PRESS RELEASE

Environmental Assessment Worksheet for Corcoran Farms Business Park available for comment June 7th

CORCORAN, Minn. – The public is invited to comment on the Environmental Assessment Worksheet (EAW) for the proposed Corcoran Farms Business Park located on 68.68 acres at 20130 Lakin Road in Corcoran, MN, beginning Tuesday, June 7, 2022.

The EAW, which assesses the potential environmental impacts of the project, will be available to view electronically at *www.corcoranmn.gov* and during business hours at the following locations:

- Corcoran City Hall, 8200 County Road 116, Corcoran, MN 55340

Comments on the EAW will be received through Thursday, July 7, 2022.

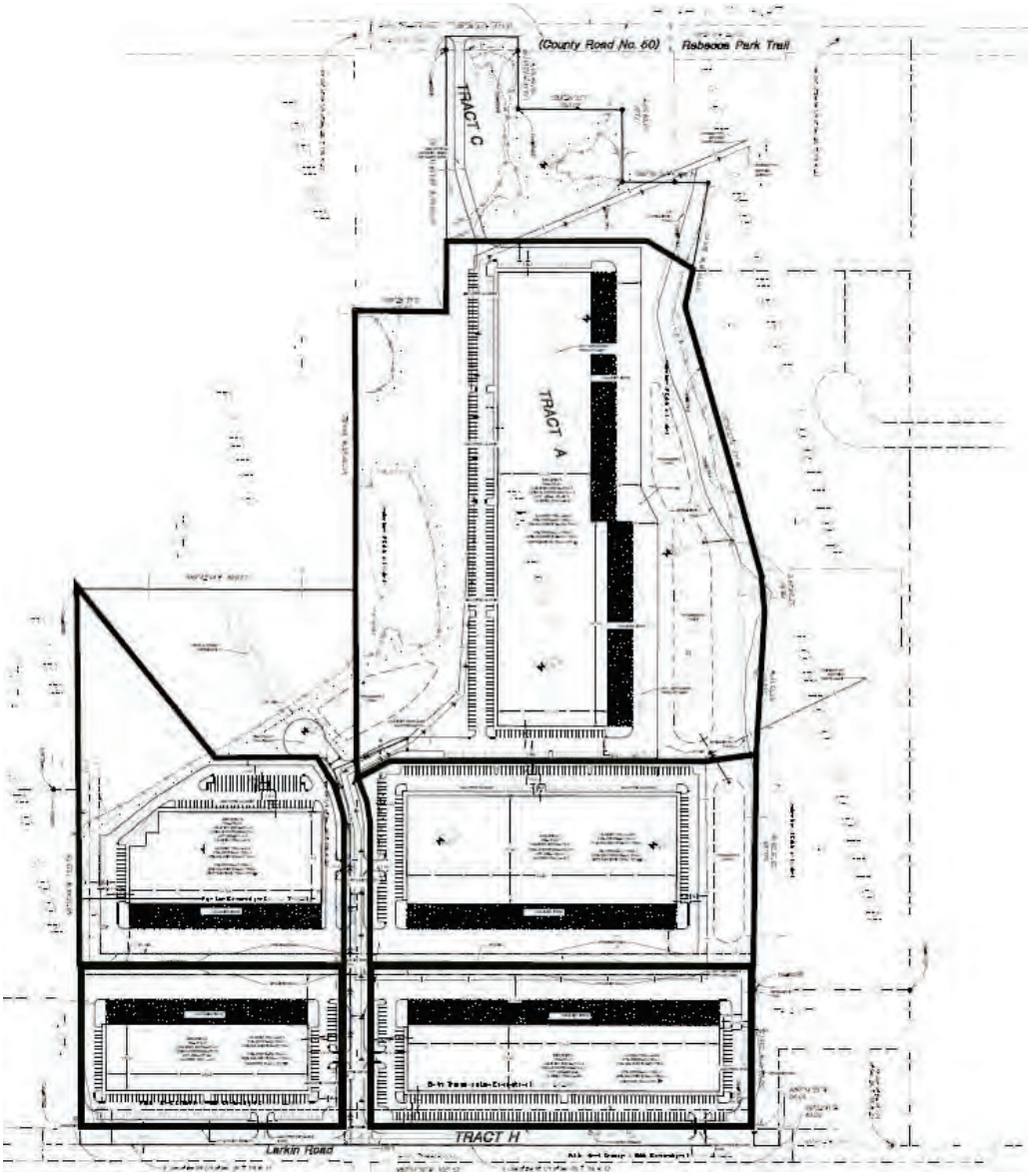
To provide comments on the EAW, or for questions about the project, contact:

Kendra Lindahl, AICP
City Planner
8200 County Road 116
Corcoran, MN 55304

Phone: 612-638-0225
Email: klindahl@landform.net

Corcoran Farms Business Park

Draft Environmental Assessment Worksheet



Proposer: JMMK, LLC

RGU: City of Corcoran

May 11, 2022

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July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm.
The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item or can be addresses collectively under EAW Item 19.
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

Corcoran Farms Business Park

2. Proposer

JMMK, LLC
Contact person: Jeff Minea
Title: Applicant
Address: 18805 37th Ave. N.
City, State, ZIP: Plymouth, MN 55446
Phone: 612-701-7741
Email: jiminea@lee-associates.com

3. Responsible Governmental Unit

City of Corcoran
Contact person: Kendra Lindahl
Title: Planner
Address:8200 County Road 116
City, State, ZIP: Corcoran, MN 55357
Email: klindahl@landform.net

4. Reason for EAW Preparation

Required:	Discretionary:
EIS Scoping	Citizen petition
X Mandatory EAW	RGU discretion
	Proposer initiated

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

A mandatory EAW is required in accordance with Minnesota Rules 4410.4300, Subpart 14 Industrial, Commercial and Institutional Facilities

5. Project Location

County: Hennepin

City/Township: Corcoran

PLS Location (¼, ¼, Section, Township, Range): NW 1/4 and the SW 1/4 and the SE 1/4 of Section 26 T 119 R 23W (Tract A, Registered Land Survey No. 1657 on Certificate of Title No. 1444050)

Watershed (81 major watershed scale): Elm Creek

GPS Coordinates: 45.09053, -93.55222

Tax Parcel Number: 26-119-23-13-0006

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project;

  See Figure 1 and Figure 2, Appendix A

- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and

  See Figure 1, Appendix A

- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.

  See Figure 3, Appendix A

6. Project Description

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

The Project proposes to construct a 70-acre business park consisting of five buildings with a combined area of 726,394 square feet. Project components include construction of warehouse/office buildings, parking areas, access roads, a public trail, sewer/water utility improvements and stormwater ponds. The Project Area is currently utilized for agricultural production.

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.

1) Construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes.

The Project proposes to construct a business park consisting of five buildings of varying size totaling 726,394 square feet. The Project Area includes an approximately 70-acre in the City of Corcoran in Hennepin County, Minnesota. The Project Area is currently utilized for agricultural production. The Project Area is bordered by Larkin Road along the South and CSAH 50 (Rebecca Park Trail) to the north. Agricultural land is present to the west and industrial/commercial development is present to the

east of the Project Area. The Project Area contains seven wetland basins that were delineated in 2021. The wetlands are mostly along the outer edges of the field with two smaller basins toward the center. A DNR protected creek flows allows along the eastern edge of the site. A 50-foot gas line easement crosses the site east/west along the southern portion of the property. A city park is located north of the site across CSAH 50. Figure 1 (USGS Topographic Map) and Figure 2 (Hennepin County Location Map) in Appendix A illustrate the project location.

The Project will require the construction of a north/south public street to serve the industrial buildings with associated parking lots. City sewer and water will be brought through the center of the site from the north to the south with a public trail constructed along the eastern edge. The City completed a feasibility study to analyze the infrastructure needs for the site and surrounding area.

The Project is proposed to be developed in phases starting from the southern end. As the street and utilities will need to be constructed through the entire site for development to occur, extensive grading is expected to occur across the Project Area as part of the initial phase. The grading will be needed to construct the proposed access road, utilities, trail, stormwater ponds and various retaining walls, specifically along the gas easement. Impacts to wetlands are anticipated in the central portion of the Project Area and along the north end to allow for road access. Minimal impacts to County Ditch 16 will occur to extend the sewer and water utilities currently located on the east side of County Ditch 16 to the Project Area. Minor tree removals will be required near the existing farm buildings and structures. Figure 3, Appendix A provides the proposed site plan.

2) Modifications to existing equipment or industrial processes.

No existing equipment or industrial processes are proposed to be modified as part of the Project.

3) Significant demolition, removal, or remodeling of existing structures.

Three pole-style farm structures along the eastern edge of the site that will be demolished as part of the Project.

4) Timing and duration of construction activities

Site preparation with initial grading may occur Fall of 2022 with most of the first phase construction occurring in the Spring of 2023. The duration of the construction is dependent on the size and location of the first buildings.

c. Project magnitude

Table 1 summarizes the project magnitude.

Table 1. Project Magnitude

Description	**Number**
Total project acreage	70.4
Linear project length (feet)	8,355
Number and type of residential units	Not applicable (N/A)
Residential building area (in square feet)	N/A
Commercial building area (in square feet)	N/A

Industrial building area (in square feet)	726,394
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s) (feet)	34

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 purpose of the project is to allow for development of additional industrial businesses in the City of Corcoran.

e. ***Are future stages of this development including development on any other property planned or likely to happen? Yes X No***
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. Is this project a subsequent stage of an earlier project? Yes X No
If yes, briefly describe the past development, timeline and any past environmental review.

7. Cover Types

Table 2 summarizes the cover types within the Project Area for the existing and proposed conditions.
Table 2. Cover Types within the Project Area

Cover Types	Before (approx.)	After (approx.)
Wetlands (acres)	6.1	5.9
Deep Water/Streams (linear ft.)	662.5	662.5
Wooded/Forest (acres)	0.75	0
Brush/Grassland (acres)	22.5	10
Cropland (acres)	40	0
Lawn/Landscaping (acres)	0	12.4
Impervious Surface (acres)	1.0	39.0
Stormwater Pond (acres)	0	3.0
Other (describe)	N/A	N/A
TOTAL	70.3	70.3

8. Permits and Approvals

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 3 identifies permits and approvals anticipated to be required for the proposed Project.

Table 3. Permits and Approvals

Unit of Government	Type of Application	Status
Federal		
U.S. Army Corps of Engineers	Section 404 Permit	To be completed
U.S. Fish and Wildlife Service	Section 7 ESA Consultation	To be completed, if required
State		
Minnesota Pollution Control Agency (MPCA)	Section 401 Certification	To be completed
MPCA	National Pollutant Discharge Elimination System (NPDES) Permit	To be completed
Local		
Hennepin County	Driveway Access Permit	To be completed, if required
Hennepin County	Right-of-way Excavation Permit	To be completed, if required
City of Corcoran	EAW / EIS Need Decision	Draft prepared
City of Corcoran	Wetland Conservation Act (Boundary Approval/Replacement Plan)	To be completed
City of Corcoran	Preliminary and Final Plat	To be completed
City of Corcoran	Erosion Control, Grading, and Stormwater Permit	To be completed
City of Corcoran	Building Permits	To be completed
Elm Creek Watershed Management Commission	Stormwater, Erosion Control, and Site Plan Approval	To be completed

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land Use

a. Describe:

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

There is an existing single-family residence on the property and several associated farmstead agricultural buildings. Most of the existing land use of the site is agricultural. On the uncultivated

areas, there are scattered clumps of trees and vegetation, natural grasslands and mowed turf areas. Seven wetlands, a drainage ditch and an unnamed perennial stream were identified on the property.

The surrounding properties have a variety of existing land uses. The existing and planned land use for the adjacent property to the east is Light Industrial. The properties to the west are rural residential homesteads, Cropland, woods, wetlands, and undeveloped natural open space. See Appendix A Figure 4 for details.

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.

The property is currently guided and zoned Light Industrial (I-1) and the eastern portion of the property is in the Shoreland Overlay district. The zoning ordinance permits warehouse and office uses in the overlying I-1 (Light Industrial zoning district), but the applicant will be requesting a rezoning to Planned Unit Development (PUD) to allow for reduced setbacks.

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

The property is bisected on the eastern quarter by the established shoreland district in Corcoran. This impact is identified on Figure 9.

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

The proposed site design for the property includes planned infrastructure improvements related to streets, utilities, surface water management and treatment. Erosion control measures will be required and utilized per state requirements during construction, and the zoning ordinance addresses noise, smoke odor and other potential negative impacts on surrounding areas that could be encountered with an industrial use of the site. Landscaping installations required with the project development will have known and proven benefits for birds, wildlife, shade cooling, air quality and carbon reduction.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

The project will help the City meet the 2040 Comprehensive Plan goal to "Attract and encourage new light industrial, office-industrial, high tech and professional services, and maintain and expand existing businesses in Corcoran. The required setbacks and landscaping for the project is a standard first step in buffering a new use from existing surrounding land uses, the other referenced zoning ordinance protections will be reviewed by the City as part of a formal development application.

10. Geology, Soils and Topography/Land Forms

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 and bedrock geology for Hennepin County has been mapped in the Minnesota Geological Survey's Geologic Atlas of Hennepin County[1]. Surficial deposits in the central and northern portion of the Project Area are comprised of loam to clay loam diamict with scattered pebbles, cobbles, and rare boulders. On average, the composition of this very coarse-grained sand fraction is 41 percent shale. The southern portion of the Project Area contains a slightly different surficial deposit makeup. This area is comprised of silt loam, sandy loam, and loamy sand gravel mix with fine grained sand and silt. The bedrock geology of the northern portion of the Project Area consists of St. Lawrence Formation, which is dolomitic, feldspathic siltstone with interbedded, very fine-grained sandstone and shale. The southern portion of the Project Area consists of Jordan Sandstone, a medium- to coarse-grained, friable quartzose sandstone. The Northwest corner of the Project Area contains a small inclusion of the Mazomanie Formation, a fine- to medium-grained, cross-stratified, generally friable, quartzose sandstone. The estimated depth from the land surface to the bedrock surface is approximately 101 to 200 in the north portion of the Project Area and approximately 101 to 150 in the southern portion of the Project Area.

According to the surrounding water well logs on the Minnesota Department of Health (MDH) Minnesota Source Water Protection Map[2], no wellhead protection areas or drinking water supply management areas are within the Project Area. The Maple Hill Estates Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA) are located approximately 1.5 miles east of the Project Area and would not be affected by the Project. The drinking water supply management area vulnerability ranking is classified as low. No known karst or sinkhole features are present within the Project Area.

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 11.b.ii.

According to the Natural Resource Conservation Service (NRCS) Web Soil Survey, the Project Area is comprised of eight soil types. Soil within the Project Area is associated mainly with moraines and hillslopes. The soil types include Lester loam (ground moraines and hillslopes; well drained), Cordova loam (drainageways on moraines, poorly drained), Glencoe clay loam (depressions, very poorly drained), Le Sueur loam (hillslopes and ground moraines; somewhat poorly drained), Hamel, overwash-Hamel complex (ground moraines, somewhat poorly drained), Angus loam (hillslopes and ground moraines; well drained), and Hamel-Glencoe complex (ground moraines, poorly drained). Figure 5, Appendix A identifies soils classifications within and in the vicinity of the Project Area.

Table 4 lists hydrologic soil groups. The four hydrologic soil groups are:

- **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. These soils have a slow rate of water transmission.

[1] Steenberg, Julia R.; Bauer, Emily J; Chandler, V.W.; Retzler, Andrew J; Berthold, Angela J; Lively, Richard S. (2018). C-45, Geologic Atlas of Hennepin County, Minnesota. Minnesota Geological Survey. Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/200919.
[2] MDH. Source Water Protection Map. Available at https://mdh.maps.arcgis.com/apps/View/index.html?appid=8b0db73d3c95452fb45231900e977be4. Accessed April, 2022.

- **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 later 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 and assigned to dual classes.

Table 4. NRCS Soil Types within the Project Area

Map Unit Symbol	Map Unit Name	Percent Slopes	Hydrologic Soil Group	Acres	Approx. Pct. of Project Area
L22C2	Lester loam	6-10	C	14.9	21.6
L22E	Lester loam	10-22	C	1.3	1.9
L23A	Cordova loam	0-2	C/D	12.3	17.9
L24A	Glencoe clay loam	0-1	C/D	4.6	6.7
L25A	Le Sueur loam	1-3	C/D	13.7	20.0
L36A	Hamel, overwash-Hamel complex	0-3	C/D	15.0	21.8
L37B	Angus loam, 2 to 6 percent slopes	2-6	C	3.3	4.8
L132A	Hamel-Glencoe complex	0-2	C/D	3.6	5.2

Topography within the Project Area is generally flat with no slopes greater than 22 percent identified. Overall, the soil has a slower infiltration rate, which can result in higher runoff potential. Areas that have steeper slopes, measures will be considered during construction to help prevent erosion. Measures will include, erosion control blankets, along with native vegetation establishment to permanently stabilize side slopes and any areas impacted as a result of construction.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. 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, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include 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

A review of Minnesota Department of Natural Resources (DNR) geospatial data determined that no lakes, trout streams or trout lakes[3], wildlife lakes[4], migratory waterfowl feeding/resting lakes[5], or outstanding resource value waters[6] are present within the Project Area. One county ditch (County Ditch 16, M-062-004-002-002) is located within and along the eastern edge of the Project Area. Thirteen unnamed surface water features and one named surface water feature (Rush Creek, South Fork) are present within a one-mile radius of the Project Area. Figure 6, Appendix A identifies surface waters in the vicinity of the Project Area.

