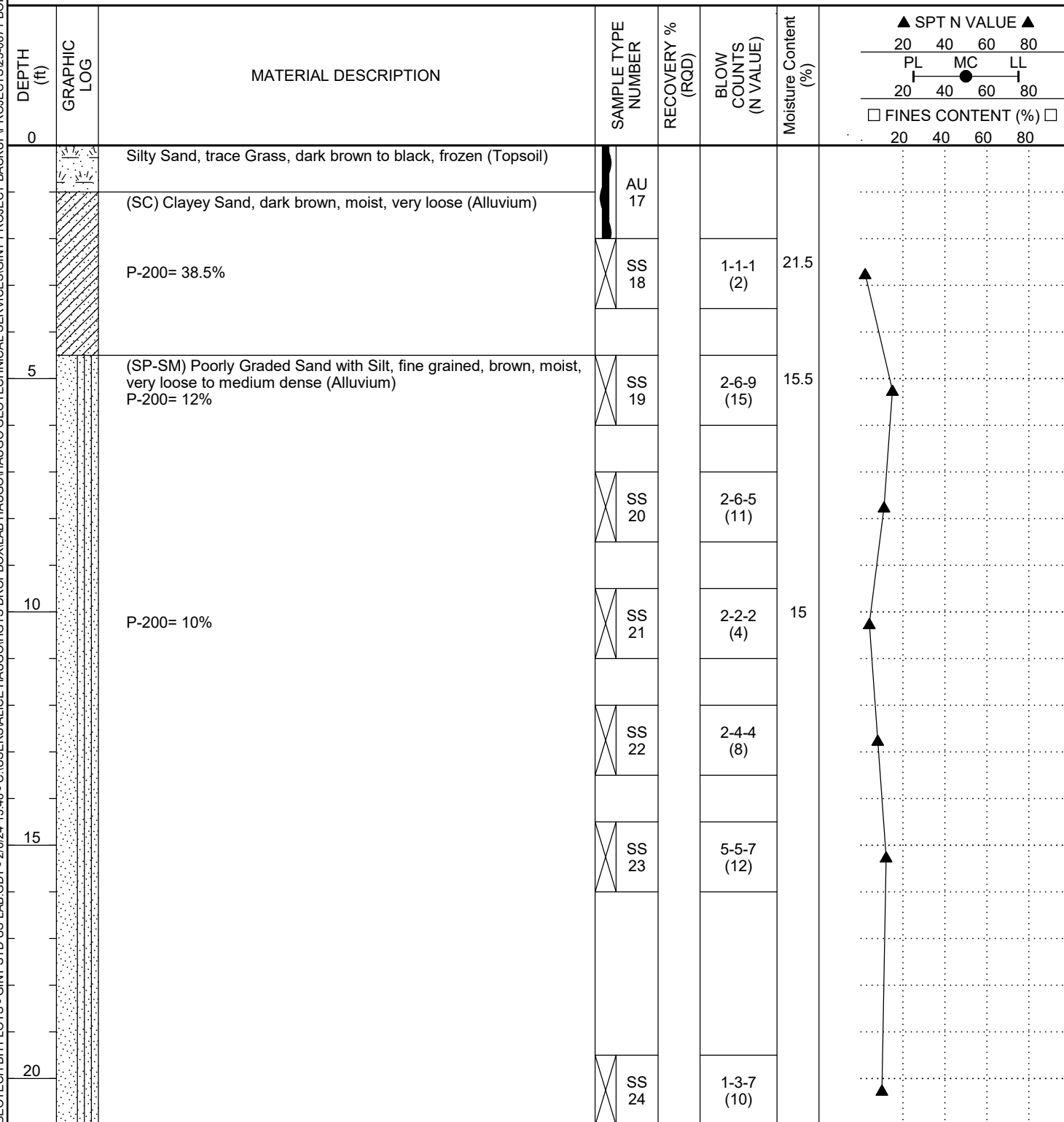
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AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-6

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION 908.8 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

▽ AT TIME OF DRILLING 10.00 ft / Elev 898.80 ft

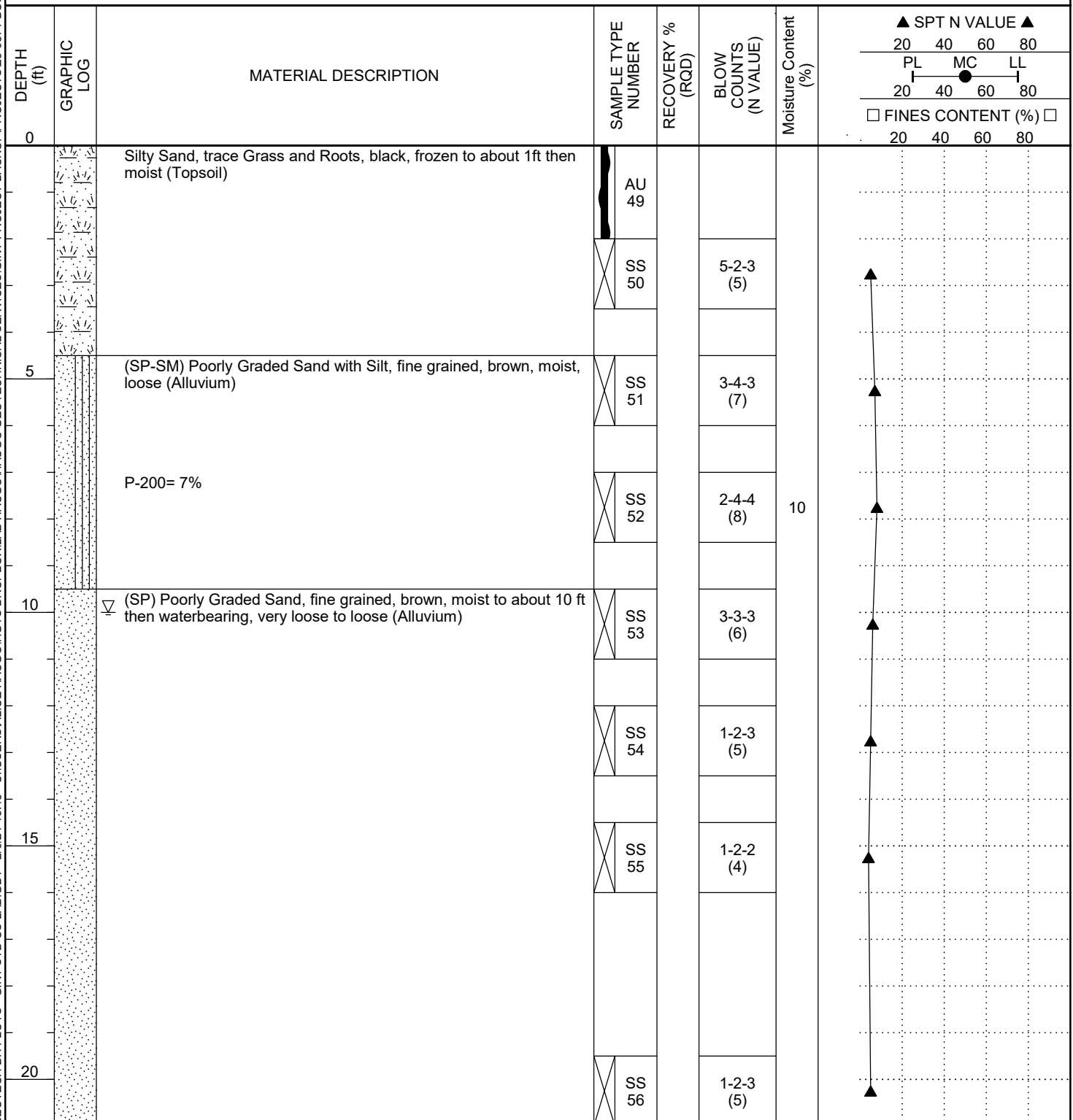
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING ---

NOTES ---

AFTER DRILLING ---

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Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-7

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION 912.8 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

▽ AT TIME OF DRILLING 12.50 ft / Elev 900.30 ft

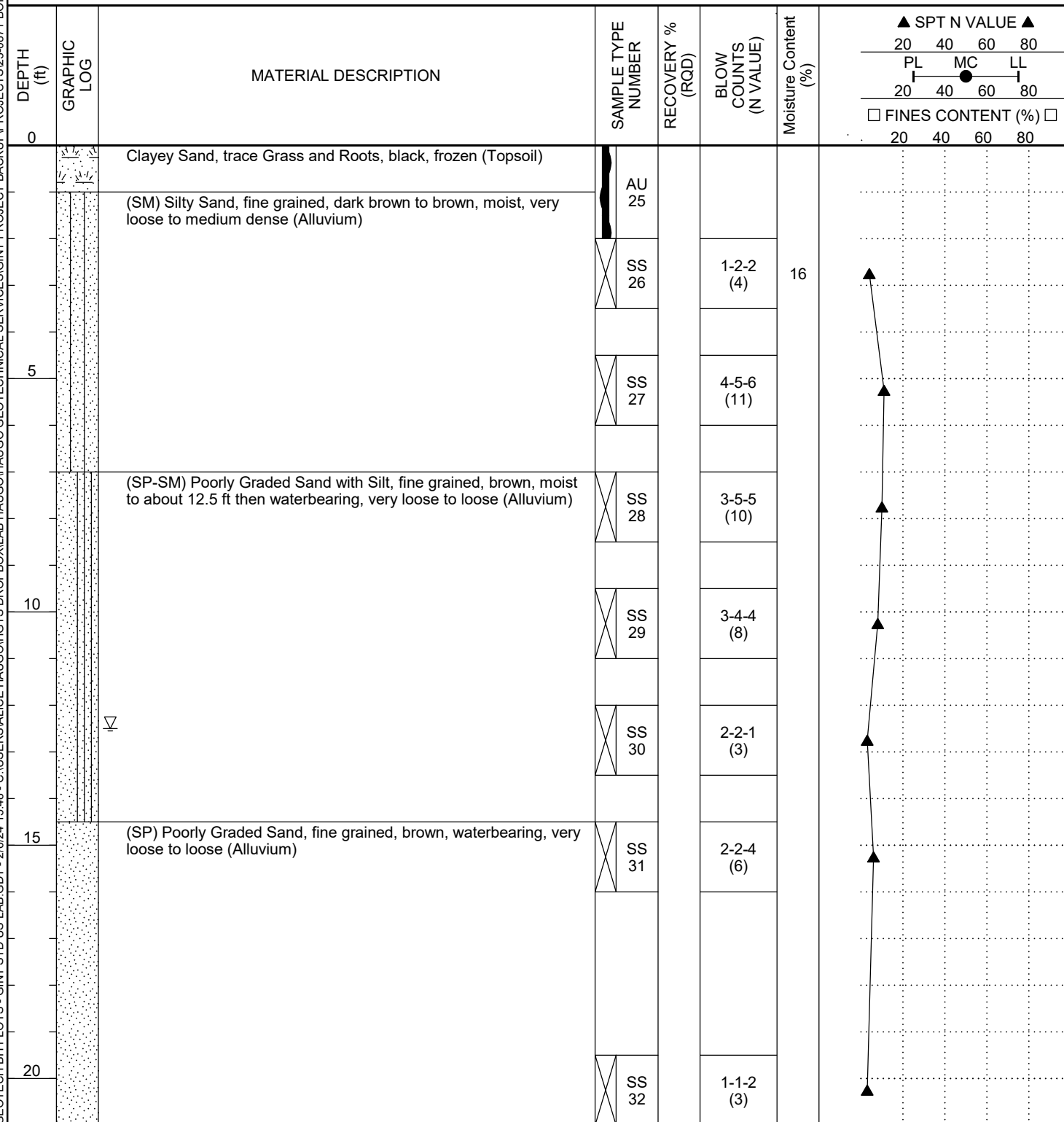
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING ---

NOTES ---

AFTER DRILLING ---

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Bottom of borehole at 21.0 feet.



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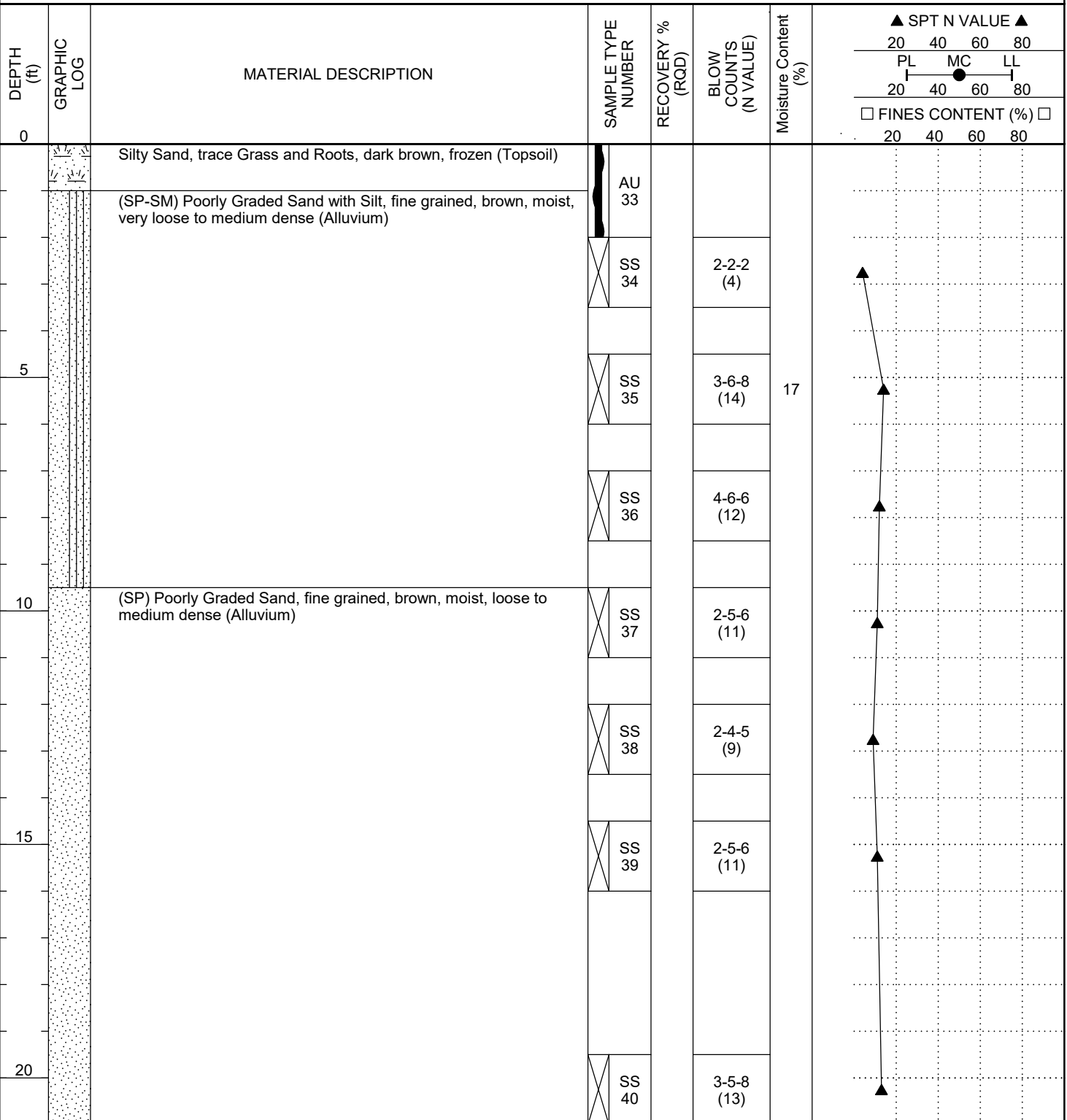
BORING NUMBER SB-8

PAGE 1 OF 1

CLIENT LGI Homes
PROJECT NUMBER 23-0871
DATE STARTED 12/28/24 COMPLETED 12/28/24
DRILLING CONTRACTOR HGTS 750-2
DRILLING METHOD Hollow Stem Auger/Split Spoon
LOGGED BY MS CHECKED BY PG
NOTES _____

PROJECT NAME Meadows Ridge
PROJECT LOCATION North Branch, MN
GROUND ELEVATION 918 ft HOLE SIZE 3 1/4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- Not Encountered
AT END OF DRILLING --- Not Encountered
AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 2/6/24 15:48 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-9

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION 919 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

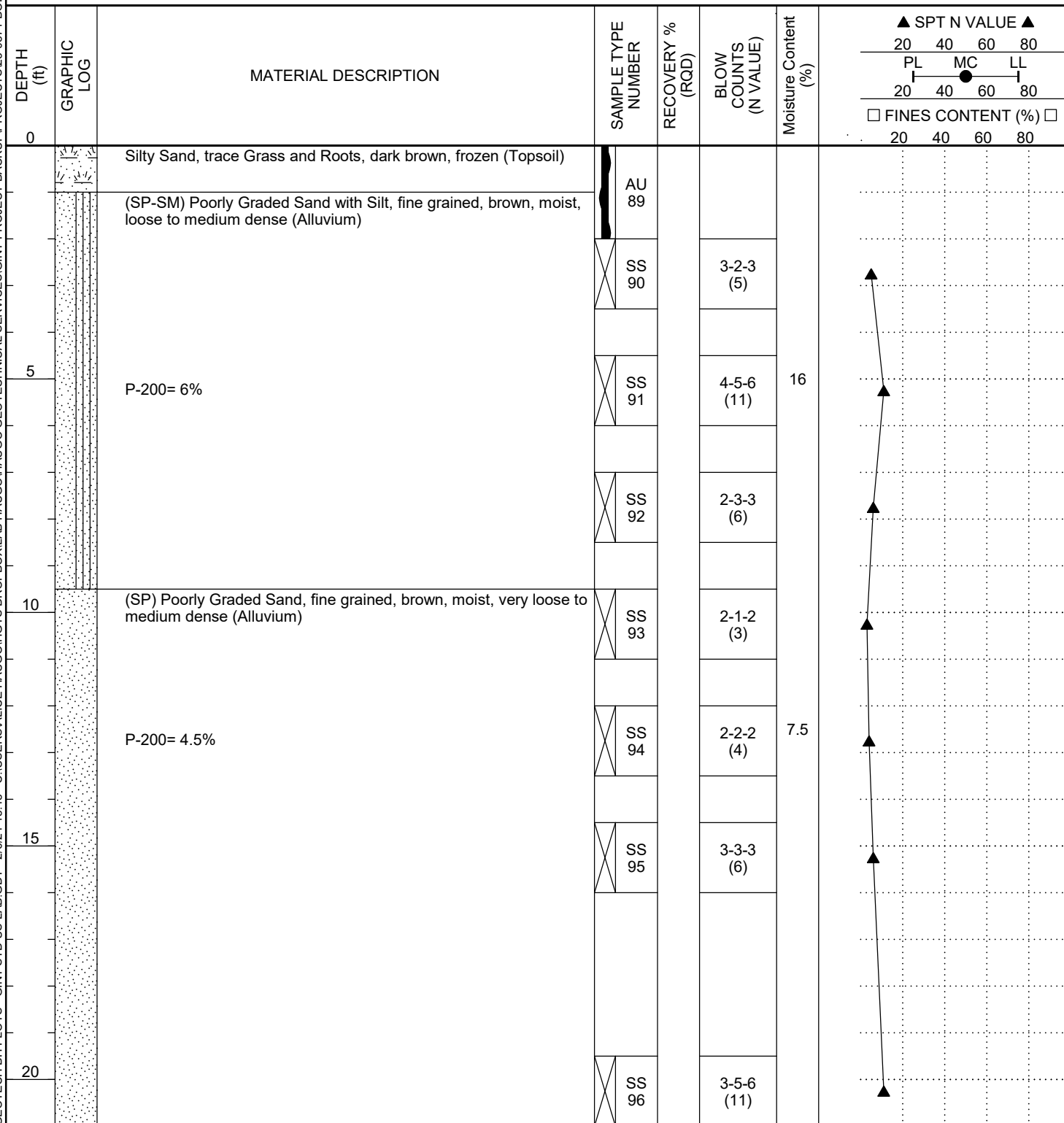
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AT END OF DRILLING --- Not Encountered

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AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 2/6/24 15:48 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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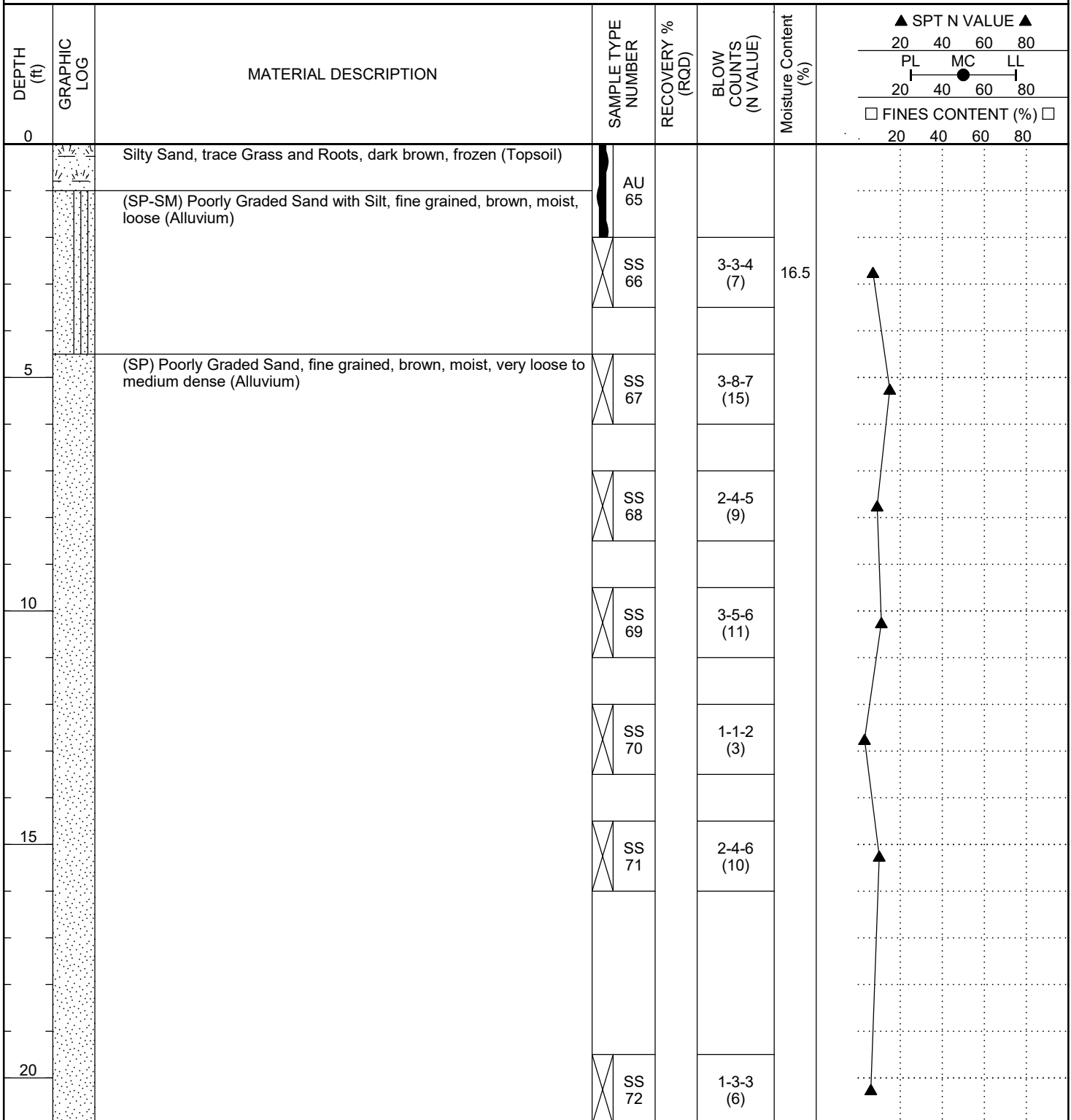
BORING NUMBER SB-10

PAGE 1 OF 1

CLIENT LGI Homes
PROJECT NUMBER 23-0871
DATE STARTED 12/28/24 COMPLETED 12/28/24
DRILLING CONTRACTOR HGTS 750-2
DRILLING METHOD Hollow Stem Auger/Split Spoon
LOGGED BY MS CHECKED BY PG
NOTES _____

PROJECT NAME Meadows Ridge
PROJECT LOCATION North Branch, MN
GROUND ELEVATION 920.2 ft HOLE SIZE 3 1/4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- Not Encountered
AT END OF DRILLING --- Not Encountered
AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 2/6/24 15:48 - C:\USERS\ALICE HAUGO\HGTS DROBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-11

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION 917.2 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

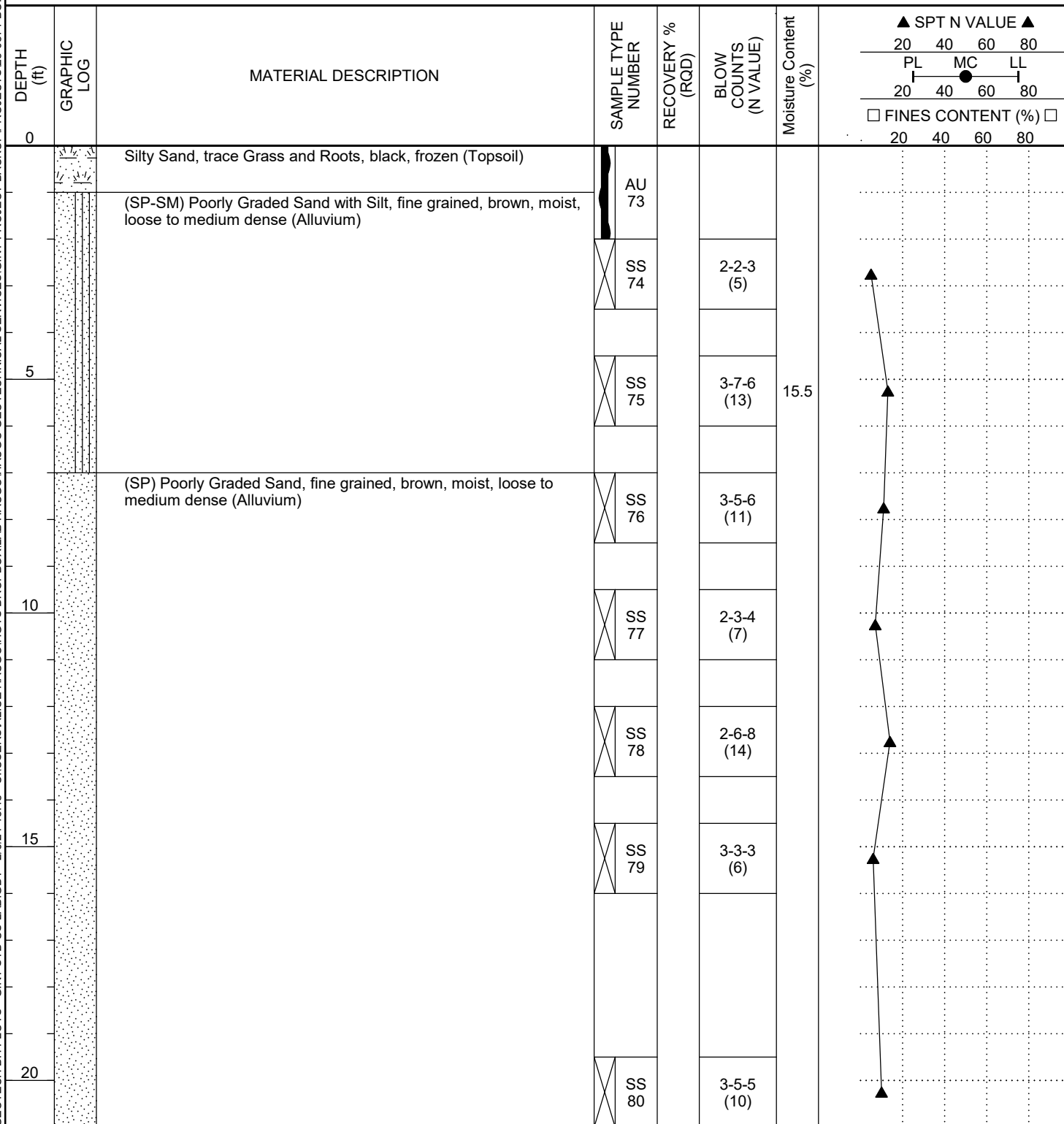
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AT END OF DRILLING --- Not Encountered

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AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 2/6/24 15:48 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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BORING NUMBER SB-12

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION 919.7 ft HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

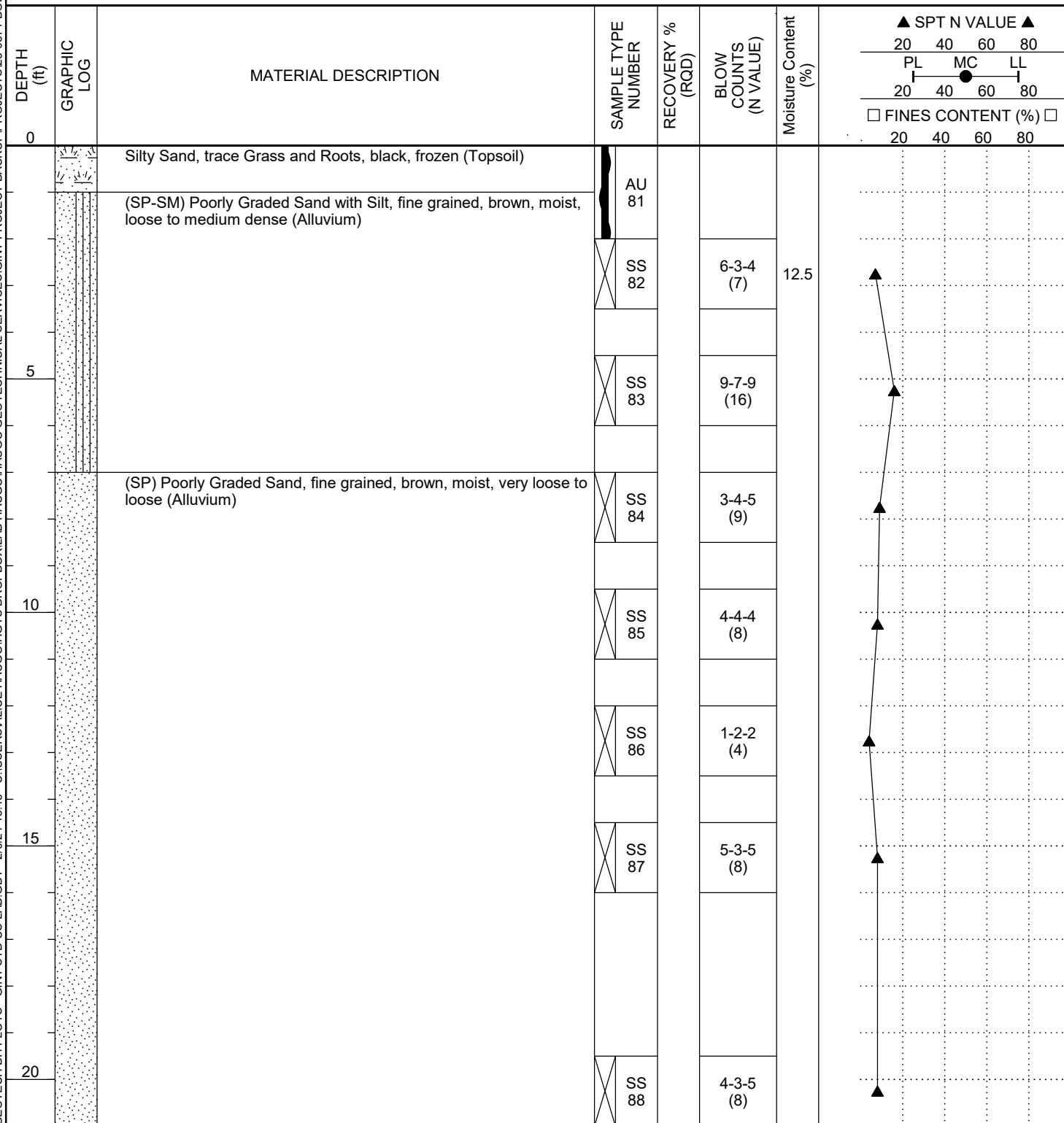
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 2/6/24 15:48 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.

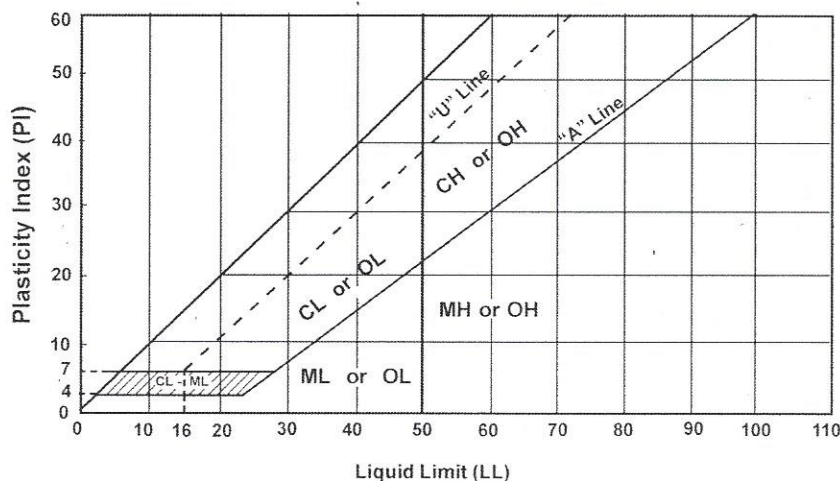


Standard D 2487 - 00

Classification of Soils for Engineering Purposes
(Unified Soil Classification System)

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

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



Laboratory Tests

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

Particle Size Identification

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

Relative Density of Cohesionless Soils

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

Consistency of Cohesive Soils

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

Drilling Notes

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

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

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

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

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

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

TW indicates thin-walled (undisturbed) tube sample.

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

Meadows Ridge
Environmental Assessment Worksheet
Appendix C

Wetland Delineation



Minnesota Wetland Conservation Act Notice of Decision

Local Government Unit: Chisago County Environmental Services	County: Chisago
Applicant Name: Lester Koehnen Applicant Representative: Alex Yellick	
Project Name: Koehnen Plat LGU Project No. (if any): 2021-01332 11.00142.00 & 11.00143.00	
Date Complete Application Received by LGU: 10/06/2021	
Date of LGU Decision: October 27, 2021	
Date this Notice was Sent: October 27, 2021	

WCA Decision Type - check all that apply

☐ Wetland Boundary/Type	☐ Sequencing	☐ Replacement Plan	☐ Bank Plan (not credit purchase)
☒ No-Loss (8420.0415)	☐ Exemption (8420.0420)		
Part: ☒ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H		Subpart: ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9	

Replacement Plan Impacts (replacement plan decisions only)

Total WCA Wetland Impact Area:
Wetland Replacement Type: ☐ Project Specific Credits: ☐ Bank Credits:
Bank Account Number(s):

Technical Evaluation Panel Findings and Recommendations (attach if any)

☐ Approve ☒ Approve w/Conditions ☐ Deny ☐ No TEP Recommendation
--

LGU Decision

☐ Approved with Conditions (specify below) ¹ ☒ Approved ¹ ☐ Denied
8420.0415 NO-LOSS CRITERIA. "No-loss" means no permanent loss of, or impact to, wetlands from an activity according to the criteria in this part. The following qualify for a no-loss:
A. an activity that will not impact a wetland.
Decision-Maker for this Application: ☒ Staff ☐ Governing Board/Council ☐ Other:
Decision is valid for: ☒ 5 years (default) ☐ Other (specify):

¹ Wetland Replacement Plan approval is not valid until BWSR confirms the withdrawal of any required wetland bank credits. For project-specific replacement a financial assurance per MN Rule 8420.0522, Subp. 9 and evidence that all required forms have been recorded on the title of the property on which the replacement wetland is located must be provided to the LGU for the approval to be valid.

LGU Findings – Attach document(s) and/or insert narrative providing the basis for the LGU decision¹.

☒ Attachment(s) (specify): **Delineation certifying no wetlands on the parcel.**

☐ Summary:

¹ Findings must consider any TEP recommendations.

Attached Project Documents

☒ Site Location Map ☐ Project Plan(s)/Descriptions/Reports (specify):

Appeals of LGU Decisions

If you wish to appeal this decision, you must provide a written request within 30 calendar days of the date you received the notice. All appeals must be submitted to the Board of Water and Soil Resources Executive Director along with a check payable to BWSR for \$500 *unless* the LGU has adopted a local appeal process as identified below. The check must be sent by mail and the written request to appeal can be submitted by mail or e-mail. The appeal should include a copy of this notice, name and contact information of appellant(s) and their representatives (if applicable), a statement clarifying the intent to appeal and supporting information as to why the decision is in error. Send to:

Appeals & Regulatory Compliance Coordinator
Minnesota Board of Water & Soils Resources
520 Lafayette Road North
St. Paul, MN 55155
travis.germundson@state.mn.us

Does the LGU have a local appeal process applicable to this decision?

☒ Yes¹ ☐ No

¹If yes, all appeals must first be considered via the local appeals process.

Local Appeals Submittal Requirements (LGU must describe how to appeal, submittal requirements, fees, etc. as applicable)

Chisago County Board of Adjustment, 313 North Main ST, Center City, MN 55012, 651-213-8379

Notice Distribution (include name)

Required on all notices:

☒ SWCD TEP Member: Craig Mell ☒ BWSR TEP Member: Ben Meyer

☒ LGU TEP Member (if different than LGU contact): City of North Branch

☒ DNR Representative: Craig Wills, Area Hydrologist

☐ Watershed District or Watershed Mgmt. Org.:

☒ Applicant: **Lester Koehnen** ☐ Agent/Consultant: **Alex Yellick**

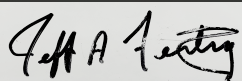
Optional or As Applicable:

☐ Corps of Engineers:

☐ BWSR Wetland Mitigation Coordinator (required for bank plan applications only):

☐ Members of the Public (notice only): ☐ Other:

Signature:



Date: October 27, 2021

This notice and accompanying application materials may be sent electronically or by mail. The LGU may opt to send a summary of the application to members of the public upon request per 8420.0255, Subp. 3.

September 23, 2021

Jay Roos
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303
(612) 840.3438
jay.roos@lgihomes.com

Subject: Wetland Determination Certification
LGI Homes, Inc.
Chisago County Parcels 11.00143.00 and 11.00142.10
Project Number: 16690

Dear Jay,

Anderson Engineering of MN, LLC conducted a field investigation on September 21, 2021 of Chisago County tax parcels 11.00143.00 and 11.00142.10 in North Branch, Minnesota to identify and delineate areas meeting wetland criteria in accordance with the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual.

An offsite hydrology and wetland determination review of available air photos were evaluated. Photo signatures do not suggest the presence of wetland hydrology during climatologically normal years. The National Wetlands Inventory (NWI) does not identify wetlands within the boundaries of the subject parcel. The nearest mapped wetland is 125 feet to the northwest. The Soil Survey of Chisago County identifies Zimmerman fine sand and Lino loamy fine sand, of which contain no more than four percent hydric soil components associated with depressional landscape positions.

The following parameters were identified and generally described:

- **Vegetation** – Communities are assumed hydrophytic.
Within investigated areas, vegetation consists of soybean (*Glycine max*) row crop. Due to cropping, normal circumstances were not present and climatic conditions are in drought. Soybeans were in senescence and leaves were dropping. Crop stress was not discernable between investigated depressional areas and adjacent areas. However, due to drought conditions and the investigated landscape position, vegetation was assumed hydrophytic.
Forested areas were reviewed and found to be dominated by bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), white oak (*Quercus alba*), Siberian elm (*Ulmus pumila*), European buckthorn (*Rhamnus cathartica*), and/or prickly ash (*Zanthoxylum americanum*). Forested areas did not contain suspect wetland.
- **Soil** – Investigated soil profiles did not meet hydric soil indicator criteria.
A soil profile was investigated in representative soil units at the lowest landscape position within depression areas identified in the offsite hydrology wetland determination review. Investigated soil profiles were dark; however, redox concentrations and/or soil depletion was not observed. Investigated soil profiles did not meet hydric criteria.

Wetland Determination Certification
Chisago County Parcel 11.00143.00 and 11.00142.10

- **Hydrology** – Criteria was not met.

The landscape position consisted of very gradual and shallow closed basins. Secondary hydrology criteria geomorphic position was wet; however, saturation visible on aerial photography (based on the offsite wetland hydrology determination review of climatologically normal years) was not.

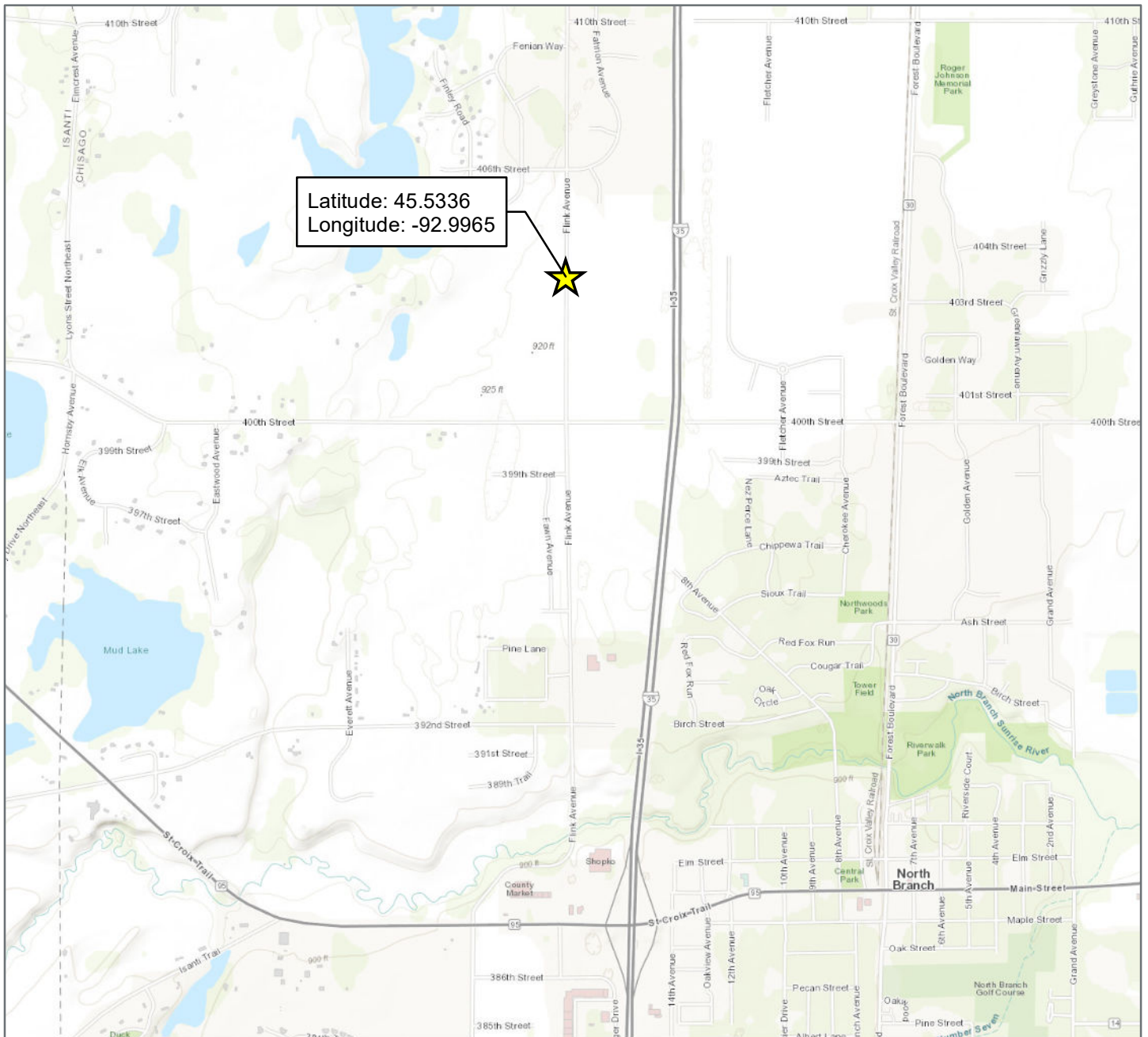
This letter certifies that the subject property **does NOT contain any jurisdictional wetlands** as identified using the 1987 U. S. Army Corps of Engineers Wetland Delineation Manual.

If you have any questions or need additional information regarding this site investigation, please contact me at 763-412-4000.

Sincerely,

Alex Yellick, WDC
Senior Environmental Scientist
MN Certified Wetland Delineator #1354

Encl.: Figure 1. Site Location
Figure 2. National Wetland Inventory
Figure 3. Soil Survey
Figure 4. Public Water Inventory
Figure 5. Site Investigation
Offsite Hydrology Wetland Determination
Wetland Determination Data Forms – Northcentral and Northeast
Site Photographs



Legend



Project Location

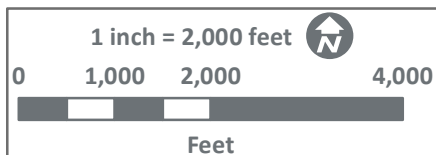
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Lat/Long: 45.5336, -92.9965

PID: 11.00143.00,
11.00142.10

Project No: 16690

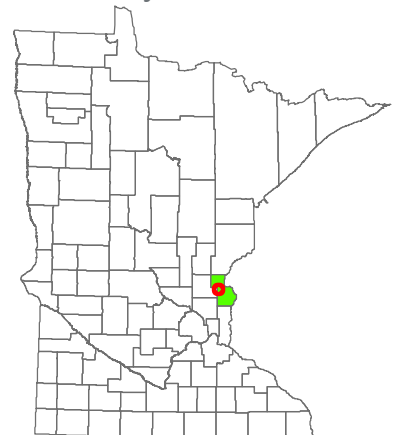
Date: 9.15.2021



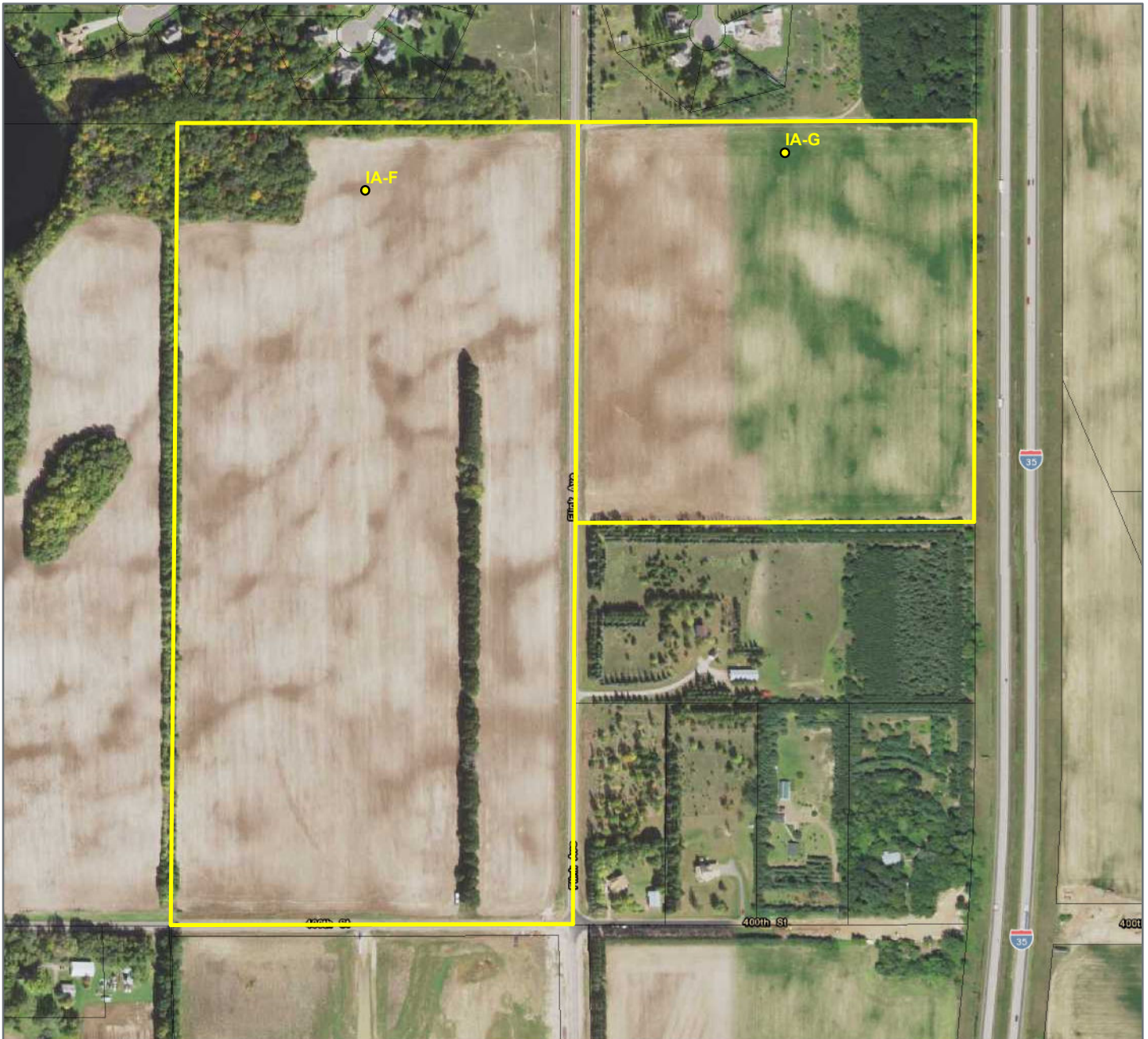
ANDERSON

13605 1st Ave N #100, Plymouth, MN 55441
P 763.412.4000 F 763.412.4090 ae-mn.com

Project Location



City of North Branch
Chisago County, MN



Legend

- Project Extent
- Chisago Co. Parcels
- Sample Point

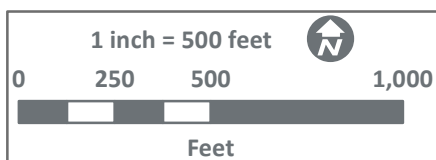
Address: Address Unassigned

Lat/Long: 45.5336, -92.9965

PID: 11.00143.00,
11.00142.10

Project No: 16690

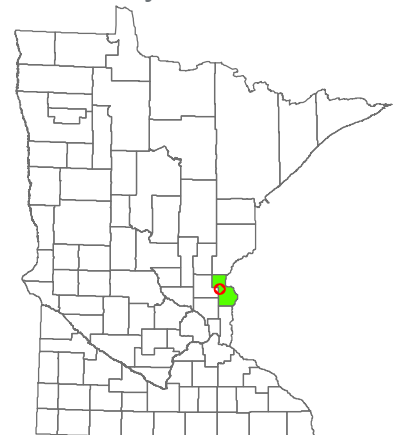
Date: 9.22.2021



ANDERSON

13605 1st Ave N #100, Plymouth, MN 55441
P 763.412.4000 F 763.412.4090 ae-mn.com

Project Location



City of North Branch
Chisago County, MN

RE: 2021-01332 Wetland Delineation

Jeff A. Fertig <Jeff.Fertig@chisagocountymn.gov>

Thu 1/11/2024 11:54 AM

To: Mary Clare McAleer <Maryclare@kjolhaugenv.com>

That is correct.

Jeff Fertig | Wetland Specialist
Environmental Services
313 N Main St
Suite 240
Center City, MN 55012
Jeff.Fertig@chisagocountymn.gov
Phone: 651-213-8378

'Chisago County was created by the State of Minnesota to serve, protect, and enhance the quality of life for those we serve.'



NOTICE: E-mail correspondence to and from Chisago County may be public data subject to the Minnesota Data Practices Act and/or may be disclosed to third parties.

From: Mary Clare McAleer <Maryclare@kjolhaugenv.com>

Sent: Thursday, January 11, 2024 11:44 AM

To: Jeff A. Fertig <Jeff.Fertig@chisagocountymn.gov>

Subject: Re: 2021-01332 Wetland Delineation

This is an external email message!

This message originated from outside the Chisago County email system. Use caution when clicking hyperlinks, downloading pictures or opening attachments.

Jeff,

Good morning,

I wanted to follow up on my previous email again, the notice of decision appears to be for a no-loss application. Does this NOD include concurrence on the no-wetland determination?

Thank you,

Mary Clare McAleer, Wetland/Soil Specialist



2500 Shadywood Road, Suite 130

Orono, MN 55331

Phone: 224-456-7944

From: Mary Clare McAleer <Maryclare@kjolhaugenv.com>
Sent: Thursday, December 28, 2023 12:12 PM
To: jeff.fertig@chisagocounty.us <jeff.fertig@chisagocounty.us>
Subject: Re: 2021-01332 Wetland Delineation

Jeff,
I hope you are having a lovely holiday season. I wanted to follow up on my previous email.
Thank you,

Mary Clare McAleer, Wetland/Soil Specialist



2500 Shadywood Road, Suite 130

Orono, MN 55331

Phone: 224-456-7944

From: Mary Clare McAleer
Sent: Thursday, December 21, 2023 3:54 PM
To: jeff.fertig@chisagocounty.us <jeff.fertig@chisagocounty.us>
Subject: 2021-01332 Wetland Delineation

Jeff,
I hope this email finds you well. I am following up on a delineation completed by Anderson Engineering. The project number is "2021-01332" and the report and determination I have on file are attached.

The notice of decision appears to be for a no-loss application. Does this NOD include concurrence on the no-wetland determination?

Thank you,

Mary Clare McAleer, Wetland/Soil Specialist



2500 Shadywood Road, Suite 130

Orono, MN 55331

Phone: 224-456-7944

Meadows Ridge
Environmental Assessment Worksheet
Appendix D

Climate Trends

Exhibit 2. PDSI for the Lower St. Croix River, January

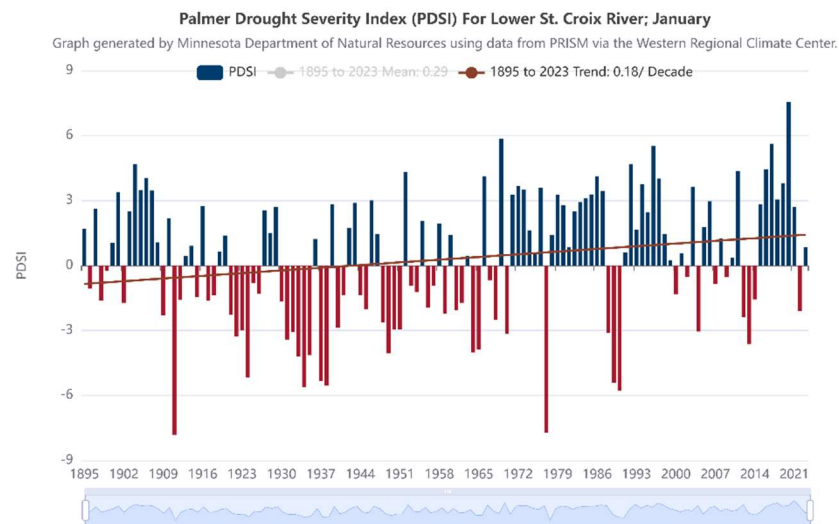


Exhibit 4. PDSI for the Lower St. Croix River, July

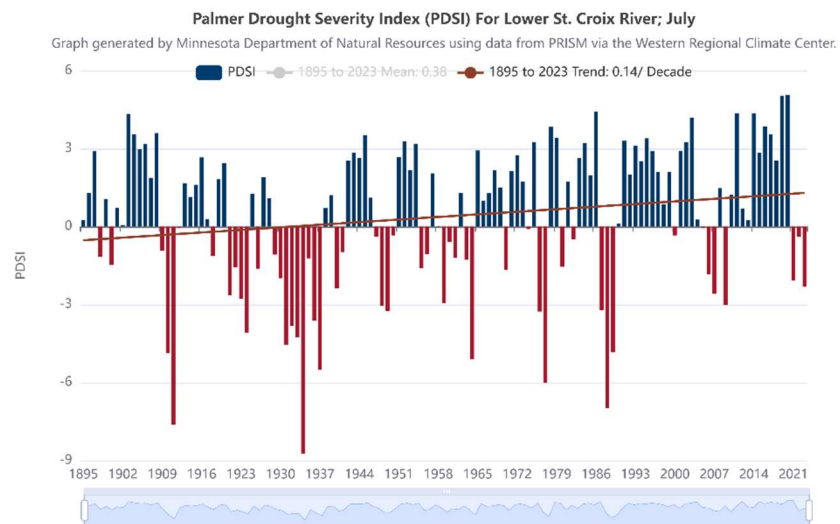


Exhibit 3. PDSI for the Lower St. Croix River, April

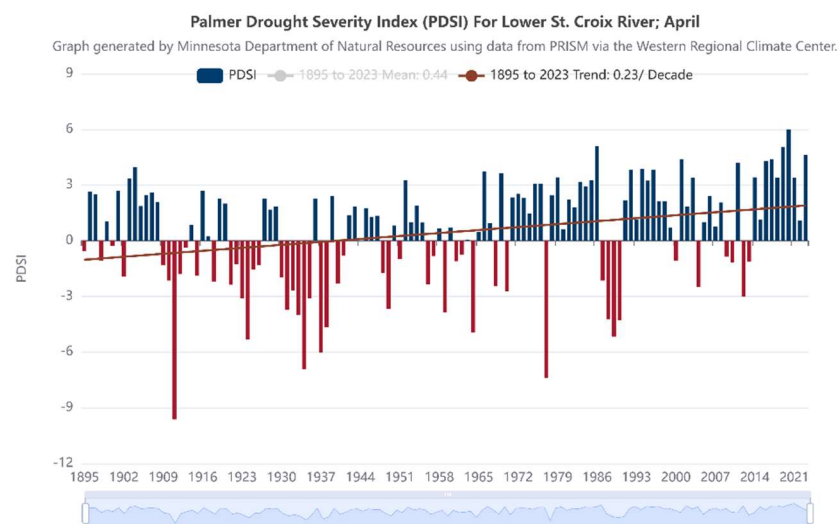
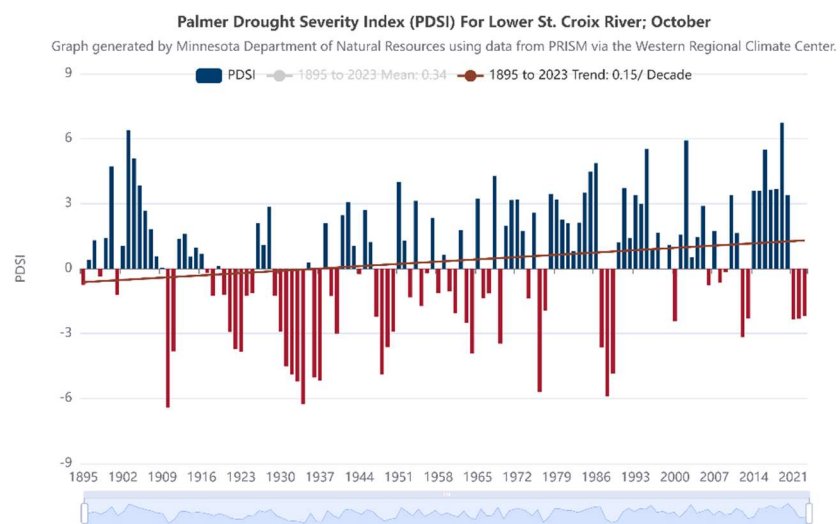
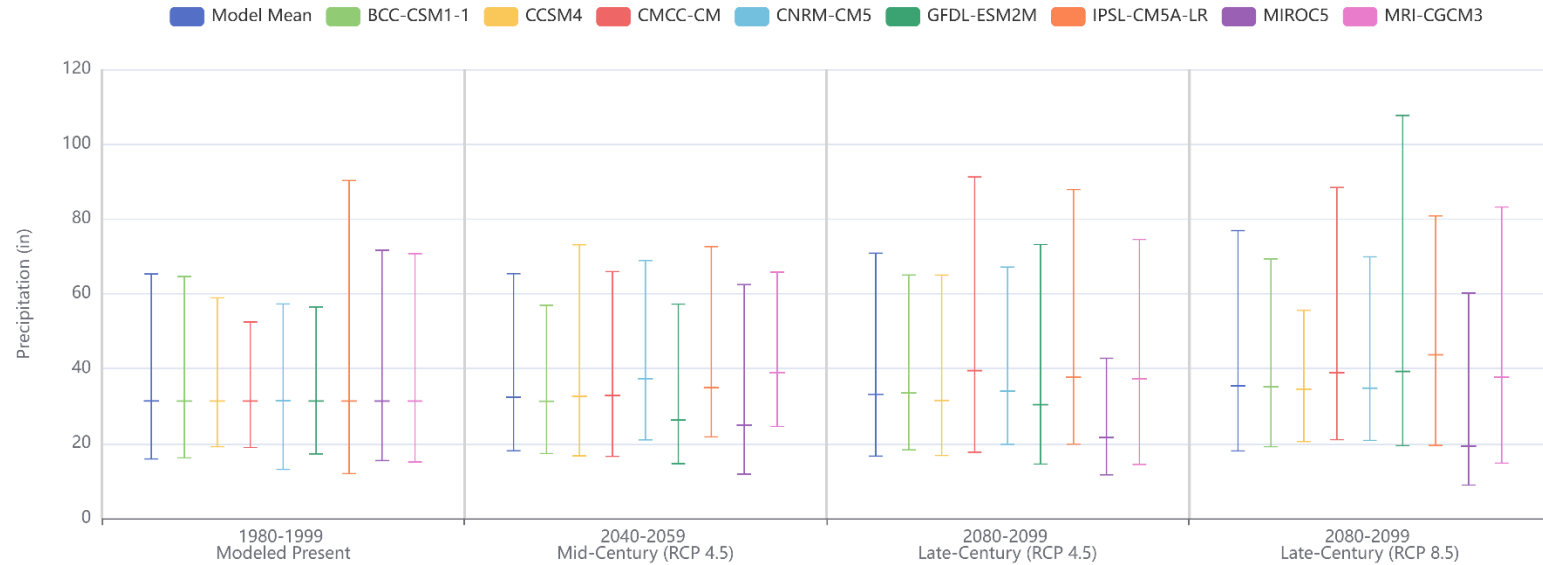


Exhibit 5. PDSI for the Lower St. Croix River, October



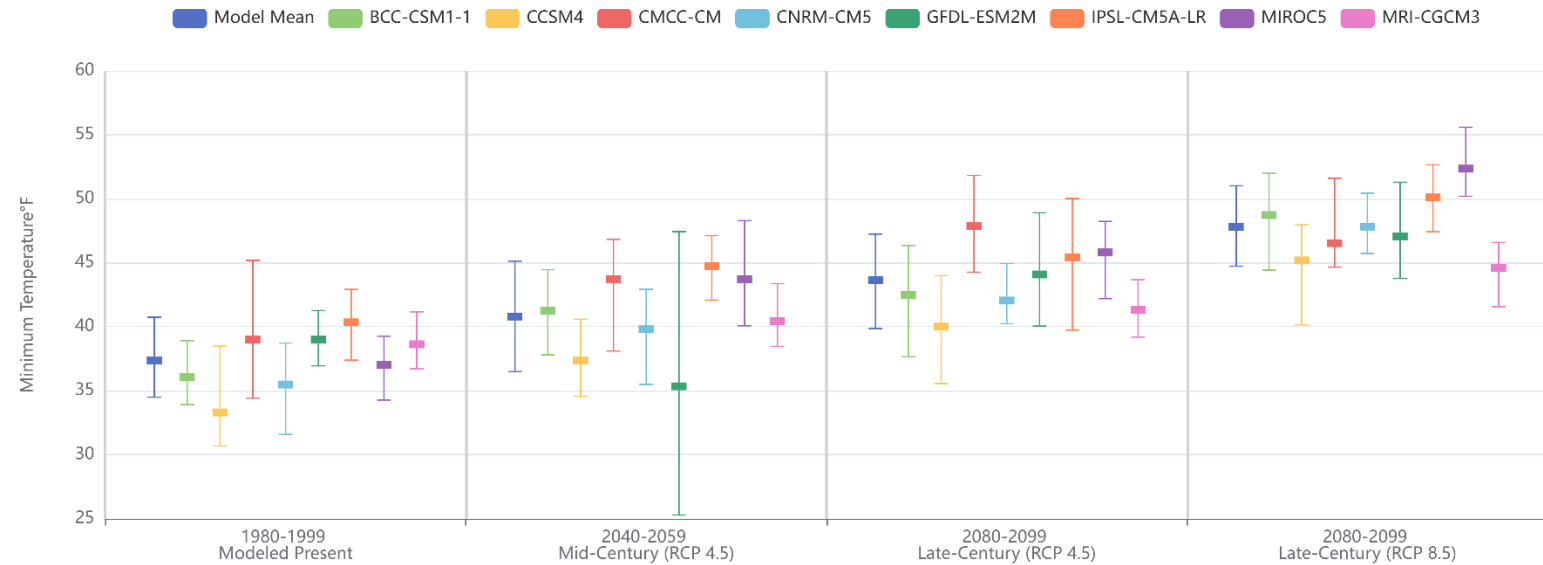
Recent and Projected Future Precipitation For Lower St. Croix River; January-December

Graph generated by Minnesota Department of Natural Resources using data from University of Minnesota climate modeling. These values may differ from those published in national and global climate assessments.



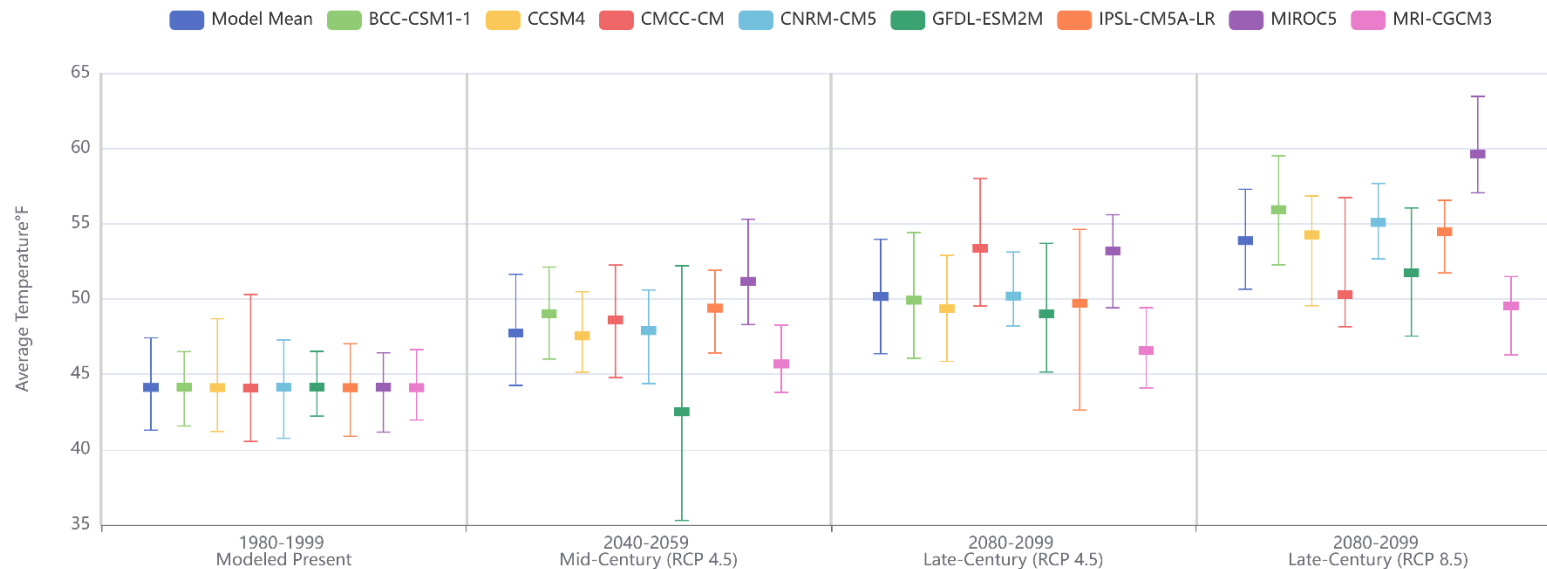
Recent and Projected Future Minimum Temperature For Lower St. Croix River; January-December

Graph generated by Minnesota Department of Natural Resources using data from University of Minnesota climate modeling. These values may differ from those published in national and global climate assessments.



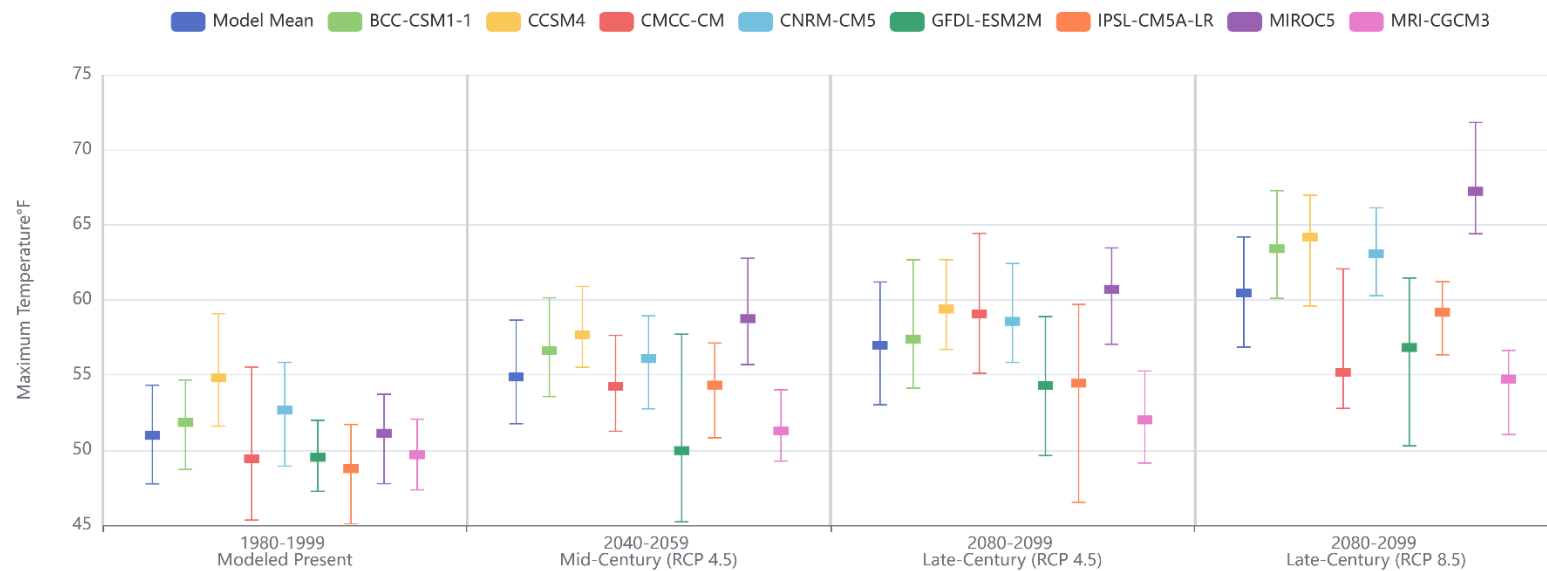
Recent and Projected Future Average Temperature For Lower St. Croix River; January-December

Graph generated by Minnesota Department of Natural Resources using data from University of Minnesota climate modeling. These values may differ from those published in national and global climate assessments.



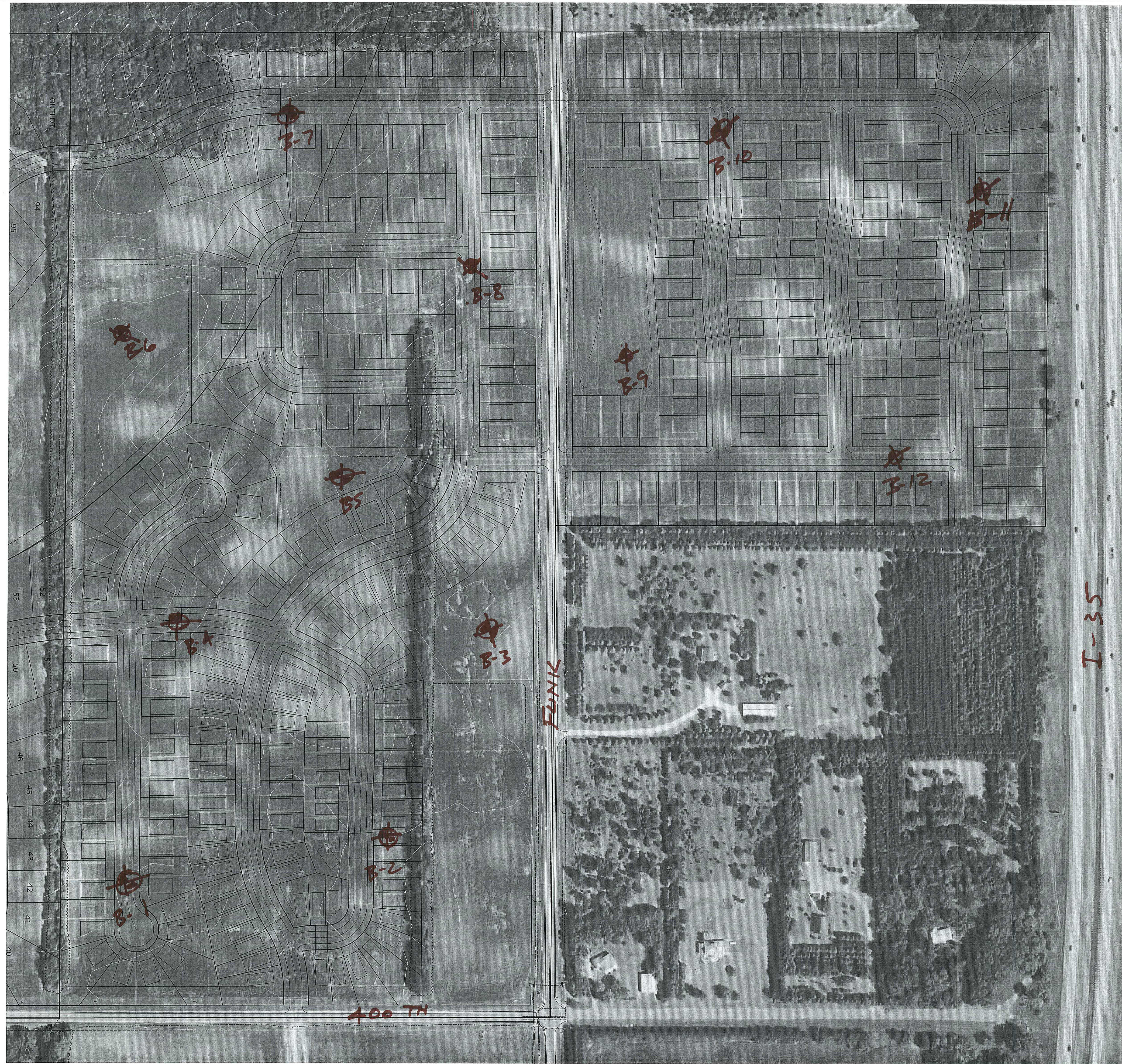
Recent and Projected Future Maximum Temperature For Lower St. Croix River; January-December

Graph generated by Minnesota Department of Natural Resources using data from University of Minnesota climate modeling. These values may differ from those published in national and global climate assessments.



Meadows Ridge
Environmental Assessment Worksheet
Appendix E

Soil Boring Information





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

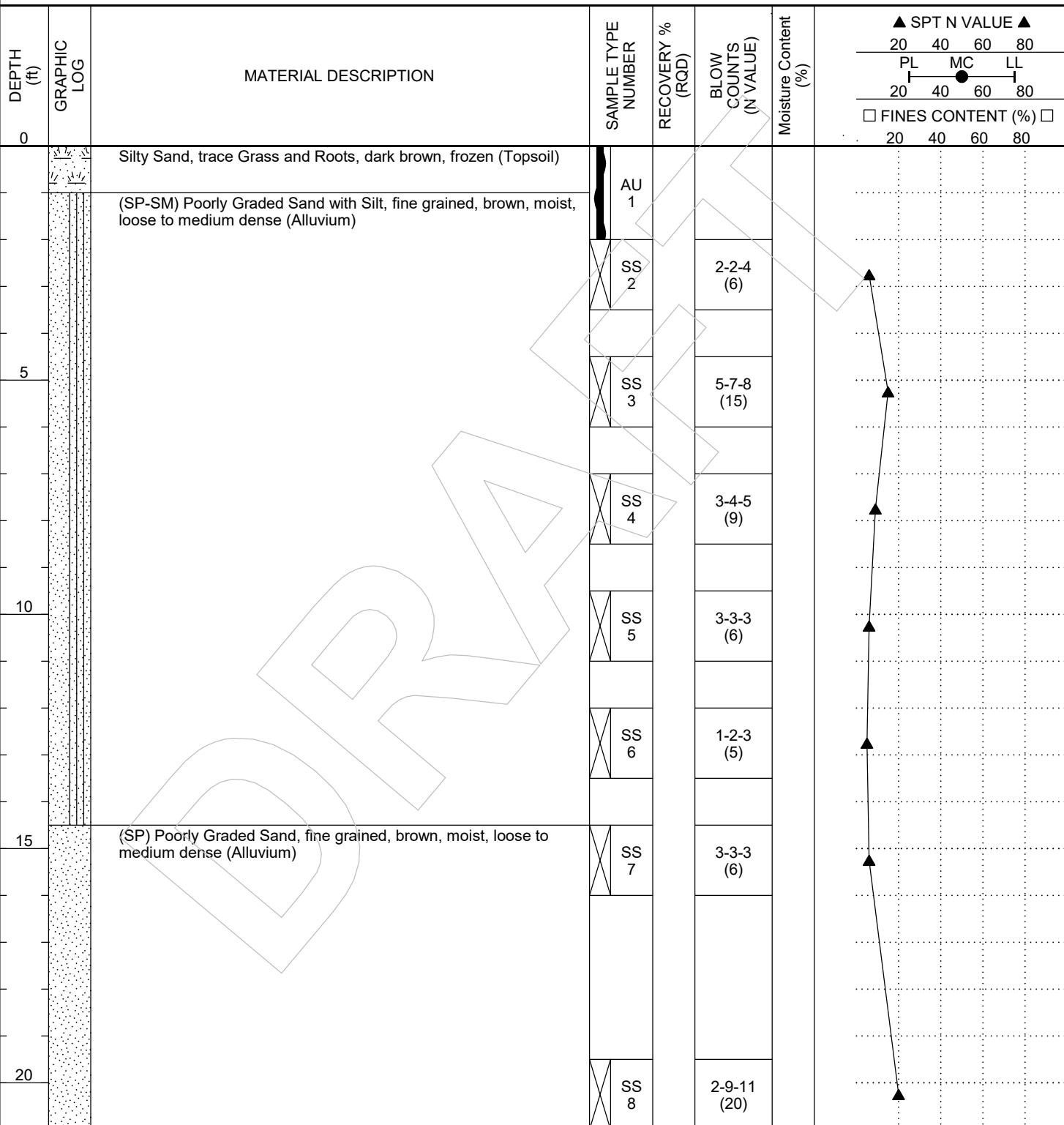
BORING NUMBER SB-1

PAGE 1 OF 1

CLIENT LGI Homes
PROJECT NUMBER 23-0871
DATE STARTED 12/28/24 COMPLETED 12/28/24
DRILLING CONTRACTOR HGTS 750-2
DRILLING METHOD Hollow Stem Auger/Split Spoon
LOGGED BY MS CHECKED BY PG
NOTES _____

PROJECT NAME Meadows Ridge
PROJECT LOCATION North Branch, MN
GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- Not Encountered
AT END OF DRILLING --- Not Encountered
AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-2

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

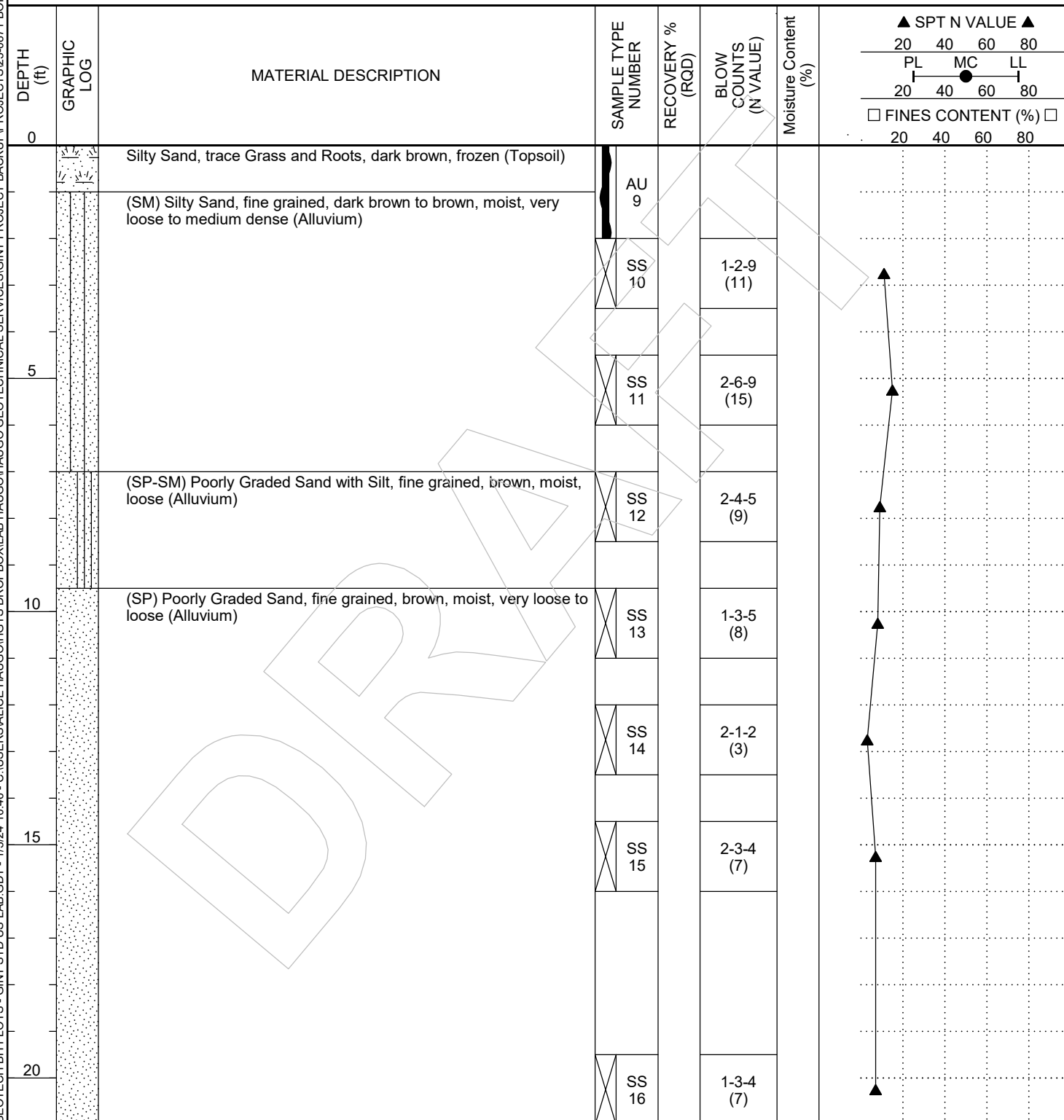
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-3

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

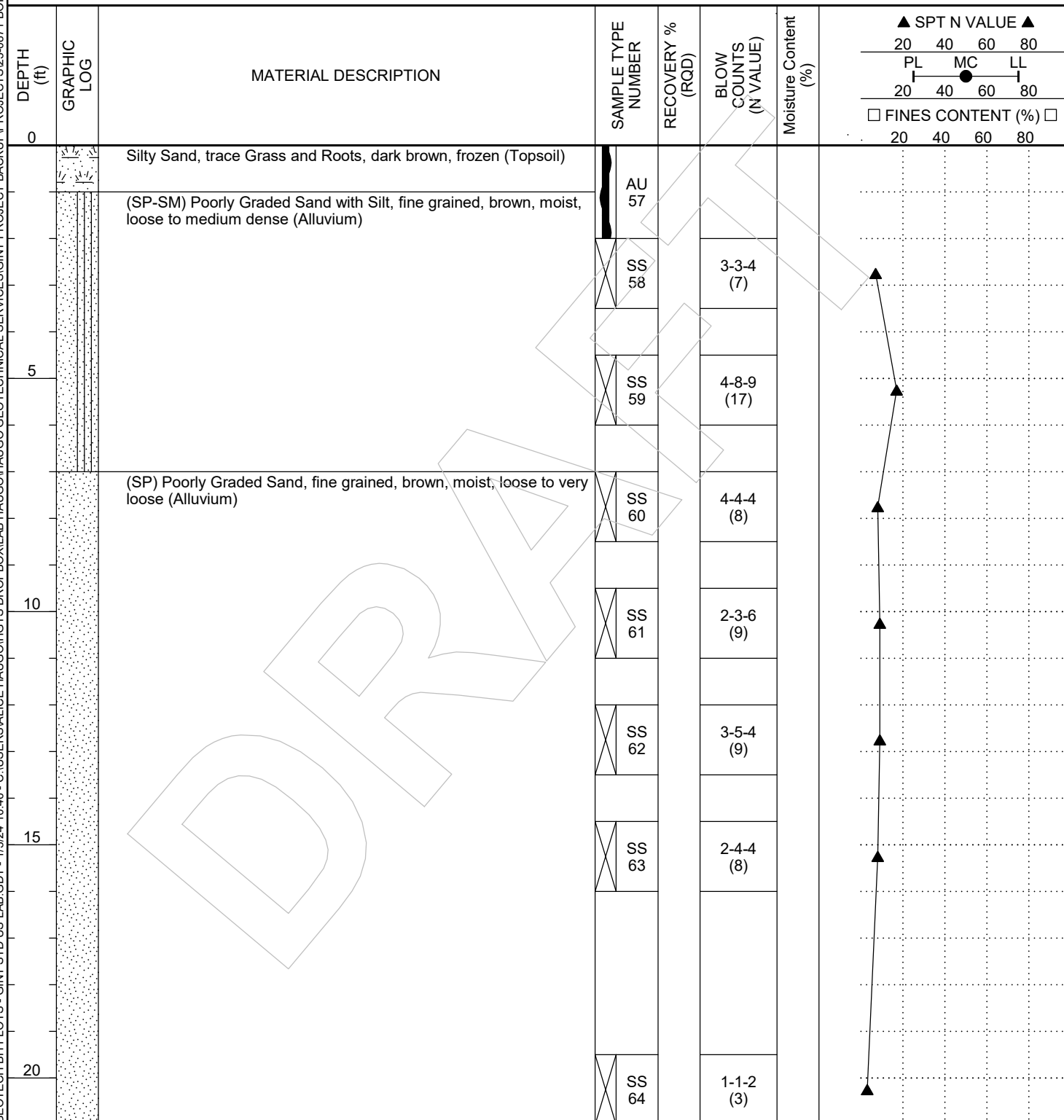
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-4

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)	▲ SPT N VALUE ▲			
							20	40	60	80
0		Silty Sand, trace Grass and Roots, dark brown, frozen (Topsoil)	AU 41							
		(SP-SM) Poorly Graded Sand with Silt, fine grained, brown, moist, loose (Alluvium)	SS 42		2-3-4 (7)					
5			SS 43		2-3-4 (7)					
		(SP) Poorly Graded Sand, fine grained, brown, moist, very loose to loose (Alluvium)	SS 44		1-2-2 (4)					
10			SS 45		1-3-3 (6)					
			SS 46		3-4-5 (9)					
15			SS 47		1-3-5 (8)					
20			SS 48		1-3-3 (6)					

Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-5

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

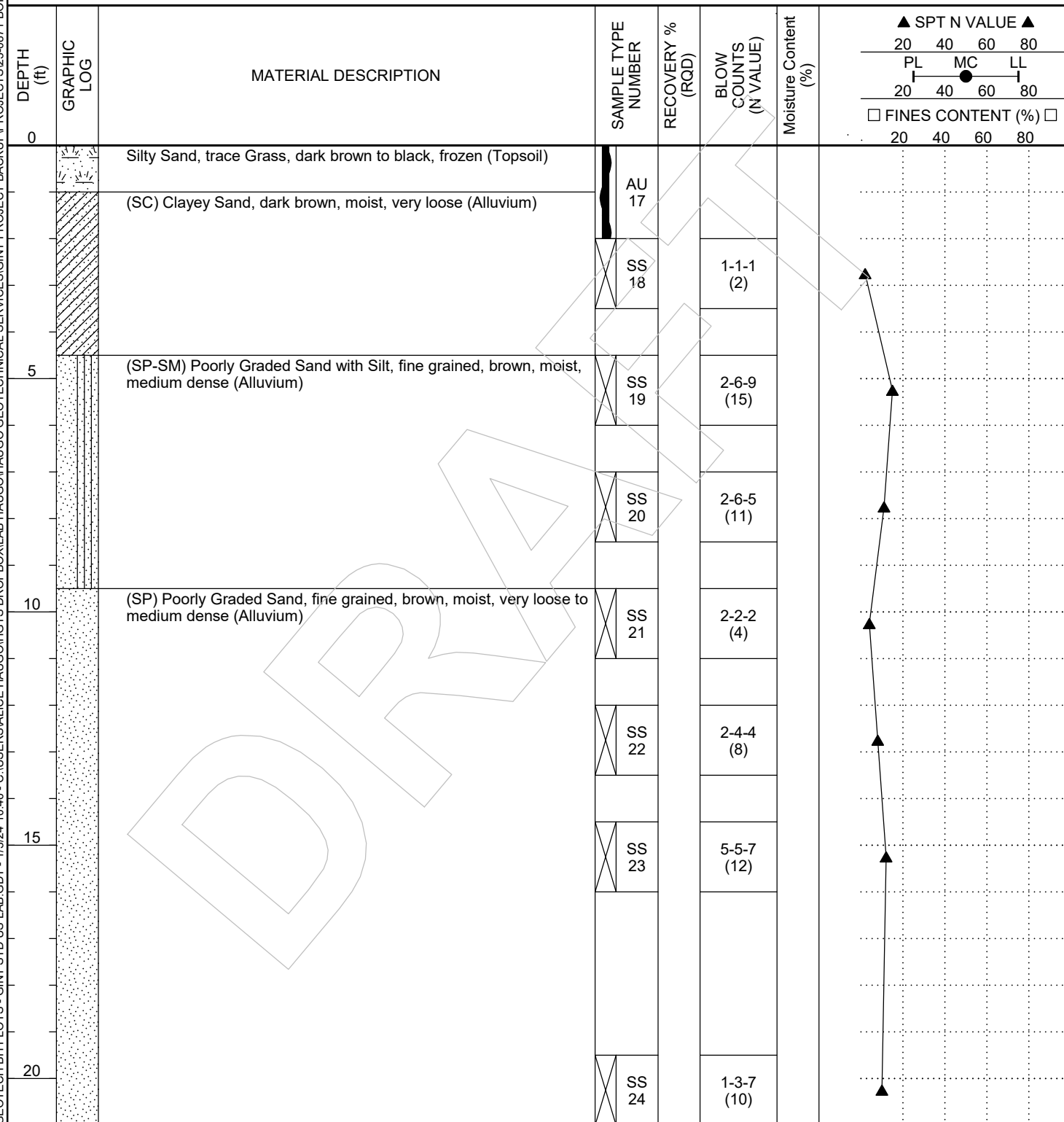
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-6

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/28/24 COMPLETED 12/28/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

▽ AT TIME OF DRILLING 10.00 ft

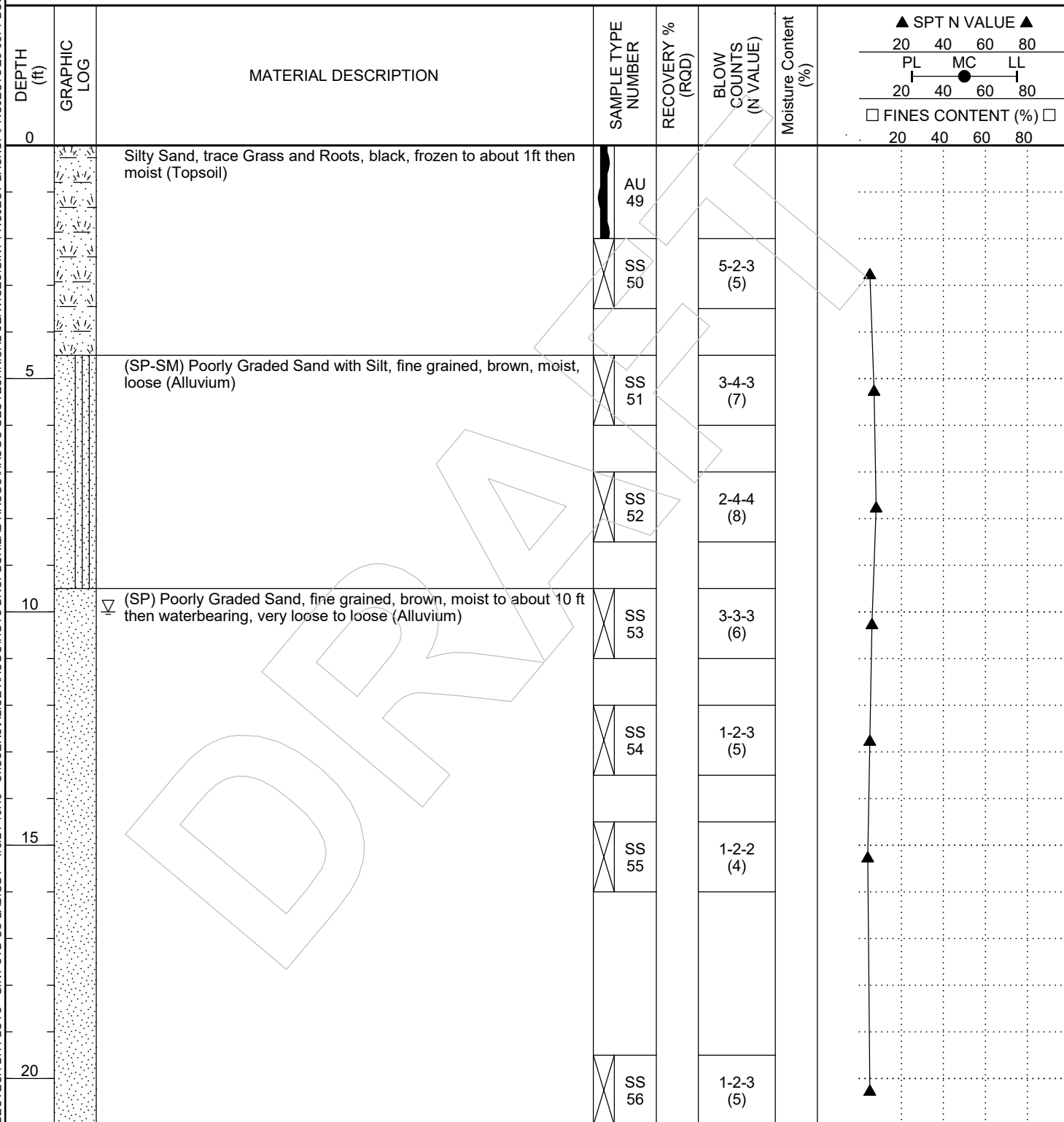
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING ---

NOTES _____

AFTER DRILLING ---

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

BORING NUMBER SB-7

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

▽ AT TIME OF DRILLING 12.50 ft

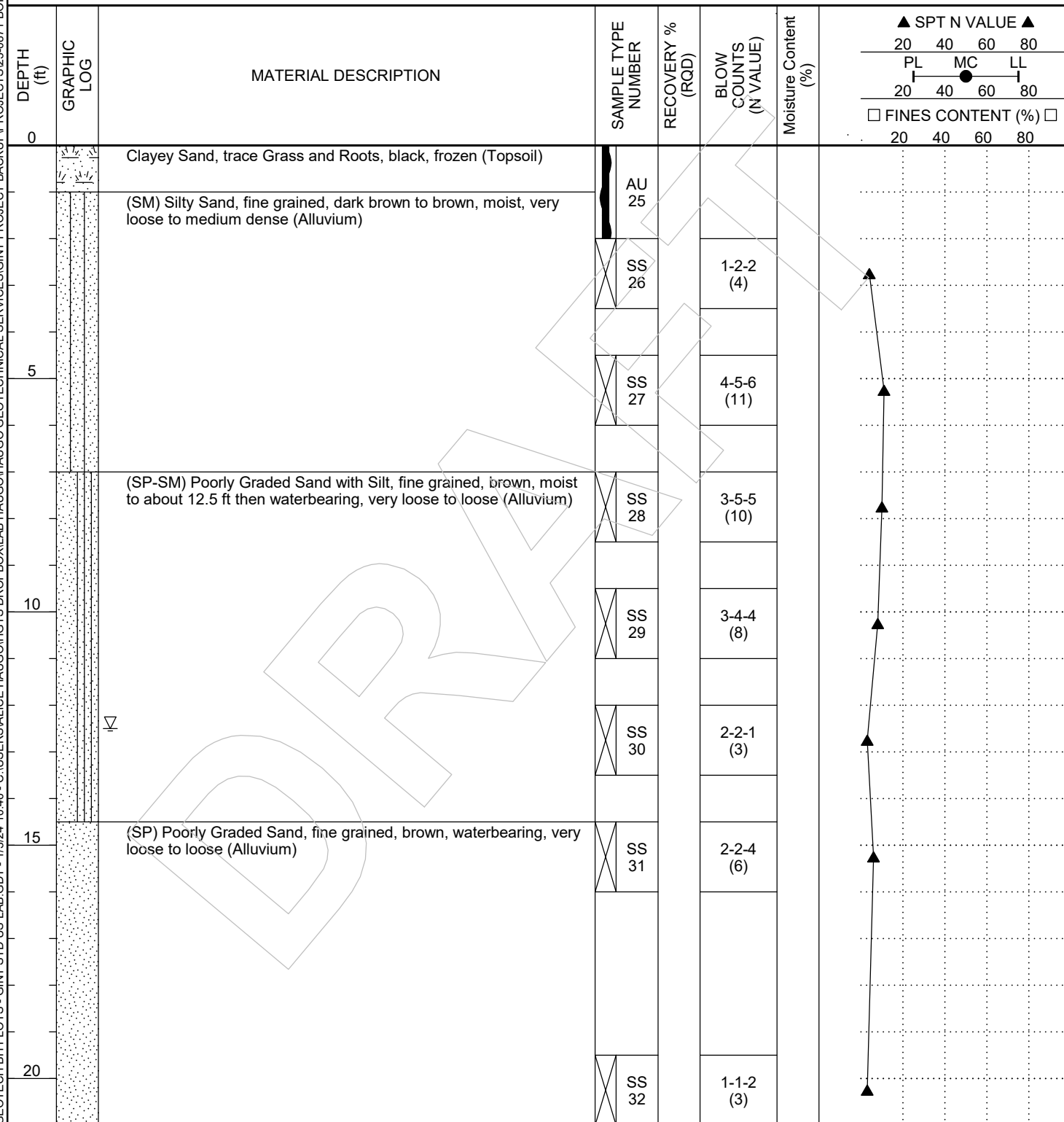
LOGGED BY MS CHECKED BY PG

AT END OF DRILLING ---

NOTES _____

AFTER DRILLING ---

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-8

PAGE 1 OF 1

CLIENT LGI Homes
PROJECT NUMBER 23-0871
DATE STARTED 12/28/24 COMPLETED 12/28/24
DRILLING CONTRACTOR HGTS 750-2
DRILLING METHOD Hollow Stem Auger/Split Spoon
LOGGED BY MS CHECKED BY PG
NOTES _____

PROJECT NAME Meadows Ridge
PROJECT LOCATION North Branch, MN
GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- Not Encountered
AT END OF DRILLING --- Not Encountered
AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)	▲ SPT N VALUE ▲			
							20	40	60	80
0		Silty Sand, trace Grass and Roots, dark brown, frozen (Topsoil)	AU 33							
		(SP-SM) Poorly Graded Sand with Silt, fine grained, brown, moist, very loose to medium dense (Alluvium)	SS 34		2-2-2 (4)					
5			SS 35		3-6-8 (14)					
			SS 36		4-6-6 (12)					
10		(SP) Poorly Graded Sand, fine grained, brown, moist, loose to medium dense (Alluvium)	SS 37		2-5-6 (11)					
			SS 38		2-4-5 (9)					
15			SS 39		2-5-6 (11)					
20			SS 40		3-5-8 (13)					

Bottom of borehole at 21.0 feet.



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

BORING NUMBER SB-9

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

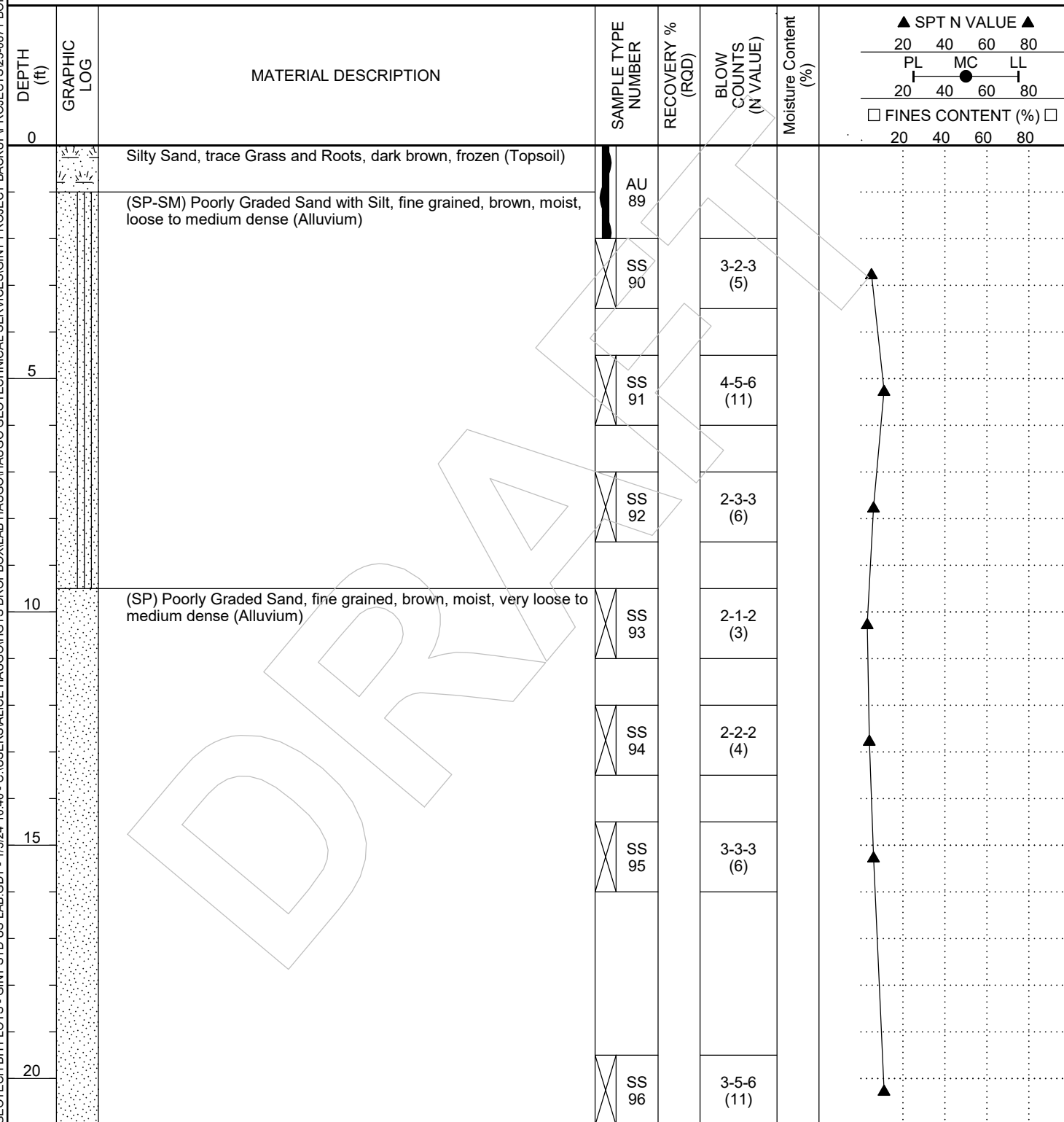
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AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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

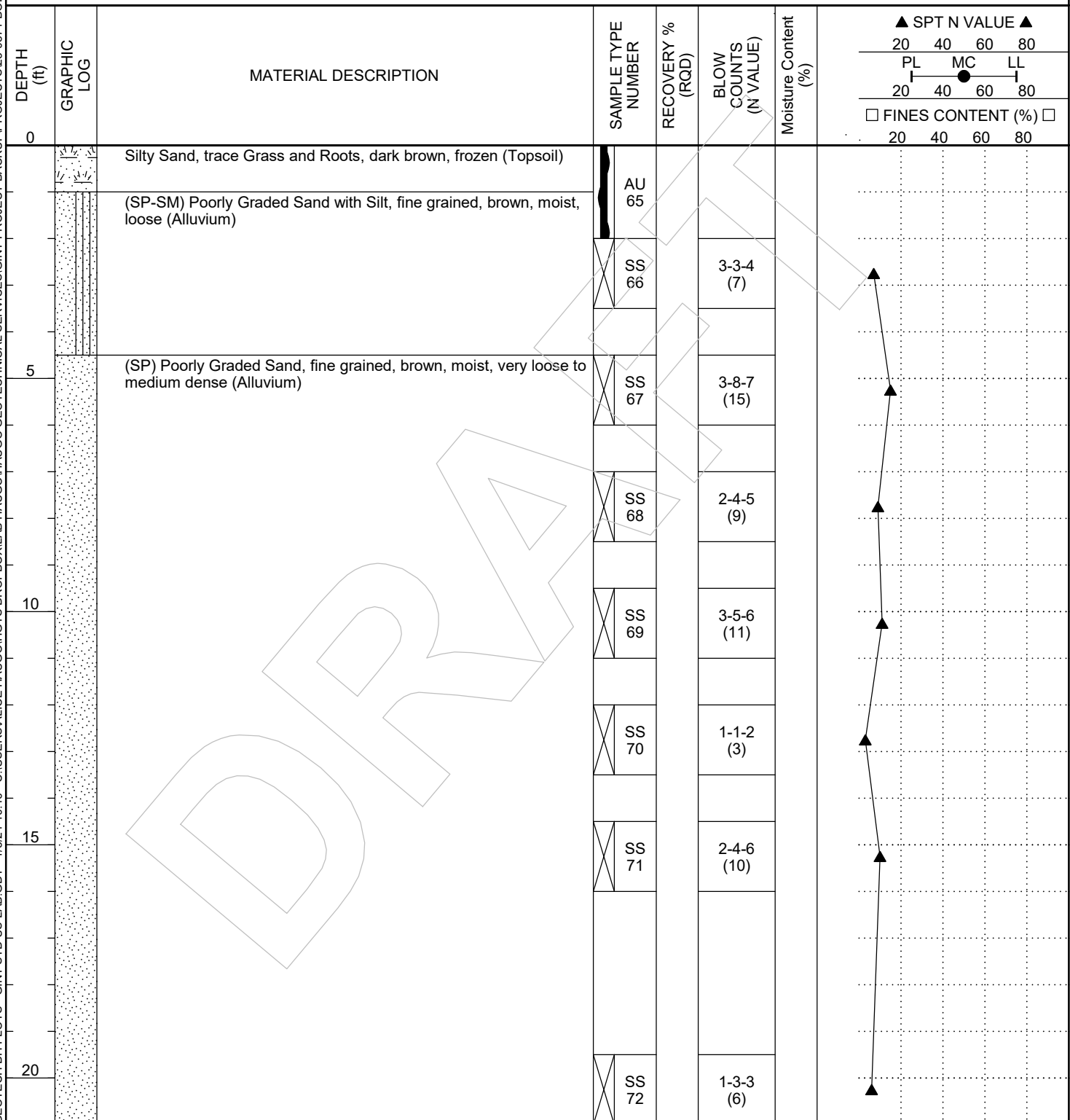
BORING NUMBER SB-10

PAGE 1 OF 1

CLIENT LGI Homes
PROJECT NUMBER 23-0871
DATE STARTED 12/28/24 COMPLETED 12/28/24
DRILLING CONTRACTOR HGTS 750-2
DRILLING METHOD Hollow Stem Auger/Split Spoon
LOGGED BY MS CHECKED BY PG
NOTES _____

PROJECT NAME Meadows Ridge
PROJECT LOCATION North Branch, MN
GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- Not Encountered
AT END OF DRILLING --- Not Encountered
AFTER DRILLING --- Not Encountered

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 1/3/24 10:46 - C:\USERS\ALICE HAUGO\HGTS DROPBOX\LAB HAUGO\HAUGO GEOTECHNICAL SERVICES\GINT PROJECT BACKUP\PROJECTS\23-0871 BORING LOG DRAFT.GPJ



Bottom of borehole at 21.0 feet.