DNR Public Waters

Two DNR Public Waters and Watercourses are partially located within the Project Area (Figure 6, Appendix A). Table 5 lists DNR Public Waters and Public Watercourses within the Project Area and within a one-mile radius of the Project Area.

Table 5. DNR Public Waters within One Mile of the Project Area

Name	Public Water ID	Type
Public Waters Within the Project Area		
Unnamed	27043000	Public Water Wetland
Unnamed (County Ditch 16)	M-062-004-002-002	Public Watercourse
Public Waters Within a One Mile Radius of the Project Area		
Unnamed	27042400	Public Water Wetland
Unnamed	27042600	Public Water Wetland
Unnamed	27042700	Public Water Wetland
Unnamed	27042800	Public Water Wetland
Unnamed	27042900	Public Water Wetland
Unnamed	27043100	Public Water Wetland
Unnamed	27043200	Public Water Wetland
Unnamed	27043700	Public Water Wetland
Unnamed	27043800	Public Water Wetland
Unnamed (East Portion)	27043901	Public Water Wetland
Rush Creek, South Fork	M-062-004-002	Public Watercourse
Unnamed Stream	M-062-012	Public Watercourse

[3] DNR. 2020. State Designated Trout Streams, Minnesota. Available at: https://gisdata.mn.gov/dataset/env-trout-stream-designations. Accessed April 2022.
[4] DNR. 2016. Designated Wildlife Lakes. Available at: https://gisdata.mn.gov/dataset/env-designated-wildlife-lakes. Accessed April 2022.
[5] DNR. 2016. Migratory Waterfowl Feeding and Resting Areas. Available at: https://gisdata.mn.gov/dataset/env-migratory-waterfowl-areas. Accessed April 2022.
[6] DNR. 2020. Lakes of Biological Significance. Available at: https://gisdata.mn.gov/dataset/env-lakes-of-biological-signific. Accessed April 2022.

Wetland Resources

Based on a review of the National Wetland Inventory (NWI) data, time-lapsed aerial imagery, and a wetland delineation performed by Kjolhaug Environmental Services on August 19, 2021, seven wetlands are present within the Project Area (Figure 6, Appendix A). Appendix B provides the wetland delineation report and Notice of Decision.

Wetland 1/1a is located along the eastern boundary of the Project Area and consists of a shallow marsh that drains into an unnamed creek that flows into a system of culverts. Wetland 1/1a is classified as a partially drained shallow marsh/ wet meadow, palustrine emergent wetland (PEM1Cd/PEM1Bd). Wetland 2 is located along the northeast border of the Project Area and is identified by field verification as a wet meadow palustrine emergent wetland (PEM1B). Wetland 3 is located in the north central and northwestern boundary of the Project Area and consists of a shallow open water basin and wet meadow. Wetland 3 is classified in the NWI database as a PUBFx and by field verification as a PEM1B/PUBGx wetland. Wetland 4 is located along the western edge of the Project Area and consists of a wet meadow wetland. Wetland 4 was not identified within the NWI but was determined as a PEM1A through field verification. Wetland 5 is located on the western edge of the Project Area and classified as a partially drained shallow marsh and wet meadow and is classified by the NWI as a PEM1A. Wetlands 6 and 7 are located in the south central and southeastern areas of the Project Area and are both classified as farmed seasonally flooded basins and where not mapped on the NWI. Field verification classified both of these wetlands as palustrine emergent (PEM1Af) wetlands. Table 6 summarizes wetlands delineated in the Project Area. Figure 6, Appendix A identifies wetlands and other aquatic resources within or in the vicinity of the Project Area. Appendix B includes the wetland delineation report and WCA Notice of Decision.

Table 6. Wetlands within the Project Area

Wetland ID	Circular* 39	Cowardin	Eggers and Reed	Dominant Vegetation	Size (Acres Onsite)
1/1A	Type 3/2	PEM1Cd	Partially Drained Shallow Marsh / Wet Meadow	Narrowleaf cattail, reed canary grass, stinging nettle and giant goldenrod.	0.63
2	Type 2	PEM1B	Wet Meadow	Reed canary grass, swamp milkweed, various sedges, and lesser timothy and red clover.	0.26
3	Type 2/5	PEM1B/ PUBGx	Shallow Open Water / Wet Meadow	Reed canary grass, swamp milkweed, various sedges, with lesser amounts of timothy and red clover.	0.39
4	Type 1	PEM1A	Wet Meadow	Reed canary grass, various sedges with lesser amounts of timothy and unknown fleabane.	0.27
5	Type 3/2	PEM1Cd/ PEM1Bd	Partially Drained Shallow Marsh / Wet Meadow	Narrowleaf cattail, reed canary grass, jewelweed, river bulrush, hedge bindweed, stinging nettle, swamp milkweed, and lake sedge.	4.39

Wetland ID	Circular* 39	Cowardin	Eggers and Reed	Dominant Vegetation	Size (Acres Onsite)
6	Type 1	PEM1Af	Farmed Seasonally Flooded Basin	Stunted soybean crop with scattered yellow nut sedge.	0.35
7	Type 1	PEM1Af	Farmed Seasonally Flooded Basin	Reed canary grass, yellow foxtail, Pennsylvania smartweed, and lesser amounts of timothy.	0.14

**Type 1 wetland types include seasonally flooded basins or flats; Type 3 wetlands indicate inland shallow fresh marshes.*

MPCA 303d Impaired Waters List

County Ditch 16, Assessment Unit Identification (AUID) 07010206-761, is designated as impaired based on the MPCA's draft 2022 impaired waters list. The impaired stream runs along the eastern side of the Project boundary. (Figure 6, Appendix A). County Ditch 16 is impaired for aquatic life.

Floodway/Floodplain

A FIRMette was generated through the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) mapping tool[7], which indicates that the Project Area is located within Zone X, an area with minimal flood hazard. Appendix C includes the FEMA FIRMette for the Project Area.

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.

1. *Depth to groundwater*

   Based on a review of domestic water wells located near the Project Area, the depth to static water level ranges from 20 feet and 150 feet with an average depth to static water levels of 62 feet.

2. *MDH Wellhead Protection Area*

   The Project Area is not within a MDH Wellhead Protection Area (WHPA) or Drinking Water Supply Management Area (DWSMA)[8].

3. *Onsite and/or nearby wells*

   A search of the MDH Minnesota Well Index (MWI) database indicates that there are zero wells present within the Project Area[9]. Twenty wells are present within a 500-foot radius of the

[7] FMEA. 2020. National Flood Hazard Layer FIRMette. Available at: FEMA Flood Map Service Center | Search By Address. Accessed April 2022.
[8] MDH. Source Water Protection Web Map Viewer. Available at: https://mdh.maps.arcgis.com/apps/View/index.html?appid=8b0db73d3c95452fb45231900e977be4. Accessed April 2022.
[9] MDH. Minnesota Well Index. Available at: https://mnwellindex.web.health.state.mn.us/mwi/. Accessed April 2022.

Project area. Table 7 tabulates documented wells within 500 feet of the Project Area based on the MDH MWI database. Figure 8 in Appendix A identifies the locations of wells in the vicinity of the project. Appendix D provides the MDH well log records.

Table 7. MWI Wells within 500 feet of the Project Area

Well ID	Use Type	Status	Elevation (msl ft.)	Well Depth (ft.)	Static Water Level (ft.)
104845	Domestic	Active	963	203	55
118887	Domestic	Active	961	197	60
148105	Domestic	Active	956	323	150
168654	Domestic	Active	965	75	20
192837	Domestic	Active	994	231	80
259743	Public	Active	951	N/A	N/A
421780	Domestic	Active	972	315	55
470764	Domestic	Active	957	254	53
479959	Domestic	Active	973	252	65
511975	Domestic	Active	958	230	55
551597	Industrial	Active	970	240	65
563093	Industrial	Active	978	253	68
592153	Domestic	Active	976	83	55
594127	Domestic	Sealed	981	195	65
597473	Domestic	Active	974	251	70
607761	Domestic	Active	965	178	65
638346	Domestic	Active	974	167	64
728690	Domestic	Active	979	187	65
728994	Domestic	Active	980	250	60
755332	Industrial	Active	975	252	65

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

i. 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.

On behalf of the City of Corcoran, Stantec Consulting Services Inc. (Stantec) completed a feasibility study to evaluate infrastructure improvement recommendations. Sewer service for

the proposed development will be via a tie-in to the existing 18-inch trunk sewer located near the northeast corner of the parcel. In accordance with the City's 2040 Comprehensive Plan, the Proposer will be required to construct an 18-inch sewer southward through the development to the southern parcel line along Larkin Road. Appendix E includes the feasibility study report.

In addition to the primary 18-inch trunk sewer, two sewer stubs must also be constructed in accordance with the Comprehensive Plan. A 12-inch trunk sewer stub to the west parcel line must be constructed at approximately the same installation depth as the 18-inch sewer (i.e., as deep as possible, allowing for proper tie-in at the tee manhole). An 8-inch sewer lateral to the southeast corner of the parcel must also be constructed to serve the parcels located further east.

In order to avoid overloading the City's existing and planned wastewater infrastructure, the Proposer will be required to limit the total wastewater volume from all lots combined to not more than 0.064 mgd (average day). This is the volume of wastewater that has been planned for in the Comprehensive Plan. This is particularly important given that the Rush Creek Reserve development (located north of this Project and downstream in the local sewershed) is in the process of building a new wastewater lift station to replace the previously used lift station on County State Aid Highway (CSAH) 10. The new lift station is adequately sized to accommodate planned wastewater flows from this and other developments, but any unplanned increase could potentially exceed this lift station's design capacity.

Permanent easements for the trunk and lateral sewers will be dedicated to the City. Where both sewer and potable water utilities are being installed in parallel, the easements must be wide enough to accommodate the required separation distance between sewer and potable water lines.

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.*

The Project does not propose to discharge to a SSTS.

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.

The Project would not result in wastewater discharges to surface waters.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

Pre-Construction Stormwater Runoff

Under existing conditions, the Project Area primarily consists of agricultural land, wetlands, and rural residential property. Surface water runoff drains towards existing wetlands areas and roadway ditches. No existing stormwater features are present within the existing Project Area. Pollutants

typically associated with agricultural areas include pesticides, sediment, nutrients (nitrogen, phosphorus, and potassium) from fertilizers, and metals.

Post-Construction Stormwater Runoff

Although elimination of agriculture can benefit water quality by reducing export of nutrients and sediments through onsite ponding and filtration (Best Management Practices or BMPs), construction of additional impervious surfaces, such as the roads, driveways, rooftops, and sidewalks increase the volume to nearby surface waters. The increased impervious surface areas will result in higher runoff rates, volumes, and pollutants compared to the existing conditions. Stormwater best management practices (BMPs) will be constructed to mitigate stormwater runoff rate, volumes, and pollutant loading. It is anticipated that the project will include wet sedimentation ponds with filtration benches to provide stormwater treatment. Onsite stormwater flow will be directed into these BMP's and away from the impaired waterway on the eastern border of the Project Area identified as County Ditch (07010206-761). Figure 3, Appendix A identifies the preliminary locations for the proposed stormwater BMPs. The proposed drainage design will be confirmed as the project design is developed and will comply with all applicable local and state regulatory requirements.

The MPCA will require a National Pollutant Discharge Elimination System (NPDES) Construction Stormwater permit to be obtained for the project and all design since more than one acre of land will be disturbed by the proposed project. Project construction will adhere to NPDES permitting requirements. The Project will also adhere to the City of Corcoran and Elm Creek Watershed Management Commission (ECWMC) stormwater requirements. A Construction Stormwater Pollution Prevention Plan (SWPPP) will be required in accordance with MPCA and City of Corcoran stormwater requirements. A SWPPP be prepared during final project design and submitted for approval prior to construction of the project. Erosion control will utilize temporary sediment basins with ditches and check dams (sized per permit guidance), temporary ground cover where construction has paused, and perimeter control to avoid erosion and sedimentation throughout the site. Stockpiles will be stabilized when not in use and have the stockpile perimeter controlled. All permanent slopes 4:1 or steeper will have erosion control blankets installed.

Section 23 of the General Stormwater Permit identifies additional controls and conditions required for construction sites within one mile of an impaired water. The Project will be required to utilize additional best management practices (BMPs) during construction as specified in the Construction Stormwater permit due to the proximity of the Project Area to County Ditch 16, a designated impaired water. These BMPs include stabilizing soils within seven days after the construction activity in that portion of the site temporarily pr permanently ceases and providing a temporary sediment basin where five or more acres drain to a common location. In addition, if the Project will disturb 50 or more acres, the SWPPP must be submitted to the MPCA 30 days prior to obtaining the Construction Stormwater permit.

iii. 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. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The water supply for the Project will be consistent with the water supply planned for all of Southeast Corcoran. Under a contract to provide water service, the City of Maple Grove will continue to supply Southeast Corcoran with up to a peak of five million gallons per day (MGD).

The infrastructure feasibility study completed by Stantec identified multiple service operation for varying watermain layouts and sizes within and outside of the Project Area. A 12-inch watermain within the Project Area is required, running north to south through the Project Area to the connection to the 12-inch trunk main near CSAH 50 and the connection (or stub) to the planned 16-inch trunk main at the intersection of Larkin Road and Blue Bonnet Drive. Construction of the 12-inch trunk watermain along the north side of Shamrock Golf Course along Larkin Road is critical to ensure target fire flows of 3,000 gpm can be provided to downtown areas including the proposed Corcoran Farms Business Park. Appendix E provides the feasibility study report which includes a detailed summary of the watermain improvements recommended as part of this Project.

iv. Surface Waters

b) 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. 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.

Seven wetlands are located within the Project Area covering a combined 5.9 acres. Complete avoidance of these wetland will not be feasible with the proposed project. For the purposes of this EAW, potential wetland impacts were estimated based on a 25-foot buffer from proposed improvements including buildings, access roads, and parking areas. Based on the preliminary conceptual design, it is anticipated that the Project will avoid impacts to Wetland 2 and Wetland 3. The Project is anticipated to encroach into portions of Wetland 1/1A, Wetland 3, Wetland 6, and Wetland 7. Impacts to Wetland 5 would occur as a result of a future public road extension project and would not result for this Project. Minimization of impacts to wetlands will be evaluated as the project design advances. Figure 7, Appendix A illustrates the potential impacts to wetlands resulting from the proposed project. Table 8 identifies the potential wetland impacts resulting from the proposed project.

Table 8. Potential Wetland Impacts

Wetland ID	Circular 39	Cowardin	Size (Acres onsite)	Potential Impact (acres)
Wetland 1/1A	Type 3/2	PEM1Cd/PEM1Bd	0.63	0.021
Wetland 3	Type 2/5	PEM1B/PUBGx	0.39	0.071
Wetland 5	Type 3/2	PEM1Cd/PEM1Bd	4.39	0.11*
Wetland 6	Type 1	PEM1Af	0.35	0.35
Wetland 7	Type 1	PEM1Af	0.14	0.14
Total			**5.9**	**0.7***

**Potential impacts anticipated as part of a future public road extension project.*

Impacts to wetlands are regulated by the Minnesota Wetland Conservation Act (WCA) and the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. The City of Corcoran is the WCA local governmental unit (LGU). It is anticipated that impacts to regulated wetlands will be mitigated through wetland banking credits within the same Wetland Bank Service Area. The Project Area is located in Wetland Bank Service Area 7. Current regulations require wetland impacts within this area of the state are replace at a minimum ratio of 2:1. Mitigation for unavoidable permanent wetland impacts will be provided in accordance with all regulations and requirements in place at the time of final design and permitting. Wetlands that are avoided will be required to comply with the City of Corcoran's Municipal Code[10] wetland buffer requirements outlined in 1050 Subpart 5 section C.

One surface water identified as a (27043000) DNR Public Water Wetland located on the central western border of the Project Area may be impacted by a future public road extension. The Project will not impact this DNR Public Water Wetland. The Project has been designed to not accommodate the future public road extension. Coordination with the DNR would need to be completed and a DNR Public Waters Work Permit would be required at the time that the future public road extension is proposed.

c) ***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. 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 Project would not directly impact or alter surface water features. No surface waters will be directly impacted by the Project. County Ditch 16 extends along the eastern boundary of the Project Area. As discussed in Item 11.b.ii of this EAW, additional BMP requirements will be required given the proximity of the Project to County Ditch 16, a designated impaired water.

12. 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 review of Minnesota Pollution Control Agency's (MPCA) *What's in My Neighborhood* (WIMN)

[10] City of Corcoran. 2019. City of Corcoran Municipal Code. Available at: https://corcoranmn.gov/cms/One.aspx?portalId=15543764&pageId=15584702.Accessed April 2022.

database[11] was conducted to identify documented potentially contaminated sites within or in the vicinity of the Project Area. No WIMN records are located within the Project Area. Table 9 summarizes MPCA potentially contaminated sites within 500 feet of the Project Area. Figure 9, Appendix A illustrates the location of potentially contaminated sites within and in close proximity to the Project.

Table 9. MPCA Potentially Contaminated Sites within 500 Feet of the Project Area

Site Name	Site ID	MPCA Program	Status	Approx. Distance from Project Area (ft.)	Direction in Relation to Project Area
Pauls Corcoran Service	189764	Petroleum remediation/leak site (LS0002461)	Inactive (leak reported 1990 – site closed 2001)	140	North
Pro Drywall and Painting Inc.	232524	Hazardous waste; one time generator (MNS000333008)	Active (registered 2019, 2020, 2021)	180	East
Countryside Service	149808	Hazardous waste; very small quantity generator (MNS000223917)	Active (registered 2015)	280	North
Miller Brothers	99843	Aboveground tank (TS0124251)	Active (registered 2006)	288	East
Gazelle Marketing	126692	Construction stormwater (C00024481)	Active (coverage issuance 2007-2022)	330	East

An additional review of the Minnesota Department of Agriculture (MDA) WIMN database[12] was conducted to identify documented potentially contaminated sites within or in the vicinity of the Project Area. No records were identified with the Project Area or within a 500-foot buffer.

The MPCA and MDA reviews did not identify any known potentially contaminated sites or hazardous materials within or within the vicinity of the Project Area that would be exposed or exacerbated by the construction of the proposed Project. In the event that potentially contaminated soils or other potentially hazardous materials are encountered during construction, plans will be developed to properly handle and treat contaminated soil and/or groundwater. Any contaminated soils or other potentially hazardous materials encountered during construction will be handled and disposed of in accordance with MPCA and any other applicable requirements.

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.

Construction Waste

[11] MPCA. Undated. What's in My Neighborhood. Available at: What's in My Neighborhood | Minnesota Pollution Control Agency (state.mn.us). Accessed. April 2022.
[12] MDA. 2022. What's in My Neighborhood? - Agricultural. Available at: https://app.gisdata.mn.gov/mda-agchem/. Accessed. April 2022.

Construction wastes will be typical of office/light industrial developments. Construction wastes will be primarily non-hazardous and would be managed as municipal solid waste (MSW) or construction/ demolition debris. Hazardous wastes in the form of used oils/lubricants, waste paints, or other materials may be generated during construction. The contractor will be required to manage and dispose of all construction-generated waste in accordance with MPCA requirements and all other applicable regulatory requirements. Construction wastes will either be recycled or stored in approved containers and disposed of in the proper facilities. Any excess soil material that is not suitable for use onsite would become the property of the contractor and would be disposed of properly. All solid waste will be managed according to MPCA and other regulatory requirements.

Construction will require demolition of three pole-style farm structures found within the eastern boundary of the Project Area. Solid wastes generated from the demolition of the existing structures would be disposed of as construction/demolition debris at a permitted landfill.

Hazardous waste may be generated during Project construction from demolition of the existing farmstead and barn structures. If encountered, regulated materials such as asbestos, lights, and other regulated wastes will be abated and properly disposed of at a permitted facility. A pre-demolition hazardous materials survey will be completed prior to the start of demolition activities. If any regulated materials such as asbestos-containing materials, lead-based paint and other regulated materials/wastes are present, an abatement plan will be prepared to address removal and proper disposal of regulated materials identified in the hazardous materials survey. If required, a comprehensive abatement closeout report would be prepared following abatement and demolition activities, which will document the removal, management, and disposal of any regulated materials.

Operational Waste

The project would generate solid waste during operation of the development, which is anticipated to include office and warehouse uses. Solid waste generated during operation of the development will be typical of waste generated by these office/light industrial uses and would be primarily managed as mixed municipal solid waste (MSW). The California Department of Resources Recycling and Recovery (CalRecycle) provides a list of estimated solid waste generate rates for office, industrial, service, and other establishments for general planning purposes[13]. Based on estimated solid waste generate rates of 1.42 lbs. per 100 square feet per day for office/warehouse uses, it was estimated that the Project may produce approximately 1,340 tons of MSW per year. The collection of MSW would be managed by a waste hauler licensed by the City of Corcoran. The Project will adhere to all MPCA requirements and other regulations pertaining to the use, handling, and disposal of solid waste. Recycling areas will be provided in compliance with the Minnesota State Building code.

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 above or below ground tanks to store petroleum or other materials. 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

[13] CalRecycle. 2019. Estimated Solid Waste Generation Rates. Available at: https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates. Accessed April 2022.

chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

The Project is not anticipated to include permanent chemicals/hazardous materials storage or use during its operation. No above – or below-ground storage tanks are planned for permanent use within the Project Area. If this changes, a Spill Prevention, Control, and Countermeasures plan will be prepared by a Minnesota Professional Engineer pursuant to federal regulations.

Construction equipment may require the limited use of potentially hazardous materials, such as gasoline or diesel fuels, motor oils, hydraulic fluids, and other lubricants. Vehicles responsible for the transportation of hazardous materials will be equipped with spill kits for rapid response to any spills and refueling procedures will be implemented to eliminate leakage. Additionally, all fuels, oils, and lubricants will be stored in containment apparatuses while not in use or when being stored. Construction staff will be trained to spot and appropriately respond to potential spills. In the event that a leak or spill incident occurs, the contractor will be required to respond in accordance with MPCA containment and remedial action procedures. A Spill Prevention, Control, and Countermeasures plan will be prepared by a Minnesota Professional Engineer pursuant to federal 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.

It is not anticipated that the Project would generate or require storage of hazardous wastes during its construction or operation. Item12.c describes the potential storage and use of hazardous materials during construction and operation of the Project.

13. 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.

The vegetative land cover within the proposed Project Area primarily consists of active agricultural land including lowland grassland around the identified wetlands. Due to the dominance of agricultural land throughout the Project Area, there is limited habitat available for use by wildlife (woodlands, water resources, prairie, etc.). The Project Area borders the City of Corcoran to the east and north which includes residential and warehouse buildings. The identified wetlands within and surrounding the Project Area along with surrounding agricultural fields may provide limited habitat for migratory birds. Other common species that may be present within the Project Area are urban wildlife species, such as deer, coyotes, fox, mice, rabbits, raccoons, chipmunks, squirrels, toads, salamanders, and turtles (DNR 2022)[14].

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County 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-1005) and/or correspondence number (ERDB N/A) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

[14] DNR. 2022a. Minnesota Animals. Available at: https://www.dnr.state.mn.us/animals/index.html. Accessed March 2022.

State-Listed Threatened and Endangered Species

Under Stantec's Limited License to Use Copyrighted Material (LA-1005) related to Rare Features Data, the Minnesota Department of Natural Resources (MDNR) Natural Heritage Information System (NHIS) was searched in March 2022 to identify species within the Project Area and a one-mile buffer. The NHIS search indicated one record within the proposed Project Area including the Trumpeter Swan *(Cygnus buccinator; state special concern species)*. No other records of listed species were identified within the Project Area or a one-mile buffer. A concurrence request was submitted to the DNR for review in April 2022. Appendix F provides the response received from the DNR generated through the DNR's Minnesota Conservation Explorer system.

Trumpeter Swan (Cygnus buccinator)

During the breeding season, trumpeter swans use small ponds and lakes or bays on larger water bodies that have approximately 100 meters of open water for take-off and have extensive beds of emergent vegetation such as cattails, bulrushes, and sedges. They will commonly use muskrat houses, beaver lodges, exposed hummocks, small islands, and floating platforms to construct their nests. Adult trumpeter swans are primarily herbivorous but will occasionally feed on small crustaceans, fish, and fish eggs. Currently, the leading threat to their population is lead poisoning from lead shot and fishing sinkers. Other threats include degradation of wetland habitat, power line collisions, and illegal hunting. Although repopulation efforts have continued to be successful, the trumpeter swan was included on Minnesota's List of Endangered and Threatened Species with the status of special concern due to continued threats to their population. (DNR 2022b)[15].

The Project Area consists of active agricultural land and does not contain suitable breeding or feeding habitats for the trumpeter swan such as small ponds and lakes. Based on a review of the NHIS data, occurrences of trumpeter swans were associated with an unnamed waterbody which is approximately 0.85 miles southeast of the Project Area. Due to the lack of suitable habitat, the Project will have no impact on the trumpeter swam.

Native Plant Communities and Sites of Biodiversity Significance

Native plant communities, biodiversity sites, and Regionally Significant Ecological Areas (RSEA) were reviewed within the Project Area and within a one-mile buffer using the Stantec's NHIS license (LA-1005). No native plant communities, biodiversity sites, or RSEAs were noted within the Project Area. However, one RSEA was noted within the one-mile buffer.

A RSEA of outstanding significance was identified approximately 0.65 miles northeast of the Project Area. The site is located outside of the proposed Project Area and would not be impacted by the proposed Project.

Federally Listed Threatened and Endangered Species

[15] DNR 2022b. Rare Species Guide Trumpeter Swan. Available at: Cygnus buccinator : Trumpeter Swan | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed March 2022.

The United States Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) tool (USFWS 2022)[16] was reviewed to identify federally listed species within the Project Area. Two species were identified that have the potential to occur within the Project Area: the northern long-eared bat (*Myotis septentrionalis*; threatened) and the monarch butterfly *(Danaus plexippus*; candidate).

Northern long-eared Bat (Myotis septentrionalis)

Suitable roosting, forage, and travel habitat for northern long-eared bats (NLEB) in the summer consists of a wide variety of forested and wooded habitats. While roosting, NLEB is generally found in deep crevices in areas such as forests and woodlots (i.e., live trees and/or snags greater than or equal to three inches diameter at breast height that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. NLEB roosts in both live trees or snags (Sasse and Perkins 1996, Foster and Kurta 1999, Owen et al. 2003)[17,18,19]. During winter months, NLEB hibernate in caves or abandoned mines (Foster and Kurta 1999). The NLEB is federally listed as threatened due to marked population declines caused by white-nose syndrome.

Hennepin County is not listed as a county with documented white-nose syndrome according to the White-nose Syndrome Response Team individual spread maps (White-nose Syndrome Response Team 2021)[20]. Stantec also used its MDNR NHIS license agreement (LA-1005), and according to the NHIS database, no known roost trees or hibernaculum are in the Project Area or within the one-mile buffer. The MDNR maintains a list of townships containing documented NLEB maternity roost trees and/or hibernacula entrances. Based on a review of this list, the Project Area is not within 0.25 mile of a known, occupied hibernaculum, or within 150 feet of a known, occupied maternity roost trees (MDNR and USFWS 2021)[21]. The Project Area is primarily composed of agricultural land, and it does not contain potentially suitable summer roosting habitat (continuous forested areas) or potentially suitable overwintering habitat (caves or abandoned mines). Additionally, no known maternity roost trees or known hibernacula were identified in the NHIS review or in the MDNR and USFWS joint document. No tree clearing is anticipated to occur within the Project Area. As such, the Project will have ***no effect*** on the NLEB.

Monarch Butterfly (Danaus plexippus)

The monarch butterfly is a candidate for federal listing due to habitat loss, relating mainly to the loss of milkweeds and native prairies. This species exists in two main populations within the United States divided by the Rocky Mountains: the eastern population that overwinters in the mountains of Mexico, and the western population that overwinters along the southern pacific coast of California (United States

[16] USFWS 2022. IPaC – Information, Planning, and Conservation System. Available at: http://ecos.fws.gov/ipac/. Accessed March 2022.
[17] Sasse, D.B., and P.J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (Myotis septentrionalis) in the White Mountain National Forest. Bats and forests symposium. British Columbia Ministry of Forests Working Paper 23:91-101.
[18] Foster, R. W. and A. Kurta. 1999. Roosting ecology of the northern bat. (Myotis septentrionalis) and comparisons with the endangered Indiana bat (Myotis sodalis). Journal of Mammalogy 80:659–672.
[19] Owen, et al. 2003. Homerange size and habitat use by northern Myotis (Myotis septentrionalis). American Midland Naturalist 150: 352-359.
[20] White-nose Syndrome Response Team 2021. 2006-2021 Spread Map. Available at: https://www.whitenosesyndrome.org/. Accessed March 2022.
[21] MDNR and USFWS 2021. Townships Containing Documented Northern Long-Eared Bat (NLEB) Maternity Roost Trees and/or Hibernacula Entrances in Minnesota. Available at: https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf. Accessed March 2022.

Department of Agriculture [USDA] Forest Service undated)[22]. This species generally occurs in areas with high densities of nectar sources, preferably native prairies with nectar species such as black-eyed Susan (*Rudbeckia hirta*), narrow-leaved coneflower (*Echinacea angustifolia*), and rough blazing star (*Lastris aspera*). Foraging species such as these are utilized by adults for feeding, but the presence of milkweed (genus *Asclepias*) is required for breeding habitat as it is the only plant on which the larvae can feed (MDNR 2022c and National Wildlife Federation undated)[23,24].

The Project Area consists primarily of agricultural land and does not contain suitable feeding habitat (native prairies) or breeding habitat (high density of milkweeds) to support the monarch butterfly.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. 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.

The Project Area is not anticipated to have any impacts or adverse effects on the state-listed trumpeter swan as suitable habitat to support the breeding cycle of this species, such as small ponds or lakes, is not present within the Project Area.

No native plant communities, biodiversity sites, or RSEAs were identified within the Project Area. Therefore, the Project is not anticipated to have any impacts on these sites.

The Project Area is not anticipated to have impacts or adverse effects on federally threatened and endangered species in the Project Area due to the lack of suitable habitat for the NLEB and monarch butterfly.

Although the Project Area is unlikely to provide suitable summer habitat for the NLEB, under the Final 4(d) Rule of the Endangered Species Act (ESA), tree clearing, although not expected, is not prohibited as there are no records of NLEB maternity roost trees or a hibernaculum within the Project Area or a 0.25-mile buffer. Please note that this species may be up-listed from threatened to endangered by the USFWS within the next few months. Further consultation with the USFWS may be required but is not expected.

The US Department of Agriculture's National Invasive Species Information Center provides information regarding Best Management Practices (BMP) to prevent or mitigate invasive species establishment or movement. The Minnesota DNR also provides guidance on preventing the spread of aquatic and terrestrial invasive species. Guidance for implementation can be referenced at https://www.invasivespeciesinfo.gov/resources-indexed?f%5b0%5d=field_location:108

Urban wildlife may be impacted with the removal of agricultural land. However, these habitat generalist species, such as deer, coyotes, fox, mice, rabbits, raccoons, chipmunks, squirrels, toads, salamanders, and turtles are typically adaptive to development activities and would likely relocate to similar undeveloped areas in the vicinity or continue to live in the remaining undeveloped areas within the Project Area.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife,

[22] United States Department of Agriculture [USDA] Forest Service undated. Migration and Overwintering. Available at: https://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/migration/. Accessed November 2021

[23] MDNR 2022c. Butterfly Gardens. Available at: https://www.dnr.state.mn.us/gardens/butterfly/index.html. Accessed March 2022.

[24] National Wildlife Federation undated. Monarch Butterfly. Available at: https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates/Monarch-Butterfly. Accessed November 2021.

plant communities, and sensitive ecological resources.

Minimal tree removal will likely be required during construction of the Project. The extent of tree clearing will be determined as the final design develops and minimized to the extent possible. Removal of vegetation will avoid the NLEB pupping season from June 1 through August 15, when possible.

Construction activities that involve soil disturbance can result in the introduction and spread of invasive species. Minnesota statutes (Chapter 18) and local ordinances regulate the management of noxious weeds and invasive species. Best management practices during construction activities and operation within the Project Area should be implemented to minimize the introduction or spread of noxious weeds and invasive species at the site. These practices include cleaning mud and debris off of construction equipment and clothing and staying on designated roads and trails.

Sightings of any rare species during construction of activities will be reported to the MDNR Nongame Wildlife specialist and the City of Corcoran will follow the guidance that is received to avoid impacts.

JMMK will manage the cutting and disturbance of native species during construction and when applicable, replant the native species that were removed or affected by construction activities.

14. Historic Properties

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.

Appendix H includes a letter from the Minnesota State Historical Preservation Office with their determination that no known historical structures, archeological sites or cultural properties are on or near the project site.

15. Visual

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 Project Area currently consists primarily of agricultural land with wooded field edges that border sections of the Project Area. No designated scenic views or vistas are present in the vicinity of the Project. The landscape immediately surrounding the site consists of undeveloped agricultural land to the west, Larkin Road to the south, CSAH 50 to the north, industrial and commercial buildings to the east, and residential uses that border the north and south of the Project Area. The primarily visual impact will the transition of views from undeveloped and agricultural land to buildings, parking lots, and stormwater basins. The development is not expected to include industries that would emit vapor plumes. The Project Area is zoned by the City of Corcoran as light industrial. The Project will be required to adhere to the City of Corcoran's ordinance requirements including building height and form, landscape screening, and lighting (City of Corcoran Municipal Code 2022)[25]. The existing tree lines and vegetation along sections of the Project Area will

[25] City of Corcoran Municipal Code. Available at: TITLE I (civiclive.com). Accessed March 2022.

partially serve as a buffer for nearby residents. Tree removal and wetland impacts will be minimized to the extent possible primarily around the edges of the Project Area boundary.