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Minneapolis, MN, 55407
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BORING NUMBER SB-11

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

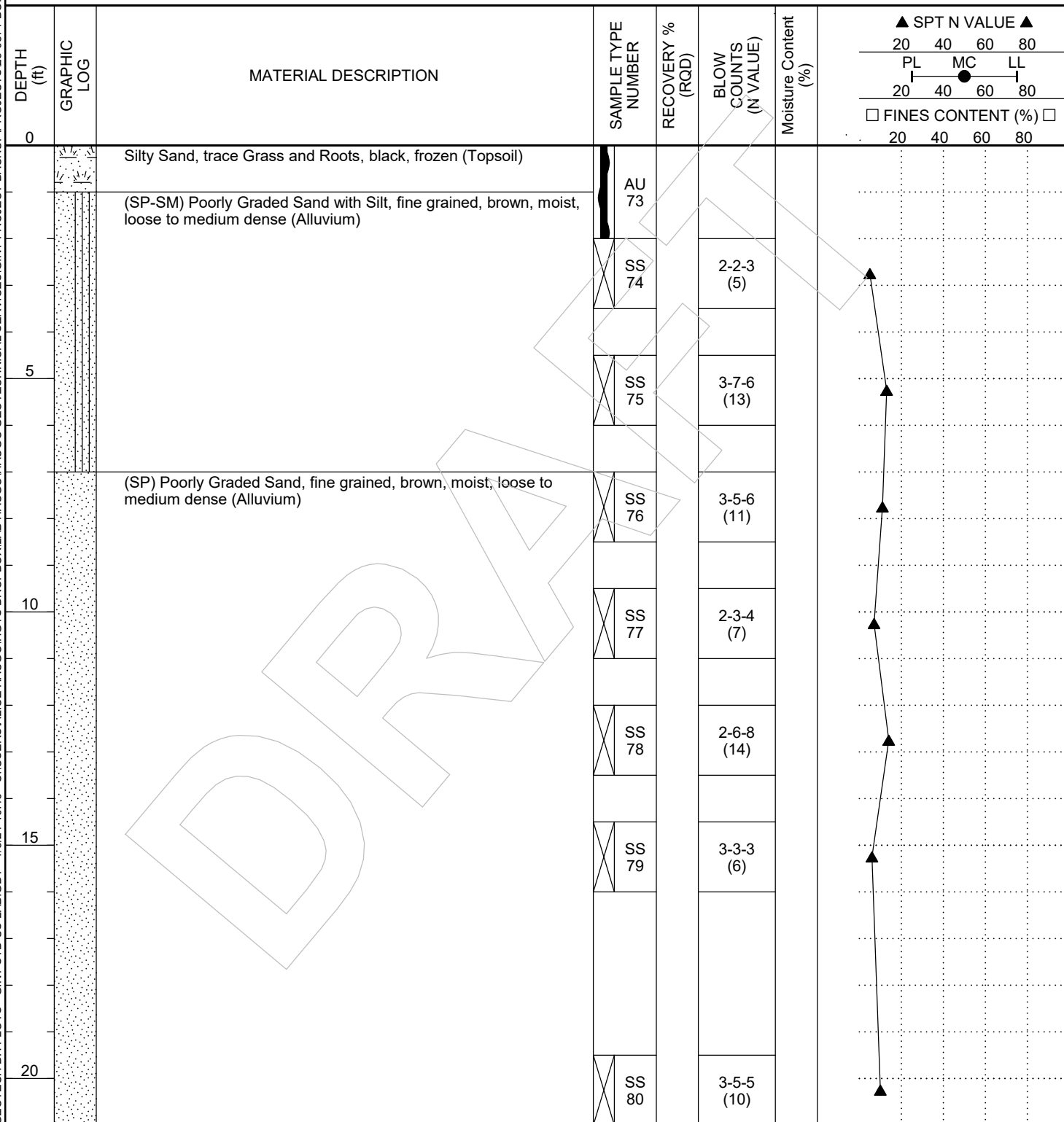
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AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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Bottom of borehole at 21.0 feet.



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Minneapolis, MN, 55407
Telephone: 612-729-2959
Fax: 763-445-2238

BORING NUMBER SB-12

PAGE 1 OF 1

CLIENT LGI Homes

PROJECT NAME Meadows Ridge

PROJECT NUMBER 23-0871

PROJECT LOCATION North Branch, MN

DATE STARTED 12/29/24 COMPLETED 12/29/24

GROUND ELEVATION _____ HOLE SIZE 3 1/4 inches

DRILLING CONTRACTOR HGTS 750-2

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger/Split Spoon

AT TIME OF DRILLING --- Not Encountered

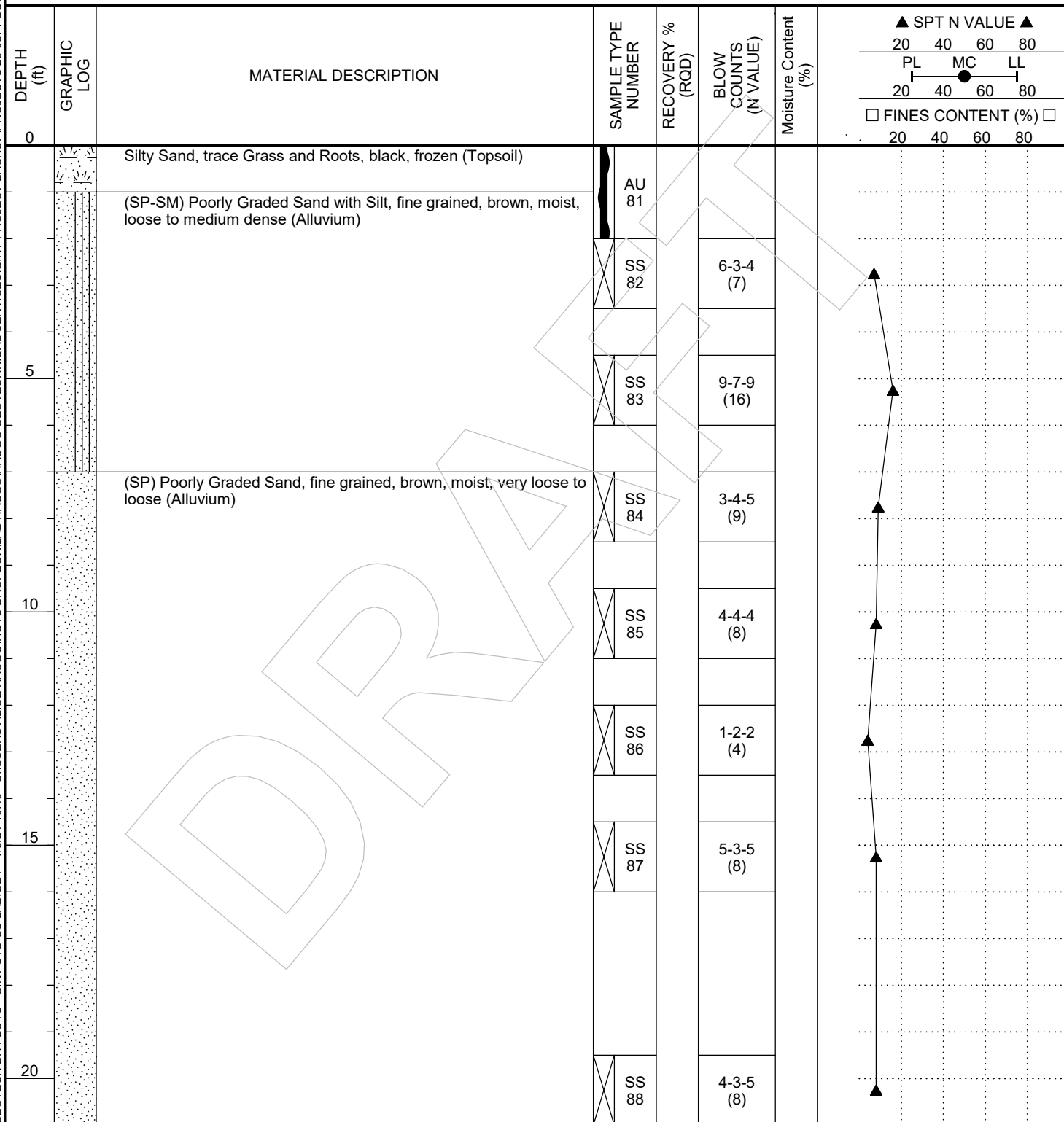
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AT END OF DRILLING --- Not Encountered

NOTES _____

AFTER DRILLING --- Not Encountered

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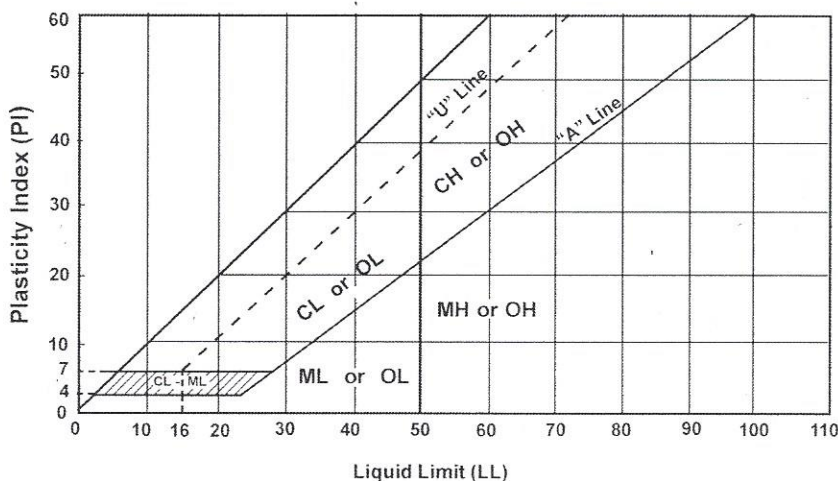


Standard D 2487 - 00

Classification of Soils for Engineering Purposes
(Unified Soil Classification System)

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

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



Laboratory Tests

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

Particle Size Identification

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

Relative Density of Cohesionless Soils

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

Consistency of Cohesive Soils

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

Drilling Notes

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

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

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

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

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

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

TW indicates thin-walled (undisturbed) tube sample.

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

Meadows Ridge
Environmental Assessment Worksheet
Appendix F

Phase 1 Environmental Assessment



PHASE I ENVIRONMENTAL SITE ASSESSMENT

40-Acre Rehbein Parcel
East of Flink Avenue & West of I-35W
North Branch, MN 55056

AET Project No. P-0013127

Date:
June 13, 2022

Prepared for:
LGI Homes-Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

Geotechnical • Materials
Forensic • Environmental
Building Technology
Petrography/Chemistry

American Engineering Testing
550 Cleveland Avenue North
St. Paul, MN 55114-1804
teamAET.com • 800.972.6364

June 13, 2022



LGI Homes-Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303
Attn: Mr. Jay Roos, VP of Land Acquisitions & Development

RE: Phase I Environmental Site Assessment
40-Acre Rehbein Parcel
East of Flink Avenue & West of I-35W
North Branch, MN 55056
AET Project No. P-0013127

Dear Mr. Roos:

American Engineering Testing, Inc. has completed Phase I Environmental Site Assessment services at the 40-Acre Rehbein Parcel, located east of Flink Avenue & west of I-35W in North Branch, Minnesota. This Phase I Environmental Site Assessment was done in accordance with our Proposal No. P-0013127.

We appreciate the opportunity to serve you on this project. If you have any questions regarding the information presented in this Phase I Environmental Site Assessment report, or if we may be of additional service, please contact me.

Sincerely,
American Engineering Testing, Inc.

A handwritten signature in blue ink, appearing to read 'DMcComas', is positioned above the printed name.

Dennis McComas, PG
Senior Geologist
Phone: (651) 647-2759
Email: dmccomas@teamAET.com

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FIGURES

1. Site Location Map
2. Site Map

APPENDICES

- A. Acronyms/Abbreviations and Definitions
- B. Client/User Provided Information
- C. Records Review Documentation
- D. Historical Research Documentation
- E. Site Photographs
- F. Resumes

EXECUTIVE SUMMARY

In accordance with Proposal No. P-0013127, American Engineering Testing, Inc. performed a Phase I Environmental Site Assessment of the 40-Acre Rehbein Parcel, east of Flink Avenue & west of I-35W, North Branch, Minnesota 55056. Services were performed in accordance with the scope and limitations of the Standards and Practices of the United States Environmental Protection Agency's All Appropriate Inquiries rule (40 CFR Part 312, December 30, 2013) and the American Society for Testing Materials Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process – ASTM E1527-13 for the exclusive use of LGI Homes-Minnesota, LLC.

The Site area is a mixture of residential and agricultural development. From at least 1938 the Site has predominantly been agricultural land. The adjoining properties remain residential development, agricultural land, and farmstead. From at least 1985 highway I-35W has been present to the east. The current configuration of the Site has been present since at least 1938.

This assessment has revealed no evidence of recognized environmental conditions in connection with the Site.

This assessment has revealed no evidence of controlled recognized environmental conditions (CRECs) in connection with the Site.

No significant data gaps were encountered with regard to evaluating the Site for this Phase I Environmental Site Assessment.

1.0 INTRODUCTION

1.1 Purpose and Methodology

The purpose of this Phase I Environmental Site Assessment (ESA) is to identify, to the extent reasonable pursuant to the methodology prescribed below, recognized environmental conditions (RECs) in connection with the Phase I Environmental Site Assessment, 40-acre Parcel east of Flink Avenue & west of I-35W (hereafter referred to as the Site). American Engineering Testing, Inc. (AET) understands this Phase I ESA is being performed as part of LGI Homes-Minnesota, LLC's due diligence process to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) liability.

This Phase I ESA was conducted in accordance with the United States Environmental Protection Agency (USEPA) All Appropriate Inquiries (AAI) rule (40 CFR Part 312), December 30, 2013, and the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process – ASTM E 1527-13.

A list of the acronyms and abbreviations and definitions of common terms used in this report is included as Appendix A.

1.2 Scope of Services

The scope of this Phase I ESA was defined in AET's Proposal No. P-0013127 which Jay Roos authorized on May 17, 2022. The scope of services included the following items:

- Review reasonably ascertainable and readily available records and historical use information to help identify RECs in connection with the Site.
- Perform a reconnaissance of the Site to obtain information indicating the likelihood of identifying RECs in connection with the Site.
- Interview owners, occupants, state, and/or local government officials to obtain information indicating RECs in connection with the Site.
- Interpret information collected in conjunction with performing the records review, site reconnaissance, interviews, and present the results in a written report.

1.3 Limitations and Exceptions of Assessment

Although the USEPA AAI rule and the ASTM standard have been followed, the scope of services is not exhaustive and there may be certain environmental conditions AET cannot ascertain and will not be AET's responsibility. Localized contamination related to disposal of contaminants not reported to appropriate government agencies, not made known to AET or not reasonably observable at the time of AET's Site visit may be on Site.

The services performed by AET have been conducted in a manner consistent with the level of skill and care ordinarily exercised by other members of the profession currently practicing in this area. No environmental site assessment can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Performance of this Phase I ESA is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the Site.

The findings, opinions, and conclusions presented in this report are based on AET's understanding of the client's intended use of the Site. If the intended use of the Site changes, or if conditions differing from AET's original findings are found, AET should be notified to review these changes and to determine the impact, if any, of the changes on the presented findings, opinions, and conclusions.

1.4 Reliance

This Phase I ESA has been prepared for the exclusive use of LGI Homes-Minnesota, LLC for specific application to the Site.

2.0 SITE DESCRIPTION

2.1 Location and Legal Description

Figure 1 shows the location of the Site and Figure 2 shows the configuration of the Site. The legal description of the Site, as provided by LGI Homes-Minnesota, LLC, is included in Appendix B. The Site has no address and is located between Flink Avenue and I-35W, to the north of 400 Street, North Branch, Chisago County Minnesota with Parcel Identification No. 11.00142.10. The Site is located in the northeast $\frac{1}{4}$ of the southwest $\frac{1}{4}$ of Section 8, Township 35 North, Range 21 West, Chisago County.

2.2 Current Site Use

The Site comprises 40 acres located in an agricultural and residential developed area of North Branch. The Site is currently cultivated farmland.

2.3 Current Use of Adjoining Properties

The Site is adjoined as noted below.

North	A trail runs along the north property line. Beyond that is a housing development.
East	I-35W followed by cultivated farmland.
South	A farmstead and residential development followed by 400 th Street.
West	Flink Avenue followed by cultivated farmland.

3.0 USER PROVIDED INFORMATION

AET provided LGI Homes-Minnesota, LLC with a User Questionnaire and requested the completed Questionnaire be returned to AET. The questionnaire, attached in Appendix B, was completed by Mr. Jay Roos. Mr. Roos responded “No” to questions regarding knowledge of environmental liens; activity and use limitations; Mr. Roos responded “Yes” to having specialized knowledge or experience related to the Site or nearby properties, saying “I have worked for the land development company that currently owns the land. I have about 3 years of knowledge of the site”; Mr. Roos responded “Yes” to having limited knowledge of past uses of the Site, saying “I have known the site for about 3 years. The site is vacant farmland and I am not aware of any differing past uses.”; Mr. Roos responded “No” to questions regarding specific chemicals that are present or that once were present; spills or other chemical releases that have taken place at the Site; environmental cleanups that have taken place at the Site; or obvious indicators that point to the presence or likely presence of releases at the Site. Mr. Roos’s response also indicates the purchase price being paid for the Site reasonably reflects the fair market value of the Site if it were not contaminated.

As indicated in AET’s proposal to LGI Homes-Minnesota, LLC, the User will share with AET all available and relevant information pertaining to the Site. AET was not provided with Site specific information.

4.0 RECORDS REVIEW

4.1 Physical Setting

Spills, leaks, or disposal of hazardous substances or petroleum products at a Site will generally migrate on the surface or in the subsurface via soil, groundwater, and/or vapor. There is also the potential for surface or subsurface contamination to migrate from adjoining properties towards the Site or migrate off Site depending on subsurface conditions.

AET reviewed published geologic studies, atlases, the current topographic map, and available subsurface reports. Publications not included in the appendices are referenced in Section 11.0. The review indicated the following:

- The Site is located in the Lower St. Croix watershed.
- The surficial soils in the vicinity of the Site are very fine- to medium-grained sand that may be silty in places, and scattered lenses of silt to silty clay may occur at depth.
- The uppermost bedrock underlying the Site is the Eau Claire Formation composed of sandstone. The depth to bedrock is 101 to 150 feet below ground surface (bgs).
- The regional groundwater gradient in the vicinity of the Site is south towards the north branch of the Sunrise River with a depth to groundwater approximately 5 to 15 feet bgs.

It is important to note that our agreed upon scope of services did not include performing soil borings or rock coring at the Site. Soil borings/rock coring would need to be performed to judge the engineering properties (strength, compressibility, etc.) of soils and rock that underlie the Site and to confirm bedrock formations and depths to the top of bedrock. Also, installation and monitoring of groundwater monitoring wells or piezometers would be required to document current groundwater elevations and localized flow patterns at the Site.

The Minnesota Department of Health maintains a limited database of water well records. AET reviewed this database for well logs located at or near the Site. This search did not find any wells registered at the Site.

4.2 Database Search

Environmental Risk Information Services (ERIS) provided Federal, State, Local, and Tribal record information within ASTM-specified minimum search distances of the Site. A copy of their report, dated May 24, 2022, is included in Appendix C. The results of the database searches are discussed below.

4.2.1 Standard Environmental Record Sources for the Site

The Site was not identified within the ASTM specified Federal, State, Local and/or Tribal databases.

4.2.2 Standard Environmental Record Sources for Surrounding Properties

The following table identifies ASTM specified databases that were searched, distances searched, and the number of sites identified within the searched distances.

Regulatory Database	Search Distance (miles)	Federal	State/Tribal Equivalent
NPL	1.0	0	0
NPL (Delisted)	0.5	0	0
CERCLIS	0.5	0	0
CERCLIS-NFRAP	0.5	0	NA
RCRA CORRACTS	1.0	0	NA
RCRA-TSD	0.5	0	NA
RCRA Generators	Adjoining Properties	0	NA
Landfill/Solid Waste Disposal Sites	0.5	NA	0
Registered Leaking Storage Tanks	0.5	NA	1
Registered Storage Tanks	Adjoining Properties	NA	1
Voluntary Cleanup Sites	0.5	NA	0
Brownfields Sites	0.5	0	0

NA: Not applicable – this database is not included in the ASTM standard.

Because the properties identified are located cross or down groundwater gradient and/or sufficiently distant from the Site, they are not likely to have an impact on the Site, except for the following:

- Chain Lake Preserve, north of the Site, is listed by the MPCA AI database based on its identification as a site subject to environmental regulations or of environmental interest associated with construction storm water.

Due to the distance and lack of groundwater contamination, AET does not consider the construction storm water in association with the Chain Lake Preserve a suspect REC in connection with the Site.

4.2.3 Orphan Summary or Unlocatable Properties and Non-ASTM Specified Databases

Environmental Risk Information Services (ERIS) also included a list of sites that could not be mapped due to poor or inadequate address information (Orphan Summary or Unlocatable Properties) and various non-ASTM specified databases. The Orphan Summary or Unlocatable Properties and non-ASTM specified databases and distances searched are listed in the ERIS report.

Based on our review of the Orphan Summary or Unlocatable Properties listings and the additional non-ASTM specified database search results, we did not identify any sites that we consider suspect RECs in connection with the Site.

4.3 Historical Use Information

Historical records were reviewed because past land use is an indication of whether hazardous substances or petroleum products have been used at the Site and adjoining properties and potentially introduced to the subsurface. The historical records were searched for and reviewed, if available, for types of businesses regulated for hazardous substances or petroleum products, evidence of spills, leaks, or disposal, and potential routes of entry to the subsurface.

In evaluating historical land use, the hazardous substances or petroleum products are generally inferred from what was typical of the tenant on the Site. The tenants are determined from User provided information, insurance maps, city directories, wells logs, building and fire inspection records, and interviews or they are inferred from aerial photographs, topographic maps, [and plat maps]. The routes of entry may be determined from User provided information, fire insurance maps, aerial photographs, and the Site reconnaissance. Releases including the import of fill may be determined from User provided information, aerial photographs, topographic maps, the Site reconnaissance, boring logs, and regulatory data.

The historical records discussed below were found in the User provided information and/or were provided to AET by Historical Information Gatherers, Inc. (HIG) and are included in Appendix D.

4.3.1 Topographic Maps

AET reviewed United States Geological Survey (USGS) 7.5- and 15-Minute Series Topographic Maps. These are limited in urban areas because improvements are not always shown. Topographic maps

were reviewed for evidence of land use and changes in topography suggesting the import of fill. The review comprised the Site and adjoining properties. Our review of the topographic maps is summarized in the table below.

Summary of Topographic Maps Review		
Year	Direction	Observations
1983	Site	Vacant land, no improvements are indicated. The Site elevation is approximately 920 ± 5 above mean sea level (amsl).
	North	Vacant land.
	East	Interstate I-35W followed by vacant land.
	South	Vacant land.
	West	A road followed by vacant land.
2013, 2016 2019	Site and adjoining properties	Modern topographic maps no longer show individual buildings, and improvements are limited to roads, rail lines, and icons for landmark buildings such as fire stations and schools. Streets border the Site to the north, south, and east, but no additional improvements are indicated.

4.3.2 Aerial Photographs

AET reviewed aerial photographs that include the Site area. These are limited by the quality and resolution of the photograph. The aerial photographs were reviewed for indications of land use, routes of entry such as unpaved areas, and indications of spills, leaks, or disposal such as stains, lack of vegetation, or debris. The review comprised the Site and adjoining properties. Our review of the aerial photography is summarized in the table below.

Summary of Aerial Photographs Review		
Year	Direction	Observations
1938, 1948	Site	Cultivated farmland.
1952, 1954	North	Cultivated farmland.
1965, 1973	East	Interstate, followed by cultivated farmland.
1978, 1980	South	Cultivated farmland, followed by a road.
1983, 1986 1992	West	A road followed by cultivated farmland.
1996, 2003 2008, 2013 2017, 2021	Site	Similar to above photos.
	North	By 2003 a housing development is present, and a dirt trail runs along the north property line.
	East	Similar to previous photos.
	South	By 1996 a farmstead is present to the south. By 2003 more housing is present south of the farmstead.
	West	Similar to previous photos.

4.3.3 Fire Insurance Maps

AET requested fire insurance maps for the Site and adjoining properties. Fire insurance maps were created by insurance companies and typically contain maps of occupants and fire hazards, land use and the specific use and storage of hazardous substances or petroleum products such as fuels and solvents. HIG indicated fire insurance maps for the Site area are not available

4.3.4 City Directories

City directories were provided by HIG, limited by errors in cross street location and thoroughness of validation. Directories (approximately every 5 years), indexed by address, were reviewed for tenant identification and land use at the Site and adjoining properties. Because the Site is located in an agricultural and residential developed area, we did not review directories for residential streets. We reviewed the 2007, 2012 and 2017 City Directories for Flink Avenue, Hemingway Avenue, and 400th Street and found no listings for the Site or adjoining properties. AET did not identify any suspect RECs in reviewing these directories.

4.3.5 Historical Plat Maps/Atlases

Historical Plat Maps/Atlases were not available for the Site.

4.3.6 Additional Record Sources

AET reviewed the following documents regarding the Site. The sources and documents are provided in section 11.0 References and Appendix D, and include the following:

Underground Pipelines Review: National Pipeline Mapping System online mapping system regarding underground petroleum pipelines in the vicinity of the Site. The maps do not show any petroleum pipelines extending through or adjoining the Site.

Minnesota Groundwater Contamination Atlas: AET reviewed the MPCAs online Groundwater Contamination Atlas that includes current and available groundwater data from Superfund sites. There is no documented groundwater contamination associated with a Superfund site in the Site vicinity.

AET reviewed a previous Phase I ESA report completed by AET related to a property located southwest of the Site, "Meadows North Townhome Development Site, Southwest Quadrant of 400th St and Flink Ave", dated September 10, 2021 (AET Meadows North September 2021 Phase I ESA). No suspect RECs were identified in connection with the AET Meadows North September 2021 Phase I ESA.

4.3.7 Historical Information Summary

The Site area is a mixture of residential and agricultural development. From at least 1938 the Site has been undeveloped cultivated agricultural land. The adjoining properties remain residential development, undeveloped forest, agricultural land, and farmstead. The current configuration of the Site has been

present since at least 1938. From at least 1985 highway I-35W has been present to the east. The current configuration of the Site has been present since at least 1938.

5.0 SITE RECONNAISSANCE

The Site was visited by Dennis McComas of AET on June 9, 2022. Mr. McComas was not accompanied. Photographs taken at the time of AET's visit are included in Appendix E.

5.1 Site Description

Information contained in this section is based on a visual reconnaissance conducted while walking through the Site and the accessible interior areas of structures, if any.

Site Description	
Feature	Description
Structures	No structures currently occupy the Site. The Site is a cultivated agricultural field.
Drinking Water/ Sanitary Sewer	The Site is not connected to the municipal drinking water or sanitary sewer systems. It is unknown if municipal water and sanitary services are available in the Site vicinity.
Stormwater Runoff	Surface water at the Site drains to the topographically lower areas of the Site. There are drainage ditches adjacent to the west and the east of the Site, along the roadways.
Roads	The Site is accessible from the adjacent Flink Avenue to the west.
Other	Several utility pedestals and related barrier poles and signs for underground cable, electric and fiber optic were observed adjacent to the west along the ditch.

5.2 Site Observations

The following table summarizes Site observations.

Site Observations	
Feature	Description
Containers	No automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers were observed.
Storage Tanks	No storage tanks or indicators of storage tanks such as piping, dispensers or concrete pads were observed.
Drums	No drums, totes or other bulk storage containers were observed.
Odors	No usual odors were detected.
Liquids/Stains/ Corrosion	No liquids, stains or evidence of corrosion was observed.
Stressed Vegetation	The vegetation did not appear stressed and appeared to be in good condition.
Drains/Waste Traps/Sumps	No drains, waste traps or sumps were observed.

Site Observations	
Feature	Description
PCB Containing Equipment	No suspect PCB containing equipment was observed.
Pits, Ponds, or Lagoons	No pits, ponds or lagoons were observed on or adjoining the Site.
Solid Waste Disposal	AET observed no evidence of indiscriminate dumping or solid waste disposal on the surface of the Site.
Physical Setting Analysis	The Site is located in an agricultural and rural residential developed area. Residential neighborhoods border the Site to the north and to the south.

6.0 INTERVIEWS

The User indicated AKM Farm, LLC, and Mr. Kent Roessler is the current owner of the Site. AET representatives Madelynn Gorg and Dennis McComas interviewed various parties as part of this Phase I ESA. The results of the interviews are summarized below.

Kent Roessler, AKM Farm, LLC – Site Owner Representative

The owner representative, Mr. Roessler, is not aware of any pending, threatened, or past litigation, administrative proceedings, or notices from any governmental entity relevant to hazardous substances or petroleum products in, on or from the property. Mr. Roessler stated he has owned the Site for approximately three years. He indicated to the best of his knowledge, there has never been any structures on the Site, and it has always been used as a cultivated agricultural field.

Fire Chief Kevin Grote – North Branch Fire Department

The city of North Branch Fire Inspection Department representative Kevin Grote indicated there are no existing permits for storage tanks, hazardous materials storage, or wells; and there are no complaints of dumping, leaks, or spills for the Site. He also indicated there are no records of fires at the Site.

7.0 FINDINGS AND OPINIONS

No suspect RECs were identified in connection with the Site.

8.0 DATA GAPS

No significant data gaps were encountered with regard to evaluating the Site for this Phase I Environmental Site Assessment.

9.0 CONCLUSIONS

AET has performed a Phase I ESA in conformance with the scope and limitations of the USEPA All Appropriate Inquiries rule (40 CFR Part 312) and ASTM Practice E 1527-13 of the Site. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the Site.

This assessment has revealed no evidence of controlled recognized environmental conditions (CRECs) in connection with the Site.

10.0 REFERENCES

American Engineering Testing, Inc., Phase I Environmental Site Assessment, Meadows North Townhome Development Site, Southwest Quadrant of 400th Street and Flink Avenue, North Branch, Minnesota, September 10, 2021.

American Society for Testing and Materials, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E 1527-13, 2013.

Chisago County Government Offices. <https://www.chisagocountymn.gov>

Minnesota Department of Health, Minnesota Well Index (MWI) Online.
<https://www.health.state.mn.us/communities/environment/water/mwi/index.html>

Minnesota Department of Natural Resources and the University of Minnesota in conjunction with the Minnesota Geological Survey - Geologic County Atlas Program online access
https://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html

Minnesota Pollution Control Agency (MPCA) What's in My Neighborhood online database.
<https://mpca.maps.arcgis.com/apps/webappviewer/index.html?id=9d45793c75644e05bac197525f633f87>

MPCA, Minnesota Groundwater Contamination Atlas online map viewer.
<https://www.pca.state.mn.us/data/minnesota-groundwater-contamination-atlas>

MPCA, Construction Stormwater Permit, Site ID 5629, June 20, 2022.

National Pipeline Mapping System (NPMS) online viewer. <https://www.npms.phmsa.dot.gov/>

University of Minnesota and Minnesota Geological Survey, Geologic Atlas, Chisago County Minnesota, Atlas C-7, 1992, Plates 2 (Bedrock Geology), 3 (Surficial Geology), and 6 (Depth to Bedrock).

United States Environmental Protection Agency, All Appropriate Inquiries Final Rule (40 CFR Part 312), December 30, 2013.

11.0 QUALIFICATIONS AND RESUMES

I, **Dennis McComas** declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312 and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Site. I have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Refer to Appendix F for resumes of the AET personnel associated with this Phase I ESA.

Report Prepared By:



Madelynn Gorg
Environmental Scientist I

Report Reviewed By:



Dennis McComas, PG
Senior Geologist, Due Diligence Manager

Figures

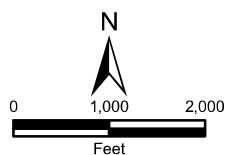
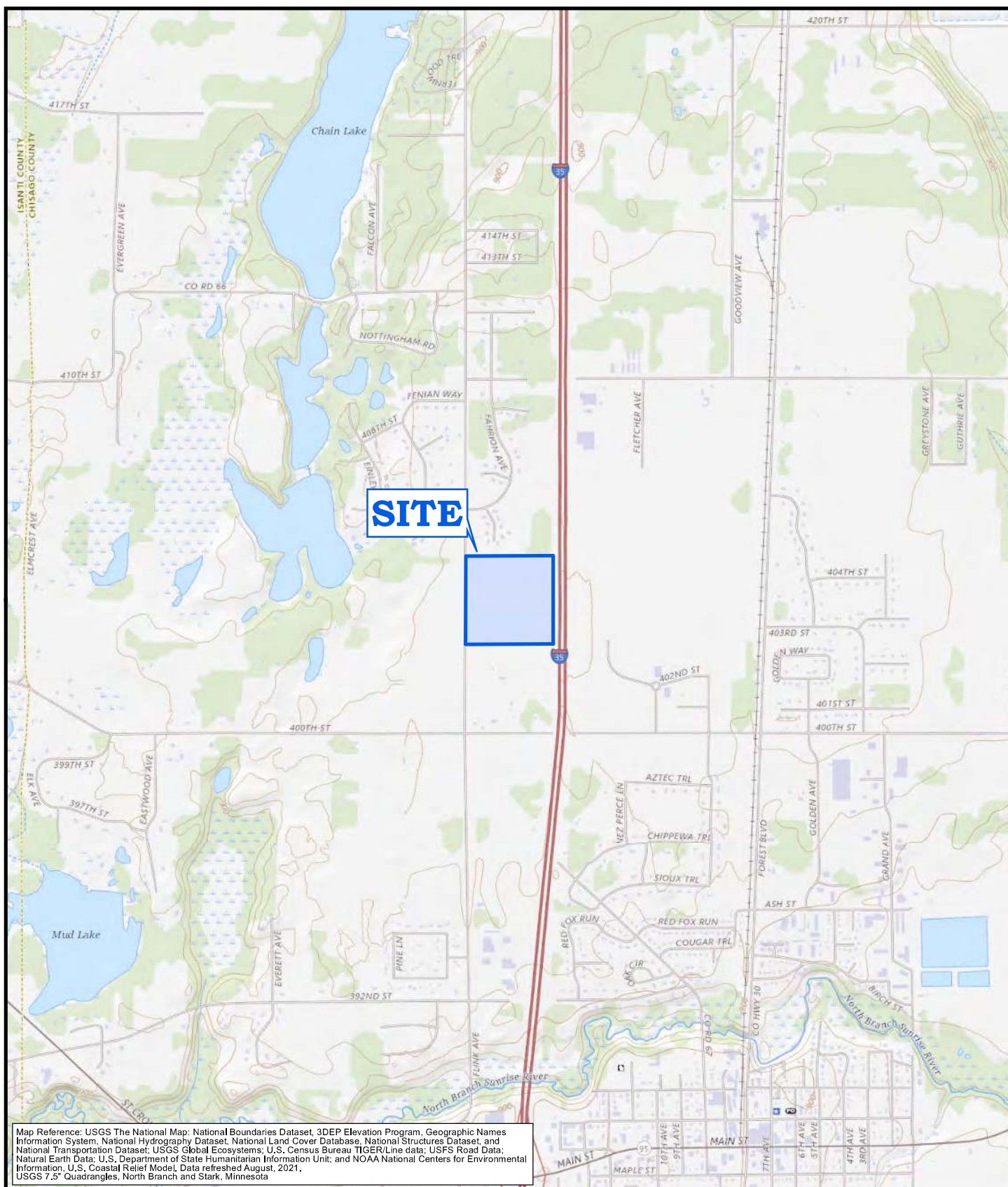


Figure 1
Site Location Map

LGI Homes North Branch East 40 Acres
North Branch, Minnesota

Date: 05/31/2022

AET Project No. P-0013127



Legend

Approximate Site Boundary



Map Reference:
Chisago County, 2019

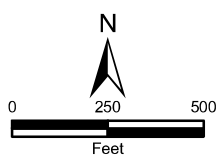


Figure 2
Site Map

LGI Homes North Branch East 40 Acres
North Branch, Minnesota

Date: 05/31/2022

AET Project No. P-0013127

Appendix A

Acronyms/Abbreviations and Definitions

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

°C	degrees Celsius
°F	degrees Fahrenheit
%	percent
AAI	EPA All Appropriate Inquiry (§312.10 of 40 CFR 312)
ACM	asbestos containing material
ACWM	asbestos containing waste material
AET	American Engineering Testing, Inc.
AHERA	Asbestos Hazard Emergency Response Act
AST	aboveground storage tank
ASTM	American Society for Testing and Materials (now known only by acronym)
AUL	activity and use limitation
BaPs	benzo(a)pyrene equivalents
BETX	benzene, ethylbenzene, toluene, xylene
Brownfields	SDDENR Brownfields Program
bgs	below ground surface
CAL	SDDENR Cleanup Action Level
CAP	Corrective Action Plan
CCP	Construction Contingency Plan
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act (Superfund)
CERCLIS	Comprehensive Environmental Response, Compensation, Liability Information System
CESQG	RCRA Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CG	cleanup goal
CGI	combustible gas indicator
COC	MPCA Certificate of Completion
CoC	contaminant of concern
c.o.c.	chain of custody
CORRACTS	RCRA Corrective Actions Information System
cPAH	carcinogenic polynuclear aromatic hydrocarbon
CVOC	chlorinated volatile organic compound
cy or CY	cubic yards
DML	MPCA Dredge Management Level
DRO	diesel range organics ("-Si" indicates silica-gel pretreatment)
EA/EAW	Environmental Assessment [Worksheet]
EC	engineering control
ECP	Emissions Control Plan
ECR	Environmental Construction Report
EDR	Environmental Data Resources, Inc.
EIS	Environmental Impact Statement
EP	Environmental Professional (§312.10 of 40 CFR 312)
EPA	Environmental Protection Agency (also USEPA)
ERNS	Emergency Response Notification System (federal)
ESA	Environmental Site Assessment
EWP	Environmental Work Plan
f/cc	fibers-per-cubic-centimeter
ft	feet
GEN	RCRA Generator

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

GIS	geographic information system
GPS	global positioning system
GRO	gasoline range organics
HASP	Health and Safety Plan
HBV	MDH Health Based Value
HIG	Historical Information Gatherers, Inc.
HREC	historical recognized environmental condition
HRL	MDH Health Risk Limit
IC	institutional control
ISV	MPCA Intrusion Screening Value
LAST	leaking aboveground storage tank
LEL	lower explosion limit
If or LF	lineal feet
LIMS	laboratory information management system
LLP	landowner liability protection
LQG	RCRA Large Quantity Generator
LSI	MPCA Limited Site Investigation
LUST	leaking underground storage tank
MCES	Metropolitan Council Environmental Services
MCL	EPA Maximum Contaminant Level
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDL	method detection limit.
mg/kg	milligrams-per-kilogram
mg/L	milligrams-per-liter
MGS	Minnesota Geological Survey
MMP	Materials Management Plan
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPCA AI	Minnesota Pollution Control Agency Agency Interests
MS/MSD	matrix spike/matrix spike duplicate
MSDS	material safety data sheet
MTBE	methyl tert-butyl ether
NA	not assigned or not applicable
NAD	MPCA No Association Determination
ND	no detection
NEPA	National Environmental Protection Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	MPCA No Further Action
NFRAP	No Further Remedial Action Planned
NLR	RCRA No Longer Regulated Information System
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List (federal Superfund)
NR	not recorded
ODI	EPA Open Dump Inventory
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

PEL	OSHA Permissible Exposure Limit
PBP	MPCA Petroleum Brownfield Program
PCB	polychlorinated biphenyl
pcm	point count method
PCM	phase-contrast microscopy
PE	Professional Engineer
PEF	potency equivalency factor
PG	Professional Geologist
PID	photoionization detector
PLM	polarized light microscopy
PLP	Permanent List of Priorities (state Superfund)
ppb	parts-per-billion
ppbv	parts-per-billion by volume
PPE	personal protective equipment
ppm	parts-per-million
ppmv	parts-per-million by volume
PRP	MPCA Petroleum Remediation Program
PVOC	petroleum volatile organic compound
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RACM	regulated asbestos containing material
RAI	Response Action Implementation
RAP	Response Action Plan
RCRA	Resource Conservation Recovery Act
REC	recognized environmental condition
RI	MPCA or MDA Remedial Investigation
RL	laboratory reporting limit
ROD	EPA Record of Decision
SDCL	South Dakota Codified Law
SDDENR	South Dakota Department of Environmental and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGF&P	South Dakota Game, Fish, and Parks
SDGS	South Dakota Geological Survey
SHOP	Special Handling Operations Plan
SLV	MPCA Soil Leaching Value
SMP	Soil Management Plan
SOP	standard operating procedure
SPILLS	MPCA / SSDENR Spills inventory
SQG	RCRA Small Quantity Generator
SREC	suspect recognized environmental condition
SRV	MPCA Soil Reference Value
SSP	Site Safety Plan
SVOC	semi-volatile organic compound
SWF/LF	MPCA / SSDENR Solid Waste Facilities/Landfill Sites
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

TRIS	EPA Toxic Release Inventory System
TSCA	Toxic Substances Control Act
TSD	RCRA Transportation Storage and Disposal inventory
TWA	time-weighted average
µg/kg	micrograms-per-kilogram
µg/l or µg/L	micrograms-per-liter
µg/m ³	micrograms-per-cubic-meter
USEPA	United States Environmental Protection Agency (also EPA)
USGS	United States Geological Survey
UST	underground storage tank
VIC	MPCA Voluntary Investigation and Cleanup Program
VOC	volatile organic compound
WCA	Wetland Conservation Act
WQS	South Dakota Surface Water Quality Standards
XRF	x-ray fluorescence

DEFINITIONS

Controlled recognized environmental condition (CREC): a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

De minimus condition: a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies. Conditions determined to be de minimus conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Historical recognized environmental condition (HREC): a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Recognized environmental condition (REC): the presence or likely presence of hazardous substances or petroleum products in, on, or at a property: 1) due to release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment.

Appendix B

Client/User Provided Information



Parcel Information Report

Parcel Number: 11.00142.10

General Parcel Information

Parcel: 11.00142.10

Town: NORTH BRANCH

School District: SCHOOL DISTRICT 138

Acres: 40.00

Section: 08

Township: 035

Range: 021

Plat:

Plat Description:

Block:

Lot:

Legal: NE1/4 OF SW1/4 EX PT DEEDED TO ST FOR RD

Owner Name: AKM FARM LLC

Mailing Address: 4870 VIKING BLVD NW

City/State/Zip: ANOKA, MN 55303

Property Use Code 1:

Property Use Code 2:

Property Use Code 3:



Valuation

Year: 2021

Classification - Homestead 1: 200 Agricultural - 2ANHGA-Agricultural
Non-homestead - Non HGA

Classification - Homestead 2: -

Classification - Homestead 3:

Total Acres:

Total EMV Land: \$170,100.00

Total EMV Bldg: \$0.00

Total EMV: \$170,100.00

User Questionnaire**40-Acre Parcel East of Flick Avenue, North Branch, MN****AET Project No. P-001127****Page 1 of 2**

In order to qualify for one of the Landowner Liability protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "Brownfields Amendments"), the User must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. These inquiries must also be conducted by EPA Brownfield Assessment and Characterization grantees. The User should provide the following information to the environmental professional. Failure to conduct these inquiries could result in a determination that "all appropriate inquiries" is not complete.

(1.) Environmental liens that are filed or recorded against the Site (40 CFR 312.25).

Did a search of recorded land title records (or judicial records where appropriate) identify any environmental liens filed or recorded against the Site under federal, tribal, state, or local law? If yes, please explain.

None that I am aware of - JR

(2.) Activity and use limitations (AULs) that are in place on the Site or that have been filed or recorded against the Site (40 CFR 312.26(a)(1)(v) and (vi)).

Did a search of recorded title records (or judicial records where appropriate) identify any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the Site and/or have been filed or recorded against the Site under federal, tribal, state, or local law? If yes, please explain.

Not that I am aware of - JR

(3.) Specialized knowledge or experience of the person seeking to qualify for the LLP (40 CFR 312.28).

Do you have any specialized knowledge or experience related to the Site or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the Site or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? If yes, please explain.

Yes, I worked for the land development company that currently owns the land. I have about 3 years of knowledge of the site - JR

(4.) Relationship of the purchase price to the fair market value of the Site if it were not contaminated (40 CFR 312.29).

Does the purchase price being paid for the Site reasonably reflect the fair market value of the Site? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the Site?

Fair Market Value - JR

User Questionnaire**40-Acre Parcel East of Flick Avenue, North Branch, MN****AET Project No. P-0013127****Page 2 of 2****(5.) Commonly known or reasonably ascertainable information about the Site (40 CFR 312.30).**

Are you aware of commonly known or reasonably ascertainable information about the Site that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example,

(a.) Do you know the past uses of the Site? If yes, please explain.

I have known the site for about 3 years. The site is vacant farmland and I am not aware of any differing past uses - JR

(b.) Do you know of specific chemicals that are present or once were present at the Site? If yes, please explain.

No - JR

(c.) Do you know of spills or other chemical releases that have taken place at the Site? If yes, please explain.

No - JR

(d.) Do you know of any environmental cleanups that have taken place at the Site? If yes, please explain.

No - JR

(6.) The degree of obviousness of the presence or likely presence of contamination at the Site, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).

Based on your knowledge and experience related to the Site are there any obvious indicators that point to the presence or likely presence of releases at the Site? If yes, please explain.

No - JR

Prepared By (print name)

Jay Roos

Signature

A handwritten signature in blue ink that reads 'Jay Roos'.

As a representative of:

LGI Homes - Minnesota, LLC

Dated:

5/17/2022

Appendix C

Records Review Documentation



DATABASE REPORT

REVIEWED*By Dennis McComas at 7:07 am, Jun 12, 2022*

Project Property: *40 Acre Parcel East of Flick Avenue
east of Flick Avenue and west of I-35W
North Branch MN 55056*

Project No: *2064140*

Report Type: *Database Report*

Order No: *22052000855*

Requested by: *Historical Information Gatherers*

Date Completed: *May 24, 2022*

Environmental Risk Information Services

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Executive Summary

Property Information:

Project Property: *40 Acre Parcel East of Flick Avenue
east of Flick Avenue and west of I-35W North Branch MN 55056*

Project No: *2064140*

Coordinates:

Latitude: *45.53369019*
Longitude: *-92.99396017*
UTM Northing: *5,042,239.42*
UTM Easting: *500,471.59*
UTM Zone: *15T*

Elevation: *920 FT*

Order Information:

Order No: *22052000855*
Date Requested: *May 20, 2022*
Requested by: *Historical Information Gatherers*
Report Type: *Database Report*

Historicals/Products:

Executive Summary: Report Summary

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
<u>Standard Environmental Records</u>								
Federal								
DOE FUSRAP	Y	1	0	0	0	0	0	0
NPL	Y	1	0	0	0	0	0	0
PROPOSED NPL	Y	1	0	0	0	0	0	0
DELETED NPL	Y	0.5	0	0	0	0	-	0
SEMS	Y	0.5	0	0	0	0	-	0
ODI	Y	0.5	0	0	0	0	-	0
SEMS ARCHIVE	Y	0.5	0	0	0	0	-	0
CERCLIS	Y	0.5	0	0	0	0	-	0
IODI	Y	0.5	0	0	0	0	-	0
CERCLIS NFRAP	Y	0.5	0	0	0	0	-	0
CERCLIS LIENS	Y	PO	0	-	-	-	-	0
RCRA CORRACTS	Y	1	0	0	0	0	0	0
RCRA TSD	Y	0.5	0	0	0	0	-	0
RCRA LQG	Y	0.25	0	0	0	-	-	0
RCRA SQG	Y	0.25	0	0	0	-	-	0
RCRA VSQG	Y	0.25	0	0	0	-	-	0
RCRA NON GEN	Y	0.25	0	0	0	-	-	0
RCRA CONTROLS	Y	0.5	0	0	0	0	-	0
FED ENG	Y	0.5	0	0	0	0	-	0
FED INST	Y	0.5	0	0	0	0	-	0
LUCIS	Y	0.5	0	0	0	0	-	0
NPL IC	Y	0.5	0	0	0	0	-	0
ERNS 1982 TO 1986	Y	PO	0	-	-	-	-	0
ERNS 1987 TO 1989	Y	PO	0	-	-	-	-	0
ERNS	Y	PO	0	-	-	-	-	0
FED BROWNFIELDS	Y	0.5	0	0	0	0	-	0
FEMA UST	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
FRP	Y	0.25	0	0	0	-	-	0
DELISTED FRP	Y	0.25	0	0	0	-	-	0
HIST GAS STATIONS	Y	0.25	0	0	0	-	-	0
REFN	Y	0.25	0	0	0	-	-	0
BULK TERMINAL	Y	0.25	0	0	0	-	-	0
SEMS LIEN	Y	PO	0	-	-	-	-	0
SUPERFUND ROD	Y	1	0	0	0	0	0	0

State

PLP	Y	1	0	0	0	0	0	0
DEL PLP	Y	1	0	0	0	0	0	0
SHWS	Y	0.5	0	0	0	0	-	0
SITE ASSESSMENT	Y	0.25	0	0	0	-	-	0
SWF/LF	Y	0.5	0	0	0	0	-	0
LCP	Y	0.5	0	0	0	0	-	0
UNPERMITTED LF	Y	0.5	0	0	0	0	-	0
RECYCLING	Y	0.5	0	0	0	0	-	0
HIST LUST	Y	0.5	0	0	0	0	-	0
DEL LUST	Y	0.5	0	0	0	0	-	0
HIST LAST	Y	0.5	0	0	0	1	-	1
HIST LEAKSITES	Y	0.5	0	0	0	0	-	0
LST REM SITE	Y	0.5	0	0	0	1	-	1
LST INCIDENT	Y	0.5	0	0	0	0	-	0
DELISTED LST	Y	0.5	0	0	0	0	-	0
UST	Y	0.25	0	0	0	-	-	0
AST	Y	0.25	0	0	0	-	-	0
HIST TANK	Y	0.25	0	0	0	-	-	0
DELISTED TANK	Y	0.5	0	0	0	0	-	0
INST	Y	0.5	0	0	0	0	-	0
AG CONTINGENCY	Y	0.125	0	0	-	-	-	0
BROWNFIELDS	Y	0.5	0	0	0	0	-	0
VIC	Y	0.5	0	0	0	0	-	0
POTENTIAL VIC	Y	0.5	0	0	0	0	-	0
MPCA AI	Y	0.5	0	0	2	3	-	5

Tribal

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
INDIAN LUST	Y	0.5	0	0	0	0	-	0
INDIAN UST	Y	0.25	0	0	0	-	-	0
DELISTED ILST	Y	0.5	0	0	0	0	-	0
DELISTED IUST	Y	0.25	0	0	0	-	-	0

County**No County standard environmental record sources available for this State.****Additional Environmental Records****Federal**

FINDS/FRS	Y	PO	0	-	-	-	-	0
TRIS	Y	PO	0	-	-	-	-	0
PFAS TRI	Y	0.5	0	0	0	0	-	0
PFAS NPL	Y	0.5	0	0	0	0	-	0
PFAS WATER	Y	0.5	0	0	0	0	-	0
PFAS SSEHRI	Y	0.5	0	0	0	0	-	0
ERNS PFAS	Y	0.5	0	0	0	0	-	0
HMIRS	Y	0.125	0	0	-	-	-	0
NCDL	Y	0.125	0	0	-	-	-	0
TSCA	Y	0.125	0	0	-	-	-	0
HIST TSCA	Y	0.125	0	0	-	-	-	0
FTTS ADMIN	Y	PO	0	-	-	-	-	0
FTTS INSP	Y	PO	0	-	-	-	-	0
PRP	Y	PO	0	-	-	-	-	0
SCRD DRYCLEANER	Y	0.5	0	0	0	0	-	0
ICIS	Y	PO	0	-	-	-	-	0
FED DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DELISTED FED DRY	Y	0.25	0	0	0	-	-	0
FUDS	Y	1	0	0	0	0	0	0
FORMER NIKE	Y	1	0	0	0	0	0	0
PIPELINE INCIDENT	Y	PO	0	-	-	-	-	0
MLTS	Y	PO	0	-	-	-	-	0
HIST MLTS	Y	PO	0	-	-	-	-	0
MINES	Y	0.25	0	0	0	-	-	0
SMCRA	Y	1	0	0	0	0	0	0
MRDS	Y	1	0	0	0	0	0	0
URANIUM	Y	1	0	0	0	0	0	0
ALT FUELS	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
CONSENT DECREES	Y	0.25	0	0	0	-	-	0
SSTS	Y	0.25	0	0	0	-	-	0
PCBT	Y	0.5	0	0	0	0	-	0
PCB	Y	0.5	0	0	0	0	-	0
State								
DRYCLEANERS	Y	0.25	0	0	0	-	-	0
SPILLS	Y	0.125	0	0	-	-	-	0
AG SPILLS	Y	0.125	0	0	-	-	-	0
HIST SPL	Y	0.125	0	0	-	-	-	0
PFAS GW	Y	0.5	0	0	0	0	-	0
PFAS LANDFILL	Y	0.5	0	0	0	0	-	0
CDL	Y	PO	0	-	-	-	-	0
FEEDLOTS	Y	0.5	0	0	0	0	-	0
TIER 2	Y	0.125	0	0	-	-	-	0
BULK STORAGE	Y	0.25	0	0	0	-	-	0
Tribal								
<i>No Tribal additional environmental record sources available for this State.</i>								
County								
<i>No County additional environmental record sources available for this State.</i>								
Total:			0	0	2	5	0	7

* PO – Property Only

* 'Property and adjoining properties' database search radii are set at 0.25 miles.

Executive Summary: Site Report Summary - Project Property

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Direction</i>	<i>Distance (mi/ft)</i>	<i>Elev Diff (ft)</i>	<i>Page Number</i>
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No records found in the selected databases for the project property.

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number
<u>1</u>	MPCA AI	Topline Automotive	40245 Fletcher Ave North Branch MN 55056	ESE	0.25 / 1,301.69	0	<u>17</u>
<u>2</u>	MPCA AI	2019 Flink Avenue Watermain & Sanitary Trunk Project	Flink Avenue North Branch MN 55056	SSW	0.25 / 1,311.10	1	<u>18</u>
<u>3</u>	MPCA AI	Chain Lake Preserve	CSLL: Centroid of Site North Branch MN 55056	NNW	0.29 / 1,531.59	0	<u>20</u>
<u>4</u>	HIST LAST	Bauer Residence	6116 400th St North Branch MN 55056	ESE	0.41 / 2,147.30	0	<u>21</u>
Tank Site / Active?: 15455 No Complete Site Closure Date / Leaksite Type Desc: 10/20/2006 00:00:00 Both Leak/PBP Site							
<u>4</u>	MPCA AI	Bauer Residence	6116 400th St North Branch MN 55056	ESE	0.41 / 2,147.30	0	<u>23</u>
<u>4</u>	LST REM SITE	Bauer Residence	6116 400th St North Branch MN	ESE	0.41 / 2,147.30	0	<u>24</u>
<u>5</u>	MPCA AI	Meadows North 2nd Addition	XXX Flink Avenue North Branch MN 55056	SSW	0.41 / 2,178.82	1	<u>25</u>

Executive Summary: Summary by Data Source

Standard

State

HIST LAST - Historical Leaking Aboveground Storage Tanks

A search of the HIST LAST database, dated Nov 1, 2016 has found that there are 1 HIST LAST site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Bauer Residence	6116 400th St North Branch MN 55056	ESE	0.41 / 2,147.30	<u>4</u>
<i>Tank Site / Active?: 15455 / No Complete Site Closure Date / Leaksite Type Desc: 10/20/2006 00:00:00 / Both Leak/PBP Site</i>				

LST REM SITE - MPCA Remediation Leak Sites

A search of the LST REM SITE database, dated Mar 1, 2022 has found that there are 1 LST REM SITE site(s) within approximately 0.50 miles of the project property.

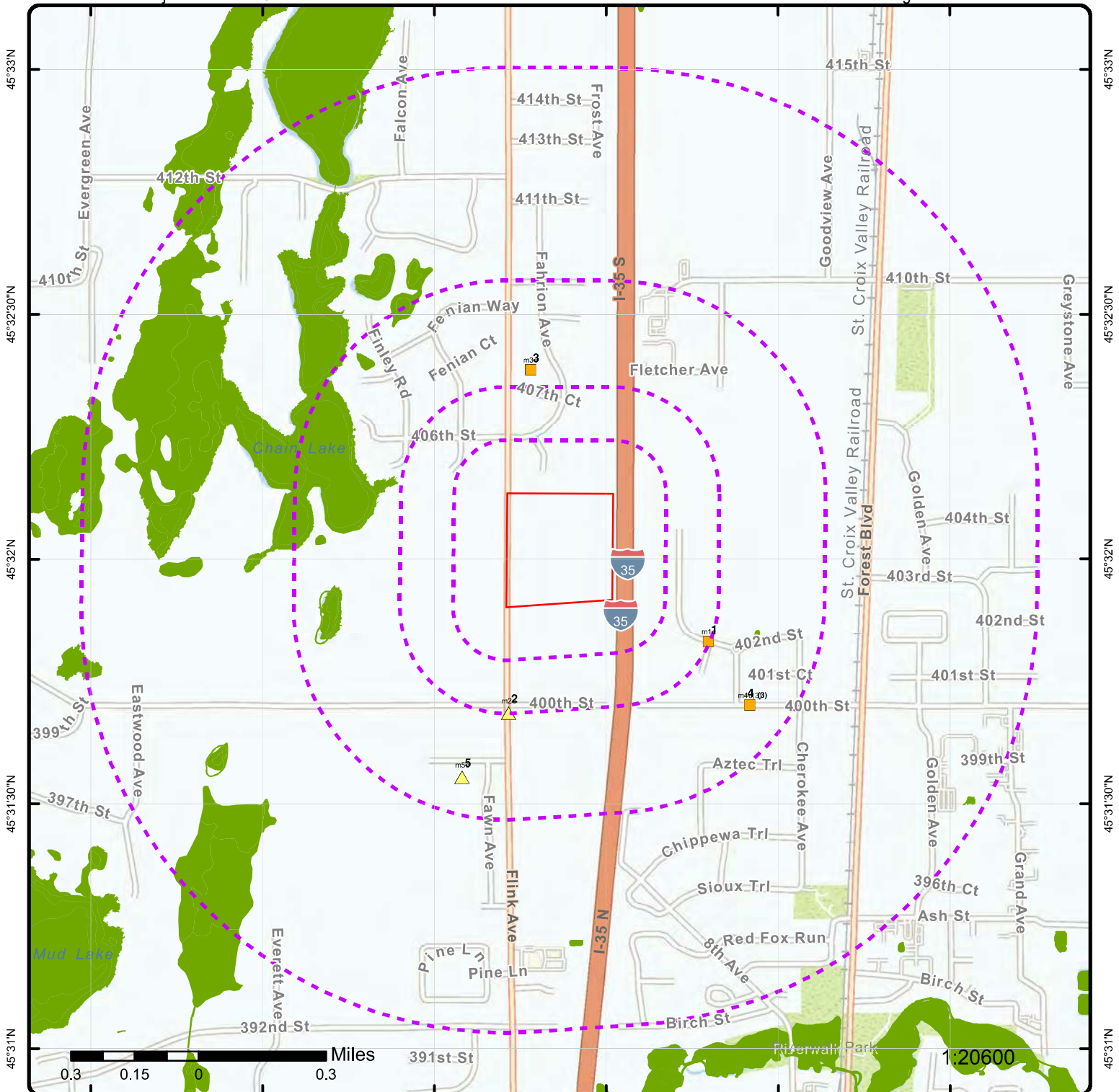
<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Bauer Residence	6116 400th St North Branch MN	ESE	0.41 / 2,147.30	<u>4</u>

MPCA AI - MPCA Agency Interests

A search of the MPCA AI database, dated Mar 4, 2022 has found that there are 5 MPCA AI site(s) within approximately 0.50 miles of the project property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
Topline Automotive	40245 Fletcher Ave North Branch MN 55056	ESE	0.25 / 1,301.69	<u>1</u>
2019 Flink Avenue Watermain & Sanitary Trunk Project	Flink Avenue North Branch MN 55056	SSW	0.25 / 1,311.10	<u>2</u>
Chain Lake Preserve	CSLL: Centroid of Site North Branch MN 55056	NNW	0.29 / 1,531.59	<u>3</u>
Bauer Residence	6116 400th St North Branch MN 55056	ESE	0.41 / 2,147.30	<u>4</u>
Meadows North 2nd Addition	XXX Flink Avenue North Branch MN 55056	SSW	0.41 / 2,178.82	<u>5</u>

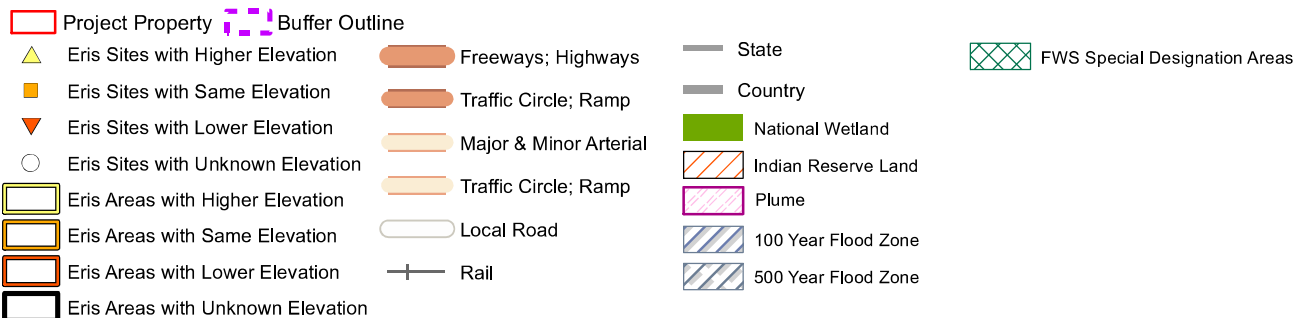
<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
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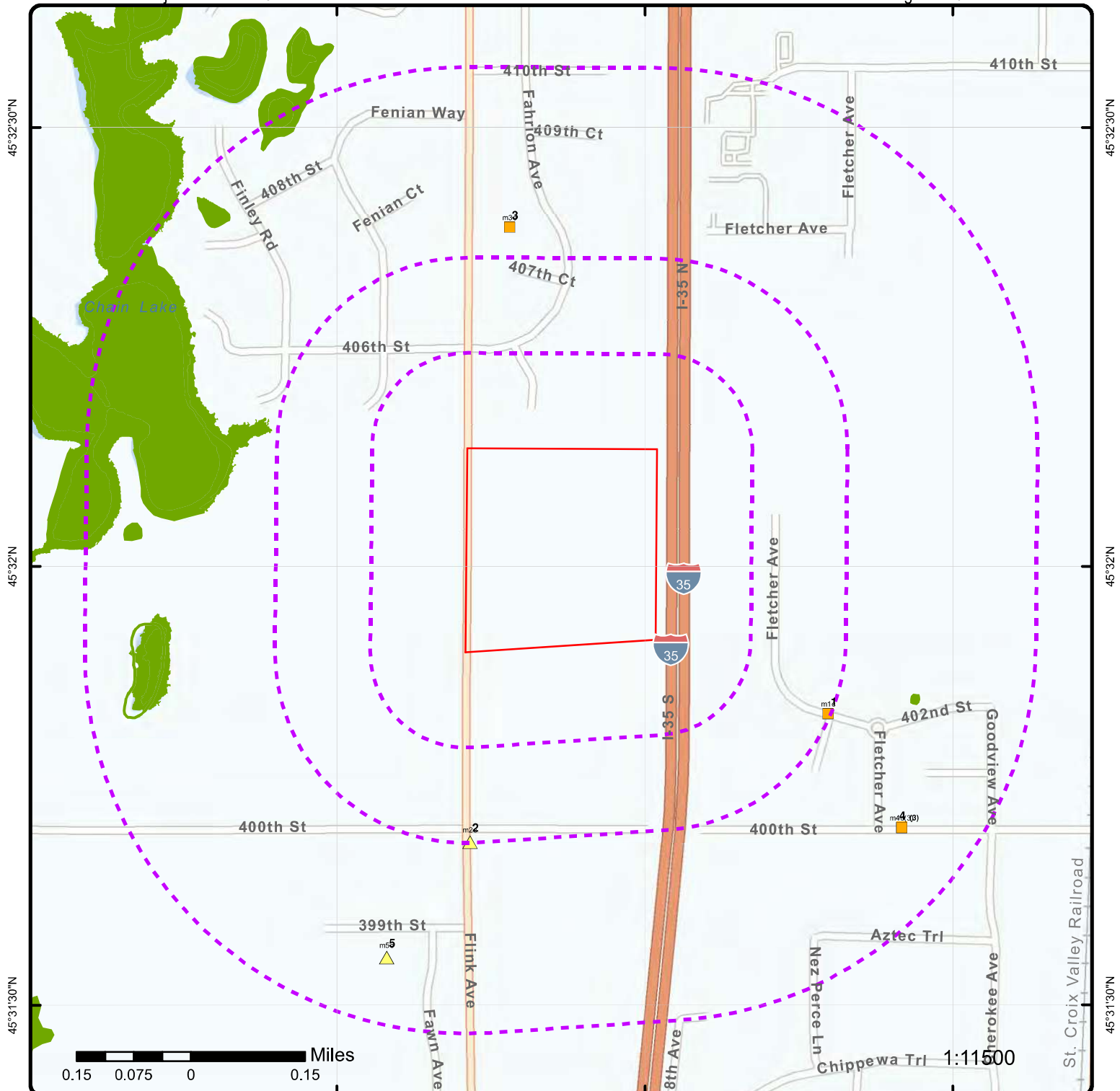


Map: 1.0 Mile Radius

Order Number: 22052000855

Address: east of Flick Avenue and west of I-35W, North Branch, MN

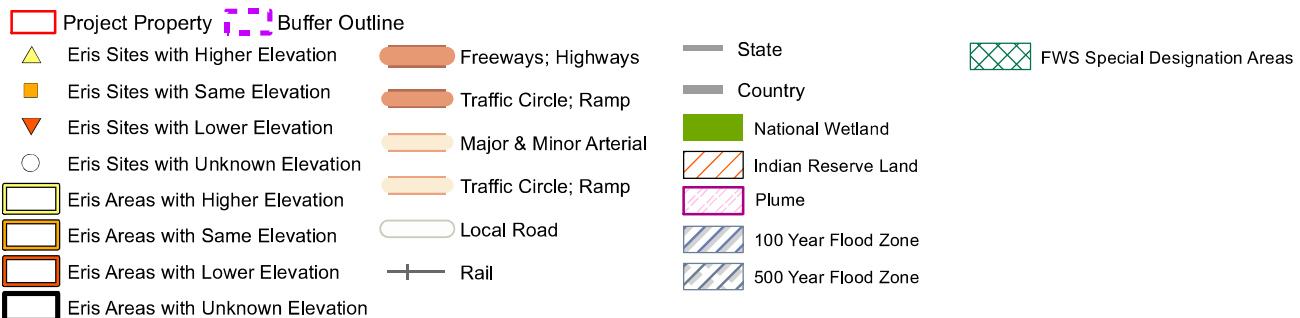


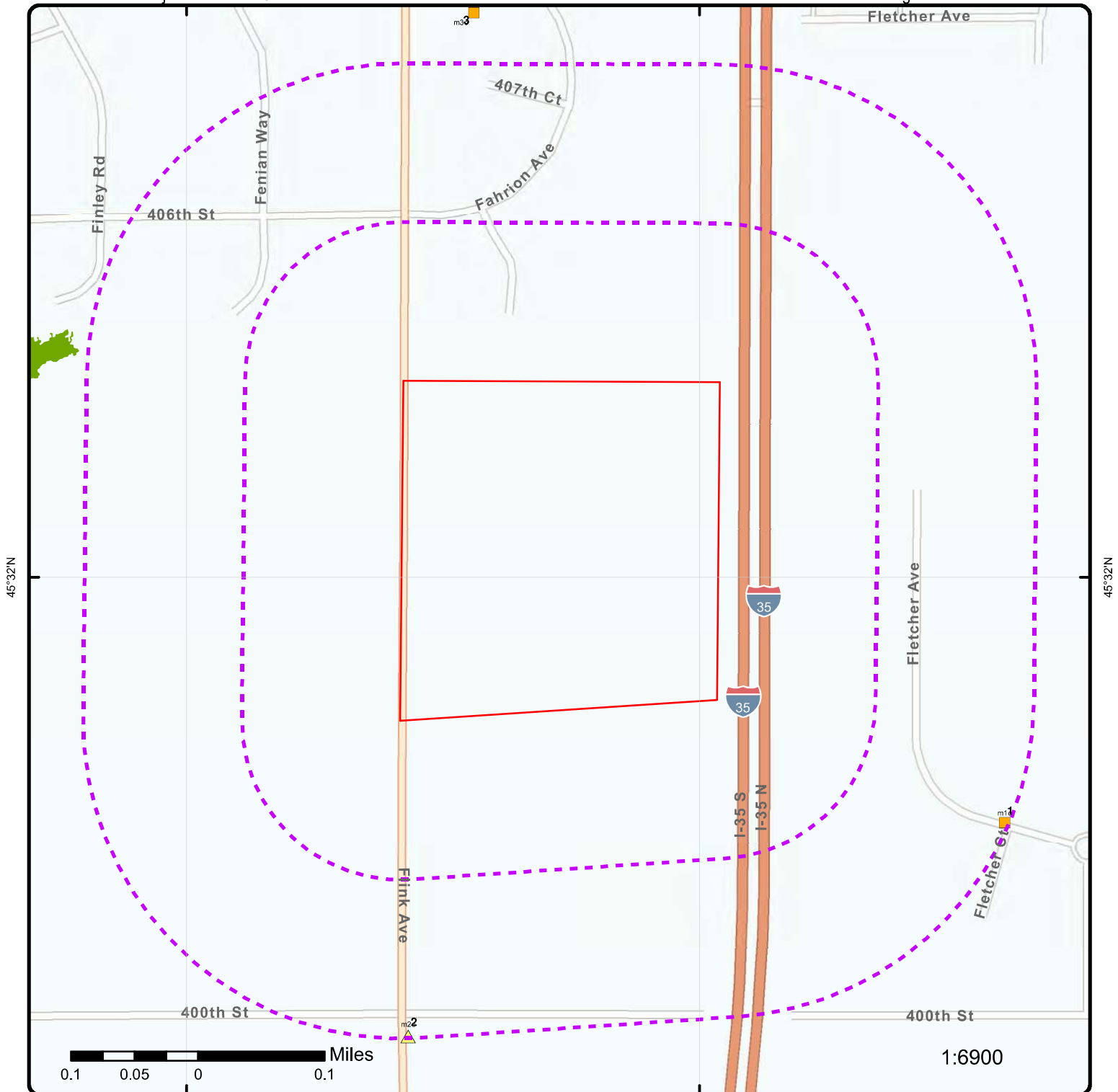


Map: 0.5 Mile Radius

Order Number: 22052000855

Address: east of Flick Avenue and west of I-35W, North Branch, MN

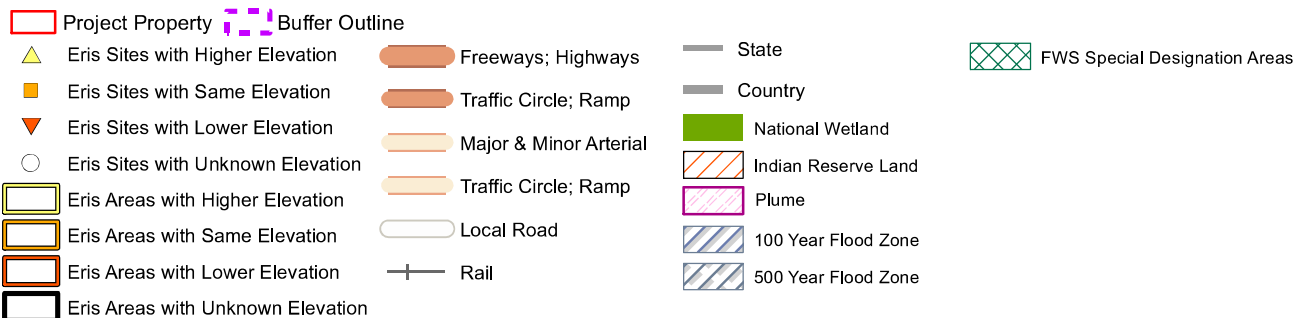




Map: 0.25 Mile Radius

Order Number: 22052000855

Address: east of Flick Avenue and west of I-35W, North Branch, MN



45°32'30"N

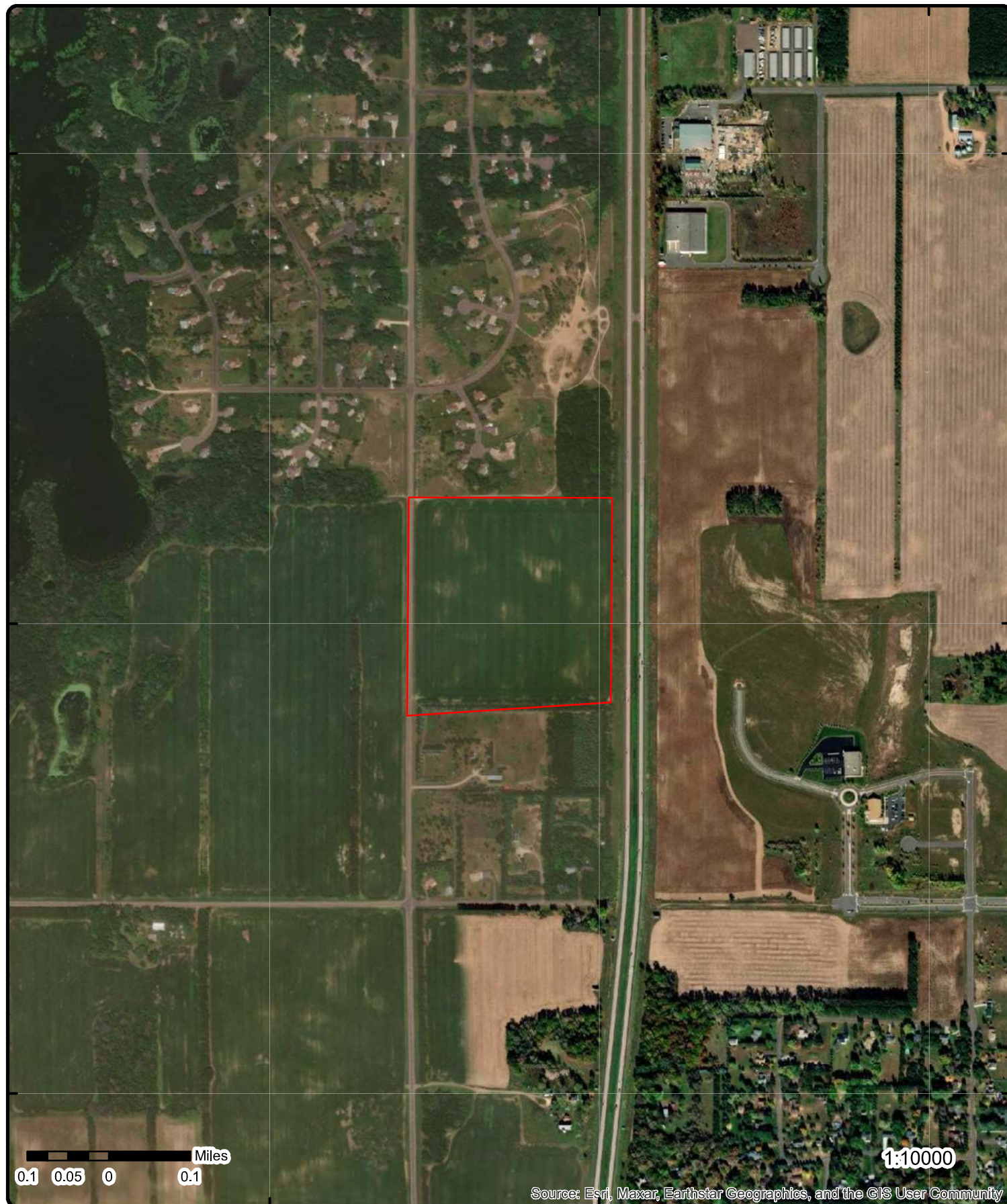
45°32'N

45°31'30"N

45°32'30"N

45°32'N

45°31'30"N

**Aerial** Year: 2018

Address: east of Flick Avenue and west of I-35W, North Branch, MN

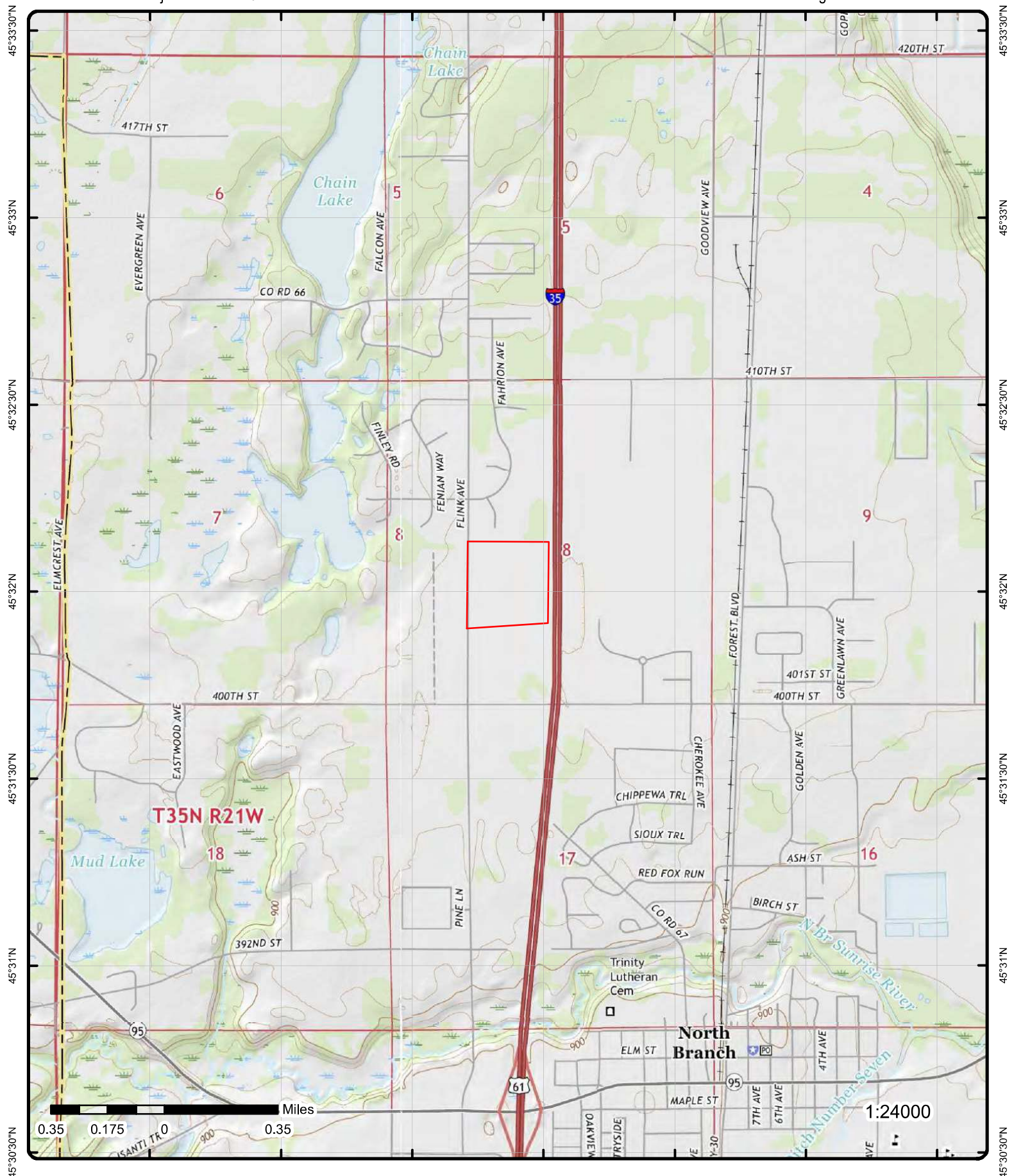
Source: ESRI World Imagery

Order Number: 22052000855



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Topographic Map

Year: 2016

Order Number: 22052000855

Address: east of Flick Avenue and west of I-35W, MN

Quadrangle(s): North Branch, MN; Stark, MN

Source: USGS Topographic Map



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Detail Report

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	1 of 1	ESE	0.25 / 1,301.69	920.12 / 0	Topline Automotive 40245 Fletcher Ave North Branch MN 55056	MPCA AI

Agency Interest ID: 126884
Name (Site): Topline Automotive
Address (Site): 40245 Fletcher Ave
City (Site): North Branch
State (Site): MN
ZIP (Site): 55056
County (Site): Chisago
Latitude (Site): 45.5427383
Longitude (Site): -92.9859891
Name (Req): Topline Automotive
Address (Req): 40245 Fletcher Ave
City (Req): North Branch
State (Req): MN
ZIP (Req): 55056

Name (Map): Topline Automotive
Address (Map): 40245 Fletcher Ave
City (Map): North Branch
State (Map): MN
ZIP (Map): 55056
County Code (Map): 025
County (Map): Chisago
Latitude (Map): 45.5427383
Longitude (Map): -92.9859891
County Code (Req): 25
County (Req): Chisago
Latitude (Req): 45.5427383
Longitude (Req): -92.9859891

Data Source: MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request

Loc Desc (Map):
Loc Desc (Req):

Agency Interests: Map Details

Item ID: 126884-AISI0000126884
Status: Active
Status Date:
Program: Const Stormwater
Program List: CS
CTU Code: 239525
CTU Name: North Branch
HUC 8: 07030005
HUC 8 Name: Lower St. Croix River
HUC 10: 0703000503
HUC 12: 070300050302
HUC 12 Name: Middle North Branch Sunrise River
PLS Twsp:
Range :
Range Dir:
Section:
Quarters:
Collection Date: 07-Apr-2016
Tmsp Created: 09-Oct-2007
User Created: DELTA_M_R1
Tmsp Updt: 26-Apr-2016
Name: Topline Automotive

Spatial ID: 53736218
Int Doc ID: 0
SI Type: CON
SI Cat: AISI
SI ID: 126884
SI Cat Desc: Agency Interest
SI Type Desc: Conventional Site
Description:
SI Designation:
Cong Dist: 8
House Dist: 32B
Senate Dist: 32
DWSMA Code:
DWSMA Name:
TRDSQQ:
Method Code: A1
Method Desc: Address Matching House Number
Ref Code: GEN
Ref Desc: General Location
Verified: No
User Updt: spatial_

My Neighborhood Site Details

Site ID: 126884
Active FLA: Yes
Activity: Construction Stormwater
Addr St: 40245 Fletcher Ave
Addr City: North Branch
Addr ZIP: 55056
Address: MN
MPCA ID: C00024138

IC Flag: No
City: North Branch
County: Chisago
Cong Distr: 8
Senate Dis: 32
House Dist: 32B
HUC 8: 07030005
Watershed : Lower St. Croix River

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
MPCA ID List:	C00024138			Latitude:	45.5427383	
Program Co:	ST			Longitude:	-92.9859891	
Program Name:	Stormwater			Coord Coll:	A1	
Program 1:	Stormwater			Coord Co 1:	Address Matching House Number	
Name:	Topline Automotive					
Site URL:	https://webapp.pca.state.mn.us/wimn/site/126884					
Activity L:	Construction Stormwater					
Industrial:						

Agency Interests: File Request Details

Item ID:	126884-AISI0000126884	Spatial ID:	53736218
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	126884
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	7030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	703000503	Cong Dist:	8
HUC 12:	70300050302	House Dist:	32B
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	A1
Quarters:		Method Desc:	Address Matching House Number
Collection Date:	4/7/2016	Ref Code:	GEN
Tmsp Created:	10/9/2007	Ref Desc:	General Location
User Created:	DELTA_M_R1	Verified:	No
Tmsp Updt:	4/26/2016	User Updt:	spatial_
Name:	Topline Automotive		
HUC 10 Name:	North Branch Sunrise River		

2 1 of 1 SSW 0.25 / 1,311.10 921.32 / 1 2019 Flink Avenue Watermain & Sanitary Trunk Project MPCA AI
Flink Avenue
North Branch MN 55056

Agency Interest ID:	229768	Name (Map):	2019 Flink Avenue Watermain & Sanitary Trunk Project
Name (Sites):	2019 Flink Avenue Watermain & Sanitary Trunk Project	Address (Map):	Flink Avenue
Address (Site):	Flink Avenue	City (Map):	North Branch
City (Site):	North Branch	State (Map):	MN
State (Site):	MN	ZIP (Map):	55056
ZIP (Site):	55056	County Code (Map):	025
County (Site):	Chisago	County (Map):	Chisago
Latitude (Site):	45.5281	Latitude (Map):	45.5281
Longitude (Site):	-92.9964	Longitude (Map):	-92.9964
Name (Req):	2019 Flink Avenue Watermain & Sanitary Trunk Project	County Code (Req):	25
Address (Req):	Flink Avenue	County (Req):	Chisago
City (Req):	North Branch	Latitude (Req):	45.5281
State (Req):	MN	Longitude (Req):	-92.9964
ZIP (Req):	55056		
Data Source:	MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request		
Loc Desc (Map):			
Loc Desc (Req):			

Agency Interests: Map Details

Item ID:	229768-AISI0000229768	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON

<i>Map Key</i>	<i>Number of Records</i>	<i>Direction</i>	<i>Distance (mi/ft)</i>	<i>Elev/Diff (ft)</i>	<i>Site</i>	<i>DB</i>
Program:	Const Stormwater				SI Cat:	AISI
Program List:	CS				SI ID:	229768
CTU Code:	239525				SI Cat Desc:	Agency Interest
CTU Name:	North Branch				SI Type Desc:	Conventional Site
HUC 8:	07030005				Description:	
HUC 8 Name:	Lower St. Croix River				SI Designation:	
HUC 10:	0703000503				Cong Dist:	8
HUC 12:	070300050302				House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River				Senate Dist:	32
PLS Twsp:					DWSMA Code:	
Range :					DWSMA Name:	
Range Dir:					TRDSQQ:	
Section:					Method Code:	G8
Quarters:					Method Desc:	GPS - Other
Collection Date:	22-May-2019				Ref Code:	CEN
Tmsp Created:	22-May-2019				Ref Desc:	Center of Feature Represented
User Created:	RSP				Verified:	No
Tmsp Updt:	22-May-2019				User Updt:	geo_nc
Name:	2019 Flink Avenue Watermain & Sanitary Trunk Project					

My Neighborhood Site Details

Site ID:	229768	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	Flink Avenue	Cong Distr:	8
Addr City:	North Branch	Senate Dis:	32
Addr ZIP:	55056	House Dist:	32A
Address:	MN	HUC 8:	07030005
MPCA ID:	C00053904	Watershed :	Lower St. Croix River
MPCA ID List:	C00053904	Latitude:	45.5281
Program Co:	ST	Longitude:	-92.9964
Program Name:	Stormwater	Coord Coll:	G8
Program 1:	Stormwater	Coord Co 1:	GPS - Other
Name:	2019 Flink Avenue Watermain & Sanitary Trunk Project		
Site URL:	https://webapp.pca.state.mn.us/wimn/site/229768		
Activity L:	Construction Stormwater		
Industrial:			

Agency Interests: File Request Details

Item ID:	229768-AISI0000229768	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	229768
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	7030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	703000503	Cong Dist:	8
HUC 12:	70300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	G8
Quarters:		Method Desc:	GPS - Other
Collection Date:	5/22/2019	Ref Code:	CEN
Tmsp Created:	5/22/2019	Ref Desc:	Center of Feature Represented
User Created:	RSP	Verified:	No
Tmsp Updt:	5/22/2019	User Updt:	geo_nc
Name:	2019 Flink Avenue Watermain & Sanitary Trunk Project		
HUC 10 Name:	North Branch Sunrise River		

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
<u>3</u>	1 of 1	NNW	0.29 / 1,531.59	920.12 / 0	Chain Lake Preserve CSLL: Centroid of Site North Branch MN 55056	MPCA AI
Agency Interest ID: 6431 Name (Sites): Chain Lake Preserve Address (Site): See location description City (Site): North Branch State (Site): MN ZIP (Site): 55056 County (Site): Chisago Latitude (Site): 45.53977258 Longitude (Site): -92.99533281 Name (Req): Chain Lake Preserve Address (Req): See location description City (Req): North Branch State (Req): MN ZIP (Req): 55056 Data Source: MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request Loc Desc (Map): CSLL: Centroid of Site *** Note:many records provided by the department have a truncated LOC_DESC field. Loc Desc (Req): CSLL: Centroid of Site Name (Map): Chain Lake Preserve Address (Map): See location description City (Map): North Branch State (Map): MN ZIP (Map): 55056 County Code (Map): 025 County (Map): Chisago Latitude (Map): 45.53977258 Longitude (Map): -92.99533281 County Code (Req): 25 County (Req): Chisago Latitude (Req): 45.53977258 Longitude (Req): -92.99533281						

Agency Interests: Map Details

Item ID:	6431-AISI0000006431	Spatial ID:	9360
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	6431
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	07030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	0703000503	Cong Dist:	8
HUC 12:	070300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	A1
Quarters:		Method Desc:	Address Matching House Number
Collection Date:	25-Apr-2016	Ref Code:	GEN
Tmsp Created:	17-May-1999	Ref Desc:	General Location
User Created:	DELTA_M_R1	Verified:	Yes
Tmsp Updt:	26-Apr-2016	User Updt:	spatial_
Name:	Chain Lake Preserve		

My Neighborhood Site Details

Site ID:	6431	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	See location description	Cong Distr:	8
Addr City:	North Branch	Senate Dis:	32
Addr ZIP:	55056	House Dist:	32A
Address:	MN	HUC 8:	07030005
MPCA ID:	C00005629	Watershed :	Lower St. Croix River
MPCA ID List:	C00005629	Latitude:	45.53977258
Program Co:	ST	Longitude:	-92.99533281
Program Name:	Stormwater	Coord Coll:	A1
Program 1:	Stormwater	Coord Co 1:	Address Matching House Number
Name:	Chain Lake Preserve		
Site URL:	https://webapp.pca.state.mn.us/wimn/site/6431		
Activity L:	Construction Stormwater		
Industrial:			

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
<u>Agency Interests: File Request Details</u>						
Item ID:	6431-AISI0000006431			Spatial ID:	9360	
Status:	Active			Int Doc ID:	0	
Status Date:				SI Type:	CON	
Program:	Const Stormwater			SI Cat:	AISI	
Program List:	CS			SI ID:	6431	
CTU Code:	239525			SI Cat Desc:	Agency Interest	
CTU Name:	North Branch			SI Type Desc:	Conventional Site	
HUC 8:	7030005			Description:		
HUC 8 Name:	Lower St. Croix River			SI Designation:		
HUC 10:	703000503			Cong Dist:	8	
HUC 12:	70300050302			House Dist:	32A	
HUC 12 Name:	Middle North Branch Sunrise River			Senate Dist:	32	
PLS Twsp:				DWSMA Code:		
Range :				DWSMA Name:		
Range Dir:				TRDSQQ:		
Section:				Method Code:	A1	
Quarters:				Method Desc:	Address Matching House Number	
Collection Date:	4/25/2016			Ref Code:	GEN	
Tmsp Created:	5/17/1999			Ref Desc:	General Location	
User Created:	DELTA_M_R1			Verified:	Yes	
Tmsp Updt:	4/26/2016			User Updt:	spatial_	
Name:	Chain Lake Preserve					
HUC 10 Name:	North Branch Sunrise River					

4	1 of 3	ESE	0.41 / 2,147.30	920.12 / 0	Bauer Residence 6116 400th St North Branch MN 55056	HIST LAST
Prog Int ID:	274035			Address Source:	CORE	
Site ID:	248844			Township Name:	Amador	
State County Code:	13			County Name:	Chisago	
Country:	USA			Lat/Long ID:	135071	
Interest Type Cd:	LS			Interest Type Dsc:	Leak Site	
ADDR ID:	389972			Lat Degrees:	45	
Tank Site:	15455			Lat Minutes:	31	
Interest Phone:	NO CORE PI PH.			Lat Seconds:	42.31	
Interest Start Dt:	10/21/2003 00:00:00			Long Degrees:	-92	
Interest End Dt:	12/05/2006 07:41:16			Long Minutes:	59	
Active?:	No			Long Seconds:	21.93	
Timestamp Added:	12/05/2006 07:41:16			Lat/Long Source:	CORE	
Timestamp Updt:	11/10/2014 08:17:05			Lat/Long Site ID:	248844	
Staff ID Updt:	RGAGLE			Lat/Long Spatial ID:	51861179	
Source:	CORE			Collection Date:	02/24/2004 00:00:00	
Coord Src Type:				Map Scale Code:		
Coord Src Desc:				Org Name Source:	A. Sandbeck	
Foreign State:				Foreign Zone:		
FIPS County Cd1:	025					
Addr Timestamp Add:	12/05/2006 07:40:29					
Addr Timestamp Lst Updt:	11/04/2008 21:13:55					
Addr Updater Staff ID:	SYSTEM					
Lat/Long Timestamp Added:	12/05/2006 07:41:30					
Lat/Long Tmstmp Last Upd:	12/05/2006 22:03:53					
Lat/Long Updater Staff ID:	COREUSER					
Lat/Long Desc:						
Coord Coll Method Desc:	Digitized-DOQ					
Coord Coll Method Code:	I2					
Comments:						

Leak Site

Complete Site Closure Date:	10/20/2006 00:00:00
Cond Closure Date:	
Release Discovered Date:	10/15/2003 00:00:00
Leaksite Type Code:	3
Leaksite Type Desc:	Both Leak/PBP Site

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Leak Report Date:		10/16/2003 00:00:00				
Tank Reg Status Code:		N				
TMSP Added:		10/21/2003 12:19:10				
TMSP Last Updt:		05/29/2007 10:53:48				
CU Yds Excavated Qty:						
ENF Action Begin Date:		10/23/2003 00:00:00				
Residence Type Code:						
File Archive Box:						
File Archive Lot:						
Soil Digout Date:						
Staff ID Last Updt:		DMITZUK				
Std Letter Response Date:		03/15/2005 00:00:00				
VPIC Acres:		.5				
VPIC Application Date:						
Contam Soils Remaining Flag:		U				
Indoor Air Collected Flag:						
LUST Trust Eligible Flag:		No				
Offsite Contam Flag:		U				
REIMB Awarded Flag:		No				
Release From AST Flag:		Yes				
Release From UST Flag:		No				
Soil Gas Action Level Flag:						
Soil Gas Data Collected Flag:		No				
Sub Slab Sample Collected Flag:						
Surface Water Impact Flag:		U				
Utility Project Flag:		No				
Vapor Intrusion Action Flag:						
Vapor Intrusion Checked Flag:		Yes				
Leaksite Type Defn:		Both leak and a PBP site.				
Soil Gas Data Comments:						
Vapor Intrusion Comments:						
<u>Leak Product Release</u>						
Product RIs Seq ID:		100576				
Leak Product Desc:		Fuel Oil 1 & 2				
Leak Product Defn:		The product is fuel oil 1 & 2.				
Product RIs Seq ID:		100575				
Leak Product Desc:		Gasoline, Type Unknown				
Leak Product Defn:		The product is an unknown type of gasoline.				
<u>Leak GW Info</u>						
Well Type Code:						
Affected Non Res Props:						
Affected Residential Props:						
Staff ID Last Updt:		MKOPLIT				
Staff ID Wellhead Area Assess:		3369				
TMSP Added:		11/03/2006 17:35:36				
TMSP Last Updt:		11/03/2006 17:35:36				
Water Supply Exceeds Ral Flag:						
Cleanup Goal Achieved Flag:						
DW Supply Contam Flag:						
Free Product at Close Flag:		No				
Free Product Observed Flag:						
Free Product Thickness:						
Ground Water Contam Flag:		Y				
GW Cleanup Goal:						
GW Exceeds Cleanup Goal Flag:						
Impacted Aquifer Code:						
MTBE High Level Date:						
MTBE High Ug Per Liter Char:						
MTBE High Ug Per Liter Numb:						

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Program 1:		Investigation and Cleanup		Coord Co 1:	Digitized-DOQ	
Name:		Bauer Residence				
Site URL:		https://webapp.pca.state.mn.us/wimn/site/194710				
Activity L:		Petroleum Remediation, Leak Site				
Industrial:						
<u>Agency Interests: File Request Details</u>						
Item ID:		194710-AISI0000194710		Spatial ID:	51861178	
Status:		Active		Int Doc ID:	0	
Status Date:				SI Type:	CON	
Program:		PetroleumRemediation		SI Cat:	AIS	
Program List:		PR		SI ID:	194710	
CTU Code:		239525		SI Cat Desc:	Agency Interest	
CTU Name:		North Branch		SI Type Desc:	Conventional Site	
HUC 8:		7030005		Description:		
HUC 8 Name:		Lower St. Croix River		SI Designation:		
HUC 10:		703000503		Cong Dist:	8	
HUC 12:		70300050302		House Dist:	32B	
HUC 12 Name:		Middle North Branch Sunrise River		Senate Dist:	32	
PLS Twsp:				DWSMA Code:		
Range :				DWSMA Name:		
Range Dir:				TRDSQQ:		
Section:				Method Code:	I2	
Quarters:				Method Desc:	Digitized-DOQ	
Collection Date:		4/25/2016		Ref Code:	GEN	
Tmsp Created:		12/5/2006		Ref Desc:	General Location	
User Created:		DELTA_M_R2		Verified:	No	
Tmsp Updt:		4/26/2016		User Updt:	spatial_	
Name:		Bauer Residence				
HUC 10 Name:		North Branch Sunrise River				

<u>4</u>	3 of 3	ESE	0.41 / 2,147.30	920.12 / 0	Bauer Residence 6116 400th St North Branch MN	LST REM SITE
Item ID:	194710-AREA0000000001			Federal Reg:		
Project ID:	LS0015455			Fed State Reg:		
Project Type:	Leak Site			Non Reg:	Yes	
Project ID (RAP):	LS0015455			SEMS?:		
Project Type (RAP):	Leak Site			NPL:		
Site Status:	Closed			Unpermitted Dump?:		
Perm List of Prior?:				Latitude:	45.52842331	
Petrol Brownfield?:				Longitude:	-92.98943329	
VIC Site?:				County (RAP):	Chisago	
Sf Voluntary:				Latitude (RAP):	45.52842331	
Inst Controls?:				Longitude (RAP):	-92.98943329	
State Reg:						
Project Name:	Bauer Residence					
Site Address 1:	6116 400th St					
Site Address 2:						
Site City:	North Branch					
Site State:	MN					
Site ZIP:	55056					
Site County:	Chisago					
Project Name(RAP):	Bauer Residence					
Address1 (RAP):	6116 400th St					
Address2 (RAP):						
City (RAP):	North Branch					
State (RAP):	MN					
ZIP (RAP):	55056					
Project Managers:	Mark Koplitz (former)					
Data Source:	MPCA Remediation Sites; MPCA Remediation Sites with RAP approvals					

Remediation Sites Details

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Activity ID:	194710				DWSMA Name:	
SI ID:	1				Cong Dist:	8
SI Cat:	AREA				House Dist:	32B
SI Type:	LEAK				Senate Dis:	32
Site Type:	CON				HUC 8:	07030005
Acreage:	0.50				HUC 10:	0703000503
HRS Score:					HUC 12:	070300050302
Score Year:					AI Name:	Bauer Residence
DWSMA Code:					Method Desc:	Digitized-DOQ
Objectid:		1519				
Loc Desc:		Center of Site				
Huc 8 Name:		Lower St. Croix River				
Huc12 Name:		Middle North Branch Sunrise River				
Hydrologis:		Bassou Oulgout (former)				
WIMN Url:		https://webapp.pca.state.mn.us/wimn/site/194710				

Remediation Sites with RAP Approval

Activity ID:	194710	Rap Date:	
No Assoc Date:		Site Start:	10/16/2003
No Assoc Letter:	No	Rap Approved:	4/28/2006
Has Rp:	Yes	Rap Completed:	10/20/2006
Coord Collect Methd:	Digitized-DOQ	Site Closed:	10/20/2006
Parcels:			
WIMN:	https://webapp.pca.state.mn.us/wimn/site/194710		
AI Name:	Bauer Residence		
Rp Names:	Don Bauer		

Spatial Remediation Activity

AI ID:	194710	Site Start:	2003-10-16 00:00:00
Site ID:	LS0015455	Remedy Imp:	
SI ID:	1	Remedy Sel:	
SI Cat:	AREA	ASMT Compl:	
NFA Decisi:		Received:	
Site Close:	2006-10-20 00:00:00	NPL List:	
Leak Discovered:	2003-10-15 00:00:00	NPL Delete:	
Leak Reported:	2003-10-16 00:00:00	PLP List:	
Leak Reopened:		PLP Delist:	
Activity No:	1	Staff Assi:	
Activity ID:	SIW20030001	FF Aproved:	
Activity Type:	Leak Site Investigation	FF Closed:	
Activity Code:	SIW	Inv Comple:	
Activity Year:	2003	App Comple:	2006-02-28 00:00:00
Discovered:		Er Site Ev:	
Object ID:	29480		

5	1 of 1	SSW	0.41 / 2,178.82	921.14 / 1	Meadows North 2nd Addition XXX Flink Avenue North Branch MN 55056	MPCA AI
Agency Interest ID:	228631	Name (Map):	Meadows North 2nd Addition			
Name (Sites):	Meadows North 2nd Addition	Address (Map):	XXX Flink Avenue			
Address (Site):	XXX Flink Avenue	City (Map):	North Branch			
City (Site):	North Branch	State (Map):	MN			
State (Site):	MN	ZIP (Map):	55056			
ZIP (Site):	55056	County Code (Map):	025			
County (Site):	Chisago	County (Map):	Chisago			
Latitude (Site):	45.525908	Latitude (Map):	45.525908			
Longitude (Site):	-92.998656	Longitude (Map):	-92.998656			
Name (Req):	Meadows North 2nd Addition	County Code (Req):	25			
Address (Req):	XXX Flink Avenue	County (Req):	Chisago			
City (Req):	North Branch	Latitude (Req):	45.525908			
State (Req):	MN	Longitude (Req):	-92.998656			
ZIP (Req):	55056					
Data Source:	MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request					

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Loc Desc (Map):		Southwest Quadrant of Flink Avenue and 400th Street *** Note:many records provided by the department have a truncated LOC_DESC field.				
Loc Desc (Req):		Southwest Quadrant of Flink Avenue and 400th Street				

Agency Interests: Map Details

Item ID:	228631-AISI0000228631	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	228631
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	07030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	0703000503	Cong Dist:	8
HUC 12:	070300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	DP
Quarters:		Method Desc:	Digitized - MPCA online map
Collection Date:	05-Mar-2019	Ref Code:	CEN
Tmsp Created:	06-Mar-2019	Ref Desc:	Center of Feature Represented
User Created:	RSP	Verified:	No
Tmsp Updt:	27-May-2021	User Updt:	dcharpe
Name:	Meadows North 2nd Addition		

My Neighborhood Site Details

Site ID:	228631	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	XXX Flink Avenue	Cong Distr:	8
Addr City:	North Branch	Senate Dis:	32
Addr ZIP:	55056	House Dist:	32A
Address:	MN	HUC 8:	07030005
MPCA ID:	C00053081	Watershed :	Lower St. Croix River
MPCA ID List:	C00053081	Latitude:	45.525908
Program Co:	ST	Longitude:	-92.998656
Program Name:	Stormwater	Coord Coll:	DP
Program 1:	Stormwater	Coord Co 1:	Digitized - MPCA online map
Name:	Meadows North 2nd Addition		
Site URL:	https://webapp.pca.state.mn.us/wimn/site/228631		
Activity L:	Construction Stormwater		
Industrial:			

Agency Interests: File Request Details

Item ID:	228631-AISI0000228631	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	228631
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	7030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	703000503	Cong Dist:	8
HUC 12:	70300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	DP

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Quarters:				Method Desc:		Digitized - MPCA online map CEN Center of Feature Represented No dcharpe
Collection Date:		3/5/2019	Ref Code:			
Tmsp Created:		3/6/2019	Ref Desc:			
User Created:		RSP	Verified:			
Tmsp Updt:		5/27/2021	User Updt:			
Name:		Meadows North 2nd Addition				
HUC 10 Name:		North Branch Sunrise River				

Unplottable Summary

Total: 3 Unplottable sites

DB	Company Name/Site Name	Address	City	Zip	ERIS ID
FINDS/FRS	FLINK AVENUE ALIGNMENT	FLINK AVE	NORTH BRANCH MN	55056	857876038
		<i>Registry ID:</i> 110068404426			
HIST SPL	WENZEL TOWING INC	I 35	NORTH BRANCH MN		819436999
		<i>Program Int ID:</i> 188403			
SPILLS	WENZEL TOWING INC	I 35 MN	NORTH BRANCH MN		860684194

Unplottable Report

Site: **FLINK AVENUE ALIGNMENT**
FLINK AVE NORTH BRANCH MN 55056

[FINDS/FRS](#)

Registry ID: 110068404426
FIPS Code: 27025
HUC Code:
Site Type Name: STATIONARY
Location Description:
Supplemental Location:
Create Date: 02-JUN-16
Update Date:
Interest Types: STATE MASTER
SIC Codes:
SIC Code Descriptions:
NAICS Codes:
NAICS Code Descriptions:
Conveyor:
Federal Facility Code:
Federal Agency Name:
Tribal Land Code:
Tribal Land Name:
Congressional Dist No:
Census Block Code:
EPA Region Code: 05
County Name: CHISAGO
US/Mexico Border Ind:
Latitude:
Longitude:
Reference Point:
Coord Collection Method:
Accuracy Value:
Datum: NAD83
Source:
Facility Detail Rprt URL: https://ofmpub.epa.gov/frs_public2/fii_query_detail.disp_program_facility?p_registry_id=110068404426
Program Acronyms:

MN-TEMPO:124840

Site: **WENZEL TOWING INC**
I 35 NORTH BRANCH MN

[HIST SPL](#)

Program Int ID:	188403	Tmsp Added:	03/21/1996 00:00:00
Site ID:	0	TMSP Update:	05/04/2002 07:36:20
Interest Type:	Spill Site	Prgm Int Source:	TALES
Preferred ID:	19368	Address Source:	TALES
Active?:		Interest Phone:	
Interest Start:	03/21/1996 00:00:00	Township:	
Interest End:		County:	Chisago
Comments:	*NO FILE*		

Spill Site

Spill Site Closure Date: 04/25/1994 00:00:00
Spill Date: 04/25/1994 00:00:00
Spill Reported Date: 04/25/1994 00:00:00
Priority Code: 4
MPCA Involvement:
Initial Cause: SEMI SPUN OUT

Initial Source:**Public Safety Spill ID:****Duty Officer Report Number:****Spill Reported by:** METRO STATE PATROL**Report Taken By Initials:** 3297**Rpt Taken by Duty Officer Flag:****MPCA Project Manager:** 3297**Tmsp Added:** 03/21/1996 00:00:00**Tmsp Last Updt:** 04/11/2007 08:23:03**Staff ID Last Updt:** RSUCHAN**Rep Name:****Rep Phone:****Archive Lot:****Archive Box:****Response Desc:****Spill Released Product****Spill Product:** Light Fuel Oil and Diesel**Spill Released Quantity:** 50**Spill Qty Units:** Gallons**Spill Incident Accuracy:** Known**Date Added:** 03/21/1996 00:00:00**Last Update:** 05/04/2002 07:36:20**Staff ID Last Update:** TANKS**Site:** WENZEL TOWING INC
I 35 MN NORTH BRANCH MN

SPILLS

Incident ID: 19368**Incident Status:** Closed or Completed**Incident Type:** Spill or Release**Incident Date:** 4/25/1994**Program:** Emergency Response**Closure Type:****County:** Chisago**Coord Method:****Location:** I 35

MN

**Note: Many records provided by the department have a truncated LOCATION field.

AI ID Source:**Source Address:****Source City:****Source State:****Source Zip:****Latitude:****Longitude:****Lead Investigator and Duty Officer****Substances:** 50 gallons Diesel Fuel**Duty Officer No:****Lead Investigator:** Richard Kable

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ERIS updates databases as set out in ASTM Standard E1527-13 and E1527-21, Section 8.1.8 Sources of Standard Source Information:

"Government information from nongovernmental sources may be considered current if the source updates the information at least every 90 days, or, for information that is updated less frequently than quarterly by the government agency, within 90 days of the date the government agency makes the information available to the public."