16. 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, and any greenhouse gases. 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 Project does not include heavy industrial uses that would have significant emissions. The Project includes light industrial uses consisting of office and warehouse buildings. These facilities may utilize natural gas and electric-powered equipment, which would emit low levels of greenhouse gas emissions (GHG) as well as hazardous air pollutants (HAPs) and criteria pollutants, such as Nitrogen Oxides (NOx), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), and particulate matter (PM). An inventory of potential electric and natural gas equipment to be installed at these facilities is not known at this time as prospective tenants have not been finalized. Generally, air emissions associated by these types of office and light industrial uses are relatively low and the facilities would not require an air permit. However, future tenants would be responsible for determining air permit applicability or exemption determinations based on the equipment to be installed with the facility prior to starting construction.

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.

The Project Area is located in a CO maintenance area. The Project is expected to generate increased vehicular traffic, which will result in a relatively small increase in CO emissions and other vehicle related emissions. The Minnesota Department of Transportation (MnDOT) developed a CO hot spot screening method designed to identify intersections that may result in CO emissions that exceed air quality standards. MnDOT's screening method assumes that intersections with a total daily traffic volume exceeding 82,300 vehicles per day may result in potential CO impacts that exceed air quality standards. A traffic impact study was completed for the Project, which is discussed in Item 18 of this EAW. Based on this study, intersections within the study area would not generate traffic exceeding 82,300 vehicles per day. Therefore, it is not anticipated that vehicle emissions generated by the project would have the potential to significantly impact CO air pollution.

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 16a). 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.

The Project is not anticipated to produce dust or odors during its operation, but it may generate temporary dust and odors during construction. Sensitive receptors to these dusts and odors would include residents to the north and west of the Project Area. Potential odors would likely be associated with exhaust from diesel engines and fuel storage. Dust generated during construction will be minimized through standard

dust control measures such as applying water to exposed soils and limiting the duration of exposed soils to the extent possible. Dust levels after construction is complete would be minimal as all surfaces will be paved or revegetated. With these mitigations in place, the quality of life for nearby residences is not anticipated to be affected.

17. Noise

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 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

1) Existing noise levels/sources in the area

Existing noise sources include vehicle traffic along CSAH 50, County Road (CR) 116, and CSAH 10 to the north and east of the Project Area. Other existing noise sources include commercial and industrial uses east of the Project Area.

2) Nearby sensitive receptors

The noise receptors nearest to the Project Area include rural residential areas located to the west and south of the Project Area. The closest rural residential properties are approximately 100 to 200 feet from the Project Area. Rush Creek Reserve, a residential development, is currently under construction along CSAH 10, north of the Project Area. Additionally, Corcoran City Park is located on the north side of CSAH 50, across from the Project Area.

3) Conformance to state noise standards

The Project will minimize noise disturbances caused by the construction of the Project to the extent possible and will adhere to the noise regulations outlined in Minnesota State Statute 7030.0030 and Corcoran City Ordinances 1060.090 and 82.03 subpart 5 (MPCA 2015 and City of Corcoran Municipal Code 2022)[16,26] The regulations state that construction activities are prohibited between 10:00 p.m. and 7:00 a.m. on weekdays and 9:00 p.m. and 9:00 a.m. on weekends. (MPCA 2015)[6].

4) Quality of life

The Project consists of office and warehouse uses that would not emit noise levels exceeding state noise standards. Construction of the Project will temporarily result in elevated noise levels. Construction noise would be temporary and will adhere to local ordinance requirements. No construction or operation hours would occur during nighttime hours. Construction equipment will be properly muffled and maintained in working order. This Project is not anticipated to affect the quality of life for nearby residents. The Project will be required to adhere to State and city noise regulations.

18. Transportation

[26] MPCA 2015. Noise rules in Minnesota. Available at: A Guide to Noise Control in Minnesota (state.mn.us). Accessed March 2022.

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.

1) Existing and proposed parking spaces

The existing Project Area consists of an agricultural area with a few farm buildings and structures. No existing parking areas are present within the Project Area. The Project would provide approximately 1,077 parking spaces to accommodate the proposed development.

2) Estimated total average daily traffic generated

It is anticipated that the Project will generate 2,072 trips per day. Table 10 summarizes daily and peak hour traffic under build conditions.

Table 10. Weekday Trip Generation for Proposed Project

Land Use	Size (sq. ft.)	Weekday AM Peak Hour Trips	Weekday PM Peak Hour Trips	Weekday Daily Total Trips
Office	145,278	221	209	1,575
Warehouse	581,118	99	105	497
Total	726,394	320	314	2,072

3) Maximum peak hour traffic generated and time of occurrence

The maximum peak hour traffic generated is 320 trips during a.m. peak hour (7:30 a.m. - 8:30 a.m.). Table 10, above, summarizes peak hour traffic generation estimates resulting from the Project.

4) Source of trip generation rates

Trip Generation, Eleventh Edition, published by the Institute of Transportation Engineers.

5) Availability of transit and/or other alternative transportation modes

No transit routes or pedestrian facilities are present in the Project Area.

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.

A traffic impact study was completed to evaluate opening year (year 2027) and future (year 2040) traffic volumes and determine the effects of the proposed project on traffic congestion in the area. The traffic impact study includes relevant figures including existing traffic volumes, future peak traffic volumes,

proposed development layout, and access locations. Appendix G includes the complete Traffic Impact Study. A summary of the results of the traffic impact study is provided in the following paragraphs.

The traffic impact study was completed using Synchro software for the following intersections:

- CSAH 10/CR 116
- CSAH 10/CSAH 50
- CR 116/Larkin Road
- Larkin Road/Blue Bonnet Drive

Traffic capacity results are present in terms of level of service (LOS) which is defined in terms of traffic delay at the intersection. Intersections are ranked from LOS A through LOS F. LOS results are based on the average delay per vehicle. LOS A indicates the best traffic operation and LOS F denotes an intersection where demand exceeds capacity. Typically, intersection LOS A through D is considered to be acceptable traffic flow conditions. Table 11 and Table 12 summarize the results of the intersection operations analysis for the year 2027 and 2040 conditions, respectively. Appendix G includes the traffic impact study which provides additional details.

Table 11. Year 2027 No Build and Build Intersection Operations Analysis

Intersection	**Traffic Control**	**2027 No Build LOS**		**2027 Build LOS**	
		AM Peak Hour	**PM Peak Hour**	**AM Peak Hour**	**PM Peak Hour**
CSAH 10/CR 116	Signal	C/C	C/C	C/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/A	A/B	A/B
CR 116/Larkin Road	EB/WB stop	A/B	A/C	A/D	A/D
Larkin Road/ Blue Bonnet Drive	NB stop	A/A	A/A	A/B	A/B

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS D or better during the a.m. and p.m. peak Hours under Year 2027 No Build and Build conditions.

Table 12. Year 2040 No Build and Build Intersection Operations Analysis

Intersection	**Traffic Control**	**2040 No Build LOS**		**2040 Build LOS**	
		AM Peak Hour	**PM Peak Hour**	**AM Peak Hour**	**PM Peak Hour**
CSAH 10/CR 116	Signal	C/D	C/D	C/D	C/D
CSAH 10/CSAH 50	EB stop	A/B	A/B	A/B	A/B
CR 116/Larkin Road	EB/WB stop	A/C	A/C	B/F	C/F
Larkin Road/ Blue Bonnet Drive	NB stop	A/A	A/A	A/B	A/B

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

Under future year 2040 Build conditions, the eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better during the a.m. and p.m. peak hours during year 2040 No Build and Build conditions.

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

CR 116/ Larkin Road Intersection

The eastbound movements at the CR 116/Larkin Road intersection operates at a LOS F during the 2040 Build conditions. In order to accommodate traffic generated by the proposed development, traffic signal control was considered at this intersection. The traffic volume forecasts were used to determine if specific warrants are satisfied based on published criteria outlined in the Minnesota Manual of Uniform Traffic Control Devices (MMUTCD).

The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County. Table 13 summarizes the results of this analysis.

Table 13. CR 116/Larkin Road Intersection Operations Analysis with Traffic Signal Control

2027 Build LOS		**2040 Build LOS**	
AM Peak Hour	**PM Peak Hour**	**AM Peak Hour**	**PM Peak Hour**
B/B	B/B	B/C	B/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

Recommended Traffic Mitigation Measures

Table 14 summarizes recommended measures to mitigate potential traffic impacts resulting from the proposed development.

Table 14. Recommended Traffic Mitigation Measures

Intersection	**Short-Term Measures**	**Long-Term Measures**
CSAH 10/ CR 116	• No improvements needed	• No improvements needed
CSAH 10/ CSAH 50	• No improvements needed	• No improvements needed
CR 116/ Larkin Road	• Widen the eastbound and westbound approaches to accommodate a left turn lane and a through/right turn lane. • Widen the northbound and southbound approaches to accommodate a left turn lane, through lane, and right turn lane.	• Monitor traffic volumes to determine when signal control is warranted.

Intersection	Short-Term Measures	Long-Term Measures
Larkin Road/ Blue Bonnet Drive	• Construct a westbound right turn lane.	• No additional improvements needed.

19. Cumulative Potential Effects

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

a. ***Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.***

It is anticipated that the Project would be constructed in phases with the majority of the construction of the first phase of the Project occurring in the Spring of 2023. The timeline of project construction will depend on market conditions and may vary from the current foreseeable construction timeline.

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.***

Several residential and senior living development are currently under review by the City. These proposed developments are primarily concentrated towards the eastern portion of the City of Corcoran along CR 116 which extends north to south approximately 2,000 feet east of the Project Area.

The Rush Creek Reserve development is currently under development approximately 500 feet north of the Project Area between CSAH 10 and CR 116. The current phase of the residential development will include total of 106 units including 29 single family homes, 16 twin-homes, 15 basement villas, and 27 townhomes. The development will also include wetland areas, common open space, and trail facilities. As noted in Item 11.b.iii of this EAW, a new wastewater lift station is being constructed to replace the previously used lift station on CSAH 10 as part of this project.

The Pioneer Trail Business Park Project proposes construct a five-lot industrial/business park with a total of ten buildings and a new public road on an approximately 56-acre site at the northwest corner of Highway 55 and Pioneer Trail. The Project would include a mini storage/self-storage, gas/convenience, office, warehousing, retail, and light manufacturing uses. An EAW for the Pioneer Trail Business Park Project has been distributed for public comment. Full development of the business park is not anticipated to occur until 2026 and would be dependent on market conditions.

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.***

Potential impacts that were considered as part of the cumulative potential effects evaluation include waters resources, wetlands, public infrastructure, and loss of agricultural land, and transportation.

<u>Water Resources</u>

The project will convert undeveloped agricultural land into a proposed business park, which will increase impervious surfaces compared to existing conditions. As discussed in Item 11 of this EAW, the proposed

additional impervious surface area is expected to result in higher runoff rates, volumes, and pollutants compared to the existing conditions. Other proposed developments in the area resulting in the conversion of agricultural and rural residential land to commercial, industrial and residential developments will similarly increase the area of impervious surfaces. These future developments will be required to implement stormwater BMPs to mitigate stormwater runoff impacts in accordance with all City, ECWMC, and MPCA approval and permitting requirements. Therefore, adverse cumulative impacts to water quality and quantity are not anticipated.

Public Infrastructure

As discussed in Item 11, water supply for the Project will be provided through the City of Maple Grove under an existing contract with the City of Corcoran. Water supply for the Project will be consistent with the water supply planned for the Southeast Corcoran area. It is noted that the City is requesting that the Proposer provide a parcel to the City for locating a future municipal well within Corcoran Farms Business Park (approximately 110 by 110 feet in size).

As discussed in Item 11, sewer and watermain improvements will be required to provide services to the Project. In order to avoid overloading the City's existing and planned wastewater infrastructure, the Proposer will be required to limit the total wastewater volume from all lots combined to not more than 0.064 mgd (average day) which is consistent with the volume of wastewater planned for in the City's Comprehensive Plan. The City of Corcoran regulates future development thought its land use policies and zoning requirements. The City's 2040 Comprehensive Plan identified the potential for future municipal well exploration areas and future studies to evaluate sewer and water extension to Southwest Corcoran. Therefore, adverse cumulative impacts related to public infrastructure are not anticipated.

Wetlands

As described in Item 11, it is anticipated that the Project will impact approximately 0.7 acres of wetlands, which conservatively includes impacts associated with a future potential public road extension to the Project Area. Potential wetland impacts will be confirmed during final design and permitting of the Project. Planned development in the vicinity of the Project may also impact wetlands in the surrounding area. Wetlands are protected by state and federal laws, Section 404 of the Clean Water Act and WCA, which require avoidance of wetland impacts when possible, and when avoidance is not possible, impacts must be minimized and mitigated. Adverse cumulative impacts to wetlands are not anticipated given the federal and state regulations that mandate avoidance, minimization, and mitigation requirements for wetland impacts.

Agricultural Land

The Project will convert existing agricultural land to a business park development. Planned development in surrounding areas along CR 116 may also convert agricultural land to other land uses. The City of Corcoran guides development through the City's land use plan and zoning ordinance. The Project is consistent with the City's 2040 Comprehensive Plan, which identifies the Project Area and adjacent properties for future Light Industrial development. The City of Corcoran through their land use policies and zoning requirements, regulates future development and can protect agricultural land from future development as appropriate. Therefore, adverse cumulative impacts to agricultural land are not anticipated.

Transportation

A Traffic Impact Study for the Project was completed that incorporated future traffic growth and recommended mitigation measures to address traffic impacts. Appendix G includes the Traffic Impact Study. Future developments in the surrounding area that are anticipated to increase traffic congestion, would be required to complete a traffic impact study and identify mitigation measures to address these impacts. Therefore, adverse cumulative impacts related to traffic congestion are not anticipated.

20. Other Potential Environmental Effects

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.

No other additional environmental effects are anticipated as a result of the proposed project. Potential environmental effects have been addressed in Items 1 through 19.

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

I hereby certify that:

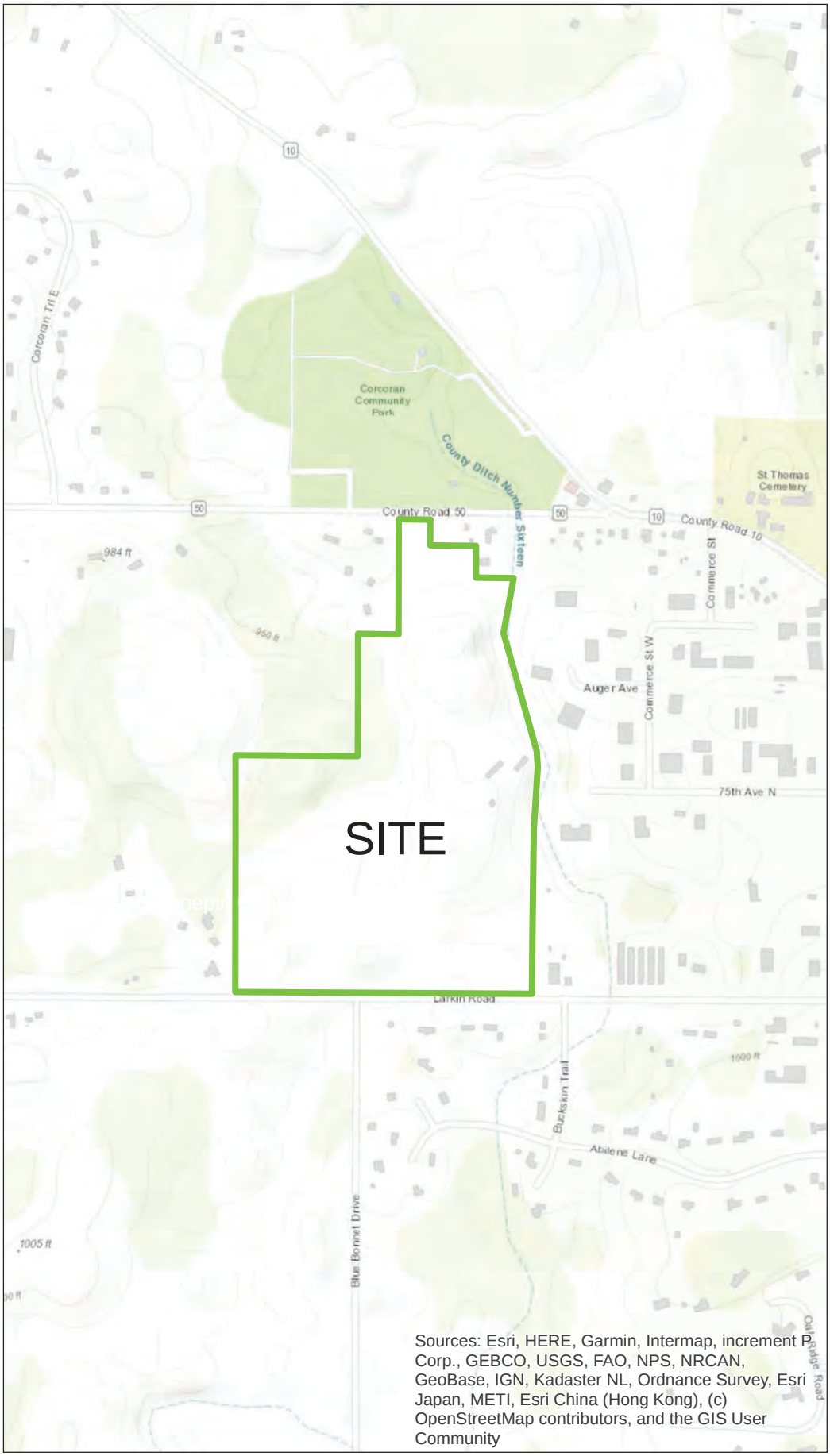
- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions,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

Signature _____ Date _____

Title _____

Appendix A

Figures



Legend

Site

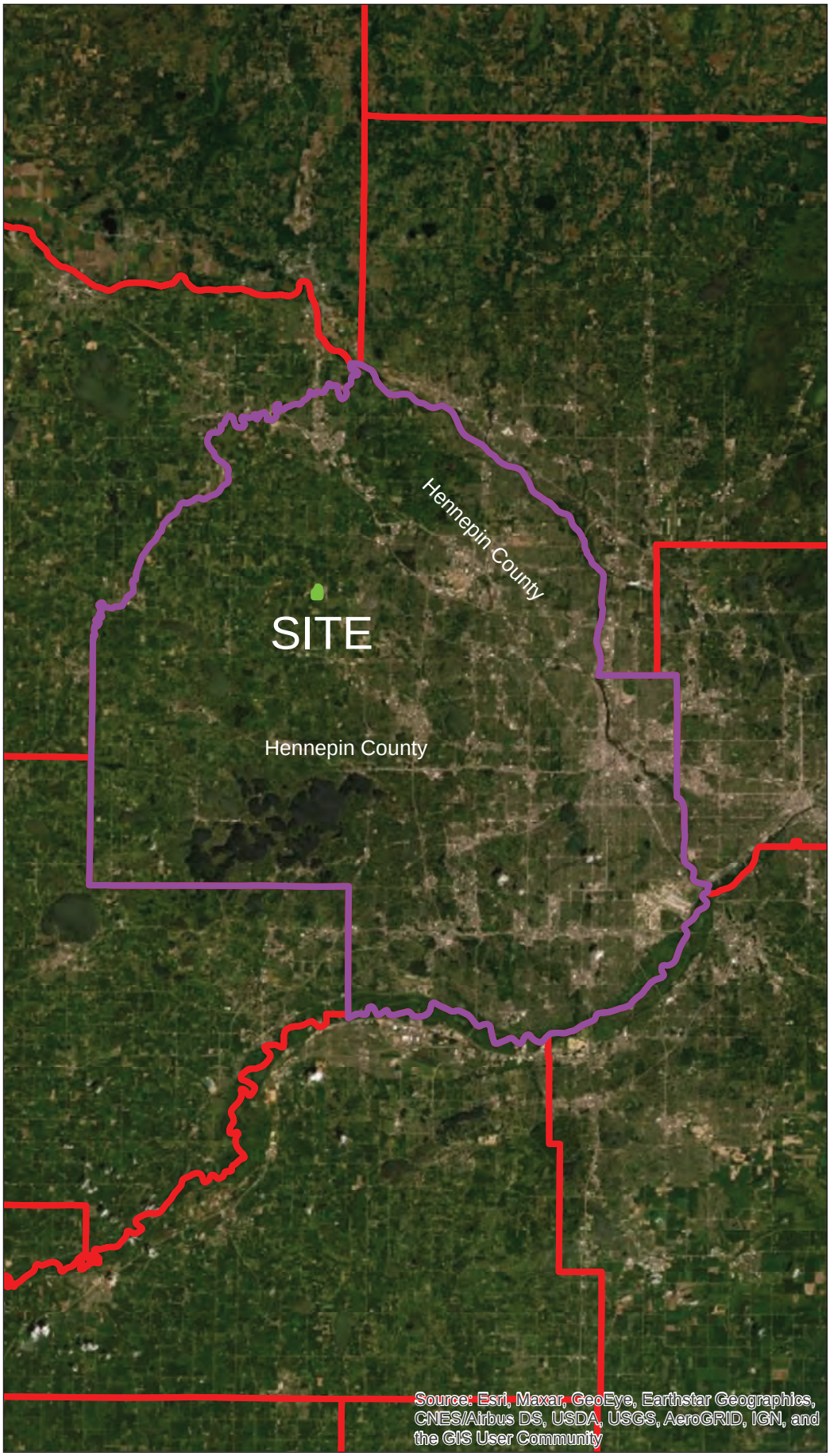
0 500 1,000 Feet

NORTH

Figure1: USGS Topographic Map

Corcoran Farms Business Park EAW • Corcoran, MN

05.17.22



Legend

- Site
- Hennepin_County
- County Boundaries

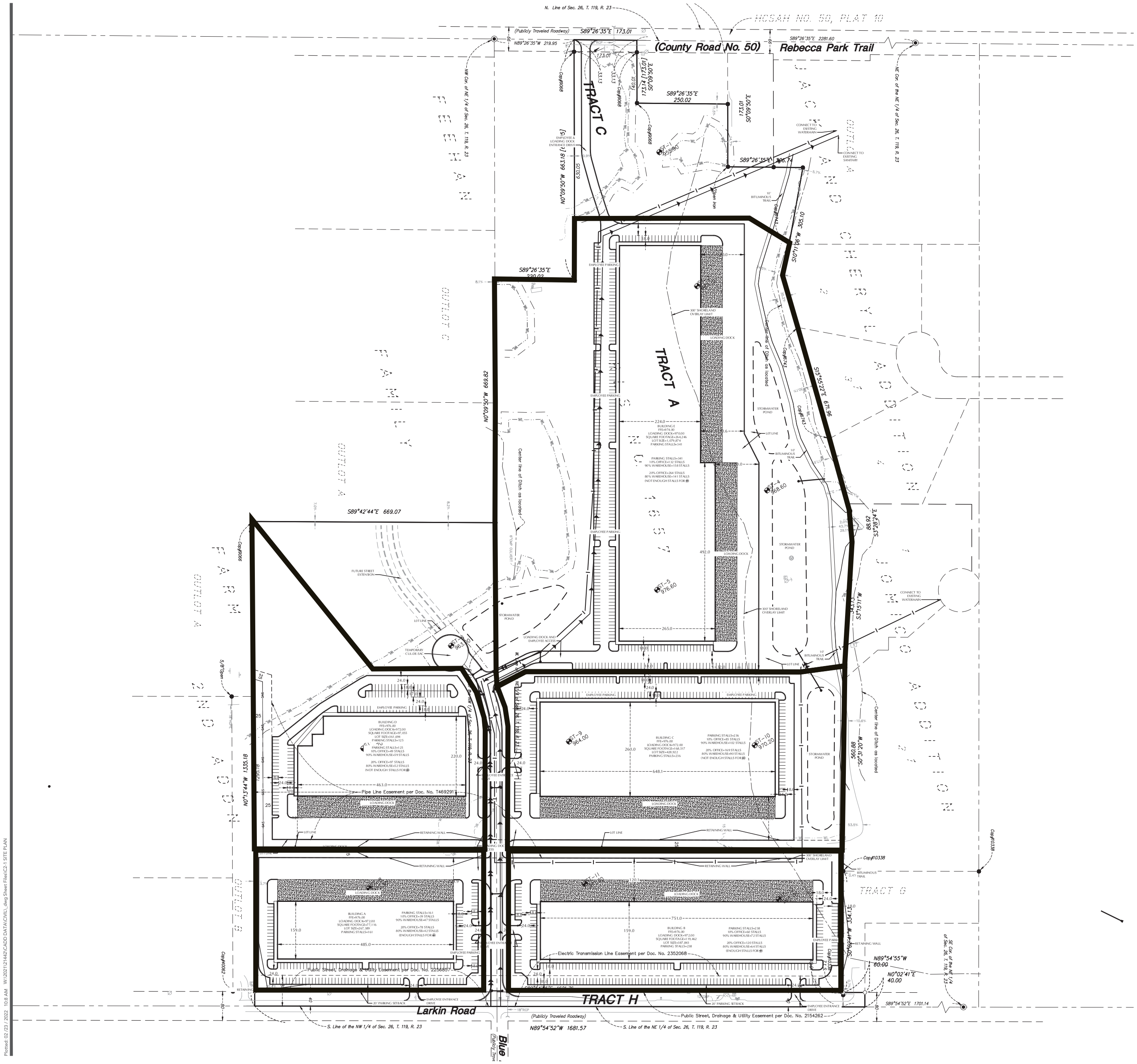
0 5 10 Miles

NORTH

Figure 2: Hennepin County Location Map

Cororan Farms Business Park • Corcoran, MN

05.17.22



LARKIN ROAD FEASIBILITY

CORCORAN, MN

LEE & ASSOCIATES

5353 GAMBLE DRIVE, SUITE 106
MINNEAPOLIS, MN 55416

LOUCKS

PLANNING
CIVIL ENGINEERING
LAND SURVEYING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL

7200 Hemlock Lane, Suite 300
Maple Grove, MN 55369
763.424.5505
www.loucksinc.com

CIVIL LEGEND

EXISTING		PROPOSED
	SANITARY MANHOLE	
	STORM MANHOLE	
	CATCH BASIN	
	CULVERT	
	HYDRANT	
	GATE VALVE	
	POST INDICATOR VALVE	
	LIGHT POLE	
	POWER POLE	
	SIGN	
	BENCHMARK	
	SOIL BORINGS	
	WATER MANHOLE	
	TELEPHONE MANHOLE	
	UTILITY MANHOLE	
	ELECTRIC MANHOLE	
	WATER SERVICE	
	SANITARY SERVICE	
	HANDICAP PARKING	
	DIRECTION OF FLOW	
	SPOT ELEVATION	
	CONTOURS	
	SANITARY SEWER	
	STORM SEWER	
	WATERMAIN	
	FORCEMAIN	
	DRAINTILE	
	SILT FENCE	
	CURB & GUTTER	
	RETAINING WALL	
	TREELINE	
	EASEMENT LINE	
	SETBACK LINE	
	FENCE LINE	
	UNDERGROUND TELE	
	UNDERGROUND GAS	
	OVERHEAD UTILITY	
	UNDERGROUND FIBER OPTIC	
	UNDERGROUND ELECTRIC	
	UNDERGROUND CABLE TV	
	PROPERTY LINE	
	CONIFEROUS TREE	
	DECIDUOUS TREE	
	PARKING COUNTS	

CADD QUALIFICATION

SUBMITTAL/REVISIONS

PROFESSIONAL SIGNATURE

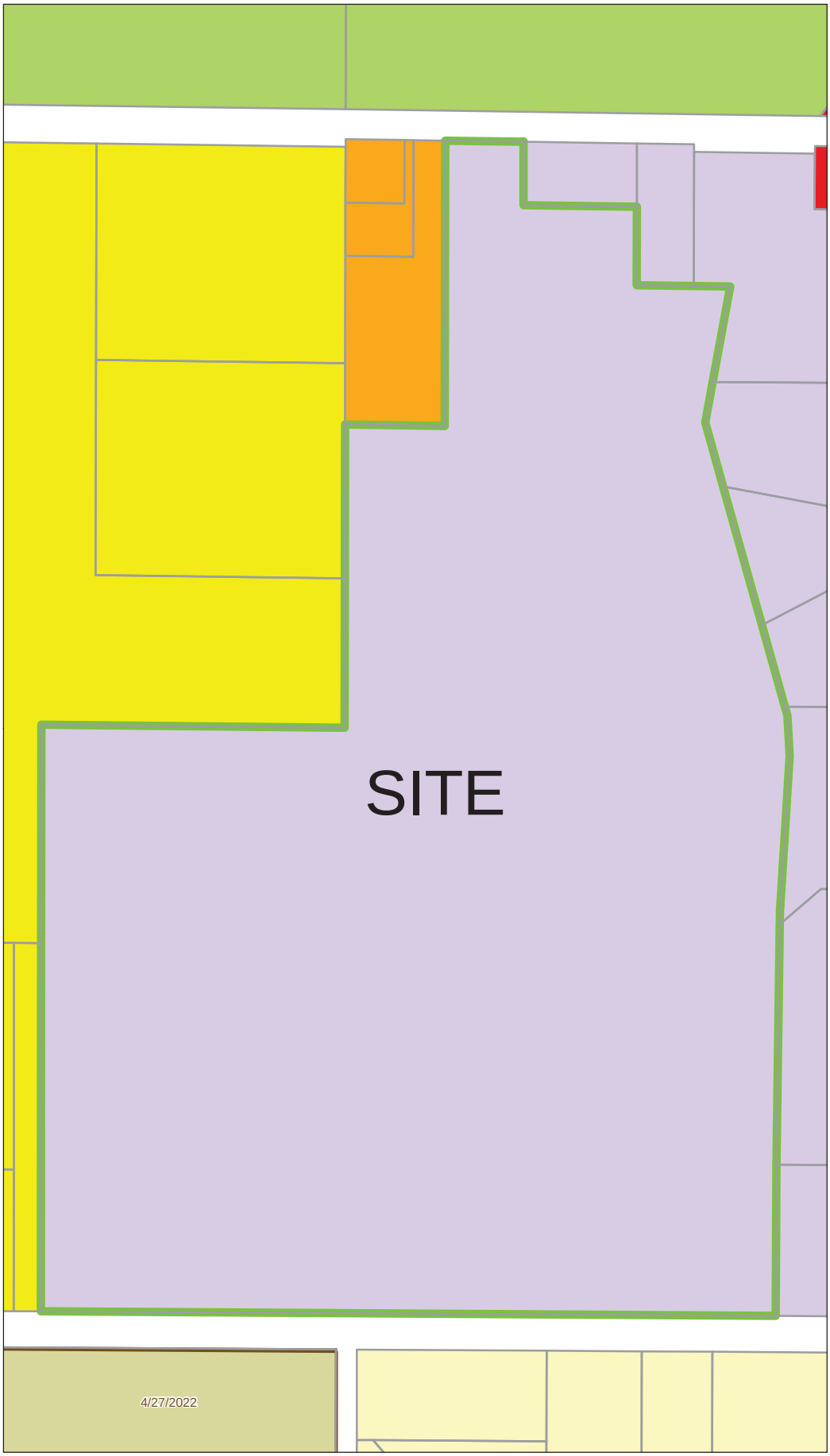
QUALITY CONTROL

SCALE IN FEET: 0 100 200

UTILITY PLAN

Figure 3

Plotted: 02 / 23 / 2022 10:8 AM W:\2021\21442\CADD DATA\CIVIL_dwg Sheet Files\C2-1 SITE PLAN



Legend

- Site
- Hennepin_County
- Rural/Ag Residential
- Existing Residential
- Low Density Residential
- Medium Density Residential
- Mixed Residential
- High Density Residential
- Rural Service/Commercial
- Commercial
- Mixed Use
- Business Park
- Light Industrial
- Public/Semi-Public
- Parks/Open Space
- Agricultural Preserve (Date of Expiration)
- Open Water
- Parcel Boundaries