Standard Environmental Record Sources

Federal

Formerly Utilized Sites Remedial Action Program:

DOE FUSRAP

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

Government Publication Date: Mar 4, 2017

National Priority List:

NPL

Sites on the United States Environmental Protection Agency (EPA)'s National Priorities List of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. The NPL, which EPA is required to update at least once a year, is based primarily on the score a site receives from EPA's Hazard Ranking System. A site must be on the NPL to receive money from the Superfund Trust Fund for remedial action. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Mar 30, 2022

National Priority List - Proposed:

PROPOSED NPL

Sites proposed - by the EPA, the state agency, or concerned citizens - for addition to the NPL due to contamination by hazardous waste and identified by the Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Mar 30, 2022

Deleted NPL:

DELETED NPL

Sites deleted from the United States Environmental Protection Agency (EPA)'s National Priorities List. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Mar 30, 2022

SEMS List 8R Active Site Inventory:

SEMS

The Superfund Program has deployed the Superfund Enterprise Management System (SEMS), which integrates multiple legacy systems into a comprehensive tracking and reporting tool. This inventory contains active sites evaluated by the Superfund program that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted.

Government Publication Date: Apr 27, 2022

Inventory of Open Dumps, June 1985:

ODI

The Resource Conservation and Recovery Act (RCRA) provides for publication of an inventory of open dumps. The Act defines "open dumps" as facilities which do not comply with EPA's "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR 257).

Government Publication Date: Jun 1985

SEMS List 8R Archive Sites:

SEMS ARCHIVE

The Superfund Enterprise Management System (SEMS) Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time.

Government Publication Date: Apr 27, 2022

Comprehensive Environmental Response, Compensation and Liability Information System -

CERCLIS

CERCLIS:

Superfund is a program administered by the United States Environmental Protection Agency (EPA) to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The EPA administers the Superfund program in cooperation with individual states and tribal governments; this database is made available by the EPA.

Government Publication Date: Oct 25, 2013

EPA Report on the Status of Open Dumps on Indian Lands:

IODI

Public Law 103-399, The Indian Lands Open Dump Cleanup Act of 1994, enacted October 22, 1994, identified congressional concerns that solid waste open dump sites located on American Indian or Alaska Native (AI/AN) lands threaten the health and safety of residents of those lands and contiguous areas. The purpose of the Act is to identify the location of open dumps on Indian lands, assess the relative health and environment hazards posed by those sites, and provide financial and technical assistance to Indian tribal governments to close such dumps in compliance with Federal standards and regulations or standards promulgated by Indian Tribal governments or Alaska Native entities.

Government Publication Date: Dec 31, 1998

CERCLIS - No Further Remedial Action Planned:

CERCLIS NFRAP

An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. The Archive designation means that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Government Publication Date: Oct 25, 2013

CERCLIS Liens:

CERCLIS LIENS

A Federal Superfund lien exists at any property where EPA has incurred Superfund costs to address contamination ("Superfund site") and has provided notice of liability to the property owner. A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. This database is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Jan 30, 2014

RCRA CORRACTS-Corrective Action:

RCRA CORRACTS

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. At these sites, the Corrective Action Program ensures that cleanups occur. EPA and state regulators work with facilities and communities to design remedies based on the contamination, geology, and anticipated use unique to each site.

Government Publication Date: Apr 11, 2022

RCRA non-CORRACTS TSD Facilities:[RCRA TSD](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. This database includes Non-Corrective Action sites listed as treatment, storage and/or disposal facilities of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Government Publication Date: Apr 11, 2022

RCRA Generator List:[RCRA LQG](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Large Quantity Generators (LQGs) generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste.

Government Publication Date: Apr 11, 2022

RCRA Small Quantity Generators List:[RCRA SQG](#)

RCRA Info is the EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Small Quantity Generators (SQGs) generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.

Government Publication Date: Apr 11, 2022

RCRA Very Small Quantity Generators List:[RCRA VSQG](#)

RCRA Info is the EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Very Small Quantity Generators (VSQG) generate 100 kilograms or less per month of hazardous waste, or one kilogram or less per month of acutely hazardous waste. Additionally, VSQG may not accumulate more than 1,000 kilograms of hazardous waste at any time.

Government Publication Date: Apr 11, 2022

RCRA Non-Generators:[RCRA NON GEN](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Non-Generators do not presently generate hazardous waste.

Government Publication Date: Apr 11, 2022

RCRA Sites with Controls:[RCRA CONTROLS](#)

List of Resource Conservation and Recovery Act (RCRA) facilities with institutional controls in place. RCRA gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Government Publication Date: Apr 11, 2022

Federal Engineering Controls-ECs:[FED ENG](#)

Engineering controls (ECs) encompass a variety of engineered and constructed physical barriers (e.g., soil capping, sub-surface venting systems, mitigation barriers, fences) to contain and/or prevent exposure to contamination on a property. This database is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Dec 30, 2021

Federal Institutional Controls-ICs:[FED INST](#)

Institutional controls are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Although it is EPA's (United States Environmental Protection Agency) expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use whenever practicable, ICs play an important role in site remedies because they reduce exposure to contamination by limiting land or resource use and guide human behavior at a site.

Government Publication Date: Dec 30, 2021

Land Use Control Information System:

LUCIS

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

Government Publication Date: Sep 1, 2006

Institutional Control Boundaries at NPL sites:

NPL IC

Boundaries of Institutional Control areas at sites on the United States Environmental Protection Agency (EPA)'s National Priorities List, or Proposed or Deleted, made available by the EPA's Shared Enterprise Geodata and Services (SEGS). United States Environmental Protection Agency (EPA)'s National Priorities List of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy.

Government Publication Date: Mar 30, 2022

Emergency Response Notification System:

ERNS 1982 TO 1986

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1982-1986

Emergency Response Notification System:

ERNS 1987 TO 1989

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1987-1989

Emergency Response Notification System:

ERNS

Database of oil and hazardous substances spill reports made available by the United States Coast Guard National Response Center (NRC). The NRC fields initial reports for pollution and railroad incidents and forwards that information to appropriate federal/state agencies for response. These data contain initial incident data that has not been validated or investigated by a federal/state response agency.

Government Publication Date: Dec 31, 2021

The Assessment, Cleanup and Redevelopment Exchange System (ACRES) Brownfield Database:

FED BROWNFIELDS

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off greenspaces and working lands. This database is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Aug 20, 2021

FEMA Underground Storage Tank Listing:

FEMA UST

The Federal Emergency Management Agency (FEMA) of the Department of Homeland Security maintains a list of FEMA owned underground storage tanks.

Government Publication Date: Dec 31, 2017

Facility Response Plan:

FRP

List of facilities that have submitted Facility Response Plans (FRP) to EPA. Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit Facility Response Plans (FRPs). Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments.

Government Publication Date: Dec 31, 2021

Delisted Facility Response Plans:

DELISTED FRP

Facilities that once appeared in - and have since been removed from - the list of facilities that have submitted Facility Response Plans (FRP) to EPA. Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit Facility Response Plans (FRPs). Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments.

Government Publication Date: Dec 31, 2021

Historical Gas Stations:

HIST GAS STATIONS

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

Government Publication Date: Jul 1, 1930

Petroleum Refineries:

REFN

List of petroleum refineries from the U.S. Energy Information Administration (EIA) Refinery Capacity Report. Includes operating and idle petroleum refineries (including new refineries under construction) and refineries shut down during the previous year located in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, and other U.S. possessions. Survey locations adjusted using public data.

Government Publication Date: Feb 4, 2022

Petroleum Product and Crude Oil Rail Terminals:

BULK TERMINAL

List of petroleum product and crude oil rail terminals made available by the U.S. Energy Information Administration (EIA). Includes operable bulk petroleum product terminals located in the 50 States and the District of Columbia with a total bulk shell storage capacity of 50,000 barrels or more, and/or the ability to receive volumes from tanker, barge, or pipeline; also rail terminals handling the loading and unloading of crude oil that were active between 2017 and 2018. Petroleum product terminals comes from the EIA-815 Bulk Terminal and Blender Report, which includes working, shell in operation, and shell idle for several major product groupings. Survey locations adjusted using public data.

Government Publication Date: Feb 4, 2022

LIEN on Property:

SEMS LIEN

The EPA Superfund Enterprise Management System (SEMS) provides LIEN information on properties under the EPA Superfund Program.

Government Publication Date: Apr 27, 2022

Superfund Decision Documents:

SUPERFUND ROD

This database contains a listing of decision documents for Superfund sites. Decision documents serve to provide the reasoning for the choice of (or) changes to a Superfund Site cleanup plan. The decision documents include Records of Decision (ROD), ROD Amendments, Explanations of Significant Differences (ESD), along with other associated memos and files. This information is maintained and made available by the US EPA (Environmental Protection Agency).

Government Publication Date: May 3, 2022

State**Minnesota Permanent List of Priorities:**

PLP

The state Superfund sites in Minnesota are listed on the Minnesota Permanent List of Priorities (PLP). The hazardous waste sites on the PLP are in various stages of remediation. At these sites investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues. This data is made available by the Minnesota Pollution Control Agency (MPCA). This database is state equivalent NPL.

Government Publication Date: Mar 1, 2022

Delisted Permanent List of Priorities (PLP):

DEL PLP

This list contains sites that were previously included in Permanent List of Priorities (PLP) maintained by Minnesota's Pollution Control Agency (MPCA) but have now been delisted. This database is state equivalent NPL.

Government Publication Date: Mar 1, 2022

Minnesota Site Remediation Section Database:

SHWS

The Site Remediation Section identifies, investigates, and determines appropriate cleanup plans for abandoned or uncontrolled hazardous waste sites where a release or potential release of a hazardous substance poses a risk to human health or the environment. This data is made available by the Minnesota Pollution Control Agency (MPCA)'s Site Remediation Section. This database is state equivalent CERCLIS.

Government Publication Date: Mar 1, 2022

MPCA Site Assessment Sites:

SITE ASSESSMENT

A list of active and closed sites that are currently under site assessment by Minnesota Pollution Control Agency (MPCA) and are a part of MPCA Remediation Sites list.

Government Publication Date: Mar 1, 2022

Permitted Solid Waste Facilities:

SWF/LF

A list of permitted solid waste and landfill facilities made available by the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 22, 2022

Closed Landfills Priority List:

[LCP](#)

The Minnesota Legislature enacted the Landfill Cleanup Act (LCA) in 1994 to ensure the proper closure and post-closure care at up to 112 closed, permitted municipal sanitary landfills located throughout the state. Based on this legislation, the Minnesota Pollution Control Agency (MPCA) created the Closed Landfill Program (CLP) to administer the LCA mandates. This data made available by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Oct 6, 2020

Unpermitted Dump Sites:

[UNPERMITTED LF](#)

The Minnesota Pollution Control Agency (MPCA) defines "dumps" as those landfills that never held a valid permit from the MPCA. Generally, dumps existed prior to the permitting program established with the creation of the MPCA in 1967. This database made available by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Recycling Markets Directory:

[RECYCLING](#)

The Recycling Markets Directory is provided by the Minnesota Pollution Control Agency (MPCA). The markets in this database accept large (commercial) quantities of materials.

Government Publication Date: Nov 8, 2018

Historical Leaking Underground Storage Tanks:

[HIST LUST](#)

A list of leaking underground storage tanks (LUSTs) in the tanks database maintained by the Minnesota Pollution Control Agency (MPCA) up until Nov 01, 2016.

Government Publication Date: Nov 1, 2016

Deleted Leaking Underground Storage Tanks:

[DEL LUST](#)

A list of leaking underground storage tanks that are often deleted for various reasons. Deletion occurs primarily due to a duplication, or that the source was determined to not be from a tank. This list was provided by Minnesota Pollution Control Agency.

Government Publication Date: Jan 5, 2016

Historical Leaking Aboveground Storage Tanks:

[HIST LAST](#)

A list of leaking aboveground storage tanks (LASTs) in the tanks database maintained by the Minnesota Pollution Control Agency (MPCA) up until Nov 01, 2016.

Government Publication Date: Nov 1, 2016

Historical Leak Sites:

[HIST LEAKSITES](#)

A list of leak sites that were neither determined as aboveground nor underground in the tanks database maintained by the Minnesota Pollution Control Agency (MPCA) up until Nov 01, 2016.

Government Publication Date: Nov 1, 2016

MPCA Remediation Leak Sites:

[LST REM SITE](#)

A list of leak sites in which Minnesota Pollution Control Agency (MPCA) is involved in remediation activities, this list is published by MPCA.

Government Publication Date: Mar 1, 2022

MPCA Tank Incidents:

[LST INCIDENT](#)

A list of leaking and registered tank sites in Minnesota that includes locations, details of tank installation and construction, and installed safety measures. This list is provided by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Delisted Leaking Storage Tanks:

[DELISTED LST](#)

This database contains a list of closed leaking storage tank sites that were removed from the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Underground Storage Tanks:

[UST](#)

In Minnesota, there are about 18,000 regulated underground storage tanks (USTs) currently in use. The Underground Storage Tank Program in the Minnesota Pollution Control Agency (MPCA) was created to help prevent contamination caused by leaking tanks. This is a list that contains all regulated USTs. This data made available by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Minnesota Above Ground Storage Tanks:

AST

There are more than 20,000 regulated above-ground storage tanks (ASTs) currently in use across Minnesota. Most tanks located above ground containing liquid substances (i.e., not gaseous or solid at ambient temperature and pressure) are subject to the Minnesota Pollution Control Agency's (MPCA) rules for design and operation of ASTs. This list contains ASTs regulated by MPCA. This data made available by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Tank Sites:

HIST TANK

A list of tank sites not included in AST or UST, this list maintained by the Minnesota Pollution Control Agency (MPCA) up until Dec 30, 2016.

Government Publication Date: Dec 30, 2016

Delisted Storage Tanks:

DELISTED TANK

This database contains a list of storage tank sites that were removed from the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Apr 28, 2022

Sites with Institutional Control Events:

INST

A list made available by the Minnesota Pollution Control Agency (MPCA) consisting of remediation sites that have various institutional controls in place.

Government Publication Date: Feb 14, 2022

Agricultural Contingency Sites Boundaries:

AG CONTINGENCY

The Minnesota Department of Agriculture (MDA) Incident Response Unit (IRU) is the state lead agency for the investigation and remediation of incidents involving agricultural chemicals (pesticides and fertilizer). This MDA IRU database includes sites with a soil or ground water contingency, deed restriction, local ordinance, restrictive covenant or deed affidavit in place. The accuracy of the boundaries of these sites can be variable - in most cases, the site boundaries should be considered as only representing the vicinity of the soil or ground water contingency area or plume.

Government Publication Date: Feb 22, 2022

Petroleum Brownfields Program Sites:

BROWNFIELDS

The Minnesota Pollution Control Agency (MPCA)'s Petroleum Brownfields Program handles petroleum contamination under the Petroleum Tank Release Cleanup Act (Minnesota Statutes § 115C). This data made available by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Voluntary Investigation and Cleanup Program List:

VIC

The Minnesota Pollution Control Agency's (MPCA) Brownfield Program consists of an integrated program called the Voluntary Investigation and Cleanup (VIC) Program. This program handles hazardous substance contamination under Minnesota's Environmental Response and Liability Act (Minnesota Statutes § 115B). This database made available by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Potential Voluntary Investigation and Cleanup Program Sites:

POTENTIAL VIC

This listing of Potential Voluntary Investigation and Cleanup Program sites is provided by the Minnesota Pollution Control Agency (MPCA). These potential sites have not yet entered into the VIC Program until an application has been received at the MPCA.

Government Publication Date: Apr 22, 2016

MPCA Agency Interests:

MPCA AI

Facility, site and project locations from the Minnesota Pollution Control Agency's enterprise database, representing locations associated with waste water, storm water, hazardous waste, feedlot, solid waste, tanks, remediation, and other agency programs. Includes records from "What's In My Neighborhood Sites".

Government Publication Date: Mar 4, 2022

Tribal**Leaking Underground Storage Tanks on Indian Lands:**

INDIAN LUST

LUSTs on Tribal/Indian Lands in Region 5, which includes Michigan, Minnesota, and Wisconsin.

Government Publication Date: Oct 12, 2021

Underground Storage Tanks (USTs) on Indian Lands:

INDIAN UST

USTs on Tribal/Indian Lands in Region 5, which includes Michigan, Minnesota, and Wisconsin.

Government Publication Date: Oct 12, 2021

Delisted Tribal Leaking Storage Tanks:

DELISTED ILST

Leaking Underground Storage Tank facilities which have been removed from the Regional Tribal LUST lists made available by the EPA.

Government Publication Date: Oct 12, 2021

Delisted Tribal Underground Storage Tanks:

DELISTED IUST

Underground Storage Tank facilities which have been removed from the Regional Tribal UST lists made available by the EPA.

Government Publication Date: Oct 13, 2021

County

No County standard environmental record sources available for this State.

Additional Environmental Record Sources**Federal****Facility Registry Service/Facility Index:**

FINDS/FRS

The Facility Registry Service (FRS) is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, and data collected from EPA's Central Data Exchange registrations and data management personnel. This list is made available by the Environmental Protection Agency (US EPA).

Government Publication Date: Nov 2, 2020

Toxics Release Inventory (TRI) Program:

TRIS

The EPA's Toxics Release Inventory (TRI) is a database containing data on disposal or other releases of over 650 toxic chemicals from thousands of U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment. One of TRI's primary purposes is to inform communities about toxic chemical releases to the environment.

Government Publication Date: Aug 24, 2021

Perfluorinated Alkyl Substances (PFAS) Releases:

PFAS TRI

List of Toxics Release Inventory (TRI) facilities at which the reported chemical is a Per- or polyfluorinated alkyl substance (PFAS) included in the Environmental Protection Agency (EPA)'s consolidated PFAS Master List of PFAS Substances. The EPA's Toxics Release Inventory (TRI) is a database containing data on disposal or other releases of over 650 toxic chemicals from thousands of U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment.

Government Publication Date: Aug 24, 2021

PFOA/PFOS Contaminated Sites:

PFAS NPL

List of sites where PFOA or PFOS contaminants have been found in drinking water or soil. Made available by the Federal Environmental Protection Agency (EPA).

Government Publication Date: Jan 11, 2022

Perfluorinated Alkyl Substances (PFAS) Water Quality:

PFAS WATER

The Water Quality Portal (WQP) is a cooperative service sponsored by the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council (NWQMC). This listing includes records from the Water Quality Portal where the characteristic (environmental measurement) is in the Environmental Protection Agency (EPA)'s consolidated PFAS Master List of PFAS Substances.

Government Publication Date: Jul 20, 2020

SSEHRI PFAS Contamination Sites:

PFAS SSEHRI

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Disclaimer: The source conveys this database undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Limited location details are available with this data. Access the following for the most current informations <https://pfasproject.com/pfas-contamination-site-tracker/>

Government Publication Date: Dec 12, 2019

National Response Center PFAS Spills:

ERNS PFAS

National Response Center (NRC) calls from 1990 to the most recent complete calendar year where there is indication of Aqueous Film Forming Foam (AFFF) usage. NRC calls may reference AFFF usage in the "Material Involved" or "Incident Description" fields. Data made available by the US Environmental Protection Agency (EPA). Disclaimer: dataset may include initial or misidentified incident data not yet validated or investigated by a federal/state response agency.

Government Publication Date: Feb 23, 2022

Hazardous Materials Information Reporting System:

HMIRS

US DOT - Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) Incidents Reports Database taken from Hazmat Intelligence Portal, U.S. Department of Transportation.

Government Publication Date: Sep 1, 2020

National Clandestine Drug Labs:

NCDL

The U.S. Department of Justice ("the Department") provides this data as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy.

Government Publication Date: Nov 22, 2021

Toxic Substances Control Act:

TSCA

The Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule.

The CDR enables EPA to collect and publish information on the manufacturing, processing, and use of commercial chemical substances and mixtures (referred to hereafter as chemical substances) on the TSCA Chemical Substance Inventory (TSCA Inventory). This includes current information on chemical substance production volumes, manufacturing sites, and how the chemical substances are used. This information helps the Agency determine whether people or the environment are potentially exposed to reported chemical substances. EPA publishes submitted CDR data that is not Confidential Business Information (CBI).

Government Publication Date: Apr 11, 2019

Hist TSCA:

HIST TSCA

The Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule.

The 2006 IUR data summary report includes information about chemicals manufactured or imported in quantities of 25,000 pounds or more at a single site during calendar year 2005. In addition to the basic manufacturing information collected in previous reporting cycles, the 2006 cycle is the first time EPA collected information to characterize exposure during manufacturing, processing and use of organic chemicals. The 2006 cycle also is the first time manufacturers of inorganic chemicals were required to report basic manufacturing information.

Government Publication Date: Dec 31, 2006

FTTS Administrative Case Listing:

FTTS ADMIN

An administrative case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.

Government Publication Date: Jan 19, 2007

FTTS Inspection Case Listing:

FTTS INSP

An inspection case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.

Government Publication Date: Jan 19, 2007

Potentially Responsible Parties List:

PRP

Early in the cleanup process, the Environmental Protection Agency (EPA) conducts a search to find the potentially responsible parties (PRPs). EPA looks for evidence to determine liability by matching wastes found at the site with parties that may have contributed wastes to the site.

Government Publication Date: Mar 30, 2022

State Coalition for Remediation of Drycleaners Listing:

SCRD DRYCLEANER

The State Coalition for Remediation of Drycleaners (SCRD) was established in 1998, with support from the U.S. Environmental Protection Agency (EPA) Office of Superfund Remediation and Technology Innovation. Coalition members are states with mandated programs and funding for drycleaner site remediation. Current members are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Government Publication Date: Nov 08, 2017

Integrated Compliance Information System (ICIS):

ICIS

The Integrated Compliance Information System (ICIS) is a system that provides information for the Federal Enforcement and Compliance (FE&C) and the National Pollutant Discharge Elimination System (NPDES) programs. The FE&C component supports the Environmental Protection Agency's (EPA) Civil Enforcement and Compliance program activities. These activities include Compliance Assistance, Compliance Monitoring and Enforcement. The NPDES program supports tracking of NPDES permits, limits, discharge monitoring data and other program reports.

Government Publication Date: Jan 15, 2022

Drycleaner Facilities:

FED DRYCLEANERS

A list of drycleaner facilities from Enforcement and Compliance History Online (ECHO) online search. The Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments.

Government Publication Date: May 5, 2021

Delisted Drycleaner Facilities:

DELISTED FED DRY

List of sites removed from the list of Drycleaner Facilities (sites in the EPA's Integrated Compliance Information System (ICIS) with NAIC or SIC codes identifying the business as a drycleaner establishment).

Government Publication Date: May 5, 2021

Formerly Used Defense Sites:

FUDS

Formerly Used Defense Sites (FUDS) are properties that were formerly owned by, leased to, or otherwise possessed by and under the jurisdiction of the Secretary of Defense prior to October 1986, where the Department of Defense (DoD) is responsible for an environmental restoration. This list is published by the U.S. Army Corps of Engineers.

Government Publication Date: May 26, 2021

Former Military Nike Missile Sites:

FORMER NIKE

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline, heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

Government Publication Date: Dec 2, 1984

PHMSA Pipeline Safety Flagged Incidents:

PIPELINE INCIDENT

A list of flagged pipeline incidents made available by the U.S. Department of Transportation (US DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA regulations require incident and accident reports for five different pipeline system types.

Government Publication Date: Jul 7, 2020

Material Licensing Tracking System (MLTS):

MLTS

A list of sites that store radioactive material subject to the Nuclear Regulatory Commission (NRC) licensing requirements. This list is maintained by the NRC. As of September 2016, the NRC no longer releases location information for sites. Site locations were last received in July 2016.

Government Publication Date: May 11, 2021

Historic Material Licensing Tracking System (MLTS) sites:

HIST MLTS

A historic list of sites that have inactive licenses and/or removed from the Material Licensing Tracking System (MLTS). In some cases, a site is removed from the MLTS when the state becomes an "Agreement State". An Agreement State is a State that has signed an agreement with the Nuclear Regulatory Commission (NRC) authorizing the State to regulate certain uses of radioactive materials within the State.

Government Publication Date: Jan 31, 2010

Mines Master Index File:

MINES

The Master Index File (MIF) contains mine identification numbers issued by the Department of Labor Mine Safety and Health Administration (MSHA) for mines active or opened since 1971. Note that addresses may or may not correspond with the physical location of the mine itself.

Government Publication Date: Nov 2, 2021

Surface Mining Control and Reclamation Act Sites:

SMCRA

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of Abandoned Mine Land (AML) impacts, as well as information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Government Publication Date: Dec 18, 2020

Mineral Resource Data System:

MRDS

The Mineral Resource Data System (MRDS) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps.

Government Publication Date: Mar 15, 2016

Uranium Mill Tailings Radiation Control Act Sites:

URANIUM

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

Government Publication Date: Mar 4, 2017

Alternative Fueling Stations:

ALT FUELS

List of alternative fueling stations made available by the US Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Biodiesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE). The National Renewable Energy Laboratory (NREL) obtains information about new stations from trade media, Clean Cities coordinators, a Submit New Station form on the Station Locator website, and through collaborating with infrastructure equipment and fuel providers, original equipment manufacturers (OEMs), and industry groups.

Government Publication Date: May 16, 2022

Superfunds Consent Decrees:

CONSENT DECREES

A list of Superfund consent decrees made available by the Department of Justice, Environment & Natural Resources Division (ENRD).

Government Publication Date: Sep 30, 2018

Registered Pesticide Establishments:

SSTS

List of active EPA-registered foreign and domestic pesticide-producing and device-producing establishments based on data from the Section Seven Tracking System (SSTS). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 7 requires that facilities producing pesticides, active ingredients, or devices be registered. The list of establishments is made available by the EPA.

Government Publication Date: Mar 30, 2022

Polychlorinated Biphenyl (PCB) Transformers:

PCBT

Locations of Transformers Containing Polychlorinated Biphenyls (PCBs) registered with the United States Environmental Protection Agency. PCB transformer owners must register their transformer(s) with EPA. Although not required, PCB transformer owners who have removed and properly disposed of a registered PCB transformer may notify EPA to have their PCB transformer de-registered. Data made available by EPA.

Government Publication Date: Oct 15, 2019

Polychlorinated Biphenyl (PCB) Notifiers:

PCB

Facilities included in the national list of facilities that have notified the United States Environmental Protection Agency (EPA) of Polychlorinated Biphenyl (PCB) activities. Any company or person storing, transporting or disposing of PCBs or conducting PCB research and development must notify the EPA and receive an identification number.

Government Publication Date: Jan 20, 2022

State**Registered Dry Cleaning Facilities:**

DRYCLEANERS

The Minnesota Pollution Control Agency (MPCA) maintains this listing of registered dry cleaning facilities.

Government Publication Date: Aug 20, 2019

Spills reported to the Pollution Control Agency:

SPILLS

The Minn. Stat. §115.061, which has been in effect since 1969, describes the duty of people to notify the Minnesota Pollution Control Agency (MPCA) when spills occur. This is the list of spills reported to MPCA, and the list maintained by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Department of Agriculture Spills:

AG SPILLS

The Minnesota Department of Agriculture Incident Response Unit is the regulatory authority of Agricultural Chemical (Ag-Chem) Incidents in Minnesota. This list contains pesticide and fertilizer incidents reported to the Response Unit. This data made available by The Minnesota Department of Agriculture, Incident Response Unit.

Government Publication Date: Mar 29, 2022

Historic spills reported to the Pollution Control Agency:

HIST SPL

The Minn. Stat. §115.061, which has been in effect since 1969, describes the duty of people to notify the Minnesota Pollution Control Agency (MPCA) when spills occur. This is the list of spills reported to MPCA, and maintained by The Minnesota Pollution Control Agency (MPCA). This list was maintained till 1 Nov 2016.

Government Publication Date: Nov 1, 2016

PFAS in Groundwater Samples:

PFAS GW

A list of sites from the Minnesota Groundwater Contamination Atlas where Per- and Polyfluoroalkyl Substances (PFAS) were found in groundwater samples. This list is made available by the Minnesota Pollution Control Agency.

Government Publication Date: Nov 12, 2021

PFAS in Landfills:

PFAS LANDFILL

A list of sites in the Closed Landfill Program where Per- or polyfluorinated alkyl substances (PFAS) have been detected. This list is made available by the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Jul 30, 2020

Clandestine Drug Labs:

CDL

The Methamphetamine Laboratory Program at the Minnesota Department of Health (MDH) works to protect human health by providing technical advice on the remediation of clandestine methamphetamine production laboratories (meth labs) and decontamination of property exposed to meth lab activities.

Government Publication Date: Aug 23, 2021

Animal Feedlots:

FEEDLOTS

The Minnesota Pollution Control Agency (MPCA) tracks locations of animal feedlot facilities. The locations of animal feedlots provide information and context to support decisions on animal health, land use, and maintaining environmental quality.

Government Publication Date: Nov 25, 2021

Tier 2 Report:

TIER 2

A list of Tier 2 Facilities in Minnesota. This list is provided by Minnesota Department of Public Safety overseen by the Division of Homeland Security and Emergency Management.

Government Publication Date: May 5, 2020

Bulk Storage Permits:

BULK STORAGE

The Minnesota Department of Agriculture's Licensing Information System (LIS) lists individuals or companies who hold licenses, certificates and/or permits required by state law and regulated by the Department. This database only contains those LIS licenses related to anhydrous ammonia storage facilities and bulk pesticide/ fertilizer storage facilities.

Government Publication Date: Apr 28, 2022

Tribal

No Tribal additional environmental record sources available for this State.

County

No County additional environmental record sources available for this State.

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

Appendix D

Historical Research Documentation

HIG Research Summary

Site Location

40 Acre Parcel East of Flick Avenue
east of Flick Avenue and west of I-35W
North Branch, MN

Requested by

American Engineering Testing, Inc.
550 Cleveland Avenue North
St. Paul, MN

HIG Project #

2064140

Client Project #

P-0013127

Date Created

05/25/2022



Historical
Information
Gatherers

REVIEWED

By Dennis McComas at 7:08 am, Jun 12, 2022

This Research Summary identifies the products and services provided by Historical Information Gatherers, Inc. (HIG) for the above referenced site location. All products are provided as PDFs unless otherwise noted.

Database Report

An ERIS Database Report is provided as a file named DBR.

Disclaimer & Limitation of Liability

This Research Summary and the related documents and images provided by Historical Information Gatherers (hereafter referred to as the "Site Specific HIG Data") contain information obtained from a variety of public and private sources. Additional information for the site and surrounding properties may exist. Accordingly, there can be no guaranty or warranty that the information provided is complete for its particular intended purpose. No warranty expressed or implied, is made whatsoever in connection with the Site Specific HIG Data. Historical Information Gatherers specifically disclaims the making of any such warranties, including without limitation, merchantability or fitness for a particular purpose. Historical Information Gatherers, its officers, employees and independent contractors cannot be held liable to anyone for any loss or damage, whether arising out of errors or omissions, negligence, accident or any other cause, resulting directly or indirectly from any information provided or any information not provided in the Site Specific HIG Data. Any liability on the part of Historical Information Gatherers is strictly limited to a refund equal to the amount paid for the Site Specific HIG Data.

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



2021

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



2017

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



2013

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



2008

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



2003

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1996

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1992

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1986

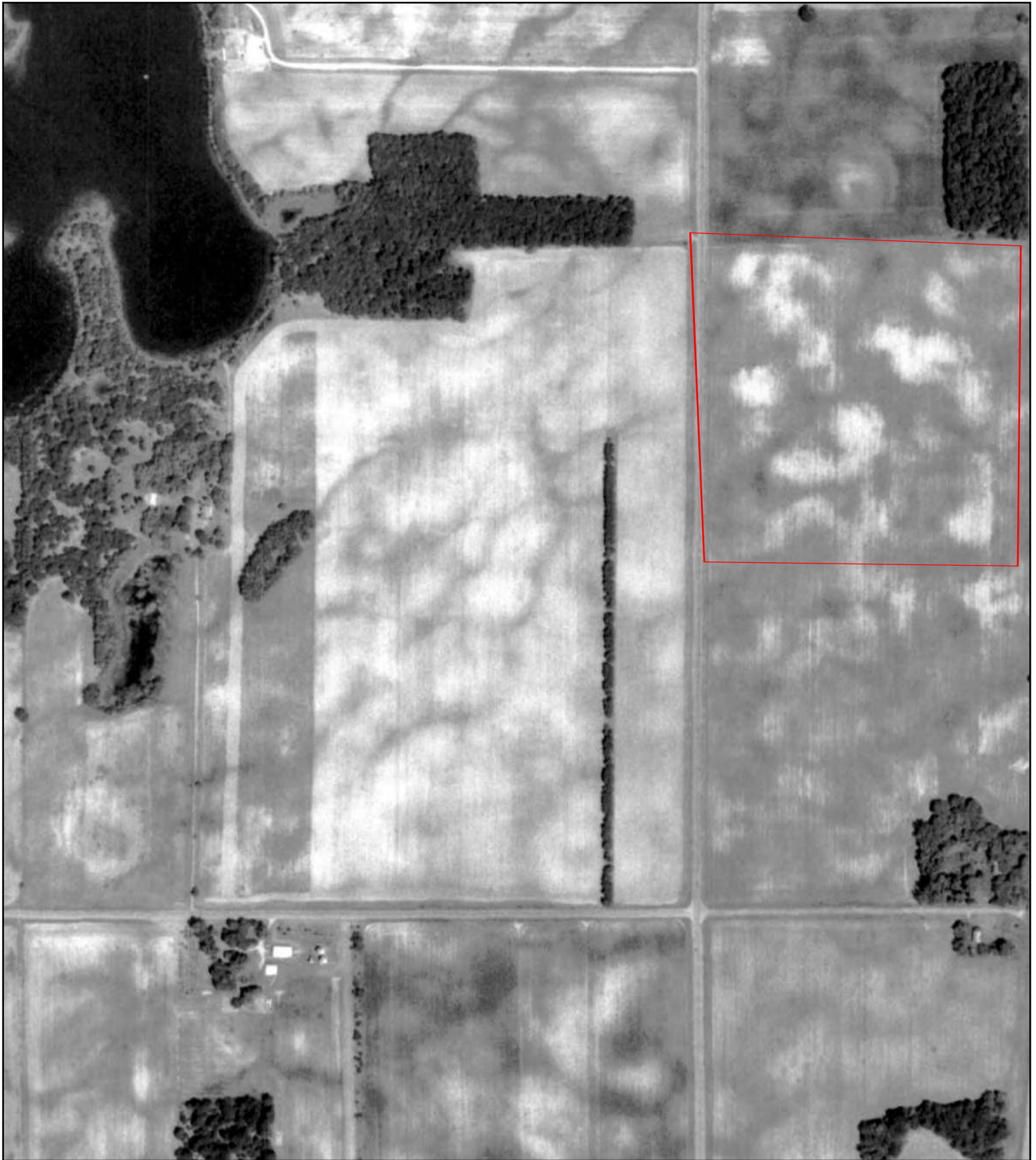
HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1983

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1980

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Client Project # p-0013127

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1978

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1973

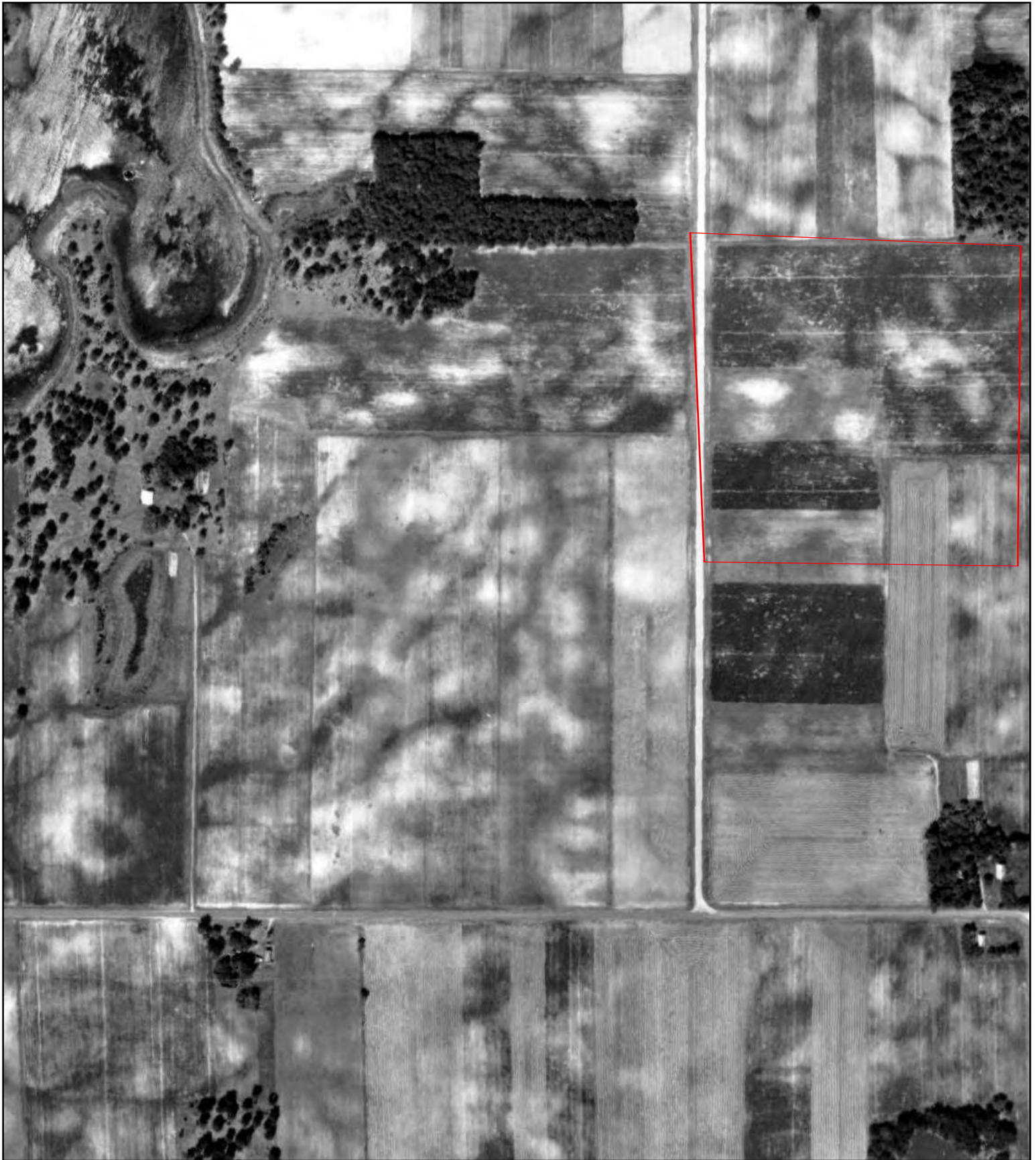
HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1965

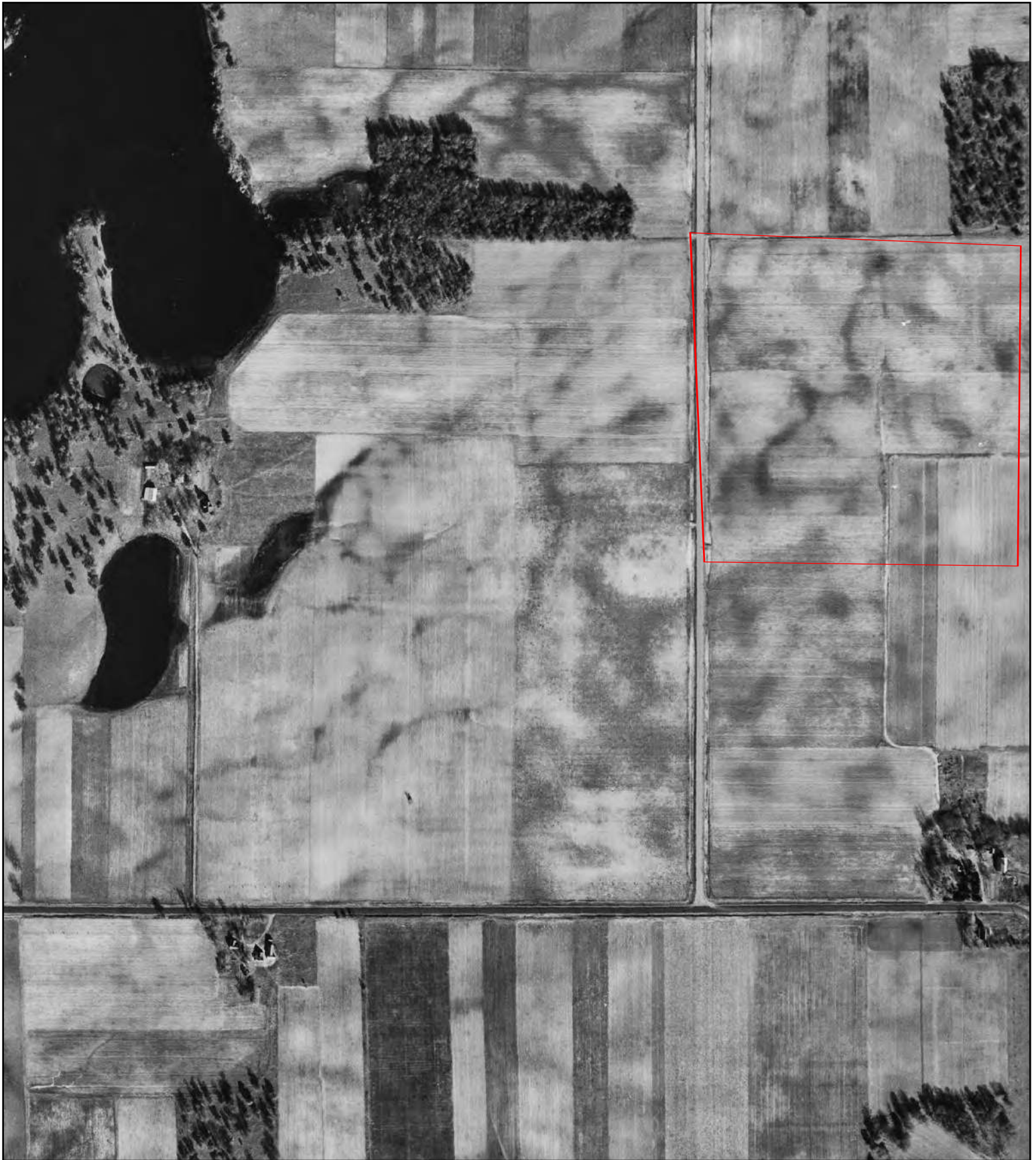
HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1954

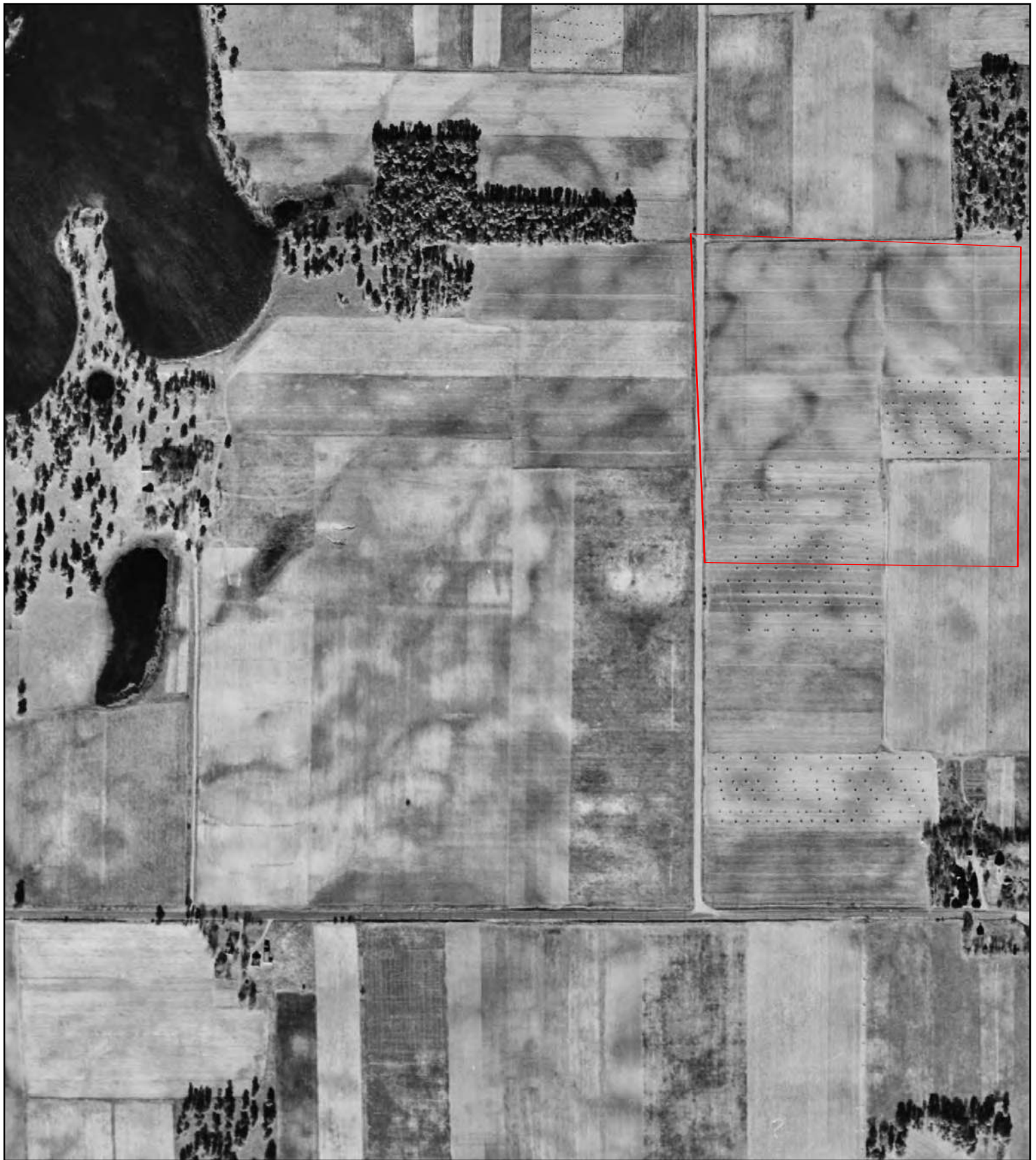
HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1952

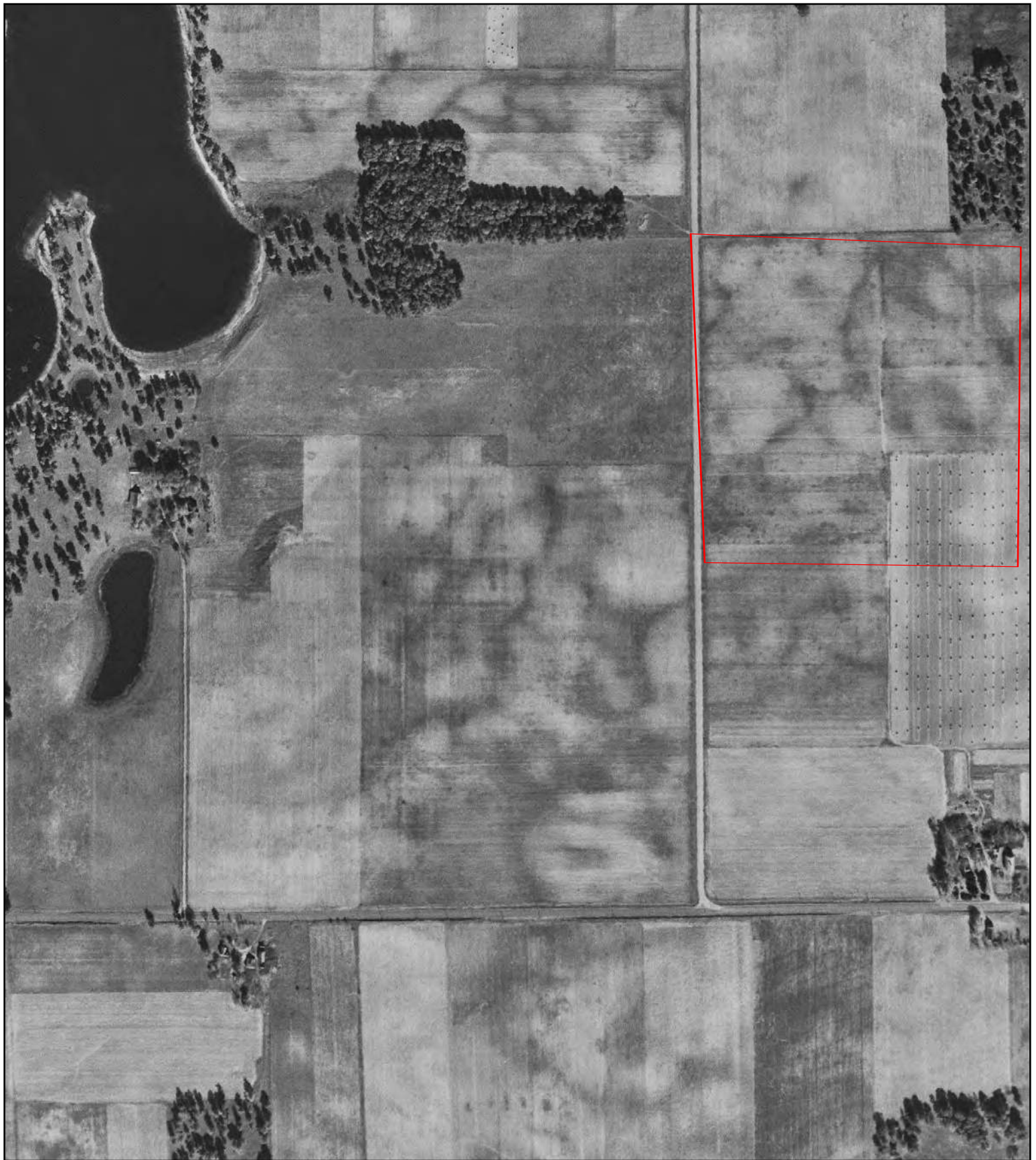
HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1948

HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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40 Acre Parcel East of Flink Avenue
E of Flink Ave and NW of 400th St
North Branch, MN



1938

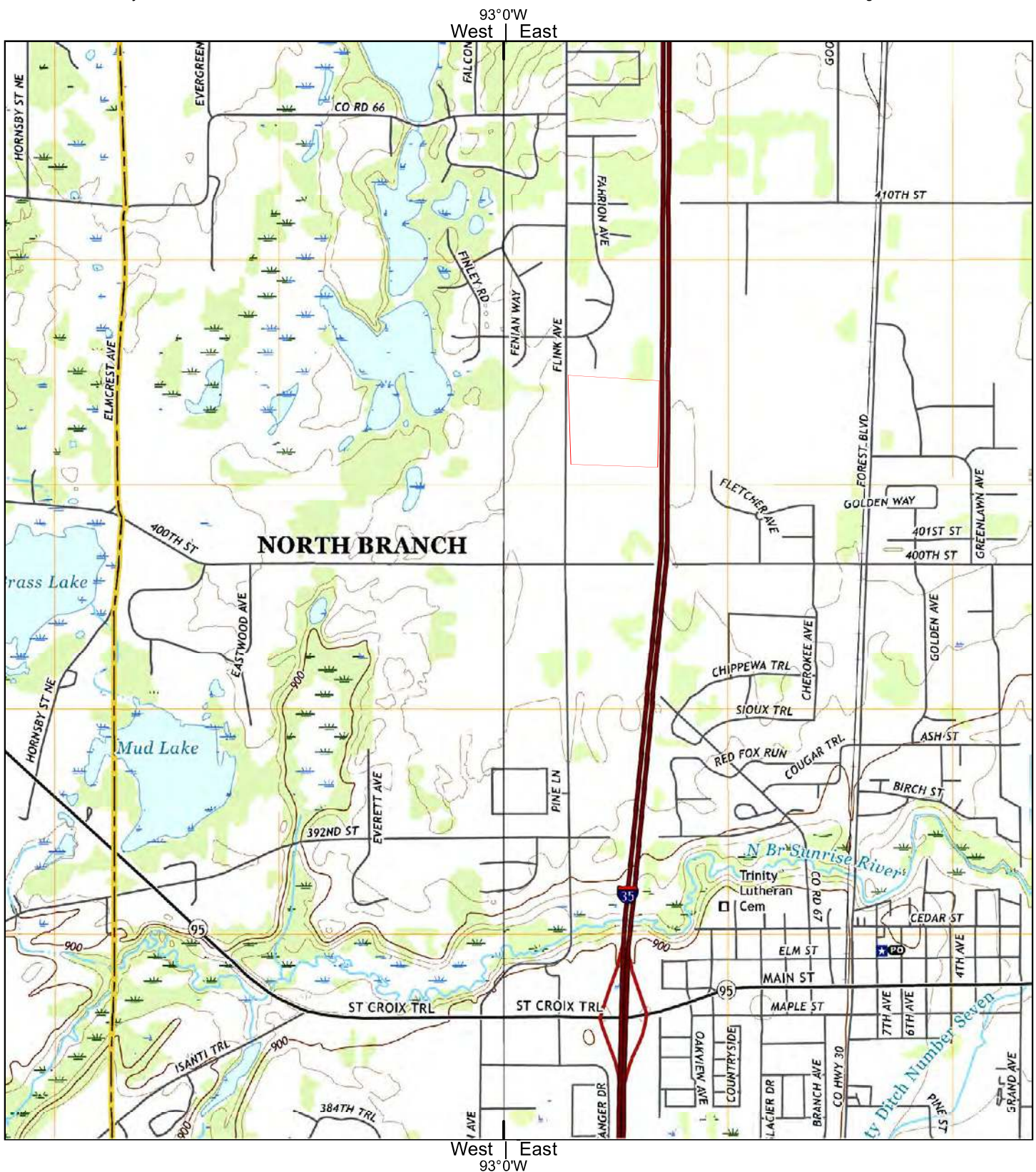
HIG Project # 2064140

Client Project # p-0013127

Approximate Scale 1: 6,000 (1"=500')

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2019

0 Distance in Miles 1
1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

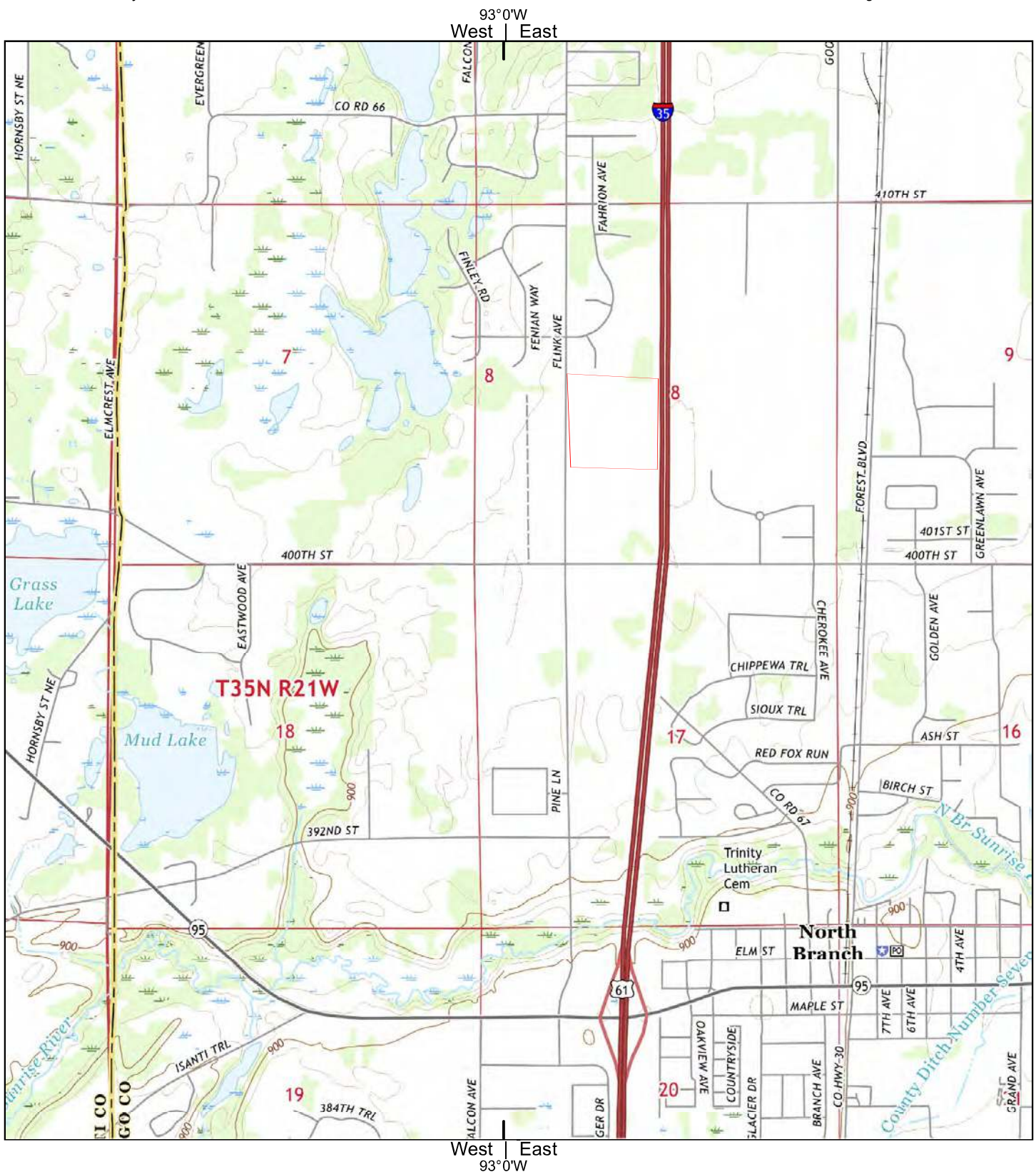
Site information:
40 Acre Parcel East of Flick
Avenue NW of Flick Ave and
400th St North Branch, MN



Unified maps show subdued modern topo features where
corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013127
HIG #2064140 completed: 08/12/2021 14:21

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	North Branch, MN	USGS	7½' x 7½'	2019	--	--	--
West	Stark, MN	USGS	7½' x 7½'	2019	--	--	--



2016

0 Distance in Miles 1
1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

Site information:

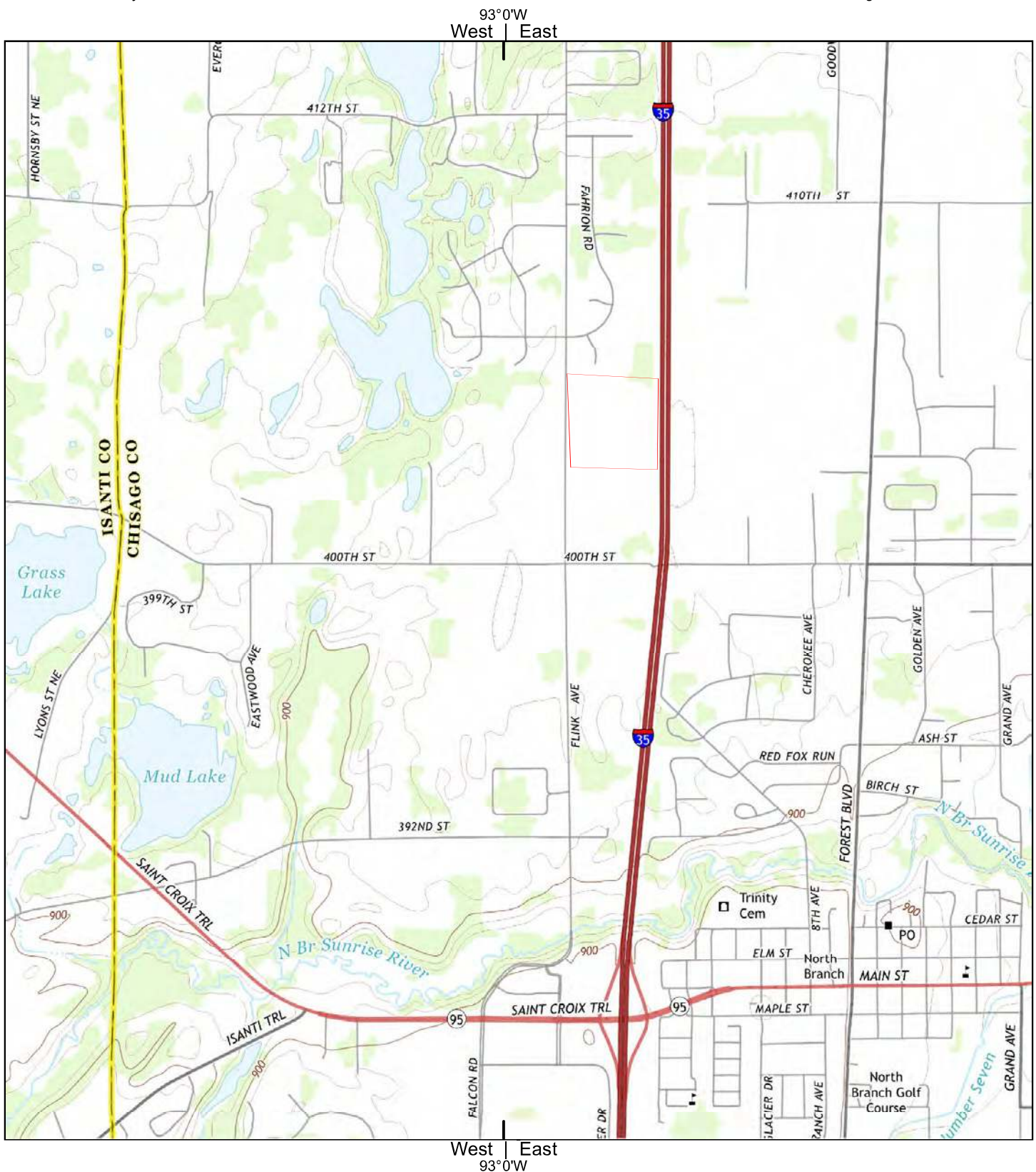
40 Acre Parcel East of Flick
Avenue NW of Flick Ave and
400th St North Branch, MN



Unified maps show subdued modern topo features where
corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013127
HIG #2064140 completed: 08/12/2021 14:21

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	North Branch, MN	USGS	7½' x 7½'	2016	--	--	--
West	Stark, MN	USGS	7½' x 7½'	2016	--	--	--



2013

0 Distance in Miles 1
1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

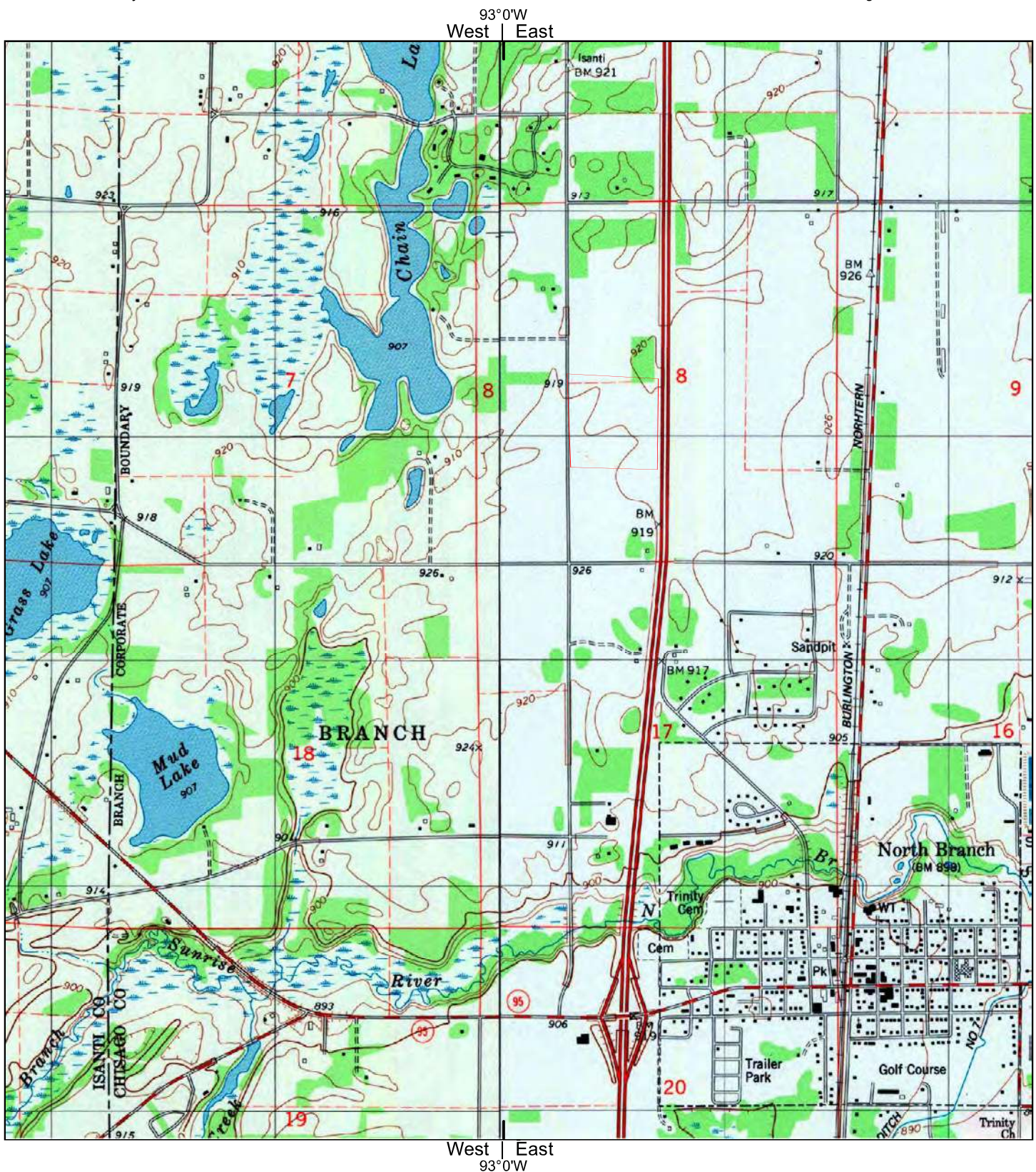
Site information:
40 Acre Parcel East of Flick
Avenue NW of Flick Ave and
400th St North Branch, MN



Unified maps show subdued modern topo features where
corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013127
HIG #2064140 completed: 08/12/2021 14:21

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	North Branch, MN	USGS	7½' x 7½'	2013	--	--	--
West	Stark, MN	USGS	7½' x 7½'	2013	--	--	--



1983

0 Distance in Miles 1

1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

Site information:
40 Acre Parcel East of Flick
Avenue NW of Flick Ave and
400th St North Branch, MN



Unified maps show subdued modern topo features where
corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013127
HIG #2064140 completed: 08/12/2021 14:21

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	North Branch, MN	USGS	7½' x 7½'	1983	1978	--	--
West	Stark, MN	USGS	7½' x 7½'	1983	1978	--	--

COLE

70th EDITION MINNEAPOLIS

PAGE 1551

FLINT TRL

FLETCHER CT

CT 1104.01	Wyoming	27405 - 27500	\$B
		27405 - 27500	55092
273RD ST INTS			
27405 Lisa Joan Blumhofer	94	651.462.2483	
Mark Alan Blumhofer	94	651.462.2483	
Julie Kay Larson	90	NP	
Troy Allen Larson	90	NP	
27425 Fran V. Klausen (7/05)	04	651.462.2124	
Greg Lynn Klausen (7/05)	04	651.462.2124	
27430 Stone Lawrence Olson (7/03)	93	651.462.4630	
Dorothy Jean Trocks (7/03)	96	NP	
27445 Thomas K. Trocks (7/03)	96	NP	
27450 Dona Rae Faust (7/03)	78	651.462.5528	
Patrick G. Faust (7/03)	78	651.462.5528	
27465 Brenda Joyce Klockner (7/03)	93	NP	
Walter Eugene Klockner Jr (7/03)	93	NP	
27470 Rosemarie C. Wiegand (7/03)	05	NP	
Todd Oberg Wiegand (7/03)	05	NP	
27475 Emily Rose (7/03)	96	NP	
Karen A. Rose (7/03)	96	NP	
27485 Karalee Marie Mokske (7/03)	01	NP	
Tom Edward Mokske (7/03)	01	NP	
27490 Marga Jungbluth	15	NP	
17500 *Fashion Floors By Bob Inc	15	651.462.2221	
Linda Lee Johnson	05	NP	
Robert Charles Johnson	05	NP	
22 RESIDENCE			1 BUSINESS

FLETCHER DR

CT 269.09	Rogers	12224 - 12478	\$A
		12224 - 12478	55374
12224 Mary Berentes (7/07)	07	NP	
12248 Elaine Marie Achison (7/05)	05	NP	
Wade Jeffery Achison (7/05)	05	NP	
12249 Amy A. Campbell (7/04)	14	NP	
Patrick Erikson (7/04)	14	NP	
12258 Andrew M. Valenius (7/04)	10	NP	
12370 Ann M. Louisa (7/16)	13	NP	
Henry Elmer Louisa (7/16)	13	NP	
12407 Anne Lee Nash	+	NP	
Bernard Arthur Nash	+	NP	
12424 Amy Susan Branton	+	NP	
Dorothy Benjamin Branton	+	NP	
12432 Alexander R. Cooney (7/10)	10	NP	
Joseph K. Cooney (7/10)	10	NP	
12437 Kathleen Anne Ashfield	+	NP	
Louis L. Ashfield	+	NP	
12478 Corey Adam Caniker (7/10)	10	NP	
Jennifer Ann Caniker (7/10)	10	NP	
18 RESIDENCE			

FLETCHER LN

CT 269.10	Maple Grove	11925 - 11965	\$B
		11925 - 11965	55311
11925 Jose A. White (7/00)	70	763.428.4576	
Daniel Charles Gonzalez (7/02)	82	763.428.4573	
Charles Albert Stamp (7/02)	82	763.428.4573	
3 RESIDENCE			

FLETCHER LN

CT 269.09	Rogers	11700 - 12475	\$A
		11700 - 12560	55374
11700 Heather Lynn Murphy	90	763.428.4503	
Michael David Murphy	90	763.428.4503	
11785 Carol Rose Martin	70	763.428.2711	
Neil E. Martin	70	763.428.2711	
*Special Effects Decorating Service	13	763.428.2711	

ALLEY VIEW TER INTS

12015 Scott T. Thole (7/03)	93	763.428.2687	
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ALLEY VIEW TER INTS

12020 *St Walburga Church Fletcher	13	763.428.9283	
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ERRITIAL RD INTS

12165 Eric Davis Thomson	07	NP	
12185 Alvern John Kinko	85	NP	
12205 Patricia L. Kinko	85	NP	
12205 Cheryl A. Johnston	02	NP	
12320 Randall Lynn Johnston	02	NP	
12320 Jennifer Lynn Erickson (7/03)	96	763.428.8924	
Kath Eric Erickson (7/03)	96	763.428.8924	
12435 Keith C. Alvarez	04	763.428.4967	
Ramona A. Alvarez	04	763.428.4967	
12475 Dwight G. Erickson	92	NP	
Jennifer A. Ketter	92	NP	

WILSON CT INTS

CT 12510	Building		
L *A/C Construction & Restoration	11	763.428.5263	
J *Arma Coatings	07	763.420.0233	
K *Data Tech	15	763.497.7070	
K *Energy Performance Systems	05	763.428.0846	
*Healthy Heart Market	13	763.428.3626	
C *High Point Church	09	763.428.9901	
L *Highpoint Sales	13	763.428.4930	
L *Lan Construction	10	763.391.7347	
*Massman Automation Designs LLC Psa D	12	763.273.4810	
*Rekusent Communications	13	763.425.6030	
*Riverside Logistics	12	763.498.1445	
*Spotlight Dance Studio	05	763.424.1100	
H *The Bounce House	10	763.657.0927	
12560 Building			
360 *Access Point Technologies	07	763.428.0010	
200 *Access Point Technologies	10	763.657.1876	
16 RESIDENCE			17 BUSINESS

FLETCHER PL

CT 232.00	Hopkins	1 - 9	\$A
		1 - 9	55305
1 Anne Elizabeth Bigham (7/16)	13	NP	
2 Dean Bigham (7/16)	13	NP	
3 Hinda Lee Litson	69	952.935.1687	
Thomas Litson	69	952.935.1687	
4 Jane Marie Ray	05	NP	
5 Sarah Jane Ray	05	NP	
6 Jennifer S. Lick (7/04)	93	952.935.4406	
Mike Lick (7/04)	93	952.935.4406	
7 Sophie Ball Kelley (7/04)	10	952.933.4107	
Stephan Paul Kelley (7/04)	10	952.933.4107	
8 Jill Lynn Hesse (7/05)	85	952.935.4050	
Thomas E. Hesse (7/05)	85	952.935.4050	
9 Benjamin Colt Schleuss (7/15)	15	NP	
Freia Liane Schleuss (7/15)	15	NP	
14 RESIDENCE			

LORING RD INTS

14 RESIDENCE			
--------------	--	--	--

FLICKER CIR

CT 607.27	Saint Paul	1221 - 1246	\$C
		1221 - 1246	55123
1221 Jeffrey Donald Zimmerman (7/00)	01	NP	
1227 David Bradley Carpenter	+	NP	
Sheryl Lynn Carpenter	+	NP	
1233 Michael John Koehnmaier (7/16)	16	NP	
Molly Koehnmaier (7/16)	16	NP	
1234 Paul D. Placko (7/15)	15	NP	
1239 Debra Ann Studer (7/08)	35	651.405.1752	
Russell Dale Studer (7/08)	35	651.405.1752	
1240 Arden Gene Peterson	83	651.452.3911	
Geri J. Peterson	83	651.452.3911	
1245 James Kevin Christenson	91	651.454.7146	
1246 Patricia Ann Triles	95	651.452.4143	
Stephen Douglas Triles	95	651.452.4143	
13 RESIDENCE			

FLIGHT LN

CT 608.29	Saint Paul	15629 - 15663	\$C
		15629 - 15663	55124
15629 Richard F. Bogucki (7/12)	12	NP	
15631 Minahilun Ntuen Dang (7/14)	03	NP	
15631 Ky X. Nguyen (7/14)	03	NP	
15635 Mary Kay Peltz (7/03)	99	952.431.1345	
Robert Henry Peltz (7/03)	99	952.431.1345	
15678 ST W INTS			
15643 Sue Kay Milying (7/02)	02	NP	
Warren Thomas Milying (7/02)	02	NP	
15645 Andrew L. Washington Jr.	12	NP	
Tamara Lashell Washington	12	NP	
15647 Brian P. Postrom	02	NP	
15649 Andrea Anita Egger (7/02)	01	NP	
15651 Kim Jo Schultz	02	NP	
15655 Dean Clifford Fehleke (7/06)	06	NP	

FLOAT CT INTS

15659 Lauren Peterson	14	NP	
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FLOAT LN INTS

15661 Jodie Garrett	05	952.432.8690	
---------------------	----	--------------	--

FLIGHT WAY

CT 608.29	Saint Paul	15480 - 15595	\$C
		15480 - 15597	55124
15480 Heather Allen Rosa	04	NP	
Rachel Rose	04	NP	
15481 Sandra Jean Gaffney	14	NP	
15482 Katie Kohnmaier	13	NP	
15483 Martha K. Munwo	12	NP	
15484 Nelsanet Dele Chichiso (7/05)	04	NP	
Hanna Goche (7/05)	04	NP	
15485 Rajakumar Satharmanam (7/16)	16	NP	
15486 Geneva Jean Lybuck	11	NP	
15487 Mary Lillian Farham (7/02)	02	952.891.5963	
Sarah Jane Farham (7/02)	02	952.891.5963	
15488 Jim Allen Hamilton (7/02)	02	NP	
15489 Vickie L. Bradley	14	NP	
15491 Christine Marie Fehske (7/07)	07	NP	
15492 Troy Joseph Wicks	15	952.236.9747	
15497 Cynthia S. Foster (7/10)	10	NP	
15498 Don Wayne Simonson (7/02)	00	952.431.9025	
John Simonson (7/02)	00	952.431.9025	
15501 Mark Paul Gastin Jr (7/02)	02	952.255.8214	
Zo U. Gastin	09	NP	
15503 Zhi E. Li (7/09)	09	NP	
15505 Michael A. Aneta (7/00)	06	NP	
Kristin Michelle Lindgren (7/06)	06	NP	
15507 Jacob P. Rele	07	NP	
15509 Danielle Speid	08	NP	
15511 Gregory Paul Osterman (7/00)	02	NP	
15513 Alice M. Sedgwick (7/02)	02	NP	
15517 K. Sodergren (7/02)	08	NP	
15527 Beth Agnes Leyandrysk (7/03)	03	NP	
15529 Andrew T. Dachtel	09	NP	
15531 Thomas E. Dachtel	09	NP	
15531 Matthew Thomas Legere (7/03)	02	NP	
Nicholas A. Legere (7/03)	02	NP	
15535 Kelly Mae McGrath (7/06)	06	NP	
15537 Natalie Raykhelid (7/02)	02	NP	
15539 Yovovoy V. Raykhelid (7/02)	02	NP	
15539 Brandon John Genetz	01	NP	
Jessica Genetz	01	NP	
15541 James Fisher (7/07)	01	952.933.6231	
Susan Elizabeth Fisher (7/07)	01	952.933.6231	
15543 Kelsey Ann Erickson (7/03)	03	NP	

15545 Troy John Swanson (7/10)	10	NP	
15547 Timothy J. Sloper (7/05)	05	NP	
15548 Anna Voigt (7/14)	14	NP	
15551 Carl I. Wahlstrom (7/01)	96	NP	
Diana Leone Wahlstrom (7/01)	96	NP	
15553 Lorie Jean Johnson (7/03)	01	NP	
Todd Burdell Johnson (7/03)	01	NP	
15555 Anni Marie Sunderland (7/01)	00	NP	
15557 Casey Sallander (7/10)	10	NP	
Rachael A. Sallander (7/10)	10	NP	
15559 Katrina M. Krumm (7/03)	09	NP	
Michael Krumm (7/03)	09	NP	
15561 Russell E. Prosski	05	NP	
15567 Nichola Elander (7/04)	04	NP	
Nick Ryan Elander (7/04)	04	NP	
15571 Brett Christopher Topness	09	952.236.0901	
Holly Laura Topness	09	952.236.0901	
15573 Camilo Pannik	07	NP	
Joseph Blake Pannik	07	NP	
15575 Doug William Holland	09	NP	
Tracy Lynn Holland	09	NP	
15577 Ann C. Hanson (7/03)	05	NP	
Cheri Denise Hanson (7/03)	05	NP	
15579 Karla Duren	03	NP	
Timothy Michael Duren Sr.	03	NP	
15581 Todd Schukit	15	952.236.9334	
15583 Salim Sabila	14	952.378.4027	
15587 Douglas Ryan Melleson (7/01)	01	NP	
15589 Patricia W. Williams	06	NP	
15595 Devin L. Schiltz	11	NP	
15597 *Scott Dawn Enterprises Inc	10	952.236.8541	
73 RESIDENCE			1 BUSINESS

FLINK AVE

CT 1103.01	North Branch	40167 - 41971	\$D
		39347 - 41971	55056
39347 *Concrete Pump Repair	97	651.674.2160	
39451 *Lampars	13	651.674.4415	
39451 *Lampars	13	651.674.4415	
39535 *Huntington Appraisals	13	651.674.8194	
*Ladies & Fine Community Inc	15	651.674.4362	

400TH ST INTS

40167 *Chad Doctor	01	651.674.4175	
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400TH ST INTS

40160 Jackie A. Ballock	85	651.674.4522	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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400TH ST INTS

40164 Douglas E. Gerner (7/04)	04	NP	
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1245	Gert J Peterson	83	651.452.3911		
1246	James Kevin Christenson	91	651.454.7146		
1247	Patricia Ann Trites	95	651.452.4143		
1248	Stephen Douglas Trites	95	651.452.4143		
14 RESIDENCE					

FLIGHT LN

CT	608.27	0	15629 - 15663	\$C
15629	Janrod P Mount (7/05)	04	952.997.3376	
15630	Carla M Velez (7/05)	04	952.997.3376	
15631	Nhuz Dant	03	952.997.3376	
15632	Alecece Nicole Gilman (4/03)	02	952.431.8875	
15633	Sean Michael Gilman (4/03)	02	952.431.8875	
15634	Diane Edna Pello (4/03)	99	952.431.1345	
15635	Robert Henry Pello (4/03)	99	952.431.1345	

-156TH ST W INTS

15641	Glenyce M Shine (6/02)	00	952.255.8050	
15642	Jeffery Dean Shine (6/02)	00	952.255.8050	
15643	15645			
15644	Brian P Bostrom	02	NP	
15649	Diane Ann Egger (7/02)	02	NP	
15651	Kim Jo Kusch (7/02)	02	NP	
15652	Blake Rose (7/02)	06	NP	
15653	Dan Clifford Felmlee (7/02)	06	NP	
15657	Marys Jeannet Henneman (7/02)	05	NP	
15658	M J Henneman (7/02)	05	NP	

-FLOAT CT INTS

15659	Sedrick B Page	10	NP
15661	Michael Joseph Kittelson	+	952.236.8482
	Tammy Marie Kittelson	+	952.236.8482
15663	Fatema A Feiha (6/05)	05	NP
	Jamil Dawud Feiha (6/05)	05	NP
23 RESIDENCE			

FLIGHT WAY

CT	608.27	15479 - 15597	\$C
15479	Jeffrey J Strese (10/04)	05	NP
15480	David Richard Preetz (1/03)	02	952.255.8373
15481	Heather Aileen Preetz (1/03)	02	952.255.8373
15482	Michael Fries		NP
15483	Karen L Oneil (6/05)	05	NP
15484	William Bessire	08	NP
15485	Elizabeth Gore		952.236.9926
15486	Natsanel Chichiso (2/05)	04	NP
15487	Hanna Geche (2/05)	04	NP
15488	Chris Richard Rosival	10	NP
15489	Dawn M Rosival	10	NP
15490	Mary Lillian Farnham (7/02)	02	952.891.5963
15491	Sarah Jane Farnham (7/02)	02	952.891.5963
15492	Jennifer Lynn Fahrmann (7/02)	00	952.953.0507
15493	Linda Mainan (7/02)	00	952.953.0507
15494	James Horton		NP
15495	Tera Lynn Horton		NP
15496	Christine Marie Floersch (9/07)	06	NP
15497	Chelsey Bergman		NP
15498	Ben Thomas Brand (7/04)	04	NP
15499	Stephanie Brand (7/04)	04	NP
15500	Alaya J Hayslett		NP
15501	Cynthia S Foster (6/10)	09	NP
15502	Mark Paul Gustin Jr (6/02)	02	952.255.8314
15503	En Liza (6/05)	10	NP
15504	15505		NP
15506	Robert Wacker (6/05)	02	NP
15507	Sharon L Wacker (6/05)	02	NP
15508	Angela Kathryn Smith (1/10)	03	NP
15509	Angie Smith (1/10)	03	NP
15510	Kyle Frayne Hjelmstad (4/02)	00	NP
15511	Melissa Hjelmstad (4/02)	00	NP
15512	Gregory Paul Osterman (4/02)	02	952.431.1846
15513	Alice Marie Sodergren (4/02)	98	952.431.4881
15514	David M Sodergren (4/02)	98	952.431.4881
15515	Brian Prinz	09	952.236.9604
15516	Shannon Prinz	09	952.236.9604
15517	15518		NP
15519	15520		NP
15521	15522		NP
15523	15524		NP
15525	15526		NP
15527	15528		NP
15529	15530		NP
15531	15532		NP
15533	15534		NP
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15537	15538		NP
15539	15540		NP
15541	15542		NP
15543	15544		NP
15545	15546		NP
15547	15548		NP
15549	15550		NP
15551	15552		NP
15553	15554		NP
15555	15556		NP
15557	15558		NP
15559	15560		NP
15561	15562		NP
15563	15564		NP
15565	15566		NP
15567	15568		NP
15569	15570		NP
15571	15572		NP
15573	15574		NP
15575	15576		NP
15577	15578		NP
15579	15580		NP
15581	15582		NP
15583	15584		NP
15585	15586		NP
15587	15588		NP
15589	15590		NP
15591	15592		NP

	Michael Junior Layne (4/04)	04	NP
15595	Victoria Gekht (6/04)	04	NP
15597	Mari Sara Askeroot	10	NP
★Scott Dawn Enterprises Inc 10 952.236.854			
	83 RESIDENCE	1	BUSINESS

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HEMINGWAY AVE S

HEMATITE ST NW

CT	502.28	13864 - 15525	SC
13864	Jeffrey Jackson Gustafson (10/01)	05 763 433 9147	
13865	Jeffrey A Bowers (11/06)	06 NP	
13868	Arnelinde Kulagrad Balog (12/01)	05 NP	
13869	Calie M Brown (12/01)	06 763 323 0977	
13872	Julie M Mercer (20/01)	04 763 323 0977	
13875	Scott P Corbin (20/01)	06 NP	
13876	Janel Mary Mark (20/01)	06 763 205 2883	
13879	Tiffany L Zoph (20/01)	08 NP	
13880	Danitra D Morgado (20/01)	04 NP	
13883	Anita E Schroeder (20/01)	04 NP	
13884	Nicole Schroeder (20/01)	04 NP	
13887	Clair Elizabeth Sontberg (20/01)	+ 763 434 7517	
13888	Gary Allen Sontberg (20/01)	+ 763 434 7517	
13889	Anthony Thomas Durkin (20/01)	05 763 427 2574	
13892	Karla J Anderson (20/01)	05 NP	
13894	Arnold William Vinsen (20/01)	05 NP	

INDUSTRY AVE NW INTS

14640	Tammy Kay Cardotia (20/01)	09 NP	
14641	Vicari Rangel Cordoba (20/01)	09 NP	
14642	Gustis Dombrowski (20/01)	08 NP	
14643	Jordana Dombrowski (20/01)	08 NP	

146TH CIR NW INTS

14650	Kari Ann Vaughn (10/01)	04 NP	
14651	Robert Lloyd Vaughn III (10/01)	04 NP	
14652	Hester Lee Hanson (10/01)	03 NP	
14653	Trent A Hanson (10/01)	03 NP	
14660	John John Brown (20/01)	09 763 268 0857	
14661	Leah Danielle Brown (20/01)	09 763 268 0857	
14670	Bruce Charles Peck (10/01)	98 763 576 8467	
14680	Ashley M Batters (20/01)	09 NP	
14681	Matthew Daniel Batters (20/01)	09 NP	
14682	Julie Renee Farrell (20/01)	96 763 323 8290	
14690	Shannon Marie Blaylock (20/01)	96 763 576 8554	
14691	Song Thao Blyang (20/01)	96 763 576 8554	
14692	Sunshine Wang (20/01)	04 NP	
14693	John Stanley Struzyk (20/01)	00 763 323 7088	
14694	John Stanley Struzyk (20/01)	00 763 323 7088	

147TH AVE NW INTS

150TH AVE NW INTS

15000	Ann Marie Fox (20/01)	99 NP	
15001	Tim P Fox (20/01)	99 NP	
15002	Brad W Rood (20/01)	83 763 427 8048	
15003	Sandra Lee Rood (20/01)	83 763 427 8048	
15004	Katherine Kay Anderson (20/01)	75 763 427 8046	

152ND AVE NW INTS

15220	Charlene Tiemann (10/01)	04 NP	
15221	Nicholas Michael Tiemann (10/01)	04 NP	
15222	James Thomas Johnson (10/01)	71 763 421 2679	
15223	Lena Marie Johnson (10/01)	71 763 421 2679	
15230	Diane Marie Schaefer (10/01)	81 763 421 9874	
15231	Rex A Schaefer (10/01)	81 763 421 9874	
15232	Judy Ann Synieski (10/01)	94 763 422 0425	
15233	William James Synieski (10/01)	94 763 422 0425	

153RD AVE NW INTS

15328 Grandmas Global Enterprises

15354	John Leslie Williams (10/01)	05 763 767 1288	
15355	Patricia Lee Williams (10/01)	05 763 767 1288	
15356	Bernard Nicholas Wurm (10/01)	70 763 421 4201	
15357	Dr Dale Optum Nelson (20/01)	71 763 421 3844	
15358	Sharon Joan Nelson (20/01)	71 763 421 3844	
15359	Dr Michael Eric Benz (20/01)	89 763 576 8643	
15360	Nancy Ruth Benz (20/01)	89 763 576 8643	

154TH LN NW INTS

15454	Bill Paul Cashman (10/01)	80 763 323 7958	
15455	Laura Marie Cashman (10/01)	80 763 323 7958	
15456	Christine A Delara (10/01)	05 NP	
15457	Vivian Sophia Tripp (10/01)	70 763 427 2624	
15458	Barbara Jean Tripp (10/01)	96 763 506 0908	
15459	Tamara M Orr (10/01)	96 763 506 0908	

156TH AVE NW INTS

15600	88 RESIDENCE	1 BUSINESS	
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HEMINGWAY AVE

CT	1103.00	36032 - 40926	SD
36032	Teessa Hallett (20/01)	08 NP	

360TH ST INTS

36187	Jeff Scott Call (20/01)	02 651 674 2526	
36188	Sandra L Call (20/01)	02 651 674 2526	
36306	Anne Elizabeth Neff (20/01)	08 651 237 0851	
36310	John Tilton Neff (20/01)	08 651 237 0851	
36311	Timothy Lloyd Young (20/01)	05 NP	
36312	Tracy Lynn Young (20/01)	05 NP	
36313	Dale Virgil Fairbanks (20/01)	82 651 674 7311	
36314	Sharon Ann Fairbanks (20/01)	82 651 674 7311	
36373	Charles John Hoppe (20/01)	94 651 674 2139	
36374	Maylout J Luginan (20/01)	94 651 674 2139	
36375	Carmen Marie Burt (20/01)	96 NP	
36376	Mike Lucas Burt (20/01)	96 NP	
36377	Amber T Burns (20/01)	+ NP	
36378	John William Croft (20/01)	08 NP	
36379	Beth Lynette Grube (20/01)	01 651 674 1859	
36380	Steve G Grube (20/01)	01 651 674 1859	

376TH ST INTS

37611	Heidi Cullen Carlson (20/01)	92 651 674 5116	
37612	Steve D Carlson (20/01)	92 651 674 5116	
37667	Arnellie A Braun (20/01)	96 NP	
37723	Jacob Michael Mayne (20/01)	98 NP	
37724	Kristin Ann Mayne (20/01)	98 NP	

378TH ST INTS

37834	Dorcas Fairbanks (20/01)	90 651 674 6949	
37835	Dorcas Jeanne Fairbanks (20/01)	90 651 674 6949	
37836	Ronan Christopher Bedford (10/01)	03 NP	
37837	Bill Robert Taylor (10/01)	02 651 277 0283	
37838	John J Turnell (10/01)	02 651 277 0156	

381ST ST INTS

38139	Mariene Stanton (20/01)	06 NP	
38140	Tom G Stanton (20/01)	06 NP	

383RD ST INTS

38317	Cindy Joanne Nielsen (20/01)	94 651 674 2587	
38318	Jeff Daniel Nielsen (20/01)	94 651 674 2587	
38319	Daniel David Bengtson (20/01)	92 651 462 1178	
38320	Jennifer Bengtson (20/01)	92 651 462 1178	
38321	Tracy Lynn Degrote (20/01)	05 NP	
38322	Ash Ludovissie (20/01)	+ NP	
38323	Ashley D Ludovissie (20/01)	+ NP	

391ST ST INTS

39101	Donna Jean Minick (20/01)	74 651 674 7261	
39102	Terry R Minick (20/01)	74 651 674 7261	
39103	Jacqueline D Johnson (20/01)	76 651 674 4028	
39104	Lorraine M Harter (20/01)	74 651 674 4028	
39105	Beth Schmidt (20/01)	74 651 674 4023	
39106	Chad Alan Pasch (20/01)	07 NP	
39107	Douglas James Sami (20/01)	96 651 674 7983	
39108	Kristi Jolene Sampson (20/01)	96 651 674 7983	
39109	Brandon Robert Springer (20/01)	01 651 674 1827	
39110	Wendy Jo Springer (20/01)	01 651 674 1827	

392ND ST INTS

39250	Duane Vernon Baker (20/01)	89 651 674 7381	
39251	Lisa M Baker (20/01)	89 651 674 7381	
39252	Christa Michelle Hegley (20/01)	78 NP	
39253	Diane Gail Hegley (20/01)	78 NP	
39254	Mark Jona Tei (20/01)	96 651 674 7264	
39255	Trudy Ann Tei (20/01)	96 651 674 7264	
39256	Leona M Ohtani (20/01)	80 651 674 5632	
39257	Pat Brian Hunter (20/01)	94 651 674 0241	
39258	John Magnus Lundgren (20/01)	94 651 674 5004	
39259	Marjorie Margaret Lundgren (20/01)	94 651 674 5004	
39260	Daniel Duane Nelson (20/01)	81 651 237 3383	
39261	Catherine Ann Hendren (20/01)	95 651 674 7988	
39262	Vincent L Hendren (20/01)	95 651 674 7988	
39263	Barbara E Vincent (20/01)	86 651 674 7935	
39264	Richard T Vincent (20/01)	86 651 674 7935	
39265	Thomas Francis Tallarico (20/01)	86 651 674 2143	

394TH ST INTS

39446	David Allen Leal (20/01)	04 NP	
39447	Renee Michelle Leal (20/01)	04 NP	
39448	Jeffrey Patch (20/01)	00 NP	
39449	Ronald F Fitch (20/01)	00 NP	
39450	Paul Joseph Kalka (10/01)	98 651 237 0276	
39451	Sharon Carol Kalka (10/01)	98 651 237 0276	
39452	Cheryl J Theuer (20/01)	04 NP	
39453	Erna Agnes Pittman (20/01)	74 651 674 4664	
39454	Geord J Pittman (20/01)	74 651 674 4664	
39455	Cheryl L Fredrickson (20/01)	09 NP	
39456	Jeffery L Fredrickson (20/01)	09 NP	
39457	Bill John Koski Jr (20/01)	92 651 674 8395	
39458	Val N Koski (20/01)	92 651 674 8395	
39459	Lane Allen Fischer (20/01)	88 651 674 9305	
39460	Suzanne Marie Fischer (20/01)	88 651 674 9305	
39461	A Scott (20/01)	02 NP	
39462	Jeff Allen Eckholm (20/01)	02 NP	

397TH ST INTS

39700	Christine Mary Swanson (20/01)	92 651 674 4869	
39701	Terry Arthur Swanson (20/01)	92 651 674 4869	
39702	Jeff Frederick Dorr (20/01)	93 651 674 2302	
39703	Lana Kaye Dorr (20/01)	93 651 674 2302	

39732

39732	Joe L Cleveland (20/01)	+ NP	
39733	Kris M Cleveland (20/01)	+ NP	

400TH ST INTS

40106	Charles L Sutton (20/01)	97 651 674 7928	
40107	Gary J Schaefer (20/01)	90 651 674 7245	

TEMPCOPY ST INTS

40224	Lisa Beth Gensch (20/01)	99 651 674 9929	
40225	Jack Hugh Walker (20/01)	82 651 674 8219	
40226	Rosemary Ann Walker (20/01)	82 651 674 8219	
40227	Bridget Ann Duncos (20/01)	03 651 277 0067	
40228	Armen Richard Hitzeman (20/01)	03 651 277 0067	
40229	Debra Doreen Hansen (20/01)	99 NP	
40230	Scott Richard Hansen (20/01)	99 NP	
40231	Jacqueline June Foley (20/01)	93 NP	
40232	Timothy Mark Foy (20/01)	93 NP	
40233	Donna Lee Shipka (20/01)	07 651 674 7771	

410TH ST INTS

41000	106 RESIDENCE		
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HEMINGWAY AVE S

CT	712.06	7751 - 7897	SC
7751	Jennifer Lee Kloes (20/01)	92 651 458 8107	
7752	Steven Donald Swanson (20/01)	92 651 458 8107	
7753	Roberta Cameron (20/01)	10 651 458 4074	

Community Action Partnership Of Rams

7754	East Metro Womens Council (10/01)	10 651 458 4822	
7755	REM MCS (20/01)	09 651 787 9255	
7756	Karen Susan Frim (20/01)	94 651 787 7139	

7754 Apartments

7754	Chris N Harves (20/01)	08 651 768 0304	
7755	Melinda N Harves (20/01)	08 651 768 0304	
7756	Asha Montgomery (20/01)	08 NP	
7757	Richard Rietmann (20/01)	09 NP	
7758	Keith Wenker (20/01)	09 NP	
7759	Koray Wenker (20/01)	09 NP	
7760	Brody Schenke (20/01)	08 NP	
7761	Joshua Ryan Turner (20/01)	05 NP	
7762	Monica M Turner (20/01)	05 NP	

7756 Apartments

7756	Loonie M Onell (20/01)	88 651 769 9613	
7757	Michael Jeffrey Onell (20/01)	88 651 769 9613	
7758	Mous P Wang (20/01)	04 NP	
7759	Laura Warner (20/01)	04 NP	
7760	Sarina J Rana (20/01)	03 NP	
7761	Shahid Kabeem Rana (20/01)	03 NP	

7758 Apartments

7758	N Gonzalez (20/01)	00 651 458 1086	
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7760 Apartments

7760	Noemy Gonzalez (20/01)	00 651 458 1086	
7761	Alissa McCarri (20/01)	00 651 458 1086	
7762	Rosetta Smith (20/01)	+ NP	
7763	Robert Nelson (20/01)	10 651 528 8092	
7764	Cene A Wiley (20/01)	+ NP	
7765	Kenya Wiley (20/01)	+ NP	
7766	Jerry Dittmar Hahn (20/01)	94 651 772 1932	
7767	Leona Elizabeth Hahn (20/01)	94 651 772 1932	

7762 Apartments

2	Mark Urboski	+	651 330 5063
2	Aurea J Kessler-Roering	+	NP
	MCS	09	651 340 4333
	★Vedette Noel Monjeau	+	NP
	Jonathan Robert Schneider	10	NP
7765	Justin J. Weiss (1/00)	09	NP
7767	James Philip Damato Jr (5/92)	92	651 458 5981
7771	Kari A Hauge	+	NP
7773	Jay R Knudtson	09	NP
	Shawn Glover (20/01)	09	651 769 2519

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HEMINGWAY AVE S

HELIUM ST NW

CT 1306.00	Princeton	31775 - 34072	SC
CT 9707.00		32369 - 34899	SE
CT 1301.00		34150 - 36474	SD
RR6		31775 - 32369	55371

317TH AVE NW INTS

31775	NP
31777	Carol Lee Larson
31778	Robert Larson
31779	David Lee Puka
31780	Sandra Lee Hanson
31781	Theresa Gabe Hanson
31782	Kenneth A. Rasmussen
31783	Dave A. Leibel
31784	Dawn M. Fulk
31785	Mark Alan Fulk
31786	Tamara L. Hall

RR5

33976 - 34860	55371
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STATE HIGHWAY 95 INTS

33976	Ruth Agne Hanson
33977	Jeff Philip Hanson
33978	Dana Suzanne Berg
33979	Thomas D. Murray
33980	Theresa D. Murray
33981	Murphy Racing
33982	Michael Henderson
33983	Seth Evans
33984	Tina Louise Liddle

34290 Personal Drive Ld.

34290	Jessica Jean Schiermerhorn
34291	Roman James Schiermerhorn
34292	Kathleen M. Swanson
34293	Wayne Swanson
34294	RDS Enterprises Inc.
34295	Crystal Dayne Beckert
34296	Randy Dale Beckert
34297	Evel E. Torgler
34298	Nelson Marie Temari

RR5

34899 - 34899	55371
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RR5

34964 - 36474	55371
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34964	Catherine Marie Slater
34965	Greg Charles Slater
34966	Colleen Ann Engstrom
34967	Jill Zelinsky
34968	Josephine Marie Sullivan
34969	Ronald L. Bump
34970	NP

35500 Central Claims Service Inc.

35500	Central Claims Service Inc.
35501	John Francis Jefferson
35502	John Jefferson
35503	John Jefferson
35504	John Jefferson
35505	John Jefferson
35506	John Jefferson
35507	John Jefferson
35508	John Jefferson
35509	John Jefferson

35995 Central Siding & Remodeling

35995	Central Siding & Remodeling
35996	Sue Marie Heggen
35997	Terry L. Heggen
35998	Del D. Young
35999	Maya Smith-Sturm
36000	Gary Smith-Sturm
36001	Malissa Marie Feigman
36002	Chris Allen Asarud
36003	Rebecca Ellen Asarud
36004	Donald D. Lubrecht
36005	Thomas Richard Lubrecht