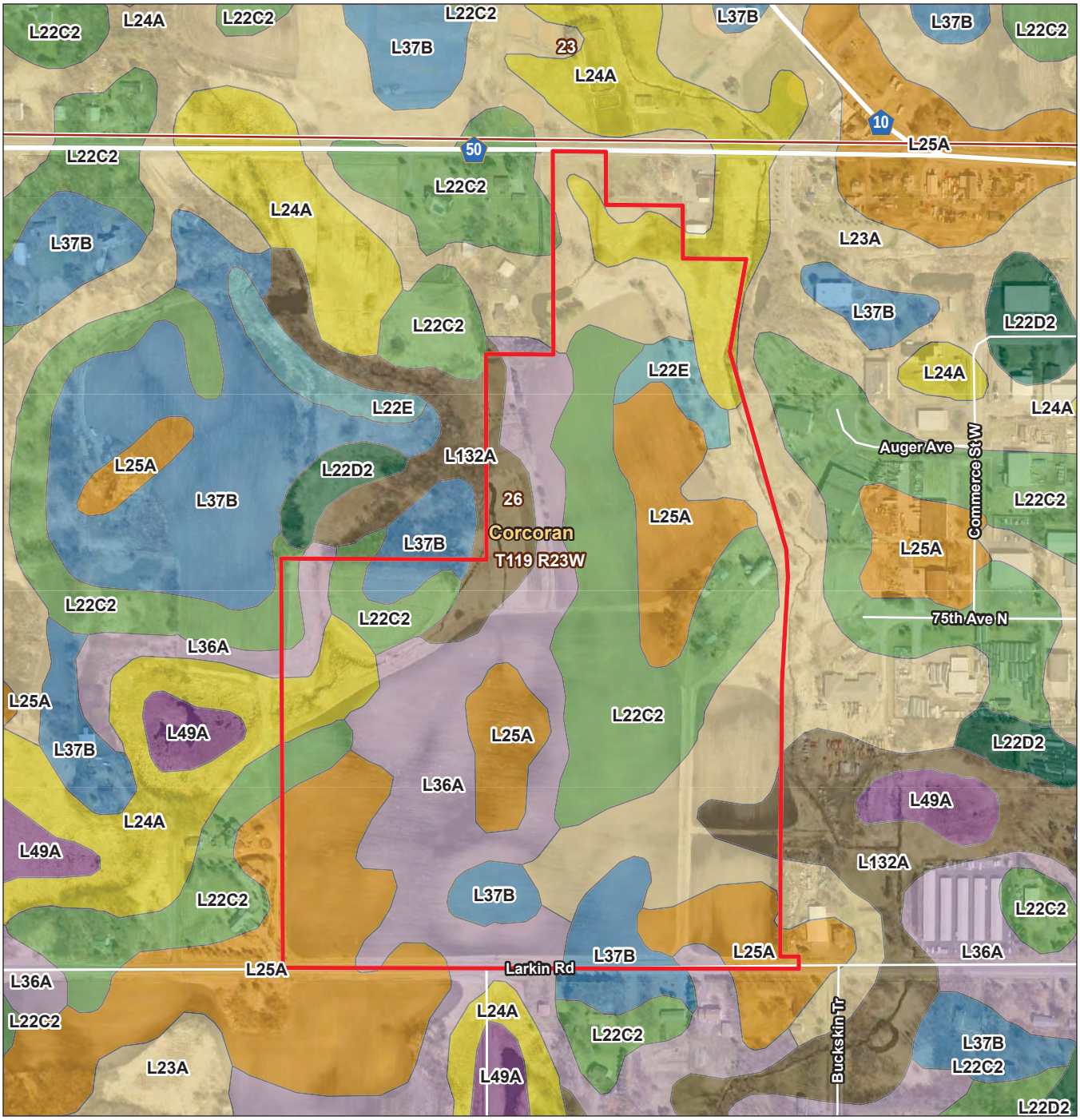
0 200 400 Feet

NORTH

Figure 4: 2040 Comprehensive Land Use Map

Corcoran Farms Business Park • Corcoran, MN

05.17.22



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: City of Corcoran, NRCS, MNDOT
3. Background: MnGeo 2020 7-county

Legend

Project Area

Mapunit Symbol,Mapunit Name

- L132A,Hamel-Glencoe complex, 0 to 2 percent slopes
- L22C2,Lester loam, 6 to 10 percent slopes, moderately eroded
- L22D2,Lester loam, 10 to 16 percent slopes, moderately eroded
- L22E,Lester loam, 10 to 22 percent slopes
- L23A,Cordova loam, 0 to 2 percent slopes
- L24A,Glencoe clay loam, 0 to 1 percent slopes
- L25A,Le Sueur loam, 1 to 3 percent slopes
- L36A,Hamel, overwash-Hamel complex, 0 to 3 percent slopes
- L37B,Angus loam, 2 to 6 percent slopes
- L49A,Klossner soils, depressional, 0 to 1 percent slopes

0 250 500 Feet

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1:6,000

N

Stantec

Project Location
T119N, R23W, S26
Corcoran, Hennepin Co., MN

Prepared by KJM on 2022-04-01

Client/Project
City of Corcoran, MN
Corcoran Farms Business Park
EAW

227704868

Figure No.
5

Title
Soil Classifications

Page 1 of 1

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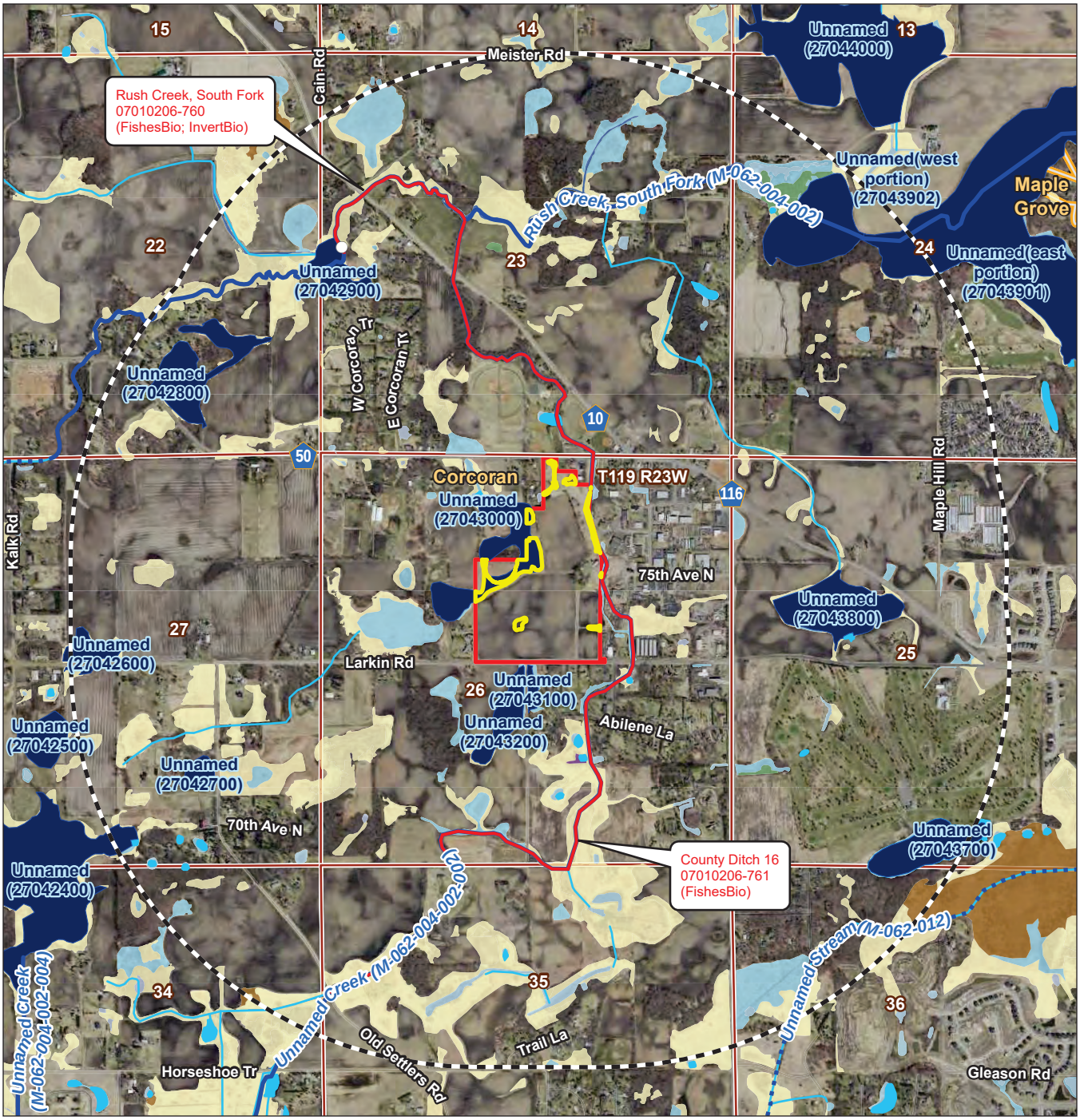
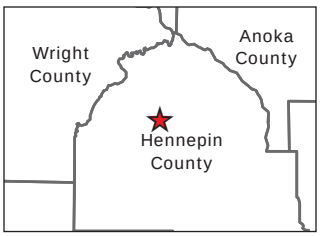
FIGURE 5





Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: City of Corcoran, MNDNR, MNDOT
3. Background: MnGeo 2020 7-county

Legend

- 1 Mile Radius
- Project Area
- Field Delineated Wetland
- 2022 MPCA Impaired Streams (Draft)

Minnesota Public Waters Delineations

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Public Waters Basins
- NHD - Flowline
- NHD - Waterbody

NWI Circular 39 Class

- 1 - Seasonally Flooded Basin or Flat
- 2 - Wet Meadow
- 3 - Shallow Marsh
- 4 - Deep Marsh
- 5 - Shallow Open Water
- 6 - Shrub Swamp
- 7 - Wooded Swamp
- 8 - Bog
- Riverine Systems

0 1,000 2,000 Feet
(At original document size of 8.5x11)
1:24,000

N

Stantec

Project Location
T119N, R23W, S26
Corcoran, Hennepin Co., MN

Prepared by KJM on 2022-04-01

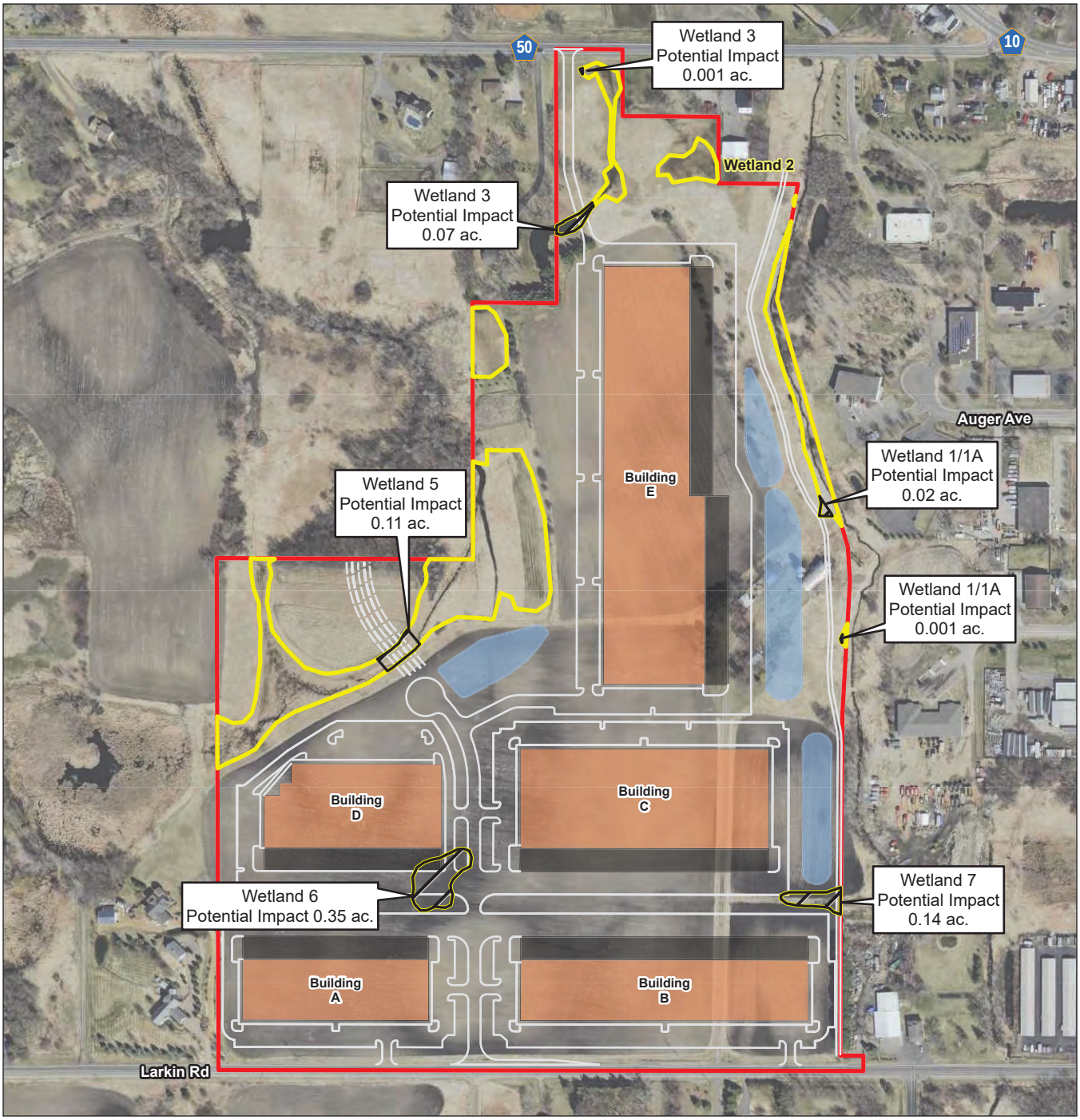
Client/Project
City of Corcoran, MN
Corcoran Farms Business Park
EAW

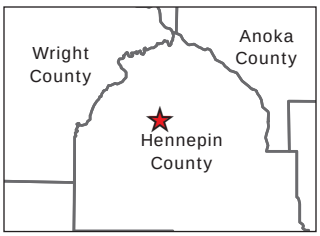
227704868

Figure No.
6

Title
Water Resources Map

FIGURE 6





Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: City of Corcoran, MNDNR, MNDOT
3. Background: MnGeo 2020 7-county

Legend
- Potential Wetland Impact
- Field Delineated Wetland

Business Park Concept Plan
- Road/Trail/Parking
- Future Street Extension
- Stormwater Pond
- Building Footprint
- Loading Dock
- Project Area

0 200 400 Feet
(At original document size of 8.5x11)
1:4,800

N

Stantec

Project Location
T119N, R23W, S26
Corcoran, Hennepin Co., MN

Prepared by KJM on 2022-04-28

Client/Project
City of Corcoran, MN
Corcoran Farms Business Park
EAW

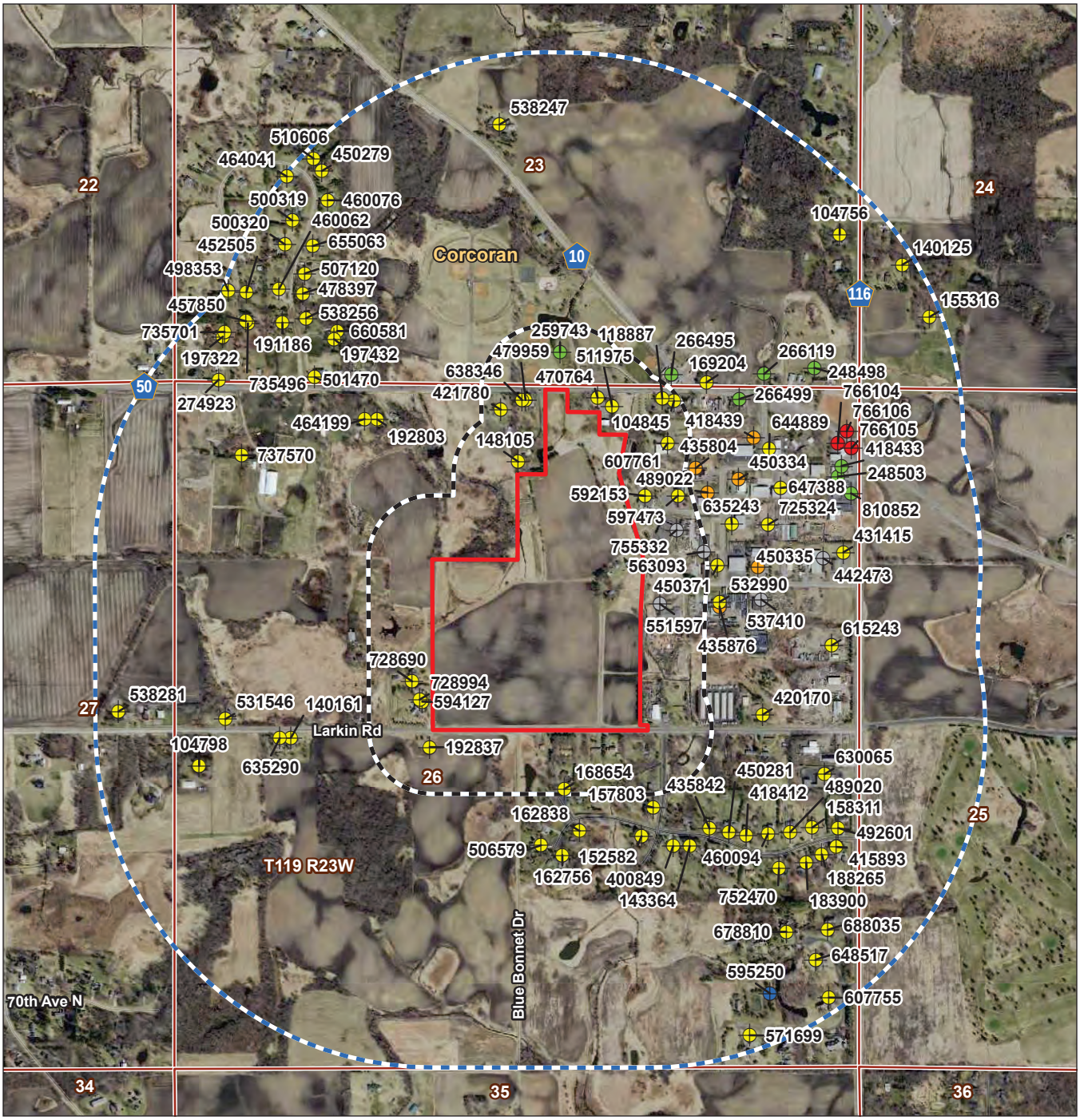
227704868

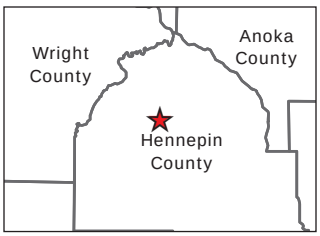
Figure No.
7

Title
Potential Wetland Impacts

V:\2277\active\227704868\03_data\gis_cad\gis\pro\eaw\eaw.aprx Revised: 2022-04-28 By: kjmueller

FIGURE 7





Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: City of Corcoran, NRCS, MNDOT, MNDOH
3. Background: MnGeo 2020 7-county

Legend
County Well Index
- Commercial
- Domestic
- Industrial
- Irrigation
- Monitor Well
- Public Supply
- 500 ft Radius
- 1/2 mi Radius
- Project Area

0 600 1,200 Feet
(At original document size of 8.5x11)
1:14,400

N

Stantec

Project Location
T119N, R23W, S26
Corcoran, Hennepin Co., MN

Prepared by KJM on 2022-04-01

Client/Project
City of Corcoran, MN
Corcoran Farms Business Park
EAW

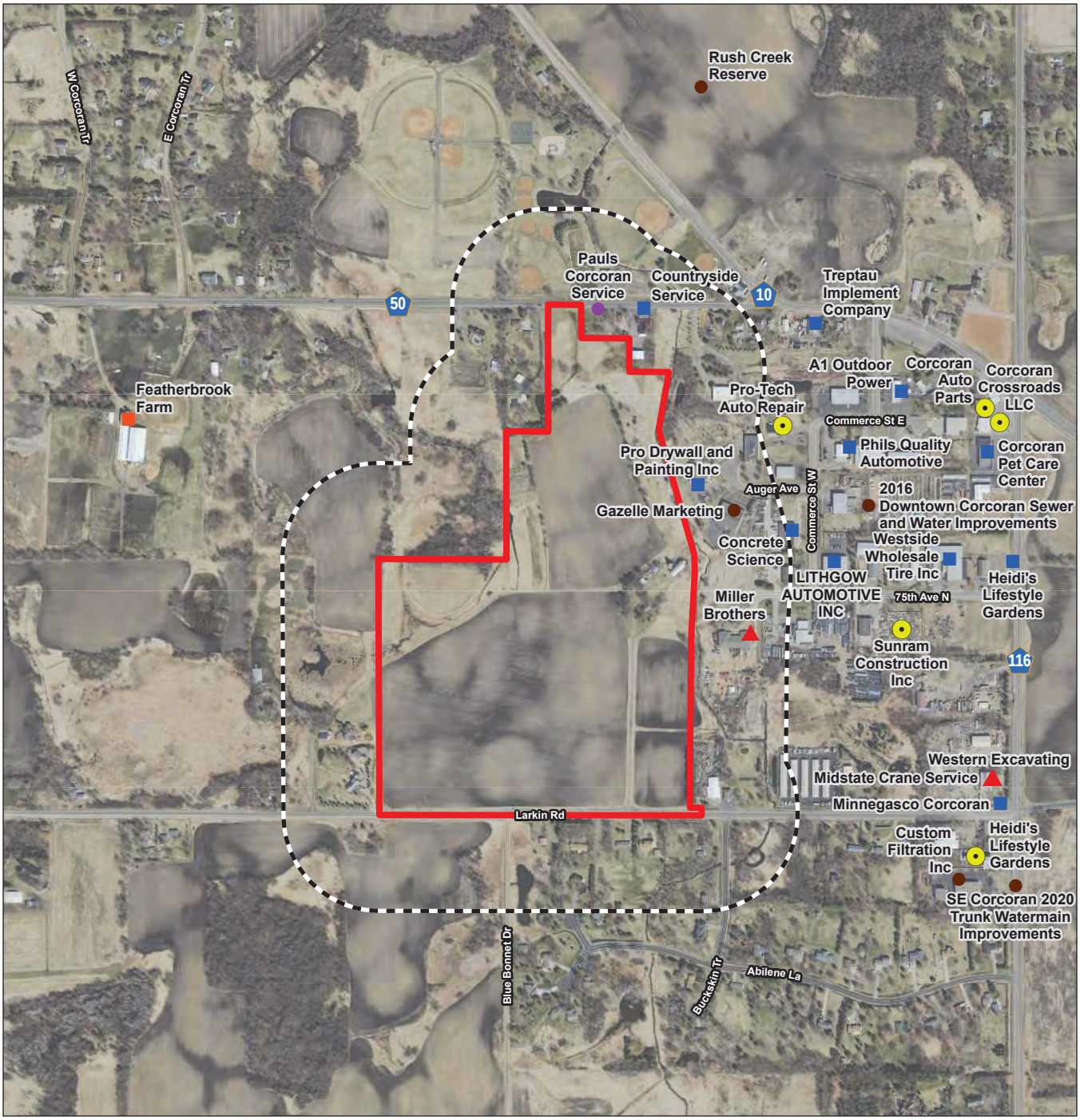
227704868

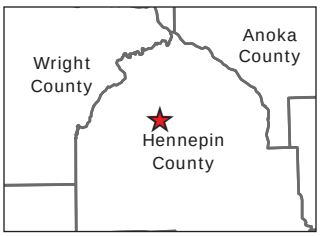
Figure No.
8

Title
County Well Index

V:\2277\active\227704868\03_data\gis_cad\gis\pro\eaw\eaw.aprx Revised: 2022-04-01 By: kjmueller

FIGURE 8





Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Stantec, Hennepin Co., MnGeo, MnDOT, MPCA
3. Background: 2020 color 7-county

Legend
- Project Area
- 500 ft Buffer

MPCA Sites
Program Name
- Multiple Programs
- Feedlots
- Hazardous Waste
- Investigation and Cleanup
- Stormwater
- Tanks

0 400 800 Feet
(At original document size of 8.5x11)
1:9,600

N

Stantec

Project Location
T119N, R23W, S26
Corcoran, Hennepin Co., MN

Prepared by KJM on 2022-04-05

Client/Project
227704868
City of Corcoran, MN
Corcoran Farms Business Park
EAW

Figure No.
9

Title
MPCA WIMN Potentially Contaminated Sites

V:\227\active\227704868\03_data\gis_cad\gis\pro\eaw\eaw.aprx Revised: 2022-04-05 By: kjmueller

FIGURE 9

Appendix B

Wetland Delineation and WCA Notice of Decision

Larkin Road Site

City of Corcoran, Hennepin County, Minnesota

Wetland Delineation Report

Prepared for
Loucks Associates

by
Kjolhaug Environmental Services Company, Inc.
(KES Project No. 2021-166)

October 11, 2021

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Providing Sound, Balanced, Comprehensive Natural Resource Solutions

Larkin Road Site

Corcoran, Hennepin County, Minnesota

Wetland Delineation Report
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FIGURES

APPENDICES

Larkin Road Site

Corcoran, Hennepin County, Minnesota

Wetland Delineation Report

1. WETLAND DELINEATION SUMMARY

- The 68.63-acre Larkin Road Site was inspected on August 19, 2021 for the presence and extent of wetland.
- The National Wetlands Inventory (NWI) map showed seven wetlands within the site boundaries.
- The soil survey showed Cordova (Predominantly Hydric), Hamel-Glencoe (Predominantly Hydric) and Glencoe (Hydric) and Hamel, overwash-Hamel (Partially Hydric) as the Hydric Soil types mapped on the property. Soil mapping units are summarized in **Table 2.**
- The DNR Public Waters Inventory showed one DNR Public Wetland: Unnamed (27-430W) on the western portion of the site, and one DNR Public Watercourse: Unnamed Creek (M-062-004-002-002) flowing north along the eastern border of the site.
- The National Hydrography Dataset showed one Canal/Ditch flowing north along the eastern border of the site.
- Seven wetlands delineated within the site boundaries are summarized in **Table 3**.

2. OVERVIEW

The 68.63-acre Larkin Road Site was inspected on August 19, 2021 for the presence and extent of wetland. The property was located in Section 26, Township 119 North, Range 23 West, City of Corcoran, Hennepin County, Minnesota. The site was situated west of CR-116, south of CR-50 and north of Larkin Road (**Figure 1**). The site boundaries corresponded to Hennepin County PID #: 2611923130006

The site consisted of farm fields, agricultural storage units and rural residential housing. The topography of the site sloped from an elevation of 988 ft MSL on the southern and north central portions of the site down to a low of 954 ft MSL on the northern portion. Surrounding land use consisted of single-family residential, farmland and rural residential.

Seven wetlands were delineated within the site boundaries. The delineated wetland boundaries and existing conditions are shown on **Figure 2**. Figure 2 does represent an official survey.

3. METHODS

3.1 Wetland Delineation

Wetlands were identified using the Routine Determination method described in the Corps of Engineers Wetlands Delineation Manual (Waterways Experiment Station, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0) as required under Section 404 of the Clean Water Act and the Minnesota Wetland Conservation Act.

Wetland boundaries were identified as the upper-most extent of wetland that met criteria for hydric soils, hydrophytic vegetation, and wetland hydrology. Wetland-upland boundaries were marked with pin flags that were located using Trimble R1 GPS Units.

Soils, vegetation, and hydrology were documented at a representative location along the wetland-upland boundary. Plant species dominance was estimated based on the percent aerial or basal coverage visually estimated within a 30-foot radius for trees and vines, a 15-foot radius for the shrub layer, and a 5-foot radius for the herbaceous layer within the community type sampled.

Soils were characterized to a minimum depth of 24 inches (unless otherwise noted) using a Munsell Soil Color Book and standard soil texturing methodology. Hydric soil indicators used are from Field Indicators of Hydric Soils in the United States (USDA Natural Resources Conservation Service (NRCS) in cooperation with the National Technical Committee for Hydric Soils, Version 7, 2010).

Mapped soils are separated into five classes based on the composition of hydric components and the Hydric Rating by Map Unit color classes utilized on Web Soil Survey. The five classes include Hydric (100 percent hydric components), Predominantly Hydric (66 to 99 percent hydric components), Partially Hydric (33 to 65 percent hydric components), Predominantly Non-Hydric (1 to 32 percent hydric components), and Non-Hydric (less than one percent hydric components).

Plants were identified using standard regional plant keys. Taxonomy and indicator status of plant species was taken from the 2018 National Wetland Plant List (U.S. Army Corps of Engineers 2018. National Wetland Plant List, version 3.3, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH).

3.2 Aerial Review for Offsite Hydrology Determinations

Areas in agricultural cropland that exhibited potential wetland signatures on aerial photography and with low or depressional topography were reviewed generally following methods described in Using Aerial Imagery to Assess Wetland Hydrology (Minnesota Board of Water and Soil Resources (BWSR) 2010) and Guidance for Submittal of Delineation Reports to the St. Paul District Corps of Engineers and Wetland Conservation Act Local Governmental Units in Minnesota, Version 2.0 (USACE 2015). These methods use aerial photography and antecedent precipitation conditions to identify areas that have wetland hydrology signatures during periods of typical precipitation.

Available years of Farm Service Agency (FSA) aerial photography were reviewed for the site to determine long-term hydrology. In cases where additional aerial photography was relevant, available, and necessary to make hydrology determinations, we reviewed aerial photography from other sources such as the Minnesota Geospatial Information Office (MnGEO) and Google Earth.

Signatures at locations of potential wetlands on aerial photographs were interpreted and classified using seven codes (**Table 1**). Wetland hydrology was assumed to be present within areas exhibiting wetland signatures in more than 50% of years with normal climatic conditions based on antecedent precipitation.

Table 1. Aerial photograph interpretation codes

Code	Classification
CS	Crop stress
DO	Drowned out
NC	Not cropped
SW	Standing water
WS	Wetland signature
AP	Altered pattern
NV	Normal vegetation

This analysis used only aerial photographs taken following periods of precipitation within the normal range as determined using the Wetland Delineation Precipitation Data Retrieval tool (Minnesota Climatology Office 2015). This tool classifies antecedent precipitation as Normal (N), Wet (W) or Dry (D) by comparing precipitation during the three months preceding the estimated date of aerial photography to the 30-year average from 1981-2010. Dates of aerial imagery were determined from the MnGeo database and July 1 was used as the estimated date of FSA aerial photography.

4. RESULTS

4.1 Review of NWI, Soils, Public Waters and NHD Information

The National Wetlands Inventory (NWI) (Minnesota Geospatial Commons 2009-2014 and U.S. Fish and Wildlife Service) showed seven wetlands mapped within the site boundaries (**Figure 3**).

The Soil Survey (USDA NRCS 2015) showed Cordova (Predominantly Hydric), Hamel-Glencoe (Predominantly Hydric) and Glencoe (Hydric) and Hamel,overwash-Hamel (Partially Hydric) as the Hydric Soil types mapped on the property. Soil types mapped on the property are listed below in **Table 2** and a map showing soil types is included in **Figure 4**.

Table 2. Soil types mapped on the Larkin Road Site

Symbol	Soil Name	Acres	% of Area	% Hydric	Hydric Category
L22C2	Lester loam, 6 to 10 percent slopes, moderately eroded	14.9	21.60%	2	Predominantly Non-Hydric
L22E	Lester loam, 10 to 22 percent slopes	1.3	1.90%	0	Non Hydric
L23A	Cordova loam, 0 to 2 percent slopes	12.3	17.90%	95	Predominantly Hydric
L24A	Glencoe clay loam, 0 to 1 percent slopes	4.6	6.70%	100	Hydric
L25A	Le Sueur loam, 1 to 3 percent slopes	13.7	20.00%	15	Predominantly Non-Hydric
L36A	Hamel, overwash-Hamel complex, 0 to 3 percent slopes	15	21.80%	45	Partially Hydric
L37B	Angus loam, 2 to 6 percent slopes	3.3	4.80%	5	Predominantly Non-Hydric
L132A	Hamel-Glencoe complex, 0 to 2 percent slopes	3.6	5.20%	90	Predominantly Hydric

The Minnesota DNR Public Waters Inventory (Minnesota Department of Natural Resources 2015 showed one DNR Public Wetland: Unnamed (27-430W) on the western portion of the site, and one DNR Public Watercourse: Unnamed Creek (M-062-004-002-002) flowing north along the eastern border of the site (**Figure 5**).

The National Hydrography Dataset (U.S. Geological Survey 2015) showed one Canal/Ditch flowing north along the eastern border of the site (**Figure 6**).

4.2 Wetland Determinations and Delineations

Potential wetlands were evaluated during field observations on August 19, 2021. Seven wetlands were identified and delineated on the property based on field observations and aerial photography (**Figure 2**). Corresponding data forms are included in **Appendix B**. The following descriptions of the wetlands and adjacent uplands reflects conditions observed at the time of the field visit. Herbaceous vegetation and crops were actively growing at that time. Precipitation conditions were typical based on the Precipitation Worksheet Using Gridded Database method, and drier than the normal range based on available 30-day rolling total precipitation (**Appendix C**). Wetland descriptions are shown on the following page on **Table 3**.

4.3 Other Areas

Tributary 1 (T1) was a perennial tributary that flowed north along the eastern portion of the site boundary. Tributary 1 corresponded to DNR Public Watercourse: Unnamed Creek (M-062-004-002-002) and encompassed approximately 662.5 linear feet within site limits.

4.4 Aerial Review for Offsite Hydrology Determinations

Recent, available Google Earth, MNGEO and FSA photo years were assessed for wet/normal/dry climatic conditions using the Wetland Delineation Precipitation Data Retrieval tool. Available aerial photographs from the 6 most recent and available normal years (2006, 2010, 2012, 2018, 2019 and 2020) were used for the offsite hydrology review (**Table 4**).

Table 4. Decision matrix for offsite hydrology review.

Source	Photo Date	Date Used for Climate Assessment	Climatic Conditions
FSA	7/1/2019 (Assumed)	7/1/2019	Normal
FSA	8/31/2017	9/1/2017	Wet
FSA	9/27/2015	10/1/2015	Normal (Late Season)
FSA	7/12/2013	7/12/2013	Wet
FSA	9/12/2010	9/12/2010	Normal
FSA	7/31/2009	8/1/2009	Dry
FSA	7/30/2008	8/1/2008	Dry
FSA	7/1/2003 (assumed)	7/1/2003	Wet
FSA	5/6/1991	5/6/1991	Wet
MN GEO	April 4-10, 2020	4/4/2020	Most Recent Wet Photo
MN GEO	5/1/2018	5/1/2018	Normal
MN GEO	April 9-22, 2016	4/15/2016	Dry
MN GEO	March 25- April 4, 2012	4/1/2012	Normal
MN GEO	April 23, 2008	5/1/2008	Wet
MN GEO	April 17-18, 2006	5/1/2006	Wet
Google Earth	5/11/2020	5/11/2020	Normal
Google Earth	4/5/2017	4/5/2017	Dry
Google Earth	10/11/2014	10/11/2014	Normal (Late Season)
Google Earth	6/6/2006	6/6/2006	Normal

Results - Twelve areas showing a wet signature on the 2020 MNGEO photo – most recent wet photo – were included in the review. The location of ***Areas A – L*** are shown on **Figure 7**. Photographs for each year of review and the Wetland Hydrology Recording from Aerial Imagery - Recording Form are included in **Appendix D**.