36423

36423	NP
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36474 Lighthouse Alarm Communications

36474	Lighthouse Alarm Communications
36475	Duane Marie Poir
36476	Pauline Marie Poir
36477	Edith M. Poir

HELIUM ST NW

CT 1306.00	Saint Francis	24601 - 28070	SC
RR1		24601 - 28070	55070

SEELYE BROOK DR NW INTS

24601	Jeff Lynn Olson
24602	Philip John Olson
24603	Alan John Olson
24604	Terry Lee Stephens
24605	Pat A. Olson
24606	James Leo McGabe
24607	Yvonne Elaine McGabe
24608	NP
24609	Robert Edward Jones

RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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RR1

24601 - 28070	55070
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HEMATITE ST NW

CT 502.28	Anoka	13872 - 15525	SC
13872	Angela L. Olson	13872 - 15525	55303
13873	Scott P. Olson		
13874	Tracy Lynn Johnson		
13875	Jenna E. Schneider		
13876	Adria Chenev		
13877	Shawn Chenev		
13878	Anthony Thomas Dunken		
13879	Karla J. Andersen		
13880	Arnold William Vinson		

146TH CIR NW INTS

14640	Master Klean
14641	Laura Valencia
14642	Roy R. Krause
14643	Ronald J. Krause
14644	Raymond R. Krause Construction
14645	Kari A. Vaughn
14646	Robert L. Vaughn II
14647	Heather L. Hanson
14648	Trent A. Hanson
14649	John J. Brown
14650	Leah D. Brown
14651	Brutus Charles Peck
14652	Wave 2000
14653	Donald Clinton Farrell
14654	Jude Renee Farrell
14655	Midwest Dragn Imports
14656	Amy Lucille Struzky
14657	Robert J. Struzky

150TH AVE NW INTS

15000	Suzanne Jeanette Evans
15001	Bradley L. Evans
15002	Straight Line Metal Works
15003	Brad W. Ruid
15004	Sandra Lee Ruid
15005	Kathleen Kay Anderson
15006	Charles Kay Olsson
15007	James Thomas Johnson
15008	Lena Marie Johnson
15009	Diane Marie Schaefer
15010	Judy A. Schaefer
15011	Jeff Ann Synneski
15012	William James Synneski

152ND AVE NW INTS

15200	Grace M. Haugvedt
15201	Harriet L. Haugvedt
15202	NP
15203	Bernard Nicholas Wurm
15204	Colleen Marie Wurm
15205	NP
15206	NP
15207	NP
15208	NP
15209	NP
15210	NP
15211	NP
15212	NP
15213	NP
15214	NP
15215	NP
15216	NP
15217	NP
15218	NP
15219	NP
15220	NP
15221	NP
15222	NP
15223	NP
15224	NP
15225	NP
15226	NP
15227	NP
15228	NP
15229	NP
15230	NP
15231	NP
15232	NP
15233	NP
15234	NP
15235	NP
15236	NP
15237	NP
15238	NP
15239	NP
15240	NP
15241	NP
15242	NP
15243	NP
15244	NP
15245	NP
15246	NP
15247	NP
15248	NP
15249	NP
15250	NP
15251	NP
15252	NP
15253	NP
15254	NP
15255	NP
15256	NP
15257	NP
15258	NP
15259	NP
15260	NP
15261	NP
15262	NP
15263	NP
15264	NP
15265	NP
15266	NP
15267	NP
15268	NP
15269	NP
15270	NP
15271	NP
15272	NP
15273	NP
15274	NP
15275	NP
15276	NP
15277	NP
15278	NP
15279	NP
15280	NP
15281	NP
15282	NP
15283	NP
15284	NP
15285	NP
15286	NP
15287	NP
15288	NP
15289	NP
15290	NP
15291	NP
15292	NP
15293	NP
15294	NP
15295	NP
15296	NP
15297	NP
15298	NP
15299	NP
15300	NP

156TH AVE NW INTS

15600	NP
15601	NP
15602	NP
15603	NP
15604	NP
15605	NP
15606	NP
15607	NP
15608	NP
15609	NP
15610	NP
15611	NP
15612	NP
15613	NP
15614	NP
15615	NP
15616	NP
15617	NP
15618	NP
15619	NP
15620	NP
15621	NP
15622	NP
15623	NP
15624	NP
15625	NP
15626	NP
15627	NP
15628	NP
15629	NP
15630	NP
15631	NP
15632	NP
15633	NP
15634	NP
15635	NP
15636	NP
15637	NP
15638	NP
15639	NP
15640	NP
15641	NP
15642	NP
15643	NP
15644	NP
15645	NP
15646	NP
15647	NP
15648	NP
15649	NP
15650	NP
15651	NP
15652	NP
15653	NP
15654	NP
15655	NP
15656	NP
15657	NP
15658	NP
15659	NP
15660	NP
15661	NP
15662	NP
15663	NP
15664	NP
15665	NP
15666	NP
15667	NP
15668	NP
15669	NP
15670	NP
15671	NP
15672	NP
15673	NP
15674	NP
15675	NP
15676	NP
15677	NP
15678	NP
15679	NP
15680	NP
15681	NP
15682	NP
15683	NP
15684	NP
15685	NP
15686	NP
15687	NP
15688	NP
15689	NP
15690	NP
15691	NP
15692	NP
15693	NP
15694	NP
15695	NP
15696	NP
15697	NP
15698	NP
15699	NP
15700	NP

158TH AVE NW INTS

15800	NP
15801	NP
15802	NP
15803	NP
15804	NP
15805	NP
15806	NP
15807	NP
15808	NP
15809	NP
15810	NP
15811	NP
15812	NP
15813	NP
15814	NP
15815	NP
15816	NP
15817	NP
15818	NP
15819	NP
15820	NP
15821	NP
15822	NP
15823	NP
15824	NP
15825	NP
15826	NP
15827	NP
15828	NP
15829	NP
15830	NP
15831	NP
15832	NP
15833	NP
15834	NP
15835	NP
15836	NP
15837	NP
15838	NP
15839	NP
15840	NP
15841	NP
15842	NP
15843	NP
15844	NP
15845	NP
15846	NP
15847	NP
15848	NP
15849	NP
15850	NP
15851	

393RD ST

393RD ST

North Branch		7451	7524	\$0
CT 1103.00		7451	7524	55056
HENNA AVE INTS				
7451	Michelle Carlsens	07	NP	
	John M. Schobolner	07	NP	
7468	Eric David Bjerketved (1/06)	05	651.277.0634	
	Erica Sue Bjerketved (1/06)	05	651.277.0634	
7491	Robert M. Martin (1/06)	08	NP	
7524	Linda L. Prince (1/06)	92	651.674.5127	
-393RD CT INTS				
6 RESIDENCE				

394TH AVE NE

Stanchfield				
CT 1301.00		15 -	37	\$0
CT 1302.00	E	18 -	18	\$E
		15 -	37.....	55080

394TH ST

North Branch		7351	7500	\$0
CT 1103.00		7351	7500	55056
HENNA AVE INTS				
7351	James A. Still	94	NP	
	Michelle E. Still	94	NP	
7356	Nan Mae Hult	93	651.674.7237	
	Ronald Otto Hult	93	651.674.7237	
7386	Glen Davis Spires (1/06)	96	651.674.2070	
	Traci Lynn Spires (1/06)	96	651.674.2070	
7418	7450		NP	
7474	Dawn Allen Johnson	87	651.674.4203	
	Sherril Eileen Johnson	87	651.674.4203	
7500	Andrea Page Grote	96	NP	
	Kevin Arnold Grote	96	NP	
-HEMINGWAY AVE INTS				
12 RESIDENCE				

395TH AVE NE

Stanchfield		3489	3784	\$E
CT 1302.00		3489	3784	55080
HENNA AVE INTS				
3489	Kathleen Anne Leick (1/06)	96	NP	
	Rod Kenneth Leick (1/06)	96	NP	
3598	Carolyn M. Klunder	10	NP	
3676			NP	
3776	Phyllis Jeanne Christenson	80	320.396.2510	
	Verlie Christenson	80	320.396.2510	
3784	A. Ruppert & Son Well Co.	10	763.420.2446	
	Debra Denise Knode		NP	
-VICKERS ST NE INTS				
7 RESIDENCE 1 BUSINESS				

395TH AVE NW

Dalbo		7275	7275	\$0
CT 1301.00		7275	7275	55017
RHINESTONE ST NW INTS				
7275	Connie Rose Elton	82	763.389.2147	
	Stanley Oliver Elton	82	763.389.2147	
2 RESIDENCE				

395TH ST

North Branch		9837	9837	\$0
CT 1107.00		9837	9837	
CT 1103.00		9919	9951	\$0
HORUS AVE INTS				
7522	Kvetons Cleaning	10	651.277.1010	
	Jennifer Rost (1/06)	05	651.674.7293	
	Travis L. Rost (1/06)	05	651.674.7293	
9919	Jill Sarah Alkonson (1/06)	04	NP	
	Kevin Jamey Hydruke (1/06)	04	NP	
9951	Lorrie Marie Bauer (1/06)	94	651.674.5702	
	Matthew John Bauer (1/06)	94	651.674.5702	
-KEYSTONE AVE INTS				
6 RESIDENCE 1 BUSINESS				

396TH CT

North Branch		6530	6551	55056
CT 1107.00		6530	6551	
6530 * Exterior Wall Systems Inc.				
6551 * Northern Lights Steel Fabrication				
08 651.237.0214				
2 BUSINESS				

397TH AVE NE

Stanchfield		200	200	\$0
CT 1301.00		200	200	
CT 1302.00		1338	4975	\$E
-UNIVERSITY AVE INTS				
200	Bradley T. Schmitz (1/06)	07	NP	
-BUCHANAN ST NE INTS				
1338	Heidi Kari Nelson (1/06)	99	320.396.3065	
	Norm Lee Nelson (1/06)	99	320.396.3065	
1401	Carl Anderson	82	320.396.3192	
	Melissa Anderson	82	320.396.3192	
1404			NP	
1596	Eddy Emerson Hirsch	90	320.396.0051	
	Elizabeth Hirsch	90	320.396.0051	
1610	Jaron A. Spicka (1/06)	05	NP	
1621	Kurt John Attendorf	94	320.396.2402	

397TH ST

North Branch		4445	7610	\$0
CT 1103.00		4445	7610	55056
4445				
4445	Jennifer Ann Becker (1/06)	07	NP	
	E. M. Barrett		NP	
4461	Dan Jay Valdez (1/06)	99	651.674.4144	
	Rose Dorothy Valdez (1/06)	99	651.674.4144	
4510	G Hicks		651.674.6166	
	Brooke Marie Jenny		651.674.6166	
4527	Lisa Hatle (1/06)	07	NP	

COLE

1746	Melissa Lynn Attendorf	94	320.396.2402	
1750			NP	
1788	Richard Allen Person	82	320.396.3554	
	Teresa Lee Person	82	320.396.3554	
-HASTINGS ST NE INTS				
1850			NP	
1896	Donald Richard Fiedler	04	320.396.3409	
	Katherine D. Fiedler	04	320.396.3409	
2045			NP	
2075	John Carl Attendorf	77	320.396.2593	
	Phyllis Jean Attendorf	77	320.396.2593	
2080	Harold Willis Conrad	82	320.396.2008	
	Kathy Joan Conrad	82	320.396.1680	
2176	Jennifer Jane Bondeson	07	320.396.3677	
2237	Jeff Duane Schroeder (1/06)	06	NP	
	Kayla Schroeder (1/06)	06	NP	
2270	Ruth Harnet Englund	88	320.396.3244	
2383	Dorothy Louise Person (12/96)	81	320.396.2140	
	Leroy Elmer Person (12/96)	81	320.396.2140	
2403	Mindy J. Fuhol	86	320.396.2548	
	Wladimir Fuhol Jr.	86	320.396.2548	
2440	Kevin Edward Nelson	88	320.396.2064	
	Marie Lois Nelson	88	320.396.2064	
2711	Ray L. White	82	320.396.2289	
2776	Daniel Richard Lissy	90	NP	
	Laurie Justine Lissy	90	NP	
2800			NP	
2950	Charles Raymond White	82	320.396.3197	
	Heike Nordby White	82	320.396.3197	

STATE HIGHWAY 65 INTS

4057	Kurt Larry Lindquist	02	320.396.3888	
	Sarah L. Lindquist	02	320.396.3900	
4113	Donald Joseph Fox	82	320.396.3111	
	Donna Marie Fox	82	320.396.3111	
4330	James Donald Klanderud	98	320.396.2110	
	Sandra Kay Klanderud	98	320.396.2110	
4499	Chris Laurie Anderson	91	NP	
	Paul Raymond Anderson	91	NP	
4720	John W. Heidelberg	96	320.396.3505	
	Lois L. Heidelberg	96	320.396.3505	
4741	Lisa Ann Heidelberg	03	NP	
4975	Judy L. Bendickson	90	320.396.4296	
	Robert Lee Bendickson	90	320.396.4296	
52 RESIDENCE				

397TH AVE NW

Braham		2712	4050	\$0
CT 1301.00		2712	4050	55006
2712				
2712	Charles James Bergman	07	320.396.3572	
2913	Patrick John Gerold (1/06)	92	320.396.0345	
	Terril Lee Gerold (1/06)	92	320.396.0345	
3020	Albert John Mathberg	82	320.396.3447	
3121	Chris Frederic Richter	99	NP	
3193			NP	
-LILY ST NW INTS				
3352	Adeline Johnson	82	320.396.3567	
	Donald Wilfred Johnson	82	320.396.3567	
3549	Gary Arthur Bromwich	84	NP	
-TULIP ST NW INTS				
3711	James R. Smith	10	320.396.3811	
	Robert Allen Smith	10	320.396.3811	
3720	Lyle Edward Doebbeling	82	320.396.3431	
	Mikeld Lois Doebbeling	82	320.396.3431	
3970	David Lee Blakely Sr (1/06)	98	NP	
4045	Rhonda Jean Trisko (1/06)	91	320.396.4436	
	S. J. Trisko (1/06)	91	320.396.4436	
4050	Robert G. Turchi Jr.	82	320.396.2525	
17 RESIDENCE				

397TH AVE NW

Dalbo		6998	7009	\$0
CT 1301.00		6998	7009	55017
6998				
6998	Dan Allen Brown	82	763.389.4398	
	Robyn Carole Brown	82	763.389.4398	
7009	Todd Matthew Gonia (1/06)	07	763.389.5529	
	Theresa Mary Roettger (1/06)	07	763.389.5529	
-HACRE ST NW INTS				
4 RESIDENCE				

397TH AVE NW

Stanchfield		599	2001	\$0
CT 1301.00		599	2001	
CT 1302.00		985	985	\$E
599				
599	Danika J. Dahlin (1/06)	09	NP	
	Jacob L. Dahlin (1/06)	09	NP	
9014	Julia Ruth Eastling	02	NP	
	Tom Donald Eastling	02	NP	
982	Cameo Kay Zehnder (1/06)	03	320.396.3834	
	Chad Michael Zehnder (1/06)	03	320.396.3834	
985	Daniel Heidelberg	02	320.396.0069	
1000	Harvey C. Hastings (1/06)	09	NP	
1003	Daniel Heidelberg	99	NP	
	Rachel Marie Heidelberg	99	NP	
1201	Kim Kopecky (1/06)	07	320.396.2166	
	Ruff Kopecky (1/06)	07	320.396.2166	
1962	Cheryl H. Johnstone (1/06)	08	NP	
	Martin I. Johnstone (1/06)	08	NP	
1975			NP	
2001	Linda Loraine Lambert	91	NP	
16 RESIDENCE				

397TH ST

North Branch		4445	7610	\$0
CT 1103.00		4445	7610	55056
4445				
4445	Jennifer Ann Becker (1/06)	07	NP	
	E. M. Barrett		NP	
4461	Dan Jay Valdez (1/06)	99	651.674.4144	
	Rose Dorothy Valdez (1/06)	99	651.674.4144	
4510	G Hicks		651.674.6166	
	Brooke Marie Jenny		651.674.6166	
4527	Lisa Hatle (1/06)	07	NP	

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4569	Paul Hatle (1/07)	07	NP
	Bruce Alan Jaworski (1/06)	04	651.277.0240
	Charlynn Ann Jaworski (1/06)	04	651.277.0240
-HEMINGWAY AVE INTS			
7364	Daniel Bernth Weissmann (1/06)	03	NP
	Jackie Mae Weissmann (1/06)	03	NP
7367	Cindy Rose Brown (1/06)	02	NP
7411	Barbara J. Burnington	98	NP
7424	James Inoske (1/06)	03	651.674.2669
7444	Janice L. Parsons	82	651.674.8481
	Joseph F. Parsons	82	651.674.8481
7459			NP
-HORUS AVE INTS			
7518	Marcella Hulda Marking (1/06)	89	651.674.2394
	Sylvester Everett Marking Jr (1/06)	89	651.674.2394
7576	Joseph Wayne Anderson (1/06)	94	651.674.6117
	Mary Kay Anderson (1/06)	94	651.674.6117
7579	Fred Edward Olmstead Jr.	94	651.674.2228
	Suzanne Marie Olmstead	94	651.674.2228
7610	Suzanne Marie Olmstead	78	651.674.4851
	Joyce Irene Walker	78	651.674.4851
-HOMESTEAD AVE INTS			
26. PRINCIPAL			

2007 MINNEAPOLIS

7674	Brian Kevin Casey	00	651.674.5709
7675	Laura Mae Casey	00	651.674.5709
7683	Kenneth G Kubal	83	651.674.7938
7706	Amie Pantelis	04	NP
	John Pantelis Jr.	04	NP
RR2	14805 - 15020	55056	
14805	Denise Rae Robins	91	651.583.2610
	Scott Alan Robins	91	651.583.2610
	*Robins Remodel & Repair	91	651.583.2610
14856	Shen C Tucker	92	651.583.2028
	Winston H Tucker II	92	651.583.2028
14930	Brian Alaric Dettler	96	651.583.2300
15020	Kristi J Beer	92	NP
	35 RESIDENCE	10 BUSINESS	

393RD CT

CT 1103.00	North Branch	7630 - 7646	\$0
RR7	7630 - 7646	55056	
7630	Jenny Heath	04	651.237.0742
	Jim R Heath	04	651.237.0742
7641	Patrick L Parnock	04	651.674.0520
7646	Carl Splitstoser	05	651.277.0108
	5 RESIDENCE		

393RD ST

CT 1103.00	North Branch	7451 - 7524	\$0
RR7	7451 - 7524	55056	
7451	Julie Kay Klein	90	651.674.5046
	Travis Mark Klein	90	651.674.5046
7468	Eric David Berkefeldt	05	651.277.0634
	Erica Sue Berkefeldt	05	651.277.0634
7491	Dale Arthur Rindahl	90	651.674.8602
7524	Linda L Prince	92	651.674.5127
	6 RESIDENCE		

394TH ST

CT 1103.00	North Branch	7351 - 7500	\$0
RR7	7351 - 7500	55056	
7351	James A Sill	94	NP
	Michelle E Sill	94	NP
7356	Nan Mae Hull	93	651.674.7237
	Ron O Hull	93	651.674.7237
7388	Glen Davis Spores	96	651.674.2070
	Traci Lynn Spores	96	651.674.2070
7418	Andrew Groundrover	05	651.674.9087
	Holly Groundrover	05	651.674.9087
	*Lakes Ceramic Tile	04	651.674.5087
7450	*Sunrise Fire Protection Inc	93	
7474	David Allen Johnson	87	651.674.4203
	Sherril Eileen Johnson	87	651.674.4203
7500	Andrea Paga Grote	96	NP
	Kevin Arnold Grote	96	NP
	12 RESIDENCE	2 BUSINESS	

395TH ST

CT 1103.00	North Branch	7522 - 9951	\$0
CT 1107.00	North Branch	9837 - 9837	\$0
RR3	E	7522 - 7522	55056
7522	Jackie Kveton	00	651.674.7503
	Robert G Kveton	00	651.674.7503
RR5	O	9837 - 9951	55056
9837	Travis L Rost	05	NP
9919	Jill Sarah Hydeke	04	651.237.0422
	Kevin J Hydeke	04	651.237.0422
9951	Lorrie Marie Bauer	94	651.674.5702
	Matthew John Bauer	94	651.674.5702
	7 RESIDENCE		

397TH ST

CT 1103.00	North Branch	4569 - 7610	\$0
RR1	O	4569 - 4569	55056
4569	Brian A Jaworski	04	651.277.0240
	Christine A Jaworski	04	651.277.0240
RR3	7364 - 7610	55056	
7364	Daniel B Weissmann	03	651.674.7878
7367	Cindy Rose Brown	02	651.674.8810
	*HEMINGWAY AVE INTS		
7411	Barbara J Burnington	98	NP
	David E Burnington	98	NP
7424	James Troske	03	651.674.2669
7444	Janice L Parsons	82	651.674.6481
	Joseph F Parsons	82	651.674.6481
7499	Gail Helen Paschke	96	651.237.0132
	Ken Willis Paschke	96	651.237.0132
7518	Marcella Hilda Marking	89	651.674.2394
	Sylvester Everett Marking Jr.	89	651.674.2394
7578	Joseph W Anderson	94	651.674.6117
	Mary K Anderson	94	651.674.6117
7579	Apartment		
300	Carl Edward Olmstead	94	651.674.2228
300	Suzanne Marie Olmstead	94	651.674.2228
	*HOMESTEAD AVE INTS		
7610	Bruce Aie Walker	78	651.674.4851
	Joyce Irene Walker	78	651.674.4851
	19 RESIDENCE		

400TH ST

CT 1103.00	North Branch	4388 - 9628	\$0
CT 1102.00	North Branch	12410 - 13864	\$0
CT 1107.00	North Branch	14757 - 15540	\$0
RR1	4388 - 5744	55056	
4388	Alan P Hansen	04	651.674.6102
	Stephanie Hansen	04	651.674.6102
	*Affordable Small Engine Sales & Serv	04	651.674.4652
4598	*Machines By Design Corp	95	651.674.8581
4688	Larry Kenneth Beach	03	NP
	*Beach Realty Inc	05	651.674.2340
	*Wildridge Place Hmwr Ascn		
4744	Kim E Klande	93	651.674.8581
	Serena K Klande	93	651.674.8581
4750	Kevin Scott Baker	93	651.674.7085
	Stacy Celine Baker	93	651.674.7085

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4762	Robert W Pfalz	92	651.674.8004
4792	*Streams Lake And Woods Corp	02	651.674.4749
	Dorell L Zachrisson	96	651.674.4749
	Nancy L Zachrisson	96	651.674.4749
4871	Jessica Lynn Johnson	98	NP
4893	Barbara Lynn Johnson	98	651.674.8629
	Marlen Dennis Johnson	99	651.674.8629
4895	Devin Zachisa	97	NP
5006	Devin M Zachrisson	95	NP
	Laura Jean Zachrisson	95	NP
5010	Beth Marie Zachrisson	97	651.674.8444
	Darin John Zachrisson	97	651.674.8444
5203	*Donald Swanson	03	
	Donald P Swanson	82	651.674.4145
	Karen Renee Swanson	82	651.674.4145
5580	Debra Jean Labore	89	651.674.5483
	Michael Robert Labore	89	651.674.5483
5648	Shirley J Erdberg	02	651.237.1150
	Cliff K Secord	02	651.237.1150
5706	Jeremy Hansen	+	651.237.1004
5744	Robin Hansen	+	651.237.1004
RR5	E	6136 - 6318	55056
6136	*Donald C Bauer	94	NP
6318	Christine Marie Sellman	96	NP
	*Steve Matthew Sellman	96	NP
RR3	6900 - 8628	55056	
6900	Marisa L Stromberg	87	651.674.7544
	Roger Eugene Stromberg	87	651.674.7544
7244	Cheryl Ann Fay	93	651.674.7441
	Michael Donald Fay	93	651.674.7441
7428	*Harley Soc Inc	91	651.674.7540
7454	Julie Sally Renitz	90	651.674.7078
	Steve D Renitz	90	320.358.4883
7516	Haley E Johnson	94	651.674.4089
	Marge Agnes Johnson	94	651.674.4089
8597	Kevin Mann	05	651.674.4321
8628	Joel Peterson	03	651.583.3172
	Rebekah J Peterson	03	651.583.3172
12410	Alan D Rasmussen	04	NP
	Cyitham M Rasmussen	04	NP
12545	Craig Alan Maltend	02	651.583.3188
	Mike Parker	02	651.583.3188

13353	Laura AHO	02	NP
13481	Nancy Johnson	93	NP
13757	Shane Jeremy Johnson	93	NP
13878	John Jeff	05	NP
13894	*Jeffs Repair	97	651.583.3342
	Jeff J Walczko	90	651.583.3342
	Michelle Elz Walczko	90	651.583.3342
14754	Craig W Johnson	03	NP
	Susan M Johnson	03	NP
15120	Brenda L Main	96	651.583.3456
	Dorrell F Main	96	651.583.3456
	*Main Consulting Corp	99	651.583.3456
15259	Jason P Carroll	01	NP
	Lon Carroll	01	NP
15325	Linda Hays	81	NP
	Ted Donald Hays	81	NP
15395	Jeff Kratz	96	651.583.2004
	Linda Marie Kratz	96	651.583.2004
15540	Mark D Walczko	94	651.583.3501
	Stephanie Walczko	94	651.583.3501
	69 RESIDENCE	9 BUSINESS	

CT 1103.00	North Branch	6436 - 6789	\$0
RR3	6436 - 6789	55056	
6436	Gaila R Kesseling	05	651.277.0747
	Michael P Kesseling	05	651.277.0747
6439	Kim Ann Pierre	96	651.674.5026
	Rus Pierre	96	651.674.5026
6466	Gene D Vonwerk	00	651.674.5570
	Sherrill Beth Vonwerk	00	651.674.5570
6469	Jason L Spoeth	01	NP
	*WEB Designs & More	01	651.237.0959
6499	Karen Lynn Crowe	03	651.674.0284
	Robert Lee Kloe	03	651.674.0284
6500	Amanda Laventure	04	NP
	Patrick A Laventure	04	NP
6536	Daniel Lee Wegan	93	651.674.5887
	Kristine Marie Wegan	93	651.674.5887
6543	Sever Walter Thompson	95	651.674.8536
	Sharon L Thompson	95	651.674.8536
6554	Kris Lee Danks	95	651.674.0037
	Wayne M Danks	95	651.674.0037
6573	James Horstall	00	NP
	*GREENLAWN AVE INTS		
6603	Dawn Marie Kaiser	04	651.674.5482
	James R Kaiser	04	651.674.5482
6661	Dave Joseph Gro	99	651.237.0108
	Wendy Ann Gro	99	651.237.0108
6705	Stacie Kay Wheeler	03	651.674.1955
6736	Jeffery R Steinbrucker	00	651.674.8970
	Roger J Steinbrucker	00	651.674.8970
6768	Carla J Haugard	04	NP
	Kevin C Haugard	04	NP
6763	Jason Jeffrey Leibe	05	651.277.0822
	Lisa Fredrick Leibe	05	651.277.0822
6785	Michael Frakes	01	NP
6788	Nicholas Jeffrey Palmer	04	651.674.8026
	Janice N Heaves	04	651.674.8026
	34 RESIDENCE	1 BUSINESS	

CT 1103.00	North Branch	6444 - 6714	\$0
RR3	6444 - 6714	55056	
6444	Keith August Magnuson	05	651.277.0470
6572	Angela Elizabeth Twill	99	651.674.0748
	Michael Gordon Twill	99	651.674.0748
	*Tweil Graphic Services LLC	+	651.674.0748
6600	John James Vincent	99	NP
6601	Daryl Wayne Norgard	04	651.674.4011
	Tammy Lee Norgard	04	651.674.4011
6628	Blair C Morales	05	NP
	Helen J Mulcher	05	NP
6629	Merissa Jo McNeal	95	651.674.6221
6656	Sandra L Black	99	NP
6657	Glenn M Germain	00	NP
6684	William Louis Fetterly	03	NP
	*GRIZZLY LN INTS		
6713	Charles Jay Nystrom	99	651.674.4181
6714	Marlyn May Hargrave	03	651.277.0344
	Tony David Hargrave	03	651.277.0344
	17 RESIDENCE	1 BUSINESS	

CT 1103.00	North Branch	5607 - 5661	\$0
RR6	5607 - 5661	55056	
5607	Jeffrey A Schertz	04	NP
	Jennifer Ak Schertz	04	NP
5614	Tammy Ellison	03	651.674.1862
	William E Ellison II	03	651.674.1862
5621	Anthony S Ness	04	651.237.0702
	Tina Ness	04	651.237.0702
5651	Janet L Knutson	02	651.674.8855
	Scott J Knutson	02	651.674.8855
	10 RESIDENCE		

CT 1103.00	North Branch	5607 - 5661	\$0
RR6	5607 - 5661	55056	
5607	Jeffrey A Schertz	04	NP
	Jennifer Ak Schertz	04	NP
5614	Tammy Ellison	03	651.674.1862
	William E Ellison II	03	651.674.1862
5621	Anthony S Ness	04	651.237.0702
	Tina Ness	04	651.237.0702
5651	Janet L Knutson	02	651.674.8855
	Scott J Knutson	02	651.674.8855
	10 RESIDENCE		

CT 1103.00	North Branch	5607 - 5661	\$0
RR6	5607 - 5661	55056	
5607	Jeffrey A Schertz	04	NP
	Jennifer Ak Schertz	04	NP
5614	Tammy Ellison	03	651.674.1862
	William E Ellison II	03	651.674.1862
5621	Anthony S Ness	04	651.237.0702
	Tina Ness	04	651.237.0702
5651	Janet L Knutson	02	651.674.8855
	Scott J Knutson	02	651.674.8855
	10 RESIDENCE		

CT 1103.00	North Branch	5607 - 5661	\$0
RR6	5607 - 5661	55056	
5607	Jeffrey A Schertz	04	NP
	Jennifer Ak Schertz	04	NP
5614	Tammy Ellison	03	651.674.1862
	William E Ellison II	03	651.674.1862
5621	Anthony S Ness	04	651.237.0702
	Tina Ness	04	651.237.0702
5651	Janet L Knutson	02	651.674.8855
	Scott J Knutson	02	651.674.8855
	10 RESIDENCE		

6705	Stacie Kay Wheeler	03/651	674,1952
6736	Jeffery R Steinbrucker	00/651	674,9370
	Roger J Steinbrucker	00/651	674,8910
6768	Kevin J Haugard	04/61	NP
	Kevin C Haussman	04/61	NP
6763	Jason Jeffrey Leibe	05/651	277,0822
	Led Fredrick Lettke	05/651	277,0822
6785	Michael Finke	01	NP
6788	Nicholas Jeffrey Palmer	04/651	674,8026
	Janice N Heaves	04/651	674,8026
6789	24. DISTANCE	1. DISTANCE	NP

Appendix E

Site Photographs

PHOTOGRAPHS

Photo 1: View from the southwest corner of Site along Flink Avenue, looking north at Site.

Photo 2: Looking east across the Site, near the southwest corner of the Site.



PHOTOGRAPHS

Photo 3: View of underground cable pedestal on the middle part of the west property line, looking east at Site.

Photo 4: View of another underground cable pedestal near the north part of the west property line, looking east at Site.



PHOTOGRAPHS

Photo 5: View of sand road adjacent to the north of the Site, looking east. Notice the house in the left part of the photograph.

Photo 6: Looking at property north of Site, along Flink Avenue.



PHOTOGRAPHS

Photo 7: Looking west at the north property boundary from the northeast corner of Site.

Photo 8: Looking south from the northeast Site corner, along the east property line. Notice I-35W to the west.



PHOTOGRAPHS

Photo 9: At southeast property corner, looking to the south. Notice I-35W to the left again.

Photo 10: Looking west from the southeast property corner. The site is to the right.



PHOTOGRAPHS

Photo 11: Looking north from the southeast property corner. I-35W is on the right.

Photo 12: Looking east from the southeast property corner. I-35W is straight ahead.



Appendix F

Resumes

Dennis P. McComas, P.G.

Senior Geologist, Due Diligence Manager



Background

Dennis McComas has over 30 years of experience in environmental due diligence management, and the assessment, investigation and cleanup of over 200 contaminated Brownfields redevelopment sites and more than 500 petroleum spill/AST/UST release sites. He has also reviewed or performed over 950 Phase I ESA projects. He is a Focus Group lead on the ASTM E50 1527-21 Subcommittee Task Group.

In the last four years, he was instrumental in securing over \$2.6M in cleanup grants for his clients. His expertise includes hydrogeological evaluations, soil vapor intrusion investigations, groundwater contamination investigations, preparation and implementation of RAPs and CCPs, environmental-related litigation experience, and brownfields grant applications.

Education

B.S. Geology,
University of Minnesota, 1988

Post-Graduate Coursework,

Contaminant Hydrogeology and Soil Physics,
Winona State University, 1992

Continuing Education

Princeton Groundwater Pollution and Hydrogeology
Course, 1992

Minnesota Routine Assessment Method (MnRAM)
for Wetlands, Version 3.0 Training, 2002

Crude Oil Spills Symposium, USGS Bemidji
Minnesota Spill Site, 2012

Registrations/Certifications

Licensed Professional Geologist, Minnesota, No.
30503

Licensed Professional Geologist, Wisconsin, No.
656-13

40-hour OSHA HAZWOPER training, 1989;
OSHA Annual 8-hour HAZWOPER refresher
courses

Professional Memberships

Minnesota Groundwater Association
ASTM International Member, No. 1653297

AET Responsibilities

- Phase I ESA projects primary reviewer and manager
- DEED and TBRA Investigation and Cleanup grant application assistance and preparation
- Due Diligence project coordination and management
- Brownfield investigation and MPCA Voluntary Brownfields Liaison and Technical Assistance Liability Assurances
- Phase II ESA, Vapor Intrusion BMP Investigations, RAP and RAP Implementation project coordination, oversight, management, review and reporting
- Client management and regulatory relationships

Project Experience

The Keller Building Redevelopment, Northeast Minneapolis, MN (2017-present), \$80,000

Coordinated environmental assessments and numerous environmental investigations of impacted soil, concrete, and soil vapor. Completed soil vapor pilot testing and vapor mitigation design of an abandoned former wagon manufacturer and military metal fabrication facility. Secured a \$600,000 DEED Cleanup grant to mitigate the vapor intrusion risks, and to remediate solvent-impacted, and hazardous-level impacted soil and concrete. When completed, the renovated facility will house a multi-use restaurant, commercial retail, and office complex.

4500 France Redevelopment, Edina, MN (2017-present), \$50,000

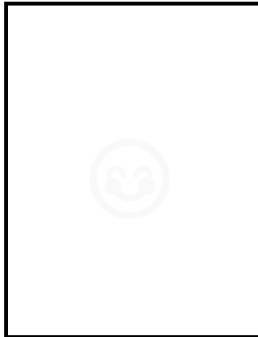
Prepared an environmental assessment, soil and vapor investigations and a Response Action Plan (RAP) of a former Minnesota State Superfund listed dry cleaner, filling station and movie theatre complex to accommodate a future multi-use commercial and residential five story structure with an underground parking ramp. We were able to avoid the necessity of a vapor mitigation system, due the proposed installation of the properly ventilated underground parking ramp under the entire building. Secured a DEED Redevelopment grant and a Hennepin County Well Sealing program grant totaling \$330,000.

Faribault Straight River Apartments and Straight River Park Project, Faribault, (2017-present), \$130,000

Completed and managed a Phase I ESA, a comprehensive Phase II ESA including soil, vapor, and groundwater analysis, a Response Action Plan, and a DEED Investigation and Cleanup grant application to remediate a former City dump, and public works facility, including petroleum impacts, heavy metal, semi-volatiles and volatile organic compounds. In January 2020, secured a \$803,000 DEED Cleanup grant to mitigate the solid waste and contaminants to accommodate a four-level apartment complex and an adjacent park facility adjacent to the scenic Straight River.

Shoreham Yard East Side Property, Minneapolis, MN (2015), \$5,000

Performed a Phase I Environmental Site Assessment (ESA) of the Shoreham Yard East Side Superfund Property. The property is an approximate 16.5 acres, irregular-shaped parcel encompassing the addresses 2800 through 3100 Central Avenue NE and included a Roundhouse/Diesel Shop, remediation treatment buildings and monitoring wells. Extensive assessment, investigation and cleanup activities have previously been completed at the Site.



Education

Geology, B.S.

University of Wisconsin – Eau Claire, 2020

Registrations/Certifications

MnDOT Tech ID:

MnDOT Aggregate Production Level I

MnDOT Concrete Field Level I

MnDOT Grading and Base Level I

MSHA

Part 48, Form 5000-23 Certificate

Employment

American Engineering Testing, Inc.

Engineering Technician

May 2020-Present

Professional Memberships

AET Responsibilities

- Concrete Testing
- Soil Testing (Nuclear gauge, Sand Cone, DCP)
- Bituminous Testing/Sampling
- Laboratory Testing (Standard/Modified Proctor)

Project Experience

Unbridled Avenue Reconstruction; Shakopee, MN 2020

A new road was put in north of Canterbury Park from Shenandoah Drive to County Highway 83. Performed nuclear density testing, moisture sampling and testing, and proctor sampling and testing for road construction including storm sewer and embankment fill.

Bacon Avenue Improvements; Inver Grove Heights, MN 2020

Improvements to 60th Street, 62nd Street, and Bacon Avenue included addition of curb and gutter, storm sewer construction, and sanitary sewer and watermain repairs. Performed nuclear density testing, proctor sampling and testing, gradation sampling, DCP testing, topsoil sampling throughout the duration of the project.

3M Center 301 Annex; Maplewood, MN 2020

Tested soils and aggregate for the reconstruction of 4th Street, east of the new building at the 3M Center in Maplewood. Performed nuclear density testing, proctor sampling and testing, gradation sampling, DCP testing.

MN 302 Rehabilitation at Highway 88; Minneapolis, MN 2020

Performed nuclear density testing, proctor sampling and testing, and bituminous testing and sampling for the rehabilitation and reconstruction of manholes, restoration of curb and gutter, and restoration of pavement.

Washington/Ramsey Recycling; Newport, MN 2020-2021

A new addition is being constructed at the load-out area on the east side of the Recycling & Energy Center building. Responsibilities include nuclear density testing, proctor sampling and testing, and excavation observation.



PHASE I ENVIRONMENTAL SITE ASSESSMENT

80-Acre Koehnen Parcel
Northwest of Flink Avenue & 400th Street
North Branch, Minnesota 55056

AET Project No. P-0013129

Date:
June 13, 2022

Prepared for:
LGI Homes-Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

Geotechnical • Materials
Forensic • Environmental
Building Technology
Petrography/Chemistry

American Engineering Testing
550 Cleveland Avenue North
St. Paul, MN 55114-1804
teamAET.com • 800.972.6364

June 13, 2022



LGI Homes-Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, Minnesota 55303

Attn: Jay Roos, VP of Land Acquisitions & Development

RE: Phase I Environmental Site Assessment
80-Acre Koehnen Parcel
Northwest of Flink Avenue & 400 Street
North Branch, MN 55056
AET Proposal No. P-0013129

Dear Mr. Roos:

American Engineering Testing, Inc. has completed Phase I Environmental Site Assessment services at the 80-Acre Koehnen Parcel, located to the northwest of Flink Avenue and 400 Street in North Branch, Minnesota. This Phase I Environmental Site Assessment was done in accordance with our Proposal No. P-0013129.

We appreciate the opportunity to serve you on this project. If you have any questions regarding the information presented in this Phase I Environmental Site Assessment report, or if we may be of additional service, please contact me.

Sincerely,
American Engineering Testing, Inc.

A handwritten signature in blue ink, appearing to read 'D McComas', is positioned above the printed name.

Dennis McComas, PG
Senior Geologist
Phone: (651) 647-2759
Email: dmccomas@teamAET.com

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FIGURES

1. Site Location Map
2. Site Map

APPENDICES

- A. Acronyms/Abbreviations and Definitions
- B. Client/User Provided Information
- C. Records Review Documentation
- D. Historical Research Documentation
- E. Site Photographs
- F. Resumes

EXECUTIVE SUMMARY

In accordance with Proposal No. P-0013129, American Engineering Testing, Inc. performed a Phase I Environmental Site Assessment of the 80-acre Parcel West of Flink Avenue & West of I-35W, North Branch, Minnesota 55056. Services were performed in accordance with the scope and limitations of the Standards and Practices of the United States Environmental Protection Agency's All Appropriate Inquiries rule (40 CFR Part 312, December 30, 2013) and the American Society for Testing Materials Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process – ASTM E1527-13 for the exclusive use of LGI Homes, Inc.

The Site area is a mixture of residential and agricultural development. From at least 1938 the Site has been undeveloped cultivated agricultural land. The adjoining properties remain residential development, undeveloped forest, agricultural land, and farmstead. The current configuration of the Site has been present since at least 1938.

This assessment has revealed no evidence of recognized environmental conditions in connection with the Site.

This assessment has revealed no evidence of controlled recognized environmental conditions (CRECs) in connection with the Site.

No significant data gaps were encountered with regard to evaluating the Site for this Phase I Environmental Site Assessment.

1.0 INTRODUCTION

1.1 Purpose and Methodology

The purpose of this Phase I Environmental Site Assessment (ESA) is to identify, to the extent reasonable pursuant to the methodology prescribed below, recognized environmental conditions (RECs) in connection with the Phase I Environmental Site Assessment, 80-Acre Koehnen Parcel, located northwest of Flink Avenue & 400 Street (hereafter referred to as the Site). American Engineering Testing, Inc. (AET) understands this Phase I ESA is being performed as part of LGI Homes-Minnesota, LLC's due diligence process to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) liability.

This Phase I ESA was conducted in accordance with the United States Environmental Protection Agency (USEPA) All Appropriate Inquiries (AAI) rule (40 CFR Part 312), December 30, 2013, and the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process – ASTM E 1527-13.

A list of the acronyms and abbreviations and definitions of common terms used in this report is included as Appendix A.

1.2 Scope of Services

The scope of this Phase I ESA was defined in AET's Proposal No. P-0013129 which Jay Roos authorized on May 17, 2022. The scope of services included the following items:

- Review reasonably ascertainable and readily available records and historical use information to help identify RECs in connection with the Site.
- Perform a reconnaissance of the Site to obtain information indicating the likelihood of identifying RECs in connection with the Site.
- Interview owners, occupants, state, and/or local government officials to obtain information indicating RECs in connection with the Site.
- Interpret information collected in conjunction with performing the records review, site reconnaissance, interviews, and present the results in a written report.

1.3 Limitations and Exceptions of Assessment

Although the USEPA AAI rule and the ASTM standard have been followed, the scope of services is not exhaustive and there may be certain environmental conditions AET cannot ascertain and will not be AET's responsibility. Localized contamination related to disposal of contaminants not reported to

appropriate government agencies, not made known to AET or not reasonably observable at the time of AET's Site visit may be on Site.

The services performed by AET have been conducted in a manner consistent with the level of skill and care ordinarily exercised by other members of the profession currently practicing in this area. No environmental site assessment can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Performance of this Phase I ESA is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the Site.

The findings, opinions, and conclusions presented in this report are based on AET's understanding of the client's intended use of the Site. If the intended use of the Site changes, or if conditions differing from AET's original findings are found, AET should be notified to review these changes and to determine the impact, if any, of the changes on the presented findings, opinions, and conclusions.

1.4 Reliance

This Phase I ESA has been prepared for the exclusive use of LGI Homes-Minnesota, LLC for specific application to the Site.

2.0 SITE DESCRIPTION

2.1 Location and Legal Description

Figure 1 shows the location of the Site and Figure 2 shows the configuration of the Site. The legal description of the Site, as provided by LGI Homes-Minnesota, LLC, is included in Appendix B. The Site has no address, is located adjacent to the northwest of Flink Avenue and 400th Street, North Branch, Minnesota with Chisago County Parcel Identification No. 11.00143.00. The Site is located in Section 08, Township 35 North, Range 21 West, Chisago County.

2.2 Current Site Use

The Site comprises 80 acres located in an agricultural and residential developed area of North Branch. The Site is currently cultivated farmland.

2.3 Current Use of Adjoining Properties

The Site is adjoined as noted below.

North	Residential housing.
East	Flink Avenue followed by cultivated farmland and residential development.
South	400 th Street followed by a fallow field and then a residential development.
West	Cultivated farmland.

3.0 USER PROVIDED INFORMATION

AET provided LGI Homes, Inc. with a User Questionnaire and requested the completed Questionnaire be returned to AET. The questionnaire, attached in Appendix B, was completed by Mr. Jay Roos. Mr. Roos responded “No” to questions regarding knowledge of environmental liens; activity and use limitations; Mr. Roos responded “Yes” to having specialized knowledge or experience related to the Site or nearby properties, saying “I have worked for the land development company that currently owns the land. I have about 3 years of knowledge of the site”; Mr. Roos responded “Yes” to having limited knowledge of past uses of the Site, saying “I have known the site for about 3 years. The site is vacant farmland, and I am not aware of any differing past uses.”; Mr. Roos responded “No” to questions regarding specific chemicals that are present or that once were present; spills or other chemical releases that have taken place at the Site; environmental cleanups that have taken place at the Site; or obvious indicators that point to the presence or likely presence of releases at the Site. Mr. Roos’s response also indicates the purchase price being paid for the Site reasonably reflects the fair market value of the Site if it were not contaminated.

As indicated in AET’s proposal to LGI Homes-Minnesota, LLC, the User will share with AET all available and relevant information pertaining to the Site. AET was not provided with Site specific information.

4.0 RECORDS REVIEW

4.1 Physical Setting

Spills, leaks, or disposal of hazardous substances or petroleum products at a Site will generally migrate on the surface or in the subsurface via soil, groundwater, and/or vapor. There is also the potential for surface or subsurface contamination to migrate from adjoining properties towards the Site or migrate off Site depending on subsurface conditions.

AET reviewed published geologic studies, atlases, the current topographic map, and available subsurface reports. Publications not included in the appendices are referenced in Section 11.0. The review indicated the following:

- The Site is located in the Lower St. Croix River watershed.
- The surficial soils in the vicinity of the Site are very fine- to medium-grained sand that may be silty in places, and scattered lenses of silt to silty clay may occur at depth.
- The uppermost bedrock underlying the Site is the Tunnel City Group composed of sandstone. The depth to bedrock is 101 to 150 feet below ground surface (bgs).
- The regional groundwater gradient in the vicinity of the Site is southeast towards the north branch of the Sunrise River with a depth to groundwater approximately 5 to 15 feet bgs.

It is important to note that our agreed upon scope of services did not include performing soil borings or rock coring at the Site. Soil borings/rock coring would need to be performed to judge the engineering properties (strength, compressibility, etc.) of soils and rock that underlie the Site and to confirm bedrock formations and depths to the top of bedrock. Also, installation and monitoring of groundwater monitoring wells or piezometers would be required to document current groundwater elevations and localized flow patterns at the Site.

The Minnesota Department of Health maintains a limited database of water well records. AET reviewed this database for well logs located at or near the Site. This search did not find any wells registered at the Site.

4.2 Database Search

Environmental Risk Information Services (ERIS) provided Federal, State, Local, and Tribal record information within ASTM-specified minimum search distances of the Site. A copy of their report, dated May 24, 2022, is included in Appendix C. The results of the database searches are discussed below.

4.2.1 Standard Environmental Record Sources for the Site

The Site was not identified within the ASTM specified Federal, State, Local and/or Tribal databases.

4.2.2 Standard Environmental Record Sources for Surrounding Properties

The following table identifies ASTM specified databases that were searched, distances searched, and the number of sites identified within the searched distances.

Regulatory Database	Search Distance (miles)	Federal	State/Tribal Equivalent
NPL	1.0	0	0
NPL (Delisted)	0.5	0	0
CERCLIS	0.5	0	0
CERCLIS-NFRAP	0.5	0	NA
RCRA CORRACTS	1.0	0	NA
RCRA-TSD	0.5	0	NA
RCRA Generators	Adjoining Properties	0	NA
Landfill/Solid Waste Disposal Sites	0.5	NA	0
Registered Leaking Storage Tanks	0.5	NA	1
Registered Storage Tanks	Adjoining Properties	NA	1
Voluntary Cleanup Sites	0.5	NA	0
Brownfields Sites	0.5	0	0

NA: Not applicable – this database is not included in the ASTM standard.

Because the properties identified are located cross or down groundwater gradient and/or sufficiently distant from the Site, they are not likely to have an impact on the Site, except for the following:

- Chain Lake Preserve, north of the Site, is listed by the MPCA AI database based on its identification as a site subject to environmental regulations or of environmental interest associated with storm water.

Due to the distance and lack of groundwater contamination, AET does not consider the construction storm water in association with the Chain Lake Preserve a suspect REC in connection with the Site.

4.2.3 Orphan Summary or Unlocatable Properties and Non-ASTM Specified Databases

Environmental Risk Information Services (ERIS) also included a list of sites that could not be mapped due to poor or inadequate address information (Orphan Summary or Unlocatable Properties) and various non-ASTM specified databases. The Orphan Summary or Unlocatable Properties and non-ASTM specified databases and distances searched are listed in the ERIS report.

Based on our review of the Orphan Summary or Unlocatable Properties listings and the additional non-ASTM specified database search results, we did not identify any sites that we consider suspect RECs in connection with the Site.

4.3 Historical Use Information

Historical records were reviewed because past land use is an indication of whether hazardous substances or petroleum products have been used at the Site and adjoining properties and potentially introduced to the subsurface. The historical records were searched for and reviewed, if available, for types of businesses regulated for hazardous substances or petroleum products, evidence of spills, leaks, or disposal, and potential routes of entry to the subsurface.

In evaluating historical land use, the hazardous substances or petroleum products are generally inferred from what was typical of the tenant on the Site. The tenants are determined from User provided information, insurance maps, city directories, wells logs, building and fire inspection records, and interviews or they are inferred from aerial photographs, topographic maps, [and plat maps]. The routes of entry may be determined from User provided information, fire insurance maps, aerial photographs, and the Site reconnaissance. Releases including the import of fill may be determined from User provided information, aerial photographs, topographic maps, the Site reconnaissance, boring logs, and regulatory data.

The historical records discussed below were found in the User provided information and/or were provided to AET by Historical Information Gatherers, Inc. (HIG) and are included in Appendix D.

4.3.1 Topographic Maps

AET reviewed United States Geological Survey (USGS) 7.5- and 15-Minute Series Topographic Maps. These are limited in urban areas because improvements are not always shown. Topographic maps were reviewed for evidence of land use and changes in topography suggesting the import of fill. The review comprised the Site and adjoining properties. Our review of the topographic maps is summarized in the table below.

Summary of Topographic Maps Review		
Year	Direction	Observations
1983	Site	Vacant land, no improvements are indicated. The Site elevation is 910 to 920 $\pm$ 5 above mean sea level (amsl), with the lowest area at the northwest part of the Site.
	North	Neighborhood streets.
	East	A road followed by vacant land.
	South	A road followed by vacant Land.
	West	Vacant land followed by wetlands.
2013, 2016 2019	Site and adjoining properties	Modern topographic maps no longer show individual buildings, and improvements are limited to roads, rail lines, and icons for landmark buildings such as fire stations and schools. Streets border the Site to the north, south, and east, but no additional improvements are indicated.

4.3.2 Aerial Photographs

AET reviewed aerial photographs that include the Site area. These are limited by the quality and resolution of the photograph. The aerial photographs were reviewed for indications of land use, routes of entry such as unpaved areas, and indications of spills, leaks, or disposal such as stains, lack of vegetation, or debris. The review comprised the Site and adjoining properties. Our review of the aerial photograph is summarized in the table below.

Summary of Aerial Photographs Review		
Year	Direction	Observations
1938, 1948 1952, 1954 1965, 1973 1978, 1980 1983, 1986 1992	Site	Cultivated farmland. A north-south line of trees (windbreak) appears in the eastern section of the Site in 1973.
	North	A small, forested area followed by cultivated farmland.
	East	A road followed by cultivated farmland.
	South	Cultivated farmland. A farmstead is present to the southwest since at least 1948.
	West	Cultivated farmland.
1996, 2003 2008, 2013 2017, 2021	Site	Similar to above photos.
	North	A small, forested area followed by cultivated farmland. By 2003, a residential housing development is present and increases in size

Summary of Aerial Photographs Review		
Year	Direction	Observations
		through 2021, beyond the forested area.
	East	In 1996 a drive and a structure appear adjacent to the east; more structures and development appear in the 2008 photo.
	South	Cultivated farmland. A farmstead is present to the southwest since at least 1948. In the 2021 photo, the adjacent land to the south is cleared and residential development is apparent.
	West	Similar to previous photos.

4.3.3 Fire Insurance Maps

AET requested fire insurance maps for the Site and adjoining properties. Fire insurance maps were created by insurance companies and typically contain maps of occupants and fire hazards, land use and the specific use and storage of hazardous substances or petroleum products such as fuels and solvents. HIG indicated fire insurance maps for the Site area are not available for the area.

4.3.4 City Directories

City directories were provided by HIG, limited by errors in cross street location and thoroughness of validation. Directories (approximately every 5 years), indexed by address, were reviewed for tenant identification and land use at the Site and adjoining properties. Because the Site is located in an agricultural and residential developed area, we did not review directories for residential streets. We reviewed the 2007, 2012 and 2017 City Directories for Flink Avenue and 400th Street and found no listings for the Site or adjoining properties, except for an unspecified business listing at the west adjoining property, 5203 400th Street in 2007. AET did not identify any suspect RECs in reviewing these directories.

4.3.5 Historical Plat Maps/Atlases

Historical Plat Maps/Atlases were not available for the Site

4.3.6 Additional Record Sources

AET reviewed the following documents regarding the Site. These documents are provided in section 11.0 References and Appendix D and include the following:

- **Underground Pipelines Review:** National Pipeline Mapping System online mapping system regarding underground petroleum pipelines in the vicinity of the Site. The maps do not show any petroleum pipelines extending through or adjoining the Site.
- **Minnesota Groundwater Contamination Atlas:** AET reviewed the MPCAs online Groundwater Contamination Atlas that includes current and available groundwater data from Superfund sites. There is no documented groundwater contamination associated with a Superfund site in the Site vicinity.

- AET reviewed a previous Phase I ESA report completed by AET related to a property located adjacent to the south of the Site, “Meadows North Townhome Development Site, Southwest Quadrant of 400th St and Flink Ave”, dated September 10, 2021 (AET Meadows North September 2021 Phase I ESA). No suspect RECs were identified in connection with the AET Meadows North September 2021 Phase I ESA.

4.3.7 Historical Information Summary

The Site area is a mixture of residential and agricultural development. From at least 1938 the Site has been undeveloped cultivated agricultural land. The adjoining properties remain residential development, undeveloped forest, agricultural land, and farmstead. The current configuration of the Site has been present since at least 1938.

5.0 SITE RECONNAISSANCE

The Site was visited by Dennis McComas of AET on June 9, 2022. Mr. McComas was not accompanied. Photographs taken at the time of AET’s visit are included in Appendix E.

5.1 Site Description

Information contained in this section is based on a visual reconnaissance conducted while walking through the Site and the accessible interior areas of structures, if any.

Site Description	
Feature	Description
Structures	No structures currently occupy the Site. The northwest corner of the Site is heavily wooded and there is a north-south aligned tree windbreak on the east half of the Site. The Site is a cultivated agricultural field.
Drinking Water/ Sanitary Sewer	The Site is not connected to the municipal drinking water or sanitary sewer systems. It is unknown if municipal water and sanitary services are available in the Site vicinity.
Stormwater Runoff	Surface water at the Site drains to the topographically lower areas of the Site. The general gradient at the Site is towards the northwest. There are drainage ditches adjacent to the south and the east of the Site, along the roadways.
Roads	The Site is accessible from the adjacent Flink Avenue to the east and 400 th Street to the south.
Other	Several utility pedestals and related barrier poles and signs for underground cable, electric and fiber optic were observed adjacent to the east and south along the ditches. A sign and marker for underground natural gas, along with a valve at grade level, was observed adjacent to the southeast corner of the Site.

5.2 Site Observations

The following table summarizes Site observations.

Site Observations	
Feature	Description
Containers	No automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers were observed.
Storage Tanks	No storage tanks or indicators of storage tanks such as piping, dispensers or concrete pads were observed.
Drums	No drums, totes or other bulk storage containers were observed.
Odors	No usual odors were detected.
Liquids/Stains/Corrosion	No liquids, stains or evidence of corrosion was observed.
Stressed Vegetation	The vegetation did not appear stressed and appeared to be in good condition.
Drains/Waste Traps/Sumps	No drains, waste traps or sumps were observed.
PCB Containing Equipment	No suspect PCB containing equipment was observed. One new-looking pad-mounted transformer was observed near the middle of the south property line. No indications of a release or spill were observed.
Pits, Ponds, or Lagoons	No pits, ponds or lagoons were observed on or adjoining the Site.
Solid Waste Disposal	AET observed no evidence of indiscriminate dumping or solid waste disposal on the surface of the Site other than an apparent vehicle windshield and car hood, including glass and metal along the south Site property line.
Physical Setting Analysis	The Site is located in an agricultural and rural residential developed area. Residential neighborhoods border the Site to the north, northeast and east. A new residential development was observed adjacent to the south.

6.0 INTERVIEWS

The User indicated Paxmar Property LLC and Mr. Kent Roessler is the current owner of the Site. AET representatives Madelynn Gorg and Dennis McComas interviewed various parties as part of this Phase I ESA. The results of the interviews are summarized below.

Kent Roessler, Paxmar Property, LLC – Site Owner Representative

The owner representative, Mr. Roessler, is not aware of any pending, threatened, or past litigation, administrative proceedings, or notices from any governmental entity relevant to hazardous substances or petroleum products in, on or from the property. Mr. Roessler stated he has owned the Site for approximately three years. He indicated to the best of his knowledge, there has never been any structures on the Site, and it has always been used as a cultivated agricultural field.

Fire Chief Kevin Grote – North Branch Fire Department

The city of North Branch Fire Inspection Department representative Kevin Grote indicated there are no existing permits for storage tanks, hazardous materials storage, or wells; and there are no complaints of dumping, leaks, or spills for the Site. He also indicated there are no records of fires at the Site.

7.0 FINDINGS AND OPINIONS

No suspect RECs were identified in connection with the Site.

8.0 DATA GAPS

No significant data gaps were encountered with regard to evaluating the Site for this Phase I Environmental Site Assessment.

9.0 CONCLUSIONS

AET has performed a Phase I ESA in conformance with the scope and limitations of the USEPA All Appropriate Inquiries rule (40 CFR Part 312) and ASTM Practice E 1527-13 of the Site. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the Site. This assessment has revealed no evidence of controlled recognized environmental conditions (CRECs) in connection with the Site.

10.0 REFERENCES

American Engineering Testing, Inc., Phase I Environmental Site Assessment, Meadows North Townhome Development Site, Southwest Quadrant of 400th Street and Flink Avenue, North Branch, Minnesota, September 10, 2021

American Society for Testing and Materials, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation: E 1527-13, 2013.
Minnesota Department of Health, Minnesota Well Index (MWI) Online.
<https://www.health.state.mn.us/communities/environment/water/mwi/index.html>

Chisago County Government Offices. <https://www.chisagocountymn.gov>

Minnesota Department of Natural Resources and the University of Minnesota in conjunction with the Minnesota Geological Survey - Geologic County Atlas Program online access
https://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html

Minnesota Pollution Control Agency (MPCA) What's in My Neighborhood online database.
<https://mpca.maps.arcgis.com/apps/webappviewer/index.html?id=9d45793c75644e05bac197525f633f8>

7

MPCA, Minnesota Groundwater Contamination Atlas online map viewer.
<https://www.pca.state.mn.us/data/minnesota-groundwater-contamination-atlas>

MPCA, Construction Stormwater Permit, Site ID 5629, June 20, 2022.

National Pipeline Mapping System (NPMS) online viewer. <https://www.npms.phmsa.dot.gov/>

University of Minnesota and Minnesota Geological Survey, Geologic Atlas, Chisago County Minnesota, Atlas C-7, 1992, Plates 2 (Bedrock Geology), 3 (Surficial Geology), and 6 (Depth to Bedrock).

United States Environmental Protection Agency, All Appropriate Inquiries Final Rule (40 CFR Part 312), December 30, 2013.

11.0 QUALIFICATIONS AND RESUMES

I, Dennis McComas, PG, declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312 and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Site. I have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

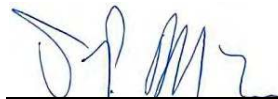
Refer to Appendix F for resumes of the AET personnel associated with this Phase I ESA.

Report Prepared By:



Madelynn Gorg
Environmental Scientist I

Report Reviewed By:



Dennis McComas, PG
Senior Geologist, Due Diligence Manager

Figures

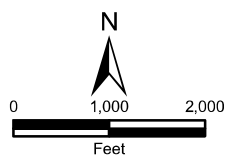
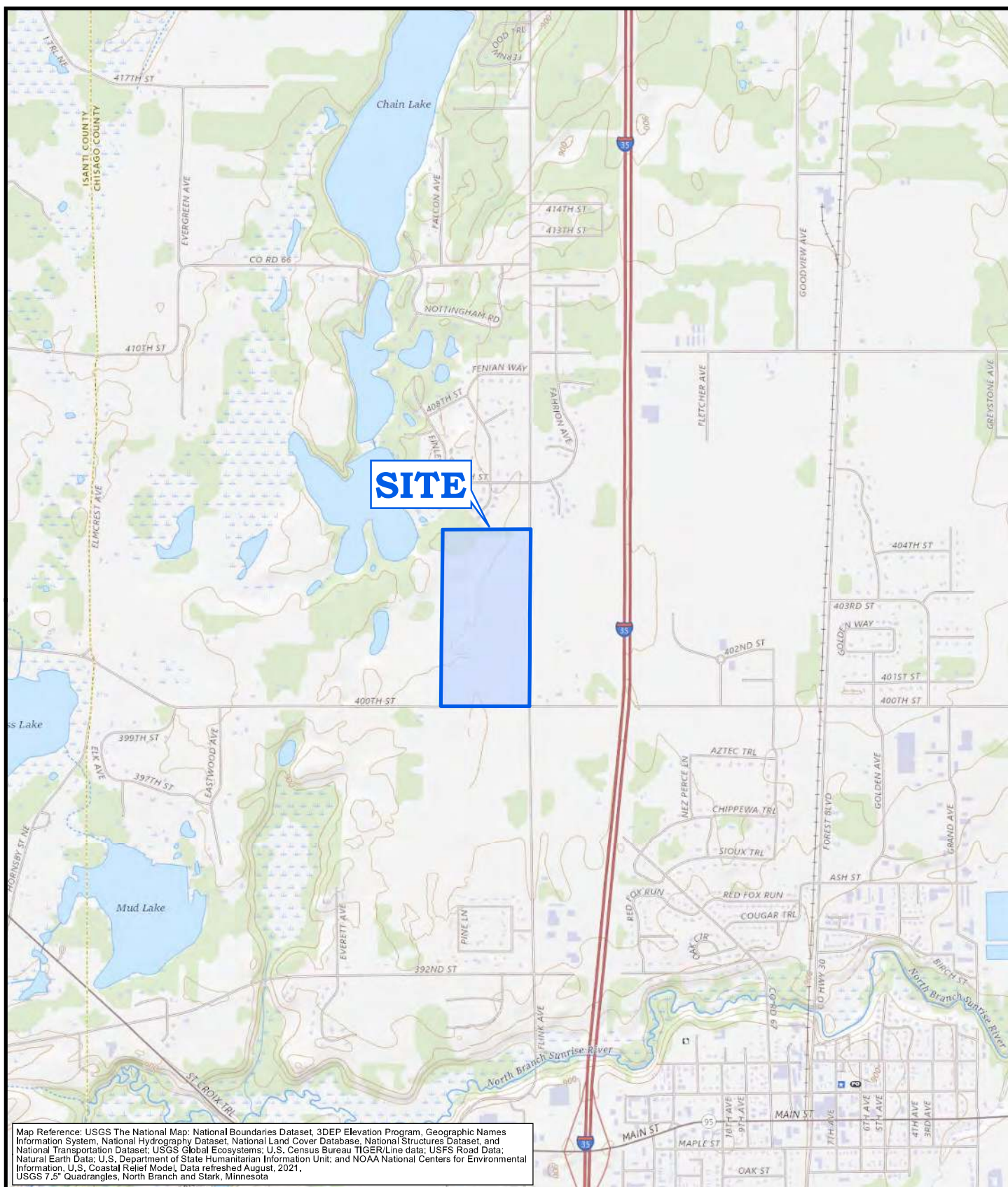


Figure 1
Site Location Map

LGI Homes North Branch West 80 Acres
North Branch, Minnesota

Date: 05/31/2022

AET Project No. P-0013129



Map Reference:
Chisago County, 2019

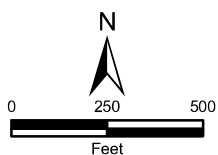


Figure 2
Site Map

LGI Homes North Branch West 80 Acres
North Branch, Minnesota

Date: 05/31/2022

AET Project No. P-0013129

Appendix A

Acronyms/Abbreviations and Definitions

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

°C	degrees Celsius
°F	degrees Fahrenheit
%	percent
AAI	EPA All Appropriate Inquiry (§312.10 of 40 CFR 312)
ACM	asbestos containing material
ACWM	asbestos containing waste material
AET	American Engineering Testing, Inc.
AHERA	Asbestos Hazard Emergency Response Act
AST	aboveground storage tank
ASTM	American Society for Testing and Materials (now known only by acronym)
AUL	activity and use limitation
BaPs	benzo(a)pyrene equivalents
BETX	benzene, ethylbenzene, toluene, xylene
Brownfields	SDDENR Brownfields Program
bgs	below ground surface
CAL	SDDENR Cleanup Action Level
CAP	Corrective Action Plan
CCP	Construction Contingency Plan
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act (Superfund)
CERCLIS	Comprehensive Environmental Response, Compensation, Liability Information System
CESQG	RCRA Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CG	cleanup goal
CGI	combustible gas indicator
COC	MPCA Certificate of Completion
CoC	contaminant of concern
c.o.c.	chain of custody
CORRACTS	RCRA Corrective Actions Information System
cPAH	carcinogenic polynuclear aromatic hydrocarbon
CVOC	chlorinated volatile organic compound
cy or CY	cubic yards
DML	MPCA Dredge Management Level
DRO	diesel range organics ("-Si" indicates silica-gel pretreatment)
EA/EAW	Environmental Assessment [Worksheet]
EC	engineering control
ECP	Emissions Control Plan
ECR	Environmental Construction Report
EDR	Environmental Data Resources, Inc.
EIS	Environmental Impact Statement
EP	Environmental Professional (§312.10 of 40 CFR 312)
EPA	Environmental Protection Agency (also USEPA)
ERNS	Emergency Response Notification System (federal)
ESA	Environmental Site Assessment
EWP	Environmental Work Plan
f/cc	fibers-per-cubic-centimeter
ft	feet
GEN	RCRA Generator

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

GIS	geographic information system
GPS	global positioning system
GRO	gasoline range organics
HASP	Health and Safety Plan
HBV	MDH Health Based Value
HIG	Historical Information Gatherers, Inc.
HREC	historical recognized environmental condition
HRL	MDH Health Risk Limit
IC	institutional control
ISV	MPCA Intrusion Screening Value
LAST	leaking aboveground storage tank
LEL	lower explosion limit
If or LF	lineal feet
LIMS	laboratory information management system
LLP	landowner liability protection
LQG	RCRA Large Quantity Generator
LSI	MPCA Limited Site Investigation
LUST	leaking underground storage tank
MCES	Metropolitan Council Environmental Services
MCL	EPA Maximum Contaminant Level
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDL	method detection limit.
mg/kg	milligrams-per-kilogram
mg/L	milligrams-per-liter
MGS	Minnesota Geological Survey
MMP	Materials Management Plan
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPCA AI	Minnesota Pollution Control Agency Agency Interests
MS/MSD	matrix spike/matrix spike duplicate
MSDS	material safety data sheet
MTBE	methyl tert-butyl ether
NA	not assigned or not applicable
NAD	MPCA No Association Determination
ND	no detection
NEPA	National Environmental Protection Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	MPCA No Further Action
NFRAP	No Further Remedial Action Planned
NLR	RCRA No Longer Regulated Information System
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List (federal Superfund)
NR	not recorded
ODI	EPA Open Dump Inventory
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

PEL	OSHA Permissible Exposure Limit
PBP	MPCA Petroleum Brownfield Program
PCB	polychlorinated biphenyl
pcm	point count method
PCM	phase-contrast microscopy
PE	Professional Engineer
PEF	potency equivalency factor
PG	Professional Geologist
PID	photoionization detector
PLM	polarized light microscopy
PLP	Permanent List of Priorities (state Superfund)
ppb	parts-per-billion
ppbv	parts-per-billion by volume
PPE	personal protective equipment
ppm	parts-per-million
ppmv	parts-per-million by volume
PRP	MPCA Petroleum Remediation Program
PVOC	petroleum volatile organic compound
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RACM	regulated asbestos containing material
RAI	Response Action Implementation
RAP	Response Action Plan
RCRA	Resource Conservation Recovery Act
REC	recognized environmental condition
RI	MPCA or MDA Remedial Investigation
RL	laboratory reporting limit
ROD	EPA Record of Decision
SDCL	South Dakota Codified Law
SDDENR	South Dakota Department of Environmental and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGF&P	South Dakota Game, Fish, and Parks
SDGS	South Dakota Geological Survey
SHOP	Special Handling Operations Plan
SLV	MPCA Soil Leaching Value
SMP	Soil Management Plan
SOP	standard operating procedure
SPILLS	MPCA / SSDENR Spills inventory
SQG	RCRA Small Quantity Generator
SREC	suspect recognized environmental condition
SRV	MPCA Soil Reference Value
SSP	Site Safety Plan
SVOC	semi-volatile organic compound
SWF/LF	MPCA / SSDENR Solid Waste Facilities/Landfill Sites
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons

ACRONYMS / ABBREVIATIONS AND DEFINITIONS

AET Standard List

TRIS	EPA Toxic Release Inventory System
TSCA	Toxic Substances Control Act
TSD	RCRA Transportation Storage and Disposal inventory
TWA	time-weighted average
µg/kg	micrograms-per-kilogram
µg/l or µg/L	micrograms-per-liter
µg/m ³	micrograms-per-cubic-meter
USEPA	United States Environmental Protection Agency (also EPA)
USGS	United States Geological Survey
UST	underground storage tank
VIC	MPCA Voluntary Investigation and Cleanup Program
VOC	volatile organic compound
WCA	Wetland Conservation Act
WQS	South Dakota Surface Water Quality Standards
XRF	x-ray fluorescence

DEFINITIONS

Controlled recognized environmental condition (CREC): a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

De minimus condition: a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies. Conditions determined to be de minimus conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Historical recognized environmental condition (HREC): a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Recognized environmental condition (REC): the presence or likely presence of hazardous substances or petroleum products in, on, or at a property: 1) due to release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment.

Appendix B

Client/User Provided Information



Parcel Information Report

Parcel Number: 11.00143.00

General Parcel Information

Parcel: 11.00143.00

Town: NORTH BRANCH

School District: SCHOOL DISTRICT 138

Acres: 80.00

Section: 08

Township: 035

Range: 021

Plat:

Plat Description:

Block:

Lot:

Legal: W1/2 OF SW1/4.

Owner Name: PAXMAR PROPERTY LLC

Mailing Address: 8952 ABBYWOOD DR

City/State/Zip: CHASKA, MN 55318

Property Use Code 1:**Property Use Code 2:****Property Use Code 3:**

Valuation

Year: 2021

Classification - Homestead 1: 200 Agricultural - 2ANHGA-Agricultural
Non-homestead - Non HGA

Classification - Homestead 2: -

Classification - Homestead 3:

Total Acres:

Total EMV Land: \$290,800.00

Total EMV Bldg: \$0.00

Total EMV: \$290,800.00

User Questionnaire**80-Acre Parcel West of Flick Avenue, North Branch, MN****AET Project No. P-0013129****Page 1 of 2**

In order to qualify for one of the Landowner Liability protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "Brownfields Amendments"), the User must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. These inquiries must also be conducted by EPA Brownfield Assessment and Characterization grantees. The User should provide the following information to the environmental professional. Failure to conduct these inquiries could result in a determination that "all appropriate inquiries" is not complete.

(1.) Environmental liens that are filed or recorded against the Site (40 CFR 312.25).

Did a search of recorded land title records (or judicial records where appropriate) identify any environmental liens filed or recorded against the Site under federal, tribal, state, or local law? If yes, please explain.

None that I am aware of - JR

(2.) Activity and use limitations (AULs) that are in place on the Site or that have been filed or recorded against the Site (40 CFR 312.26(a)(1)(v) and (vi)).

Did a search of recorded title records (or judicial records where appropriate) identify any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the Site and/or have been filed or recorded against the Site under federal, tribal, state, or local law? If yes, please explain.

Not that I am aware of - JR

(3.) Specialized knowledge or experience of the person seeking to qualify for the LLP (40 CFR 312.28).

Do you have any specialized knowledge or experience related to the Site or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the Site or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? If yes, please explain.

Yes, I worked for the land development company that currently owns the property.

I have about 3 years of knowledge of the site. JR

(4.) Relationship of the purchase price to the fair market value of the Site if it were not contaminated (40 CFR 312.29).

Does the purchase price being paid for the Site reasonably reflect the fair market value of the Site? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the Site?

Fair Market Value - JR

User Questionnaire**80-Acre Parcel West of Flick Avenue, North Branch, MN****AET Project No. P-0013129****Page 2 of 2****(5.) Commonly known or reasonably ascertainable information about the Site (40 CFR 312.30).**

Are you aware of commonly known or reasonably ascertainable information about the Site that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example,

(a.) Do you know the past uses of the Site? If yes, please explain.

I have known the site for about 3 years. The site is vacant farmland and I am not aware of any differing past uses - JR

(b.) Do you know of specific chemicals that are present or once were present at the Site? If yes, please explain.

No - JR

(c.) Do you know of spills or other chemical releases that have taken place at the Site? If yes, please explain.

No - JR

(d.) Do you know of any environmental cleanups that have taken place at the Site? If yes, please explain.

No - JR

(6.) The degree of obviousness of the presence or likely presence of contamination at the Site, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).

Based on your knowledge and experience related to the Site are there any obvious indicators that point to the presence or likely presence of releases at the Site? If yes, please explain.

No - JR

Prepared By (print name)

Jay Roos

Signature

A handwritten signature in blue ink that reads 'Jay Roos'.

As a representative of:

LGI Homes - Minnesota, LLC

Dated:

5/17/2022

Appendix C

Records Review Documentation



DATABASE REPORT

REVIEWED*By Dennis McComas at 11:50 am, Jun 13, 2022*

Project Property: *80 Acre Parcel West of Flick Avenue
NW of Flick Ave and 400th St North Branch
North Branch MN*

Project No: *2063041*

Report Type: *Database Report*

Order No: *22052000706*

Requested by: *Historical Information Gatherers*

Date Completed: *May 24, 2022*

Environmental Risk Information Services

A division of Glacier Media Inc.

1.866.517.5204 | info@erisinfo.com | erisinfo.com

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Notice: IMPORTANT LIMITATIONS and YOUR LIABILITY

Reliance on information in Report: This report DOES NOT replace a full Phase I Environmental Site Assessment but is solely intended to be used as database review of environmental records.

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Executive Summary

Property Information:

Project Property: *80 Acre Parcel West of Flick Avenue
NW of Flick Ave and 400th St North Branch North Branch MN*

Project No: *2063041*

Coordinates:

Latitude:	<i>45.5319364</i>
Longitude:	<i>-92.99902102</i>
UTM Northing:	<i>5,042,044.56</i>
UTM Easting:	<i>500,076.44</i>
UTM Zone:	<i>15T</i>

Elevation: *920 FT*

Order Information:

Order No: *22052000706*

Date Requested: *May 20, 2022*

Requested by: *Historical Information Gatherers*

Report Type: *Database Report*

Historicals/Products:

Executive Summary: Report Summary

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
<u>Standard Environmental Records</u>								
Federal								
DOE FUSRAP	Y	1	0	0	0	0	0	0
NPL	Y	1	0	0	0	0	0	0
PROPOSED NPL	Y	1	0	0	0	0	0	0
DELETED NPL	Y	0.5	0	0	0	0	-	0
SEMS	Y	0.5	0	0	0	0	-	0
SEMS ARCHIVE	Y	0.5	0	0	0	0	-	0
ODI	Y	0.5	0	0	0	0	-	0
CERCLIS	Y	0.5	0	0	0	0	-	0
IODI	Y	0.5	0	0	0	0	-	0
CERCLIS NFRAP	Y	0.5	0	0	0	0	-	0
CERCLIS LIENS	Y	PO	0	-	-	-	-	0
RCRA CORRACTS	Y	1	0	0	0	0	0	0
RCRA TSD	Y	0.5	0	0	0	0	-	0
RCRA LQG	Y	0.25	0	0	0	-	-	0
RCRA SQG	Y	0.25	0	0	0	-	-	0
RCRA VSQG	Y	0.25	0	0	0	-	-	0
RCRA NON GEN	Y	0.25	0	0	0	-	-	0
RCRA CONTROLS	Y	0.5	0	0	0	0	-	0
FED ENG	Y	0.5	0	0	0	0	-	0
FED INST	Y	0.5	0	0	0	0	-	0
LUCIS	Y	0.5	0	0	0	0	-	0
NPL IC	Y	0.5	0	0	0	0	-	0
ERNS 1982 TO 1986	Y	PO	0	-	-	-	-	0
ERNS 1987 TO 1989	Y	PO	0	-	-	-	-	0
ERNS	Y	PO	0	-	-	-	-	0
FED BROWNFIELDS	Y	0.5	0	0	0	0	-	0
FEMA UST	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
FRP	Y	0.25	0	0	0	-	-	0
HIST GAS STATIONS	Y	0.25	0	0	0	-	-	0
REFN	Y	0.25	0	0	0	-	-	0
BULK TERMINAL	Y	0.25	0	0	0	-	-	0
SEMS LIEN	Y	PO	0	-	-	-	-	0
SUPERFUND ROD	Y	1	0	0	0	0	0	0
State								
PLP	Y	1	0	0	0	0	0	0
DEL PLP	Y	1	0	0	0	0	0	0
SHWS	Y	0.5	0	0	0	0	-	0
SITE ASSESSMENT	Y	0.25	0	0	0	-	-	0
SWF/LF	Y	0.5	0	0	0	0	-	0
LCP	Y	0.5	0	0	0	0	-	0
UNPERMITTED LF	Y	0.5	0	0	0	0	-	0
RECYCLING	Y	0.5	0	0	0	0	-	0
HIST LUST	Y	0.5	0	0	0	0	-	0
DEL LUST	Y	0.5	0	0	0	0	-	0
HIST LAST	Y	0.5	0	0	0	0	-	0
HIST LEAKSITES	Y	0.5	0	0	0	0	-	0
LST REM SITE	Y	0.5	0	0	0	0	-	0
LST INCIDENT	Y	0.5	0	0	0	0	-	0
DELISTED LST	Y	0.5	0	0	0	0	-	0
UST	Y	0.25	0	0	0	-	-	0
AST	Y	0.25	0	0	0	-	-	0
HIST TANK	Y	0.25	0	0	0	-	-	0
DELISTED TANK	Y	0.5	0	0	0	0	-	0
INST	Y	0.5	0	0	0	0	-	0
AG CONTINGENCY	Y	0.125	0	0	-	-	-	0
BROWNFIELDS	Y	0.5	0	0	0	0	-	0
VIC	Y	0.5	0	0	0	0	-	0
POTENTIAL VIC	Y	0.5	0	0	0	0	-	0
MPCA AI	Y	0.5	0	1	1	2	-	4
Tribal								
INDIAN LUST	Y	0.5	0	0	0	0	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
INDIAN UST	Y	0.25	0	0	0	-	-	0
DELISTED ILST	Y	0.5	0	0	0	0	-	0
DELISTED IUST	Y	0.25	0	0	0	-	-	0

County***No County standard environmental record sources available for this State.*****Additional Environmental Records****Federal**

FINDS/FRS	Y	PO	0	-	-	-	-	0
TRIS	Y	PO	0	-	-	-	-	0
PFAS TRI	Y	0.5	0	0	0	0	-	0
PFAS NPL	Y	0.5	0	0	0	0	-	0
PFAS WATER	Y	0.5	0	0	0	0	-	0
PFAS SSEHRI	Y	0.5	0	0	0	0	-	0
ERNS PFAS	Y	0.5	0	0	0	0	-	0
HMIRS	Y	0.125	0	0	-	-	-	0
NCDL	Y	0.125	0	0	-	-	-	0
TSCA	Y	0.125	0	0	-	-	-	0
HIST TSCA	Y	0.125	0	0	-	-	-	0
FTTS ADMIN	Y	PO	0	-	-	-	-	0
FTTS INSP	Y	PO	0	-	-	-	-	0
PRP	Y	PO	0	-	-	-	-	0
SCRD DRYCLEANER	Y	0.5	0	0	0	0	-	0
ICIS	Y	PO	0	-	-	-	-	0
FED DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DELISTED FED DRY	Y	0.25	0	0	0	-	-	0
FUDS	Y	1	0	0	0	0	0	0
FORMER NIKE	Y	1	0	0	0	0	0	0
PIPELINE INCIDENT	Y	PO	0	-	-	-	-	0
MLTS	Y	PO	0	-	-	-	-	0
HIST MLTS	Y	PO	0	-	-	-	-	0
MINES	Y	0.25	0	0	0	-	-	0
SMCRA	Y	1	0	0	0	0	0	0
MRDS	Y	1	0	0	0	0	0	0
URANIUM	Y	1	0	0	0	0	0	0
ALT FUELS	Y	0.25	0	0	0	-	-	0
CONSENT DECREES	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
SSTS	Y	0.25	0	0	0	-	-	0
PCBT	Y	0.5	0	0	0	0	-	0
PCB	Y	0.5	0	0	0	0	-	0

State

DRYCLEANERS	Y	0.25	0	0	0	-	-	0
SPILLS	Y	0.125	0	0	-	-	-	0
AG SPILLS	Y	0.125	0	0	-	-	-	0
HIST SPL	Y	0.125	0	0	-	-	-	0
PFAS GW	Y	0.5	0	0	0	0	-	0
PFAS LANDFILL	Y	0.5	0	0	0	0	-	0
CDL	Y	PO	0	-	-	-	-	0
FEEDLOTS	Y	0.5	0	0	0	0	-	0
TIER 2	Y	0.125	0	0	-	-	-	0
BULK STORAGE	Y	0.25	0	0	0	-	-	0

Tribal

No Tribal additional environmental record sources available for this State.

County

No County additional environmental record sources available for this State.

Total:	0	1	1	2	0	4
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* PO – Property Only

* 'Property and adjoining properties' database search radii are set at 0.25 miles.

Executive Summary: Site Report Summary - Project Property

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Direction</i>	<i>Distance (mi/ft)</i>	<i>Elev Diff (ft)</i>	<i>Page Number</i>
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No records found in the selected databases for the project property.

Executive Summary: Site Report Summary - Surrounding Properties

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Direction</i>	<i>Distance (mi/ft)</i>	<i>Elev Diff (ft)</i>	<i>Page Number</i>
<u>1</u>	MPCA AI	2019 Flink Avenue Watermain & Sanitary Trunk Project	Flink Avenue North Branch MN 55056	SE	0.02 / 88.20	1	<u>16</u>
<u>2</u>	MPCA AI	Meadows North 2nd Addition	XXX Flink Avenue North Branch MN 55056	S	0.17 / 883.42	1	<u>17</u>
<u>3</u>	MPCA AI	Chain Lake Preserve	CSLL: Centroid of Site North Branch MN 55056	NNE	0.30 / 1,563.59	0	<u>19</u>
<u>4</u>	MPCA AI	Topline Automotive	40245 Fletcher Ave North Branch MN 55056	E	0.47 / 2,500.75	0	<u>20</u>

Executive Summary: Summary by Data Source

Standard

State

MPCA AI - MPCA Agency Interests

A search of the MPCA AI database, dated Mar 4, 2022 has found that there are 4 MPCA AI site(s) within approximately 0.50 miles of the project property.

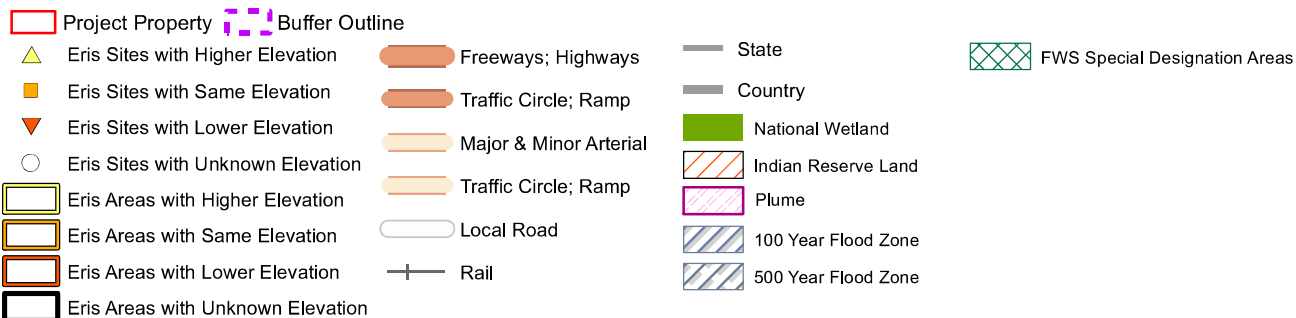
<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction</u>	<u>Distance (mi/ft)</u>	<u>Map Key</u>
2019 Flink Avenue Watermain & Sanitary Trunk Project	Flink Avenue North Branch MN 55056	SE	0.02 / 88.20	<u>1</u>
Meadows North 2nd Addition	XXX Flink Avenue North Branch MN 55056	S	0.17 / 883.42	<u>2</u>
Chain Lake Preserve	CSLL: Centroid of Site North Branch MN 55056	NNE	0.30 / 1,563.59	<u>3</u>
Topline Automotive	40245 Fletcher Ave North Branch MN 55056	E	0.47 / 2,500.75	<u>4</u>

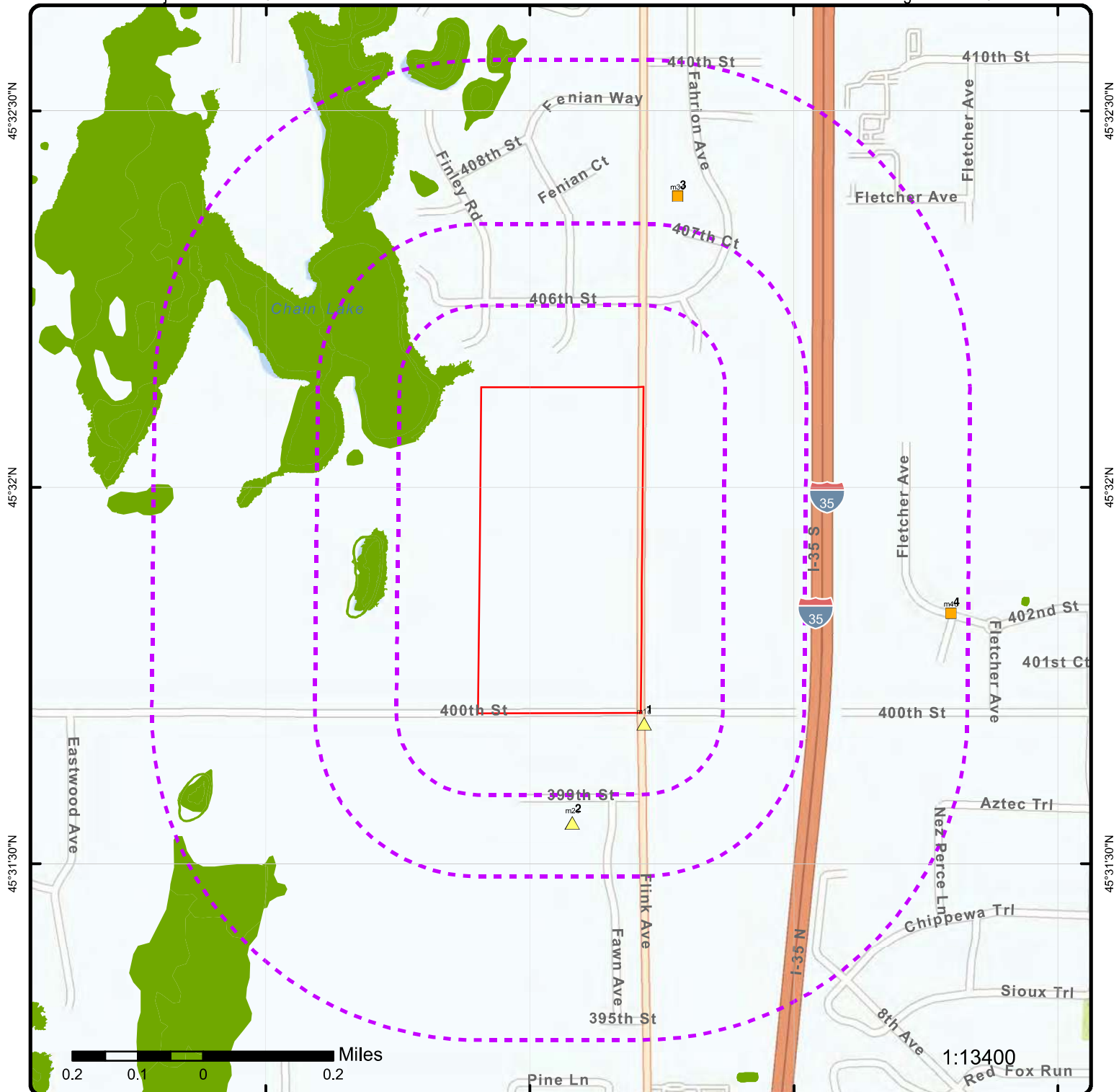


Map: 1.0 Mile Radius

Order Number: 22052000706

Address: NW of Flick Ave and 400th St North Branch, North Branch, MN

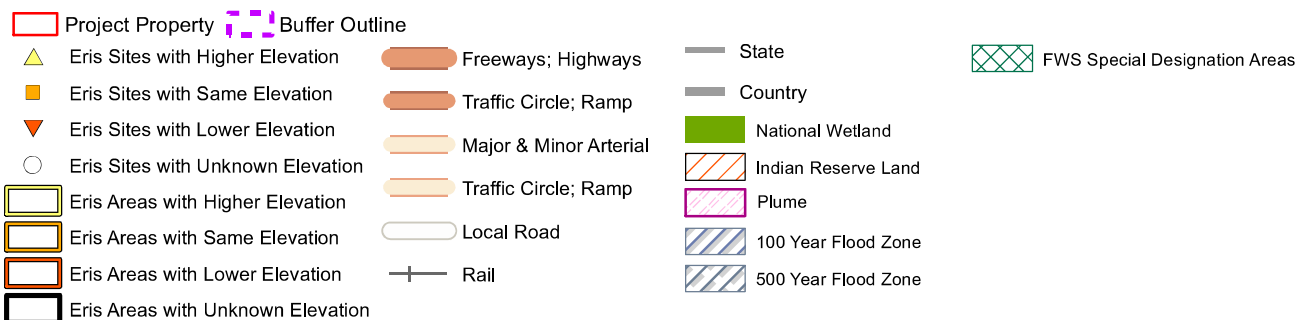


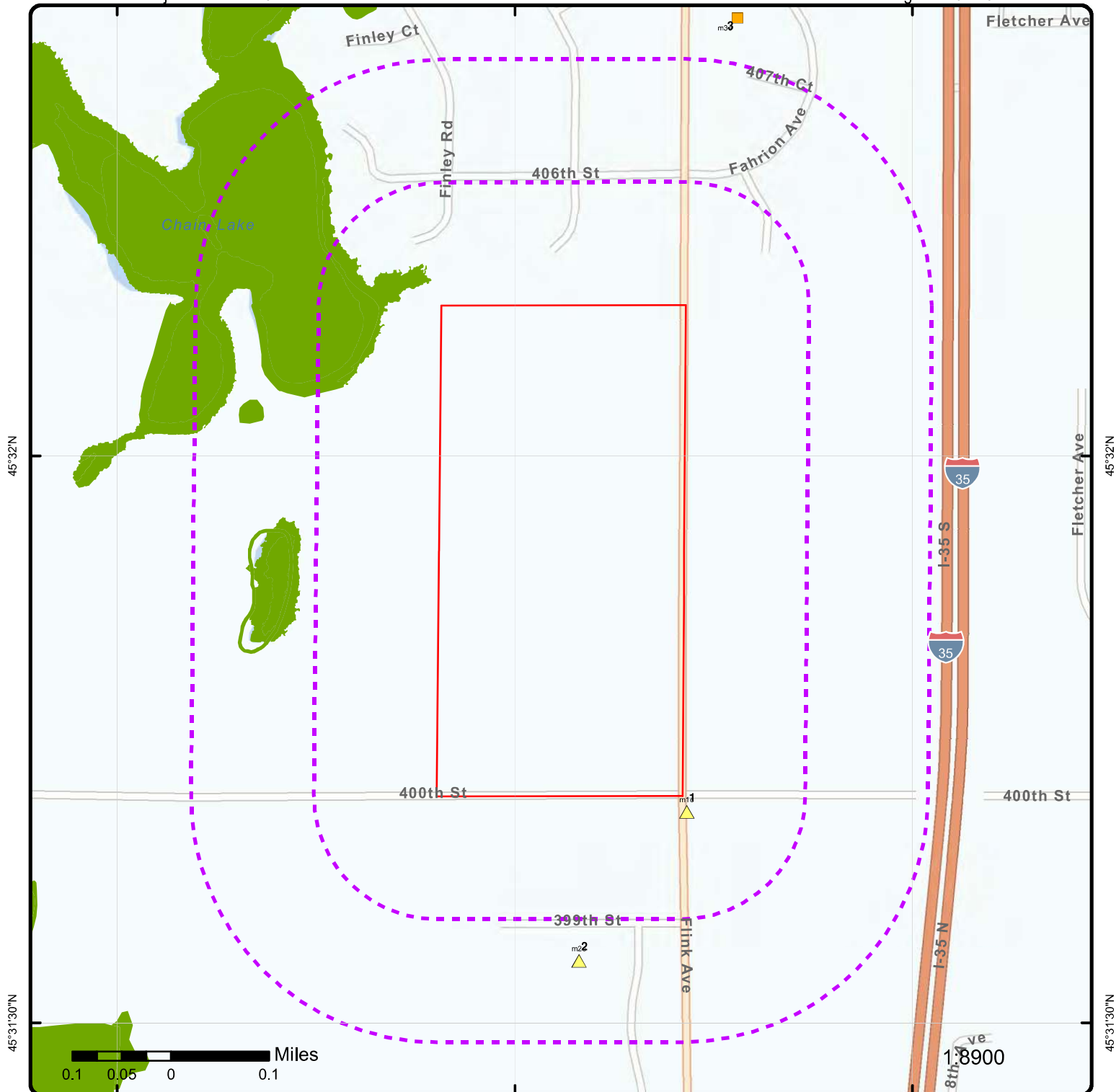


Map: 0.5 Mile Radius

Order Number: 22052000706

Address: NW of Flick Ave and 400th St North Branch, North Branch, MN

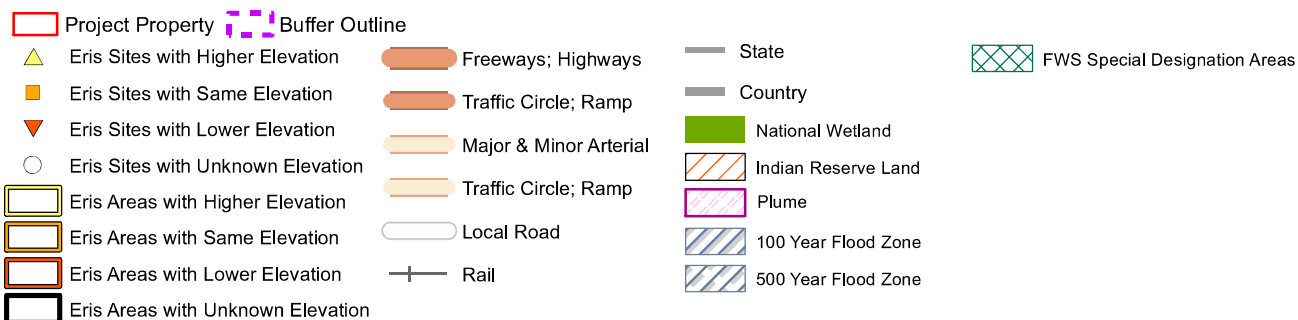




Map: 0.25 Mile Radius

Order Number: 22052000706

Address: NW of Flick Ave and 400th St North Branch, North Branch, MN





Aerial Year: 2018

Order Number: 22052000706

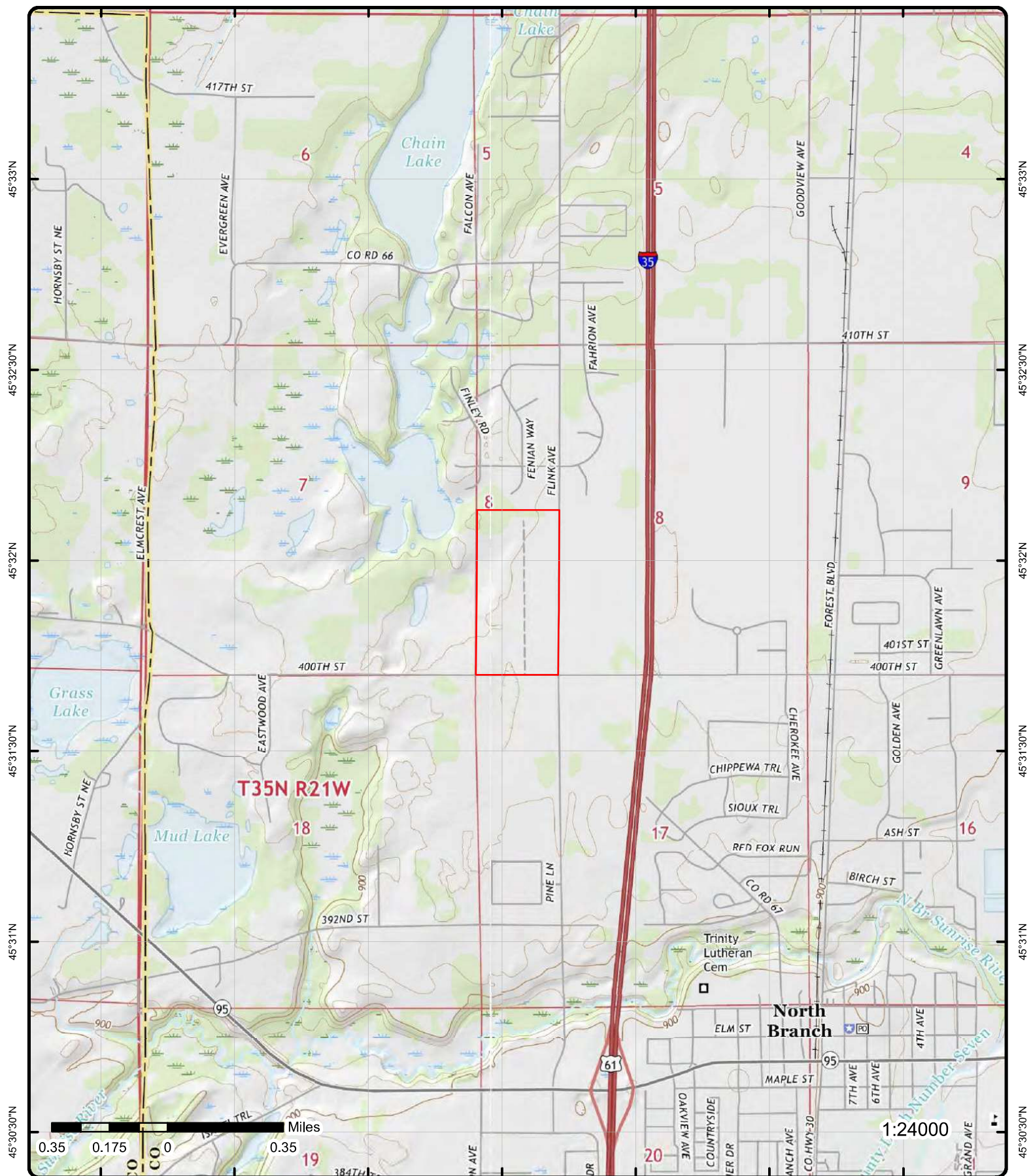
Address: NW of Flick Ave and 400th St North Branch, North Branch, MN



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Source: ESRI World Imagery

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Topographic Map

Year: 2016

Order Number: 22052000706

Address: NW of Flick Ave and 400th St North Branch, MN

Quadrangle(s): Stacy, MN; Typo Lake, MN; North Branch, MN; Stark, MN

Source: USGS Topographic Map



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Detail Report

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	1 of 1	SE	0.02 / 88.20	921.32 / 1	2019 Flink Avenue Watermain & Sanitary Trunk Project Flink Avenue North Branch MN 55056	MPCA AI
Agency Interest ID: 229768						
Name (Sites): 2019 Flink Avenue Watermain & Sanitary Trunk Project						
Address (Site): Flink Avenue						
City (Site): North Branch						
State (Site): MN						
ZIP (Site): 55056						
County (Site): Chisago						
Latitude (Site): 45.5281						
Longitude (Site): -92.9964						
Name (Req): 2019 Flink Avenue Watermain & Sanitary Trunk Project						
Address (Req): Flink Avenue						
City (Req): North Branch						
State (Req): MN						
ZIP (Req): 55056						
Data Source: MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request						
Loc Desc (Map):						
Loc Desc (Req):						

Agency Interests: Map Details

Item ID:	229768-AISI0000229768	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	229768
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	07030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	0703000503	Cong Dist:	8
HUC 12:	070300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	G8
Quarters:		Method Desc:	GPS - Other
Collection Date:	22-May-2019	Ref Code:	CEN
Tmsp Created:	22-May-2019	Ref Desc:	Center of Feature Represented
User Created:	RSP	Verified:	No
Tmsp Updt:	22-May-2019	User Updt:	geo_nc
Name:	2019 Flink Avenue Watermain & Sanitary Trunk Project		

My Neighborhood Site Details

Site ID:	229768	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	Flink Avenue	Cong Distr:	8

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Addr City:	North Branch			Senate Dis:	32	
Addr ZIP:	55056			House Dist:	32A	
Address:	MN			HUC 8:	07030005	
MPCA ID:	C00053904			Watershed :	Lower St. Croix River	
MPCA ID List:	C00053904			Latitude:	45.5281	
Program Co:	ST			Longitude:	-92.9964	
Program Name:	Stormwater			Coord Coll:	G8	
Program 1:	Stormwater			Coord Co 1:	GPS - Other	
Name:	2019 Flink Avenue Watermain & Sanitary Trunk Project					
Site URL:	https://webapp.pca.state.mn.us/wimn/site/229768					
Activity L:	Construction Stormwater					
Industrial:						

Agency Interests: File Request Details

Item ID:	229768-AISI0000229768	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	229768
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	7030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	703000503	Cong Dist:	8
HUC 12:	70300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	G8
Quarters:		Method Desc:	GPS - Other
Collection Date:	5/22/2019	Ref Code:	CEN
Tmsp Created:	5/22/2019	Ref Desc:	Center of Feature Represented
User Created:	RSP	Verified:	No
Tmsp Updt:	5/22/2019	User Updt:	geo_nc
Name:	2019 Flink Avenue Watermain & Sanitary Trunk Project		
HUC 10 Name:	North Branch Sunrise River		

2 1 of 1 S 0.17 / 883.42 921.14 / 1 Meadows North 2nd Addition XXX Flink Avenue North Branch MN 55056 MPCA AI

Agency Interest ID:	228631	Name (Map):	Meadows North 2nd Addition
Name (Sites):	Meadows North 2nd Addition	Address (Map):	XXX Flink Avenue
Address (Site):	XXX Flink Avenue	City (Map):	North Branch
City (Site):	North Branch	State (Map):	MN
State (Site):	MN	ZIP (Map):	55056
ZIP (Site):	55056	County Code (Map):	025
County (Site):	Chisago	County (Map):	Chisago
Latitude (Site):	45.525908	Latitude (Map):	45.525908
Longitude (Site):	-92.998656	Longitude (Map):	-92.998656
Name (Req):	Meadows North 2nd Addition	County Code (Req):	25
Address (Req):	XXX Flink Avenue	County (Req):	Chisago
City (Req):	North Branch	Latitude (Req):	45.525908
State (Req):	MN	Longitude (Req):	-92.998656
ZIP (Req):	55056		
Data Source:	MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request		
Loc Desc (Map):	Southwest Quadrant of Flink Avenue and 400th Street *** Note:many records provided by the department have a truncated LOC_DESC field.		
Loc Desc (Req):	Southwest Quadrant of Flink Avenue and 400th Street		

Agency Interests: Map Details

Item ID:	228631-AISI0000228631	Spatial ID:	
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Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Status:	Active				Int Doc ID:	0
Status Date:					SI Type:	CON
Program:	Const Stormwater				SI Cat:	AISI
Program List:	CS				SI ID:	228631
CTU Code:	239525				SI Cat Desc:	Agency Interest
CTU Name:	North Branch				SI Type Desc:	Conventional Site
HUC 8:	07030005				Description:	
HUC 8 Name:	Lower St. Croix River				SI Designation:	
HUC 10:	0703000503				Cong Dist:	8
HUC 12:	070300050302				House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River				Senate Dist:	32
PLS Twsp:					DWSMA Code:	
Range :					DWSMA Name:	
Range Dir:					TRDSQQ:	
Section:					Method Code:	DP
Quarters:					Method Desc:	Digitized - MPCA online map
Collection Date:	05-Mar-2019				Ref Code:	CEN
Tmsp Created:	06-Mar-2019				Ref Desc:	Center of Feature Represented
User Created:	RSP				Verified:	No
Tmsp Updt:	27-May-2021				User Updt:	dcharpe
Name:	Meadows North 2nd Addition					

My Neighborhood Site Details

Site ID:	228631	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	XXX Flink Avenue	Cong Distr:	8
Addr City:	North Branch	Senate Dis:	32
Addr ZIP:	55056	House Dist:	32A
Address:	MN	HUC 8:	07030005
MPCA ID:	C00053081	Watershed :	Lower St. Croix River
MPCA ID List:	C00053081	Latitude:	45.525908
Program Co:	ST	Longitude:	-92.998656
Program Name:	Stormwater	Coord Coll:	DP
Program 1:	Stormwater	Coord Co 1:	Digitized - MPCA online map
Name:	Meadows North 2nd Addition		
Site URL:	https://webapp.pca.state.mn.us/wimn/site/228631		
Activity L:	Construction Stormwater		
Industrial:			

Agency Interests: File Request Details

Item ID:	228631-AISI0000228631	Spatial ID:	
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	228631
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	7030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	703000503	Cong Dist:	8
HUC 12:	70300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	DP
Quarters:		Method Desc:	Digitized - MPCA online map
Collection Date:	3/5/2019	Ref Code:	CEN
Tmsp Created:	3/6/2019	Ref Desc:	Center of Feature Represented
User Created:	RSP	Verified:	No
Tmsp Updt:	5/27/2021	User Updt:	dcharpe
Name:	Meadows North 2nd Addition		
HUC 10 Name:	North Branch Sunrise River		

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
3	1 of 1	NNE	0.30 / 1,563.59	920.12 / 0	Chain Lake Preserve CSLL: Centroid of Site North Branch MN 55056	MPCA AI
Agency Interest ID: 6431 Name (Site): Chain Lake Preserve Address (Site): See location description City (Site): North Branch State (Site): MN ZIP (Site): 55056 County (Site): Chisago Latitude (Site): 45.53977258 Longitude (Site): -92.99533281 Name (Req): Chain Lake Preserve Address (Req): See location description City (Req): North Branch State (Req): MN ZIP (Req): 55056 Name (Map): Chain Lake Preserve Address (Map): See location description City (Map): North Branch State (Map): MN ZIP (Map): 55056 County Code (Map): 025 County (Map): Chisago Latitude (Map): 45.53977258 Longitude (Map): -92.99533281 County Code (Req): 25 County (Req): Chisago Latitude (Req): 45.53977258 Longitude (Req): -92.99533281 Data Source: MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request Loc Desc (Map): CSLL: Centroid of Site *** Note:many records provided by the department have a truncated LOC_DESC field. Loc Desc (Req): CSLL: Centroid of Site						

Agency Interests: Map Details

Item ID:	6431-AISI0000006431	Spatial ID:	9360
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	6431
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	07030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	0703000503	Cong Dist:	8
HUC 12:	070300050302	House Dist:	32A
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	A1
Quarters:		Method Desc:	Address Matching House Number
Collection Date:	25-Apr-2016	Ref Code:	GEN
Tmsp Created:	17-May-1999	Ref Desc:	General Location
User Created:	DELTA_M_R1	Verified:	Yes
Tmsp Updt:	26-Apr-2016	User Updt:	spatial_
Name:	Chain Lake Preserve		

My Neighborhood Site Details

Site ID:	6431	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	See location description	Cong Distr:	8
Addr City:	North Branch	Senate Dis:	32
Addr ZIP:	55056	House Dist:	32A
Address:	MN	HUC 8:	07030005
MPCA ID:	C00005629	Watershed :	Lower St. Croix River
MPCA ID List:	C00005629	Latitude:	45.53977258
Program Co:	ST	Longitude:	-92.99533281
Program Name:	Stormwater	Coord Coll:	A1
Program 1:	Stormwater	Coord Co 1:	Address Matching House Number
Name:	Chain Lake Preserve		
Site URL:	https://webapp.pca.state.mn.us/wimn/site/6431		
Activity L:	Construction Stormwater		
Industrial:			

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
<u>Agency Interests: File Request Details</u>						
Item ID:	6431-AISI0000006431			Spatial ID:	9360	
Status:	Active			Int Doc ID:	0	
Status Date:				SI Type:	CON	
Program:	Const Stormwater			SI Cat:	AISI	
Program List:	CS			SI ID:	6431	
CTU Code:	239525			SI Cat Desc:	Agency Interest	
CTU Name:	North Branch			SI Type Desc:	Conventional Site	
HUC 8:	7030005			Description:		
HUC 8 Name:	Lower St. Croix River			SI Designation:		
HUC 10:	703000503			Cong Dist:	8	
HUC 12:	70300050302			House Dist:	32A	
HUC 12 Name:	Middle North Branch Sunrise River			Senate Dist:	32	
PLS Twsp:				DWSMA Code:		
Range :				DWSMA Name:		
Range Dir:				TRDSQQ:		
Section:				Method Code:	A1	
Quarters:				Method Desc:	Address Matching House Number	
Collection Date:	4/25/2016			Ref Code:	GEN	
Tmsp Created:	5/17/1999			Ref Desc:	General Location	
User Created:	DELTA_M_R1			Verified:	Yes	
Tmsp Updt:	4/26/2016			User Updt:	spatial_	
Name:	Chain Lake Preserve					
HUC 10 Name:	North Branch Sunrise River					

<u>4</u>	1 of 1	E	0.47 / 2,500.75	920.12 / 0	Topline Automotive 40245 Fletcher Ave North Branch MN 55056	MPCA AI
Agency Interest ID:	126884			Name (Map):	Topline Automotive	
Name (Site):	Topline Automotive			Address (Map):	40245 Fletcher Ave	
Address (Site):	40245 Fletcher Ave			City (Map):	North Branch	
City (Site):	North Branch			State (Map):	MN	
State (Site):	MN			ZIP (Map):	55056	
ZIP (Site):	55056			County Code (Map):	025	
County (Site):	Chisago			County (Map):	Chisago	
Latitude (Site):	45.5427383			Latitude (Map):	45.5427383	
Longitude (Site):	-92.9859891			Longitude (Map):	-92.9859891	
Name (Req):	Topline Automotive			County Code (Req):	25	
Address (Req):	40245 Fletcher Ave			County (Req):	Chisago	
City (Req):	North Branch			Latitude (Req):	45.5427383	
State (Req):	MN			Longitude (Req):	-92.9859891	
ZIP (Req):	55056					
Data Source:	MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request					
Loc Desc (Map):						
Loc Desc (Req):						

Agency Interests: Map Details

Item ID:	126884-AISI0000126884	Spatial ID:	53736218
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	126884
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	07030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	0703000503	Cong Dist:	8
HUC 12:	070300050302	House Dist:	32B
HUC 12 Name:	Middle North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	
Range :		DWSMA Name:	
Range Dir:		TRDSQQ:	
Section:		Method Code:	A1

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
Quarters:						
Collection Date:	07-Apr-2016				Method Desc:	Address Matching House Number
Tmsp Created:	09-Oct-2007				Ref Code:	GEN
User Created:	DELTA_M_R1				Ref Desc:	General Location
Tmsp Updt:	26-Apr-2016				Verified:	No
Name:	Topline Automotive				User Updt:	spatial_
<u>My Neighborhood Site Details</u>						
Site ID:	126884				IC Flag:	No
Active FLA:	Yes				City:	North Branch
Activity:	Construction Stormwater				County:	Chisago
Addr St:	40245 Fletcher Ave				Cong Distr:	8
Addr City:	North Branch				Senate Dis:	32
Addr ZIP:	55056				House Dist:	32B
Address:	MN				HUC 8:	07030005
MPCA ID:	C00024138				Watershed :	Lower St. Croix River
MPCA ID List:	C00024138				Latitude:	45.5427383
Program Co:	ST				Longitude:	-92.9859891
Program Name:	Stormwater				Coord Coll:	A1
Program 1:	Stormwater				Coord Co 1:	Address Matching House Number
Name:	Topline Automotive					
Site URL:	https://webapp.pca.state.mn.us/wimn/site/126884					
Activity L:	Construction Stormwater					
Industrial:						
<u>Agency Interests: File Request Details</u>						
Item ID:	126884-AISI0000126884				Spatial ID:	53736218
Status:	Active				Int Doc ID:	0
Status Date:					SI Type:	CON
Program:	Const Stormwater				SI Cat:	AISI
Program List:	CS				SI ID:	126884
CTU Code:	239525				SI Cat Desc:	Agency Interest
CTU Name:	North Branch				SI Type Desc:	Conventional Site
HUC 8:	7030005				Description:	
HUC 8 Name:	Lower St. Croix River				SI Designation:	
HUC 10:	703000503				Cong Dist:	8
HUC 12:	70300050302				House Dist:	32B
HUC 12 Name:	Middle North Branch Sunrise River				Senate Dist:	32
PLS Twsp:					DWSMA Code:	
Range :					DWSMA Name:	
Range Dir:					TRDSQQ:	
Section:					Method Code:	A1
Quarters:					Method Desc:	Address Matching House Number
Collection Date:	4/7/2016				Ref Code:	GEN
Tmsp Created:	10/9/2007				Ref Desc:	General Location
User Created:	DELTA_M_R1				Verified:	No
Tmsp Updt:	4/26/2016				User Updt:	spatial_
Name:	Topline Automotive					
HUC 10 Name:	North Branch Sunrise River					

Unplottable Summary

Total: 2 Unplottable sites

DB	Company Name/Site Name	Address	City	Zip	ERIS ID
FINDS/FRS	FLINK AVENUE ALIGNMENT	FLINK AVE	NORTH BRANCH MN	55056	857876038
		Registry ID: 110068404426			
MPCA AI	Chain Lake Preserve 2nd Addition	Finley Rd & Fenian Way, So. from 406th St	North Branch MN	55056	825275852

Unplottable Report

Site: **FLINK AVENUE ALIGNMENT**
FLINK AVE NORTH BRANCH MN 55056

[FINDS/FRS](#)

Registry ID: 110068404426
FIPS Code: 27025
HUC Code:
Site Type Name: STATIONARY
Location Description:
Supplemental Location:
Create Date: 02-JUN-16
Update Date:
Interest Types: STATE MASTER
SIC Codes:
SIC Code Descriptions:
NAICS Codes:
NAICS Code Descriptions:
Conveyor:
Federal Facility Code:
Federal Agency Name:
Tribal Land Code:
Tribal Land Name:
Congressional Dist No:
Census Block Code:
EPA Region Code: 05
County Name: CHISAGO
US/Mexico Border Ind:
Latitude:
Longitude:
Reference Point:
Coord Collection Method:
Accuracy Value:
Datum: NAD83
Source:
Facility Detail Rprt URL: https://ofmpub.epa.gov/frs_public2/fii_query_detail.disp_program_facility?p_registry_id=110068404426
Program Acronyms:

MN-TEMPO:124840

Site: **Chain Lake Preserve 2nd Addition**
Finley Rd & Fenian Way, So. from 406th St North Branch MN 55056

[MPCA AI](#)

Agency Interest ID:	78891	Name (Map):	Chain Lake Preserve 2nd Addition
Name (Site):	Chain Lake Preserve 2nd Addition	Address (Map):	Finley Rd & Fenian Way, So. from 406th St
Address (Site):	Finley Rd & Fenian Way, So. from 406th St	City (Map):	North Branch
City (Site):	North Branch	State (Map):	MN
State (Site):	MN	ZIP (Map):	55056
ZIP (Site):	55056	County Code (Map):	025
County (Site):	Chisago	County (Map):	Chisago
Latitude (Site):	45.50847824	Latitude (Map):	45.50847824
Longitude (Site):	-92.96270144	Longitude (Map):	-92.96270144
Name (Req):	Chain Lake Preserve 2nd Addition	County Code (Req):	25
Address (Req):	Finley Rd & Fenian Way, So. from	County (Req):	Chisago
City (Req):	North Branch	Latitude (Req):	45.50847824
State (Req):	MN	Longitude (Req):	-92.96270144
ZIP (Req):	55056		
Data Source:	MPCA Agency Interests: Map; My Neighborhood Sites; MPCA Agency Interests: File Request		
Loc Desc (Map):			
Loc Desc (Req):			

Agency Interests: Map Details

Item ID:	78891-AISI0000078891	Spatial ID:	73489
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	78891
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	07030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	0703000503	Cong Dist:	8
HUC 12:	070300050303	House Dist:	32B
HUC 12 Name:	Lower North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	62
Range :		DWSMA Name:	North Branch
Range Dir:		TRDSQQ:	
Section:		Method Code:	Q2
Quarters:		Method Desc:	Public Land Survey-Two Quarter
Collection Date:	30-Jun-2016	Ref Code:	GEN
Tmsp Created:	23-Apr-2002	Ref Desc:	General Location
User Created:	DELTA_M_R1	Verified:	No
Tmsp Updt:	30-Jun-2016	User Updt:	geo_nc
Name:	Chain Lake Preserve 2nd Addition		

My Neighborhood Site Details

Site ID:	78891	IC Flag:	No
Active FLA:	Yes	City:	North Branch
Activity:	Construction Stormwater	County:	Chisago
Addr St:	Finley Rd & Fenian Way, So. from 406th St	Cong Distr:	8
Addr City:	North Branch	Senate Dis:	32
Addr ZIP:	55056	House Dist:	32B
Address:	MN	HUC 8:	07030005
MPCA ID:	C00008477	Watershed :	Lower St. Croix River
MPCA ID List:	C00008477	Latitude:	45.50847824
Program Co:	ST	Longitude:	-92.96270144
Program Name:	Stormwater	Coord Coll:	Q2
Program 1:	Stormwater	Coord Co 1:	Public Land Survey-Two Quarter
Name:	Chain Lake Preserve 2nd Addition		
Site URL:	https://webapp.pca.state.mn.us/wimn/site/78891		
Activity L:	Construction Stormwater		
Industrial:			

Agency Interests: File Request Details

Item ID:	78891-AISI0000078891	Spatial ID:	73489
Status:	Active	Int Doc ID:	0
Status Date:		SI Type:	CON
Program:	Const Stormwater	SI Cat:	AISI
Program List:	CS	SI ID:	78891
CTU Code:	239525	SI Cat Desc:	Agency Interest
CTU Name:	North Branch	SI Type Desc:	Conventional Site
HUC 8:	7030005	Description:	
HUC 8 Name:	Lower St. Croix River	SI Designation:	
HUC 10:	703000503	Cong Dist:	8
HUC 12:	70300050303	House Dist:	32B
HUC 12 Name:	Lower North Branch Sunrise River	Senate Dist:	32
PLS Twsp:		DWSMA Code:	62
Range :		DWSMA Name:	North Branch
Range Dir:		TRDSQQ:	
Section:		Method Code:	Q2
Quarters:		Method Desc:	Public Land Survey-Two Quarter
Collection Date:	6/30/2016	Ref Code:	GEN
Tmsp Created:	4/23/2002	Ref Desc:	General Location
User Created:	DELTA_M_R1	Verified:	No
Tmsp Updt:	6/30/2016	User Updt:	geo_nc
Name:	Chain Lake Preserve 2nd Addition		

HUC 10 Name:

North Branch Sunrise River

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ERIS updates databases as set out in ASTM Standard E1527-13 and E1527-21, Section 8.1.8 Sources of Standard Source Information:

"Government information from nongovernmental sources may be considered current if the source updates the information at least every 90 days, or, for information that is updated less frequently than quarterly by the government agency, within 90 days of the date the government agency makes the information available to the public."

Standard Environmental Record Sources

Federal

Formerly Utilized Sites Remedial Action Program:

DOE FUSRAP

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

Government Publication Date: Mar 4, 2017

National Priority List:

NPL

Sites on the United States Environmental Protection Agency (EPA)'s National Priorities List of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. The NPL, which EPA is required to update at least once a year, is based primarily on the score a site receives from EPA's Hazard Ranking System. A site must be on the NPL to receive money from the Superfund Trust Fund for remedial action. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Mar 30, 2022

National Priority List - Proposed:

PROPOSED NPL

Sites proposed - by the EPA, the state agency, or concerned citizens - for addition to the NPL due to contamination by hazardous waste and identified by the Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Mar 30, 2022

Deleted NPL:

DELETED NPL

Sites deleted from the United States Environmental Protection Agency (EPA)'s National Priorities List. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Mar 30, 2022

SEMS List 8R Active Site Inventory:[SEMS](#)

The Superfund Program has deployed the Superfund Enterprise Management System (SEMS), which integrates multiple legacy systems into a comprehensive tracking and reporting tool. This inventory contains active sites evaluated by the Superfund program that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted.

Government Publication Date: Apr 27, 2022

SEMS List 8R Archive Sites:[SEMS ARCHIVE](#)

The Superfund Enterprise Management System (SEMS) Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time.

Government Publication Date: Apr 27, 2022

Inventory of Open Dumps, June 1985:[ODI](#)

The Resource Conservation and Recovery Act (RCRA) provides for publication of an inventory of open dumps. The Act defines "open dumps" as facilities which do not comply with EPA's "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR 257).

Government Publication Date: Jun 1985

Comprehensive Environmental Response, Compensation and Liability Information System -[CERCLIS](#)**CERCLIS:**

Superfund is a program administered by the United States Environmental Protection Agency (EPA) to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The EPA administers the Superfund program in cooperation with individual states and tribal governments; this database is made available by the EPA.

Government Publication Date: Oct 25, 2013

EPA Report on the Status of Open Dumps on Indian Lands:[IODI](#)

Public Law 103-399, The Indian Lands Open Dump Cleanup Act of 1994, enacted October 22, 1994, identified congressional concerns that solid waste open dump sites located on American Indian or Alaska Native (AI/AN) lands threaten the health and safety of residents of those lands and contiguous areas. The purpose of the Act is to identify the location of open dumps on Indian lands, assess the relative health and environment hazards posed by those sites, and provide financial and technical assistance to Indian tribal governments to close such dumps in compliance with Federal standards and regulations or standards promulgated by Indian Tribal governments or Alaska Native entities.

Government Publication Date: Dec 31, 1998

CERCLIS - No Further Remedial Action Planned:[CERCLIS NFRAP](#)

An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. The Archive designation means that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Government Publication Date: Oct 25, 2013

CERCLIS Liens:[CERCLIS LIENS](#)

A Federal Superfund lien exists at any property where EPA has incurred Superfund costs to address contamination ("Superfund site") and has provided notice of liability to the property owner. A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. This database is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Jan 30, 2014

RCRA CORRACTS-Corrective Action:[RCRA CORRACTS](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. At these sites, the Corrective Action Program ensures that cleanups occur. EPA and state regulators work with facilities and communities to design remedies based on the contamination, geology, and anticipated use unique to each site.

Government Publication Date: Apr 11, 2022

RCRA non-CORRACTS TSD Facilities:[RCRA TSD](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. This database includes Non-Corrective Action sites listed as treatment, storage and/or disposal facilities of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Government Publication Date: Apr 11, 2022

RCRA Generator List:[RCRA LQG](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Large Quantity Generators (LQGs) generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste.

Government Publication Date: Apr 11, 2022

RCRA Small Quantity Generators List:[RCRA SQG](#)

RCRA Info is the EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Small Quantity Generators (SQGs) generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.

Government Publication Date: Apr 11, 2022

RCRA Very Small Quantity Generators List:[RCRA VSQG](#)

RCRA Info is the EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Very Small Quantity Generators (VSQG) generate 100 kilograms or less per month of hazardous waste, or one kilogram or less per month of acutely hazardous waste. Additionally, VSQG may not accumulate more than 1,000 kilograms of hazardous waste at any time.

Government Publication Date: Apr 11, 2022

RCRA Non-Generators:[RCRA NON GEN](#)

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Non-Generators do not presently generate hazardous waste.

Government Publication Date: Apr 11, 2022

RCRA Sites with Controls:[RCRA CONTROLS](#)

List of Resource Conservation and Recovery Act (RCRA) facilities with institutional controls in place. RCRA gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Government Publication Date: Apr 11, 2022

Federal Engineering Controls-ECs:[FED ENG](#)

Engineering controls (ECs) encompass a variety of engineered and constructed physical barriers (e.g., soil capping, sub-surface venting systems, mitigation barriers, fences) to contain and/or prevent exposure to contamination on a property. This database is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Dec 30, 2021

Federal Institutional Controls-ICs:[FED INST](#)

Institutional controls are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Although it is EPA's (United States Environmental Protection Agency) expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use whenever practicable, ICs play an important role in site remedies because they reduce exposure to contamination by limiting land or resource use and guide human behavior at a site.

Government Publication Date: Dec 30, 2021

Land Use Control Information System:

LUCIS

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

Government Publication Date: Sep 1, 2006

Institutional Control Boundaries at NPL sites:

NPL IC

Boundaries of Institutional Control areas at sites on the United States Environmental Protection Agency (EPA)'s National Priorities List, or Proposed or Deleted, made available by the EPA's Shared Enterprise Geodata and Services (SEGS). United States Environmental Protection Agency (EPA)'s National Priorities List of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy.

Government Publication Date: Mar 30, 2022

Emergency Response Notification System:

ERNS 1982 TO 1986

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1982-1986

Emergency Response Notification System:

ERNS 1987 TO 1989

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1987-1989

Emergency Response Notification System:

ERNS

Database of oil and hazardous substances spill reports made available by the United States Coast Guard National Response Center (NRC). The NRC fields initial reports for pollution and railroad incidents and forwards that information to appropriate federal/state agencies for response. These data contain initial incident data that has not been validated or investigated by a federal/state response agency.

Government Publication Date: Dec 31, 2021

The Assessment, Cleanup and Redevelopment Exchange System (ACRES) Brownfield Database:

FED BROWNFIELDS

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off greenspaces and working lands. This database is made available by the United States Environmental Protection Agency (EPA).

Government Publication Date: Aug 20, 2021

FEMA Underground Storage Tank Listing:

FEMA UST

The Federal Emergency Management Agency (FEMA) of the Department of Homeland Security maintains a list of FEMA owned underground storage tanks.

Government Publication Date: Dec 31, 2017

Facility Response Plan:

FRP

List of facilities that have submitted Facility Response Plans (FRP) to EPA. Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit Facility Response Plans (FRPs). Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments.

Government Publication Date: Dec 31, 2021

Historical Gas Stations:

HIST GAS STATIONS

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

Government Publication Date: Jul 1, 1930

Petroleum Refineries:

REFN

List of petroleum refineries from the U.S. Energy Information Administration (EIA) Refinery Capacity Report. Includes operating and idle petroleum refineries (including new refineries under construction) and refineries shut down during the previous year located in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, and other U.S. possessions. Survey locations adjusted using public data.

Government Publication Date: Feb 4, 2022

Petroleum Product and Crude Oil Rail Terminals:

BULK TERMINAL

List of petroleum product and crude oil rail terminals made available by the U.S. Energy Information Administration (EIA). Includes operable bulk petroleum product terminals located in the 50 States and the District of Columbia with a total bulk shell storage capacity of 50,000 barrels or more, and/or the ability to receive volumes from tanker, barge, or pipeline; also rail terminals handling the loading and unloading of crude oil that were active between 2017 and 2018. Petroleum product terminals comes from the EIA-815 Bulk Terminal and Blender Report, which includes working, shell in operation, and shell idle for several major product groupings. Survey locations adjusted using public data.

Government Publication Date: Feb 4, 2022

LIEN on Property:

SEMS LIEN

The EPA Superfund Enterprise Management System (SEMS) provides LIEN information on properties under the EPA Superfund Program.

Government Publication Date: Apr 27, 2022

Superfund Decision Documents:

SUPERFUND ROD

This database contains a listing of decision documents for Superfund sites. Decision documents serve to provide the reasoning for the choice of (or) changes to a Superfund Site cleanup plan. The decision documents include Records of Decision (ROD), ROD Amendments, Explanations of Significant Differences (ESD), along with other associated memos and files. This information is maintained and made available by the US EPA (Environmental Protection Agency).

Government Publication Date: May 3, 2022

State**Minnesota Permanent List of Priorities:**

PLP

The state Superfund sites in Minnesota are listed on the Minnesota Permanent List of Priorities (PLP). The hazardous waste sites on the PLP are in various stages of remediation. At these sites investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues. This data is made available by the Minnesota Pollution Control Agency (MPCA). This database is state equivalent NPL.

Government Publication Date: Mar 1, 2022

Delisted Permanent List of Priorities (PLP):

DEL PLP

This list contains sites that were previously included in Permanent List of Priorities (PLP) maintained by Minnesota's Pollution Control Agency (MPCA) but have now been delisted. This database is state equivalent NPL.

Government Publication Date: Mar 1, 2022

Minnesota Site Remediation Section Database:

SHWS

The Site Remediation Section identifies, investigates, and determines appropriate cleanup plans for abandoned or uncontrolled hazardous waste sites where a release or potential release of a hazardous substance poses a risk to human health or the environment. This data is made available by the Minnesota Pollution Control Agency (MPCA)'s Site Remediation Section. This database is state equivalent CERCLIS.

Government Publication Date: Mar 1, 2022

MPCA Site Assessment Sites:

SITE ASSESSMENT

A list of active and closed sites that are currently under site assessment by Minnesota Pollution Control Agency (MPCA) and are a part of MPCA Remediation Sites list.

Government Publication Date: Mar 1, 2022

Permitted Solid Waste Facilities:

SWF/LF

A list of permitted solid waste and landfill facilities made available by the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 22, 2022

Closed Landfills Priority List:

LCP

The Minnesota Legislature enacted the Landfill Cleanup Act (LCA) in 1994 to ensure the proper closure and post-closure care at up to 112 closed, permitted municipal sanitary landfills located throughout the state. Based on this legislation, the Minnesota Pollution Control Agency (MPCA) created the Closed Landfill Program (CLP) to administer the LCA mandates. This data made available by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Oct 6, 2020

Unpermitted Dump Sites:

UNPERMITTED LF

The Minnesota Pollution Control Agency (MPCA) defines "dumps" as those landfills that never held a valid permit from the MPCA. Generally, dumps existed prior to the permitting program established with the creation of the MPCA in 1967. This database made available by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Recycling Markets Directory:

RECYCLING

The Recycling Markets Directory is provided by the Minnesota Pollution Control Agency (MPCA). The markets in this database accept large (commercial) quantities of materials.

Government Publication Date: Nov 8, 2018

Historical Leaking Underground Storage Tanks:

HIST LUST

A list of leaking underground storage tanks (LUSTs) in the tanks database maintained by the Minnesota Pollution Control Agency (MPCA) up until Nov 01, 2016.

Government Publication Date: Nov 1, 2016

Deleted Leaking Underground Storage Tanks:

DEL LUST

A list of leaking underground storage tanks that are often deleted for various reasons. Deletion occurs primarily due to a duplication, or that the source was determined to not be from a tank. This list was provided by Minnesota Pollution Control Agency.

Government Publication Date: Jan 5, 2016

Historical Leaking Aboveground Storage Tanks:

HIST LAST

A list of leaking aboveground storage tanks (LASTs) in the tanks database maintained by the Minnesota Pollution Control Agency (MPCA) up until Nov 01, 2016.

Government Publication Date: Nov 1, 2016

Historical Leak Sites:

HIST LEAKSITES

A list of leak sites that were neither determined as aboveground nor underground in the tanks database maintained by the Minnesota Pollution Control Agency (MPCA) up until Nov 01, 2016.

Government Publication Date: Nov 1, 2016

MPCA Remediation Leak Sites:

LST REM SITE

A list of leak sites in which Minnesota Pollution Control Agency (MPCA) is involved in remediation activities, this list is published by MPCA.

Government Publication Date: Mar 1, 2022

MPCA Tank Incidents:

LST INCIDENT

A list of leaking and registered tank sites in Minnesota that includes locations, details of tank installation and construction, and installed safety measures. This list is provided by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Delisted Leaking Storage Tanks:

DELISTED LST

This database contains a list of closed leaking storage tank sites that were removed from the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Underground Storage Tanks:

UST

In Minnesota, there are about 18,000 regulated underground storage tanks (USTs) currently in use. The Underground Storage Tank Program in the Minnesota Pollution Control Agency (MPCA) was created to help prevent contamination caused by leaking tanks. This is a list that contains all regulated USTs. This data made available by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Minnesota Above Ground Storage Tanks:

AST

There are more than 20,000 regulated above-ground storage tanks (ASTs) currently in use across Minnesota. Most tanks located above ground containing liquid substances (i.e., not gaseous or solid at ambient temperature and pressure) are subject to the Minnesota Pollution Control Agency's (MPCA) rules for design and operation of ASTs. This list contains ASTs regulated by MPCA. This data made available by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Tank Sites:

HIST TANK

A list of tank sites not included in AST or UST, this list maintained by the Minnesota Pollution Control Agency (MPCA) up until Dec 30, 2016.

Government Publication Date: Dec 30, 2016

Delisted Storage Tanks:

DELISTED TANK

This database contains a list of storage tank sites that were removed from the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Apr 28, 2022

Sites with Institutional Control Events:

INST

A list made available by the Minnesota Pollution Control Agency (MPCA) consisting of remediation sites that have various institutional controls in place.

Government Publication Date: Feb 14, 2022

Agricultural Contingency Sites Boundaries:

AG CONTINGENCY

The Minnesota Department of Agriculture (MDA) Incident Response Unit (IRU) is the state lead agency for the investigation and remediation of incidents involving agricultural chemicals (pesticides and fertilizer). This MDA IRU database includes sites with a soil or ground water contingency, deed restriction, local ordinance, restrictive covenant or deed affidavit in place. The accuracy of the boundaries of these sites can be variable - in most cases, the site boundaries should be considered as only representing the vicinity of the soil or ground water contingency area or plume.

Government Publication Date: Feb 22, 2022

Petroleum Brownfields Program Sites:

BROWNFIELDS

The Minnesota Pollution Control Agency (MPCA)'s Petroleum Brownfields Program handles petroleum contamination under the Petroleum Tank Release Cleanup Act (Minnesota Statutes § 115C). This data made available by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Voluntary Investigation and Cleanup Program List:

VIC

The Minnesota Pollution Control Agency's (MPCA) Brownfield Program consists of an integrated program called the Voluntary Investigation and Cleanup (VIC) Program. This program handles hazardous substance contamination under Minnesota's Environmental Response and Liability Act (Minnesota Statutes § 115B). This database made available by Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Potential Voluntary Investigation and Cleanup Program Sites:

POTENTIAL VIC

This listing of Potential Voluntary Investigation and Cleanup Program sites is provided by the Minnesota Pollution Control Agency (MPCA). These potential sites have not yet entered into the VIC Program until an application has been received at the MPCA.

Government Publication Date: Apr 22, 2016

MPCA Agency Interests:

MPCA AI

Facility, site and project locations from the Minnesota Pollution Control Agency's enterprise database, representing locations associated with waste water, storm water, hazardous waste, feedlot, solid waste, tanks, remediation, and other agency programs. Includes records from "What's In My Neighborhood Sites".

Government Publication Date: Mar 4, 2022

Tribal

Leaking Underground Storage Tanks on Indian Lands:

INDIAN LUST

LUSTs on Tribal/Indian Lands in Region 5, which includes Michigan, Minnesota, and Wisconsin.

Government Publication Date: Oct 12, 2021

Underground Storage Tanks (USTs) on Indian Lands:

INDIAN UST

USTs on Tribal/Indian Lands in Region 5, which includes Michigan, Minnesota, and Wisconsin.

Government Publication Date: Oct 12, 2021

Delisted Tribal Leaking Storage Tanks:[DELISTED ILST](#)

Leaking Underground Storage Tank facilities which have been removed from the Regional Tribal LUST lists made available by the EPA.

Government Publication Date: Oct 12, 2021

Delisted Tribal Underground Storage Tanks:[DELISTED IUST](#)

Underground Storage Tank facilities which have been removed from the Regional Tribal UST lists made available by the EPA.

Government Publication Date: Oct 13, 2021

County

No County standard environmental record sources available for this State.

Additional Environmental Record Sources**Federal****Facility Registry Service/Facility Index:**[FINDS/FRS](#)

The Facility Registry Service (FRS) is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, and data collected from EPA's Central Data Exchange registrations and data management personnel. This list is made available by the Environmental Protection Agency (US EPA).

Government Publication Date: Nov 2, 2020

Toxics Release Inventory (TRI) Program:[TRIS](#)

The EPA's Toxics Release Inventory (TRI) is a database containing data on disposal or other releases of over 650 toxic chemicals from thousands of U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment. One of TRI's primary purposes is to inform communities about toxic chemical releases to the environment.

Government Publication Date: Aug 24, 2021

Perfluorinated Alkyl Substances (PFAS) Releases:[PFAS TRI](#)

List of Toxics Release Inventory (TRI) facilities at which the reported chemical is a Per- or polyfluorinated alkyl substance (PFAS) included in the Environmental Protection Agency (EPA)'s consolidated PFAS Master List of PFAS Substances. The EPA's Toxics Release Inventory (TRI) is a database containing data on disposal or other releases of over 650 toxic chemicals from thousands of U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment.

Government Publication Date: Aug 24, 2021

PFOA/PFOS Contaminated Sites:[PFAS NPL](#)

List of sites where PFOA or PFOS contaminants have been found in drinking water or soil. Made available by the Federal Environmental Protection Agency (EPA).

Government Publication Date: Jan 11, 2022

Perfluorinated Alkyl Substances (PFAS) Water Quality:[PFAS WATER](#)

The Water Quality Portal (WQP) is a cooperative service sponsored by the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council (NWQMC). This listing includes records from the Water Quality Portal where the characteristic (environmental measurement) is in the Environmental Protection Agency (EPA)'s consolidated PFAS Master List of PFAS Substances.

Government Publication Date: Jul 20, 2020

SSEHRI PFAS Contamination Sites:[PFAS SSEHRI](#)

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Disclaimer: The source conveys this database undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Limited location details are available with this data. Access the following for the most current informations <https://pfasproject.com/pfas-contamination-site-tracker/>

Government Publication Date: Dec 12, 2019

National Response Center PFAS Spills:

[ERNS PFAS](#)

National Response Center (NRC) calls from 1990 to the most recent complete calendar year where there is indication of Aqueous Film Forming Foam (AFFF) usage. NRC calls may reference AFFF usage in the "Material Involved" or "Incident Description" fields. Data made available by the US Environmental Protection Agency (EPA). Disclaimer: dataset may include initial or misidentified incident data not yet validated or investigated by a federal/state response agency.

Government Publication Date: Feb 23, 2022

Hazardous Materials Information Reporting System:

[HMIRS](#)

US DOT - Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) Incidents Reports Database taken from Hazmat Intelligence Portal, U.S. Department of Transportation.

Government Publication Date: Sep 1, 2020

National Clandestine Drug Labs:

[NCDL](#)

The U.S. Department of Justice ("the Department") provides this data as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy.

Government Publication Date: Nov 22, 2021

Toxic Substances Control Act:

[TSCA](#)

The Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule.

The CDR enables EPA to collect and publish information on the manufacturing, processing, and use of commercial chemical substances and mixtures (referred to hereafter as chemical substances) on the TSCA Chemical Substance Inventory (TSCA Inventory). This includes current information on chemical substance production volumes, manufacturing sites, and how the chemical substances are used. This information helps the Agency determine whether people or the environment are potentially exposed to reported chemical substances. EPA publishes submitted CDR data that is not Confidential Business Information (CBI).

Government Publication Date: Apr 11, 2019

Hist TSCA:

[HIST TSCA](#)

The Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule.

The 2006 IUR data summary report includes information about chemicals manufactured or imported in quantities of 25,000 pounds or more at a single site during calendar year 2005. In addition to the basic manufacturing information collected in previous reporting cycles, the 2006 cycle is the first time EPA collected information to characterize exposure during manufacturing, processing and use of organic chemicals. The 2006 cycle also is the first time manufacturers of inorganic chemicals were required to report basic manufacturing information.

Government Publication Date: Dec 31, 2006

FTTS Administrative Case Listing:

[FTTS ADMIN](#)

An administrative case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.

Government Publication Date: Jan 19, 2007

FTTS Inspection Case Listing:

[FTTS INSP](#)

An inspection case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.

Government Publication Date: Jan 19, 2007

Potentially Responsible Parties List:

PRP

Early in the cleanup process, the Environmental Protection Agency (EPA) conducts a search to find the potentially responsible parties (PRPs). EPA looks for evidence to determine liability by matching wastes found at the site with parties that may have contributed wastes to the site.

Government Publication Date: Mar 30, 2022

State Coalition for Remediation of Drycleaners Listing:

SCRD DRYCLEANER

The State Coalition for Remediation of Drycleaners (SCRD) was established in 1998, with support from the U.S. Environmental Protection Agency (EPA) Office of Superfund Remediation and Technology Innovation. Coalition members are states with mandated programs and funding for drycleaner site remediation. Current members are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Government Publication Date: Nov 08, 2017

Integrated Compliance Information System (ICIS):

ICIS

The Integrated Compliance Information System (ICIS) is a system that provides information for the Federal Enforcement and Compliance (FE&C) and the National Pollutant Discharge Elimination System (NPDES) programs. The FE&C component supports the Environmental Protection Agency's (EPA) Civil Enforcement and Compliance program activities. These activities include Compliance Assistance, Compliance Monitoring and Enforcement. The NPDES program supports tracking of NPDES permits, limits, discharge monitoring data and other program reports.

Government Publication Date: Jan 15, 2022

Drycleaner Facilities:

FED DRYCLEANERS

A list of drycleaner facilities from Enforcement and Compliance History Online (ECHO) online search. The Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments.

Government Publication Date: May 5, 2021

Delisted Drycleaner Facilities:

DELISTED FED DRY

List of sites removed from the list of Drycleaner Facilities (sites in the EPA's Integrated Compliance Information System (ICIS) with NAIC or SIC codes identifying the business as a drycleaner establishment).

Government Publication Date: May 5, 2021

Formerly Used Defense Sites:

FUDS

Formerly Used Defense Sites (FUDS) are properties that were formerly owned by, leased to, or otherwise possessed by and under the jurisdiction of the Secretary of Defense prior to October 1986, where the Department of Defense (DoD) is responsible for an environmental restoration. This list is published by the U.S. Army Corps of Engineers.

Government Publication Date: May 26, 2021

Former Military Nike Missile Sites:

FORMER NIKE

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline, heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

Government Publication Date: Dec 2, 1984

PHMSA Pipeline Safety Flagged Incidents:

PIPELINE INCIDENT

A list of flagged pipeline incidents made available by the U.S. Department of Transportation (US DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA regulations require incident and accident reports for five different pipeline system types.

Government Publication Date: Jul 7, 2020

Material Licensing Tracking System (MLTS):

MLTS

A list of sites that store radioactive material subject to the Nuclear Regulatory Commission (NRC) licensing requirements. This list is maintained by the NRC. As of September 2016, the NRC no longer releases location information for sites. Site locations were last received in July 2016.

Government Publication Date: May 11, 2021

Historic Material Licensing Tracking System (MLTS) sites:

HIST MLTS

A historic list of sites that have inactive licenses and/or removed from the Material Licensing Tracking System (MLTS). In some cases, a site is removed from the MLTS when the state becomes an "Agreement State". An Agreement State is a State that has signed an agreement with the Nuclear Regulatory Commission (NRC) authorizing the State to regulate certain uses of radioactive materials within the State.

Government Publication Date: Jan 31, 2010

Mines Master Index File:

MINES

The Master Index File (MIF) contains mine identification numbers issued by the Department of Labor Mine Safety and Health Administration (MSHA) for mines active or opened since 1971. Note that addresses may or may not correspond with the physical location of the mine itself.

Government Publication Date: Nov 2, 2021

Surface Mining Control and Reclamation Act Sites:

SMCRA

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of Abandoned Mine Land (AML) impacts, as well as information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Government Publication Date: Dec 18, 2020

Mineral Resource Data System:

MRDS

The Mineral Resource Data System (MRDS) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps.

Government Publication Date: Mar 15, 2016

Uranium Mill Tailings Radiation Control Act Sites:

URANIUM

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

Government Publication Date: Mar 4, 2017

Alternative Fueling Stations:

ALT FUELS

List of alternative fueling stations made available by the US Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Biodiesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE). The National Renewable Energy Laboratory (NREL) obtains information about new stations from trade media, Clean Cities coordinators, a Submit New Station form on the Station Locator website, and through collaborating with infrastructure equipment and fuel providers, original equipment manufacturers (OEMs), and industry groups.

Government Publication Date: May 16, 2022

Superfunds Consent Decrees:

CONSENT DECREES

A list of Superfund consent decrees made available by the Department of Justice, Environment & Natural Resources Division (ENRD).

Government Publication Date: Sep 30, 2018

Registered Pesticide Establishments:

SSTS

List of active EPA-registered foreign and domestic pesticide-producing and device-producing establishments based on data from the Section Seven Tracking System (SSTS). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 7 requires that facilities producing pesticides, active ingredients, or devices be registered. The list of establishments is made available by the EPA.

Government Publication Date: Mar 30, 2022

Polychlorinated Biphenyl (PCB) Transformers:

PCBT

Locations of Transformers Containing Polychlorinated Biphenyls (PCBs) registered with the United States Environmental Protection Agency. PCB transformer owners must register their transformer(s) with EPA. Although not required, PCB transformer owners who have removed and properly disposed of a registered PCB transformer may notify EPA to have their PCB transformer de-registered. Data made available by EPA.

Government Publication Date: Oct 15, 2019

Polychlorinated Biphenyl (PCB) Notifiers:

PCB

Facilities included in the national list of facilities that have notified the United States Environmental Protection Agency (EPA) of Polychlorinated Biphenyl (PCB) activities. Any company or person storing, transporting or disposing of PCBs or conducting PCB research and development must notify the EPA and receive an identification number.

Government Publication Date: Jan 20, 2022

State**Registered Dry Cleaning Facilities:**

DRYCLEANERS

The Minnesota Pollution Control Agency (MPCA) maintains this listing of registered dry cleaning facilities.

Government Publication Date: Aug 20, 2019

Spills reported to the Pollution Control Agency:

SPILLS

The Minn. Stat. §115.061, which has been in effect since 1969, describes the duty of people to notify the Minnesota Pollution Control Agency (MPCA) when spills occur. This is the list of spills reported to MPCA, and the list maintained by The Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Mar 1, 2022

Department of Agriculture Spills:

AG SPILLS

The Minnesota Department of Agriculture Incident Response Unit is the regulatory authority of Agricultural Chemical (Ag-Chem) Incidents in Minnesota. This list contains pesticide and fertilizer incidents reported to the Response Unit. This data made available by The Minnesota Department of Agriculture, Incident Response Unit.

Government Publication Date: Mar 29, 2022

Historic spills reported to the Pollution Control Agency:

HIST SPL

The Minn. Stat. §115.061, which has been in effect since 1969, describes the duty of people to notify the Minnesota Pollution Control Agency (MPCA) when spills occur. This is the list of spills reported to MPCA, and maintained by The Minnesota Pollution Control Agency (MPCA). This list was maintained till 1 Nov 2016.

Government Publication Date: Nov 1, 2016

PFAS in Groundwater Samples:

PFAS GW

A list of sites from the Minnesota Groundwater Contamination Atlas where Per- and Polyfluoroalkyl Substances (PFAS) were found in groundwater samples. This list is made available by the Minnesota Pollution Control Agency.

Government Publication Date: Nov 12, 2021

PFAS in Landfills:

PFAS LANDFILL

A list of sites in the Closed Landfill Program where Per- or polyfluorinated alkyl substances (PFAS) have been detected. This list is made available by the Minnesota Pollution Control Agency (MPCA).

Government Publication Date: Jul 30, 2020

Clandestine Drug Labs:

CDL

The Methamphetamine Laboratory Program at the Minnesota Department of Health (MDH) works to protect human health by providing technical advice on the remediation of clandestine methamphetamine production laboratories (meth labs) and decontamination of property exposed to meth lab activities.

Government Publication Date: Aug 23, 2021

Animal Feedlots:

FEEDLOTS

The Minnesota Pollution Control Agency (MPCA) tracks locations of animal feedlot facilities. The locations of animal feedlots provide information and context to support decisions on animal health, land use, and maintaining environmental quality.

Government Publication Date: Nov 25, 2021

Tier 2 Report:

TIER 2

A list of Tier 2 Facilities in Minnesota. This list is provided by Minnesota Department of Public Safety overseen by the Division of Homeland Security and Emergency Management.

Government Publication Date: May 5, 2020

Bulk Storage Permits:

BULK STORAGE

The Minnesota Department of Agriculture's Licensing Information System (LIS) lists individuals or companies who hold licenses, certificates and/or permits required by state law and regulated by the Department. This database only contains those LIS licenses related to anhydrous ammonia storage facilities and bulk pesticide/ fertilizer storage facilities.

Government Publication Date: Apr 28, 2022

Tribal

No Tribal additional environmental record sources available for this State.

County

No County additional environmental record sources available for this State.

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

Appendix D

Historical Research Documentation

REVIEWED

By Dennis McComas at 7:29 am, Jun 12, 2022



HIG Research Summary

Site Location

80 Acre Parcel West of Flick Avenue
NW of Flick Ave and 400th St
North Branch, MN

Requested by

American Engineering Testing, Inc.
550 Cleveland Avenue North
St. Paul, MN

HIG Project

2063041

Client Project

p-0013129

Date Created

05/24/2022

This Research Summary identifies the products and services provided by Historical Information Gatherers, Inc. (HIG) for the above referenced site location. All products are provided as PDFs unless otherwise noted.

Historical Aerial Photographs

Aerial photographs of the site location were used to create a multi-page file named AerialPhotos. Each aerial photograph has a title block that includes the year and scale of the photograph as well as project information submitted at the time the order was placed. The years provided are:

1938, 1948, 1952, 1954, 1965, 1973, 1978, 1980, 1983, 1986, 1992, 1996, 2003, 2008, 2013, 2017, 2021

City Directory Pages/Abstracts

Research Methodology: A search was conducted for city directories that include coverage of the site area using HIG's City Directory Collection and other sources, if needed. Directories for the following years were identified for the site area. A comma between date ranges indicates a gap of 10 years or more in available city directories:

Minneapolis, MN 2007-2017

Saint Paul, MN 2007-2017

The above listed directories were reviewed at approximate 5 year intervals to determine if the street(s) specified in the order were included in the directories and had listings for the site area. HIG attempted to identify former street names and aliases and if identified, these were also included in the review.

Research Results: City directory information, when provided, was used to create a multi-page file(s) named CD- followed by the street name. When City Directory Pages are provided, the publication name and date are shown at the top of each page. When a City Directory abstract is provided, the first page of the abstract includes the relevant publication information. The years of coverage identified for each street and any identified historical street names are as follows:

400th Street (2007-2017)

Flink Avenue (2007-2017) / 64 (no listings) / Hemingway Avenue (2007-2017)

Database Report

An ERIS Database Report is provided as a file named DBR.

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Site boundaries shown in red are approximate

80 Acre Parcel West of Flick Avenue
NW of Flick Ave and 400th St
North Branch, MN



2021

HIG Project # 2063041

Client Project # p-0013129

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





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North Branch, MN



2017

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www.historicalinfo.com





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North Branch, MN



2013

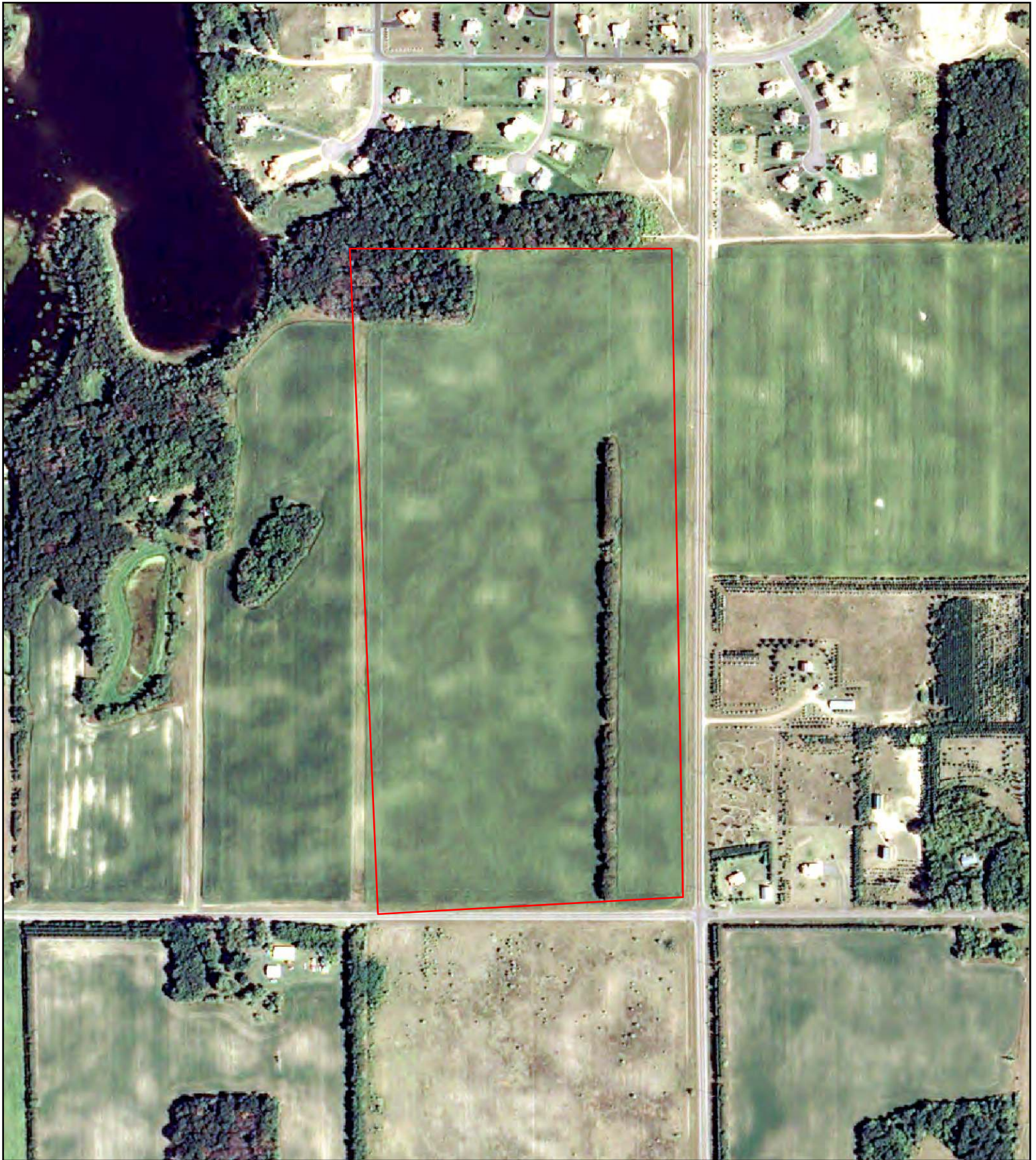
HIG Project # 2063041

Client Project # p-0013129

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





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2008

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2003

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1996

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North Branch, MN



1992

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1986

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1983

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1980

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1978

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www.historicalinfo.com





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North Branch, MN



1973

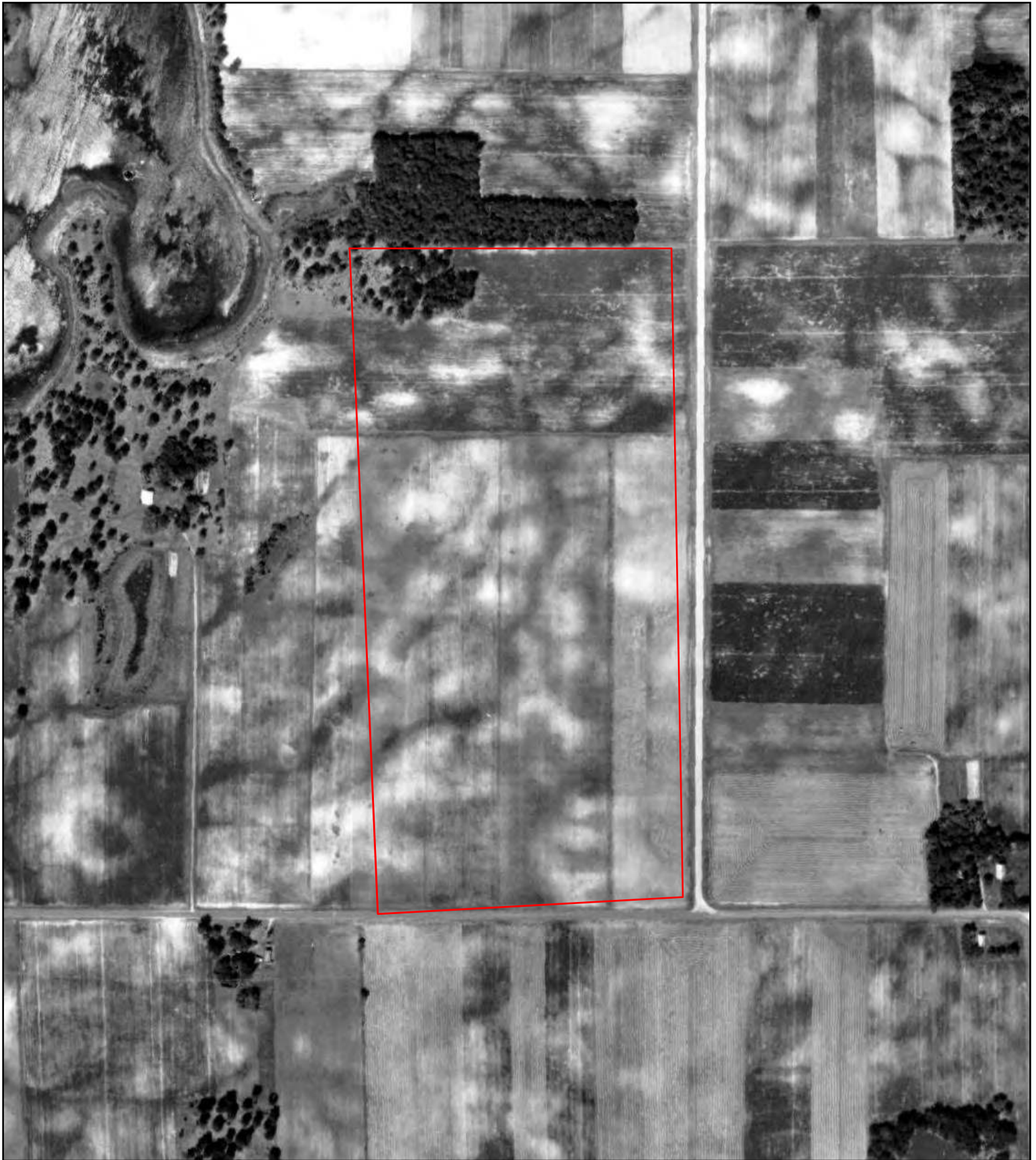
HIG Project # 2063041

Client Project # p-0013129

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www.historicalinfo.com





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1965

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1954

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1952

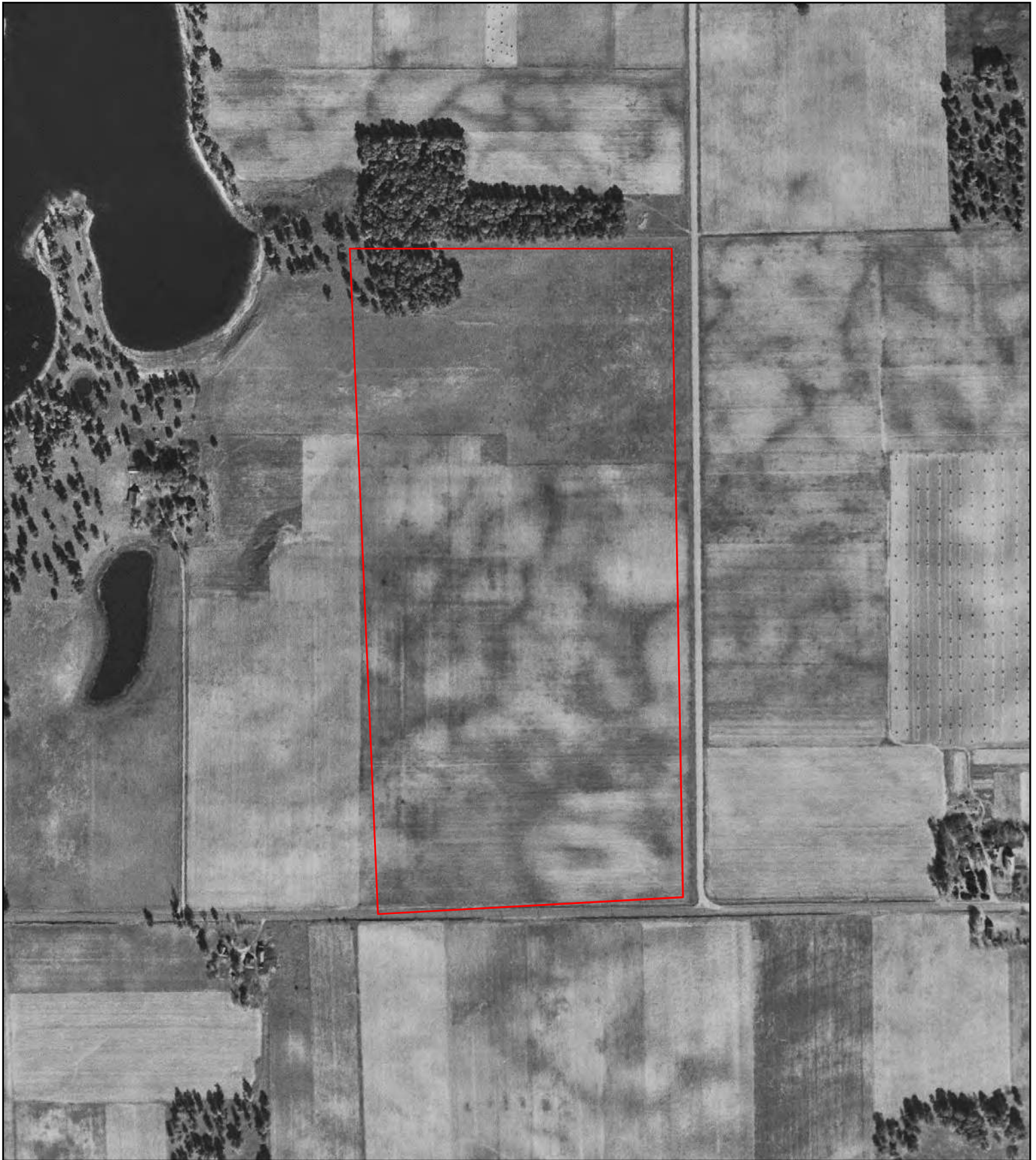
HIG Project # 2063041

Client Project # p-0013129

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





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1948

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www.historicalinfo.com





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1938

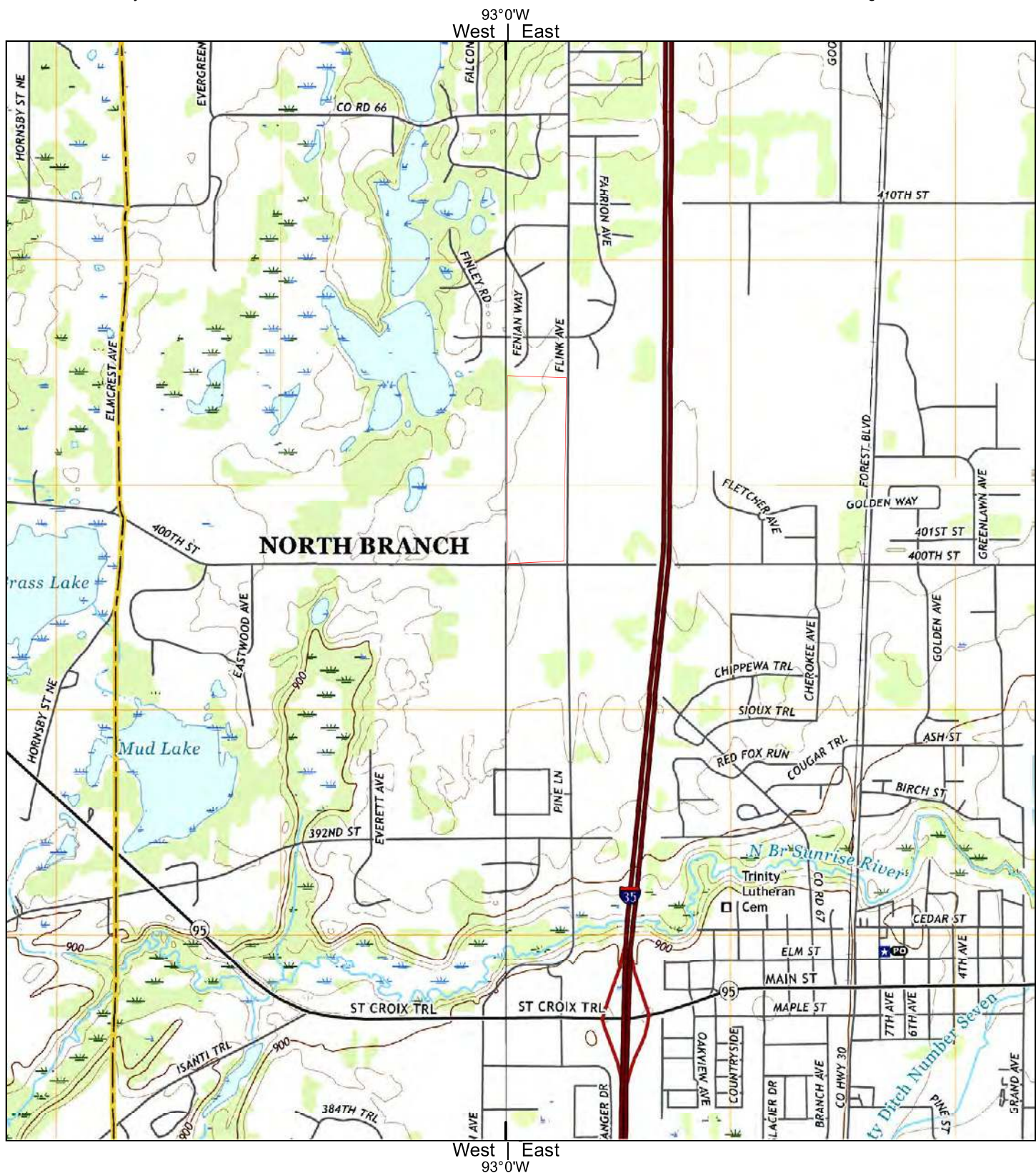
HIG Project # 2063041

Client Project # p-0013129

Approximate Scale 1: 6,000 (1"=500')

www.historicalinfo.com





2019

0 Distance in Miles 1
1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

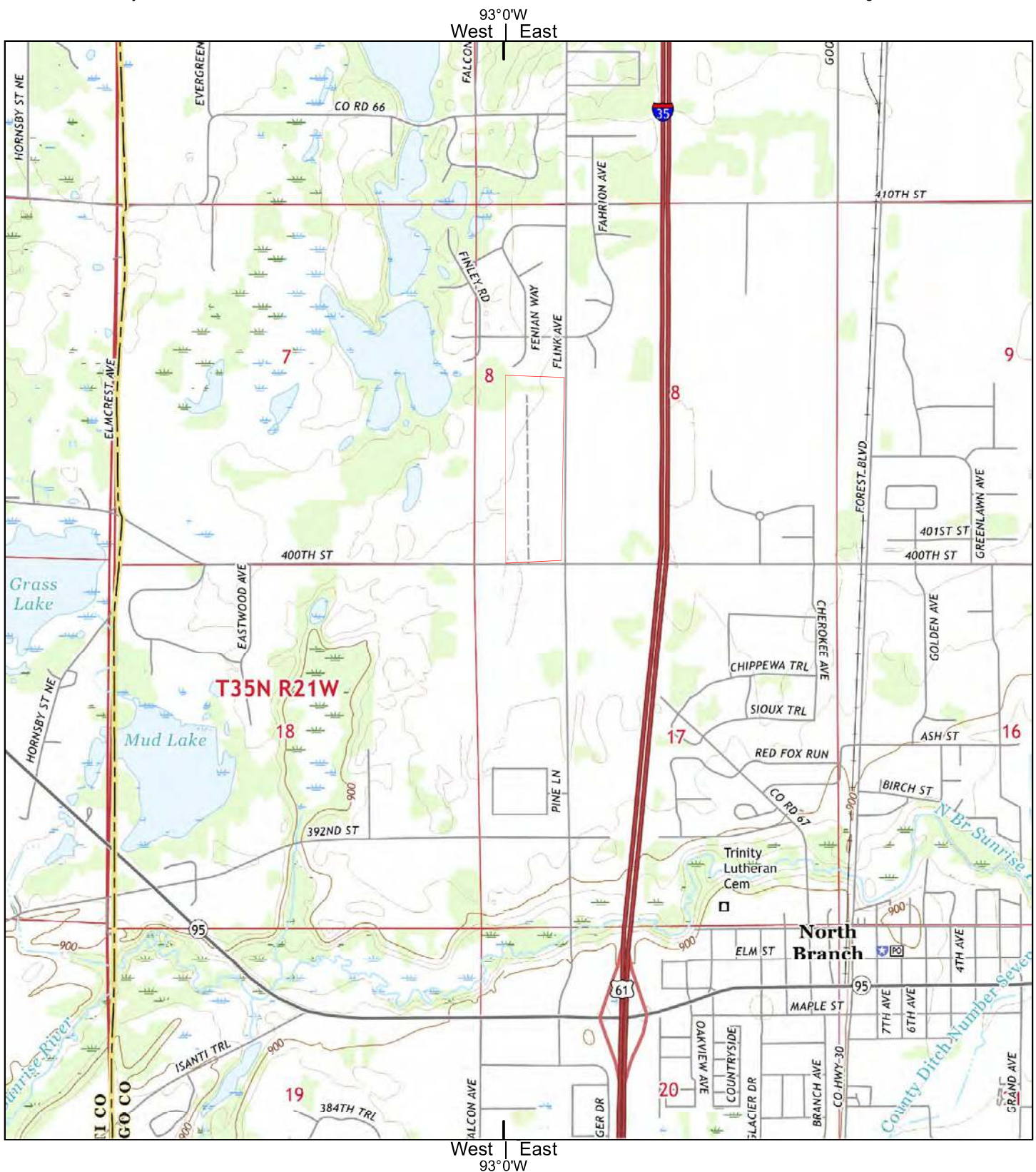
Site information:
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North Branch, MN



Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013129 HIG
#2063041 completed: 08/12/2021 14:21

Zone		Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
						Photo Year	Inspected	Revised
East		North Branch, MN	USGS	7½' x 7½'	2019	--	--	--
West		Stark, MN	USGS	7½' x 7½'	2019	--	--	--



2016

0 Distance in Miles 1
1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

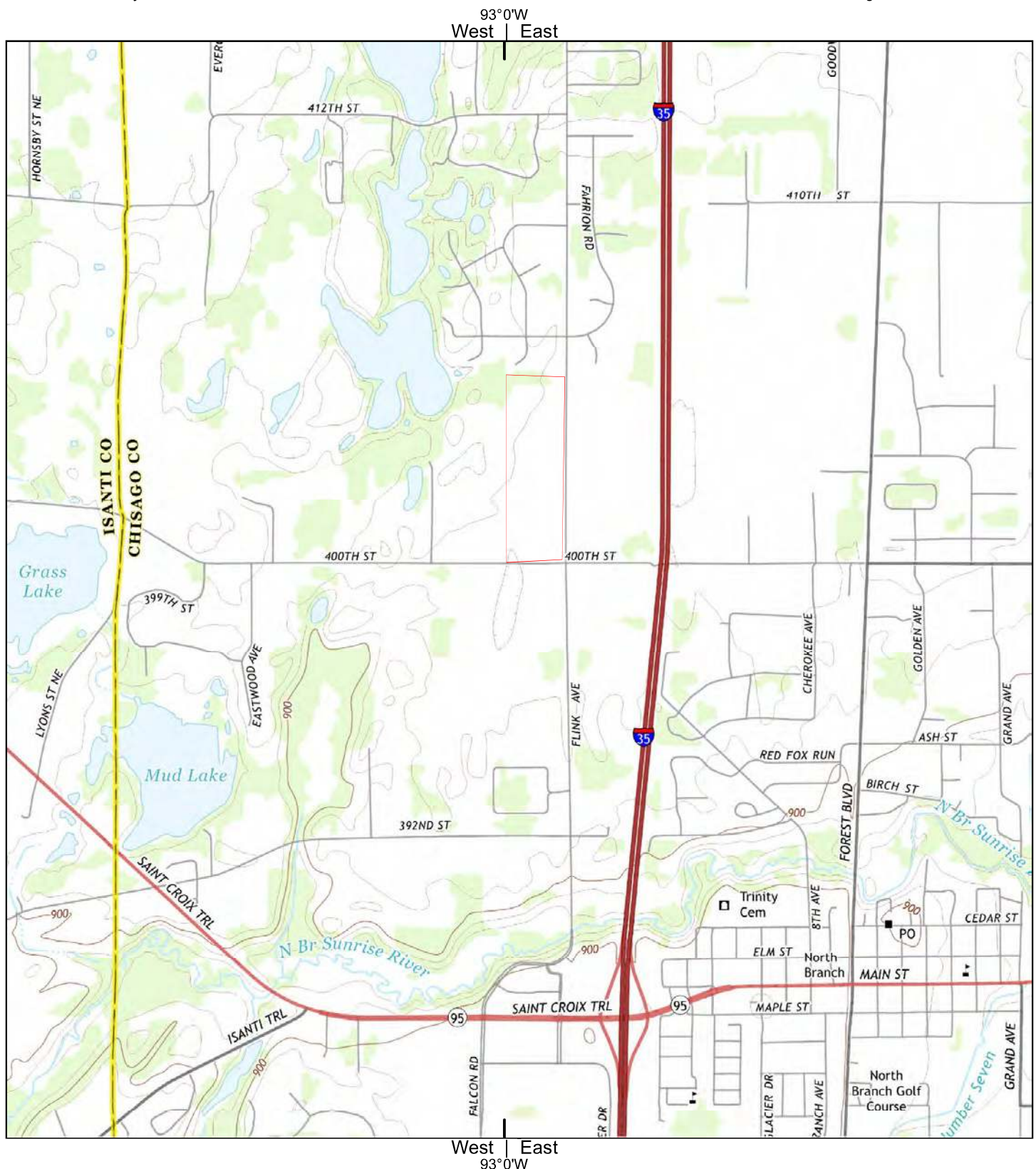
Site information:
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Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013129 HIG
#2063041 completed: 08/12/2021 14:21

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	North Branch, MN	USGS	7½' x 7½'	2016	--	--	--
West	Stark, MN	USGS	7½' x 7½'	2016	--	--	--

**2013**

0 Distance in Miles 1
1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

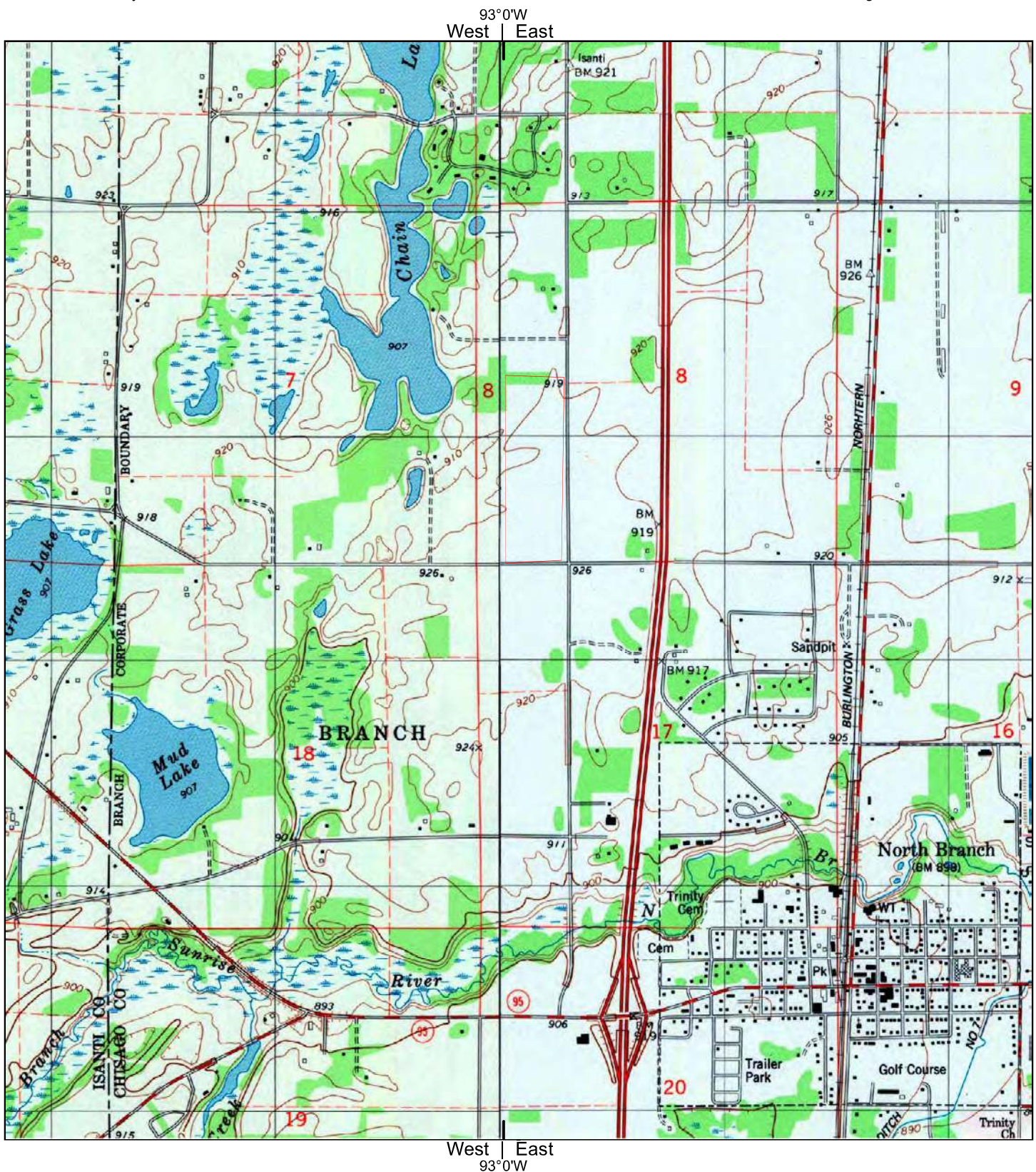
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Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013129 HIG
#2063041 completed: 08/12/2021 14:21

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	North Branch, MN	USGS	7½' x 7½'	2013	--	--	--
West	Stark, MN	USGS	7½' x 7½'	2013	--	--	--



1983

0 Distance in Miles 1

1: 24,000 (1"=2,000') NAD 1983 UTM Zone 15N

Site information:
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Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

American Engineering Testing Inc project #P-0013129 HIG
#2063041 completed: 08/12/2021 14:21

Zone		Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
						Photo Year	Inspected	Revised
East		North Branch, MN	USGS	7½' x 7½'	1983	1978	--	--
West		Stark, MN	USGS	7½' x 7½'	1983	1978	--	--

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COLE

406TH ST

70TH EDITION MINNEAPOLIS

HEMINGWAY AVE INTS			
7364	David Ronald Bandrick (4/14)	14	NP
7367	Leroy C Dockendorf	90	NP
7411	Barbara J Dorning	03	NP
7424	James Arthur Trostle (4/14)	82	NP
7444	Janice J Passoni	02	NP
7459	Joseph J Passoni	02	NP
7459	Kon Willis Paschke (7/9)	96	NP

HURUS AVE INTS			
7518	Marcello Huda Marking (7/9)	89	NP
7518	Sylvester Ewald Marking (7/9)	89	NP
7518	Marking Syl & Marcelle	15	NP
7576	Justin D Hara	01	NP
7576	Erin M Warko (7/14)	01	NP
7579	Earl Edward Olmstead Jr (7/9)	94	NP
7579	Suzanne Marie Olmstead (7/9)	94	NP
7610	Bruce A Walker	78	NP
7610	Joyce Anne Walker	78	NP

HOMESTEAD AVE INTS			
20	RESIDENCE	1	BUSINESS

399TH AVE NW			
CT 1301.00	Dalbo	5066 - 7167	\$C
5066	James William Servaty (7/9)	06	NP
5066	Shari Ann Servaty (7/9)	06	NP

JASPER ST NW INTS			
7081	Pam Vanderspoen (5/02)	02	NP
7081	Lloyd R Vanderspoen (5/02)	02	NP
7167	Jennifer L Vanderspoen (5/02)	04	NP
7167	Robert A Vanderspoen (5/02)	04	NP

399TH ST			
CT 1103.01	North Branch	4378 - 4491	\$D
4378	Tracy M Hartman (5/14)	14	NP
4422	David L Whitberg (4/14)	14	NP
4422	Bruce J Coates (7/9)	08	NP
4437	Connie J Coates (7/9)	08	NP
4437	Patrick Anthony Ford (7/14)	04	NP
4437	Randi L Ford (7/14)	04	NP
4489	Charles Shiffert (5/14)	13	NP
4489	Marie A Kelly (7/14)	13	NP

GRAND AVE INTS			
5	RESIDENCE		

399TH TRL NW			
CT 1301.00	Dalbo	5628 - 5693	\$C
5628	5628 - 5693	...	55017

HELMUM ST NW INTS			
5626	Cara Macdona Davies (12/9)	82	NP
5626	Dylan Jay Davies	87	NP
5626	Mary Patricia Davies	97	NP

400TH LN NE			
CT 1302.00	Sanctified	1829 - 1959	\$D
1829	1829 - 1959	...	55080

HASTINGS ST NE INTS			
1829	Jason T Wida (7/9)	05	NP
1888	Jeremiah Lee Gostke (7/11)	11	NP
1959	Paul Jean Gostke (7/11)	11	NP
1959	Bruce Jerome Hildebrandt (7/9)	94	NP
1959	Carol E Hildebrandt (7/9)	94	NP

400TH ST			
CT 1103.01	North Branch	4385 - 8597	\$D
CT 1102.00	12410 - 15540		\$D
CT 1107.00	15120 - 15481		\$D
4388	4388 - 15540	...	55056

FLUNK AVE INTS			
5560	Debra Jean Labaree	89	NP
5560	Michael Robert Labaree	89	NP
5560	Cliff Karl Saccor	02	NP
5560	Shirley Jane Saccor	02	NP
5560	Jose Luis Clemente St	12	NP
5560	Kathy Ann Clemente	12	NP
5560	Jake Stromberg (5/7)	87	NP
5560	Berida Lynn Stromberg (5/7)	87	NP

HARVESTER AVE INTS			
7244	Diane Allen Priebe (7/9)	09	NP
7454	Brick Bernard Ladlin	06	NP
7454	Dana Ladlin	06	NP
7454	Harley E Johnson	94	NP

HEMINGWAY AVE INTS			
7364	David Ronald Bandrick (4/14)	14	NP
7367	Leroy C Dockendorf	90	NP
7411	Barbara J Dorning	03	NP
7424	James Arthur Trostle (4/14)	82	NP
7444	Janice J Passoni	02	NP
7459	Joseph J Passoni	02	NP
7459	Kon Willis Paschke (7/9)	96	NP

HEMINGWAY AVE INTS			
7364	David Ronald Bandrick (4/14)	14	NP
7367	Leroy C Dockendorf	90	NP
7411	Barbara J Dorning	03	NP
7424	James Arthur Trostle (4/14)	82	NP
7444	Janice J Passoni	02	NP
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7367	Leroy C Dockendorf	90	NP
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7459	Joseph J Passoni	02	NP
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HEMINGWAY AVE INTS			
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7367	Leroy C Dockendorf	90	NP
7411	Barbara J Dorning	03	NP
7424	James Arthur Trostle (4/14)	82	NP
7444	Janice J Passoni	02	NP
7459	Joseph J Passoni	02	NP
7459	Kon Willis Paschke (7/9)	96	NP

8597	Kim Farms	09	NP
8597	Kevin Mann	09	NP
12410	Michael David Johnson (7/18)	03	NP
12411	Alan D Rasmussen (5/03)	03	NP
12411	Cynthia M Rasmussen (5/03)	03	NP
12411	Craig Alan Maltred (5/03)	01	NP
12411	Kane Lynn Maltred (5/03)	01	NP

POOR FARM RD INTS			
13353	Laura AHO	02	NP
13357	Graig Weston Johnson (11/18)	03	NP
13357	Susan Maria Johnson (11/18)	03	NP
13894	Jeff J Wolatko (7/03)	90	NP
13894	Michelle Ciz Wolatko (7/03)	90	NP

ORIOLE AVE INTS			
15120	John Anderson (7/11)	11	NP
15120	Peggy Anderson (7/11)	11	NP
15259	Jason Paul Carroll (7/03)	01	NP
15259	Lori Jo Carroll (7/03)	01	NP
15325	Debbie Hays	81	NP
15325	Deborah Ann Vinkauf-Hays	81	NP
15395	Jeff P Kratz	81	NP
15395	Linda Mary Kratz	81	NP
15481	Cassy Richard Garbe (7/03)	04	NP
15481	Chad Wolatko	94	NP
15481	Stephanie Annika Wolatko	94	NP

QUINLAN AVE INTS			
56	RESIDENCE	1	BUSINESS

401ST AVE NE			
CT 1301.00	Sanctified	39 - 328	\$C
CT 1302.00	806 - 3426		\$D
39	39 - 3426	...	55080

401ST AVE NW INTS			
39	Jodi Rae Haskler	08	NP
39	Jonathan David Haskler	08	NP
58	Tara Lynn Schwaning (4/15)	05	NP
96	Arnold Edward Haskler (7/18)	82	NP
96	Judy Alma Haskler (7/18)	82	NP
1834	Helen Selma Luck (2/79)	79	NP
2510	Craig Robert Remp (12/11)	11	NP
2510	Douglas A Remp (12/11)	11	NP
3284	Angela M Plagers	12	NP
805	Mike Bradley Heckler (4/02)	02	NP
3419	Ann M Sheridan (5/14)	13	NP
3426	Joe Luvene Sheridan (5/14)	13	NP
3426	Bonnie L Lakeberg	95	NP
3426	Robert Alan Lakeberg	95	NP

401ST AVE NW			
CT 1301.00	Dalbo	5385 - 7538	\$C
5385	5385 - 7538	...	55017

1034	Haeri Seema Lock (12/9)	11	NP
2510	Craig Robert Rempp (12/11)	11	NP
	◇ Douglas A Rempp (12/11)	11	NP
3284	Angela M Plapene	12	NP
805	Mike Bentley Bookler (12/09)	12	NP

393RD ST

393RD ST

North Branch			
CT 1103.00	7451 - 7524	\$D	
	7451 - 7524	55056	
HENNA AVE INTS			
7451	Michelle Carlsens	07	NP
	John M. Schobloch	07	NP
7468	Eric David Bjerketved (1/06)	05	651.277.0634
	Erica Sue Bjerketved (1/06)	05	651.277.0634
7491	Robert M. Martin (1/06)	08	NP
7524	Linda L. Prince (1/06)	92	651.674.5127
-393RD CT INTS			
6 RESIDENCE			

394TH AVE NE

Stanchfield			
CT 1301.00	15 - 37	\$D	
CT 1302.00 E	18 - 18	\$E	
	15 - 37	55080	
-UNIVERSITY AVE INTS			
15	Shanna L. Eberle	09	NP
18	Andrew Singleton	05	NP
37	Bradley Schmitz		NP
3 RESIDENCE			

394TH ST

North Branch			
CT 1103.00	7351 - 7500	\$D	
	7351 - 7500	55056	
HENNA AVE INTS			
7351	James A. Still	94	NP
	Michelle E. Still	94	NP
7356	Nan Mae Hult	93	651.674.7237
	Ronald Otto Hult	93	651.674.7237
7386	Glen Davis Spires (1/06)	96	651.674.2070
	Traci Lynn Spires (1/06)	96	651.674.2070
7418	7450		NP
7474	David Allen Johnson	87	651.674.4203
	Sherril Eileen Johnson	87	651.674.4203
7500	Andrea Page Grote	96	NP
	Kevin Arnold Grote	96	NP
-HEMINGWAY AVE INTS			
12 RESIDENCE			

395TH AVE NE

Stanchfield			
CT 1302.00	3489 - 3784	\$E	
	3489 - 3784	55080	
3489	Kathleen Anne Leick (1/06)	96	NP
	Rod Kenneth Leick (1/06)	96	NP
3598	Carolyn M. Klunder	10	NP
3676			NP
3776	Phyllis Jeanne Christenson	80	320.396.2510
	Verlie Christenson	80	320.396.2510
3784	A. Ruppert & Son Well Co.	10	763.420.2446
	Debra Denise Knode		NP
-VICKERS ST NE INTS			
7 RESIDENCE 1 BUSINESS			

395TH AVE NW

Dalbo			
CT 1301.00	7275 - 7275	\$D	
	7275 - 7275	55017	
7275	Connie Rose Elton	82	763.389.2147
	Stanley Oliver Elton	82	763.389.2147
-RHINESTONE ST NW INTS			
2 RESIDENCE			

395TH ST

North Branch			
CT 1107.00	9837 - 9837	\$D	
CT 1103.00	9919 - 9951	\$D	
	7522 - 9951	55056	

-HORUS AVE INTS

7522	Kvetons Cleaning	10	651.277.1010
9837	Jennifer Rost (1/06)	05	651.674.7293
	Travis L. Rost (1/06)	05	651.674.7293
9919	Jill Sarah Atkinson (1/06)	04	NP
	Kevin Jamey Hydruke (1/06)	04	NP
9951	Lorrie Marie Bauer (1/06)	94	651.674.5702
	Matthew John Bauer (1/06)	94	651.674.5702

-KEYSTONE AVE INTS

6 RESIDENCE 1 BUSINESS			
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396TH CT

North Branch			
6530 - 6551	6551 - 6551	55056	
6530	Exterior Wall Systems Inc.	05	651.237.0606
6551	Northern Lights Steel Fabrication	08	651.237.0214
2 BUSINESS			

397TH AVE NE

Stanchfield			
CT 1301.00	200 - 200	\$D	
CT 1302.00	1338 - 4975	\$E	
	200 - 4975	55080	

-UNIVERSITY AVE INTS

200	Bradley T. Schmitz (1/06)	07	NP
-BUCHANAN ST NE INTS			
1338	Heidi Kares Nelson (1/06)	99	320.396.3065
	Norm Lee Nelson (1/06)	99	320.396.3065
1401	Carl Anderson	82	320.396.3192
	Melissa Anderson	82	320.396.3192
1404			NP
1596	Eddy Emerson Hirsch	90	320.396.0051
	Elizabeth Hirsch	90	320.396.0051
1610	Joson A. Spucka (1/06)	05	NP
1621	Kurt John Altendorf	94	320.396.2402

COLE

1746	Melissa Lynn Altendorf	94	320.396.2402
1750			NP
1788	Richard Allen Person	82	320.396.3554
	Teresa Lee Person	82	320.396.3554
-HASTINGS ST NE INTS			
1850			NP
1896	Donald Richard Fiedler	04	320.396.3409
	Katherine D. Fiedler	04	320.396.3409
2045			NP
2075	John Carl Altendorf	77	320.396.2593
	Phyllis Jean Altendorf	77	320.396.2593
2080	Harold Willis Conrad	82	320.396.2008
	Kathy Joan Conrad	82	320.396.4680
2176	Jennifer Jane Bondeson	07	320.396.3677
2237	Jeff Duane Schroeder (1/06)	06	NP
	Kayla Schroeder (1/06)	06	NP
2270	Ruth Harnet Englund	88	320.396.3244
2383	Dorothy Louise Person (12/06)	81	320.396.2140
	Leroy Elmer Person (12/06)	81	320.396.2140
2403	Mindy J. Fuhol	86	320.396.2548
	Wladimir Fuhol Jr.	86	320.396.2548
2440	Kevin Edward Nelson	88	320.396.2064
	Marie Lois Nelson	88	320.396.2064
2711	Ray L. White	82	320.396.2289
2776	Daniel Richard Lissy	90	NP
	Laurie Justine Lissy	90	NP
2800			NP
2950	Charles Raymond White	82	320.396.3197
	Heike Nordby White	82	320.396.3197

-STATE HIGHWAY 65 INTS

-VICKERS ST NE INTS			
4057	Kurt Larry Lindquist	02	320.396.3888
	Sarah L. Lindquist	02	320.396.3900
4113	Donald Joseph Fox	82	320.396.3111
	Denise Carle Fox	82	320.396.3111
4330	James Donald Klanderud	98	320.396.2110
	Sandra Kay Klanderud	98	320.396.2110
4499	Chris Laurie Anderson	91	NP
	Paul Raymond Anderson	91	NP
4720	John W. Heidelberg	96	320.396.3505
	Lois L. Heidelberg	96	320.396.3505
4741	Lisa Ann Heidelberg	03	NP
4975	Judy L. Bendickson	90	320.396.4296
	Robert Lee Bendickson	90	320.396.4296
52 RESIDENCE			

397TH AVE NW

Braham			
CT 1301.00	2712 - 4050	\$D	
	2712 - 4050	55006	
2712	Charles James Bergman	07	320.396.3572
2913	Patrick John Gerold (1/06)	92	320.396.0345
	Teri Lee Gerold (1/06)	92	320.396.0345
3020	Albert John Mathberg	82	320.396.3447
3121	Chris Frederic Richter	99	NP
3193			NP
-LILY ST NW INTS			
3352	Adeline Johnson	82	320.396.3567
	Donald Wilfred Johnson	82	320.396.3567
3549	Gary Arthur Bromwich	84	NP
-TULIP ST NW INTS			
3711	James R. Smith	10	320.396.3811
	Robert Allen Smith	10	320.396.3811
3720	Lyle Edward Doebbeling	82	320.396.3431
	Mikeld Lois Doebbeling	82	320.396.3431
3970	David Lee Blakely Sr (1/06)	98	NP
4045	Rhonda Jean Trisko (1/06)	91	320.396.4436
	S. J. Trisko (1/06)	91	320.396.4436
4050	Robert G. Turchi Jr.	82	320.396.2525
17 RESIDENCE			

397TH AVE NW

Dalbo			
CT 1301.00	6998 - 7009	\$D	
	6998 - 7009	55017	
6998	Dan Allen Brown	82	763.389.4398
	Robyn Carole Brown	82	763.389.4398
7009	Todd Matthew Gonia (1/07)	07	763.389.5529
	Theresa Mary Roettger (1/07)	07	763.389.5529
-HACRE ST NW INTS			
4 RESIDENCE			

397TH AVE NW

Stanchfield			
CT 1301.00	599 - 2001	\$D	
CT 1302.00	985 - 985	\$E	
	599 - 2001	55080	
599	Danika J. Dahlin (1/06)	09	NP
	Jacob L. Dahlin (1/06)	09	NP
9014	Julia Ruth Eastling	02	NP
	Tom Donald Eastling	02	NP
982	Cameo Kay Zehnder (1/07)	03	320.396.3834
	Chad Michael Zehnder (1/07)	03	320.396.3834
985	Daniel Heidelberg	02	320.396.0069
1000	Harvey C. Hastings (1/10)	09	NP
1003	Daniel Heidelberg	99	NP
	Rachel Marie Heidelberg	99	NP
1201	Kim Kopecky (1/06)	07	320.396.2166
	Ruff Kopecky (1/06)	07	320.396.2166
1962	Cheryl H. Johnstone (1/06)	08	NP
	Martin I. Johnstone (1/06)	08	NP
1975			NP
2001	Linda Loraine Lambert	91	NP
16 RESIDENCE			

397TH ST

North Branch			
CT 1103.00	4445 - 7610	\$D	
	4445 - 7610	55056	
4445	Jennifer Ann Becker (1/06)	07	NP
	E. M. Barrett		NP
4461	Dan Jay Valdez (1/07)	99	651.674.4144
	Rose Dorothy Valdez (1/07)	99	651.674.4144
4510	G. Hicks		651.674.6166
	Brooke Marie Jenny		651.674.6166
4527	Lisa Hatle (1/07)	07	NP

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4569	Paul Hatle (1/07)	07	NP
	Bruce Alan Jaworski (1/07)	04	651.277.0240
	Charlynn Ann Jaworski (1/07)	04	651.277.0240
-HEMINGWAY AVE INTS			
7364	Daniel Bernth Weissmann (1/06)	03	NP
	Jackie Mae Weissmann (1/06)	03	NP
7411	Cindy Rose Brown (1/06)	02	NP
7424	Barbara J. Burnington	98	NP
7444	James Inske (1/06)	03	651.674.2669
	Janice L. Parsom	82	651.674.8481
	Joseph F. Parsons	82	651.674.8481
-HORUS AVE INTS			
7518	Marcella Hulda Marking (1/06)	89	651.674.2394
	Sylvester Everett Marking Jr (1/06)	89	651.674.2394
7576	Joseph Wayne Anderson (1/06)	94	651.674.6117
	Mary Kay Anderson (1/06)	94	651.674.6117
7579	Earl Edward Olmstead Jr.	94	651.674.2228
	Suzanne Marie Olmstead	94	651.674.2228
7610	Bruce Allen Walker	78	651.674.4851
	Joyce Irene Walker	78	651.674.4851
-HOMESTEAD AVE INTS			
26 RESIDENCE			

399TH AVE NW

Dalbo			
CT 1301.00	5066 - 7167	\$D	
	5066 - 7167	55017	
5066	James W. Sarvaty (1/06)	06	763.691.1683
	Shari A. Sarvaty (1/06)	06	763.691.1683
-JASPAR ST NW INTS			
7009	Theresa M. Gonia (1/07)	07	NP
	Todd M. Gonia (1/07)	07	NP
7167	Jennifer Lea Sundstahl (1/06)	04	NP
	Robert A. Sundstahl (1/06)	04	NP
6 RESIDENCE			

399TH ST

North Branch			
CT 1103.00	4378 - 4422	\$D	
	4378 - 4422	55056	
4378	Cindy Lou Lindner	09	651.674.4399
	Michael James Lindner	09	651.674.4399
4422	Bruce J. Coates (1/06)	08	NP
	Connie J. Coates (1/06)	08	NP
-GRAND AVE INTS			
4 RESIDENCE			

2007 MINNEAPOLIS

7674	Brian Kevin Casey	00	651.674.5709
7675	Laura Mae Casey	00	651.674.5709
7683	Kenneth G Kubal	83	651.674.7938
7706	Amie Pantelis	04	NP
	John Pantelis Jr.	04	NP
RR2	14805 - 15020	55056	
14805	Denise Rae Robins	91	651.583.2610
	Scott Alan Robins	91	651.583.2610
	*Robins Remodel & Repair	+	651.583.2610
14856	Shen C Tucker	92	651.583.2028
	Winston H Tucker II	92	651.583.2028
14930	Brian Alaric Dettler	96	651.583.2300
15020	Kristi J Beer	92	NP
	35 RESIDENCE	10 BUSINESS	

393RD CT

CT 1103.00	North Branch	7630 - 7646	\$0
RR7	7630 - 7646	55056	
7630	Jenny Heath	04	651.237.0742
	Jim R Heath	04	651.237.0742
7641	Amie Pantelis	04	651.674.0520
	Patrick L Pannock	04	651.674.0520
7646	Carl Splitstoser	05	651.277.0108
	5 RESIDENCE		

393RD ST

CT 1103.00	North Branch	7451 - 7524	\$0
RR7	7451 - 7524	55056	
7451	Julie Kay Klein	90	651.674.5046
	Travis Mark Klein	90	651.674.5046
7468	Eric David Berkefeldt	05	651.277.0634
	Erica Sue Berkefeldt	05	651.277.0634
7491	Dale Arthur Rindahl	90	651.674.8602
7524	Linda L Prince	92	651.674.5127
	6 RESIDENCE		

394TH ST

CT 1103.00	North Branch	7351 - 7500	\$0
RR7	7351 - 7500	55056	
	-HEMINGWAY AVE INTS		
7351	James A Sill	94	NP
	Michelle E Sill	94	NP
7356	Nan Mae Hull	93	651.674.7237
	Ron O Hull	93	651.674.7237
7388	Glen Davis Spores	96	651.674.2070
	Traci Lynn Spores	96	651.674.2070
7418	Andrew Groundwater	05	651.674.5087
	Holly Groundwater	05	651.674.5087
	*Lakes Ceramic Tile	04	651.674.5087
7450	*Sunrise Fire Protection Inc	93	
7474	David Allen Johnson	87	651.674.4203
	Sherril Eileen Johnson	87	651.674.4203
7500	Andrea Paige Grote	96	NP
	Kevin Arnold Grote	96	NP
	12 RESIDENCE	2 BUSINESS	

395TH ST

7418	Andrew Groundhoelter	08	651.674.5087
	Holly Groundhoelter	05	651.674.5087
	★Lakes Ceramic Tile	04	851.674.5087
7450	★Sunrise Fire Protection Inc	93	
7474	David Allen Johnson	87	651.674.4203
	Shem Eileen Johnson	87	651.674.4203
7500	Andrea Paige Grote	96	NP
	Kevin Arnold Grote	96	NP
	12 RESIDENCE	2	BUSINESS

397TH ST

CT 1103.00	North Branch	4569 - 7610	\$0
RR1	O	4569 - 4569	55056
4569	Brian A Jaworski	04	651.277.0240
	Christine A Jaworski	04	651.277.0240
RR3	7364 - 7610	55056	
7364	Daniel B Weissmann	03	651.674.7878
7367	Cindy Rose Brown	02	651.674.8810
	-HEMINGWAY AVE INTS		
7411	Barbara J Burington	98	NP
	David E Burington	98	NP
7424	James Troske	03	651.674.2669
7444	Janice L Parsons	82	651.674.6481
	Gale F Parsons	82	651.674.6481
7499	Joseph H Paschke	96	651.237.0132
	Ken Willis Paschke	96	651.237.0132
7518	Marcella Hilda Marking	89	651.674.2394
	Sylvester Everett Marking Jr.	89	651.674.2394
7578	Joseph W Anderson	94	651.674.6117
	Mary K Anderson	94	651.674.6117
7579	Apartment		
300	Carl Edward Olmstead	94	651.674.2228
300	Suzanne Marie Olmstead	94	651.674.2228
	-HOMESTEAD AVE INTS		
7610	Bruce Aie Walker	78	651.674.4851
	Joyce Irene Walker	78	651.674.4851
	19 RESIDENCE		

400TH ST

North Branch			
CT 1103.00	4589 - 7610		\$0
◆ RR1	0 4589 - 4589	...	55056
4589	Bruce A Jaworski	04	651.277.0240
	Cherilyn A Jaworski	04	651.277.0240
◆ RR3	7364 - 7610	...	55056
7364	Daniel B Weissmann	03	651.674.7878
7367	Cindy Rose Brown	02	651.674.8810

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4762	Robert W Pfalz	92	651.674.8004
4792	*Streams Lake And Woods Corp	02	651.674.4749
	Dorell L Zachrisson	96	651.674.4749
	Nancy L Zachrisson	96	651.674.4749
4871	Jessica Lynn Johnson	99	651.674.8629
4893	Barbara Lynn Johnson	99	651.674.8629
	Marlen Dennis Johnson	97	NP
4895	Devin Zachisa	95	NP
5006	Devin M Zachrisson	95	NP
	Laura Jean Zachrisson	95	NP
5010	Beth Marie Zachrisson	97	651.674.8444
	Darin John Zachrisson	97	651.674.8444
5203	*Donald Swanson	03	
	Donald P Swanson	82	651.674.4145
	Karen Renee Swanson	82	651.674.4145
5580	Debra Jean Labore	89	651.674.5483
	Michael Robert Labore	89	651.674.5483
5648	Shirley J Erdberg	02	651.237.1150
	Cliff K Secord	02	651.237.1150
5706	Jeremy Hansen	+	651.237.1004
5744	Robin Hansen	+	651.237.1004
RR5	E	6136 - 6318	55056
6136	*Donald C Bauer	94	NP
6318	Christine Marie Sellman	96	NP
	*Steve Matthew Sellman	96	NP
RR3	6900 - 8628	55056	
6900	Marisa L Stromberg	87	651.674.7544
	Roger Eugene Stromberg	87	651.674.7544
7244	Cheryl Ann Fay	93	651.674.7441
	Michael Donald Fay	93	651.674.7441
7428	*Harley Soc Inc	91	651.674.7540
7454	Julie Sally Renitz	90	651.674.7078
	Steve D Renitz	90	651.674.7078
7516	Harley E Johnson	94	651.674.4089
	Marge Agnes Johnson	94	651.674.4089
8597	Kevin Mann	05	651.674.4321
8628	Joel Peterson	03	651.583.3172
	Rebekah J Peterson	03	651.583.3172
12410	Alan D Rasmussen	04	NP
	Cyitham M Rasmussen	04	NP
12545	Craig Alan Maltend	02	651.583.3188
	Mike Parker	02	651.583.3188

CT 1103.00	North Branch	6544 - 6714	\$0
RR3	6544 - 6714	55056	
	-GOLDEN AVE INTS		
6544	Keith August Magnuson	05	651.277.0470
6572	Angela Elizabeth Twill	99	651.674.0748
	Michael Gordon Twill	99	651.674.0748
	*Tweil Graphic Services LLC	+	651.674.0748
6600	John James Vincent	99	NP
6601	Daryl Wayne Norgard	04	651.674.4011
	Tammy Lee Norgard	04	651.674.4011
6628	Blair C Morales	05	NP
	Helen J Mulcher	05	NP
6629	Merissa Jo McNeal	95	651.674.6221
6656	Sandra L Black	99	NP
6657	Glenn M Germain	00	NP
6684	William Louis Fetterly	03	NP
	-GRIZZLY LN INTS		
6713	Charles Jay Nystrom	99	651.674.4181
6714	Marlyn May Hargrave	03	651.277.0344
	Tony David Hargrave	03	651.277.0344
	17 RESIDENCE	1 BUSINESS	

CT 1103.00	North Branch	6436 - 6789	\$0
RR3	6436 - 6789	55056	
6436	Gayla R Kesselring	05	651.277.0747
	Michael P Kesselring	05	651.277.0747
6439	Kim Ann Pierre	96	651.674.5026
	Rus Pierre	96	651.674.5026
6466	Gene D Vonwerk	00	651.674.5570
	Sherrill Beth Vonwerk	00	651.674.5570
6469	Jason L Spoeth	01	NP
	*WEB Designs & More	01	651.237.0959
6499	Karen Lynn Crowe	03	651.674.0284
	Robert Lee Kiser	03	651.674.0284
6500	Amanda Laventure	04	NP
	Patrick A Laventure	04	NP
6536	Daniel Lee Wegan	93	651.674.5887
	Kristine Marie Wegan	93	651.674.5887
6543	Sever Walter Thompson	95	651.674.8536
	Sharon L Thompson	95	651.674.8536
6554	Kris Lee Danks	95	651.674.0037
	Wayne M Danks	95	651.674.0037
6573	James Horsfall	00	NP
	-GREENLAWN AVE INTS		
6603	Dawn Marie Kaiser	04	651.674.5482
	James R Kaiser	04	651.674.5482
6661	Wayne Joseph Gro	99	651.237.0108
	Wendy Ann Gro	99	651.237.0108
6705	Stacie Kay Wheeler	03	651.674.1955
6736	Jeffery R Steinbrucker	00	651.674.8970
	Roger J Steinbrucker	00	651.674.8970
6768	Carla J Haugard	04	NP
	Kevin C Haugard	04	NP
6763	Jason Jeffrey Leibe	05	651.277.0822
	Lisa Fredrick Leibe	05	651.277.0822
6785	Michaela Frakes	01	NP
	Nicholas Jeffrey Palmer	04	651.674.8026
6788	Janice N Heaves	04	651.674.8026
	34 RESIDENCE	1 BUSINESS	

CT 1103.00	North Branch	6436 - 6789	\$0
RR3	6436 - 6789	55056	
6436	Gayla R Kesselring	05	651.277.0747
	Michael P Kesselring	05	651.277.0747
6439	Kim Ann Pierre	96	651.674.5026
	Rus Pierre	96	651.674.5026
6466	Gene D Vonwerk	00	651.674.5570
	Sherrill Beth Vonwerk	00	651.674.5570
6469	Jason L Spoeth	01	NP
	*WEB Designs & More	01	651.237.0959
6499	Karen Lynn Crowe	03	651.674.0284
	Robert Lee Kiser	03	651.674.0284
6500	Amanda Laventure	04	NP
	Patrick A Laventure	04	NP
6536	Daniel Lee Wegan	93	651.674.5887
	Kristine Marie Wegan	93	651.674.5887
6543	Sever Walter Thompson	95	651.674.8536
	Sharon L Thompson	95	651.674.8536
6554	Kris Lee Danks	95	651.674.0037
	Wayne M Danks	95	651.674.0037
6573	James Horsfall	00	NP
	-GREENLAWN AVE INTS		
6603	Dawn Marie Kaiser	04	651.674.5482
	James R Kaiser	04	651.674.5482
6661	Wayne Joseph Gro	99	651.237.0108
	Wendy Ann Gro	99	651.237.0108
6705	Stacie Kay Wheeler	03	651.674.1955
6736	Jeffery R Steinbrucker	00	651.674.8970
	Roger J Steinbrucker	00	651.674.8970
6768	Carla J Haugard	04	NP
	Kevin C Haugard	04	NP
6763	Jason Jeffrey Leibe	05	651.277.0822
	Lisa Fredrick Leibe	05	651.277.0822
6785	Michaela Frakes	01	NP
	Nicholas Jeffrey Palmer	04	651.674.8026
6788	Janice N Heaves	04	651.674.8026
	34 RESIDENCE	1 BUSINESS	

13978	*John Left	05	NP
13984	*Jeffs Repair	97	651.583.3342
	Jeff J Walczko	90	651.583.3342
	Michelle Eliz Walczko	90	651.583.3342
ORIOLE AVE INTS			
14757	*Craig W Johnson	03	NP
	*Susan M Johnson	03	NP
15120	Brenda L Main	95	651.583.3456
	Darrell F Main	95	651.583.3456
	*Main Consulting Corp	99	651.583.3456

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1245	Gert J Peterson	83	651.452.3911	
1246	James Kevin Christenson	91	651.454.7146	
1247	Patricia Ann Trites	95	651.452.4143	
1248	Stephen Douglas Trites	95	651.452.4143	
14 RESIDENCE				

FLIGHT LN

CT	608.27	0	15629 - 15663	\$C
15629	Janrod P Mount (7/05)	04	952.997.3376	
15630	Carla M Velez (7/05)	04	952.997.3376	
15631	Nhuz Dant	03	952.997.3376	
15632	Alecece Nicole Gilman (4/03)	02	952.431.8875	
15633	Sean Michael Gilman (4/03)	02	952.431.8875	
15634	Diane Edna Pello (4/03)	99	952.431.1345	
15635	Robert Henry Pello (4/03)	99	952.431.1345	

-156TH ST W INTS

15641	Glenyce M Shine (6/02)	00	952.255.8050	
15642	Jeffery Dean Shine (6/02)	00	952.255.8050	
15643	15645			
15644	Brian P Bostrom	02	NP	
15649	Diane Ann Egger (7/02)	02	NP	
15651	Kim Jo Reese (7/02)	02	NP	
15652	Blake Rice (5/08)	06	NP	
15653	Dan Clifford Fennell (5/08)	06	NP	
15657	Marys Jeannet Henneman (7/03)	05	NP	
15658	0 MJ Henneman (7/03)	05	NP	

-FLOAT CT INTS

15659	Sedrick B Page	10	NP	
15661	Michael Joseph Kittelson		952.236.8482	
15662	Tammy Marie Kittelson		952.236.8482	
15663	Fatema A Fuda (5/05)	05	NP	
15664	Jamil Dawud Fuda (5/05)	05	NP	
23 RESIDENCE				

FLIGHT WAY

CT	608.27	15479 - 15597	\$C
15479	Jeffrey J Strese (10/06)	05	NP
15480	David Richard Preetz (1/03)	02	952.255.8373
15481	Heather Aileen Preetz (1/03)	02	952.255.8373
15482	Michael Fries		NP
15483	Karen L Onell (6/05)	05	NP
15484	William Bessire	08	NP
15485	Elizabeth Gore		952.236.9926
15486	Natsanel Chichiso (2/05)	04	NP
15487	Hanna Geche (2/05)	04	NP
15488	Chris Richard Rosival	10	NP
15489	Dawn M Rosival	10	NP
15490	Mary Lillian Farnham (7/02)	02	952.891.5963
15491	Sarah Jane Farnham (7/02)	02	952.891.5963
15492	Jennifer Lynn Fahrman (7/02)	00	952.953.0507
15493	Linda Mainan (7/02)	00	952.953.0507
15494	James Horton		NP
15495	Tera Lynn Horton		NP
15496	Christine Marie Floersch (9/07)	06	NP
15497	Chelsey Bergman		NP
15498	Ben Thomas Brand (7/04)	04	NP
15499	Stephanie Brand (7/04)	04	NP
15500	Alaya J Hayslett		NP
15501	Cynthia S Foster (6/10)	09	NP
15502	Mark Paul Gustin Jr (6/10)	02	952.255.8314
15503	En Liza (6/08)	10	NP
15504	15505		NP
15506	Robert Wacker (5/05)	02	NP
15507	Sharon L Wacker (5/05)	02	NP
15508	Angela Kathryn Smith (1/10)	03	NP
15509	Angie Smith (1/10)	03	NP
15510	Kyle Frayne Hjelmstad (4/02)	00	NP
15511	Melissa Hjelmstad (4/02)	00	NP
15512	Gregory Paul Osterman (4/02)	02	952.431.1846
15513	Alice Marie Sodergren (4/02)	98	952.431.4881
15514	David M Sodergren (4/02)	98	952.431.4881
15515	Brian Prinz	09	952.236.9604
15516	Shannon Prinz	09	952.236.9604
15517	15518		NP
15519	15520		NP
15521	15522		NP
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15583	15584		NP
15585	15586		NP
15587	15588		NP
15589	15590		NP
15591	15592		NP

	Michael Junior Layne (4/04)	04	NP
15595	Victoria Gekht (5/04)	04	NP
15597	Mari Sara Askerooth	10	NP
★ Scott Dawn Enterprises Inc 10 952.236.854			
B2 BUSINESS			

64th EDITION MINNEAPOLIS

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HEMINGWAY AVE S

HEMATITE ST NW

CT	502.28	13864 - 15525	SC
13864	Jeffrey Jackson Gustafson (10/01)	05 763 433 9147	
13865	Lisa Mae Gustafson (10/01)	05 763 433 9147	
13866	Jeffery A Bowers (11/06)	06 NP	
13868	Arnelinde Kulad Bader (12/01)	05 NP	
13869	Callie M Brown (12/01)	06 763 323 0977	
13872	Callie M Danner (12/01)	06 763 323 0977	
13875	Julie M Mercer (12/01)	04 763 212 0174	
13876	Scott P Corbin (12/01)	06 NP	
13876	Janel Mary Mark (12/01)	06 763 205 2883	
13876	Tini Clyde Mark (12/01)	06 763 205 2883	
13879	Tiffany L Zoph (12/01)	08 NP	
13880	Daniela D Morgado (12/01)	04 NP	
13883	Anita E Schroeder (12/01)	04 NP	
13883	Nicole Schroeder (12/01)	04 NP	

13884	Clair Elizabeth Sontberg (12/01)	+ 763 434 7517	
13887	Gary Allen Sontberg (12/01)	+ 763 434 7517	
13888	Anthony Thomas Durkin (12/01)	05 763 427 2574	
13892	Karla J Anderson (12/01)	05 NP	
13894	Arnold William Vinsen (12/01)	05 NP	

INDUSTRY AVE NW INTS

14640	Tammy Kay Cardotia (12/01)	09 NP	
14640	Vidal Rangel Cardotia (12/01)	09 NP	
14641	Gustis Dombrowski (12/01)	08 NP	
14641	Jordana Dombrowski (12/01)	08 NP	

146TH CIR NW INTS

14650	Kari Ann Vaughn (12/01)	04 NP	
14650	Robert Lloyd Vaughn III (12/01)	04 NP	
14651	Hester Lee Hanson (12/01)	03 NP	
14651	Trent A Hanson (12/01)	03 NP	
14660	John John Brown (12/01)	09 763 268 0857	
14660	Leah Danielle Brown (12/01)	09 763 268 0857	
14670	Bruce Charles Peck (12/01)	98 763 576 8467	
14680	Ashley M Batters (12/01)	09 NP	
14680	Matthew Daniel Batters (12/01)	09 NP	
14681	Julie Renee Farrell (12/01)	96 763 323 8290	
14690	Shannon Marie Blaylock (12/01)	96 763 576 8554	
14690	Song Thao Blyang (12/01)	96 763 576 8554	
14691	Sunshine Wang (12/01)	04 NP	
14691	Ami Lucille Struzyk (12/01)	00 763 323 7088	
14691	John Stanley Struzyk (12/01)	00 763 323 7088	

147TH AVE NW INTS

150TH AVE NW INTS

15000	Ann Marie Fox (12/01)	99 NP	
15001	Tim P Fox (12/01)	99 NP	
15020	Brad W Rood (12/01)	83 763 427 8048	
15020	Sandra Lee Rood (12/01)	83 763 427 8048	
15031	Katherine Kay Anderson (12/01)	75 763 427 8046	

152ND AVE NW INTS

15220	Charlene Tiemann (12/01)	04 NP	
15220	Nicholas Michael Tiemann (12/01)	04 NP	
15221	James Thomas Johnson (12/01)	71 763 421 2679	
15221	Lena Marie Johnson (12/01)	71 763 421 2679	
15230	Diane Marie Schaefer (12/01)	81 763 421 9874	
15230	Rex A Schaefer (12/01)	81 763 421 9874	
15231	Judy Ann Synieski (12/01)	94 763 422 0425	
15231	William James Synieski (12/01)	94 763 422 0425	

153RD AVE NW INTS

15321	Grace M Houghton (12/01)	70 763 421 7033	
15321	Haris E Houghton (12/01)	70 763 421 7033	

15328 *Grandmas Global Enterprises

15354	John Leslie Williams (12/01)	05 763 767 1288	
15354	Patricia Lea Williams (12/01)	05 763 767 1288	
15407	Bernard Nicholas Wurm (12/01)	70 763 421 4201	
15407	Dr Dale Optum Nelson (12/01)	71 763 421 3844	
15410	Sharon Joan Nelson (12/01)	71 763 421 3844	
15410	Dr Michael Eric Benz (12/01)	89 763 576 8643	
15410	Nancy Ruth Benz (12/01)	89 763 576 8643	

154TH LN NW INTS

15454	Bill Paul Cashman (12/01)	80 763 323 7958	
15454	Lana Marie Cashman (12/01)	80 763 323 7958	
15461	Christine A Delora (12/01)	05 NP	
15461	Vivian Sophia Tripp (12/01)	70 763 427 2624	
15525	Brian James Orr (12/01)	96 763 506 0908	
15525	Tamara M Orr (12/01)	96 763 506 0908	

156TH AVE NW INTS

88 RESIDENCE	1 BUSINESS		
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HEMINGWAY AVE

CT	1103.00	36032 - 40926	SD
36032	Teessa Hallett (12/01)	08 NP	
36037	Jeff Scott Call (12/01)	02 651 674 2526	
36037	Sandra L Call (12/01)	02 651 674 2526	
36306	Anne Elizabeth Neff (12/01)	08 651 237 0851	
36310	John Tilton Neff (12/01)	08 651 237 0851	
36310	Timothy Lloyd Young (12/01)	05 NP	
36310	Tracy Lynn Young (12/01)	05 NP	
36734	Dale Virgil Fairbanks (12/01)	82 651 674 7311	
36734	Sharon Ann Fairbanks (12/01)	82 651 674 7311	
36773	Charles John Hoppe (12/01)	94 651 674 2139	
36773	Maylout J Ugman (12/01)	94 651 674 2139	
36875	Carmen Marie Burt (12/01)	95 NP	
36875	Mike Lucas Burt (12/01)	95 NP	
36906	Amber T Burns (12/01)	+ NP	
36930	John William Croft (12/01)	08 NP	
36930	Beth Lynette Grube (12/01)	01 651 674 1859	
37515	Steve G Grube (12/01)	01 651 674 1859	

376TH ST INTS

37611	Heidi Cullen Carlson (12/01)	92 651 674 5116	
37667	Steve D Carlson (12/01)	92 651 674 5116	
37723	Annelise A Braun (12/01)	98 NP	
37723	Jacob Michael Mayne (12/01)	98 NP	
37723	Kristin Ann Mayne (12/01)	98 NP	

378TH ST INTS

37834	Dorcas Fairbanks (12/01)	90 651 674 6949	
37834	Dorcas Jeanne Fairbanks (12/01)	90 651 674 6949	
37942	Ronan Christopher Bedford (12/01)	03 NP	
38009	Bill Robert Taylor (12/01)	01 651 277 0283	
38042	John J Turnell (12/01)	02 651 277 0156	

39045	Kayla Turnell (12/01)	02 651 277 0156	
39045	Meek Kane (12/01)	05 651 277 0268	
39139	Mariene Stanton (12/01)	06 NP	
39139	Tom G Stanton (12/01)	06 NP	

393RD ST INTS

39017	Cindy Joanne Nielsen (12/01)	94 651 674 2587	
39017	Jeff Daniel Nielsen (12/01)	94 651 674 2587	
39038	Daniel David Bengtson (12/01)	92 651 462 1178	
39038	Jennifer Bengtson (12/01)	92 651 462 1178	
39041	Tracy Lynn Degrote (12/01)	05 NP	
39066	Ash Ludovissie (12/01)	+ NP	
39066	Ashley D Ludovissie (12/01)	+ NP	

391ST ST INTS

39101	Donna Jean Minick (12/01)	74 651 674 7261	
39106	Terry R Minick (12/01)	74 651 674 7261	
39135	Jacqueline D Johnson (12/01)	76 651 674 4028	
39180	Lorraine M Harler (12/01)	74 651 674 4023	
39201	Beth Schmidt (12/01)	07 NP	
39201	Chad Alan Pasch (12/01)	07 NP	
39218	Douglas James Sami (12/01)	96 651 674 7983	
39231	Kristi Jolene Sampson (12/01)	96 651 674 7983	
39245	Brandon Robert Springer (12/01)	01 651 674 1827	
39245	Wendy Jo Springer (12/01)	01 651 674 1827	

39250

39256	Duane Vernon Baker (12/01)	89 651 674 7381	
39256	Lisa M Baker (12/01)	89 651 674 7381	

39267

39277	Christa Michelle Hegley (12/01)	78 NP	
39288	Diane Gail Hegley (12/01)	78 NP	
39288	Mark Jona Tei (12/01)	96 651 674 7264	
39303	Trudy Ann Tei (12/01)	96 651 674 7264	
39322	Leona M Ohtani (12/01)	80 651 674 5632	
39325	Pat Brian Hunter (12/01)	94 651 674 0241	
39325	John Magnus Lundgren (12/01)	94 651 674 0004	
39345	Marjorie Margaret Lundgren (12/01)	94 651 674 0004	
39350	Daniel Duane Nelson (12/01)	81 651 237 3383	
39350	Catherine Ann Hendren (12/01)	95 651 674 7988	
39368	Vincent L Hendren (12/01)	95 651 674 7988	
39368	Barbara E Vincent (12/01)	86 651 674 7935	
39368	Richard T Vincent (12/01)	86 651 674 7935	
39420	Thomas Francis Tallarico (12/01)	86 651 674 2143	

394TH ST INTS

39446	David Allen Leal (12/01)	04 NP	
39468	Renee Michelle Leal (12/01)	04 NP	
39468	Jeffrey Patch (12/01)	00 NP	
39483	Ronald F Fitch (12/01)	98 651 237 0276	
39483	Paul Joseph Kalka (12/01)	98 651 237 0276	
39483	Sharon Carol Kalka (12/01)	98 651 237 0276	
39505	Cheryl J Theuer (12/01)	04 NP	
39505	Erna Agnes Pittman (12/01)	74 651 674 4664	
39505	Geord J Pittman (12/01)	74 651 674 4664	
39600	Cheryl L Fredrickson (12/01)	09 NP	
39600	Jeffery L Fredrickson (12/01)	09 NP	
39634	Bill John Koski Jr (12/01)	92 651 674 8995	
39634	Val N Koski (12/01)	92 651 674 8995	
39653	Lane Allen Fischer (12/01)	88 651 674 9305	
39653	Suzanne Marie Fischer (12/01)	88 651 674 9305	
39666	A Scott (12/01)	02 NP	
39680	Jeff Allen Eckholm (12/01)	02 NP	

397TH ST INTS

39700	Christine Mary Swanson (12/01)	92 651 674 4869	
39721	Terry Arthur Swanson (12/01)	92 651 674 4869	
39721	Jeff Frederick Dorr (12/01)	93 651 674 2302	
39721	Lana Kaye Dorr (12/01)	93 651 674 2302	

39732

39732	Joe L Cleveland (12/01)	+ NP	
39732	Kris M Cleveland (12/01)	+ NP	

400TH ST INTS

40106	Charles L Sutton (12/01)	97 651 674 7928	
40106	Gary J Schaefer (12/01)	90 651 674 7245	

TEMPCOPY ST INTS

40224	Lisa Beth Gensch (12/01)	99 651 674 9929	
40582	Jack Hugh Walker (12/01)	82 651 674 8219	
40619	Rosemary Ann Walker (12/01)	82 651 674 8219	
40619	Bridget Ann Duncos (12/01)	03 651 277 0067	
40663	Armen Richard Hitzeman (12/01)	03 651 277 0067	
40663	Debra Doreen Hansen (12/01)	99 NP	
40677	Scott Richard Hansen (12/01)	99 NP	
40677	Jacqueline June Foley (12/01)	93 NP	
40797	Timothy Mark Foy (12/01)	07 651 674 7771	
40826	Donna Lee Shipka (12/01)	07 NP	

410TH ST INTS

106 RESIDENCE			
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HEMINGWAY AVE S

CT	712.06	7751 - 7897	SC
712.06	7751 - 7897	8354	SD
712.08	7751 - 9900	55016	SD

7751

7751	Jennifer Lee Kloes (12/01)	92 651 458 8107	
7752	Steven Donald Swanson (12/01)	92 651 458 8107	
7752	Roberta Cameron (12/01)	10 651 458 4074	

Community Action Partnership Of Rams

East Metro Womens Council

REM MCS

77530	Karen Susan Frim (12/01)	94 651 768 7159	
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7754 Apartments

7754	Chris N Harves (12/01)	08 651 768 0304	
7754	Melinda N Harves (12/01)	08 651 768 0304	
7754	Asha Montgomery (12/01)	08 NP	
7754	Richard Rietmann (12/01)	09 NP	
7754	Keith Wenker (12/01)	09 NP	
7754	Koray Wenker (12/01)	09 NP	
7754	Broce Schenke (12/01)	08 NP	
7754	Joshua Ryan Turner (12/01)	05 NP	
7754	Monica M Turner (12/01)	05 NP	

7756 Apartments

7756	Loonie M Onell (12/01)	88 651 769 9613	
7756	Michael Jeffrey Onell (12/01)	88 651 769 9613	
7756	Moua P Wang (12/01)	04 NP	
7756	Laura Warner (12/01)	04 NP	
7756	Sarina J Rana (12/01)	03 NP	
7756	Shahid Kabeem Rana (12/01)	03 NP	

7758 Apartments

7758	N Gonzalez (12/01)	00 651 458 1086	
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2	Noemy Gonzalez	00	651 438 1086
2	Alisa McCann	00	651 493 5033
3	Rosetta Smith	+	NP
7760	Apartments		
3	Robert Nelson	10	651 528 6092
4	Gene A Wiley	+	NP
4	Gene Wiley	+	NP
7761	Larry Olmhar (12/01)	94	651 772 1832
	Leola Elizabeth (12/01)	94	651 772 1832

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HEMINGWAY AVE S

HELIUM ST NW

CT 1306.00	Princeton	31775 - 34072	SC
CT 9707.00		32369 - 34899	SE
CT 1301.00		34150 - 36474	SD
RR6		31775 - 32369	55371

317TH AVE NW INTS

31775	NP
31777	Carol Lee Larson
31779	Robert Larson
31781	David Lee Puka
31783	Sandra Lee Hanson
31785	Theresa Gabe Hanson
31787	Kenneth A. Rasmussen
31789	Dave A. Leibel
31791	Mark Alan Fulk
31793	Mark Alan Fulk
31795	Tamara Hall

RR5

33976 - 34860 55371

-STATE HIGHWAY 95 INTS

33976	Ruth Agne Hanson
33978	Jeff Philip Hanson
33980	Dana Suzanne Berg
33982	Thomas Berg
33984	Theresa D. Murray
33986	Murray's Racing
33988	Michael Henderson
33990	Seth Evans
33992	Tina Louise Liddle

34290 *Personal Drive Lc.....

34290	Jessica Jean Schiermerhorn
34292	Roman James Schiermerhorn
34294	Kathleen M. Swanson
34296	Wayne Swanson
34298	RDS Enterprises Inc.
34299	Crystal Casagay Seckert
34301	Randy Dale Seckert
34303	Evel E. Torgler
34305	Nelson Marie Temari

RR5

34899 - 34899 55371

RR5

34964 - 36474 55371

34964	Catherine Marie Slater
34966	Greg Charles Slater
34968	Colleen Ann Engstrom
34970	Jill Zelinsky
34972	Jessica Marie Sullivan
34974	Ronald L. Borg
34976	NP

35500 *Central Claims Service Inc.

35500	Central Claims Service Inc.
35502	John Francis Jefferson
35504	John Jefferson
35506	John Jefferson
35508	John Jefferson
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35998	John Jefferson
36000	John Jefferson

35955 *Central Siding & Remodeling

35955	Central Siding & Remodeling
35957	Sue Marie Heggen
35959	Terry L. Heggen
35961	Del J. Storm
35963	Maya Smith-Sturm
35965	Gary Smith-Sturm
35967	Malissa Marie Feigman
35969	Chris Allen Asarud
35971	Rebecca Ellen Asarud
35973	Donald D. Lubrecht
35975	Thomas Richard Lubrecht

36423

36474 *Lighthouse Alarm Communications

36474	Lighthouse Alarm Communications
36476	Duane Marie Pior
36478	Patricia Marie Pior
36480	Ed T. Sibley

HELIUM ST NW

CT 1306.00	Saint Francis	24601 - 28070	SC
RR1		24601 - 28070	55070

SEELYE BROOK DR NW INTS

24601	Jeff Lynn Olson
24603	Philip John Olson
24605	Alan John Olson
24607	Terry Lee Stephens
24609	Pat A. Olson
24611	James Leo McGabe
24613	Yvonne Elaine McGabe
24615	NP
24617	Robert Edward Jones

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

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24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

RR1

24601 - 28070 55070

HEMATITE ST NW

CT 502.28	Anoka	13872 - 15525	SC
13872	Angela L. Olson	NP	
13874	Scott P. Olson	NP	
13876	Tracy Lynn Johnson	04	651.674.6613
13878	Julia E. Schneider	04	NP
13880	Adria Chenev	05	651.712.9279
13882	Shawn Chenev	05	651.712.9278
13884	NP	NP	
13886	Anthony Thomas Dunken	05	651.742.4886
13888	Karla J. Andersen	05	651.742.7108
13890	Arnold William Vinson	05	NP

146TH CIR NW INTS

14640	Master Klean
14642	Laura Valencia
14644	Roy R. Krause
14646	Roy R. Krause
14648	Roy R. Krause
14650	Roy R. Krause
14652	Roy R. Krause
14654	Roy R. Krause
14656	Roy R. Krause
14658	Roy R. Krause
14660	Roy R. Krause
14662	Roy R. Krause
14664	Roy R. Krause
14666	Roy R. Krause
14668	Roy R. Krause
14670	Roy R. Krause
14672	Roy R. Krause
14674	Roy R. Krause
14676	Roy R. Krause
14678	Roy R. Krause
14680	Roy R. Krause
14682	Roy R. Krause
14684	Roy R. Krause
14686	Roy R. Krause
14688	Roy R. Krause
14690	Roy R. Krause
14692	Roy R. Krause
14694	Roy R. Krause
14696	Roy R. Krause
14698	Roy R. Krause
14700	Roy R. Krause
14702	Roy R. Krause
14704	Roy R. Krause
14706	Roy R. Krause
14708	Roy R. Krause
14710	Roy R. Krause
14712	Roy R. Krause
14714	Roy R. Krause
14716	Roy R. Krause
14718	Roy R. Krause
14720	Roy R. Krause
14722	Roy R. Krause
14724	Roy R. Krause
14726	Roy R. Krause
14728	Roy R. Krause
14730	Roy R. Krause
14732	Roy R. Krause
14734	Roy R. Krause
14736	Roy R. Krause
14738	Roy R. Krause
14740	Roy R. Krause
14742	Roy R. Krause
14744	Roy R. Krause
14746	Roy R. Krause
14748	R

Appendix E

Site Photographs

PHOTOGRAPHS

Photo 1: View from the southwest corner of Site along 400th Street, looking north at Site.

Photo 2: Looking east along the south property line of 400th Street, Site on left side of photograph.



PHOTOGRAPHS

Photo 3: View of tree-lined wind break, adjacent to west of Site, near the NW part of Site.

Photo 4: Looking east across Site from the west property line.



PHOTOGRAPHS

Photo 5: View of wooded northwest corner of Site, looking north.

Photo 6: Looking west along north property line from northwest corner of Site.



PHOTOGRAPHS

Photo 7: **Underground cable pedestal on east property boundary, looking west at Site.**

Photo 8: **Looking south-southwest at north part of the tree-lined windbreak in middle of Site.**



PHOTOGRAPHS

Photo 9: Looking west along 400th Street from the southeast property corner at natural gas pipeline marker and gate valve cover.

Photo 10: New-looking pad-mounted transformer near south property line, looking south.



PHOTOGRAPHS

Photo 11: View of fiber optic cable pedestal at southeast part of Site along Flink Avenue, on east property line, looking south.

Photo 12: View of apparent crushed windshield and car hood from vehicle along south property line, looking northeast.



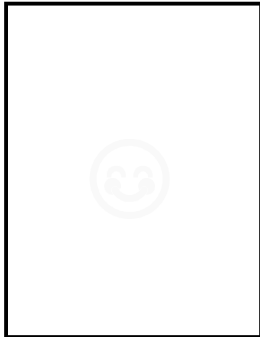
Appendix F

Resumes



Madelynn Gorg

Field Technician/GIT



Education

Geology, B.S.

University of Wisconsin – Eau Claire, 2020

Registrations/Certifications

MnDOT Tech ID:

MnDOT Aggregate Production Level I

MnDOT Concrete Field Level I

MnDOT Grading and Base Level I

MSHA

Part 48, Form 5000-23 Certificate

Employment

American Engineering Testing, Inc.

Engineering Technician

May 2020-Present

Professional Memberships

AET Responsibilities

- Concrete Testing
- Soil Testing (Nuclear gauge, Sand Cone, DCP)
- Bituminous Testing/Sampling
- Laboratory Testing (Standard/Modified Proctor)

Project Experience

Unbridled Avenue Reconstruction; Shakopee, MN 2020

A new road was put in north of Canterbury Park from Shenandoah Drive to County Highway 83. Performed nuclear density testing, moisture sampling and testing, and proctor sampling and testing for road construction including storm sewer and embankment fill.

Bacon Avenue Improvements; Inver Grove Heights, MN 2020

Improvements to 60th Street, 62nd Street, and Bacon Avenue included addition of curb and gutter, storm sewer construction, and sanitary sewer and watermain repairs. Performed nuclear density testing, proctor sampling and testing, gradation sampling, DCP testing, topsoil sampling throughout the duration of the project.

3M Center 301 Annex; Maplewood, MN 2020

Tested soils and aggregate for the reconstruction of 4th Street, east of the new building at the 3M Center in Maplewood. Performed nuclear density testing, proctor sampling and testing, gradation sampling, DCP testing.

MN 302 Rehabilitation at Highway 88; Minneapolis, MN 2020

Performed nuclear density testing, proctor sampling and testing, and bituminous testing and sampling for the rehabilitation and reconstruction of manholes, restoration of curb and gutter, and restoration of pavement.

Washington/Ramsey Recycling; Newport, MN 2020-2021

A new addition is being constructed at the load-out area on the east side of the Recycling & Energy Center building. Responsibilities include nuclear density testing, proctor sampling and testing, and excavation observation.

Dennis P. McComas, P.G.

Senior Geologist, Due Diligence Manager



Background

Dennis McComas has over 30 years of experience in environmental due diligence management, and the assessment, investigation and cleanup of over 200 contaminated Brownfields redevelopment sites and more than 500 petroleum spill/AST/UST release sites. He has also reviewed or performed over 950 Phase I ESA projects. He is a Focus Group lead on the ASTM E50 1527-21 Subcommittee Task Group.

In the last four years, he was instrumental in securing over \$2.6M in cleanup grants for his clients. His expertise includes hydrogeological evaluations, soil vapor intrusion investigations, groundwater contamination investigations, preparation and implementation of RAPs and CCPs, environmental-related litigation experience, and brownfields grant applications.

Education

B.S. Geology,
University of Minnesota, 1988

Post-Graduate Coursework,

Contaminant Hydrogeology and Soil Physics,
Winona State University, 1992

Continuing Education

Princeton Groundwater Pollution and Hydrogeology Course, 1992

Minnesota Routine Assessment Method (MnRAM) for Wetlands, Version 3.0 Training, 2002

Crude Oil Spills Symposium, USGS Bemidji
Minnesota Spill Site, 2012

Registrations/Certifications

Licensed Professional Geologist, Minnesota, No. 30503

Licensed Professional Geologist, Wisconsin, No. 656-13

40-hour OSHA HAZWOPER training, 1989;
OSHA Annual 8-hour HAZWOPER refresher courses

Professional Memberships

Minnesota Groundwater Association
ASTM International Member, No. 1653297

AET Responsibilities

- Phase I ESA projects primary reviewer and manager
- DEED and TBRA Investigation and Cleanup grant application assistance and preparation
- Due Diligence project coordination and management
- Brownfield investigation and MPCA Voluntary Brownfields Liaison and Technical Assistance Liability Assurances
- Phase II ESA, Vapor Intrusion BMP Investigations, RAP and RAP Implementation project coordination, oversight, management, review and reporting
- Client management and regulatory relationships

Project Experience

The Keller Building Redevelopment, Northeast Minneapolis, MN (2017-present), \$80,000

Coordinated environmental assessments and numerous environmental investigations of impacted soil, concrete, and soil vapor. Completed soil vapor pilot testing and vapor mitigation design of an abandoned former wagon manufacturer and military metal fabrication facility. Secured a \$600,000 DEED Cleanup grant to mitigate the vapor intrusion risks, and to remediate solvent-impacted, and hazardous-level impacted soil and concrete. When completed, the renovated facility will house a multi-use restaurant, commercial retail, and office complex.

4500 France Redevelopment, Edina, MN (2017-present), \$50,000

Prepared an environmental assessment, soil and vapor investigations and a Response Action Plan (RAP) of a former Minnesota State Superfund listed dry cleaner, filling station and movie theatre complex to accommodate a future multi-use commercial and residential five story structure with an underground parking ramp. We were able to avoid the necessity of a vapor mitigation system, due the proposed installation of the properly ventilated underground parking ramp under the entire building. Secured a DEED Redevelopment grant and a Hennepin County Well Sealing program grant totaling \$330,000.

Faribault Straight River Apartments and Straight River Park Project, Faribault, (2017-present), \$130,000

Completed and managed a Phase I ESA, a comprehensive Phase II ESA including soil, vapor, and groundwater analysis, a Response Action Plan, and a DEED Investigation and Cleanup grant application to remediate a former City dump, and public works facility, including petroleum impacts, heavy metal, semi-volatiles and volatile organic compounds. In January 2020, secured a \$803,000 DEED Cleanup grant to mitigate the solid waste and contaminants to accommodate a four-level apartment complex and an adjacent park facility adjacent to the scenic Straight River.

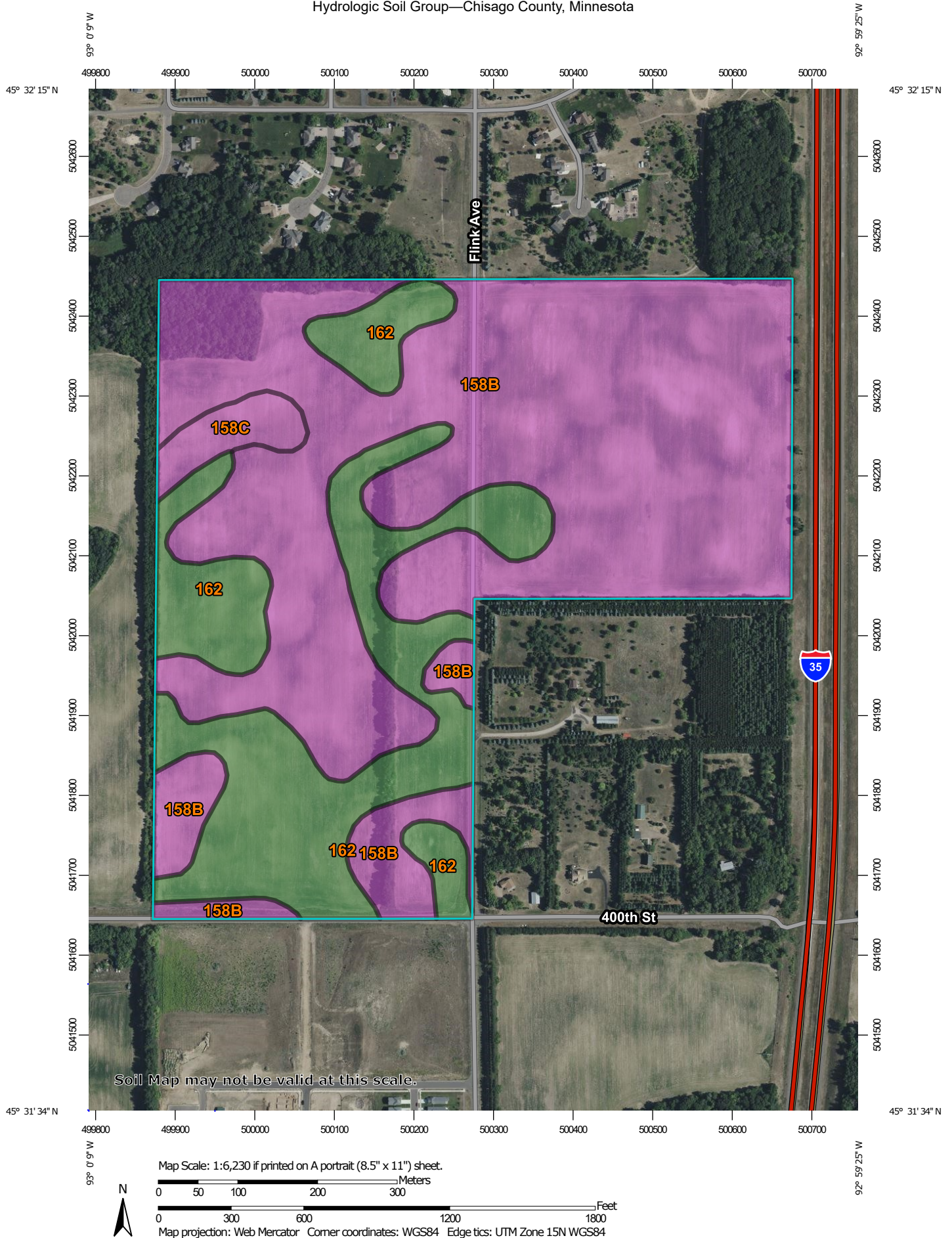
Shoreham Yard East Side Property, Minneapolis, MN (2015), \$5,000

Performed a Phase I Environmental Site Assessment (ESA) of the Shoreham Yard East Side Superfund Property. The property is an approximate 16.5 acres, irregular-shaped parcel encompassing the addresses 2800 through 3100 Central Avenue NE and included a Roundhouse/Diesel Shop, remediation treatment buildings and monitoring wells. Extensive assessment, investigation and cleanup activities have previously been completed at the Site.

Meadows Ridge
Environmental Assessment Worksheet
Appendix G

Web Soil Survey Information

Hydrologic Soil Group—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

3/31/2024
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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 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: Chisago County, Minnesota
 Survey Area Data: Version 20, Sep 10, 2023

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

Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	A	82.8	69.6%
158C	Zimmerman fine sand, 6 to 12 percent slopes	A	2.9	2.5%
162	Lino loamy fine sand	A/D	33.3	28.0%
Totals for Area of Interest			119.0	100.0%

Description

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.

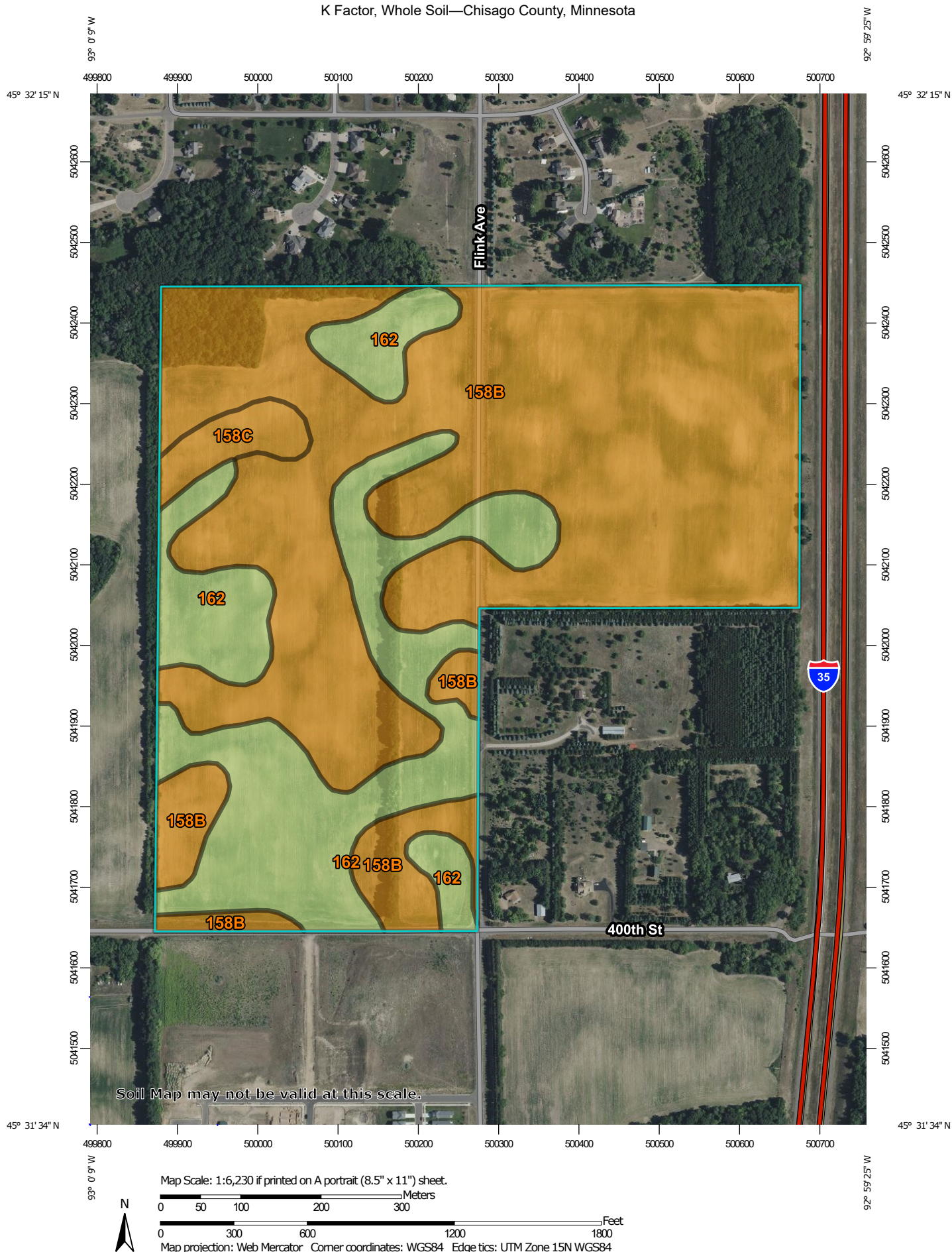
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole Soil—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

	.02
	.05
	.10
	.15
	.17
	.20
	.24
	.28
	.32
	.37
	.43
	.49
	.55
	.64
	Not rated or not available

Soil Rating Lines

	.02
	.05
	.10
	.15
	.17
	.20

	.24
	.28
	.32
	.37
	.43
	.49
	.55
	.64
	Not rated or not available

Soil Rating Points

	.02
	.05
	.10
	.15
	.17
	.20
	.24
	.28
	.32
	.37
	.43
	.49
	.55
	.64
	Not rated or not available

Water Features

	Streams and Canals
	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.

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Survey Area Data: Version 20, Sep 10, 2023

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Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

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K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	.10	82.8	69.6%
158C	Zimmerman fine sand, 6 to 12 percent slopes	.10	2.9	2.5%
162	Lino loamy fine sand	.24	33.3	28.0%
Totals for Area of Interest			119.0	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Factor K does not apply to organic horizons and is not reported for those layers.

Rating Options

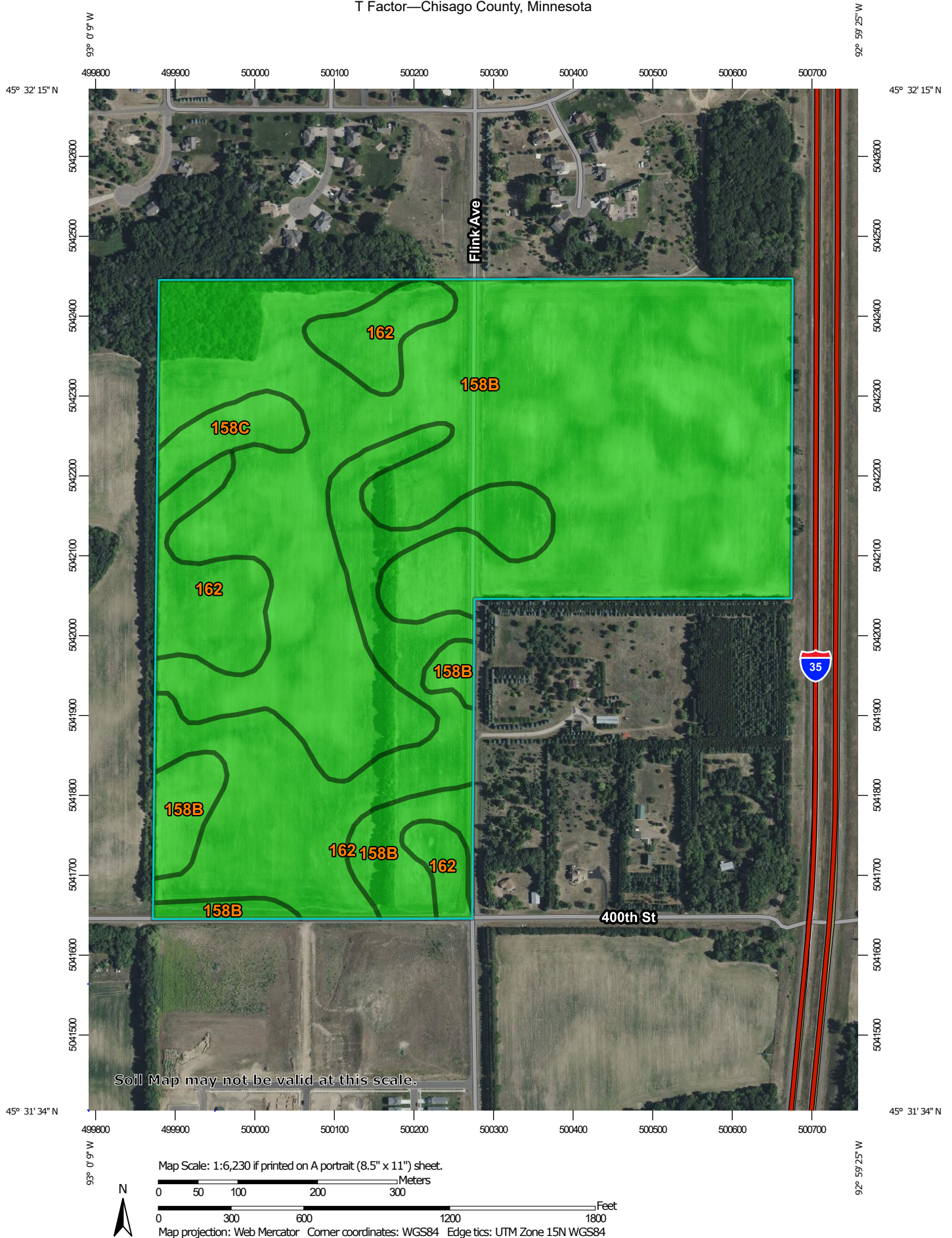
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

T Factor—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  1
-  2
-  3
-  4
-  5
-  Not rated or not available

Soil Rating Lines

-  1
-  2
-  3
-  4
-  5
-  Not rated or not available

Soil Rating Points

-  1
-  2
-  3
-  4
-  5
-  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.

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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)

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T Factor

Map unit symbol	Map unit name	Rating (tons per acre per year)	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	5	82.8	69.6%
158C	Zimmerman fine sand, 6 to 12 percent slopes	5	2.9	2.5%
162	Lino loamy fine sand	5	33.3	28.0%
Totals for Area of Interest			119.0	100.0%

Description

The T factor is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Rating Options

Units of Measure: tons per acre per year

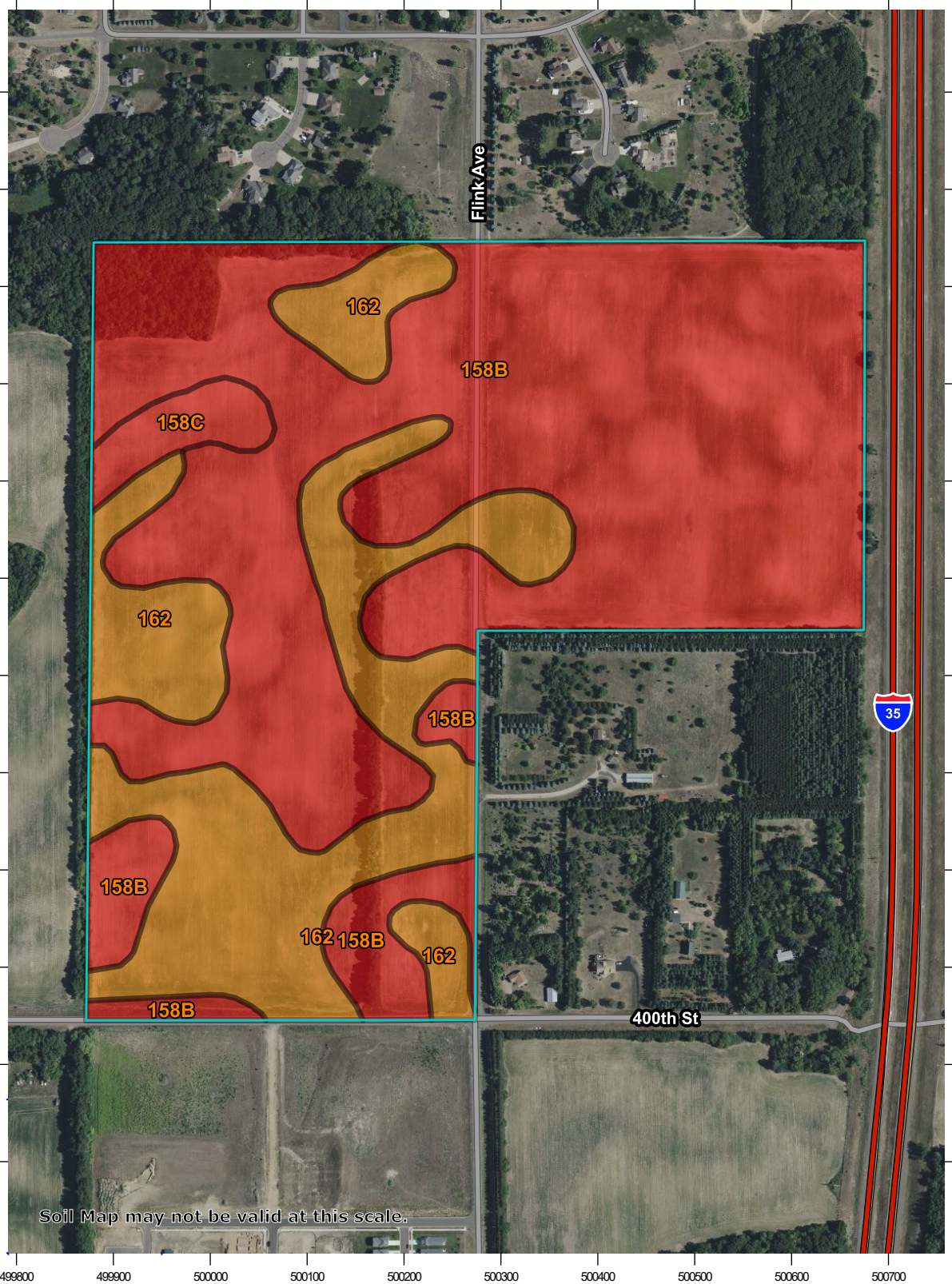
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

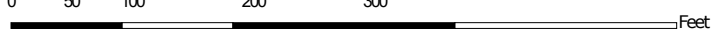
Interpret Nulls as Zero: No

Figure 1 is a map of the study area. It shows a coordinate grid with latitude (92° 59' 25" N) and longitude (93° 0' 9" W) markers. The map includes the location of the study site (indicated by a red dot) within the context of the surrounding region. The map also shows the location of the study site relative to the surrounding region, with a scale bar indicating distances up to 50000 units.



Soil Map may not be valid at this scale.

Map Scale: 1:6,230 if printed on A portrait (8.5" x 11") sheet.



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

	1		1
	2		2
	3		3
	4		4
	4L		4L
	5		5
	6		6
	7		7
	8		8
	Not rated or not available		Not rated or not available

Soil Rating Lines

	1
	2
	3
	4
	4L
	5
	6
	7
	8
	Not rated or not available

Soil Rating Points

Water Features

 Streams and Canals

Transportation

	Rails
	Interstate Highways
	US Routes
	Major Roads
	Local Roads

Background

 Aerial Photography

MAP INFORMATION

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Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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Wind Erodibility Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	1	82.8	69.6%
158C	Zimmerman fine sand, 6 to 12 percent slopes	1	2.9	2.5%
162	Lino loamy fine sand	2	33.3	28.0%
Totals for Area of Interest			119.0	100.0%

Description

A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

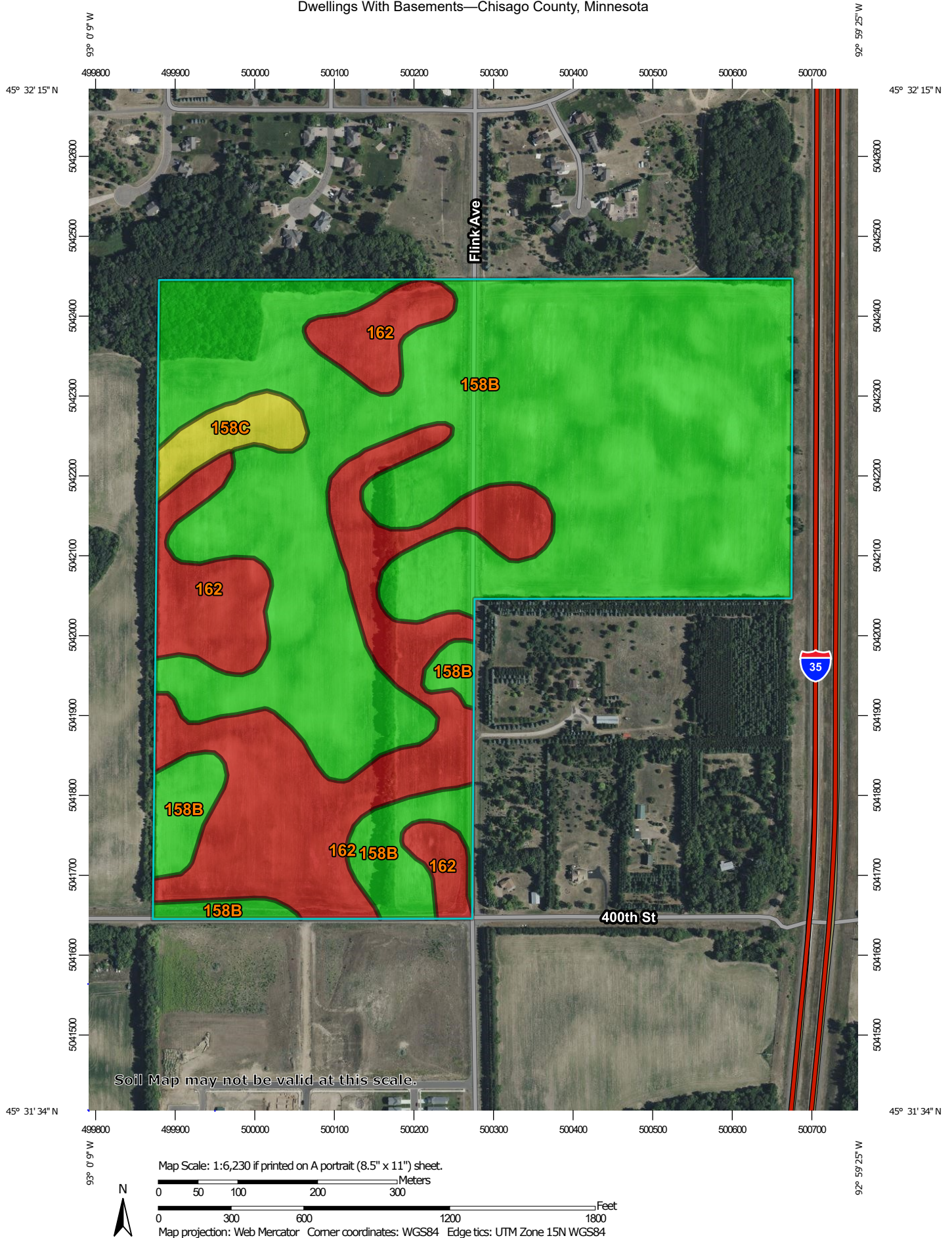
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Dwellings With Basements—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

3/31/2024
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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

MAP INFORMATION

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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: Chisago County, Minnesota
Survey Area Data: Version 20, Sep 10, 2023

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

Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

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.

Dwellings With Basements

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	Not limited	Zimmerman (90%)		82.8	69.6%
158C	Zimmerman fine sand, 6 to 12 percent slopes	Somewhat limited	Zimmerman (85%)	Slope (0.04)	2.9	2.5%
			Cantiin (5%)	Depth to saturated zone (0.82)		
				Slope (0.04)		
162	Lino loamy fine sand	Very limited	Lino (85%)	Depth to saturated zone (1.00)	33.3	28.0%
Totals for Area of Interest					119.0	100.0%

Rating	Acres in AOI	Percent of AOI
Not limited	82.8	69.6%
Very limited	33.3	28.0%
Somewhat limited	2.9	2.5%
Totals for Area of Interest	119.0	100.0%

Description

ENG - Engineering

Dwellings are single-family houses of three stories or less. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet.

The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification of the soil. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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 use (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.

Rating Options

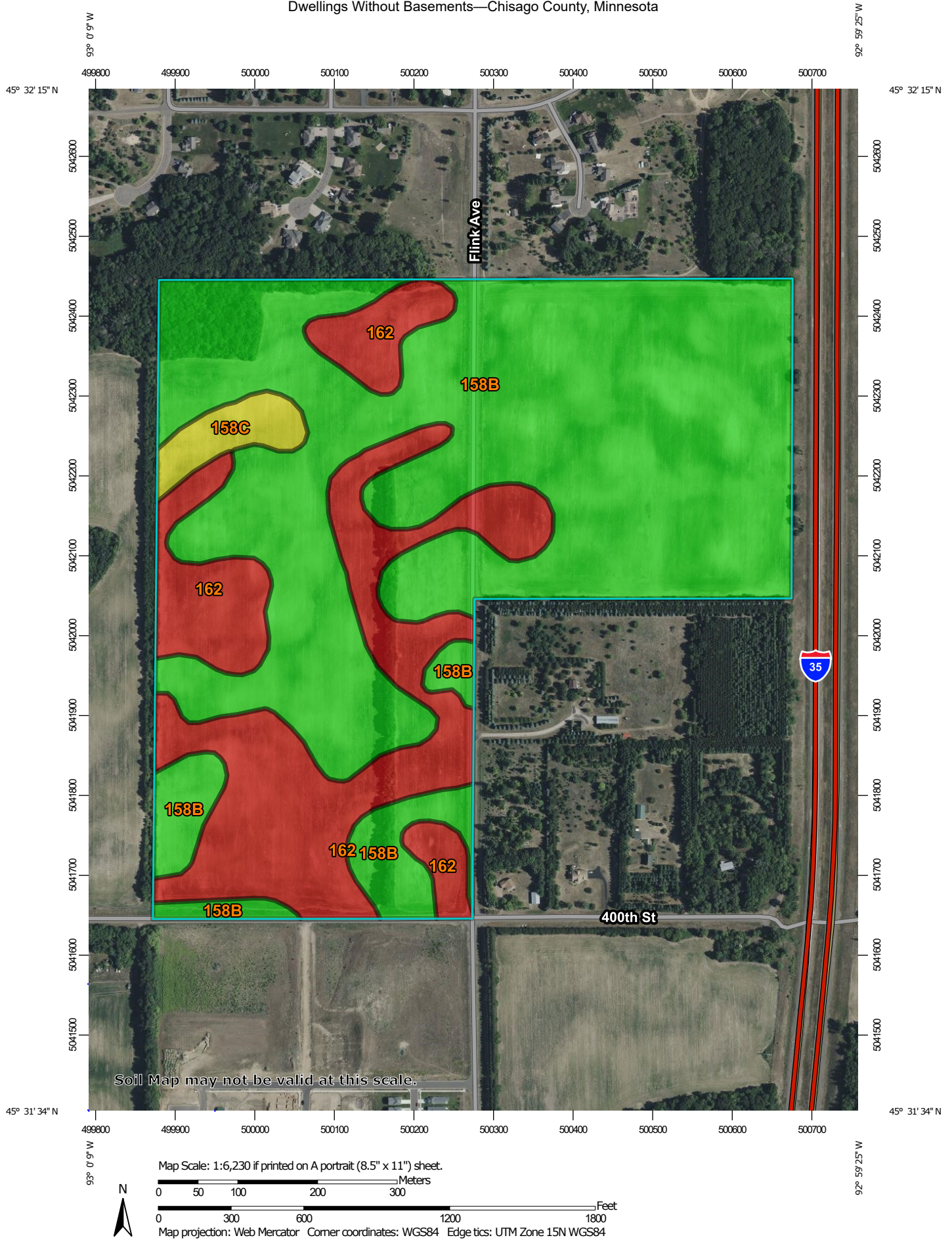
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Dwellings Without Basements—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

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)

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Soil Survey Area: Chisago County, Minnesota

Survey Area Data: Version 20, Sep 10, 2023

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

Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

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Dwellings Without Basements

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	Not limited	Zimmerman (90%)		82.8	69.6%
			Cantlin (5%)			
			Soderville (1%)			
158C	Zimmerman fine sand, 6 to 12 percent slopes	Somewhat limited	Zimmerman (85%)	Slope (0.04)	2.9	2.5%
			Cantlin (5%)	Slope (0.04)		
			Lino (4%)	Depth to saturated zone (0.98)		
162	Lino loamy fine sand	Very limited	Lino (85%)	Depth to saturated zone (1.00)	33.3	28.0%
Totals for Area of Interest					119.0	100.0%

Rating	Acres in AOI	Percent of AOI
Not limited	82.8	69.6%
Very limited	33.3	28.0%
Somewhat limited	2.9	2.5%
Totals for Area of Interest	119.0	100.0%

Description

ENG - Engineering

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper.

The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification of the soil. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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 use (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.

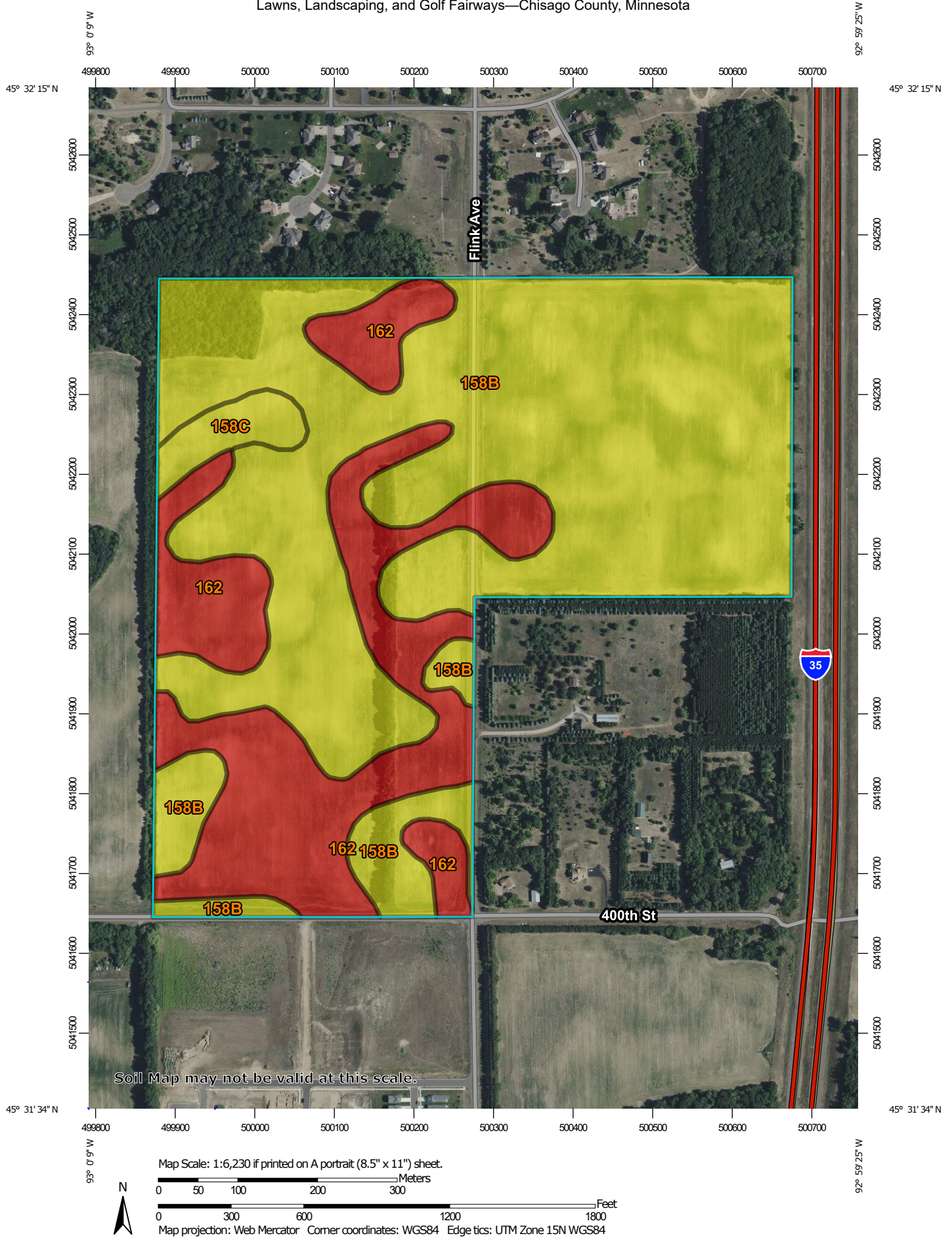
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Lawns, Landscaping, and Golf Fairways—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

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)

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Soil Survey Area: Chisago County, Minnesota
Survey Area Data: Version 20, Sep 10, 2023

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Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

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Lawns, Landscaping, and Golf Fairways

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	Somewhat limited	Zimmerman (90%)	Low exchange capacity (0.75)	82.8	69.6%
				Droughty (0.34)		
			Cantlin (5%)	Low exchange capacity (0.75)		
				Droughty (0.38)		
			Lino (2%)	Low exchange capacity (0.75)		
				Depth to saturated zone (0.75)		
				Droughty (0.50)		
			Soderville (1%)	Low exchange capacity (0.75)		
Droughty (0.31)						
158C	Zimmerman fine sand, 6 to 12 percent slopes	Somewhat limited	Zimmerman (85%)	Low exchange capacity (0.75)	2.9	2.5%
				Droughty (0.34)		
				Slope (0.04)		
			Cantlin (5%)	Low exchange capacity (0.75)		
				Droughty (0.38)		
				Slope (0.04)		
			Lino (4%)	Low exchange capacity (0.75)		
				Depth to saturated zone (0.75)		
				Droughty (0.50)		
			Soderville (2%)	Low exchange capacity (0.75)		
Droughty (0.31)						
162	Lino loamy fine sand	Very limited	Lino (85%)	Depth to saturated zone (1.00)	33.3	28.0%
				Low exchange capacity (0.75)		
				Droughty (0.41)		
Totals for Area of Interest					119.0	100.0%

Rating	Acres in AOI	Percent of AOI
Somewhat limited	85.7	72.0%
Very limited	33.3	28.0%
Totals for Area of Interest	119.0	100.0%

Description

ENG - Engineering

This interpretation rates soils for their use in establishing and maintaining turf for lawns and golf fairways and ornamental trees and shrubs for residential or commercial landscaping. Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required.

The ratings are based on the use of soil material at the site, which may have been altered by some land smoothing. Irrigation may or may not be needed and is not a criterion in rating. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. Soils that are subject to flooding are limited by the duration and intensity of flooding and the season when flooding occurs. In planning for lawns, landscaping, or golf fairways, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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 use (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.

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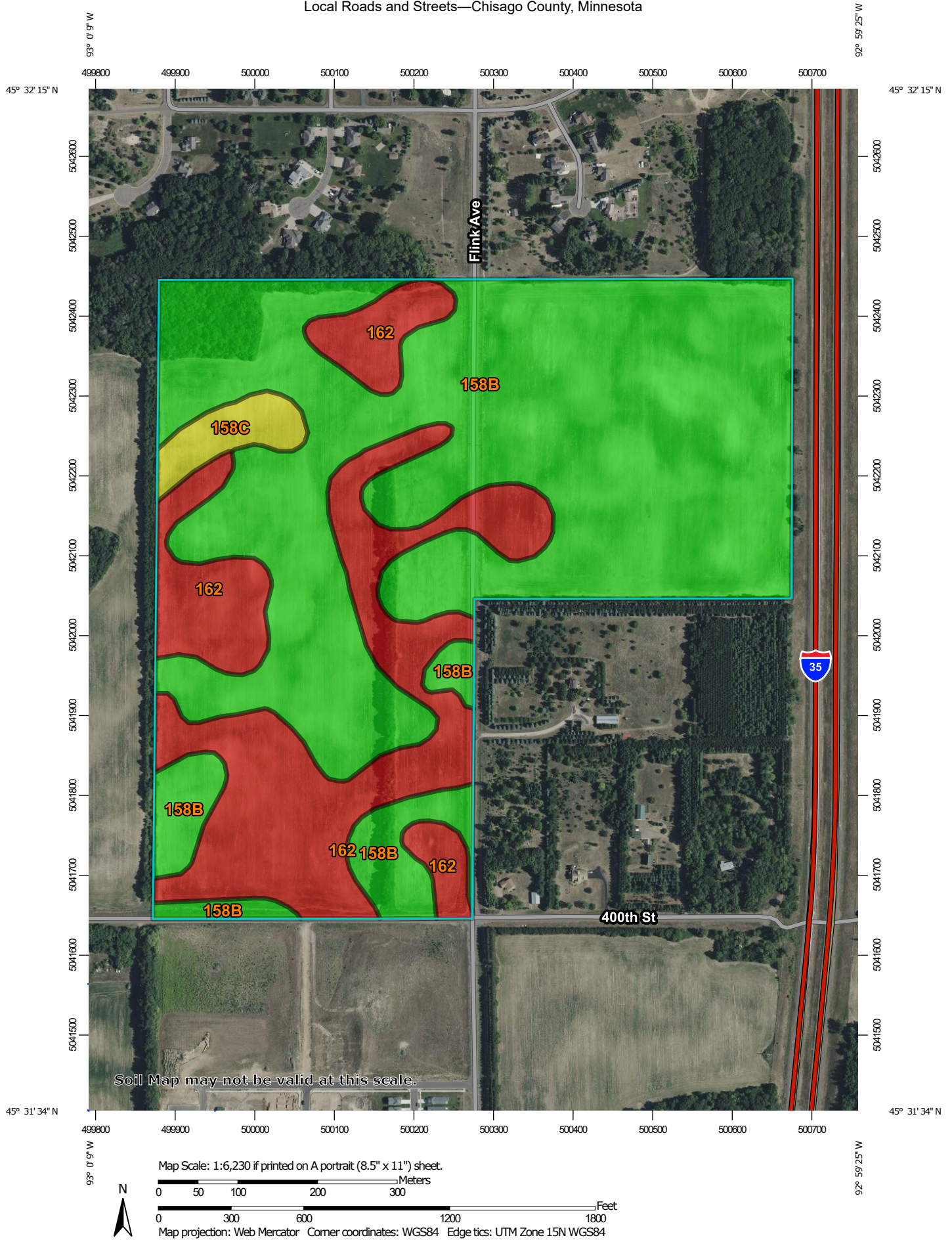
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Local Roads and Streets—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

MAP INFORMATION

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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)

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Local Roads and Streets

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	Not limited	Zimmerman (90%)		82.8	69.6%
			Cantlin (5%)			
			Soderville (1%)			
158C	Zimmerman fine sand, 6 to 12 percent slopes	Somewhat limited	Zimmerman (85%)	Slope (0.04)	2.9	2.5%
			Cantlin (5%)	Slope (0.04)		
			Lino (4%)	Depth to saturated zone (0.75)		
162	Lino loamy fine sand	Very limited	Lino (85%)	Depth to saturated zone (1.00)	33.3	28.0%
				Frost action (0.50)		
Totals for Area of Interest					119.0	100.0%

Rating	Acres in AOI	Percent of AOI
Not limited	82.8	69.6%
Very limited	33.3	28.0%
Somewhat limited	2.9	2.5%
Totals for Area of Interest	119.0	100.0%

Description

ENG - Engineering

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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 use (1.00) and the point at which the soil feature is not a limitation (0.00).

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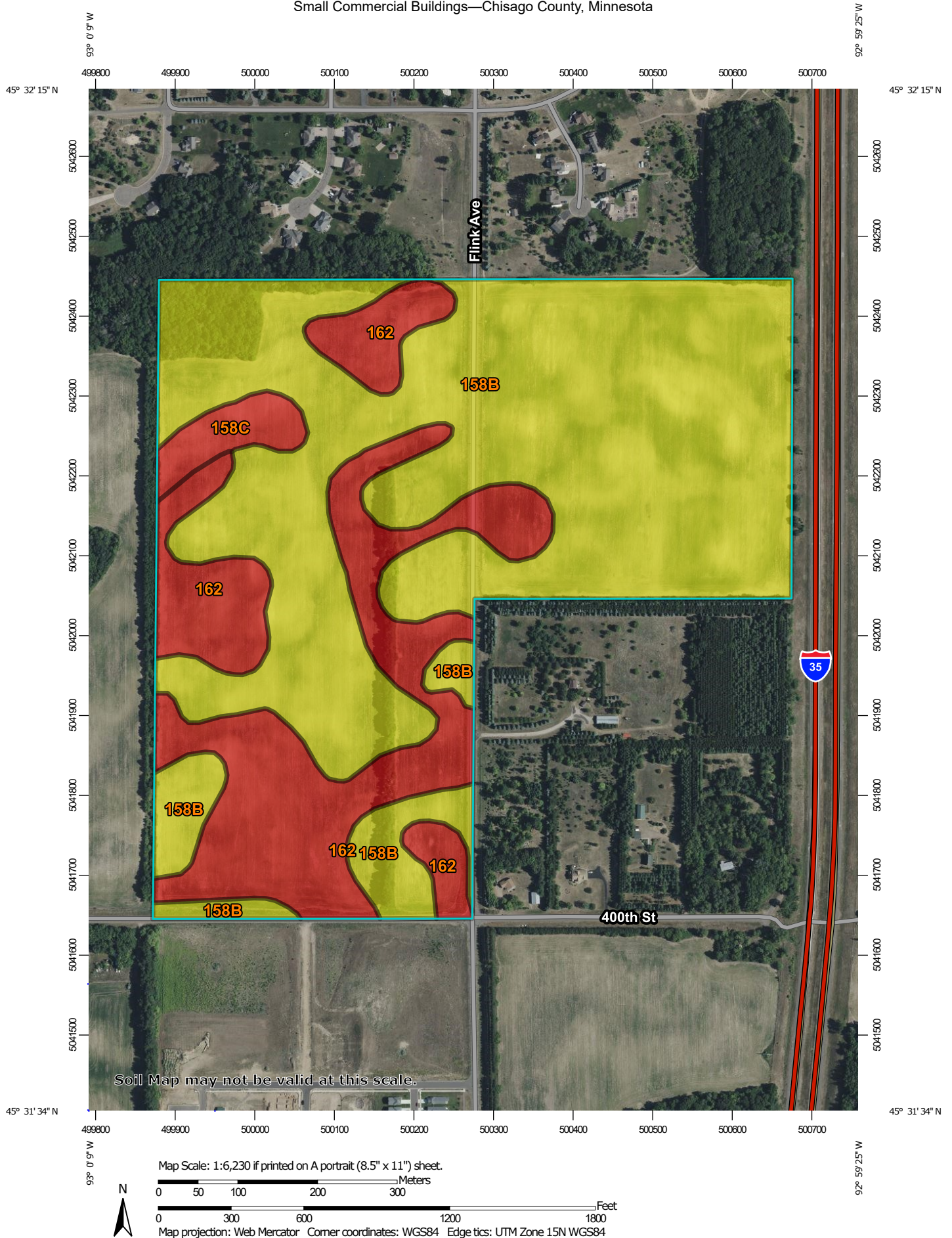
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Small Commercial Buildings—Chisago County, Minnesota



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Background

 Aerial Photography

Soils

Soil Rating Polygons

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Lines

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Soil Rating Points

-  Very limited
-  Somewhat limited
-  Not limited
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

MAP INFORMATION

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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)

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Survey Area Data: Version 20, Sep 10, 2023

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Date(s) aerial images were photographed: Jun 29, 2023—Sep 13, 2023

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Small Commercial Buildings

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
158B	Zimmerman fine sand, 1 to 6 percent slopes	Somewhat limited	Zimmerman (90%)	Slope (0.00)	82.8	69.6%
			Lino (2%)	Depth to saturated zone (0.98)		
158C	Zimmerman fine sand, 6 to 12 percent slopes	Very limited	Zimmerman (85%)	Slope (1.00)	2.9	2.5%
			Cantlin (5%)	Slope (1.00)		
			Isanti, drained (4%)	Ponding (1.00)		
				Depth to saturated zone (1.00)		
162	Lino loamy fine sand	Very limited	Lino (85%)	Depth to saturated zone (1.00)	33.3	28.0%
Totals for Area of Interest					119.0	100.0%

Rating	Acres in AOI	Percent of AOI
Somewhat limited	82.8	69.6%
Very limited	36.2	30.4%
Totals for Area of Interest	119.0	100.0%

Description

ENG - Engineering

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification of the soil). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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 use (1.00) and the point at which the soil feature is not a limitation (0.00).

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Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Meadows Ridge
Environmental Assessment Worksheet
Appendix H

MnDNR Natural Heritage Review Letter



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

March 6, 2024

Correspondence # MCE 2023-00942

Mary McAleer
Kjolhaug Environmental Services Company

RE: Natural Heritage Review of the proposed Meadows Ridge,
T35N R21W Sections 8, 17; Chisago County

Dear Mary McAleer,

As requested, the [Minnesota Natural Heritage Information System](#) has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

State-listed Species

- [Blanding's turtles](#) (*Emydoidea blandingii*), a state-listed threatened species, have been documented in the direct vicinity of the proposed project. Blanding's turtles use upland areas up to and over a mile distant from wetlands, waterbodies, and watercourses. Uplands are used for nesting, basking, periods of dormancy, and traveling between wetlands. Factors believed to contribute to the decline of this species include collisions with vehicles, wetland drainage and degradation, and the development of upland habitat. Any added mortality can be detrimental to populations of Blanding's turtles, as these turtles have a low reproduction rate that depends upon a high survival rate to maintain population levels.

This project has the potential to impact this rare turtle through direct fatalities and habitat disturbance/destruction due to excavation, fill, and other construction activities associated with the project. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of threatened or endangered species without a permit. **Given the project details and the potential for a take of a Blanding's turtle, an avoidance plan is required.**

We do not currently have a template for avoidance plans. The plan needs to:

- Provide a description of the project activities and construction methods,
- Identify measures that will be taken to avoid take and minimize disturbance to the species, and
- Include a map of disturbance areas. This can include a map of potential Blanding's turtle summer, winter, and nesting habitat overlaid with timing of project impacts.

Measures to avoid or minimize disturbance include, but are not limited to, the following:

- Avoidance of suitable habitat,
- Timing the impacts to avoid incidental take,
- Excluding turtles from the area via fencing before they become active in the spring,
- The recommendations listed in the [Blanding's turtle fact sheet](#),
- Training for construction crew.

Please submit the completed avoidance plan to the NH Review Team (Reports.NHIS@state.mn.us).

- The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed nearby, all seven of Minnesota's bats, including the federally endangered northern long-eared bat ([Myotis septentrionalis](#)), can be found throughout Minnesota. During the active season (approximately April-November) bats roost underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, **the DNR recommends that tree removal be avoided from June 1 through August 15.**
- Please visit the [DNR Rare Species Guide](#) for more information on the habitat use of these species and recommended measures to avoid or minimize impacts.

Federally Protected Species

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online [Information for Planning and Consultation \(IPaC\) tool](#).

Environmental Review and Permitting

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be

provided so the DNR can determine whether a takings permit will be needed for any of the above protected species.

- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

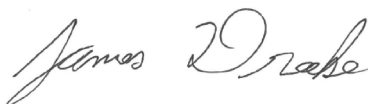
The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit the [Natural Heritage Review website](#) for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, you may contact your [DNR Regional Environmental Assessment Ecologist](#).

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

A handwritten signature in cursive script that reads "James Drake".

James Drake
Natural Heritage Review Specialist
James.F.Drake@state.mn.us

Cc: Melissa Collins



Formal Natural Heritage Review - Cover Page

See next page for results of review. A draft watermark means the project details have not been finalized and the results are not official.

Project Name: Meadows Ridge

Project Proposer: LGI Homes Inc.

Project Type: Development, Mixed Use

Project Type Activities: Tree Removal;Other

TRS: T35 R21 S17, T35 R21 S8

County(s): Chisago

DNR Admin Region(s): Central

Reason Requested: State EAW

Project Description: The Meadows Ridge residential subdivision and commercial development project is proposed on approximately 120 acres of cultivated land northwest of North ...

Existing Land Uses: Currently, the site consists of cultivated fields, a forested wind break, a small woodland portion in the northwest portion, and a portion of Flink Avenue ...

Landcover / Habitat Impacted: Primarily cropland (106.24 ac) and smaller portions of mixed forest (0.35 ac) and deciduous forest (7.57 ac).

Waterbodies Affected: No surface water features are within the project area. No wetlands were delineated and the DNR Public Waters Inventory and National Hydrography Dataset ...

Groundwater Resources Affected: Public utilities (water and sewer) lines are present at the intersection of Flink Avenue and 400th Street and will be extended to the residential and commercial developments.

Previous Natural Heritage Review: No

Previous Habitat Assessments / Surveys: No

SUMMARY OF AUTOMATED RESULTS

Category	Results	Response By Category
Project Details	Comments	Tree Removal - Recommendations
Ecologically Significant Area	No Comments	No Further Review Required
State-Listed Endangered or Threatened Species	Needs Further Review	State-protected Species in Vicinity
State-Listed Species of Special Concern	No Comments	No Further Review Required
Federally Listed Species	No Records	Visit IPaC For Federal Review



December 14, 2023

Project Name: Meadows Ridge
Project Proposer: LGI Homes Inc.
Project Type: Development, Mixed Use
Project ID: MCE #2023-00942

AUTOMATED RESULTS: FURTHER REVIEW IS NEEDED

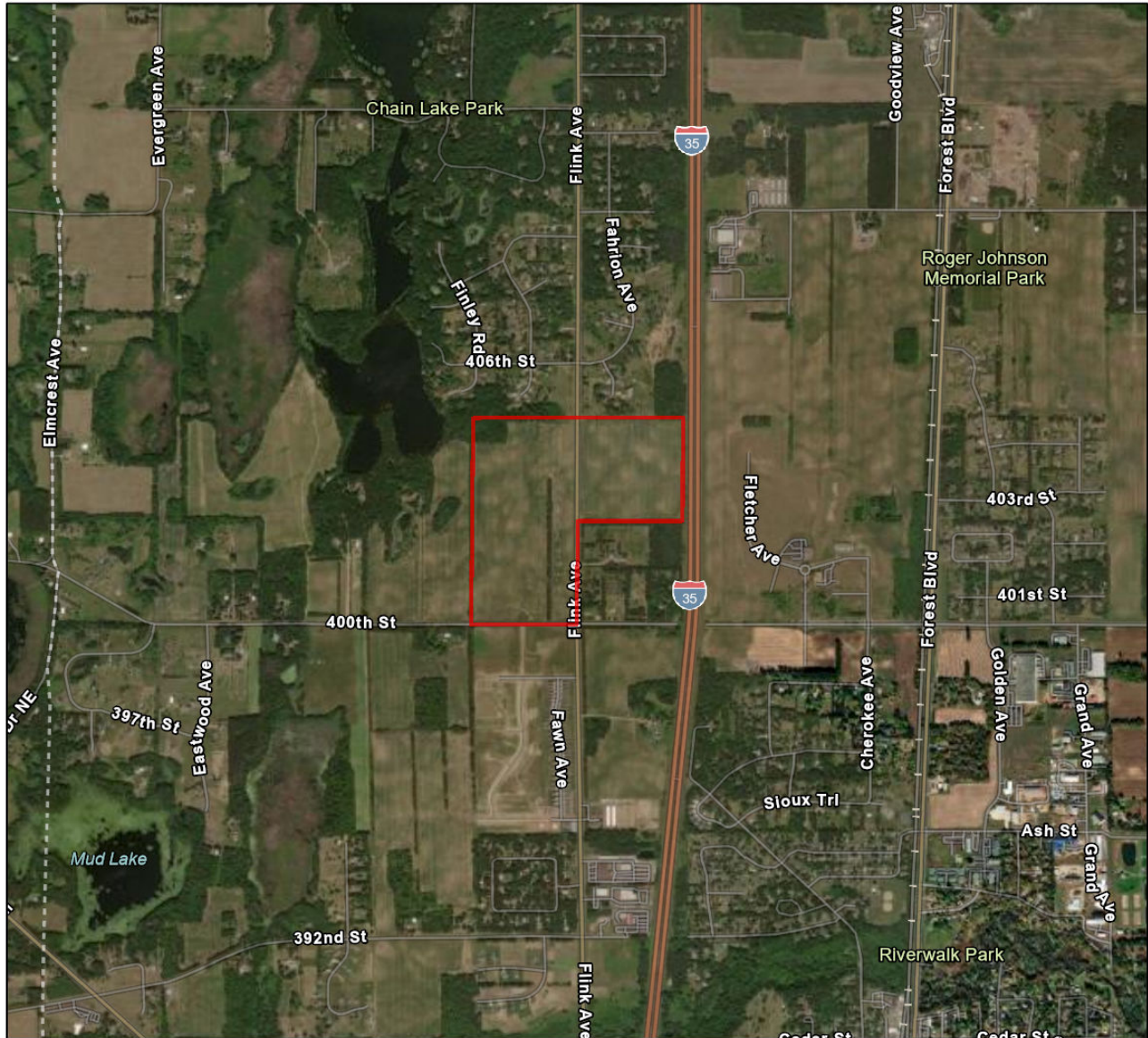
As requested, the above project has undergone an automated review for potential impacts to rare features. Based on this review, one or more rare features may be impacted by the proposed project and further review by the Natural Heritage Review Team is needed. You will receive a separate notification email when the review process is complete and the Natural Heritage Review letter has been posted.

Please refer to the table on the cover page of this report for a summary of potential impacts to rare features. For additional information or planning purposes, use the Explore Page in Minnesota Conservation Explorer to view the potentially impacted rare features or to create a Conservation Planning Report for the proposed project.

If you have additional information to help resolve the potential impacts listed in the summary results, please attach related project documentation in the Edit Details tab of the Project page. Relevant information includes, but is not limited to, additional project details, completed habitat assessments, or survey results. This additional information will be considered during the project review.

Meadows Ridge

Aerial Imagery With Locator Map



0 0.15 0.3 0.6 0.9 1.2 Miles

 Project Boundary

Project Type: Development, Mixed Use

Project Size (acres): 118.90

County(s): Chisago

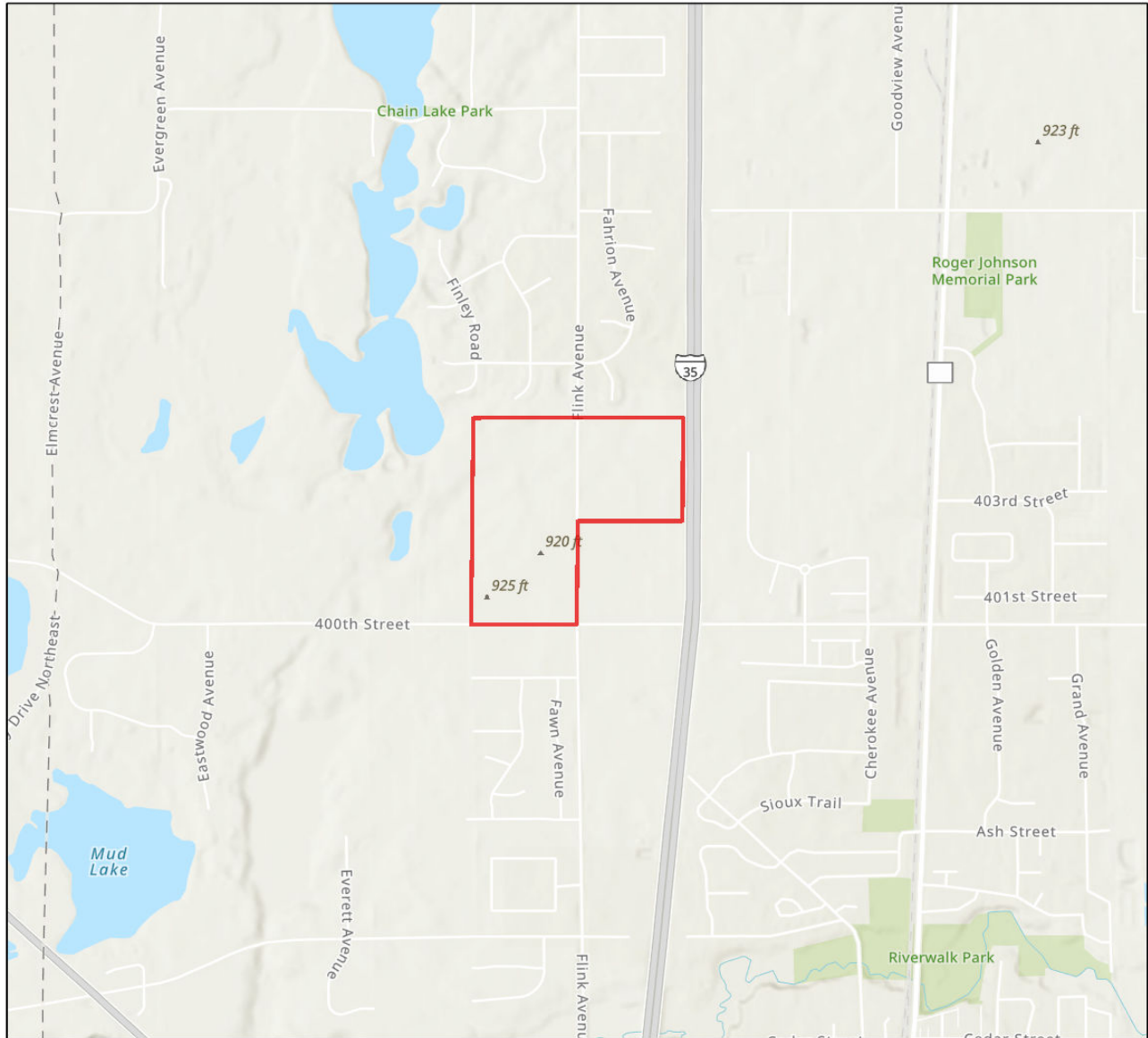
TRS: T35 R21 S17, T35 R21 S8

Esri, HERE, Garmin, FAO, NOAA, USGS, EPA
Metropolitan Council, MetroGIS, Esri, HERE, Garmin, SafeGraph,
GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau,



Meadows Ridge

USA Topo Basemap With Locator Map



0 0.15 0.3 0.6 0.9 1.2 Miles

 Project Boundary

Project Type: Development, Mixed Use

Project Size (acres): 118.90

County(s): Chisago

TRS: T35 R21 S17, T35 R21 S8

Esri, NASA, NGA, USGS, FEMA
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA
Metropolitan Council, MetroGIS, Esri, HERE, Garmin, SafeGraph,



Meadows Ridge
Environmental Assessment Worksheet
Appendix I

USFWS IPaC Results



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873



In Reply Refer To:
Project Code: 2024-0031093
Project Name: Meadows Ridge

December 29, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Please refer to our [Section 7 website](#) for guidance and technical assistance, including [step-by-step instructions](#) for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A [demonstration video](#) showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect.” In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain [Life History Information for Listed and Candidate Species](#) on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats

Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥ 3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No**

Effect determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the range-wide northern long-eared bat D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/ Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter.

Please note: On November 30, 2022, the Service published a proposal final rule to reclassify the northern long-eared bat as endangered under the Endangered Species Act. On January 26, 2023, the Service published a 60-day extension for the final reclassification rule in the Federal Register, moving the effective listing date from January 30, 2023, to March 31, 2023. This extension will provide stakeholders and the public time to preview interim guidance and consultation tools before the rule becomes effective. When available, the tools will be available on the Service's northern long-eared bat website (<https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>). Once the final rule goes into effect on March 31, 2023, the 4(d) D-key will no longer be available (4(d) rules are not available for federally endangered species) and will be replaced with a new Range-wide NLEB D-key (range-wide d-key). For projects not completed by March 31, 2023, that were previously reviewed under the 4(d) d-key, there may be a need for reinitiation of consultation. For these ongoing projects previously reviewed under the 4(d) d-key that may result in incidental take of the northern long-eared bat, we recommend you review your project using the new range-wide d-key once available. If your project does not comply with the range-wide d-key, it may be eligible for use of the Interim (formal) Consultation framework (framework). The framework is intended to facilitate the transition from the 4(d) rule to typical Section 7 consultation procedures for federally endangered species and will be available only until spring 2024. Again, when available, these tools (new range-wide d-key and framework) will be available on the Service's [northern long-eared bat website](#).

Whooping Crane

Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "[Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States](#)."

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the

mortality of migratory birds whenever possible and we encourage implementation of [recommendations that minimize potential impacts to migratory birds](#). Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed [voluntary guidelines for minimizing impacts](#).

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to [guidelines](#) developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's [Wind Energy Guidelines](#). In addition, please refer to the Service's [Eagle Conservation Plan Guidance](#), which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination

While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.

Minnesota

[Minnesota Department of Natural Resources - Endangered Resources Review Homepage](#)

Email: Review.NHIS@state.mn.us

Wisconsin

[Wisconsin Department of Natural Resources - Endangered Resources Review Homepage](#)

Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office

3815 American Blvd East

Bloomington, MN 55425-1659

(952) 858-0793

PROJECT SUMMARY

Project Code: 2024-0031093

Project Name: Meadows Ridge

Project Type: Residential Construction

Project Description: A residential/commercial development is planned for North Branch. The development is proposed on approximately 120 acres of cultivated land northwest of North Branch, Chisago County, Minnesota. The project will include approximately 348 residential lots, 83 detached townhomes, and 265 single-family homes. A 5.88-acre commercial parcel (1.03-acre buildings & 1.94-acre) is planned for the portion of the site adjacent to the intersection between 400th Street and Flink Avenue. The development will consist of mass grading, the extension of North Branch city trunk water and sewer lines, installation of minor utilities (cable, internet, etc.), construction of interior roads, stormwater management practices, and new homes.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@45.5319451,-92.99774388788609,14z>



Counties: Chisago County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane <i>Grus americana</i> Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non- Essential

CLAMS

NAME	STATUS
Salamander Mussel <i>Simpsonaias ambigua</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act¹ and the Migratory Bird Treaty Act².

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats³, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

-
1. The [Bald and Golden Eagle Protection Act](#) of 1940.
 2. The [Migratory Birds Treaty Act](#) of 1918.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

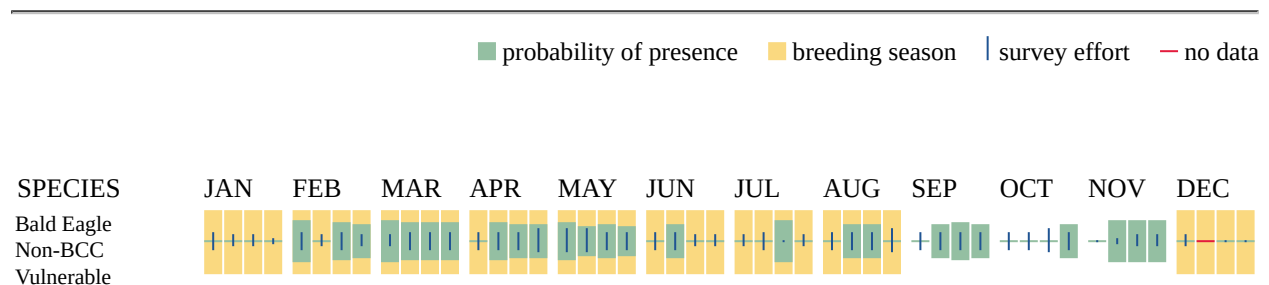
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>

- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats³ should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "[Supplemental Information on Migratory Birds and Eagles](#)".

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern <i>Chlidonias niger</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Canada Warbler <i>Cardellina canadensis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25

NAME	BREEDING SEASON
Eastern Whip-poor-will <i>Antrastomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Golden-winged Warbler <i>Vermivora chrysoptera</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper <i>Calidris melanotos</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

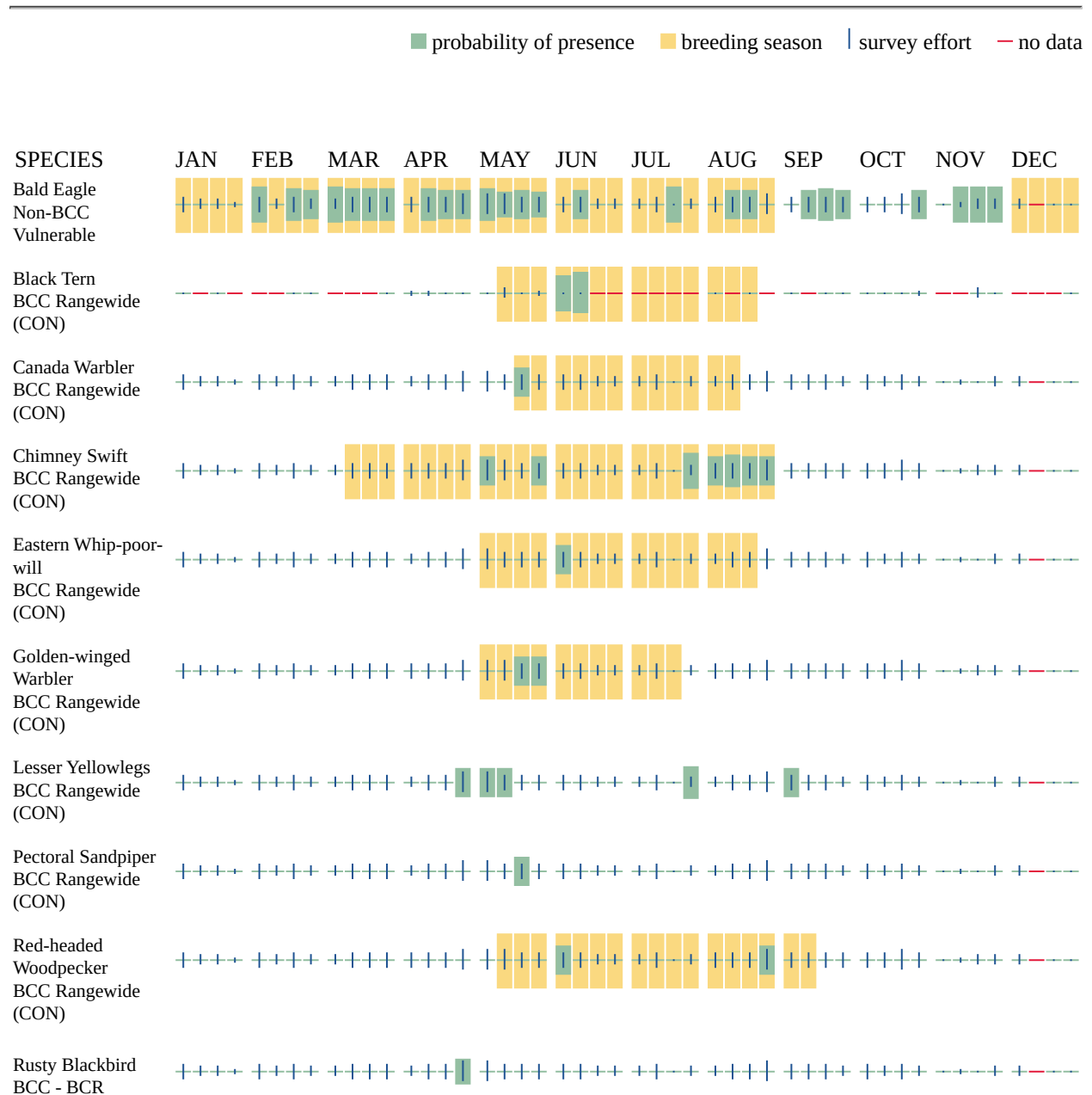
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

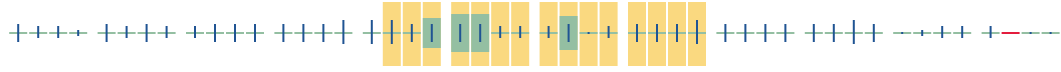
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Wood Thrush
BCC Rangewide
(CON)



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

IPAC USER CONTACT INFORMATION

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Address Line 2: Suite 130
City: Orono
State: MN
Zip: 55331
Email: maryclare@kjolhaugenv.com
Phone: 2244567944



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873



In Reply Refer To:
Project code: 2024-0031093
Project Name: Meadows Ridge

December 29, 2023

Federal Nexus: no
Federal Action Agency (if applicable):

Subject: Technical assistance for 'Meadows Ridge'

Dear Mary McAleer:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on December 29, 2023, for 'Meadows Ridge' (here forward, Project). This project has been assigned Project Code 2024-0031093 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project is not reasonably certain to cause incidental take of the northern long-eared bat. Unless the Service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate
- Salamander Mussel *Simpsonaias ambigua* Proposed Endangered
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered
- Whooping Crane *Grus americana* Experimental Population, Non-Essential

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species and/or critical habitat listed above. Note that if a new species is listed that may be affected by the identified action before it is complete, additional review is recommended to ensure compliance with the Endangered Species Act.

Next Steps

Coordination with the Service is complete. This letter serves as technical assistance. All conservation measures should be implemented as proposed. Thank you for considering federally listed species during your project planning.

We are uncertain where the northern long-eared bat occurs on the landscape outside of known locations. Because of the steep declines in the species and vast amount of available and suitable forest habitat, the presence of suitable forest habitat alone is a far less reliable predictor of their presence. Based on the best available information, most suitable habitat is now expected to be unoccupied. During the interim period, while we are working on potential methods to address this uncertainty, we conclude take is not reasonably certain to occur in areas of suitable habitat where presence has not been documented.

If no changes occur with the Project or there are no updates on listed species, no further consultation/coordination for this project is required for the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place before project implements any changes which are final or commits additional resources.

If you have any questions regarding this letter or need further assistance, please contact the Minnesota-Wisconsin Ecological Services Field Office and reference Project Code 2024-0031093 associated with this Project.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

Meadows Ridge

2. Description

The following description was provided for the project 'Meadows Ridge':

A residential/commercial development is planned for North Branch. The development is proposed on approximately 120 acres of cultivated land northwest of North Branch, Chisago County, Minnesota. The project will include approximately 348 residential lots, 83 detached townhomes, and 265 single-family homes. A 5.88-acre commercial parcel (1.03-acre buildings & 1.94-acre) is planned for the portion of the site adjacent to the intersection between 400th Street and Flink Avenue. The development will consist of mass grading, the extension of North Branch city trunk water and sewer lines, installation of minor utilities (cable, internet, etc.), construction of interior roads, stormwater management practices, and new homes.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@45.5319451,-92.99774388788609,14z>



DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of “may affect, but not likely to adversely affect” for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. The action area does not overlap with an area for which U.S. Fish and Wildlife Service currently has data to support the presumption that the northern long-eared bat is present. Are you aware of other data that indicates that northern long-eared bats (NLEB) are likely to be present in the action area?

Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed NLEB acoustic detections. Data on captures, roost tree use, and acoustic detections should post-date the year when white-nose syndrome was detected in the relevant state. With this question, we are looking for data that, for some reason, may have not yet been made available to U.S. Fish and Wildlife Service.

No

3. Does any component of the action involve construction or operation of wind turbines?

Note: For federal actions, answer ‘yes’ if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

No

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

No

PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Mary McAleer
Address: 2500 Shadywood Road
Address Line 2: Suite 130
City: Orono
State: MN
Zip: 55331
Email: maryclare@kjolhaugenv.com
Phone: 2244567944



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873



In Reply Refer To:
Project code: 2024-0031093
Project Name: Meadows Ridge

December 29, 2023

Subject: Consistency letter for 'Meadows Ridge' for specified threatened and endangered species that may occur in your proposed project location consistent with the Minnesota-Wisconsin Endangered Species Determination Key (Minnesota-Wisconsin DKey).

Dear Mary McAleer:

The U.S. Fish and Wildlife Service (Service) received on **December 29, 2023** your effect determination(s) for the 'Meadows Ridge' (Action) using the Minnesota-Wisconsin DKey within the Information for Planning and Consultation (IPaC) system. You have submitted this key to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance of with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.).

Based on your answers and the assistance of the Service's Minnesota-Wisconsin DKey, you made the following effect determination(s) for the proposed Action:

Species	Listing Status	Determination
Monarch Butterfly (<i>Danaus plexippus</i>)	Candidate	No effect
Tricolored Bat (<i>Perimyotis subflavus</i>)	Proposed	No effect
	Endangered	
Whooping Crane (<i>Grus americana</i>)	Experimental	No effect
	Population, Non-Essential	

Determination Information

Thank you for informing the Service of your "No Effect" determination(s). No further coordination is necessary for the species you determined will not be affected by the Action.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects

determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project changes are final or resources committed.

Species-specific information

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the “taking” of bald and golden eagles and defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” The Eagle Act’s implementing regulations define disturb as “... to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

If you observe a bald eagle nest in the vicinity of your proposed project, you should follow the National Bald Eagle Management Guidelines (May 2007). For more information on eagles and conducting activities in the vicinity of an eagle nest, please visit our regional eagle website or contact Margaret at Margaret_Rheude@fws.gov. **If the Action may affect bald or golden eagles, additional coordination with the Service under the Eagle Act may be required.**

The following species and/or critical habitats may also occur in your project area and **are not** covered by this conclusion:

- Northern Long-eared Bat *Myotis septentrionalis* Endangered
- Salamander Mussel *Simpsonia ambigua* Proposed Endangered

Coordination with the Service is not complete if additional coordination is advised above for any species.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

Meadows Ridge

2. Description

The following description was provided for the project 'Meadows Ridge':

A residential/commercial development is planned for North Branch. The development is proposed on approximately 120 acres of cultivated land northwest of North Branch, Chisago County, Minnesota. The project will include approximately 348 residential lots, 83 detached townhomes, and 265 single-family homes. A 5.88-acre commercial parcel (1.03-acre buildings & 1.94-acre) is planned for the portion of the site adjacent to the intersection between 400th Street and Flink Avenue. The development will consist of mass grading, the extension of North Branch city trunk water and sewer lines, installation of minor utilities (cable, internet, etc.), construction of interior roads, stormwater management practices, and new homes.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@45.5319451,-92.99774388788609,14z>



QUALIFICATION INTERVIEW

1. This determination key is intended to assist the user in evaluating the effects of their actions on Federally listed species in Minnesota and Wisconsin. It does not cover other prohibited activities under the Endangered Species Act (e.g., for wildlife: import/export, Interstate or foreign commerce, possession of illegally taken wildlife, etc.; for plants: import/export, reduce to possession, malicious destruction on Federal lands, commercial sale, etc.) or other statutes. Additionally, this key DOES NOT cover wind development, purposeful take (e.g., for research or surveys), communication towers that have guy wires or are over 450 feet in height, aerial or other large-scale application of any chemical (such as insecticide or herbicide), and approval of long-term permits or plans (e.g., FERC licenses, HCP's).

Click **YES** to acknowledge that you must consider other prohibitions of the ESA or other statutes outside of this determination key.

Yes

2. Is the action being funded, authorized, or carried out by a Federal agency?

No

3. Are you the Federal agency or designated non-federal representative?

Yes

4. Does the action involve the installation or operation of wind turbines?

No

5. Does the action involve purposeful take of a listed animal?

No

6. Does the action involve a new communications tower?

No

7. Does the activity involve aerial or other large-scale application of ANY chemical, including pesticides (insecticide, herbicide, fungicide, rodenticide, etc)?

No

8. Does the action occur near a bald eagle nest?

Note: Contact the Minnesota or Wisconsin Department of Natural Resources for an up-to-date list of known bald eagle nests.

No

9. Will your action permanently affect local hydrology?

No

10. Will your action temporarily affect local hydrology?

Yes

11. Will your project have any direct impacts to a stream or river (e.g., Horizontal Directional Drilling (HDD), hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.)?

No

12. Does your project have the potential to impact the riparian zone or indirectly impact a stream/river (e.g., cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.)?

Note: Consider all potential effects of the action, including those that may happen later in time and outside and downstream of the immediate area involved in the action.

Endangered Species Act regulation defines "effects of the action" to include all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (50 CFR 402.02).

No

13. Will your action disturb the ground or existing vegetation?

Note: This includes any off-road vehicle access, soil compaction (enough to collapse a rodent burrow), digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

Yes

14. Will your action include spraying insecticides?

No

15. Does your action area occur entirely within an already developed area?

Note: Already developed areas are already paved, covered by existing structures, manicured lawns, industrial sites, or cultivated cropland, AND do not contain trees that could be roosting habitat. Be aware that listed species may occur in areas with natural, or semi-natural, vegetation immediately adjacent to existing utilities (e.g. roadways, railways) or within utility rights-of-way such as overhead transmission line corridors, and can utilize suitable trees, bridges, or culverts for roosting even in urban dominated landscapes (so these are not considered "already developed areas" for the purposes of this question). If unsure, select NO..

No

16. [Hidden Semantic] Does the action area intersect the monarch butterfly species list area?

Automatically answered

Yes

17. Under the ESA, monarchs remain warranted but precluded by listing actions of higher priority. The monarch is a candidate for listing at this time. The Endangered Species Act does not establish protections or consultation requirements for candidate species. Some Federal and State agencies may have policy requirements to consider candidate species in planning. We encourage implementing measures that will remove or reduce threats to these species and possibly make listing unnecessary.

If your project will have no effect on monarch butterflies (for example, if your project won't affect their habitat or individuals), then you can make a "no effect" determination for this project.

Are you making a "no effect" determination for monarch?

No

18. [Hidden semantic] Does the action intersect the Tricolored bat species list area?

Automatically answered

Yes

19. The tricolored bat was proposed for listing as endangered on September 13, 2022. During winter, tricolored bats hibernate in caves, abandoned mines, and abandoned tunnels ranging from small to large in size. During spring, summer and fall months, they roost primarily among leaf clusters of live or recently dead deciduous/hardwood trees.

What effect determination do you want to make for the tricolored bat (Only make a "may affect" determination if you think the project is likely to jeopardize the continued existence of the species)?

1. "No effect"

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Mary McAleer
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City: Orono
State: MN
Zip: 55331
Email: maryclare@kjolhaugenv.com
Phone: 2244567944

Meadows Ridge
Environmental Assessment Worksheet
Appendix J

Archeologic Study

***Phase I Archaeological Investigation of the Meadows
Ridge Housing Development Project,
Chisago County, Minnesota
SHPO Number: 2024-0588***

Benjamin W. Schweer
Craig Picka



February 2, 2024

 **IN SITU**
Archaeological Consulting
7630 Executive Drive
Eden Prairie, MN 55344
Office: (952) 658-8891
Website: www.insitucrm.com

Report Title: Phase I Archaeological Investigation of the Meadows Ridge Housing Development Project, Chisago County, Minnesota
SHPO Number: 2024-0588

Report Date: February 2, 2024

Authors: Benjamin W. Schweer and Craig Picka

Principal Investigator: Craig Picka

Project Client: LGI Homes – Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, MN 55303

Kjolhaug Environmental Services
2500 Shadywood Road, Suite 130
Orono, MN 55331

Survey Date: January 3, 2024

Acres: 3.2 acres of the proposed 118.9-acre project area

Legal Description: The project area is located on privately owned land within the city limits of North Branch, Chisago County, Minnesota in the SW of Section 8 of Township (T) 35 North (N), Range (R) 21 West (W).

Project Description: The proposed project is for the proposed Meadows Ridge residential development within the city limits of North Branch, Minnesota. At the present time, the Project is not subject to Section 106 review, as the Project will not require federal assistance or authorization. However, this cultural resource assessment is being completed as part of an Environmental Assessment Worksheet (EAW) for the Project. Therefore, the Project is subject to review by the Minnesota State Historic Preservation Office (SHPO).

Location Description: The project area is located on privately owned land within the city limits of North Branch, Minnesota (Parcels 11.00142.10 and 11.00143.00) (Figures 1-2). The proposed project area is approximately 118.9 acres in size. The project area is located north of 400th Street, west of I-35, and on both sides of Flink Avenue. The project area is within an open area consisting of agricultural fields and wooded vegetation (Figure 3). The topography of the area consisted of slightly undulating terrain. Vegetation consisted of harvested soy remnants and trees. The area has been impacted by agricultural practices and urban development (roads, utilities, etc.).

Literature Search Results: A literature search within a 1-mile study area surrounding the proposed project area was conducted on January 2, 2024, by In Situ staff (Figures 4-6B). This task was completed using site data files and previous inventory files maintained at the Minnesota SHPO and Minnesota OSA. The literature search revealed no previous cultural resource surveys, no previously recorded archaeological sites, and two previously recorded architectural resources within the 1-mile study area.

The data gathered revealed two previously recorded architectural resources within the Study Area (Table 1). Both of the previously recorded architectural resources are *not eligible* for the NRHP and do not overlap with the direct APE of the project.

Table 1: Previously Recorded Architectural Resources within the Study Area			
Site Number	Site Name / Type	Location	NRHP Eligibility
XX-ROD-00012	U.S./Trunk Highway 61 (formerly State Road/Trunk Highway 1 and 3)	TH 61 from Wyoming to Duluth	Not Eligible
XX-ROD-00019	U.S./Trunk Highway 61 (formerly State Road/TH 1 and 3)	TH 61 - La Crescent to Duluth	Not Eligible

Field Personnel: The field survey crew consisted of In Situ archaeologists Craig Picka and Benjamin W. Schweer.

Field Methods and Conditions: The Phase I Cultural Resource Investigation was conducted using visual inspection and shovel testing methodologies. These methods were conducted in accordance with the Minnesota SHPO guidelines.

- *Visual Inspection* – Locations where cultural resources were not expected, such as disturbed areas, areas with a slope greater than 20 degrees, and low/wet areas were walked over and visually inspected. This method was used to verify the absence or likelihood of any cultural resources within these areas. This method was also utilized to document the general terrain of the surrounding area.
- *Shovel Testing* – this method was used to sample subsurface contexts in areas with slopes less than 20 degrees and ground visibility of less than 25%. A typical shovel test was 40 cm in circular diameter. The shovel tests were excavated on a grid at 15 m intervals, with additional radial shovel tests conducted at 5 m intervals when any artifacts were discovered. Shovel tests were excavated in 10 cm levels. All shovel tests were documented using a sub-meter GPS unit. Excavated soil was screened through 0.25-inch mesh. Shovel tests were excavated no deeper than one m or 10 cm into sterile subsoils. Data gathered from the shovel tests included stratigraphy, soil texture, Munsell color, and the presence or absence of cultural materials. All excavated soils were immediately backfilled upon completion.

The crew was supervised by a qualified archaeologist who meets the requirements for the Secretary of the Interior’s Guidelines for Professional Qualifications in Archaeology. A sub-meter GPS unit utilizing Geographic Information System (GIS) data as well as field maps were used to collect spatial data. This ensured that field personnel did not survey outside the project area. All field data, notes, and photographs are on file at In Situ’s Eden Prairie, Minnesota office.

An initial Phase I cultural resource investigation for the project was conducted on January 3, 2024. The project area is within an area consisting of agricultural fields and wooded vegetation. At the time of the survey, field conditions within the agricultural fields were not conducive for the use of pedestrian survey methods, as the ground surface visibility was poor (under 25%), due to soybean debris and snow cover. Approximately 115.7 acres

of the project area is within these agricultural fields. Due to the field conditions and project time constraints, the survey was not completed within the agricultural fields at this time and pedestrian survey for this area will take place in the spring of 2024, after the fields have been tilled. However, shovel testing was completed within the wooded area located in the northwest corner of the project area. Therefore, this report is for the wooded portion of the Project area that was subjected to shovel testing methodology, totaling 3.2 acres (Figure 7A-7B). The weather was cool and cloudy during the survey. The survey area of this portion of the project area is located within an area consisting of wooded vegetation (Figures 8-17). Shovel testing was conducted throughout this portion of the project area, as the ground surface visibility within the wooded area was poor (under 25%).

Approximately 3.2 acres were subject to shovel testing during the January 2024 cultural resource field assessment for the project. No cultural materials were observed or recorded during the archaeological assessment of this project area.

The shovel test units are classified as negative, positive, sloped, wet, and disturbed. “Negative” shovel tests have intact soils that contained no cultural material. “Positive” shovel tests have intact soils that contained cultural material. “Sloped” shovel tests were located on > 20 degree slopes. “Wet” shovel tests have undisturbed soils and contain a shallow water table and/or hydric soils. “Disturbed” shovel tests have mottled soils and/or have been greatly disturbed due to land development. A total of 61 shovel test units were conducted during this survey, all of which were negative for cultural resources. No cultural materials were observed or recovered.

A typical shovel test profile within this portion of the Project area consisted of a dark brown (10YR3/3) sandy loam over a dark yellowish brown (10YR4/4) sandy loam, as demonstrated in Figure 18. Shovel tests were terminated at least 10 cm into the sterile subsoil.

At this time, LGI Homes and Kjolhaug Environmental Services are completing the EAW process for the proposed project. Due to the poor survey conditions and project time constraints, LGI Homes, Kjolhaug Environmental Services, and In Situ request a preliminary concurrence of *No Historic Properties Affected* within the current surveyed areas and clearance to proceed with the EAW submittal and approval for the proposed project. This concurrence and clearance will take place under the condition that the remainder of the survey area is subject to archaeological survey and that all of the survey areas and findings are documented in a final report to be submitted to SHPO at a later date.

Results and Recommendations: In January 2024, In Situ conducted an initial archaeological field survey for the Meadows Ridge North Branch Development Project. The project area is within an area consisting of agricultural fields and wooded vegetation. At the time of the survey, field conditions within the agricultural fields were not conducive for the use of pedestrian survey methods, as the ground surface visibility was poor (under 25%), due to soybean debris and snow cover. Approximately 115.7 acres of the project area is within these agricultural fields. Due to the field conditions and project time constraints, the survey was not completed within the agricultural fields at this time and pedestrian survey for this area will take place in the spring of 2024, after the fields have been tilled. However, shovel testing was completed within the 3.2-acre wooded area located in the northwest corner of the project area. No cultural resources were observed during the initial cultural resource survey of the project area.

At this time, LGI Homes and Kjolhaug Environmental Services are completing the EAW process for the proposed project. Due to the poor survey conditions and project time constraints, LGI Homes, Kjolhaug Environmental Services, and In Situ request a preliminary concurrence of *No Historic Properties Affected* within the current surveyed areas and clearance to proceed with the EAW submittal and approval for the proposed project. This concurrence and clearance will take place under the condition that the remainder of the survey area is subject to archaeological survey and that all of the survey areas and findings are documented in a final report to be submitted to SHPO at a later date.

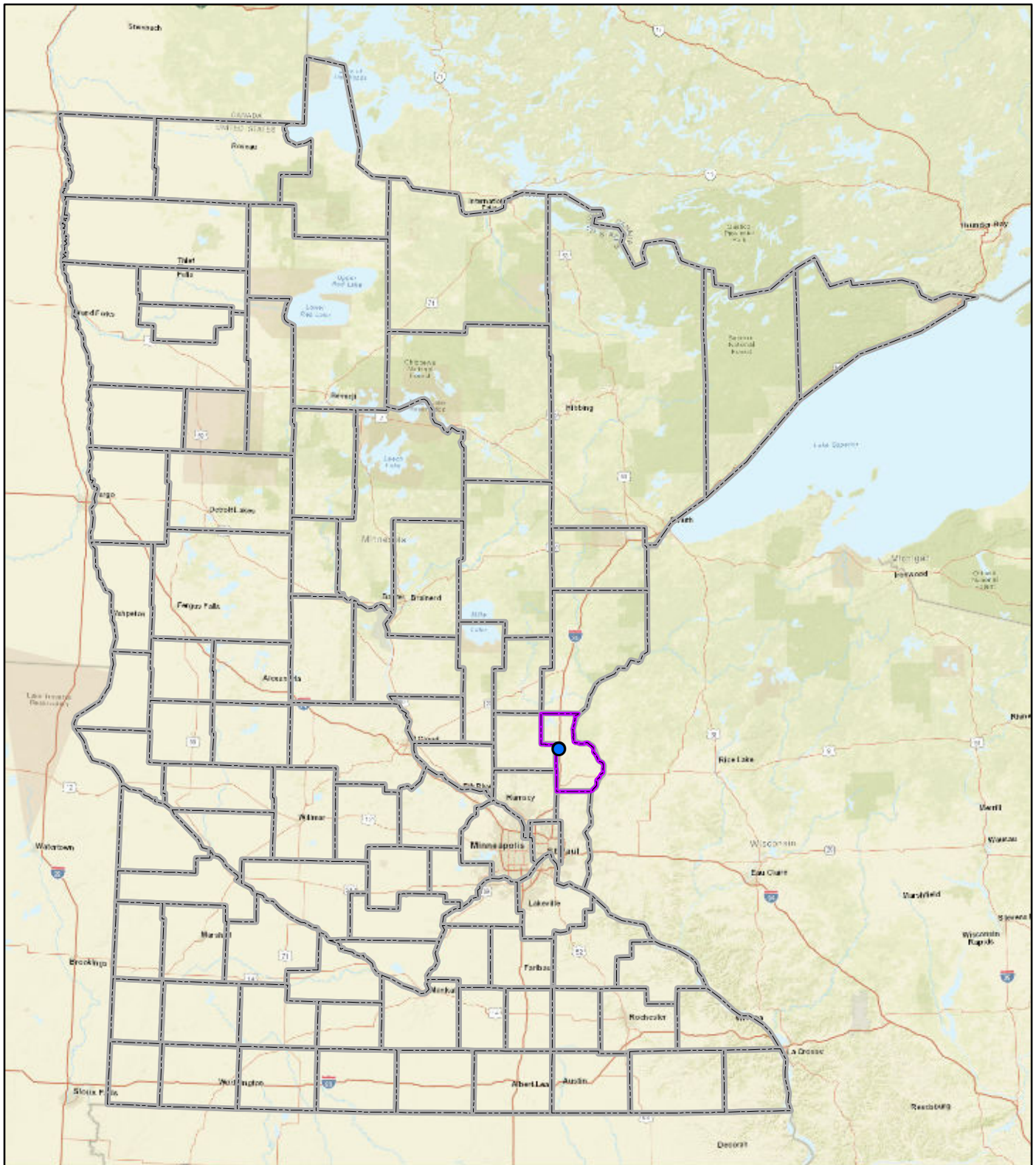
For In Situ Archaeological Consulting, LLC.

Signed: _____

Name: Craig Picka, M.S., RPA

Position: Principal Investigator, Archaeology

FIGURES



Legend

- Project Location
- Chisago County
- County Boundary



1:3,456,623

Approximate Scale in Feet

1 inch equals 288,052 feet

0 460,000 920,000

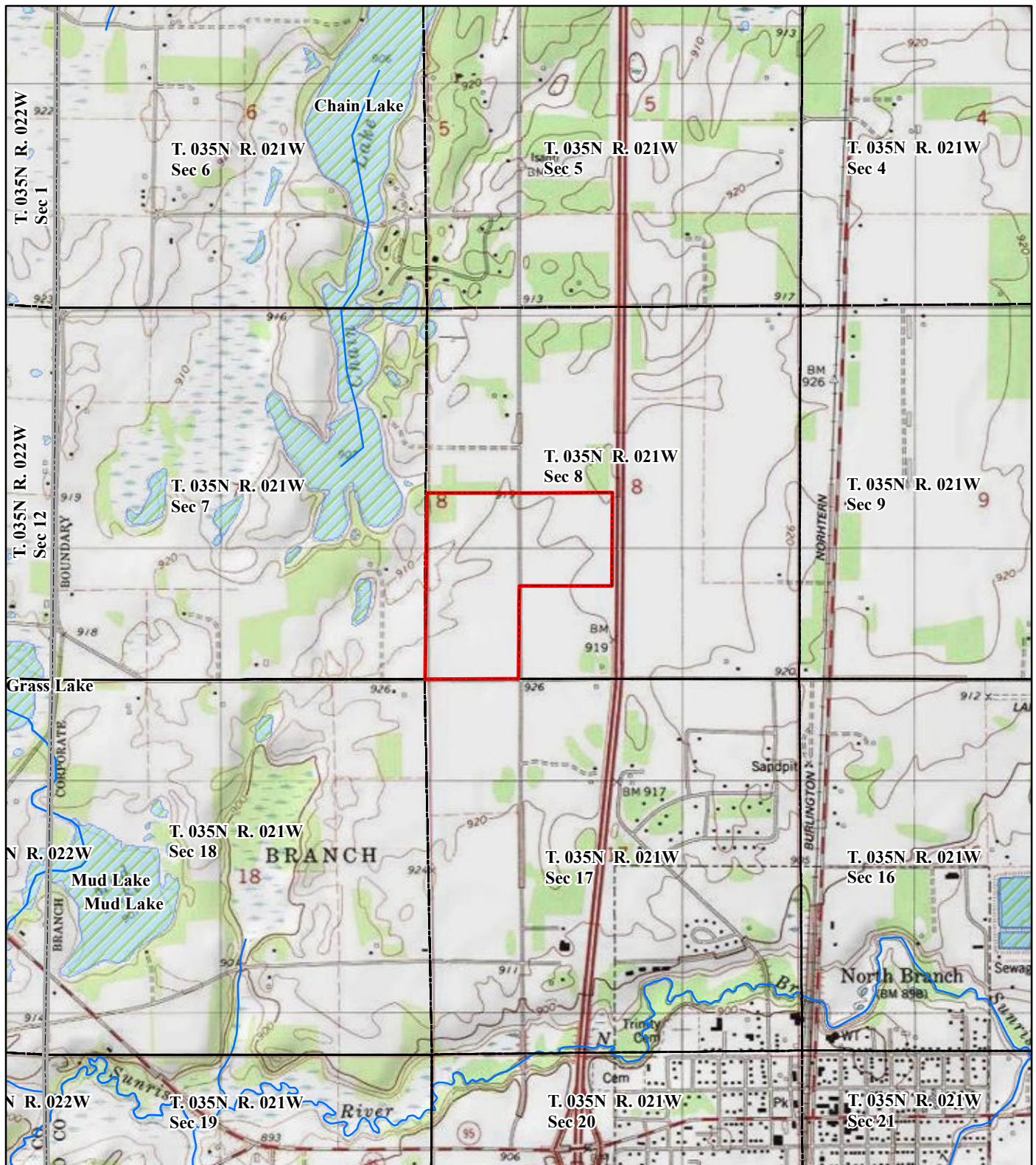
POLITICAL MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 1. Political map showing project location.





Legend

- Project Area
- Township Boundary
- Township/Range/Section
- Stream/River
- Waterbody



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

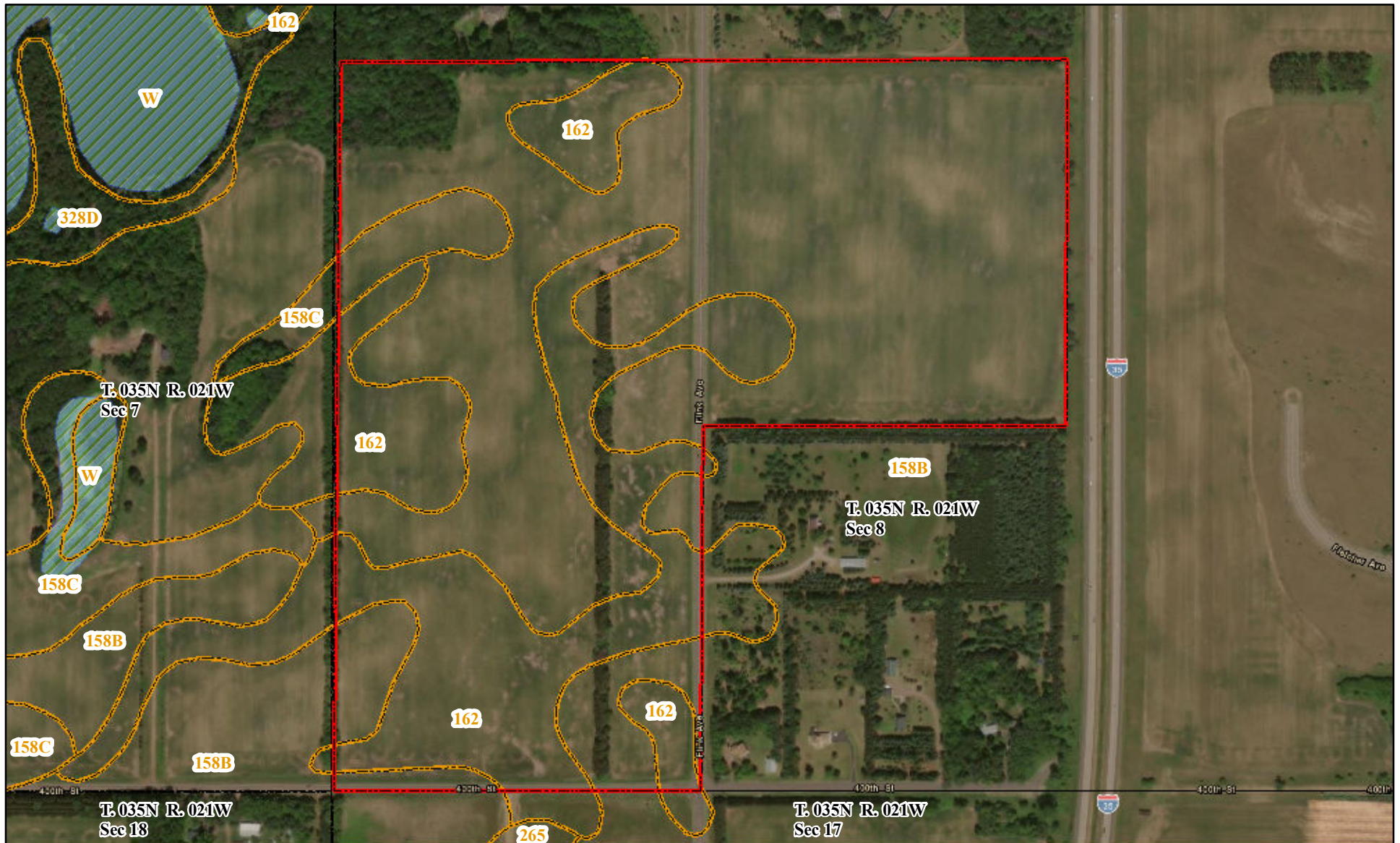
TOPOGRAPHIC MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 2. Project location on the USGS 1983 North Branch SW, MN 7.5 minute series topographic map.





Legend

- Project Area
- Soils
- Township Boundary
- Township/Range/Section
- Stream/River
- Waterbody



AERIAL MAP

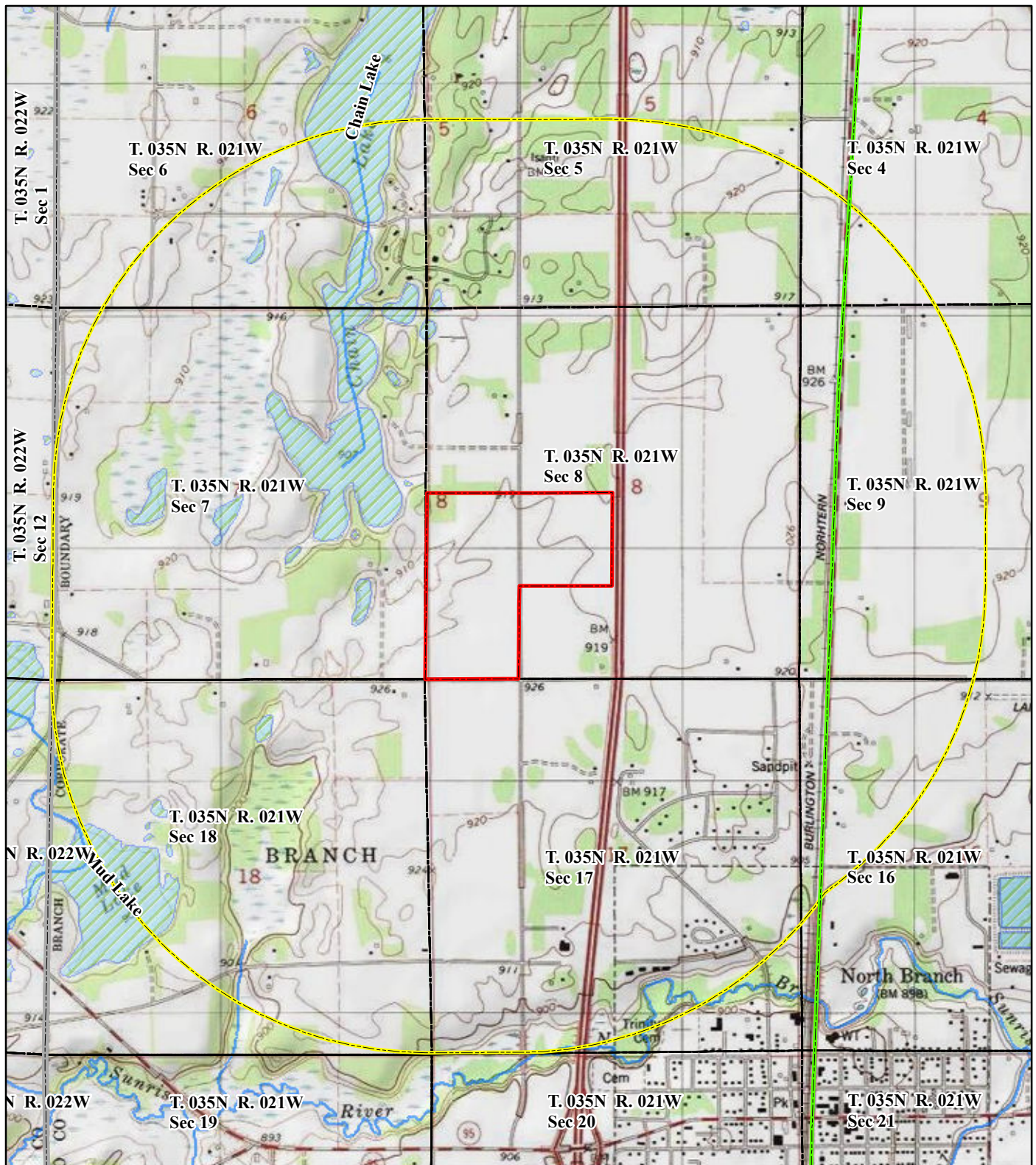
Meadows Ridge Housing
Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 3. Project location on an aerial map.

1:6,000
Approximate Scale in Feet
0 750 1,500
1 inch equals 500 feet





Legend

- Not Eligible Resource
- Stream/River
- Project Area
- Waterbody
- 1-Mile Study Area
- Township Boundary
- Township/Range/Section



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

LITERATURE REVIEW TOPOGRAPHIC MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

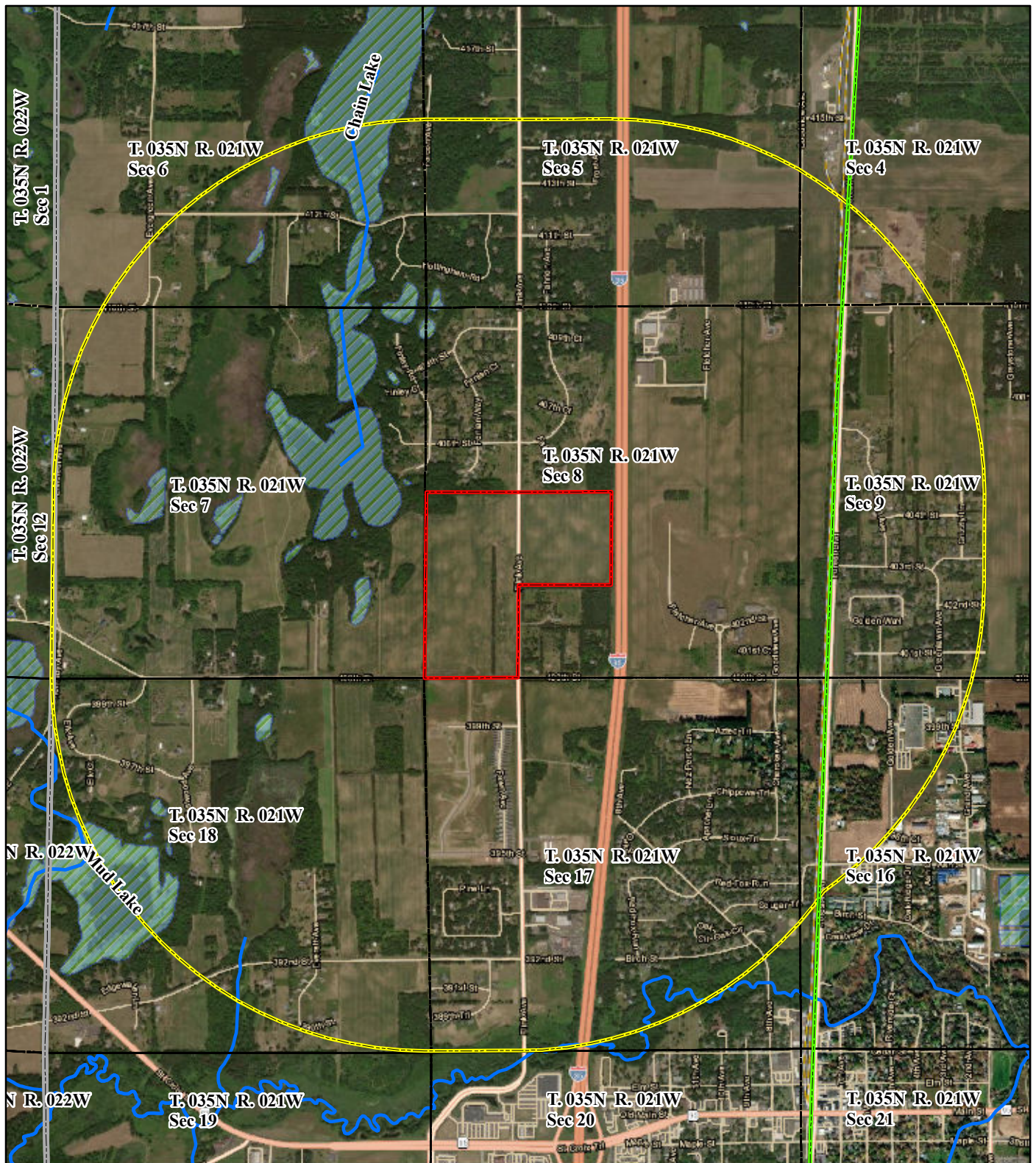
DO NOT RELEASE

Archaeological Site Location Not for Public Disclosure

Note: Imagery courtesy of ESRI

Figure 4. Topographic map with previous cultural resources surveys and previously recorded sites.





Legend

- Not Eligible Resource
- Stream/River
- Project Area
- Waterbody
- 1-Mile Study Area
- Township Boundary
- Township/Range/Section

1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400



LITERATURE REVIEW AERIAL MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

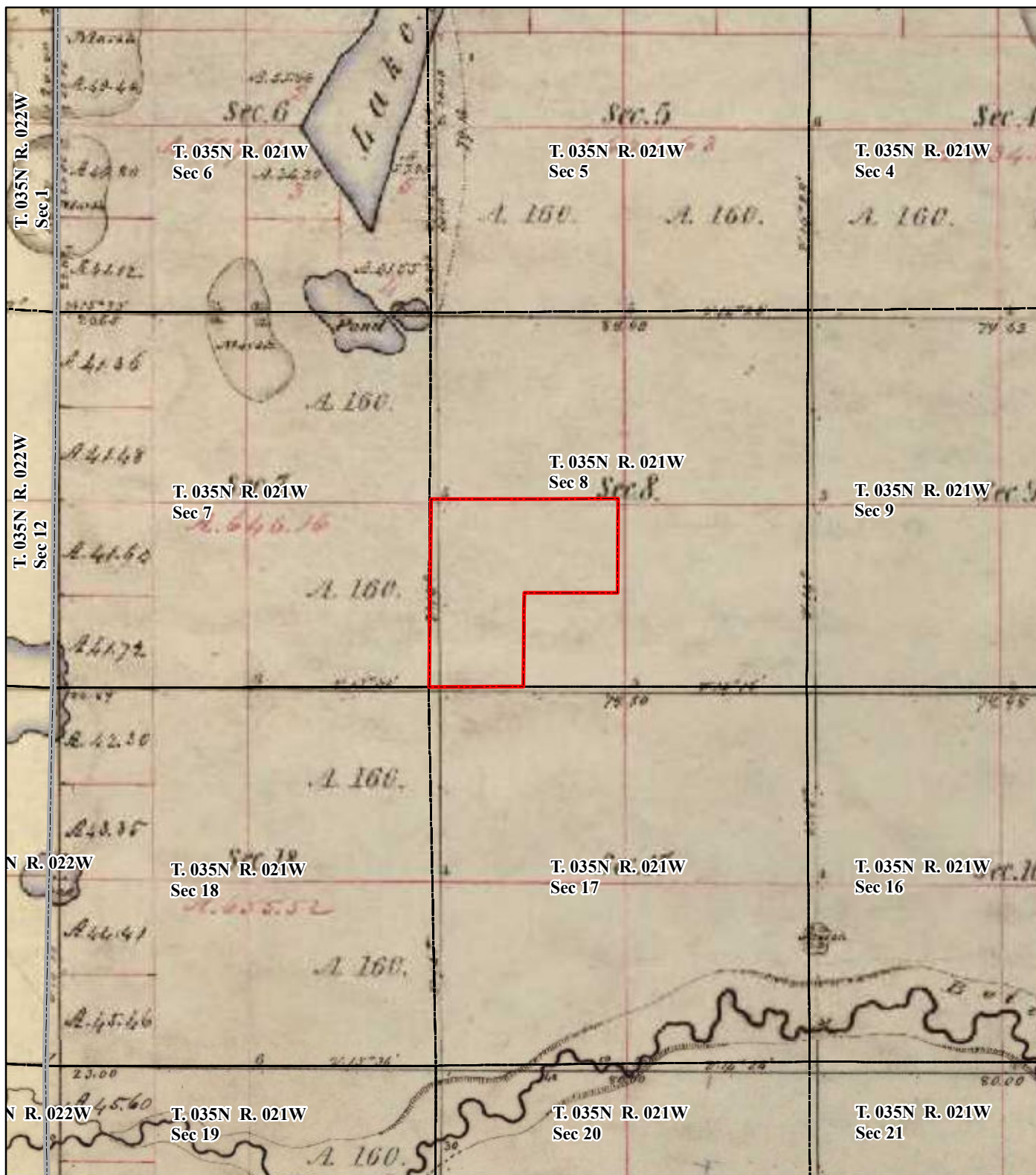
DO NOT RELEASE

Archaeological Site Location Not for Public Disclosure

Note: Imagery courtesy of ESRI

Figure 5. Aerial map with previous cultural resources surveys and previously recorded sites.





Legend

-  Project Area
-  Township Boundary
-  Township/Range/Section



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

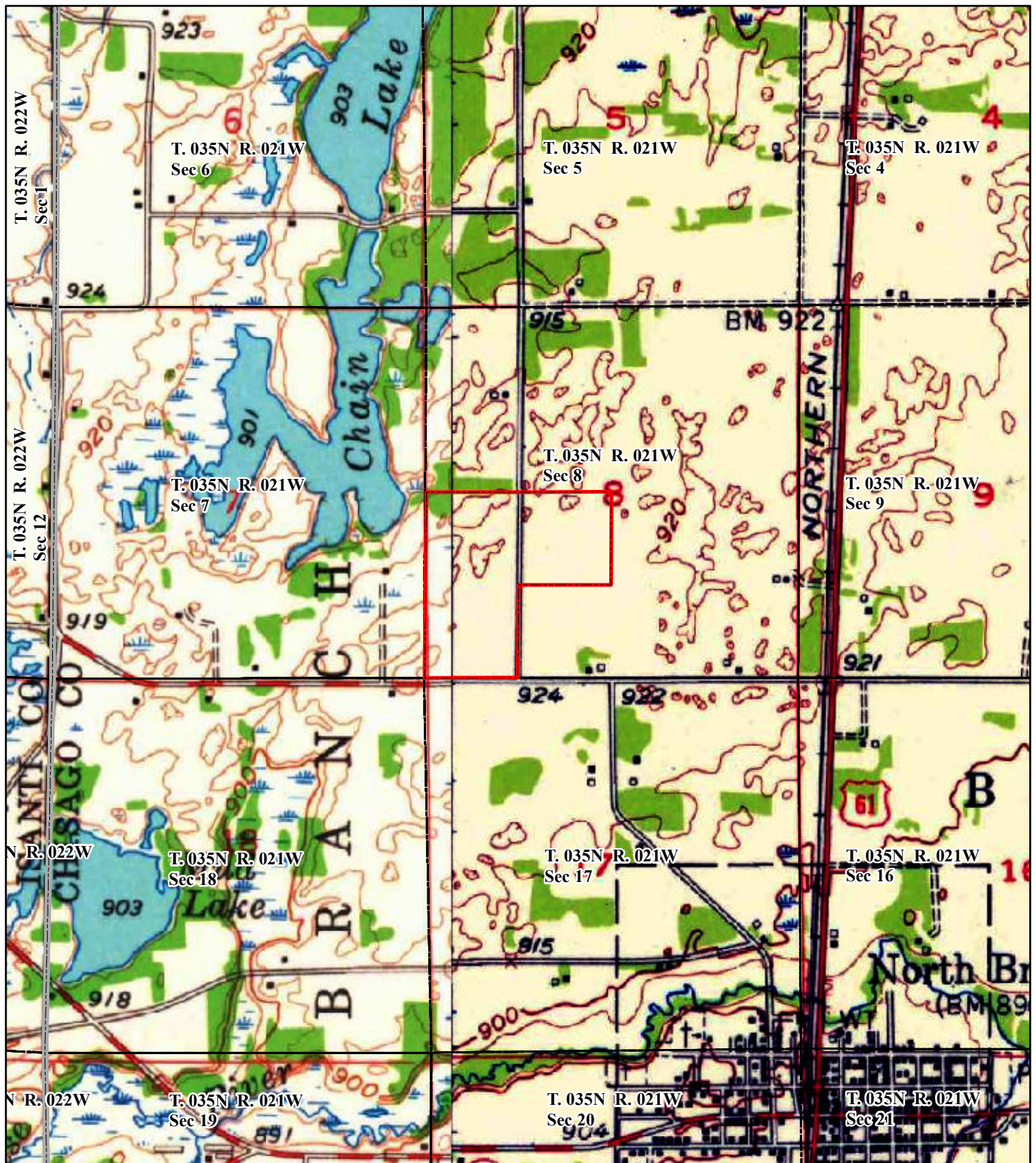
HISTORICAL BLM GLO PLAT MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of the U.S. Department of the Interior Bureau of Land Management.

Figure 6A. Project location on the 1849 BLM GLO Plat map.





Legend

- Project Area
- Township Boundary
- Township/Range/Section



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

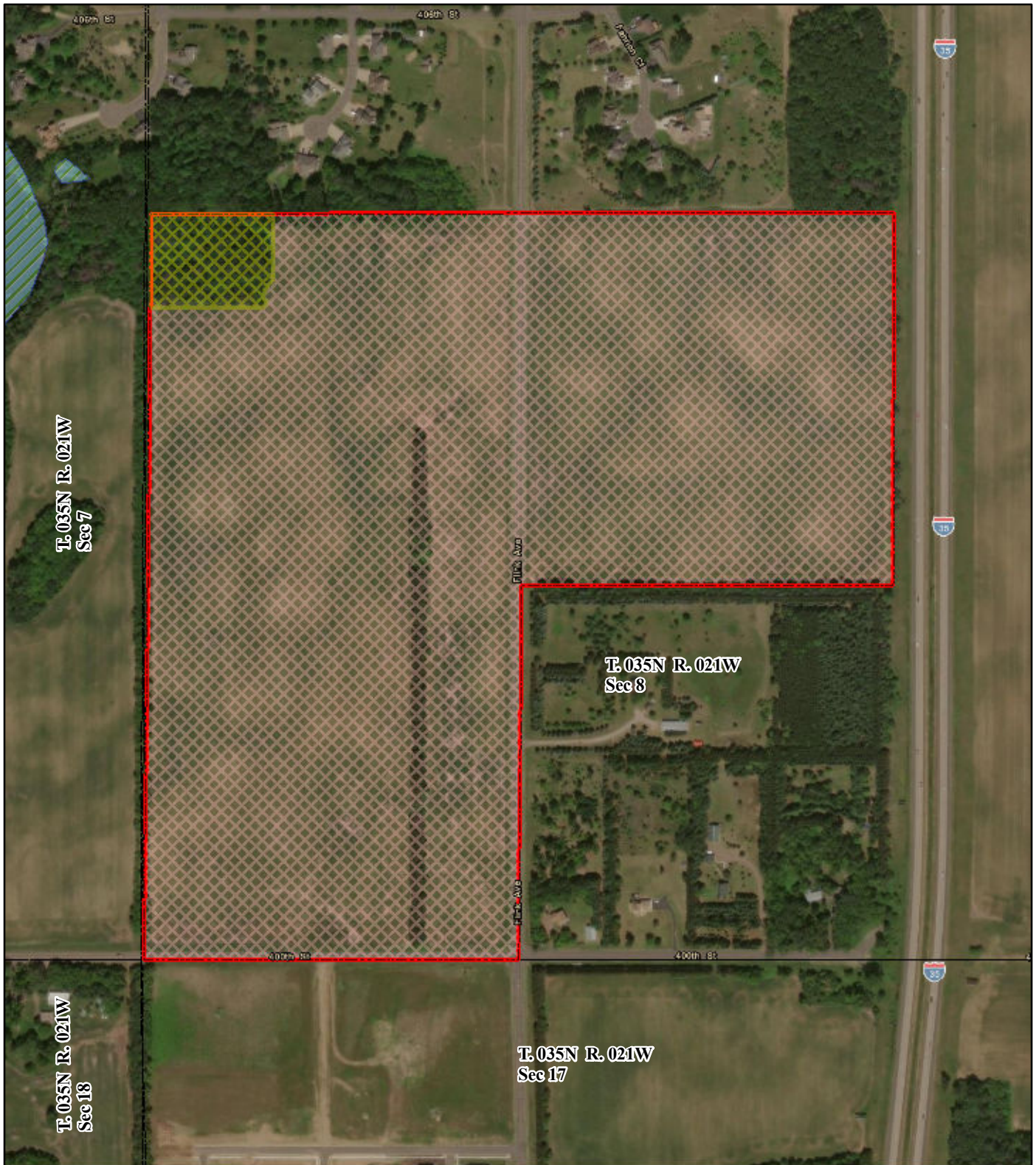
HISTORICAL TOPOGRAPHIC MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of the USGS.

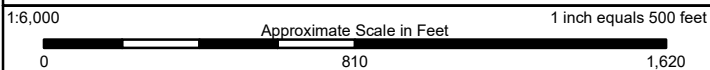
Figure 6B. Project location on the 1955
Rush City, MN/1961 Cambridge, MN
62,500 series topographic map.





Legend

-  Area Surveyed
-  Remaining Survey Area
-  Project Area
-  Township Boundary
-  Township/Range/Section
-  Stream/River
-  Waterbody



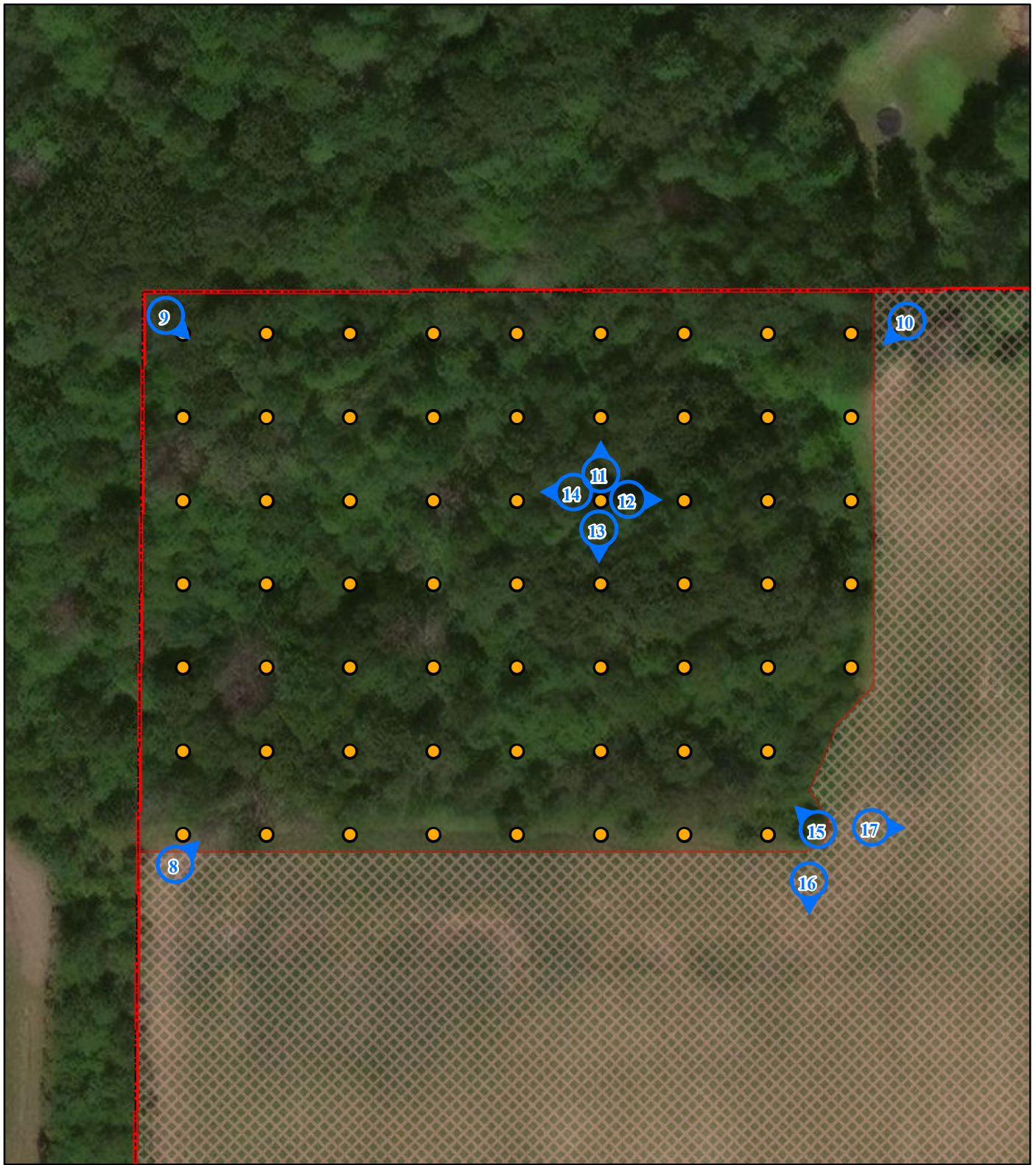
FIELDWORK MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI.

Figure 7A. Fieldwork map of the project indicating the results of testing and photo orientations.





Legend

-  Photographic Orientation
-  Negative Shovel Test
-  Remaining Survey Area
-  Project Area



1:1,000
Approximate Scale in Feet
0 130 260
1 inch equals 83 feet

FIELDWORK MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI.

Figure 7B. Fieldwork map of the project indicating the results of testing and photo orientations.





Figure 8: Overview facing northeast within the project area (DSCN2163).



Figure 9: Overview facing southeast within the project area (DSCN2172).



Figure 10: Overview facing southwest within the project area (DSCN2194).



Figure 11: Overview facing north within the project area (DSCN2185).



Figure 12: Overview facing east within the project area (DSCN2187).



Figure 13: Overview facing south within the project area (DSCN2189).



Figure 14: Overview facing west within the project area (DSCN2191).



Figure 15: Overview facing northwest within the project area (DSCN2177).



Figure 16: Overview facing south within the project area (DSCN2183).



Figure 17: Overview facing east within the project area (DSCN2181).



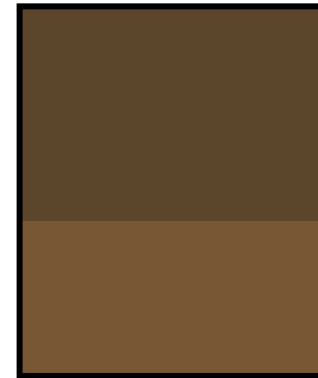
Representative soil shovel test photo.



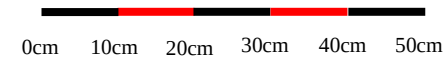
Representative soil profile photo.

Representative Soil Shovel Test Profile

Zimmerman fine sand (158B)



Scale



Depth to Subsoil: 29 cm

Excavator: BWS

Date: 01/03/2024



A 10YR3/3 Dark brown sandy loam
(0-29 cm)



B 10YR4/4 Dak yellowish brown sandy loam
(29-49 cm)

Figure 18. A typical shovel test unit excavated within the project area.

***Phase I Archaeological Investigation of the
Meadows Ridge Housing Development Project,
Chisago County, Minnesota
SHPO Number: 2024-0588***

Benjamin W. Schweer
Craig Picka



June 18, 2024

 **IN SITU**
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Website: www.insitucrm.com

***Phase I Archaeological Investigation of the Blue Earth
Public Works Project, Blue Earth County, Minnesota
SHPO Number: 2024-0588***

Prepared by:

Benjamin W. Schweer
Craig Picka

Principal Investigator:

Craig Picka



Prepared for:

LGI Homes – Minnesota, LLC
2850 Cutters Grove Avenue, Suite 207
Anoka, MN 55303
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2500 Shadywood Road, Suite 130
Orono, MN 55331

Regulatory Agency:

Minnesota State Historic Preservation Office

June 18, 2024

ABSTRACT

On behalf of LGI Homes-Minnesota, LLC, Kjolhaug Environmental Services commissioned In Situ Archaeological Consulting, LLC (In Situ) to provide cultural resource services in support of the Meadows Ridge Housing Development Project (Project). This report presents the results of the intensive Phase I cultural resource investigation conducted by In Situ for the Project.

The Project consists of the proposed Meadows Ridge residential development within the city limits of North Branch, Minnesota. The cultural resource review for the Project consisted of background literature review and field survey of approximately 118.9 acres. At the present time, the Project is not subject to Section 106 review, as the Project will not require federal assistance or authorization. However, this cultural resource assessment is being completed as part of an Environmental Assessment Worksheet (EAW) for the Project. Therefore, the Project is subject to review by the Minnesota State Historic Preservation Office (SHPO).

The Project is located in Section 8 of Township (T) 35 North (N), Range (R) 21 West (W), in Chisago County, Minnesota. The project area is located on privately-owned land within the city limits of North Branch, Minnesota. The project is located north of 400th Street, west of Flink Avenue, and south of 406th Street and north of 400th Street (Parcel 11.00143.00), south of 406th Street, east of Flink Avenue and west of Interstate 35 (Parcel 11.00142.10) within an open area consisting of a tilled agricultural field, mixed grasses, and wooded vegetation. The Phase I investigation included a background literature review within and surrounding the proposed Project area along with an intensive field survey of the proposed Project.

During the field survey, a total of 118.9 acres were inventoried for the Project. One newly recorded cultural resource was observed and recorded during the cultural resource survey of the Project. The resource (21CH0153) is an isolated find consisting of an isolated broken projectile point that is recommended as *not eligible* for the NRHP. Therefore, In Situ recommends a finding of *No Historic Properties Affected* within the surveyed Project area and no further cultural resource work is recommended for the proposed Project.

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INTRODUCTION

On behalf of LGI Homes-Minnesota, LLC, Kjolhaug Environmental Services commissioned In Situ Archaeological Consulting, LLC (In Situ) to provide cultural resource services in support of the Meadows Ridge Housing Development Project (Project). This report presents the results of the intensive Phase I cultural resource investigation conducted by In Situ for the Project.

The Project consists of the proposed Meadows Ridge residential development within the city limits of North Branch, Minnesota. The cultural resource review for the Project consisted of background literature review and field survey of approximately 118.9 acres. At the present time, the Project is not subject to Section 106 review, as the Project will not require federal assistance or authorization. However, this cultural resource assessment is being completed as part of an Environmental Assessment Worksheet (EAW) for the Project. Therefore, the Project is subject to review by the Minnesota State Historic Preservation Office (SHPO).

The Project is located in Section 8 of Township (T) 35 North (N), Range (R) 21 West (W), in Chisago County, Minnesota (Figures 1-2). The Project area is located on privately-owned land within the city limits of North Branch, Minnesota. The project is located north of 400th Street, west of Flink Avenue, and south of 406th Street and north of 400th Street (Parcel 11.00143.00), south of 406th Street, east of Flink Avenue and west of Interstate 35 (Parcel 11.00142.10) within an open area consisting of a tilled agricultural field, mixed grasses, and wooded vegetation (Figure 3). The Phase I investigation included a background literature review within and surrounding the proposed Project area along with an intensive field survey of the proposed Project.

The literature review was conducted on January 2, 2024, and the Phase I cultural resource investigation was conducted on January 3, 2024, and April 23, 2024. The Phase I investigation included a background literature review within and surrounding the proposed Project area along with an approximate 118.9-acre intensive survey of the proposed Project. Craig Picka served as Principal Investigator for the archaeological investigation. Mr. Picka meets the requirements for the Secretary of the Interior's Guidelines for Professional Qualifications in Archaeology. Mr. Picka has over 18 years of experience and he received an M.S. in Applied Anthropology from Missouri State University in 2012 and a B.A. in Anthropology, with an emphasis on Archaeology from Minnesota State University Moorhead in 2009. Fieldwork was completed by the field crew consisting of Craig Picka, Abraham Ledezma, and Benjamin W. Schweer. Literature review data was compiled by Abraham Ledezma and report figures were completed by Santos Ledezma. All field notes and photographs are maintained on file at In Situ's office located in Eden Prairie, Minnesota.

ENVIRONMENTAL AND GEOMORPHOLOGICAL CONTEXT

At the time of survey, the topography of the Project Area consisted of fairly flat to undulating terrain within a tilled agricultural field. Vegetation consisted of harvest soy and corn remnants, mixed grasses, and wooded vegetation. Impacts include natural erosion, agricultural practices, rural/suburban development (roads, utilities, etc.).

ECOLOGICAL SETTING

The Project area is located within the North Central Hardwood Forests (51) Level III ecoregion, and more specifically, the Anoka Sand Plain and Mississippi Valley Outwash (51h) Level IV ecoregion. The Anoka Sand Plain and Mississippi Valley Outwash is defined as an “undulating sandy plain with wetlands, some lakes, small grains, row crops, woodlands, and suburban development” (U.S. Environmental Protection Agency 2007).

Prehistoric and historic vegetation within the region known as the Oak Woodland and Brushland within the Anoka Sand Plain, consisted of bur oak and pin oak, aspen and hazel thickets, jack pine, and prairie openings. Currently, agriculture and urban development are the dominant land uses within the region (Minnesota Department of Natural Resources 1988; 2024).

Hundreds of wildlife species are resident or seasonal visitors to the region along with hundreds of native fish species which live in the surrounding rivers and tributaries. Some of the fauna that would have been common and available for historic and prehistoric human use in the Minnesota region include white-tail deer, black bear, elk, opossum, raccoon, cottontail rabbit, squirrel, gray fox, bobcat, mountain lion, wolf, mink, otter, beaver, muskrat, and woodchuck (Gibbon 2012).

CLIMATE

The climate of Minnesota is a continental-type climate that is marked by seasonal variations. The average annual temperatures in Minnesota range from 36 degrees Fahrenheit (°F) in the extreme north to 49°F in the southeastern corner. The average winter temperature is 17 °F and the average summer temperature is 70°F (National Climatic Data Center 2017). Chisago County winters are cold and the summers are warm. Most of the precipitation occurs during spring and early fall summer when about 75 percent of the annual precipitation is received between April and September. The average annual precipitation is about 29 inches in the county. The average snowfall in the county is about 45 inches. The average winter temperature in the county is 13°F and the average summer temperature is 79°F (U.S. Department of Agriculture 1995).

This undertaking was conducted April 23, 2024. The weather was cool mostly cloudy, typical for the region at that time of year.

PHYSIOGRAPHY AND HYDROLOGY

The physiography of the project area is located within the Anoka Sand Plain Area. This area is north of the eastern arm of the St. Croix moraine and between the Mississippi and St. Croix River. It is a broad sand plain, formed largely by glacial drainage from the northwest. In this region, the lowlands have areas of till that was not buried by the outwash sand and has patches of sand dunes (Wright 1972). The highest elevation in Chisago County is about 850 ft. above sea level with the lowest elevation at about 700 ft. above sea level (U.S. Department of Agriculture 1995).

In Chisago County, the major drainages include the St. Croix River, the Sunrise River, and their tributaries (U.S. Department of Agriculture 1995). The proposed Project area has no waterbodies within it. The nearest waterbody is the Chain Lake which is located approximately 0.07 miles west of the project area, Mud Lake which is located approximately 0.8 miles southwest of the project area and North Branch Sunrise River which is located approximately 1 mile south of the project area.

GEOLOGY

The geology of the Project area is characterized by Upper Cambrian, undivided, dating to the Late Cambrian. The Upper Cambrian, undivided consists of “Jordan Sandstone; dolomite, glauconite, and silty glauconite rocks of the St. Lawrence and Franconia Formation; Ironston and Galesville Sandstones; sandy and shaly rocks of the Eau Claire Formation; and the Mt. Simon Sandstone” (Morey and Meints 2000).

SOILS

The Project area is located within the Zimmerman-Isanti soil association. Zimmerman-Isanti soils are described as “nearly level to rolling, excessively drained and very poorly drained, sandy soils that formed in glacial outwash, eolian sediment, or both; on uplands” (U.S. Department of Agriculture 1995). Three specific soil series are present in the project area, with the most prevalent consisting of Zimmerman fine sand (158B) (Natural Resources Conservation Service 2024). Table 1 summarizes the soils within the Project area.

Table 1: Summary of Soil Series within the Project area.				
Soil Series	Parent Material	Drainage	Slope	Landform
Zimmerman fine sand (158B)	Sandy glaciofluvial deposits	Somewhat excessively drained	1-6%	Rises
Zimmerman fine sand (158C)	Sandy glaciofluvial deposits	Somewhat excessively drained	6-12%	Rises
Lino loamy fine sand (162)	Sandy outwash	Somewhat poorly drained	0-1%	Outwash plains

CULTURAL CONTEXT

The Project location is situated in Blue Earth County, Minnesota and within Archaeological Region 4 – Central Lakes Deciduous (Anfinson 1990; Gibbon 2012; Gibbon et al. 2002). The Central Lakes Deciduous region encompasses Anoka, Benton, Cass, Chisago, Crow Wing, Hennepin, Isanti, Mille Lacs, Morrison, Ramsey, Sherburne, Stearns, Todd, Wadena, Washington, and Wright counties with portions of Becker, Dakota, Douglas, Hubbard, Kandiyohi, Kanabec, Meeker, Otter Tail, Pine, Pope, and Swift counties. This region could also be extended eastward into central Wisconsin. The topography of the Central Deciduous Lakes region is characterized by a patchwork of moraines, till plains, and outwash plains. The Mississippi River flows through the central and eastern area of the region with the Lower St. Croix River on the eastern border (Anfinson 1990; Gibbon 2012; Gibbon et al. 2002).

During the contact period (1630-1837), the southern and western areas of the Central Lakes Deciduous region were dominated by Big Woods flora (elm, maple, and basswood) with large inclusions of prairie and oak forests. Oak forests likely dominated the region during the Late Holocene with the eastern area of the region still being dominated by oak forests until approximately the 1850s. The northern area of the region was a mix of deciduous and coniferous forests. Deer was the dominant fauna throughout the region with small numbers of bison and elk in the southern and western areas of the region and beaver, black bear, and moose in the northern and eastern areas of the region (Anfinson 1990; Gibbon 2012; Gibbon et al. 2002).

The following narrative presents a condensed and generalized pre-contact, contact, and post-contact cultural overviews of the survey area based on multiple resources specific to Minnesota and the region.

PRE-CONTACT (PRE-AD 1630)

Paleoindian Period (11,500–7,500 BC)

The Paleoindian Period in North America dates between approximately 11,500–7,500 BC. This is the period in which the first human populations came to North America and the last retreat of the Wisconsin glacial period. The defining characteristics of the Paleoindians were:

- the extensive use of exotic cherts,
- specialized lithic technologies,
- small and extremely mobile societies, and
- the primary subsistence on large game mammals (J. Morrow 1996; Schermer et al. 1995).

During this period, the environment in Minnesota continually changed from an “open boreal coniferous forest dominated by grasses and scattered conifer trees” (Gibbon 2012:38) to open prairie in the southwest, deciduous forest in center-southeast, and coniferous forest in the north.

Early Paleoindian Period (11,500 – 10,500 BC)

During the Early Paleoindian Period the main characteristic that distinguishes the Early Paleoindian Period from the Late Paleoindian Period are the use of fluted lanceolate points and subsistence on large-extinct animals including mammoths, mastodons, and giant bison varieties

(Gibbon 2012; J. Morrow 1996; Schermer et al. 1995). As of 2012, only about seventy-three points, and possibly a scraper and drill have been identified within Minnesota (Gibbon 2012).

The lithic technology of the Early Paleoindian Period is characterized by fluted lanceolate points. The fluted styles found in Minnesota include Clovis, Gainey, Folsom, and Holcombe Points (T. Morrow 2016). Fluting is the removal of a flake from the base of the projectile. The earliest known point type in North America is the Clovis, which dates in Minnesota from circa 9,350 to 8,650 BC (T. Morrow 2016). Clovis points are broad, thin, well-made lanceolate points with concave bases and basal flutes that extend one-half to one-fifth the length of the point. Folsom is the second oldest recorded lithic technology and overlaps with Clovis, dating in Minnesota from circa 8,800 to 8,200 BC (J. Morrow 1996; T. Morrow 2016; Schermer et al. 1995). Folsom are “thin, finely made, medium sized lanceolate points with a flattened to bi-concave cross section, parallel to convex sides, and broad flutes that cover at least 60 percent of each face” (T. Morrow 2016:128). Gainey points are fluted points that have a “lanceolate outline, deep and rounded basal concavities, and well-defined primary flutes” (T. Morrow 2016:124). Holcombe points are “small, thin lanceolate points with shallow concavities with broadly convex sides and high midpoint above the center” (T. Morrow 2016:132).

Late Paleoindian Period (10,500–7,500 BC)

The Late Paleoindian Period is characterized by the disappearance of fluted lanceolate styles and replaced with non-fluted lanceolate point types. Stemmed points, some heavy stone tools, and the use of Hixton quartzite from western Wisconsin are also characteristics of the Late Paleoindian Period in Minnesota (Gibbon 2012). The majority of Late Paleoindian artifacts have been found as surface finds in plowed fields, which have been removed from their original context. This makes any inferences between the associations between the artifacts of this period difficult. The point types found in Minnesota from this period are Agate Basin, Alberta, Angostura, Browns Valley, Eden, Frederick, Hell Gap, Midland, Plainview, and Scottsbluff. These artifacts tend to be well made with high-quality craftsmanship (Gibbon 2012; T. Morrow 2016).

Archaic Period (10,500–500 BC)

The Archaic Period within Minnesota dates between 10,500–500 BC. Within Minnesota, that Early Archaic Period coexisted with the Late Paleoindian Period with little definable timeframe. The Archaic Period in Minnesota is characterized by the:

- expansion of a subsistence strategy that relied on a variety of modern game fauna (deer, moose, bison, rabbits, beavers, birds, and fish) and wild flora resources,
- absence of pottery manufacturing,
- appearance of a variety of notched and stemmed projectile points,
- emergence of pecked and groundstone tools, and
- appearance of native copper artifacts, and some exotic materials such as marine shell (Florin et al. 2016; Gibbon 2012; Stoltman 1997).

During this period, the climate was continuously changing toward a warm and dry climate, a change known as the Altithermal. The dry and hot weather continued for approximately 1,000 years before changing to a cooler, wetter climate that led to a more modern ecology by 3,000 BC (Florin et al. 2016). Deciduous forests dominated the southern area of Minnesota while pine forests replaced the boreal spruce forests in the north. By 8,000 BC, the tallgrass prairie had spread from

west to east across the state, pushing the forests east and then receding back to their present position (Gibbon 2012).

Early Archaic Period (10,500–5,500 BC)

Within Minnesota, the Early Archaic Period is separated between the Early Plains Archaic and Early Eastern Archaic, which were contemporaneous with the Late Paleoindian Period. The Early Eastern Archaic describes the Archaic Complexes that derived from the eastern forests and the Early Plains Archaic describes the Archaic Complexes that derived from the western plains. The main differences between these two culture complexes are that the Early Eastern Archaic started earlier than the Early Plains Archaic and differed in foraging and hunting practices. The Early Archaic Period was a transitional period for cultures, less reliance upon large game mammals to more reliance upon foraging subsistence (T. Morrow 1996; Schermer et al. 1995).

The Early Eastern Archaic points are notched or stemmed styles such as Dalton, Hi-Lo, Quad, Thebes, St. Charles, Graham Cave Side Notched, and Kirk Corners Notched points. The most common diagnostic point from the Early Plains Archaic are Simonsen points (Florin et al. 2016; Gibbon 2012). These points are often associated with sparse scatters of non-diagnostic artifacts like scrapers, blades, and point blanks. As with the Paleoindian Period, it is likely that organic artifacts like wooden artifacts, cords/textiles, and bone tools have not lasted to modern times (Florin et al. 2016; Gibbon 2012).

Middle Archaic Period (7,500–3,000 BC)

The Middle Archaic Period dates approximately between 7,500–3,000 BC. The driest and warmest post-glacial period, the Altithermal, occurred during this period. Due to large climatic changes during this period, many sites may have either been buried or eroded away. The lithic technology of the Middle Archaic Period is characterized by a wide range of medium sized stemmed and notched projectile point types. The projectile points of the Middle Archaic tend to be smaller and poorly made compared to Early Archaic and Late Paleoindian points. This may have been due to an emphasis on using and possibly heat-treating poor quality local lithic resource material rather than using higher quality, exotic lithic materials (Florin et al. 2016; Gibbon et al. 2002).

Middle Archaic points are smaller than Paleoindian points, with side notches and beveled, re-sharpened edges. These edges seem to be used for both penetration and cutting. Also, the points were used as projectile points for atlatl darts, which first appeared during the Archaic Period. The site types from this period in Minnesota include base camps, short-term camps, kill sites, lithic scatters, burials, quarries, and workshops (Gibbon 2012).

The points of the Middle Archaic are divided into two broad categories, the Plains and the Eastern Woodlands. Projectile point types found in the Eastern Woodlands include LeCroy Bifurcated Stemmed, Fox Valley Truncated Barb, Osceola, Raddatz Side Notched, Eva I, Morrow Mountain I and II, Matanzas Side Notched, Etley, Benton Stemmed, and Elk River Stemmed. The point types found in the Plains are Simonsen, Graham Cave Side Notched, Oxbow, McKean, and Table Rock Stemmed. During this period, ground stone tool technology appears such as grooved stone axes, boatstones, bannerstones, and gorgets (Florin et al. 2016, Gibbon 2012; T. Morrow 1996; Schermer et al. 1995).

Late Archaic Period (3,000–500 BC)

The Late Archaic Period in Minnesota, dating between 3,000–500 BC, is characterized by the appearance of different sets of diagnostic points styles; presence of exotic, raw materials (e.g., native copper and marine shell); appearance of “unusual” artifacts including birdstones, gorgets, and Turkey Tail bifaces; presence of communal burial sites; lack of ceramics; and an increasingly modern Late Holocene environment (Gibbon 2012:78).

During the Late Archaic Period, intergroup interactions increased due to an increase in population growth. This increase in population and group interactions created similar subsistence strategies over large areas, which in turn increased each group’s territory size, and increased the number of local, distinctive artifact styles. Trade networks were also developed and established between different communities. The Altithermal ended during this period, causing increased resource stability in areas that were previously uninhabitable by humans. A more sedentary lifeway was practiced, as evident with the construction of large communal cemeteries, increases in wild rice harvesting, and the use of gardens that included sunflower, amaranth, and squash (Gibbon 2012; Schermer et al. 1995).

The point types from the Late Archaic Period are divided into five regional areas: Upper Mississippi River Valley, Northeast, Central Mississippi River Valley, Northern Plains, and Southeast. The Upper Mississippi River Valley consists of the Large Side Notched Cluster (Godar, Madison Side Notched, Osceola, and Raddatz Side Notched), Durst Cluster (Durst Stemmed) Late Archaic Stemmed Cluster (Karnak Stemmed), Turkey Tail Cluster (Turkey Tail), Terminal Archaic Barbed Cluster (Delhi and Buck Creek Barbed), Early Woodland Straight Stemmed Cluster (Fox Valley Stemmed, Kramer, Robbins), and Motley Expanding Stem Cluster (Motley, Atalissa, and Tipton). The Northeast consists of the Matanza Cluster (Matanzas Side Notched and Brewerton Eared Notched). The Central Mississippi River Valley consists of the Table Rock Cluster (Table Rock Stemmed) Etley Cluster (Etley), Nebo Hill Cluster (Nebo Hill Lanceolate, and Sedalia Lanceolate), and Wadlow Cluster (Wadlow). The Northern Plains consists of the McKean Cluster (McKean, Duncan, and Hanna), and the Oxbow Cluster (Oxbow). The Southeast consists of the Eva Cluster (Eva II), Benton Cluster (Benton Stemmed and Elk River Stemmed), Ledbetter Cluster (Ledbetter stemmed), and Dickson Contracting Stemmed Cluster (Gary and Little Bear Creek) (Gibbon 2012; T. Morrow 2016).

Woodland Period (1,000 BC–AD 1750)

The timeframe for the Woodland Period in Minnesota varies. In central and northern Minnesota, the Woodland Period dates to between 1,000 BC–AD 1750. In southeastern Minnesota, this period dates to between 500 BC–AD 1650. During this period, the environment stabilized and allowed for the development of greater regional variations (Gibbon 2012).

The two main characteristics of the Woodland Period in Minnesota are the appearances of pottery and earthen burial mounds (Johnson 1988). The appearance of these two cultural developments may suggest an increase in social complexity. Hunting and gathering continues within the Woodland Period with the “intensification of food resource activities initiated in the Late Archaic Period” (Gibbon 2012:93). However, there is an increasing reliance on domesticated plants and wild rice, which indicates an increase in population growth and sedentism (Johnson 1988; Radford et al. 2015).

Initial Woodland Period in Central and Northern Minnesota (1,000 BC–AD 500)

The Initial Woodland Period in central and northern Minnesota dates between 1,000 BC–AD 500. This period is defined by the appearance of the first ceramic vessels. The earliest ceramics and burial mounds found in central and northern Minnesota are usually connected with either the Brainerd or the Laurel Complexes. These complexes are described below.

Brainerd Complex

The Brainerd Complex is identified by Brainerd ceramics, which have net impressions or horizontal cord marking as exterior surface treatment. Brainerd ceramics have been found from north-central Minnesota, up to Lake Winnipeg and west into Montana. This complex could have indicated the earliest ceramics in central and northern Minnesota. Brainerd ceramics have open orifices, vertical rims, with conical or subconical bases, flat lips, and tempered with sand or grit. The dating for Brainerd ceramics has been a complicated matter, with the radiocarbon dating between 1,430 BC to AD 535. However, these radiocarbon dates could have been contaminated with “old carbon” from the regional water and even the clay used to make the ceramics. The lithics typically associated with the Brainerd Complex are Oxbow, Besant, Duncan/Hanna, McKean, and Pelican Lake points. Bone or antler tools have not been found in association with the Brainerd Complex. Also, hammerstone, utilized flakes, cores, small pieces of copper, and scrapers have been found with Brainerd ceramics (Arzigian 2008; Gibbon 2012).

Laurel Complex

The Laurel Complex is one of the most geographically extensive archaeological complexes in the Initial Woodland Period. It extends from western Quebec, northwestern Michigan, northwestern Wisconsin, and northern Ontario across northern Minnesota into southeastern and west-central Manitoba and east-central Saskatchewan. Laurel Complex roughly dates between 50 BC to AD 650/1000. Laurel ceramics are characterized by “the presence of relatively thick (average 6 mm, with a range of 3 to 8 mm), grit-tempered jars with conical bases, straight rims, slight to no neck constriction, smooth surfaces and stamped-tool decoration on the exterior rim, neck, and occasionally upper shoulder” (Gibbon 2012:123). Laurel ceramics are decorated with a variety of decorations including dentate stamping, incising, push-pull bands, pseudo-scallop shell stamps, bosses, and punctates. The Complex is an adaptation to the northern forests and a hunting-gathering lifeway that is focused on fish, moose, and beaver. There is also evidence of the diverse use of small and large game in the lake/forest region with bison on the prairie margin (Arzigian 2008).

The lithics typically associated with the Laurel Complex include end scrapers, large side-notched points, large corner-notched points, small side-notched points, and small-eared points and a wide range of knives, scrapers, and other chipped stone tools. There is a noticeable absence of ground stone tools in this region and period. Tools made from bone, antler, and teeth include conical bone projectile points, antler harpoons, cut beaver incisors, awls, bird-bone, tools, and ornaments from animal teeth and bone. Copper tools also appear with the Laurel Complex (Arzigian 2008; Gibbon 2012).

Terminal Woodland Period in Central and Northern Minnesota (AD 500–1750)

The Terminal Woodland Period in central and northern Minnesota dates from AD 500–1750. This period is characterized by major changes in ceramic and lithic technologies along with a major increase in the human population that had a gradually greater dependence on domesticated plants and a more sedentary lifeway. During this period, the harvesting of wild rice becomes widespread and intensive as a seasonal plant food in central and northern Minnesota (Gibbon 2012; Johnson 1988).

Early Terminal Woodland Period (AD 500–800)

The Early Terminal Woodland Period of northern and central Minnesota dates between AD 500–800. The Laurel Complex continued unchanged in northern Minnesota throughout this period. However, in central Minnesota, the St. Croix Complex appeared “from the northwestern corner of Wisconsin across eastern and central Minnesota into the Red River valley and on into adjacent areas of the Dakotas” (Gibbon 2012:181). This Complex indicated a transition between the Initial Woodland and Terminal Woodland Periods. Currently, the most diagnostic traits of the St. Croix Complex are Onamia Series ceramics and linear mounds (Arzigian 2008; Gibbon 2012).

Interestingly, mortuary traits found during this period consisted of linear and circular mounds, deep subsoil burial pits, flexed and disarticulated primary burials, bundled secondary burials frequent use of yellow and red ocher, associated utilitarian and ornamental grave goods dominated by bone and antler artifacts, Prairie Side Notched, and Broad side-notched projectile points, blade side scrapers made from Knife River Flint, and small mortuary vessels of St. Croix Stamped and Blackduck ceramic vessels (Arzigian 2008; Gibbon 2012).

Similar to the Early Terminal Woodland Period in southeastern Minnesota, the Early Terminal Woodland Period in central Minnesota is characterized by an increase of Native American populations, increase in the size and number of habitation sites, a trend to more sedentary lifeway, burial mounds become more abundant and widespread, small unnotched triangular arrow points replaced notched, stemmed dart points styles, ceramic vessels become thinner and more globular, and a dependence on a single plant food, which is wild rice in this region (Gibbon 2012).

Middle Terminal Woodland Period (AD 800–1300)

The Middle Terminal Woodland Period of northern and central Minnesota dates between AD 800–1300. The cultural complexes during this period have similar material culture and a subsistence-based that may have been heavily dependent on harvesting wild rice. The main cultural sequential complex that occurs during this period is called by Gibbon (2012) the Blackduck-Kathio-Clam River Continuum. This describes the three spatially adjacent complexes that share many stylistic attributes. These complexes are the Blackduck Complex, Kathio Complex, and the Clam River Complex. The Blackduck Complex is found in the northern forests and prairie fringes of Minnesota near Headwaters and Rainy River region, the Kathio Complex is found along the southern boundary of the north woods in east-central and central Minnesota, and the Clam River Complex is found in the north woods of northwestern Wisconsin and the adjacent area of Minnesota (Arzigian 2008; Gibbon 2012).

The main differences between these ceramic complexes are the decorative motifs of the ceramics, where they are found, and perhaps a difference in subsistence emphasis. These ceramics are grit-

tempered, cordmarked globular ceramic vessels with constricted necks, short outward flaring rims, and flat lips. The decoration on these ceramics tends to be confined to the upper area of the vessels including the interior rim, lip, and the exterior surface of the upper rim and neck. The techniques used to decorate these vessels include cordwrapped-stick stamping, comb stamping, various kinds of punctuations, and vertical brushing. The lithics that are typically associated with this period are Prairie Side-Notched, Plains Side-Notched, and unnotched and notched triangular points (Arzigian 2008; Gibbon 2012).

Late Terminal Woodland Period (AD 1300–1750)

The Late Terminal Woodland Period of northern and central Minnesota dates to between AD 1300–1750. The period extends into the Contact Period in Minnesota. The most important event in this period may be the abrupt appearance and gradual spread of the Psinomani Complex. Other important events include the reduction of Blackduck ceramics diffusing to the north, the spread of Oneota and Plains Village ceramic traits through central Minnesota, and the adoption of a truly Terminal Woodland lifeway (Gibbon 2012).

The Psinomani Complex is characterized by the presence of Sandy Lake ceramics. Sandy Lake ceramics have a shell or mixed shell and grit temper. The surface treatment of the vessel exterior includes cordmarked, smooth, or stamped with grooved paddles. The decoration on Sandy Lake ceramics is rarely found. Ogechie ceramics, which are a northern Oneota ware, are present in small amount in many Psinomani components. This Complex may indicate interactions between neighboring peoples including Oneota farming communities to the south and east, and Plains Village peoples to the west. Site types found for this Complex include semisedentary villages, wild rice harvesting, fish stations, and hunting and gathering sites. The mortuary practices of the Psinomani peoples include burying their dead in non-mound and mound contexts including intrusive burials, and both primary flexed and primary disarticulated burials. Currently, it is difficult to describe the lithic assemblage of the Psinomani Complex since few sites have been found. What has been found are small triangular points similar to other Terminal Woodland and Oneota occupation (Arzigian 2008; Gibbon 2012).

Historic Native American Tribes

Dakota

The Dakota consists of 13 subdivisions of Siouan-speaking people (Dakota-Lakota-Nakota) that were all part of the *Oceti Sakowin*, or Seven Council Fires. This council of political divisions included the Mdewakanton, Wahpekute, Sisseton, Wahpeton, Yankton, Yanktonai, and Teton tribes. The Dakota originally lived in Wisconsin and north-central Minnesota before the Contact Period, however, they migrated to reside in the prairies and eastern plains of Minnesota, Iowa, Nebraska, and eastern South Dakota by the nineteenth century. The Dakota's first contact with Europeans was with French traders and Jesuit missionaries in the 1650s. The Dakota were originally a migrational people relying on hunting and gathering subsistence strategy. They hunted bison, deer, and waterfowl and fished using spears and nets. They also foraged for wild flora resources including fruit, acorns, nuts, wild rice, and maple sap. During the 19th century, the Dakota practiced horticulture, but planted at irregular intervals. They planted corn, squash, beans, and tobacco. Their crop yields were small and would only last a few weeks (DeMallie 2001; Malinowski et al. 1998; Pritzker 2000). When the Dakota occupied the Wisconsin-Minnesota area, they formed small (occasionally palisaded) villages near lakes and rice swamps, living in large

heavily timbered bark houses with pitched roofs. During winter, some groups would live in conical houses covered in skins, and the Sisseton group sometimes used tipis after moving to the prairies (Pritzker 2000).

Ojibwe

The Ojibwe, also known as the Chippewa, are an Algonquin-speaking people that originally inhabited areas north of Lake Huron, northeast Lake Superior. Their first contact with Europeans was with Frenchman Etienne Brul  in 1622. In the 17th century, the Ojibwe became heavily involved with the French fur trade, becoming allies with the French. The Ojibwe were primarily a sedentary people, living in dwellings called wigwams. A typical wigwam is made of birch bark or cattail mats on a pole frame with a cone or dome shape. Wigwams are often built on a slope with ditches dug away from it to drain rainwater. The Ojibwe have also been known to live in tipis as well. The Ojibwe typically planted gardens consisting of corn, squash, beans, pumpkins, and fish. They would gather berries, nuts, and maple sap to make syrup. In winter, they supplemented their food storages with hunting, trapping, and fishing. The typical game animals they hunted were deer, moose, bear, beaver, lynx, mink, marten, otter, rabbit, and caribou (Malinowski et al. 1998).

POST-CONTACT (POST-AD 1630)

Contact Period (AD 1630–1837)

Disclaimer: The following discussion is written with a lens of Euro-American bias. Before the native population made contact with early French Explorers, European trade goods started to appear within Minnesota. Glass beads, iron knives, brass kettles, finger rings, and gun parts appear within the archaeological record, which were from early French traders. The local native tribes were also indirectly affected by Europeans by the spread of foreign disease, which decimated their populations. At one point or another, parts of Minnesota were claimed by the French, Spanish, British, and United States. Minnesota was first claimed by the French as part of New France (Blegen 1963; Folwell 1956).

The first recorded exploration in Minnesota was by French explorers Daniel Graysolon, Sieur du Lhut, Father Louis Hennepin, and Pierre Charles le Sueur. Sieur du Lhut was sent out from Quebec and Montreal to open trade with the Dakota in AD 1679, and for the next 11 years explored the triangle between the Mississippi and St. Croix rivers. Father Louis Hennepin along with Michel Accault, and Antonie Aguell were also sent out to explore in the Upper Mississippi River Valley circa AD 1679, where they discovered and named St. Anthony Falls. In 1731, Canadian-born French explorer Pierre Gaultier de Varennes, Sieur de La Verendrye set out to explore lands west of Lake Superior. In August of 1731, he sailed into Grand Portage and passed over the Canada-United States Border Lakes to establish a trading post at Lake of the Woods. At this post, trade could be conducted with the local tribes. At the conclusion of the Seven Years' War (French and Indian War), the 1763 Treaty of Paris gave all the land east of the Mississippi, which had been held by the Kingdom of France, to the Kingdom of Great Britain; this land would then be ceded to the United States of America in the 1783 Treaty of Paris after the conclusion of the Revolutionary War. In 1797, Pembina in North Dakota was established by Charles Baptiste Chaboillez of the Northwest Fur Company. Also, the Hudson Bay and American Fur Companies were positioned at Pembina as the fur trade increased and expanded. There were a few native tribes within the northwestern area of Minnesota including the Dakota and Ojibwe (Blegen 1963; Folwell 1956; Radford et al. 2015).

Post-Contact Period (Post–AD 1837)

Disclaimer: The following discussion is written with a lens of Euro-American bias. The area that currently includes all of Minnesota and western Wisconsin was considered “Indian Territory” and settlements were not allowed. Although the French, British, and Americans established trading posts in Minnesota, the first official white settlements were established after AD 1837. This was due to the signing of two treaties, one with the Ojibwe and one with the Dakota. The 1837 treaties had the Ojibwe and Dakota ceding all their lands east of the Mississippi, which included the Golden Triangle, the land between Mississippi and St. Croix Rivers. The treaties were ratified by Congress in AD 1838 and the land was open to American settlement. In 1849, Minnesota officially became a territory and on May 11, 1858, was admitted as a state into the United States. In 1862, Congress passed the Homestead Act which allowed up to 160 acres of land to be claimed provided that the person was head-of-household or person over 21 years of age, was a United States citizen or filed a declaration to become a citizen, and stayed on the land and worked the land for five years and pay any administration fees (Blegen 1963; Folwell 1956).

Railroad Development

In the mid-1800s, construction of railroads was started throughout the United States beginning with the first railroad built near Baltimore, Maryland in 1831 (Schwieder 2000). The railroad system in Minnesota began in 1862, with the construction of the St. Paul and Pacific, connecting St. Paul and St. Anthony. This resulted in the construction and expansions of major railway lines to the southwest and west, including the Chicago; St. Paul, Minneapolis and Omaha Railway; Chicago, Milwaukee & St. Paul Railway; and the Chicago & Northwestern Railway. The railroad helped to create the current settlement pattern and economic developments in Minnesota. They are an efficient, inexpensive way to transport goods and people. Also, for the first time, people could travel at any time of the year (Quivik and Martin 1988; Schwieder 2000).

Chisago County

Chisago County is located in the east-central area of Minnesota. It was established on May 1, 1851, and was organized on January 1, 1852. The county seat is the city of Center City. The county is named for the Anishinaabe (Ojibwe) words “*kichi*,” meaning “large,” and “*saga*,” meaning fair or lovely. Before Europeans visited and settled the area, the Dakota and Anishinaabe (Ojibwe) had been living in area that became Chisago County. The first Europeans, or people of European descent, to visit the area that is now Chisago County was Daniel Greysolon, Sieur du Luth (Duluth) in 1679. The first settlers of Chisago County were Jesse Taylor and Benjamin F. Baker in 1838, at what is now Taylor’s Falls. The first railroad to be constructed in Chisago County was the Northern Pacific Railway in 1881. By 1910, the population of Chisago County had grown to 13,537 residents (Chisago County 2019; Easton 1909; Long 2008; U.S. Department of Agriculture 1995; U.S. Department of Commerce and Labor 1912).

The lumber industry was one of the first industries in Chisago County and one of the reasons people settled in the area. For the most part, lumbering in the county was typically confined to cutting and processing northern pine was processed along the St. Croix River. However, by 1914 the lumber industry declined, and agriculture became the dominate industry in the county (U.S. Department of Agriculture 1995).

Agriculture has been the main industry in the county, however due to the proximity of the Minneapolis-St. Paul metropolitan area, agriculture has declined somewhat while urban development and industrial growth has increased in Chisago County. In 2017, there were 821 farms with an average of 141 acres. The main crops that are grown within county are soybeans, corn, forage (hay/haylage), and sod. Cattle, poultry, and hogs are the main type of livestock raised within the Chisago County (U.S. Department of Agriculture 1995; U.S. Department of Agriculture 2017).

RESEARCH DESIGN AND METHODOLOGY

The Phase I archaeological investigation was conducted in accordance with the SHPO Manual for Archaeological Projects in Minnesota (Anfinson 2005).

LITERATURE REVIEW

A literature search was conducted within a 1-mile study area of the proposed Project area. The task was completed using site data files and previous inventory files maintained at the Minnesota Office of the State Archaeologist (OSA) and Minnesota SHPO. In addition, background research was completed by reviewing publicly available National Register of Historic Places (NRHP) data, historic maps, cemetery/burial records, atlases, current aerial photographs, soil maps, topographic and geomorphic data, and other sources that might provide information for the locations of historic-era sites, areas of prior disturbance, etc.

PHASE I ARCHAEOLOGICAL INVESTIGATION

The Phase I cultural resource identification survey for this Project was completed to guidelines of the Minnesota SHPO (Anfinson 2005). The survey conducted within the Project area used three methods of sampling and testing to identify and evaluate cultural resources: visual inspection, pedestrian survey, and shovel testing.

- *Visual Inspection* – Locations where cultural resources were not expected, such as disturbed areas, areas with a slope greater than 20 degrees, and low/wet areas were walked over and visually inspected. This method was used to verify the absence or likelihood of any cultural resources within these areas. This method was also utilized to document the general terrain and the surrounding area.
- *Pedestrian Survey* – This method was used to survey landforms with slopes that are greater than 20 degrees, or landforms with slopes that are less than 20 degrees and have a surface visibility greater than 25% (e.g., plowed field). The pedestrian survey transect interval was 15 m. Transect interval spacing was reduced to 5 m and under in order to delineate the area when any artifacts were discovered.
- *Shovel Testing* – This method was used to sample subsurface contexts in areas with slopes less than 20 degrees and ground visibility of less than 25%. A typical shovel test was 40 cm in circular diameter. The shovel tests were excavated on a grid at 15 m intervals, with additional radial shovel tests conducted at 5 m intervals when any artifacts were discovered. Shovel tests were excavated in 10 cm levels. All shovel tests were documented using a sub-meter GPS unit. Excavated soil was screened through 0.25-inch mesh. Shovel tests were excavated no deeper than 1 m or 10 cm into sterile subsoils. Data gathered from the shovel tests included stratigraphy, soil texture, Munsell color, and the presence or absence of cultural materials. All excavated soils were immediately backfilled upon completion.

The crew was supervised by a qualified archaeologist who meets the requirements of the Secretary of the Interior's Guidelines for Professional Qualifications in Archaeology (48 FR 44739; National Park Service 1983). A sub-meter GPS unit utilizing Geographic Information System (GIS) data as well as field maps were used to collect spatial data and to ensure field personnel maintain an

accurate survey grid. This ensured that the crew did not extend the survey outside the project survey area. All field notes, maps, and photos for this project are maintained at the In Situ office.

SITE EVALUATION CRITERIA

The purpose of the archaeological investigation was to identify and record previously undocumented cultural resources located within the project area. Sites were evaluated for their significance as defined by criteria established in Title 36 Code of Federal Regulations 60.4 (National Park Service 1997 [1990]), which states:

The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded, or may be likely to yield, information important in prehistory or history.

A site may meet one or more of the eligibility criteria listed above, but if the site is considered to not retain sufficient integrity, then it may be recommended not eligible for inclusion in the NRHP. In addition, if any sites were recorded, In Situ followed the National Register Bulletin on Guidelines for Evaluating and Registering Archaeological Properties for the eligibility assessment of archaeological sites (National Park Service 2000).

ARTIFACT ANALYSIS AND CURATION

If any artifacts 50 years or older were recovered, they were processed in accordance with the Guidelines for Archaeological Investigations in Minnesota (Anfinson 2005). Artifacts that were collected are to be returned to the landowner. If the landowner does not want the artifacts, they will be stored at a repository that meets the Secretary of the Interior's Standards for Curation (55 FR 37630; National Park Service 1990).

RESULTS

BACKGROUND RESEARCH

A literature search was conducted within a 1-mile study area of the proposed Project Area (Figures 4-6B). The task was completed using site data files and previous inventory files maintained at the Minnesota OSA and Minnesota SHPO. In addition, background research was completed by reviewing publicly available NRHP data, historic maps, cemetery/burial records, atlases, current aerial photographs, soil maps, topographic and geomorphic data, and other sources that might provide information for the locations of historic-era sites, areas of prior disturbance, etc. Background research was conducted on January 2, 2024. The records search revealed no previous cultural resource inventories/surveys, no previously recorded archaeological sites, and two previously recorded architectural resources within the study area.

The data gathered revealed two previously recorded architectural resources within the study area that have been determined *not eligible* for the NRHP (Table 2). Neither resource is located within the Project area.

Table 2: Previously Recorded Architectural Resources within the Study Area.			
Site	Site Name/Type	Location	NRHP Eligibility
XX-ROD-00012	U.S./Trunk Highway 61 (formerly State Road/Trunk Highway 1 and 3)	TH 61 from Wyoming to Duluth	Not Eligible
XX-ROD-00019	U.S./Trunk Highway 61 (formerly State Road/TH 1 and 3)	TH 61 - La Crescent to Duluth	Not Eligible

CULTURAL RESOURCE INVESTIGATION RESULTS

A Phase I cultural resource investigation was conducted on January 3, 2024, and April 23, 2024, for the proposed Project (Figures 7A-7B). The survey area of the Project is located within an open area consisting of a tilled agricultural field, mixed grasses, and wooded vegetation (Figures 8-30). Ground surface visibility (GSV) consisted of 0-90% throughout the survey area, with the higher ground surface visibility (90% GSV) within the tilled agricultural field and the lower GSV areas (below 25%) within areas consisting of roads, mixed grasses, and wooded vegetation.

The majority of the survey took place within established agricultural fields with ample GSV (over 25%) and shovel testing was completed in areas with poor GSV (under 25%). Visual inspection was conducted within areas with previous disturbance. Existing disturbance within the Project area includes natural erosion, rural/suburban development, and agricultural practices.

Approximately 118.9 acres were subject to survey during the cultural resource field assessments for the Project. Of the 118.9 acres that were surveyed:

- 113.6 acres were within tilled agricultural fields and were subject to pedestrian survey (Figure 31A);
- 2.1 acres were within disturbed context (paved road) and were subject to visual inspection;
- 3.2 acres was within wooded areas and were shovel tested.

Shovel Testing

Shovel testing for the Project was completed on January 3, 2024. Testing took place in the northwest corner of the Project area, consisting of approximately 3.2 acres that were subject to shovel testing. No cultural materials were observed or recorded during the shovel testing.

The shovel test units are classified as negative, positive, sloped, wet, and disturbed. “Negative” shovel tests have intact soils that contained no cultural material. “Positive” shovel tests have intact soils that contained cultural material. “Sloped” shovel tests were located on > 20 degree slopes. “Wet” shovel tests have undisturbed soils and contain a shallow water table and/or hydric soils. “Disturbed” shovel tests have mottled soils and/or have been greatly disturbed due to land development. A total of 62 shovel test units were conducted during this survey, all of which were negative for cultural resources. No cultural materials were observed or recovered.

A typical shovel test profile within this portion of the Project area consisted of a dark brown (10YR3/3) sandy loam over a dark yellowish brown (10YR4/4) sandy loam, as demonstrated in Figure 31B. Shovel tests were terminated at least 10 cm into the sterile subsoil.

CULTURAL RESOURCES

One newly recorded cultural resource was observed and recorded during the cultural resource survey of the Project. This cultural resource is discussed in detail below. A copy of the Minnesota Archaeological Site Form for the newly recorded site is included in Appendix A.

Newly Recorded Cultural Resources

21CH0153

Site Type:	Isolated Find
Association:	Unknown Precontact
Site NRHP Recommendation:	Not Eligible
Management Recommendation:	No Further Work

SE NW SW Section 8, T35N, R21W; Chisago County, Minnesota
USGS 7.5 Minute Quadrangle: 1983 North Branch SW

Site 21CH0153 is an isolated find within an agricultural field. Site 21CH0153 was recorded by In Situ on April 23, 2024 (Figures 32-35). The site area measures approximately 0.1 acre and was recorded using pedestrian survey/surface collection survey methodology. Ground surface visibility was excellent (90%-100%). The site is a precontact isolated find consisting of one artifact recovered from the ground surface. The artifact is a single projectile point, possibly Madison-like in type, made from quartz that measures 27.9mm long by 20.3mm wide by 4.6mm thick and weighs 2.8 grams (Figure 36). A shovel test was placed at the find location, which yielded negative results for buried archaeological material.

Site 21CH0153 is an isolated find consisting of a broken projectile point with no other cultural materials or features. The site is in moderate condition, with potential impacts from natural erosion, agricultural activity, and proposed development. This site is not associated with any significant historical patterns, persons, or events (Criteria A and B); does not have any unique characteristics or designs (Criterion C); and is unlikely to yield any important information from the past (Criterion D). Due to the paucity of artifacts, the site is unlikely to yield any important information from the

past, and the recordation of the site exhausts research potential. Therefore, site 21CH0153 is recommended as *not eligible* for the NRHP and no further work is recommended.

Summary of Cultural Resources

During the field survey, a total of 118.9 acres were inventoried for the Project. One newly recorded cultural resource was observed and recorded during the cultural resource survey of the Project. The resource (21CH0153) is an isolated find consisting of a broken projectile point with no other cultural materials or features. Due to the paucity of artifacts, the site is unlikely to yield any important information from the past, and the recordation of the site exhausts research potential. Therefore, site 21CH0153 is recommended as *not eligible* for the NRHP and no further work is recommended.

In Situ recommends a finding of *No Historic Properties Affected* for the proposed Project. If the agencies agree with these findings, a recommendation of ‘no further work’ is considered appropriate.

MANAGEMENT RECOMMENDATIONS

An intensive Phase I cultural resource investigation was conducted on January 3, 2024, and April 23, 2024, for the proposed Project. The cultural resource review for the Project consisted of background literature review and field survey of approximately 118.9 acres.

One newly recorded cultural resource was observed and recorded during the cultural resource survey of the Project. The resource (21CH0153) is an isolated find consisting of an isolated broken projectile point that is recommended as *not eligible* for the NRHP. Therefore, In Situ recommends a finding of *No Historic Properties Affected* within the surveyed Project area and no further cultural resource work is recommended for the proposed Project.

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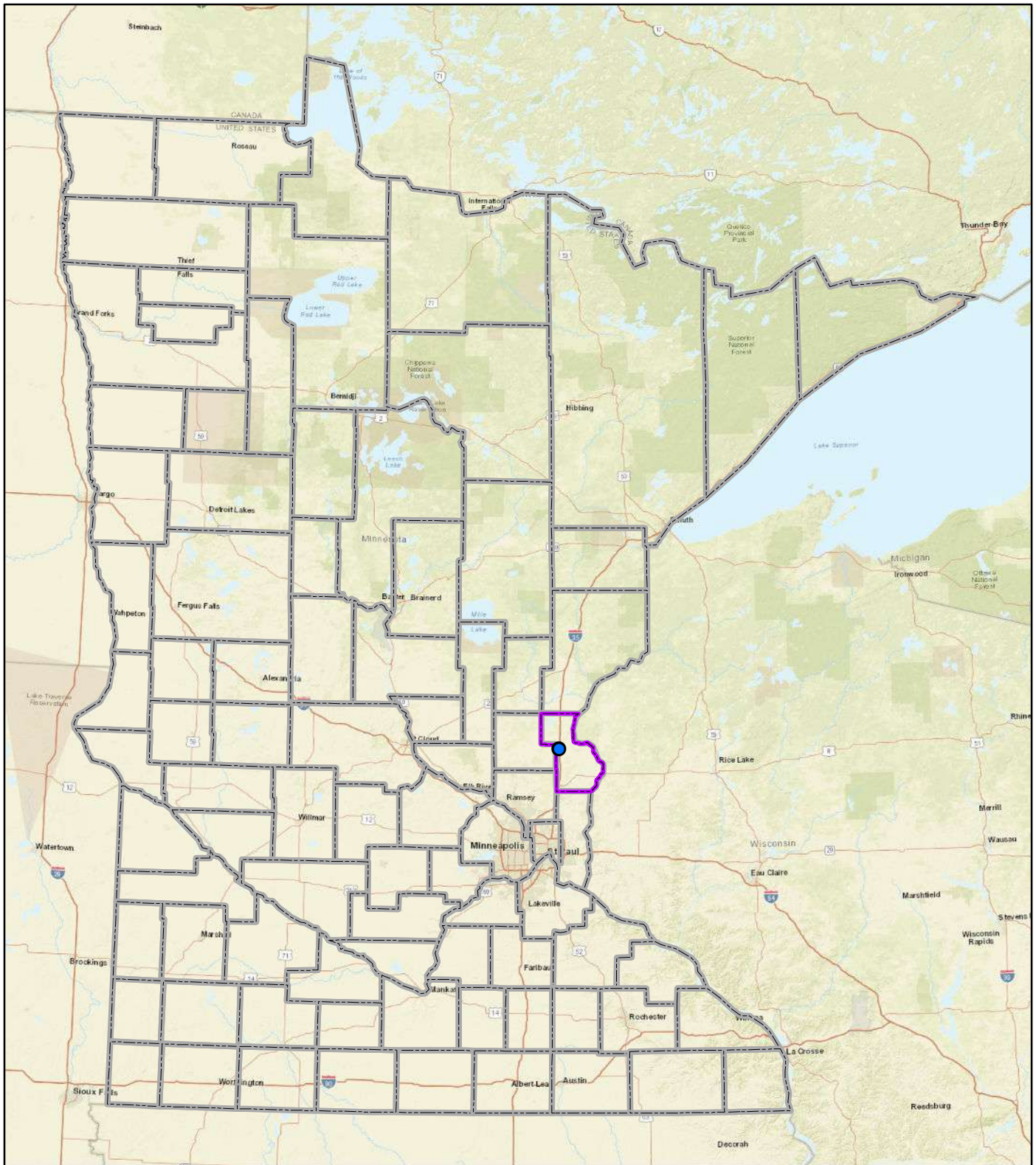
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FIGURES



Legend

- Project Location
- Chisago County
- County Boundary



1:3,456,623
 Approximate Scale in Feet
 0 460,000 920,000
 1 inch equals 288,052 feet

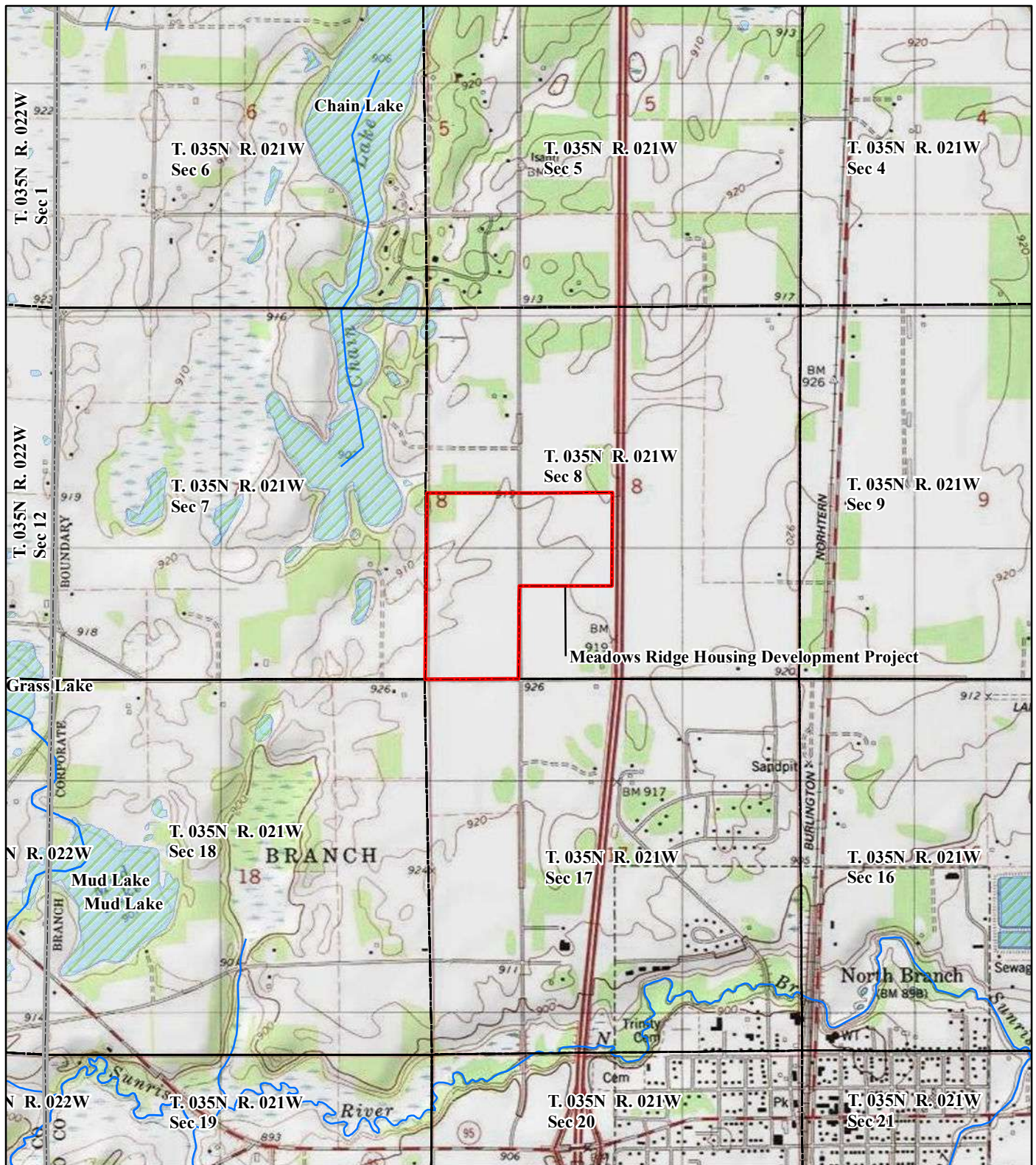
POLITICAL MAP

Meadows Ridge Housing Development Project
 Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 1. Political map showing project location.





Legend

- Project Area
- Township Boundary
- Township/Range/Section
- Stream/River
- Waterbody



1:24,000
 Approximate Scale in Feet
 0 3,200 6,400
 1 inch equals 2,000 feet

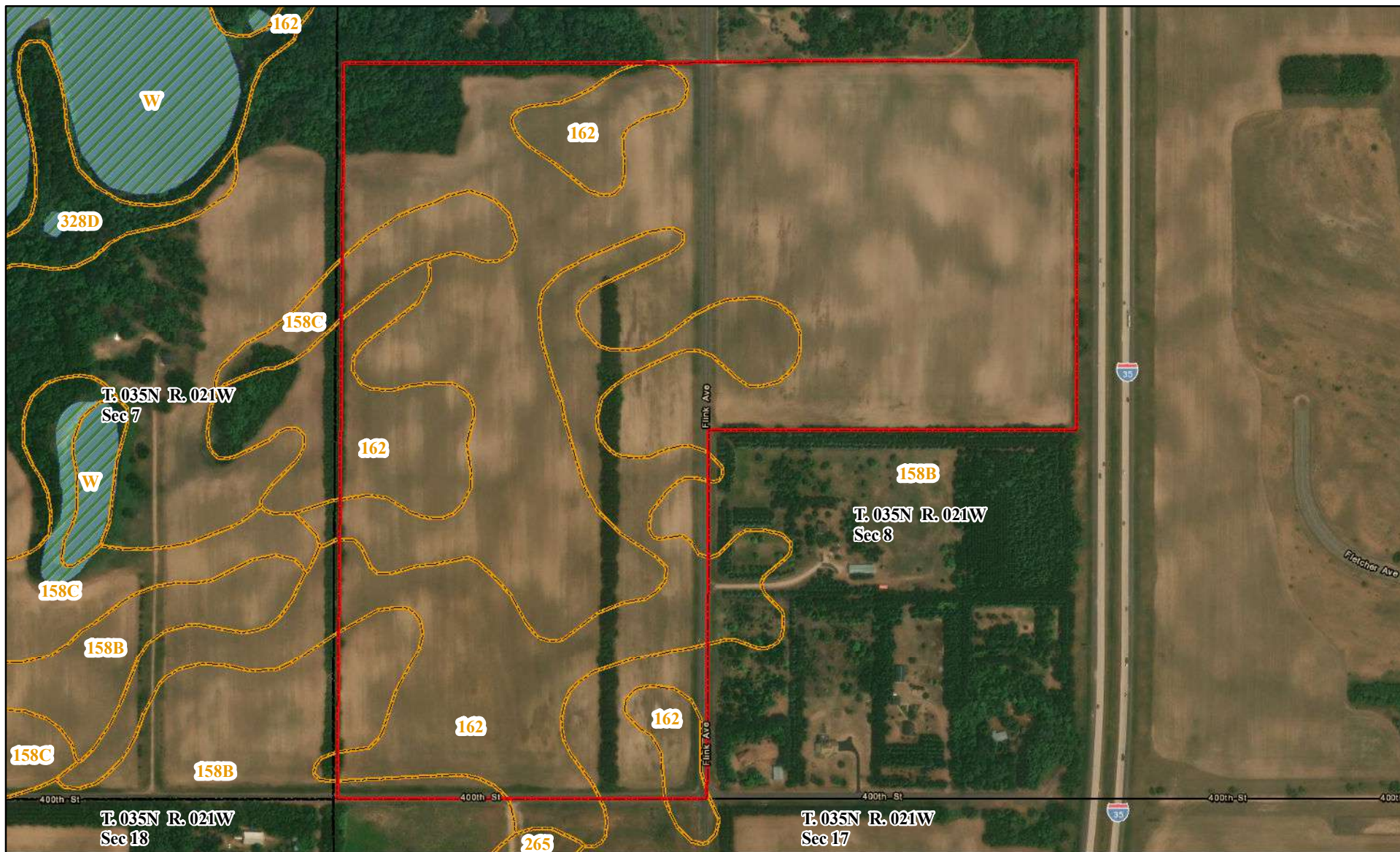
TOPOGRAPHIC MAP

Meadows Ridge Housing Development Project
 Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 2. Project location on the USGS 1983 North Branch SW, MN 7.5 minute series topographic map.





Legend

- Project Area
- Soils
- Township Boundary
- Township/Range/Section
- Stream/River
- Waterbody



AERIAL MAP

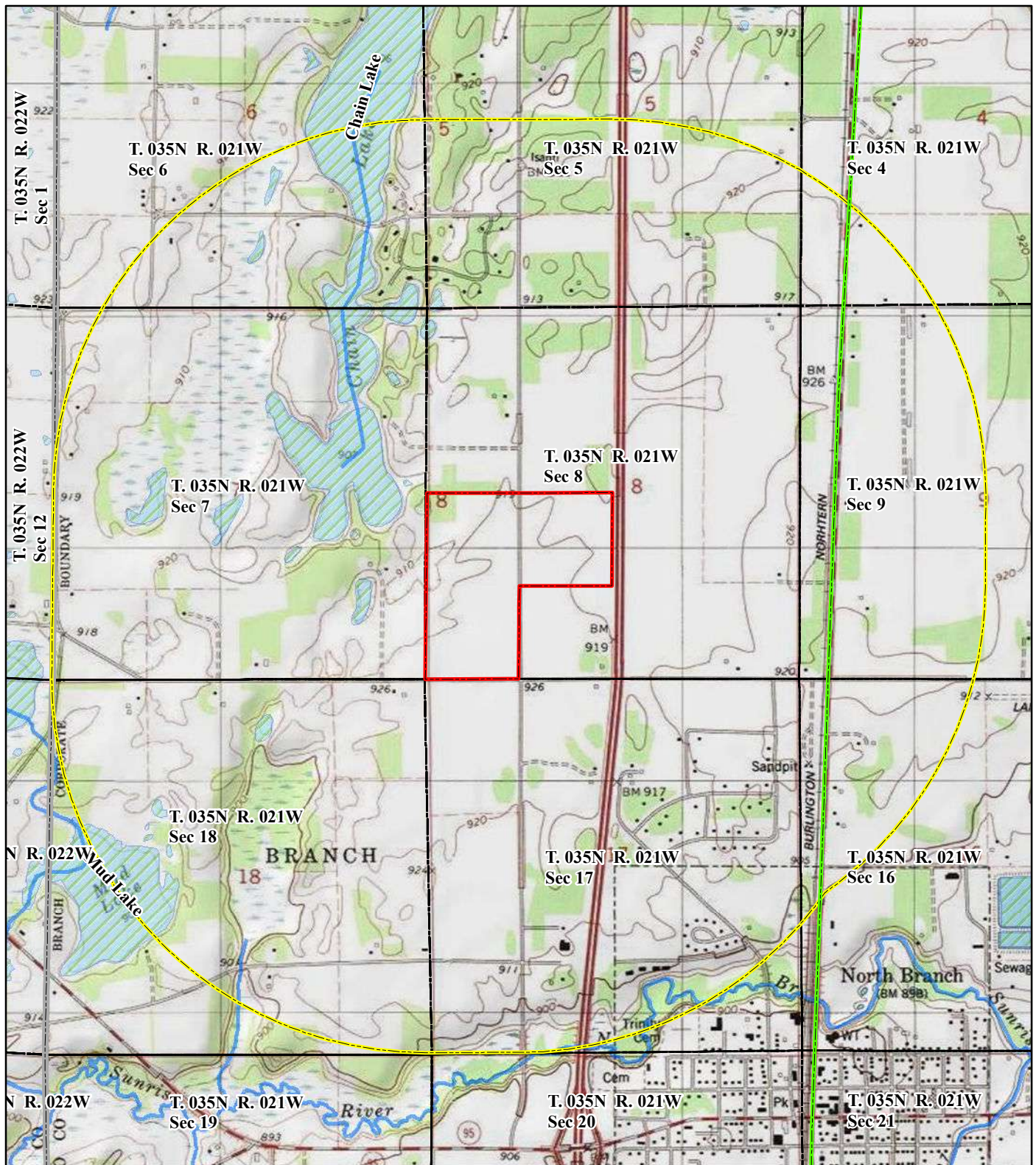
Meadows Ridge Housing
Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 3. Project location on an aerial map.



1:6,000
Approximate Scale in Feet
0 750 1,500
1 inch equals 500 feet



Legend

- Not Eligible Linear Resource
- Stream/River
- Project Area
- Waterbody
- 1-Mile Study Area
- Township Boundary
- Township/Range/Section

1:24,000
 Approximate Scale in Feet
 0 3,200 6,400
 1 inch equals 2,000 feet



LITERATURE REVIEW TOPOGRAPHIC MAP

Meadows Ridge Housing Development Project
 Chisago County, Minnesota

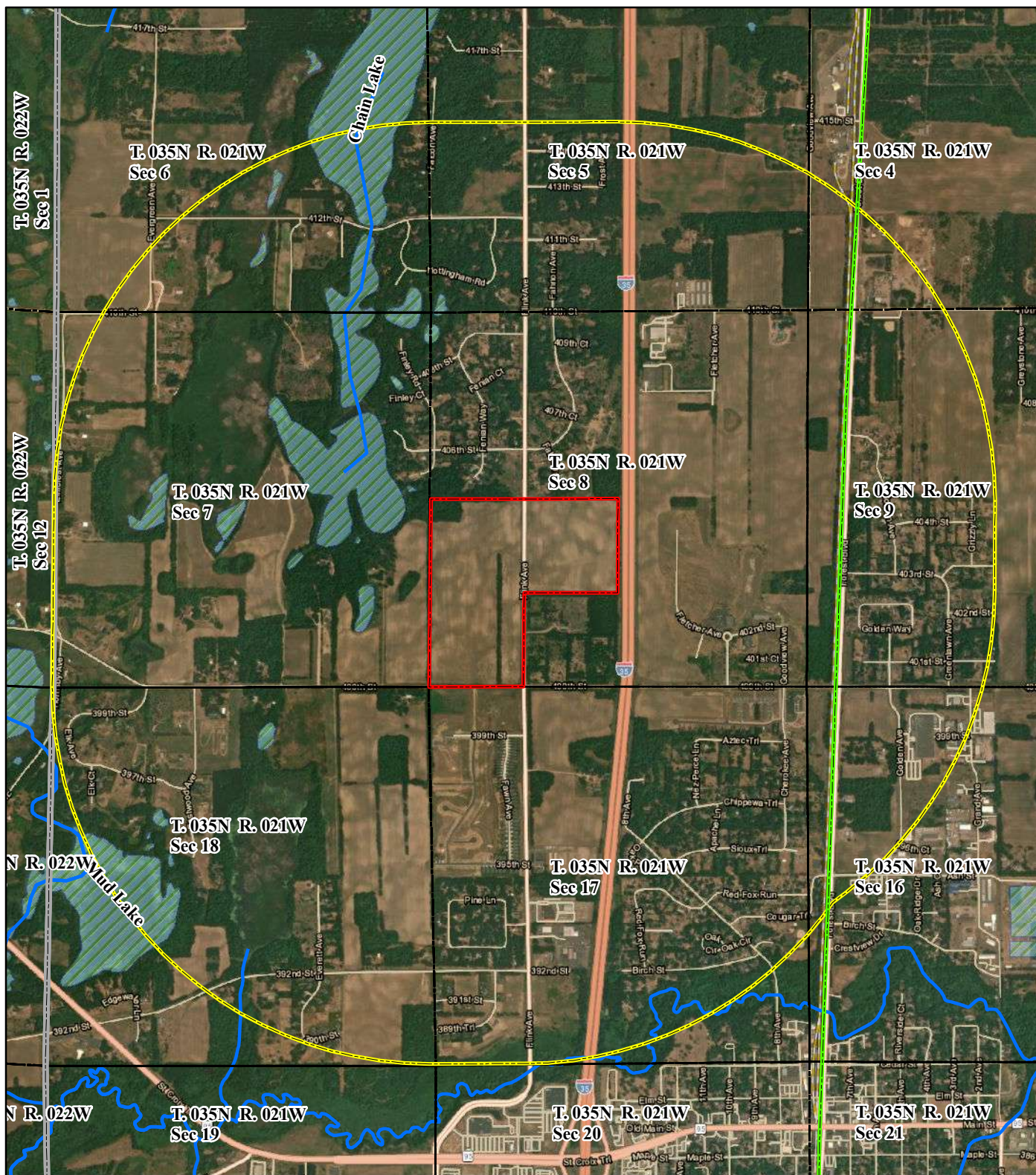
DO NOT RELEASE

Archaeological Site Location Not for Public Disclosure

Note: Imagery courtesy of ESRI

Figure 4. Topographic map with previous cultural resources surveys and previously recorded sites.





Legend

- Not Eligible Linear Resource
- Stream/River
- Project Area
- Waterbody
- 1-Mile Study Area
- Township Boundary
- Township/Range/Section

1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400



LITERATURE REVIEW AERIAL MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

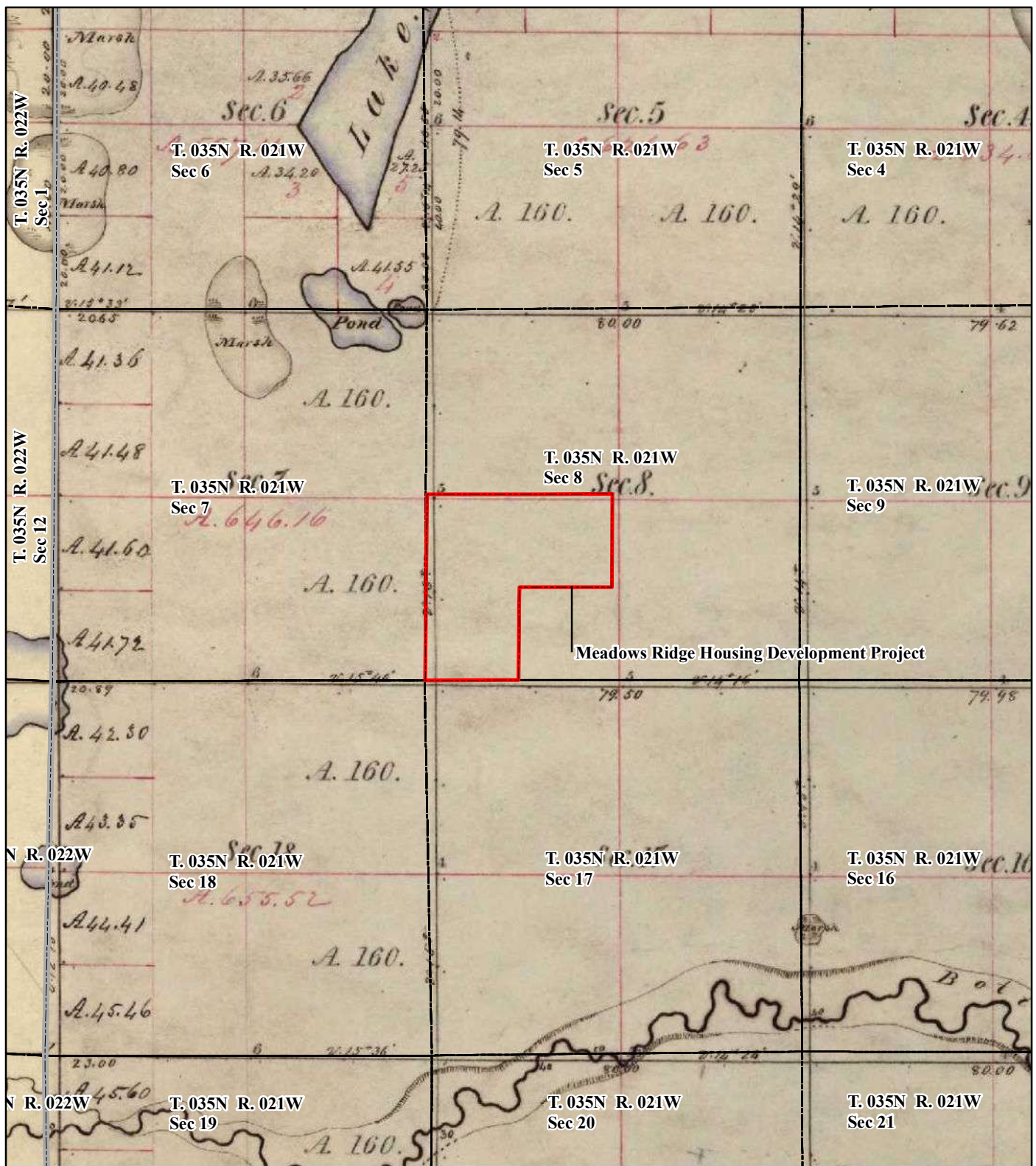
DO NOT RELEASE

Archaeological Site Location Not for Public Disclosure

Note: Imagery courtesy of ESRI

Figure 5. Aerial map with previous cultural resources surveys and previously recorded sites.





Legend

- Project Area
- Township Boundary
- Township/Range/Section



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

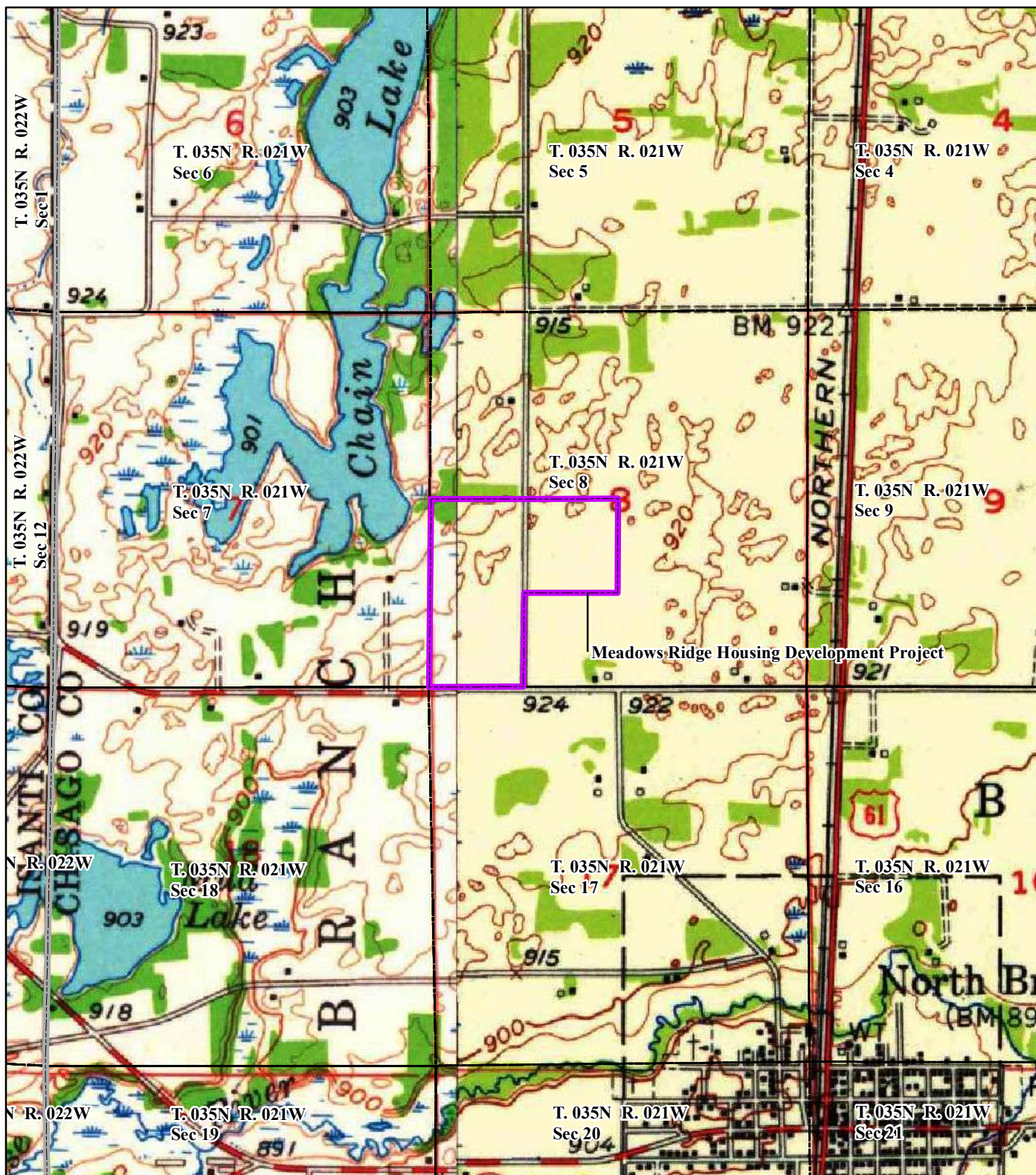
HISTORICAL BLM GLO PLAT MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of the U.S. Department of the Interior Bureau of Land Management.

Figure 6A. Project location on the 1849 BLM GLO Plat map.





Legend

- Project Area
- Township Boundary
- Township/Range/Section



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

HISTORICAL TOPOGRAPHIC MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of the USGS.

Figure 6B. Project location on the 1955
Rush City, MN/1961 Cambridge, MN
62,500 series topographic map.





Legend

- Disturbed Conditions
- Pedestrian Survey
- Shovel Test Area (Figure 7B)
- Project Area
- 21CH0153
- Township/Range/Section
- Photographic Orientation



1:5,000
Approximate Scale in Feet
1 inch equals 417 feet
0 670 1,340

FIELDWORK MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI.

Figure 7A. Fieldwork map of the project indicating the results of testing and photo orientations.





Legend

- Negative Shovel Test
- Pedestrian Survey Area
- Project Area
- Photographic Orientation



1:1,000
Approximate Scale in Feet
0 130 260
1 inch equals 83 feet

FIELDWORK MAP

Meadows Ridge Housing Development Project
Chisago County, Minnesota

Note: Imagery courtesy of ESRI.

Figure 7B. Fieldwork map of the project indicating the results of testing and photo orientations.





Figure 8: Overview facing northeast within the project area (R0010235).



Figure 9: Overview facing southeast within the project area (R0010243).



Figure 10: Overview facing south within the project area (R0010263).



Figure 11: Overview facing northwest within the project area (R0010291).



Figure 12: Overview facing northeast within the project area (R0010293).



Figure 13: Overview facing southeast within the project area (R0010295).



Figure 14: Overview facing southwest within the project area (R0010289).



Figure 15: Overview facing northwest within the project area (R0010273).



Figure 16: Overview facing northeast within the project area (R0010276).



Figure 17: Overview facing northwest within the project area (R0010281).



Figure 18: Overview facing southwest within the project area (R0010300).



Figure 19: Overview facing southeast within the project area (R0010303).



Figure 20: Overview facing northeast within the project area (R0010312).



Figure 21: Overview facing southwest within the project area (R0010320).



Figure 22: Overview facing northwest within the project area (R0010325).



Figure 23: Overview facing northeast within the project area (DSCN2163).



Figure 24: Overview facing southeast within the project area (DSCN2172).



Figure 25: Overview facing southwest within the project area (DSCN2194).



Figure 26: Overview facing north within the project area (DSCN2185).



Figure 27: Overview facing east within the project area (DSCN2187).



Figure 28: Overview facing south within the project area (DSCN2189).



Figure 29: Overview facing west within the project area (DSCN2191).



Figure 30: Overview facing northwest within the project area (DSCN2177).



Figure 31A: View of typical ground surface visibility within the project area (R0010245/R0010322).



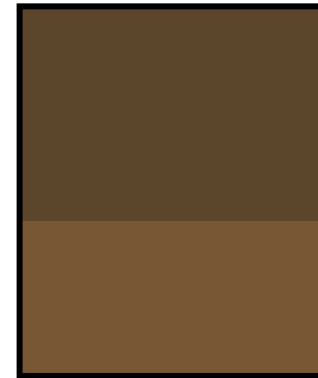
Representative soil shovel test photo.



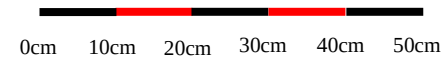
Representative soil profile photo.

Representative Soil Shovel Test Profile

Zimmerman fine sand (158B)



Scale



Depth to Subsoil: 29 cm

Excavator: BWS

Date: 01/03/2024

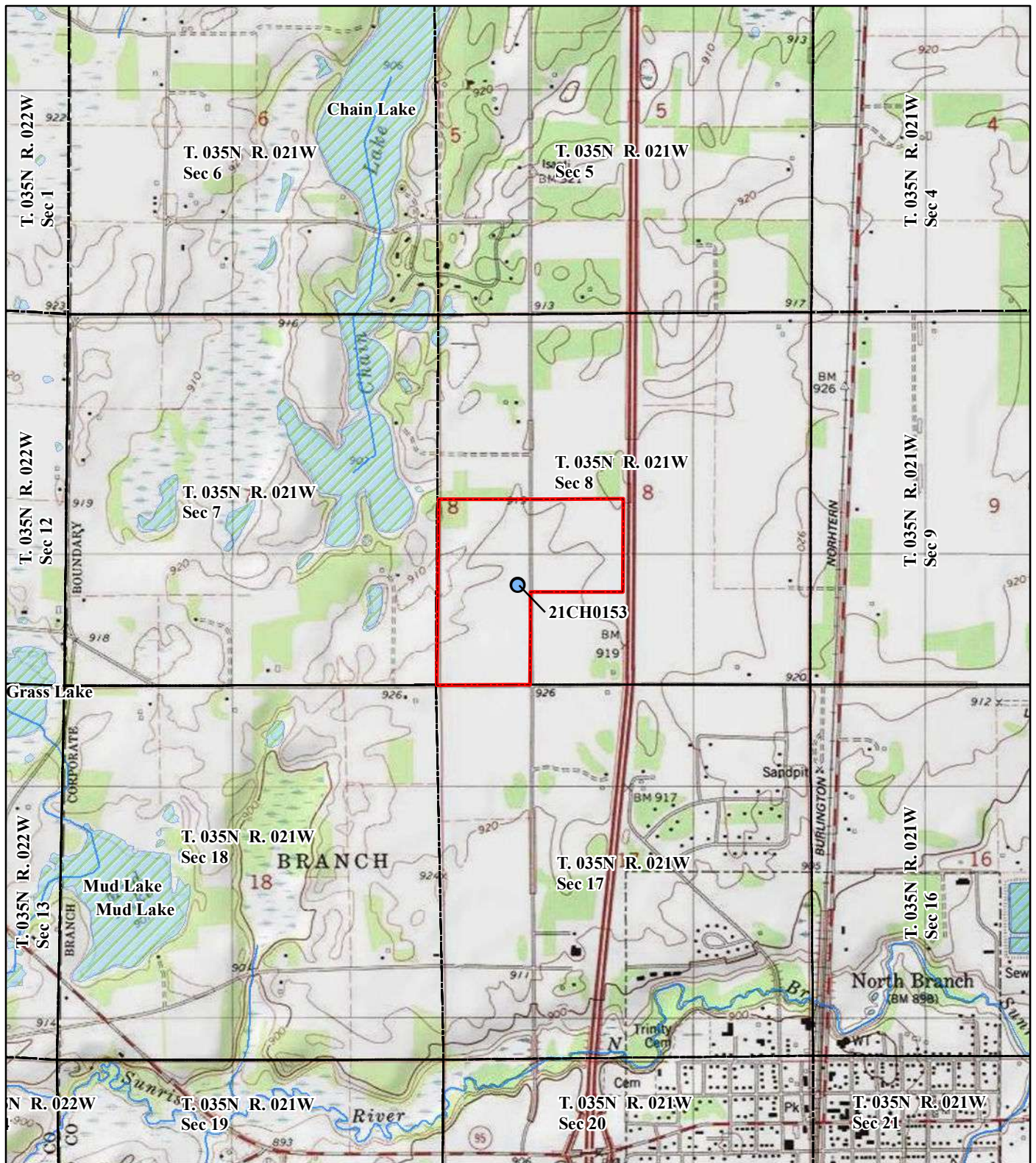


A 10YR3/3 Dark brown sandy loam
(0-29 cm)



B 10YR4/4 Dak yellowish brown sandy loam
(29-49 cm)

Figure 31B. A typical shovel test unit excavated within the project area.



Legend

- 21CH0153
- Project Area
- ▭ Township Boundary
- ▭ Township/Range/Section
- Stream/River
- ▨ Waterbody



1:24,000
Approximate Scale in Feet
1 inch equals 2,000 feet
0 3,200 6,400

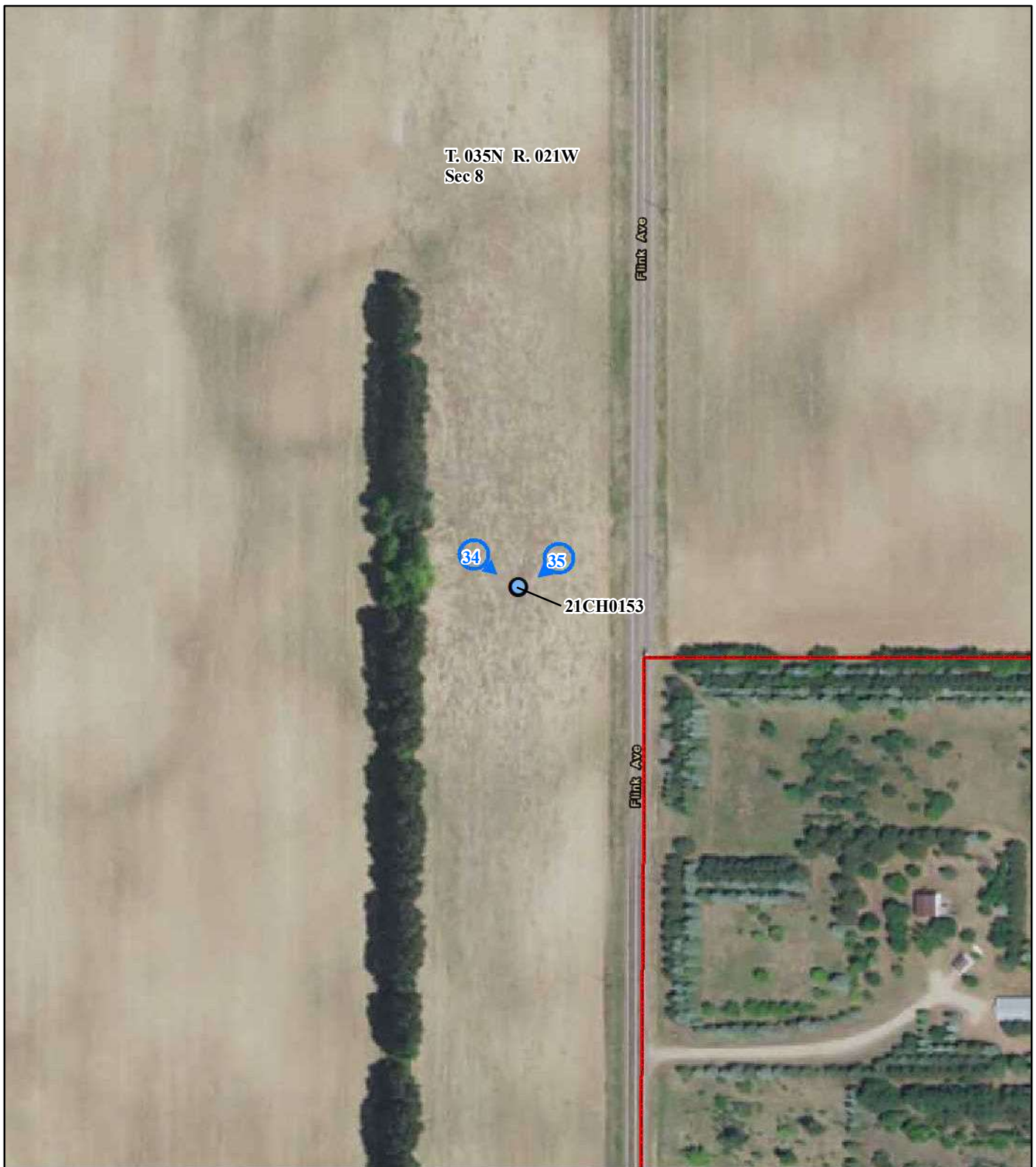
RESOURCE LOCATION TOPOGRAPHIC MAP

21CH0153
Chisago County, Minnesota

Note: Imagery courtesy of ESRI

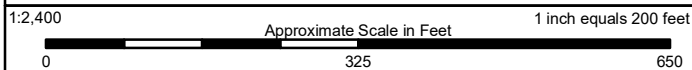
Figure 32. 21CH0153 location on the USGS
1983 North Branch SW, MN 7.5 minute
series topographic map





Legend

- 21CH0153
- Project Area
- Township/Range/Section
- Photo Spot



SITE AERIAL MAP

21CH0153
Chisago County, Minnesota

Note: Imagery courtesy of ESRI

Figure 33. Site 21CH0153 sketch map.





Figure 34: Overview facing southeast of site 21CH0153 (R0010286).



Figure 35: Overview facing southwest of site 21CH0153 (R0010287).



Figure 36: Isolated artifact from 21CH0153 (R0011118).

Meadows Ridge
Environmental Assessment Worksheet
Appendix K

Traffic Study



Memorandum

SRF No. 17427

To: Jay Roos, VP of Land Acquisitions and Development
LGI Homes

From: Brent Clark, PE, Project Manager
Ashley Sherry, EIT, Engineer II

Date: September 12, 2024

Subject: Meadow Ridge Development EAW Traffic Analysis; North Branch, Minnesota

Introduction

SRF has completed a traffic study in conjunction with an Environmental Assessment Worksheet (EAW) for the proposed Meadow Ridge development in the City of North Branch, Minnesota. The proposed development is generally located in the north quadrants of the Flink Avenue and 400th Street intersection (see Figure 1: Project Location). The main objectives of the study are to evaluate existing operations within the study area, identify any transportation impacts associated with the proposed development, and recommend improvements to address any issues, if necessary. The following information provides the assumptions, analysis, and study recommendations offered for consideration.

Previous Studies

The *Meadows North Development Traffic Study* was developed by WSB in July 2018 (hereon referred to as the *Meadows North Study*) and evaluated the Meadows North development, which is located directly south of the proposed Meadow Ridge development. The study collected new traffic data at five (5) study intersections, evaluated near-term (2020) and long-term (2040) traffic operations, and recommended infrastructure improvements. The Meadows North development, which began construction in 2019/2020, consists of over 300-residential units and a potential convenience/gas station. Approximately 80 homes have been built to date, and the remaining residential portion is expected to be completed in the next five (5) years. The development timeline for the convenience/gas station is currently unknown, however, for the purpose of this analysis was assumed to be completed by 2040. As mentioned previously, infrastructure improvements were recommended as part of the *Meadows North Study* and are summarized below:

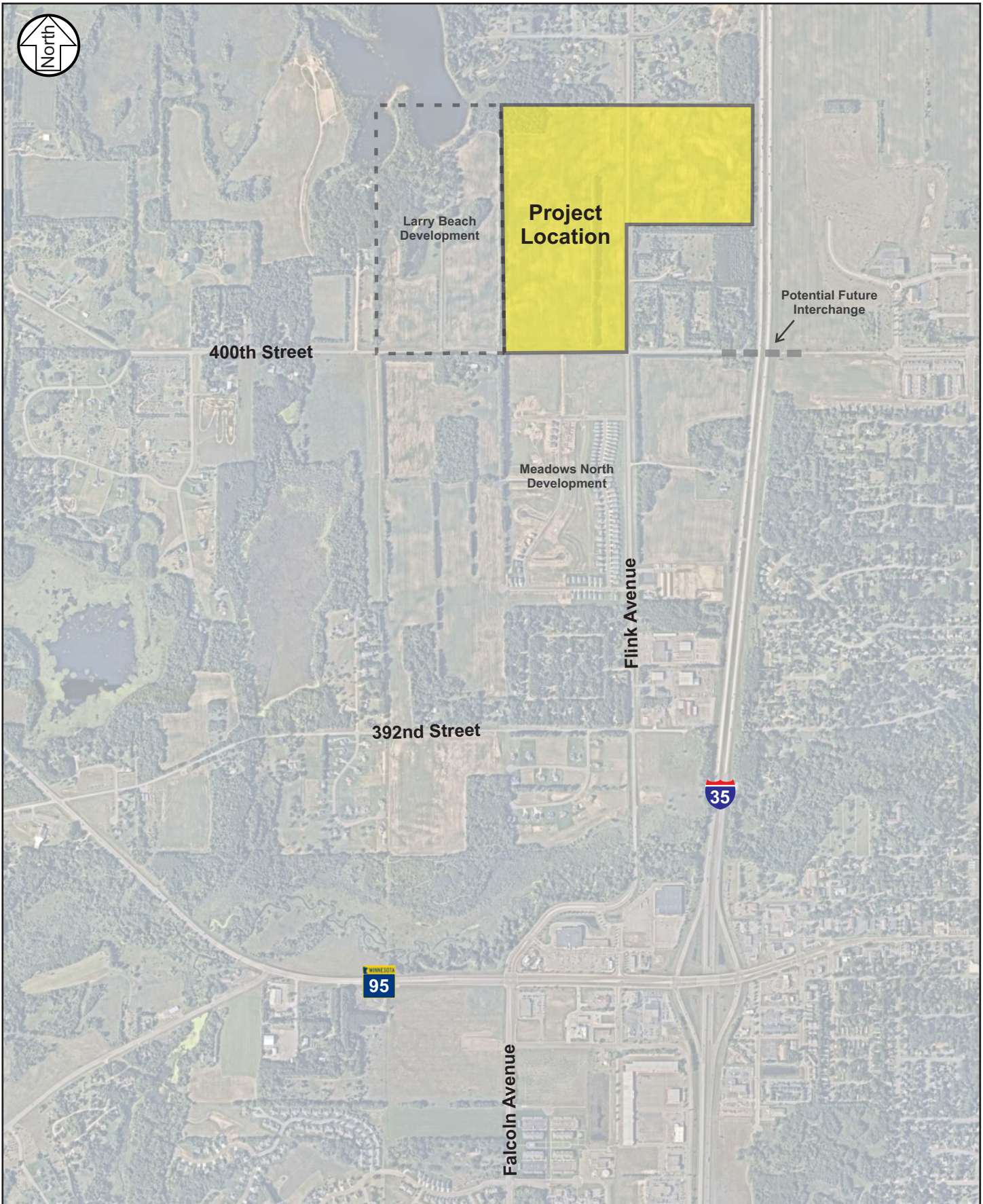
- Construct a single-lane roundabout at Flink Avenue and 400th Street
- Construct a single-lane roundabout at Flink Avenue and 392nd Street
- Adjust the traffic signal timing at Flink Avenue and MN-95

Based on discussions with City staff, the previously recommended roundabout improvements are neither programmed nor planned for construction by the City; therefore, they were not included in the future operations analysis.

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Project Location

Meadow Ridge Development EAW Traffic Analysis
North Branch, MN

Figure 1

Existing Conditions

Existing conditions were reviewed to establish a baseline to identify any future impacts associated with the proposed development. The evaluation of existing conditions includes a review of traffic volumes, roadway characteristics, and an intersection capacity analysis, which are summarized in the following sections.

Data Collection

Weekday a.m. and p.m. peak period vehicular turning movement and pedestrian/bicyclist counts were collected at the following study intersections on Wednesday, February 21, 2024:

- Flink Avenue and 400th Street
- Flink Avenue and 392nd Street
- Flink Avenue and MN-95

Roadway Characteristics

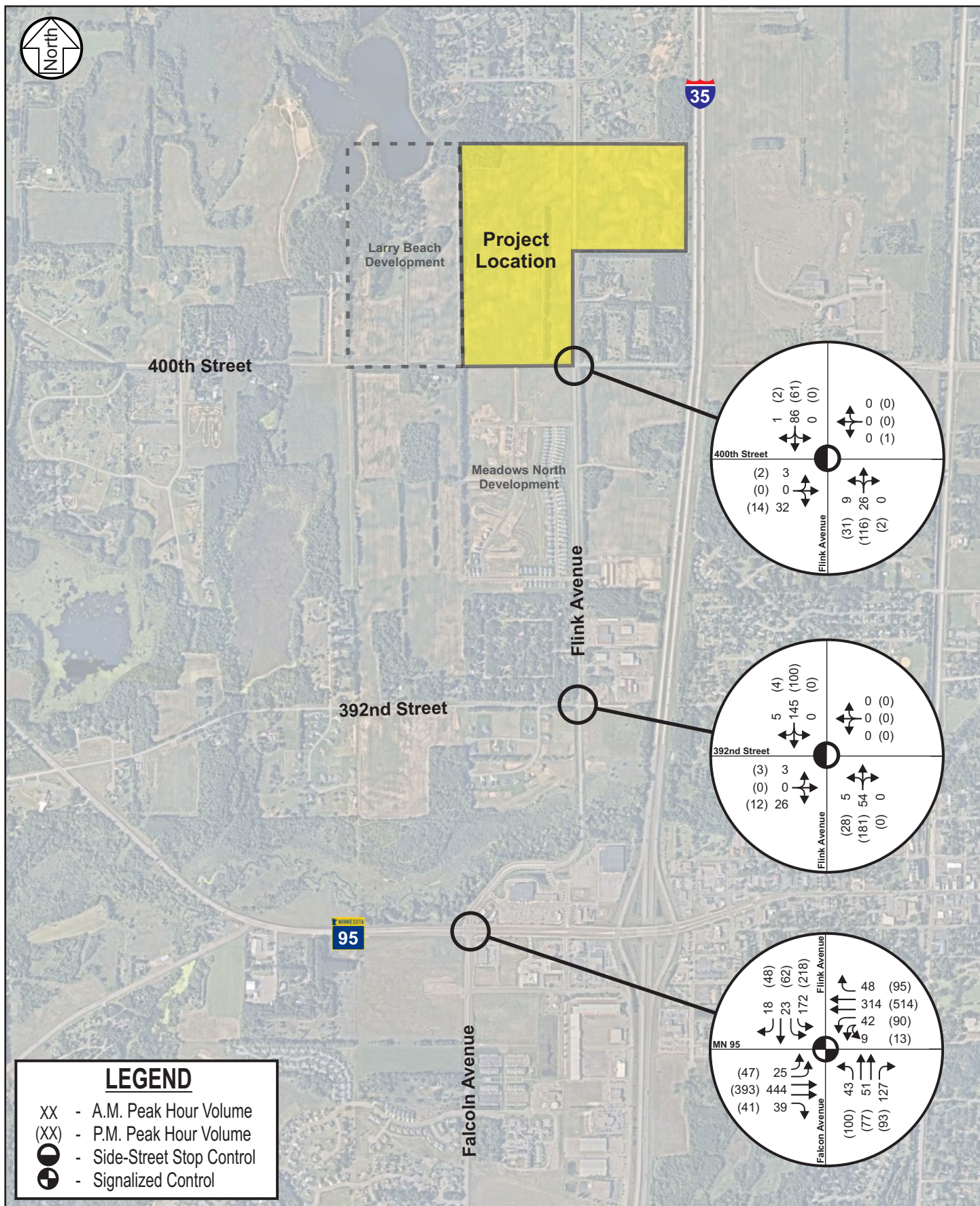
A field assessment was completed to identify various roadway characteristics within the transportation system study area, such as functional classification, general configuration, and posted speed limit. A summary of these roadway characteristics is shown in Table 1. Note that these are general characteristics and that there are some deviations within the area or segments of the roadways. For example, Flink Avenue transitions from a 4-lane divided roadway with a speed limit of 30-mph to a 2-lane undivided roadway with a speed limit of 55-mph north of Tanger Drive.

Table 1. Existing Roadway Characteristics

Roadway	Functional Classification ⁽¹⁾	General Configuration	Posted Speed Limit (mph)
Flink Avenue	Major Collector	4-lane divided/ 2-lane undivided ⁽²⁾	30/ 55 ⁽³⁾
400th Street	Local Roadway	2-lane undivided	Unposted ⁽⁴⁾
392nd Street	Local Roadway	2-lane undivided	30
MN-95	Minor Arterial	4-lane divided/ 2-lane undivided ⁽⁵⁾	45

(1) Functional Classification based on the *North Branch Comprehensive Plan*.
(2) Flink Avenue transitions from a 4-lane divided roadway to a 2-lane undivided roadway north of Tanger Drive.
(3) Flink Avenue has a posted speed limit of 30-mph south and 55-mph north of Tanger Drive.
(4) Roadway has an unposted speed limit. Speed limit was assumed to be 55-mph.
(5) MN-95 transitions from a 4-lane divided roadway to a 2-lane undivided roadway west of Flink Avenue.

From a traffic control perspective, the MN-95 and Flink Avenue intersection is signal controlled. The remaining study intersections are unsignalized with side-street stop control. Existing geometrics, traffic controls, and traffic volumes in the study area are shown in Figure 2.



Intersection Capacity Analysis

An intersection capacity analysis was completed using Synchro/SimTraffic software to establish a baseline condition to which future traffic operations could be compared. Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 2. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A though LOS D is generally considered acceptable based on MnDOT guidelines.

Table 2. Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

For side-street stop-controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high-levels of delay (i.e., poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

Results of the existing capacity analysis, shown in Table 3, indicate that all study intersections currently operate at an acceptable overall LOS B or better during the weekday a.m. and p.m. peak hours with the existing traffic control, geometric layout, and signal timing. No significant side-street stop delay or queuing issues were observed.

Table 3. Existing Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Flink Avenue and 400th Street ⁽¹⁾	A/A	2 sec.	A/A	8 sec.
Flink Avenue and 392nd Street ⁽¹⁾	A/A	4 sec.	A/A	6 sec.
Flink Avenue and MN-95	B	14 sec.	B	16 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

Transportation Improvements

The City of North Branch is planning a resurfacing project along Flink Avenue from MN-95 to 412th Street, slated for completion in the summer/fall of 2024. The project will include the addition of northbound left- and southbound right-turn lanes at the Flink Avenue/392nd Street intersection, as well as the installation of gravel shoulders along the corridor. Given the project modifies the geometry of a study intersection, it was incorporated into the future operations analysis. As mentioned previously, the roundabout improvements previously recommended at the intersections of Flink Avenue with 392nd Street and 400th Street, were not assumed within the future operations analysis, based on discussions with City staff.

A potential interchange at I-35/400th Street is noted in the *City of North Branch Transportation Plan*. The timeline and feasibility of this improvement are currently unknown. For the purposes of this study, the potential interchange was excluded from the future analysis, as it exceeds the scope of a typical traffic impact study. To effectively assess the changes and requirements associated with an interchange improvement, a more detailed evaluation of forecasting/land use, travel pattern changes, and geometric considerations is needed, along with a comprehensive analysis to determine the long-term vision for the potential interchange area.

Year 2040 No Build Conditions

To understand how general background growth, adjacent developments, and planned infrastructure improvements are expected to impact the study intersections, year 2040 no build conditions were reviewed. The following sections outline the overall traffic forecast development process and assumptions, as well as the intersection capacity analysis.

Background Traffic Growth

To account for general background growth in the area, a growth factor of 1.1 was applied to the existing peak hour traffic volumes to develop year 2040 background forecasts. This growth factor is based on the *CSAH 20-Year Traffic Projection Factors* for Chisago County, which was published in the Fall of 2023. It should be noted that this forecasting approach is generally consistent with the growth assumptions as part of the *Meadows North Study*.

Adjacent Developments (Meadows North)

As previously noted, the Meadows North development is located in the southwest quadrant of the Flink Avenue and 400th Street intersection, which is directly south of the proposed Meadow Ridge development. The development impacts were evaluated as part of the *Meadows North Study*, which was completed in 2018. Since completion of the study, land use assumptions have been updated and construction has begun. The current Meadows North development site plan consists of approximately 158 single-family attached housing units, 151 single-family detached housing units, and a convenience/gas station. Comparing to the previous study assumptions, the development has less residential units and no longer includes an assisted living component.

Therefore, to account for the most updated land use plans, trip generation estimates were updated using the *ITE Trip Generation Manual, 11th Edition* and distributed to the adjacent roadway network. It should be noted that the development began construction in 2019/2020, and approximately 80 single-family homes have been completed. Therefore, since these trips are expected to already be using the adjacent roadway network, they were not generated within the trip generation estimates. The adjacent development is expected to account for approximately 286 a.m. and 340 p.m. peak hour trips within the study area.

Intersection Capacity Analysis

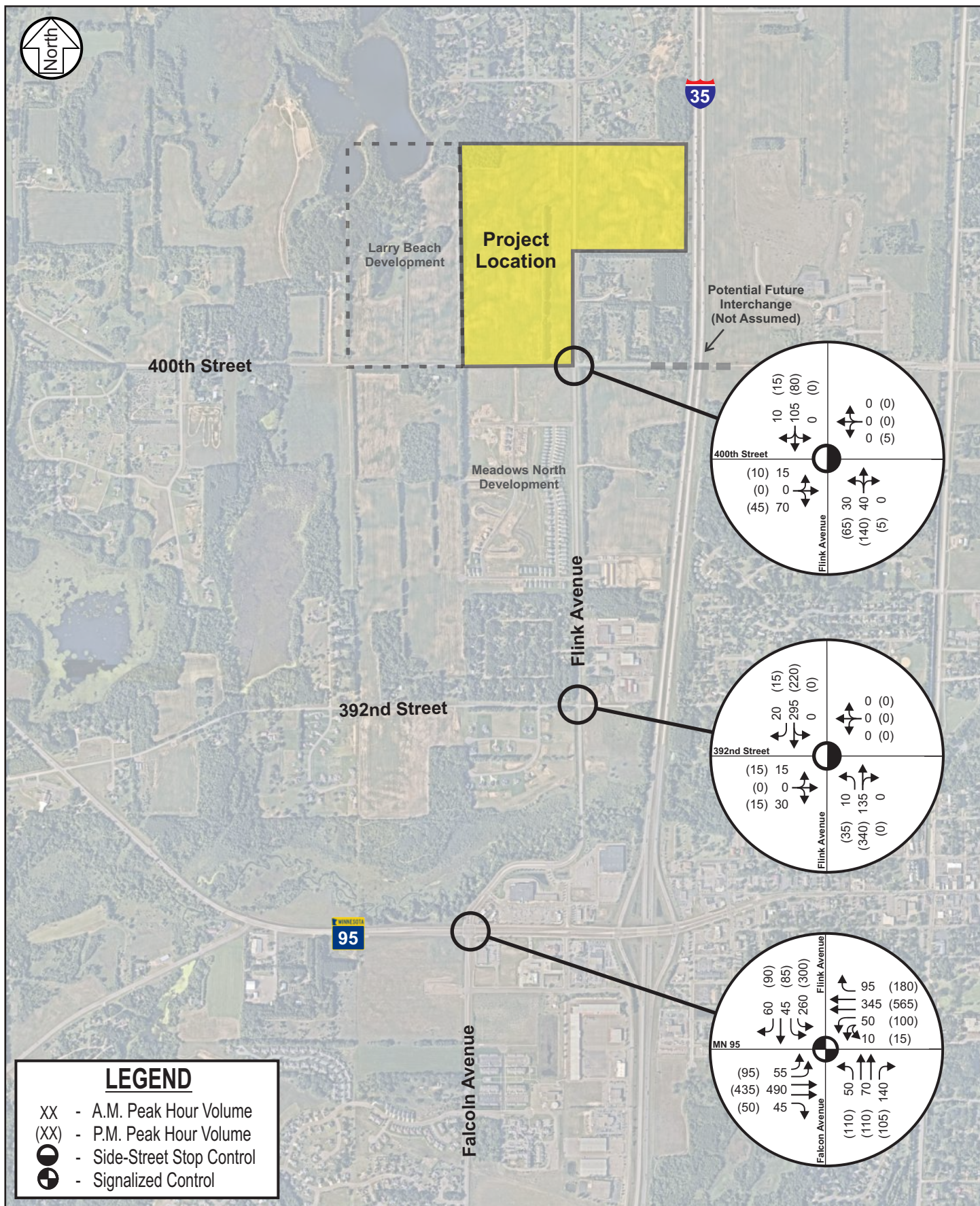
To determine how the study intersections will accommodate the year 2040 no build traffic forecasts, an intersection capacity analysis was completed using Synchro/SimTraffic. Year 2040 no build traffic forecasts, which include the adjacent developments and general background growth, are shown in Figure 3. The analysis assumes the Flink Avenue resurfacing project (i.e. northbound left- and southbound right-turn lanes at 392nd Street) and signal optimization at the Flink Avenue/MN-95 intersection. However, as previously noted, it does not include improvements such as an interchange at I-35/400th Street or roundabouts at the Flink Avenue/392nd Street and Flink Avenue/400th Street intersections. Results of the analysis, which is summarized in Table 4, indicate that all study intersections are expected to continue to operate at an overall LOS B or better during the weekday a.m. and p.m. peak hours.

Table 4. 2040 No Build Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Flink Avenue and 400th Street	A/A	3 sec.	A/A	9 sec.
Flink Avenue and 392nd Street	A/A	5 sec.	A/A	7 sec.
Flink Avenue and MN-95 ⁽¹⁾	B	16 sec.	B	19 sec.

(1) Signal timing assumed to be optimized.

Note the difference in operations between the current study and the *Meadows North Study* is likely a combination of less intensive development assumptions and lower baseline volumes. Based on the results of the 2040 no build intersection capacity analysis, single-lane roundabouts are not needed at the Flink Avenue/400th Street or Flink Avenue/392nd Street intersections from an operations perspective.

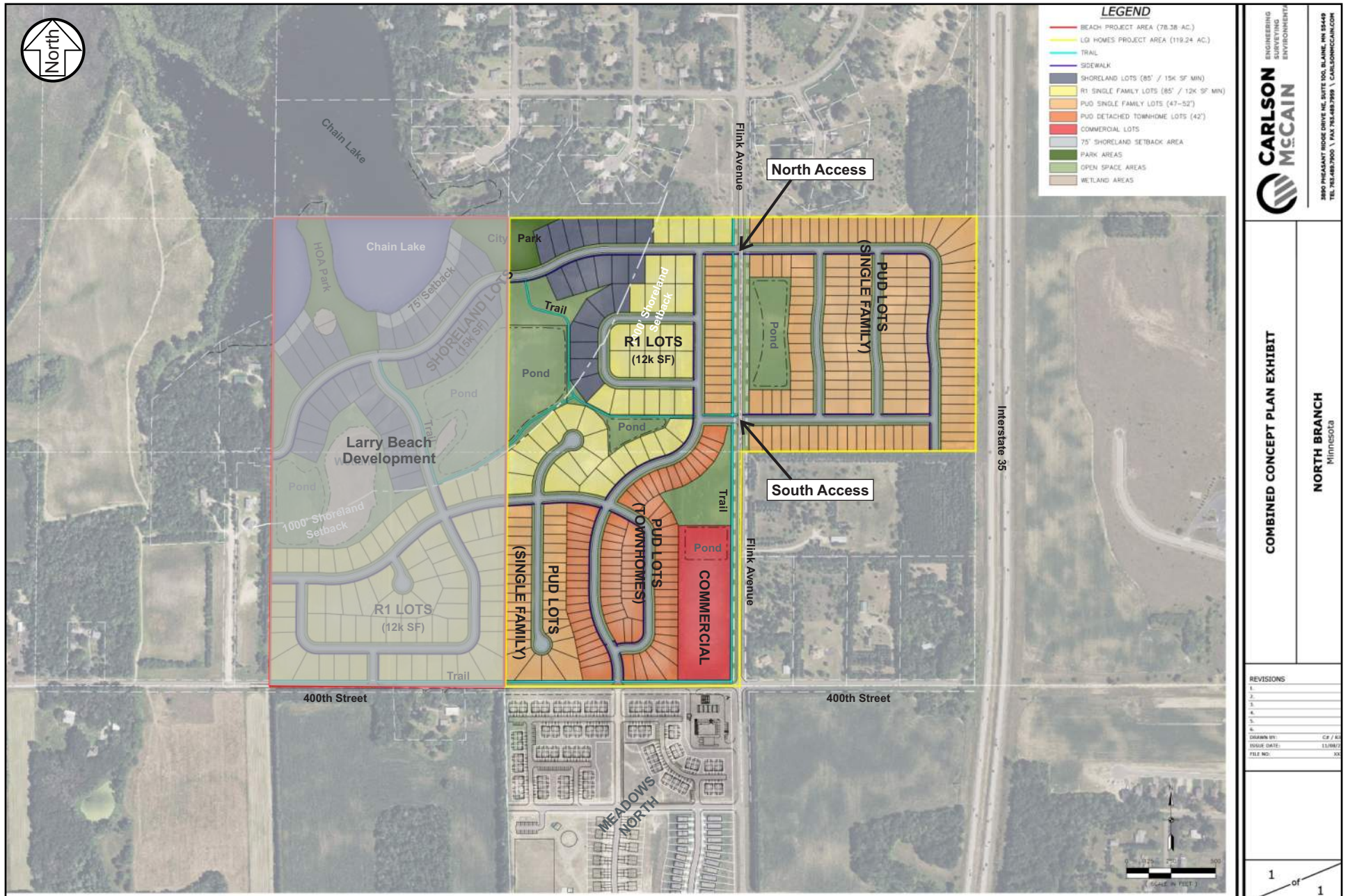


Proposed Development

The proposed development is generally located in the north quadrants of the Flink Avenue and 400th Street intersection. The proposed development consists of a total of 347 single-family detached housing units and an approximately 255,000-sf commercial lot. A preliminary site plan for the proposed development is illustrated in Figure 4, which was used as the basis for the traffic analysis. The residential component is anticipated to be fully constructed in seven (7) to 10 years, whereas the commercial development timeline is currently unknown. For the purpose of this study, the year 2040 was analyzed to account for cumulative area effects. Access to the residential component is proposed at the following three (3) locations:

- **Flink Avenue North Access** – New intersection located approximately 2,460 feet north of 400th Street
- **Flink Avenue South Access** – New intersection located approximately 1,500 feet north of 400th Street
- **400th Street Access** – Connection on north leg of the proposed Meadows North access intersection located approximately 685 feet west of Flink Avenue

In addition to the residential development access locations, there is a future commercial lot in the southeast quadrant of the development that is expected to have full access along Flink Avenue. For the purpose of this study, one (1) access point was assumed for the commercial lot. Note this assumption is based on access spacing guidance within the *North Branch Comprehensive Plan* and is discussed further in the Site Plan Review section of this memorandum.



Preliminary Site Plan

Meadow Ridge Development EAW Traffic Analysis
North Branch, MN

023417427
March 2024

Figure 4

Year 2040 Build Conditions

To identify the impacts associated with the proposed development, traffic forecasts for year 2040 build conditions were developed. The year 2040 build conditions take into account planned adjacent developments (i.e. Meadows North and Larry Beach), general background growth, and traffic generated by the proposed development. The following sections provide detail on the proposed development trip generation, intersection capacity analysis, and potential improvement considerations.

Adjacent Developments (Larry Beach)

The proposed Larry Beach development is located directly west of the proposed Meadow Ridge development and is expected to be constructed after the Meadow Ridge development is completed. Based on preliminary concept layouts, the Larry Beach development is assumed to consist of approximately 102 single-family detached units. Therefore, in order to account for development that is anticipated to be constructed prior to 2040, trip generation estimates were developed for the Larry Beach property using the *ITE Trip Generation Manual, 11th Edition*, and distributed to the adjacent roadway network. The adjacent development is expected to generate approximately 71 a.m. and 96 p.m. peak hour trips within the study area.

Proposed Development Trip Generation

To account for traffic impacts associated with the proposed development, a trip generation estimate was developed for the weekday a.m. and p.m. peak hours and a daily basis. The estimates, shown in Table 5, were developed using the *ITE Trip Generation Manual, 11th Edition*. As mentioned previously, the 255,000-square foot commercial lot development timeline and specific land uses are currently unknown. Therefore, general retail was assumed based on a floor-area-ratio of approximately 20 percent. Note that no multi-use or pass-by reductions were applied to provide a conservative estimate.

Table 5. Proposed Development Trip Generation Estimate

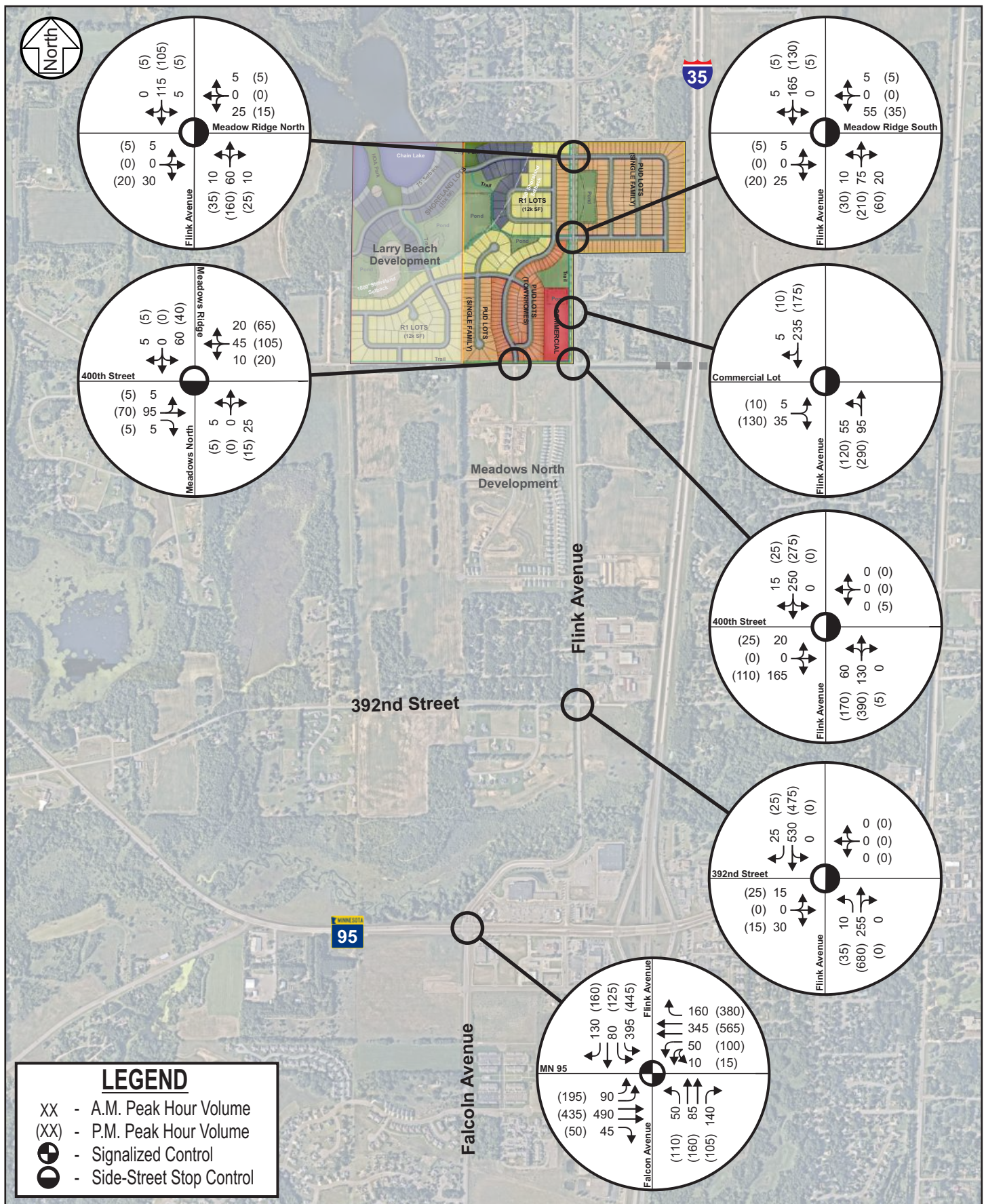
Land Use Type (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily Trips
		In	Out	In	Out	
Single-Family Housing (210)	347 DU	61	182	205	121	3,272
Retail (821)	50 KSF	54	33	127	133	3,376
Total Site Trips		115	215	332	254	6,648

Results of the trip generation estimate indicate that the proposed development is expected to generate approximately 330 a.m. peak hour, 586 p.m. peak hour, and 6,648 daily trips. The trips generated were distributed throughout the area based on the directional distribution shown in Figure 5, which was developed based existing travel patterns and engineering judgement. The resultant year 2040 build traffic forecasts, which include general area background growth, adjacent development trips (i.e. Meadows North and Larry Beach), and traffic generated by the proposed development are shown in Figure 6.

Directional Distribution

Meadow Ridge Development EAW Traffic Analysis
North Branch, MN

Figure 5



Intersection Capacity Analysis

To determine how the study intersections and site access locations will operate under year 2040 build conditions, an intersection capacity analysis was completed using Synchro/SimTraffic. The analysis assumes the Flink Avenue resurfacing project (i.e. northbound left- and southbound right-turn lanes at 392nd Street) and signal optimization at the Flink Avenue/MN-95 intersection. However, as previously noted, it does not include improvements such as an interchange at I-35/400th Street or roundabouts at the Flink Avenue/392nd Street and Flink Avenue/400th Street intersections. Results of the analysis, summarized in Table 6, indicate that all study intersections are expected to operate at an overall LOS C or better during the weekday a.m. and p.m. peak hours. No significant side-street stop delay or queuing issues are expected.

Table 6. Year 2040 Build Intersection Capacity Analysis

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
Flink Avenue and North Access ⁽¹⁾	A/A	5 sec.	A/A	7 sec.
Flink Avenue and South Access ⁽¹⁾	A/A	6 sec.	A/A	8 sec.
Flink Avenue and Commercial Lot Access ⁽¹⁾	A/A	4 sec.	A/A	8 sec.
Flink Avenue and 400th Street ⁽¹⁾	A/A	4 sec.	A/B	15 sec.
Flink Avenue and 392nd Street ⁽¹⁾	A/A	6 sec.	A/B	13 sec.
Flink Avenue and MN-95 ⁽²⁾	C	20 sec.	C	23 sec.
400th Street and West Access/Meadows North ⁽¹⁾	A/A	5 sec.	A/A	7 sec.

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst side-street approach LOS. The delay shown represents the worst side-street approach delay.

(2) Signal timing assumed to be optimized.

The following information summarizes the operational and/or safety issues that warrant consideration as traffic volumes increase:

Flink Avenue Corridor:

- While no operational or queuing issues are expected at the study intersections along Flink Avenue, the Meadows North and Meadows Ridge developments are anticipated to construct six (6) or more full access locations along Flink Avenue within a one-mile span. In addition, most site trips are expected to be destined to/from the South, and some intersections are expected to have over 100 northbound left-turn movements in a peak hour. This increase in northbound left-turning vehicles along the high-speed roadway (i.e. 55-mph) could present safety issues as area development occurs.

- **Recommendation:** Reconstruct Flink Avenue from a 2-lane undivided to a 3-lane roadway with a two-way left-turn lane, from 392nd Street to the North Residential Access. As part of the project, paved shoulders and/or pedestrian/bicycle facilities could also be considered.
- **Recommendation:** While not needed from an operational perspective, construct northbound right-turn lanes at the proposed north and south access locations along Flink Avenue to provide safety and operational benefits.

400th Street/West Access/Meadows North Access:

- **Consideration:** While not needed from an operational perspective, a westbound right-turn lane could be considered to provide safety and operational benefits. However, unlike Flink Avenue, 400th Street is a local roadway with a lower speed limit, therefore, a right turn lane is expected to be less beneficial from a safety perspective.

Site Plan Review

A review of the proposed site plan was completed to identify any issues and recommend potential improvements with regard to internal roadways, access, traffic controls, and circulation. The following information should be considered.

In general, all roadways within the proposed development are expected to function adequately as two-lane facilities. Internal intersections are also expected to operate adequately with side-street stop control. As development occurs, internal intersections should be reviewed to determine if a higher-level of traffic control (i.e. an all-way stop) should be considered. In addition, special consideration should be made to limit any sight distance impacts from future landscaping and signing at all internal and external intersections within the study area.

From an access perspective, full access locations are proposed along Flink Avenue and 400th Street. Therefore, the *North Branch Comprehensive Plan* was reviewed for access spacing guidelines and conformance. Based on this review, a full-movement intersection on a major collector should have access spacing at a minimum of 1/8-mile or 660 feet. As mentioned previously, all residential access locations are currently spaced greater than 660 feet. Therefore, the proposed site access meets access spacing guidelines. However, the commercial lot access location(s) in the southeast quadrant is currently unknown at this time. Given the commercial lot's proximity to the Flink Avenue/400th Street intersection, it may be difficult to provide more than one (1) access location while maintaining access spacing conformance. Further review of the proposed commercial access should be considered as part of future site plan submittals.

Although not shown, pedestrian and bicycle facilities should be provided on at least one-side of each roadway, if not both sides. If only one side is provided, consider providing on the north-side of the roadway to maximize sun exposure.

Summary and Conclusion

The following summary and conclusions are offered for consideration:

- 1) All study intersections currently operate at an acceptable overall LOS B or better during the a.m. and p.m. peak hours. No significant side-street stop delay or queuing issues were observed.
- 2) The adjacent Meadows North development was evaluated as part of the *Meadows North Study*, which was completed in 2018. The improvements identified as part of that study included signal optimization at MN-95 and single-lane roundabouts at Flink Avenue/400th Street and Flink Avenue/392nd Street intersections. Based on discussions with City staff, the roundabout improvements are neither programmed nor planned for construction by the city; therefore, they were not included in the future operations analysis.
- 3) Since completion of the *Meadows North Study*, land use assumptions have been updated and construction has begun. Therefore, trip generation estimates were updated to account for the adjacent development changes.
- 4) The City of North Branch is planning a resurfacing project on Flink Avenue from MN-95 to 412th Street that will include turn lanes at the Flink Avenue/392nd Street intersection and gravel shoulders along the corridor. The project, which is anticipated to be completed in summer/fall 2024, was included in the future operations analysis. However, the potential interchange at I-35/400th Street was excluded from the analysis, given the unknown nature of the improvement and its impacts exceeding the scope of a standard traffic impact study.
- 5) The year 2040 no build intersection capacity analysis indicates that all study intersections are expected to continue to operate at an overall LOS B or better during peak hours, with the assumed infrastructure improvements. No significant side-street stop delay or queuing issues are expected.
- 6) The proposed Meadow Ridge development, which is generally located in the north quadrants of the Flink Avenue and 400th Street intersection, consists of a total of 347 single-family detached housing units and an approximately 255,000-sf commercial lot. The residential component of the development is anticipated to be fully constructed in seven (7) to 10 years, whereas the commercial development timeline is currently unknown. For the purpose of this study, the year 2040 was analyzed to account for cumulative area effects. The proposed access for the development is summarized below:
 - a. Three (3) full access locations are proposed for the residential component of the development. Two (2) access locations are proposed along Flink Avenue and one (1) access location is proposed on 400th Street.
 - b. While currently unknown, one (1) full access location along Flink Avenue was assumed for the future commercial lot development.
- 7) The proposed Meadow Ridge development is expected to generate approximately 330 a.m. peak hour, 586 p.m. peak hour, and 6,648 daily site trips.

- 8) Note the Larry Beach property, which is directly west of the proposed development, is expected to be developed after the Meadow Ridge development is constructed. Therefore, trip generation estimates were developed for the adjacent development and distributed to the adjacent roadway network to provide an accurate traffic forecast for the year 2040 build conditions.
- 9) The year 2040 build intersection capacity analysis indicates that all study intersections are expected to operate at an overall LOS C or better during the weekday a.m. and p.m. peak hours, with the assumed infrastructure improvements. No significant side-street stop delay or queuing issues are expected.
- 10) The following improvement recommendations were provided:
 - a. Reconstruct Flink Avenue from a 2-lane undivided to a 3-lane roadway with a two-way left-turn lane, from 392nd Street to the North Residential Access. As part of the project, paved shoulders and/or pedestrian/bicycle facilities could also be considered.
 - b. While not needed from an operational perspective, construct northbound right-turn lanes at the proposed north and south access locations along Flink Avenue to provide safety and operational benefits.
 - c. While not needed from an operational perspective, a westbound right-turn lane could be considered at the 400th Street/West Access/Meadows North Access to provide safety and operational benefits. However, unlike Flink Avenue, 400th Street is a local roadway with a lower speed limit, therefore, a right turn lane is expected to be less beneficial from a safety perspective.
- 11) A review of the proposed site plan was completed to identify any issues and recommend potential improvements with regard to internal roadways, access, traffic controls, and circulation.

Meadows Ridge
Environmental Assessment Worksheet
Appendix L

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Prepared By: Shawn Williams, Public Works Director

Presenter: Shawn Williams, Public Works Director

Date: 10/15/2024

Board & Commission: City Council

Subject: Compost Site Hours and Use

The City is experiencing issues with the compost pile, and I am looking for direction as to posting hours and restrictions that the compost site be available only to City residents. Currently, the use of the compost site is overwhelmingly being used by contractors and non-residents dropping off materials from outside the City limits. The reason being is most if not all of our surrounding cities have shut down their compost sites do to abuse and the expense of operating them.

The City's compost site was started established in 1993 when the city banned burning leaves in town. The first 3 years of operation, the brush was manageable and burned. Over the years, the site has become very popular and the brush pile grew in size to where burning was no longer an option as the surrounding homes did not appreciate the smoke from a 10-day huge "campfire" smoldering. The initial cost to grind the pile from 95-2005 averaged from \$6-10K annually, and is funded from the city's general fund and storm water fund. From 2006-2015 we were able to work with District Energy in St. Paul and their contractor to grind our pile and haul the chips to their wood burning incinerator that provides re-newable energy for St. Paul. During this time, District Energy received funding from grants, both state and federal, for renewable energy that covered the grinding and hauling costs, and we were not charged. This funding went away in 2016 through 2022 the annual cost now ranges from \$8K-\$12K, in 2023 the cost was \$12,500 to grind and haul the chips away.

The amount of brush is getting difficult to manage and I would like to put some parameters around its use. Our site is open 24-7-365 days a year and is un-staffed and this is our problem. It has become a free-for-all and the word has got around. Lindstrom, Chisago, Stacy, and Wyoming regulate and staff it 2 days a week and charge non-residents a tipping fee for leaves and brush under 3 inch in diameter. The annual operating cost to do this is \$88K, split amount the four agencies.

Options for discussion are:

1. Be open 4 hours Saturday and Sunday, residents only and no contractors. Staffed by the public works oncall person that would verify residency.
2. Close it.
3. Continue as it currently is.
4. ?

Voting Requirements:



Prepared By: Sharon Wright, Finance Director

Presenter: Sharon Wright, Finance Director

Date: 10/15/2024

Board & Commission: City Council

Subject: 2025 Budget and Levy

The staff has been working diligently on updating the 2025 to 2035 budget documents for City Council review. We have made several reductions and changed staffing recommendations considerably. This was all done while looking not only at the 2025 fiscal year but also at what happens to the levy in 2026 through 2035.

The Council has a special meeting scheduled for October 28, 2024, at 6:30 pm to go through these materials in detail. We wanted to give you extra time to review the materials.

Voting Requirements:

2025 – 2035 Staff Additions and Capital Budget Highlights

Department	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Administration	Human Resources Specialist 	Customer Service Specialist 				Communication Specialist 				Deputy Clerk 	
Building Inspections		Code & Zoning Officer 	Inspections Program Coord. 	Building Inspector 	Rental Housing & Fire Inspector 						
Building Inspection Equipment		• 1/2 Ton 4WD pickup		• 1/2 Ton 4WD pickup	• Car • 1/2 Ton 4WD pickup	• 1/2 Ton 4WD pickup			• 1/2 Ton 4WD pickup		
Community Development – Planning			Economic Dev. Admin Svc 	Associate Planner 						City Planner 	
Elections											
Facilities Plan											
Finance	Promo Opportunity Asst Finance Dir. \$				Finance Clerk 						
Fire	Update Pay Structure Phase I	Phase 2	Phase 3	Phase 4	Phase 5						
Fire Equipment		Ladder Truck  Tanker 	• Grass Rig Replacement • Extrication Equipment (Battery powered) • Replace Truck Tank	• Grass Rig • Kenworth Engine Replacement  		• Replace SCBAs 	• Tanker Chassis replacement	• Extrication Equip. (Battery powered)			

Department	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Parks	PT GIS Consultant 		PT Parks Programming 	Make Parks Programming FT 							
Parks Equipment	Lease a Front-cut Lawn Mower 60” 30HP	GIS Equipment		All wheel drive or 4WD vehicle					All wheel drive or 4WD vehicle		
Park Projects	- Trails Maintenance and Repair - Harder Park parking lot resurface - RJMP parking lot resurfacing - Central Park basketball court resurface - Northwood Park basketball court resurface - County Road 30 Crosswalk - Flink Ave Trail Phase II - Malmquist Property	- Trails Maintenance and Repair - Wildridge Park - Outdoor Archery Range - Sunrise Prairie Regional Trail Maintenance - Clayton Anderson memorial Park improvement - Falcon Ave Trail - Harder Park Trail connection - Northwood Park playground equipment	- Trails Maintenance and Repair - Wildridge Park basketball resurface - Lucht’s Crossing Park Development - Lucht’s Crossing Trail Development - Northwood Park pickleball court lighting	- Trails Maintenance and Repair - North Branch Oaks playground equipment - Harder Park playground equipment	- Trails Maintenance and Repair - Northwoods Park underground sprinkling - Tower Fields sprinkling - Townsedge Park development - Meadows North expansion - Roger Johnson park lighting	- Trails Maintenance and Repair - Tower Fields parking lot paving - Dog Park - Roger Johnson Memorial Park playground equipment	- Trails Maintenance and Repair - RJMP Park expansion	- Trails Maintenance and Repair - Wildridge Park playground equipment	- Trails Maintenance/ Repair - St. Croix Trails Hemingway-Harder	- Trails Maintenance/ Repair - Grand Avenue pedestrian bridge	Trails Maintenance/ Repair
Police	Promo to Sergeant \$ New Patrol Off. 	Promo to Sergeant \$ New Patrol Off. 	Promo to Lieutenant \$ New Patrol Off. 	Admin. Support Position 	New Patrol Off. 	New Patrol Off. 	New Patrol Off. 				
Police Equipment	Finance 4 squad cars 	Finance 3 Squad Cars 	4 Squad Cars 	3 Squad Cars 	4 Squad Cars 	5 Squad Cars 	4 Squad Cars 	4 Squad Cars 	3 Squad Cars Speed Trailer  	4 Squad Cars 	Squad Cars 

Department	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Public Safety Warning Sirens		• Emergency Warning Siren @38177 Falcon Ave. • Emergency Warning Siren @6674 Ash Street	• Emergency Warning Siren @7852 380th St.	• Emergency Warning Siren @ 6406 Elm St	• Emergency Warning Siren @			• Warning Siren @	• Warning Siren @ 41198 Flink Avenue	• Warning Siren @ 7299 410th Street	
Public Works	New Positions 	New Position 	New Position 		New Position 		New Position 	New Position 			
Public Works Equipment		• Tandem Axle Snowplow • 1 Ton 4WD Plow Truck	• Front End Loader • Tandem Axle Plow Truck	• 4WD Utility Vehicle • Asphalt Roller • Trailer 12,000-pound capacity • Ditch Maintainer • Leaf Vacuum Unit	• 1 Ton 4WD Plow Truck			• Road Grader			
Pavement Management	\$557,000.00	\$1,420,545.00	\$1,463,161.00	\$1,507,056.00	\$1,552,268.00	1,598,836.00	\$1,546,801.00	\$1,600,000.00	1,650,000.00	\$1,700,000.00	\$1,750,000.00
Sidewalk Replacement	\$21,855.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00	\$26,000.00
Street Projects		• Ash Street • Falcon Ave. • Maple Street • 9th and 10th Ave. • 12th Ave. 360th	• Intersection, Signal Roundabout Hemmingway Ave. Paving	360 th Street							
Technology					• Replace Electronic Bulletin Board at Forest/Hwy 95					• Security Cameras	

Levy Projection

Description	Fund	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
General Fund - operating levy		5,297,000.00	6,335,842.00	6,990,296.00	7,643,261.00	8,427,574.00	9,132,453.00	10,037,426.00	10,779,747.00	11,465,734.00	12,039,021.00	12,640,972.00
Economic Development - operating levy		185,000.00	194,250.00	195,000.00	195,000.00	195,000.00	195,000.00	195,000.00	195,000.00	195,000.00	195,000.00	195,000.00
Capital Plan Funding		-	275,000.00	300,000.00	300,000.00	400,000.00	300,000.00	300,000.00	600,000.00	300,000.00	300,000.00	300,000.00
		5,482,000.00	6,805,092.00	7,485,296.00	8,138,261.00	9,022,574.00	9,627,453.00	10,532,426.00	11,574,747.00	11,960,734.00	12,534,021.00	13,135,972.00
Already Committed Debt Levies												
Chisago County	476	225,000.00	198,585.00	153,256.00	-	-	-	-	-	-	-	-
2020A*	322	48,000.00	45,100.00	40,000.00	39,000.00	43,000.00	41,000.00	-	-	-	-	-
2022A*	399	145,000.00	142,000.00	120,000.00	125,000.00	130,000.00	90,000.00	95,000.00	95,000.00	95,000.00	-	-
Total Committed Debt Levies		418,000.00	385,685.00	313,256.00	164,000.00	173,000.00	131,000.00	95,000.00	95,000.00	95,000.00	-	-
Staffing Needs												
Administrative		-	96,136.00	32,000.00	-	-	-	89,000.00	-	-	-	65,000.00
Building Inspections		-	-	43,000.00	58,000.00	85,000.00	85,000.00	-	-	-	-	-
Community Development		-	-	-	80,000.00	-	70,000.00	-	-	-	-	108,000.00
Finance		-	-	-	-	-	72,000.00	-	-	-	-	-
Public Works		-	31,906.00	24,000.00	25,000.00	-	35,000.00	25,000.00	25,000.00	-	-	-
Parks		-	-	-	20,000.00	70,000.00	-	-	-	-	-	-
Police		-	128,219.00	150,000.00	150,000.00	65,000.00	115,000.00	115,000.00	115,000.00	-	-	-
Fire		-	65,322.00	40,000.00	50,000.00	50,000.00	50,000.00	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
Total Staffing Needs		-	321,583.00	289,000.00	383,000.00	270,000.00	427,000.00	229,000.00	140,000.00	-	-	173,000.00
Capital Needs:												
Equipment Replacement by Dept												
Building Inspections	701	-	-	35,000.00	-	45,000.00	80,000.00	45,000.00	-	-	40,000.00	-
Public Works	701	-	-	185,000.00	50,000.00	220,000.00	285,000.00	240,000.00	40,000.00	120,000.00	60,000.00	60,000.00
Parks	701	-	-	55,000.00	-	30,000.00	-	-	-	-	40,000.00	-
Information Technology	701	-	-	-	-	-	100,000.00	-	-	-	-	500,000.00
Police	701	-	-	-	-	231,000.00	276,000.00	382,000.00	313,000.00	280,000.00	269,000.00	319,000.00
Fire	701	-	-	-	130,000.00	110,000.00	-	210,000.00	-	85,000.00	-	-
	701	-	-	-	-	-	-	-	-	-	-	-
Total Equipment Needs		-	-	275,000.00	180,000.00	636,000.00	741,000.00	877,000.00	353,000.00	485,000.00	409,000.00	879,000.00
Parks		-	25,000.00	-	213,000.00	87,000.00	97,000.00	108,000.00	118,000.00	136,000.00	140,000.00	100,000.00
Infrastructure		-										
Reconstruction		-	-	-	-	-	-	-	-	-	-	-
Other		-	-	-	-	-	-	-	-	-	-	-
Total Parks & Infrastructure Needs		-	25,000.00	-	213,000.00	87,000.00	97,000.00	108,000.00	118,000.00	136,000.00	140,000.00	100,000.00
Recommended Future Debt Levies												
2025/2026 Bond - \$3 Million		-	-	-	175,000.00	350,000.00	350,000.00	350,000.00	350,000.00	350,000.00	350,000.00	350,000.00
Loan for Police vehicles - 2025		-	56,408.00	56,408.00	56,408.00	56,408.00	56,408.00	-	-	-	-	-
Loan for Police vehicles - 2026		-	-	45,000.00	45,000.00	45,000.00	45,000.00	45,000.00	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
Total Recommended Future Debt Levies		-	56,408.00	101,408.00	276,408.00	451,408.00	451,408.00	395,000.00	350,000.00	350,000.00	350,000.00	350,000.00
Total Tax Levy		5,900,000.00	7,593,768.00	8,463,960.00	9,354,669.00	10,639,982.00	11,474,861.00	12,236,426.00	12,630,747.00	13,026,734.00	13,433,021.00	14,637,972.00
Increase/(Decrease) \$ over prior year			1,693,768.00	870,192.00	890,709.00	1,285,313.00	834,879.00	761,565.00	394,321.00	395,987.00	406,287.00	1,204,951.00
% increase/(Decrease) over prior year			28.7%	11.5%	10.5%	13.7%	7.8%	6.6%	3.2%	3.1%	3.1%	9.0%

General Fund

2025 Revenue Budget

Description	2023 Actual			2024 YTD	
	2022 Actual	(Unaudited)	2024 Adopted	Actual	2025 Proposed
Current Ad Valorem Taxes	\$ 4,019,909	\$ 4,479,919	\$ 5,482,000	\$ 2,881,033	\$ 7,208,083
Delinquent Ad Valorem Taxes	30,296	77,537	-	33,247	-
Tax-Incrmnt /+Excess & Surplus	2,600	(2,850)	-	-	-
Other Taxes/Solar Prod Tx	25,584	23,773	24,000	23,710	24,000
Penalties and Interest DelTax	-	-	-	2,337	-
Business Licenses/Permits	1,100	1,100	500	250	1,000
Alcoholic Beverage License	18,410	15,950	15,000	175	15,000
Beer Off/On Sale License	-	600	2,500	250	600
Liquor Off/On Sale	125	125	500	-	150
Sunday License	1,200	800	1,500	-	1,000
Club License	500	-	500	-	-
Professional and Transient	468	1,466	500	642	750
Cigarette License	2,750	3,000	2,500	-	3,000
Refuse License (Garbage)	1,092	936	1,000	-	1,000
Building Permits	158,359	230,207	190,000	177,912	200,000
Septic Permits and Opinion	6,670	5,685	7,000	5,350	6,000
Plan Check Fee	52,782	96,992	72,500	68,816	75,000
Mechanical Permits	22,648	24,966	20,000	13,663	20,000
Plumbing Permits	15,021	14,861	12,000	14,513	15,000
Site Locate/Permit	-	-	-	800	-
Grading Permit	-	1,000	-	500	750
Conditional Use Permit	1,500	600	1,000	300	750
Excavation Permit/License	3,900	3,600	5,000	11,500	5,000
Animal Licenses	1,635	1,509	2,000	750	1,500
Dance Permits	400	360	500	60	400
Sign Permits	1,755	375	1,500	405	400
Other Permits	335	5,425	500	2,080	500
State Grants and Aids	1,283	2,788	-	4,324	575,000
Local Government Aid	836,120	855,681	1,029,202	514,601	1,030,822
Mkt Value Credit	9,633	10,281	9,000	-	9,000
Muni State Aid St Maintenance	229,456	222,240	206,000	245,270	210,000
Other State Aid Grants	8,262	10,782	10,000	25,882	15,000
Other Federal Aid/Grants	-	-	-	24,000	-
Fire Aid	90,167	103,601	85,000	1,600	100,000
Police Aid	115,189	627,051	110,000	-	140,000
Youth Officer School Reimb.	48,734	43,253	50,000	25,851	26,000
Zoning and Subdivision Fees	8,030	5,345	4,000	19,320	8,000
Plat Fee	3,560	4,260	4,000	7,970	6,000
Assessment Search Fees	275	250	300	250	300
Fire Service Contract	59,456	67,119	55,000	77,051	75,000

Description	2023 Actual			2024 YTD	
	2022 Actual	(Unaudited)	2024 Adopted	Actual	2025 Proposed
Other Revenues	34,445	8,102	15,000	11,797	15,000
Court Fines	15,202	17,444	17,000	17,678	17,000
False Alarm Fees	-	225	-	-	-
Special Assessments	2,269	2,270	2,000	-	2,000
Misc Revenue	18,342	-	-	-	-
Reimbursement-Police	38,055	22,339	15,000	18,859	20,000
Reimbursement-Pbl Wks	75,487	36,010	75,000	7,138	35,000
Reimbursement-Fire Dept	8,735	20,183	-	3,950	-
PD ADM Citations	-	-	-	440	-
Interest Earnings	1,595	110,665	15,000	345,418	65,000
Refunds & Reimbursements	-	205	7,500	-	-
Refunds & Reimbursements - W&L	13,500	10,061	-	-	-
Other Revenues	1,700	12,360	-	4,826	-
Other Rents and Royalties	16,733	17,896	20,400	16,285	20,400
Insurance Reimbursement	44,251	17,046	-	6,544	-
Contributions and Donations	4,000	4,000	-	-	-
Sales of General Fixed Assets	20,777	250,871	-	-	-
Transfer from Other Fund	163,156	108,600	121,800	-	314,300
Total Revenue	\$ 6,237,451	\$ 7,578,864	\$ 7,693,702	\$ 4,617,347	\$ 10,263,705

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Employees Wages & Salaries	\$ 20,000	\$ 21,000	\$ 21,000	\$ 10,500	\$ 21,000
PERA	750	600	600	300	1,050
FICA and Medicare	1,530	1,607	1,607	804	1,607
Worker's Comp Ins	-	69	112	58	75
Computer	1,445	1,374	1,500	432	-
Professional Services	-	-	1,000	6,197	5,500
Travel Expenses	3,012	3,105	5,500	965	1,000
Conference & Training	1,714	447	2,500	1,345	2,500
Legal Notices Publishing	-	-	500	-	500
General Notices	-	-	-	5,195	-
Insurance	241	201	300	4	50
Dues and Subscriptions	30	30	100	-	100
City Council	\$ 28,722	\$ 28,433	\$ 34,719	\$ 25,800	\$ 33,382

Employees Wages & Salaries	\$ 133,149	\$ 234,862	\$ 142,646	\$ 24,296	\$ 185,528
PERA	8,655	8,504	9,272	1,170	14,515
FICA and Medicare	9,136	10,524	10,912	1,836	14,193
Employer Paid Health	19,189	15,033	17,159	10,234	39,082
Worker s Comp Insurance	996	623	834	658	750
Operating Supplies	48	221	250	-	275
Professional Svcs	-	-	2,000	9,951	2,000
Communications	546	514	800	54	900
Travel Expenses	-	-	-	-	500
Conference & Training	1,964	2,800	1,500	83	2,500
Meeting Expense	95	139	1,500	-	500
Insurance	1,085	891	1,000	42	75
Dues and Subscriptions	1,087	1,270	1,300	-	1,500
City Administrator	\$ 175,950	\$ 275,380	\$ 189,173	\$ 48,324	\$ 262,318

Employees Wages & Salaries	\$ 83,841	\$ 86,957	\$ 90,001	\$ 58,850	\$ 98,670
PERA	6,287	6,426	6,750	4,664	7,401
FICA and Medicare	6,168	6,311	6,885	4,559	7,548
Employer Paid Health	11,100	8,124	9,996	7,344	11,128
Worker s Comp Insurance	698	623	850	658	750
Operating Supplies	-	-	150	480	-
Professional Svcs	29,922	33,153	19,000	11,126	1,000
Medical Exams	618	194	600	155	-
Travel Expense	-	-	500	-	500
Conference & Training	928	1,835	1,000	340	2,000
Legal Notices Publishing	1,464	727	800	-	800
General Notices and Pub Info	-	44	150	-	200
Insurance	1,006	1,474	1,500	3,855	4,000
Dues and Subscriptions	406	314	350	334	500
Recording Fees	332	630	-	138	-
City Clerk	\$ 142,770	\$ 146,813	\$ 138,532	\$ 92,503	\$ 134,497

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Part-Time Employees	\$ 10,426	\$ -	\$ 15,000	\$ 4,324	-
Operating Supplies	1,519	-	2,500	200	-
Travel Expenses	554	-	500	232	-
Elections	\$ 12,499	\$ -	\$ 18,000	\$ 4,756	\$ -
Non-Capitalized Equipment	\$ -	\$ -	\$ -	\$ -	\$ 10,000
Computer	-	-	-	-	20,400
Operating Supplies	-	-	-	-	5,000
Copy Machine Lease	-	-	-	-	25,900
Software	-	-	-	-	303,900
Internet Lease	-	-	-	-	25,000
Network Switches/Firewall	-	-	-	-	27,200
Professional Svcs	-	-	-	-	30,000
Telephone	-	-	-	-	49,700
Technology	\$ -	\$ -	\$ -	\$ -	\$ 497,100
Employees Wages & Salaries	\$ 186,931	\$ 198,793	\$ 219,987	\$ 144,930	\$ 255,335
Overtime	141	1,070	-	101	-
PERA	12,806	13,848	16,499	11,488	19,150
FICA and Medicare	13,251	14,158	16,830	10,937	19,533
Employer Paid Health	16,400	46,863	33,641	29,865	55,628
Worker s Comp Insurance	1,776	1,867	2,503	2,972	3,500
Professional Svcs	31,828	34,975	13,000	10,598	14,000
Auditing and Acct g Services	39,515	61,460	30,000	30,266	30,000
Telephone	492	423	600	313	-
Travel Expenses	437	2,188	5,100	2,194	3,900
Conference & Training	980	3,365	3,800	1,272	2,600
Insurance	2,280	1,850	2,000	126	150
Dues and Subscriptions	530	460	1,000	510	1,000
Finance	\$ 307,367	\$ 381,321	\$ 344,960	\$ 245,572	\$ 404,796
Attorneys Fees	\$ 27,050	\$ 119,782	\$ 50,000	\$ 103,220	\$ 68,300
City Attorney	\$ 27,050	\$ 119,782	\$ 50,000	\$ 103,220	\$ 68,300
Engineering Fees	\$ 56,246	\$ (1,845)	\$ 40,000	\$ 18,179	\$ 40,000
City Engineer	\$ 56,246	\$ (1,845)	\$ 40,000	\$ 18,179	\$ 40,000
Professional Svcs	\$ 29,852	\$ 35,110	\$ 30,000	\$ 15,000	\$ 31,500
Legislative	\$ 29,852	\$ 35,110	\$ 30,000	\$ 15,000	\$ 31,500

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Employees Wages & Salaries	\$ 123,940	\$ 137,004	\$ 71,827	\$ 43,315	\$ 107,265
PERA	8,349	8,912	5,387	3,223	8,045
FICA and Medicare	8,900	8,847	5,495	3,585	8,206
Employer Paid Health	25,302	11,332	2,781	3,745	14,739
Workers Comp Insurance	883	1,490	1,000	1,534	1,900
Non-capital Equipment	181	-	-	-	-
Operating Supplies	117	-	200	-	200
Professional Svcs	12,032	6,828	89,958	15,265	25,000
Engineering Fees	12,528	5,354	16,000	-	5,000
Attorneys Fees	-	-	5,000	-	5,000
Telephone	1,764	1,618	600	929	-
Travel Expenses	-	211	1,600	-	1,600
Conference & Training	575	491	1,285	-	1,300
Legal Notices Publishing	1,900	1,245	1,600	1,427	1,600
General Notices and Pub Info	46	-	-	-	-
Insurance	1,522	1,201	1,500	101	125
Dues and Subscriptions	1,140	758	910	-	1,000
Planning & Zoning	\$ 199,179	\$ 185,290	\$ 205,143	\$ 73,124	\$ 180,980

Employees Wages & Salaries	\$ 38,842	\$ 44,503	\$ 49,886	\$ 33,395	\$ 49,210
Overtime	3,927	4,781	1,617	2,696	6,420
PERA	3,208	3,646	3,862	2,839	4,172
FICA and Medicare	3,204	3,663	3,940	2,820	4,256
Employer Paid Health	8,774	7,913	10,260	6,445	10,099
Worker s Comp Insurance	322	2,247	880	512	1,056
Non-Capitalized Equipment	1,312	6,235	3,000	-	-
Computer	19,426	21,019	15,000	13,085	-
Operating Supplies	14,488	11,659	12,000	6,844	12,480
Copy Machine Lease	9,601	11,838	10,000	7,235	-
Internet Lease	14,263	13,800	15,000	8,050	-
Network Switches/Firewall	-	5,518	6,100	3,567	-
Professional Svcs	43,095	57,980	40,000	26,576	40,000
Telephone	14,477	11,646	15,000	4,982	-
Postage	8,372	4,773	6,500	2,617	-
Insurance	9,524	9,369	12,000	9,175	14,400
Utility Services	21,802	16,349	20,000	6,366	20,000
Refuse	1,841	2,111	2,000	1,523	2,000
Repairs/Maint Buildings	20,311	13,535	30,000	1,387	30,000
Repairs/Maint Machinery/Equip	169	-	2,000	145	2,000
Miscellaneous	-	285	-	-	-
Dues and Subscriptions	371	-	300	2,412	-
City Facilities	\$ 237,329	\$ 252,870	\$ 259,345	\$ 142,671	\$ 196,093

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Employees Wages & Salaries	\$ 1,410,272	\$ 1,516,291	\$ 1,534,661	\$ 975,041	\$ 1,727,010
Overtime	60,299	86,047	81,302	85,948	64,288
PERA	264,666	255,863	268,401	191,731	304,257
FICA and Medicare	27,023	31,657	31,704	21,043	36,234
Employer Paid Health	239,539	297,711	279,360	192,391	286,638
Worker s Comp Insurance	65,412	99,357	100,000	87,964	105,000
Non-Capitalized Equipment	11,714	7,055	19,221	9,258	41,000
Computer	8,070	5,415	45,375	39,960	-
Operating Supplies	20,804	14,898	20,000	8,616	16,500
Motor Fuels	32,183	39,339	32,000	19,766	32,000
Copy Machine Lease	3,797	3,903	3,800	2,714	-
Vehical/Truck Lease	5,715	5,545	6,000	3,690	6,600
License And Permits	44	15	125	112	200
Uniforms	21,427	29,312	22,192	18,493	33,100
Professional Srvs	59,872	99,540	126,900	59,741	32,000
Attorneys Fees	-	-	300	-	300
Medical Exams	2,842	5,318	1,900	1,794	1,900
Telephone	446	721	450	279	-
Travel Expenses	109	277	75	-	100
Conference & Training	19,230	21,580	24,200	28,377	37,200
Insurance	57,583	51,282	44,000	59,594	65,000
Utility Services	4,781	3,722	4,800	1,710	4,800
Repairs/Maint Buildings	3,067	6,054	500	235	500
Repairs/Maint Machinery/Equip	41,630	26,613	46,800	14,990	46,800
Miscellaneous	120	-	300	-	300
Dues and Subscriptions	6,626	11,341	11,500	8,866	13,300
Motor Vehicles	50,768	121,295	149,670	39,016	-
Police	\$ 2,418,039	\$ 2,740,149	\$ 2,855,535	\$ 1,871,329	\$ 2,855,027

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Part-Time Employees	\$ 12,498	\$ 12,498	\$ -	\$ 7,599	\$ 31,500
Fire Call-Edu	41,200	46,200	56,800	25,200	94,500
FICA and Medicare	4,108	4,490	4,348	2,356	9,634
Worker s Comp Insurance	23,905	25,659	27,000	23,529	29,700
Training & Instruction Inside	2,935	3,234	3,000	650	5,000
Non-Capitalized Equipment	5,144	30,961	199,887	35,900	40,000
Computer	6,476	3,673	3,000	5,658	-
Operating Supplies	7,689	5,047	7,000	4,305	10,000
Motor Fuels	7,965	8,851	7,000	3,903	10,000
Copy Machine Lease	902	1,227	1,200	800	-
SCBA Maint	6,628	1,966	4,500	-	8,000
Uniforms	448	6,019	48,500	20,126	5,000
Small Tools and Minor Equip	4,191	1,948	10,000	1,338	40,000
Internet Lease	1,341	1,296	1,300	736	-
Network Switches/Firewall	-	2,069	2,000	1,065	-
Professional Svcs	15,492	16,248	28,000	6,812	28,000
Pension-Fire Relief Assoc	95,167	103,601	82,000	1,600	100,000
Medical Exams	2,564	842	3,500	4,885	8,000
Communications	13,006	13,818	24,000	16,834	24,000
Telephone	3,863	3,811	5,000	2,622	-
Conference & Training	18,358	10,137	7,500	6,152	20,000
Insurance	11,330	9,507	15,000	10,269	12,000
Utility Services	21,666	12,352	20,000	4,474	15,000
Refuse	652	839	825	666	1,000
Repairs/Maint Buildings	8,832	4,233	17,000	16,731	19,000
Repairs/Maint Machinery/Equip	45,237	71,608	45,000	33,838	55,000
Dues and Subscriptions	1,145	2,257	4,000	200	2,000
Other Equipment	2,730	-	-	-	-
Debt Srv Principal	45,386	47,275	49,241	49,241	52,000
Interest	20,113	18,225	16,258	16,258	14,250
Fire	\$ 430,971	\$ 469,888	\$ 692,859	\$ 303,747	\$ 633,584

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Employees Wages & Salaries	\$ 232,194	\$ 247,181	\$ 261,518	\$ 153,431	\$ 240,420
Overtime	-	-	-	6	-
PERA	17,329	18,212	19,614	12,093	18,032
FICA and Medicare	17,176	17,366	20,007	11,451	18,392
Employer Paid Health	50,105	44,238	55,922	42,441	67,850
Worker s Comp Insurance	1,779	505	1,500	595	650
Operating Supplies	265	559	1,500	86	1,000
Motor Fuels	1,566	2,199	2,500	902	2,500
Licenses & Permits	19	-	-	-	-
Uniforms	-	-	300	-	800
Telephone	981	933	1,200	626	-
Travel Expense	-	-	-	-	1,000
Conference & Training	2,143	276	1,000	1,262	2,100
Insurance	2,386	2,039	3,000	314	350
Repairs/Maint Machinery/Equip	156	1,905	2,750	177	1,500
Books and Pamphlets	231	-	1,500	-	1,500
Motor Vehicles	42,914	27,401	-	-	-
Building Inspection	\$ 369,244	\$ 362,814	\$ 372,311	\$ 223,384	\$ 356,094
Utility Services	\$ 4,137	\$ 2,951	\$ 2,950	\$ 1,491	\$ 3,000
Repairs/Maint Machinery/Equip	491	4,245	1,150	1,284	1,200
Capital Outlay	-	-	58,305	51,218	-
Civil Defense	\$ 4,628	\$ 7,196	\$ 62,405	\$ 53,993	\$ 4,200
Professional Svcs	\$ -	\$ 350	\$ 225	\$ -	\$ 300
Consultant Services	4,200	3,500	4,200	2,800	4,200
Animal Control	\$ 4,200	\$ 3,850	\$ 4,425	\$ 2,800	\$ 4,500
Traffic Signals	\$ 12,594	\$ 9,118	\$ 10,000	\$ 4,354	\$ 44,000
Street Lights	21,314	59,957	23,000	23,250	65,000
Street Lights	\$ 33,908	\$ 69,075	\$ 33,000	\$ 27,604	\$ 109,000

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Employees Wages & Salaries	\$ 287,161	\$ 415,663	\$ 467,945	\$ 332,949	\$ 569,512
Overtime	22,756	43,298	12,588	24,979	46,355
PERA	23,243	33,802	36,039	28,474	47,287
FICA and Medicare	23,188	33,607	36,760	28,014	48,233
Employer Paid Health	45,050	82,572	94,009	61,469	120,522
Worker s Comp Insurance	27,036	35,744	50,962	25,233	30,000
Computer	2,681	3,534	-	3,104	-
Operating Supplies	23,043	27,116	25,000	6,453	26,000
Motor Fuels	57,638	56,386	46,000	10,148	46,000
Copy Machine Lease	1,260	2,594	2,500	1,865	-
Street Maint Materials	23,704	47,979	18,000	5,784	25,000
Traffic Signs	9,313	2,982	8,000	11,016	10,000
Gravel	1,861	126,558	140,000	10,000	154,000
License And Permits	517	-	500	-	500
Uniforms	9,249	11,230	7,000	2,992	8,000
Small Tools and Minor Equip	5,346	3,360	3,000	817	5,000
Internet Lease	887	1,296	1,300	736	-
Salt - Sidewalks	7,784	2,274	4,000	-	5,000
Salt And Sand	113,018	132,960	125,000	140,391	140,000
Professional Svcs	6,083	20,865	12,000	4,462	-
Engineering Fees	-	12,425	-	-	40,000
Crack Sealing	57,288	65,461	70,000	67,420	80,000
Dust Control	43,725	56,084	70,000	49,299	90,000
Medical Exams	215	72	300	-	300
Telephone	4,679	5,411	7,000	4,295	-
Postage	-	93	-	-	-
Conference & Training	1,000	955	1,000	856	1,000
Insurance	20,365	19,937	18,000	29,805	33,000
Utility Services	16,087	14,412	10,000	6,354	18,000
Refuse	4,764	6,058	3,700	4,998	4,000
Repairs/Maint Buildings	1,323	3,591	6,300	1,315	15,000
Repairs/Maint Machinery/Equip	42,066	58,633	60,000	20,018	65,000
Drug & Alcohol Testing	142	212	500	146	500
Rentals	-	-	-	-	5,000
Other Equipment Rentals	-	2,809	2,000	-	5,000
Dues and Subscriptions	277	286	300	-	400
Streets	310,871	242,912	507,000	20,381	750,000
Improvements Other Than Bldgs	-	85,120	46,000	34,859	50,000
Heavy Machinery	-	46,626	-	-	-
Motor Vehicles	-	89,065	40,000	-	-
Public Works	\$ 1,193,620	\$ 1,793,981	\$ 1,932,703	\$ 939,928	\$ 2,438,609

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Employees Wages & Salaries	\$ 84,331	\$ 121,743	\$ 156,991	\$ 104,974	\$ 83,366
Overtime	7,593	13,180	2,706	7,501	3,905
Part-Time Employees	2,081	1,897	-	571	2,000
PERA	6,894	9,989	11,977	8,779	6,545
FICA and Medicare	6,876	9,872	12,217	8,545	6,676
Employer Paid Health	14,464	25,138	31,646	19,154	15,054
Worker s Comp Insurance	5,715	7,440	4,000	10,194	12,000
Operating Supplies	16,107	17,775	15,000	10,200	17,000
Motor Fuels	2,609	2,842	5,000	4,899	15,600
Traffic Signs	1,212	72	1,000	-	5,000
Licenses & Permits	77	-	-	-	1,100
Uniforms	1,112	1,209	850	310	100
Small Tools	984	1,246	1,260	5,000	1,000
Professional Svcs	1,000	-	-	608	31,400
Telephone	2,114	2,159	3,500	1,440	-
Conferences & Training	-	75	1,900	23	2,000
Insurance	26,287	23,281	26,000	8,064	8,750
Utility Services	10,116	5,759	17,000	5,008	18,360
Repairs & Maint Cont	5,223	20,582	114,000	6,464	175,000
Repairs/Maint Buildings	-	4,833	2,600	3,015	4,000
Repairs/Maint Machinery/Equip	12,598	7,496	5,700	2,799	6,300
Rentals	10,554	12,359	20,000	1,163	20,800
Other Equipment Rentals	14,501	16,708	5,000	6,782	5,200
Improvements - Bldgs	-	-	-	-	575,000
Parks	\$ 232,448	\$ 305,653	\$ 438,347	\$ 215,493	\$ 1,016,156
Employees Wages & Salaries	\$ 24,717	\$ 28,318	\$ 28,545	\$ 19,159	\$ 29,973
Overtime	2,499	3,043	1,029	1,716	4,085
PERA	2,041	2,320	2,218	1,649	2,554
FICA and Medicare	2,039	2,331	2,262	1,651	2,605
Employer Paid Health	5,583	5,036	5,838	3,721	6,285
Operating Supplies	-	-	100	-	-
Professional Svcs	10,692	11,579	15,000	11,341	17,000
Utility Services	33,393	30,464	35,000	9,083	36,400
Refuse	1,117	1,131	1,200	818	1,200
Repairs/Maint Buildings	7,668	1,247	3,000	1,221	10,000
Repairs/Maint Machinery/Equip	-	-	1,000	-	1,000
Library	\$ 89,749	\$ 85,469	\$ 95,192	\$ 50,359	\$ 111,102

General Fund

2025 Expenditures Budget

Description	2022 Actual	2023 Actual (Unaudited)	2024 Adopted	2024 YTD Actual	2025 Proposed
Unemployment Benefit Payments	\$ -	\$ 574	\$ -	\$ -	\$ 1,000
Professional Svcs	44,108	16,662	5,000	4,500	16,800
Postage	-	-	-	-	6,500
Insurance	2,112	6,193	2,000	29,993	2,400
Insurance - Deductible	18,004	2,178	5,000	-	5,000
Rental Bldg Expense	5,744	11	2,500	-	2,500
Miscellaneous	5,082	4,495	23,000	238	5,000
Dues and Subscriptions	11,418	12,376	12,700	-	14,000
PropTaxes/ Assessments	2,914	4,144	3,000	3,160	3,600
Contingency	9,070	17,868	34,000	-	40,800
Operating Transfers	30,000	-	185,000	-	550,658
Other General Expenditures	\$ 128,452	\$ 64,501	\$ 272,200	\$ 37,891	\$ 648,258
	\$ 6,122,223	\$ 7,325,731	\$ 8,068,849	\$ 4,495,677	\$ 10,025,497



Prepared By: Peter Schaps, Councilmember

Presenter: Peter Schaps, Councilmember

Date: 10/18/2024

Board & Commission: City Council

Subject: Request for information on contracting with Chisago County Sheriff's Department

From Peter Schaps:

I would like for the City Council to have some discussion in regard to the North Branch Police Department's request for additional police officer coverage requested by Chief Dan Meyer. I have contacted the Chisago County Sheriff, Brandon Thyen, for his thoughts on whether we, the city of North Branch, could contract with his department for the services which would fill the need that Chief Meyer has requested. Sheriff Thyen has stated to me that he would be willing to come to a regular meeting of the council and discuss this matter publicly with the council if the city council makes a formal request of him.

Voting Requirements:

Voting Options Simple Majority