Area A was not mapped as hydric soil on the soil survey or wetland on the NWI and did not show any wet signatures on normal aerial photographs. This area did not require field verification and was determined to be non-wetland based on the recording form decision matrix.

Area B was not mapped as hydric soil on the soil survey or wetland on the NWI and showed wet signatures on 17% of normal aerial photographs. This area did not require field verification and was determined to be non-wetland based on the recording form decision matrix.

Area C was not mapped as hydric soil on the soil survey or wetland on the NWI and showed wet signatures on 33% of normal aerial photographs. This area required field verification and was determined to be non-wetland based on lack of one primary or two secondary hydrology indicators. This area coincides with data sheets labeled Sample Point AA (SP-AA) which can be found within **Appendix B**. Sample Point AA was taken within a relatively flat area that was dominated by healthy soybean crop within the east central portion of the site (See **Figure 2**).

Area D was mapped as hydric soil on the soil survey, was not mapped as wetland on the NWI and showed wet signatures on 50% of normal aerial photographs. This area required field verification and was determined to be non-wetland based on lack of one primary or two secondary hydrology indicators. Geomorphic position was not applicable due to proximity of functional catch basins. This area coincides with data sheets labeled Sample Point BB (SP-BB) and Sample Point CC (SP-CC), which can be found within **Appendix B**. Sample Points BB & CC were taken within depressional areas that were dominated by healthy soybean crop (See **Figure 2**).

Area E was mapped as hydric soil on the soil survey, was not mapped as wetland on the NWI and showed wet signatures on 83% of normal aerial photographs. This area was determined to be wetland based on the recording decision matrix and was confirmed during the field visit. The boundaries of this area were determined during the offsite aerial review, which expands the eastern boundary of Wetland 5 into the adjacent soybean crop field. This area coincides with data sheets labeled Sample Point 5-1W (SP5-1W), which can be found within **Appendix B**.

Areas F, G, J and K were mapped as hydric soil on the soil survey, were not mapped as wetland on the NWI and showed wet signatures on 17% of normal aerial photographs. These areas did not require field verification and were determined to be non-wetland based on the recording form decision matrix.

Areas H and I were mapped as hydric soil on the soil survey, were not mapped as wetland on the NWI and showed wet signatures on 67% of normal aerial photographs. These areas were determined to be wetland based on the recording decision matrix and were confirmed during the field visit. Area H coincides with data sheets labeled Sample Point 6-1W (SP6-1W) and Area I coincides with data sheets labeled Sample Point 7-1W (SP7-1W), which can be found within **Appendix B**.

Area L was mapped as hydric soil on the soil survey, mapped as a PEM1Af wetland on the NWI and showed wet signatures on 17% of aerial photography during normal precipitation years. This area required field verification based on the recording form decision matrix and was determined to be non-wetland based on lack of one primary or two secondary hydrology indicators. This area coincides with data sheets labeled Sample Point DD (SP-DD), which can be found within **Appendix B**. Sample Point DD was taken within a mowed hillslope that was dominated by Reed canary grass, stinging nettle and unknown grasses within the southern portion of the site (See **Figure 2**). This area was upslope of a culvert that drained south under Larkin Road.

4.5 Request for Wetland Boundary and Jurisdictional Determination

Appendix A of this report includes a Joint Application Form for Activities Affecting Water Resources in Minnesota, which is submitted in request for: (1) a wetland boundary and type determination under the Minnesota Wetland Conservation Act (WCA), (2) delineation concurrence under Section 404 of the Clean Water Act and (3) Approved Jurisdictional Determination under Section 404 of the Federal Clean Water Act for delineated Wetland 6.

5. CERTIFICATION OF DELINEATION

The procedures utilized in the described delineation are based on the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual as required under Section 404 of the Clean Water Act and the Minnesota Wetland Conservation Act. This wetland delineation and report were prepared in compliance with the regulatory standards in place at the time the work was performed.

Site boundaries indicated on figures within this report are approximate and do not constitute an official survey product.

Delineation Completed by: Adam Cameron, Wetland Ecologist
Minnesota Certified Wetland Delineator No. 1321

Kyle Uhler
Minnesota Certified Wetland Delineator

Will Effertz, Ecologist / Soil Specialist

Report Prepared by: Will Effertz, Ecologist / Soil Specialist

Report reviewed by: _____ Date: October 11, 2021
Mark Kjolhaug, Professional Wetland Scientist No. 000845

Larkin Road Site

Wetland Delineation Report

FIGURES

1. Site Location
2. Existing Conditions
3. National Wetlands Inventory
4. Soil Survey
5. DNR Protected Waters Inventory
6. National Hydrography Dataset
7. Offsite Hydrology Assessment Areas

Figure 1 - Site Location Map

N

0 1,250 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: ESRI Streets Basemap

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

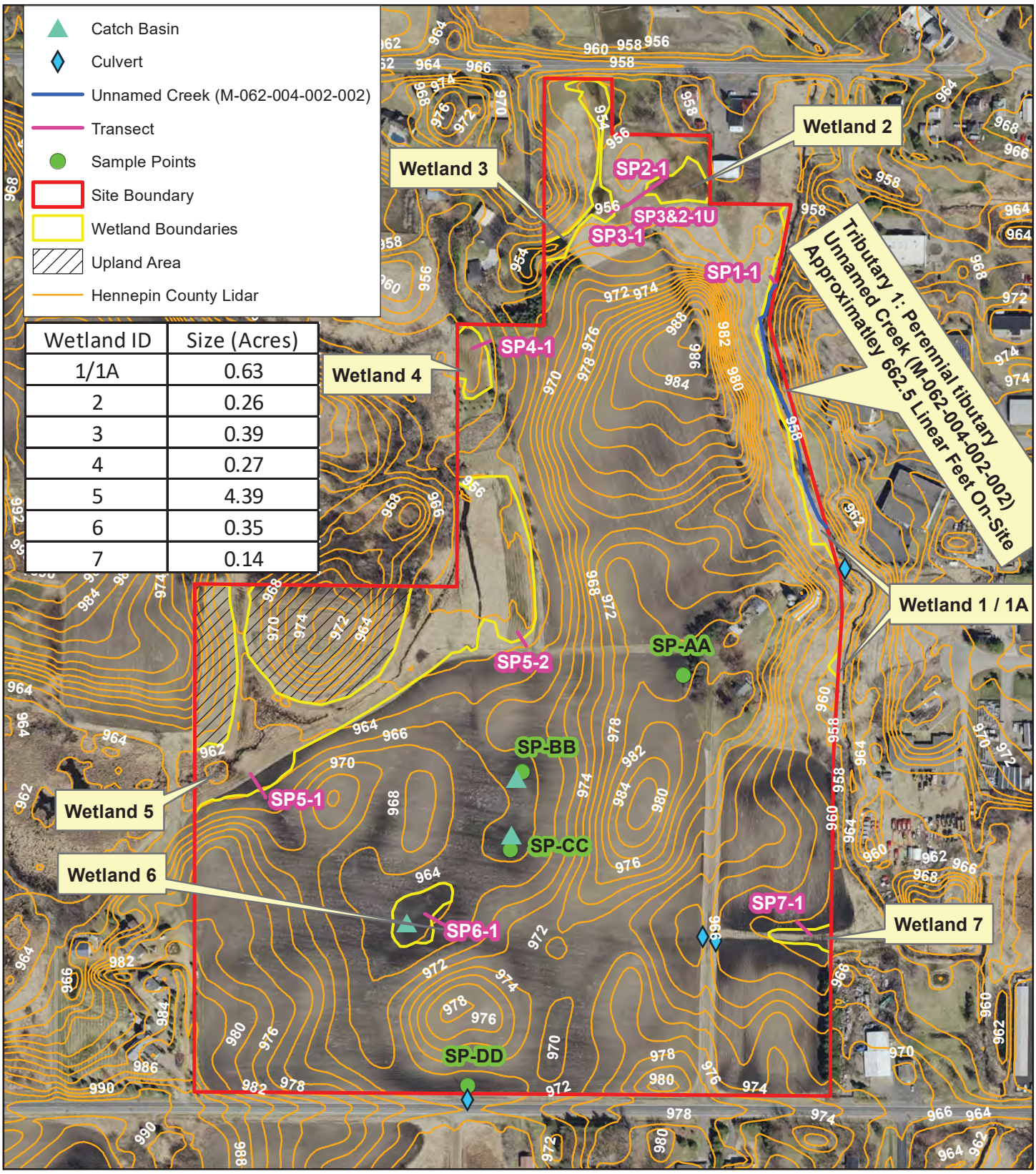


Figure 2 - Existing Conditions

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Figure 3 - National Wetlands Inventory

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons, USFWS

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

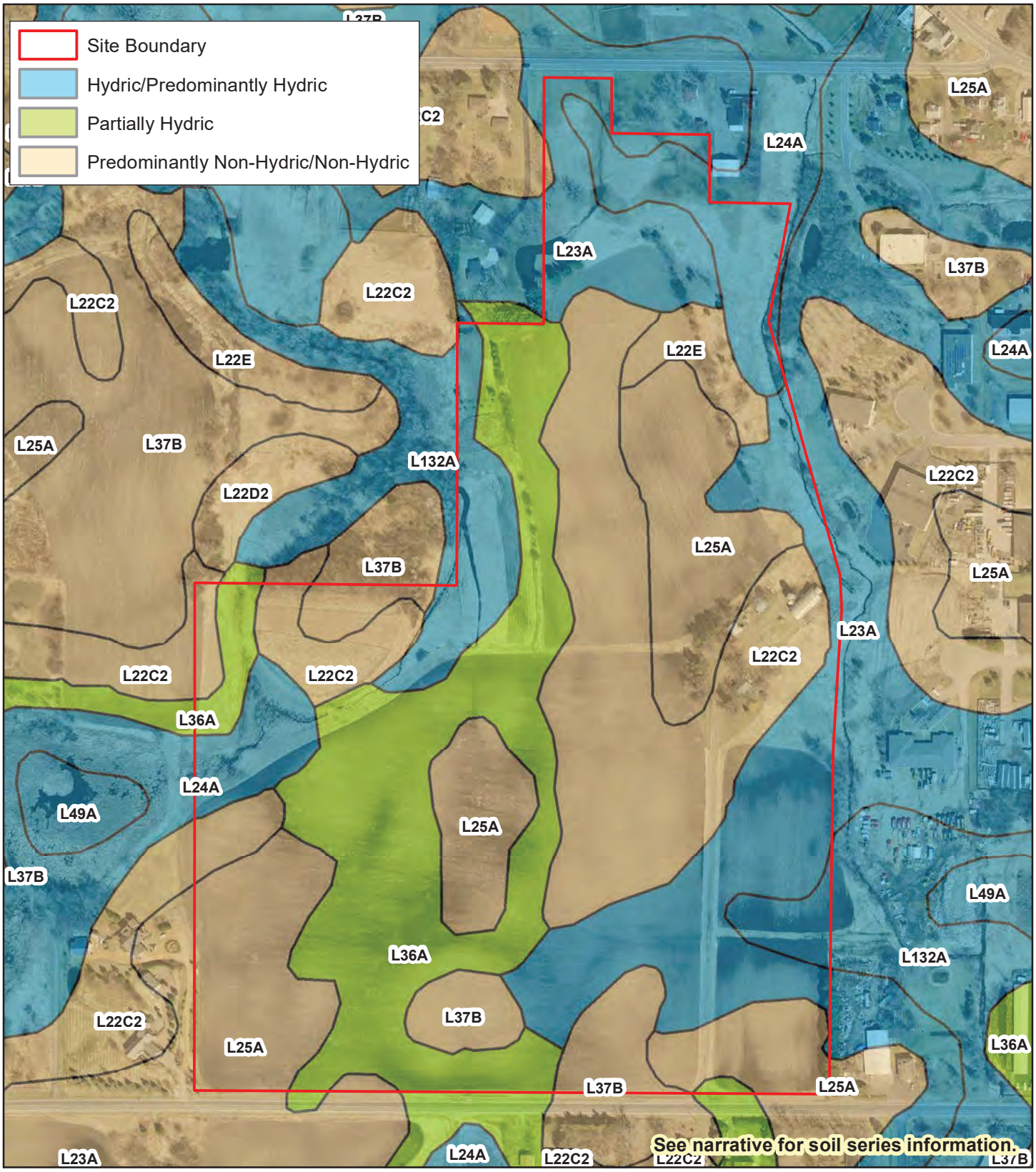


Figure 4 - Soil Survey

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons, USDA, NRCS

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Figure 5 - DNR Public Waters Inventory

N

0 1,000 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons, MN DNR

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

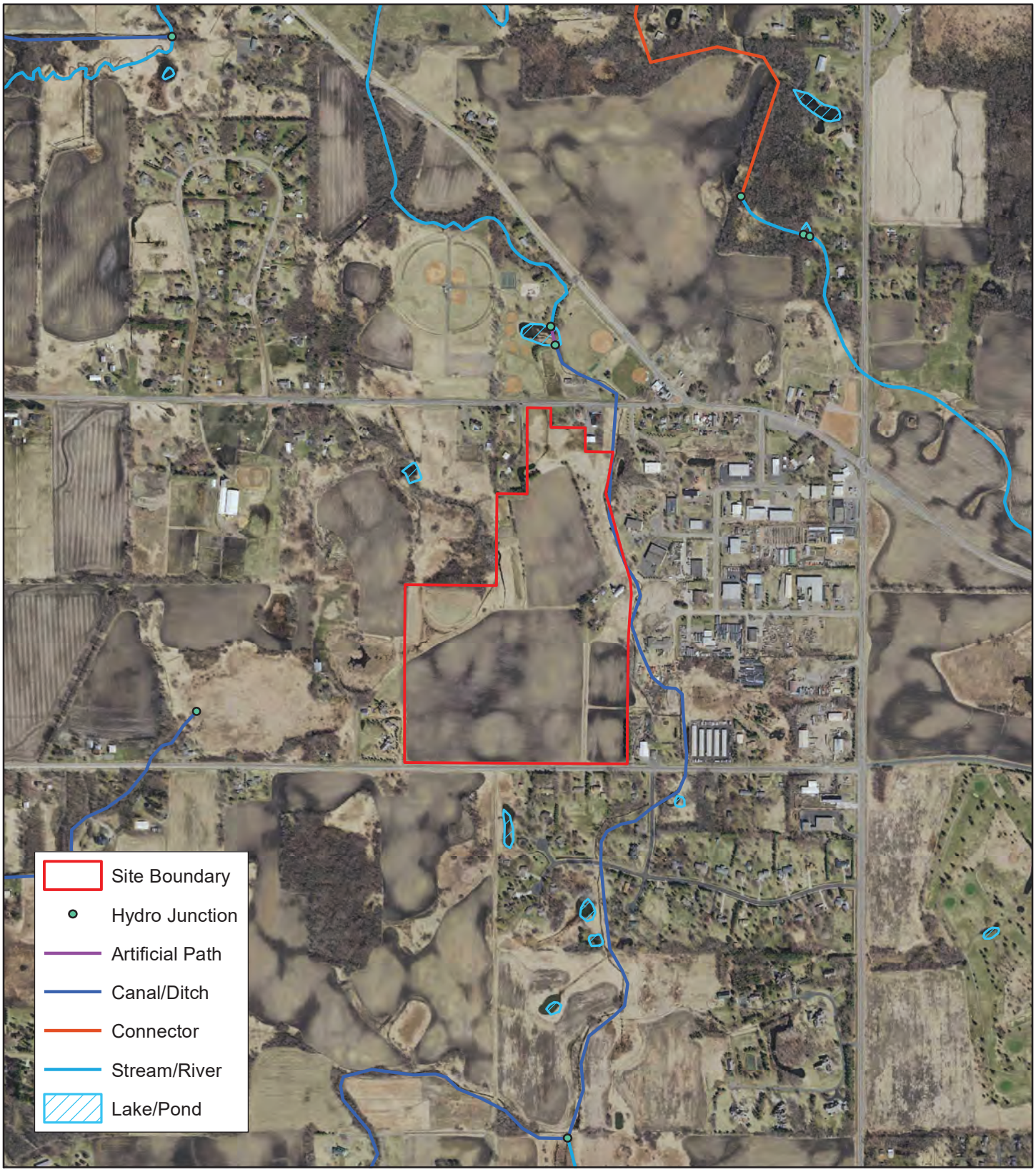


Figure 6 - National Hydrography Dataset

N

0 1,000 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons, USGS

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Figure 7 - Offsite Hydrology Assessment Areas : MN Geo, 2020 (Most Recent Wet Photo)

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Larkin Road Site

Wetland Delineation Report

APPENDIX A

Joint Application Form for Activities Affecting Water Resources in Minnesota

Joint Application Form for Activities Affecting Water Resources in Minnesota

This joint application form is the accepted means for initiating review of proposals that may affect a water resource (wetland, tributary, lake, etc.) in the State of Minnesota under state and federal regulatory programs. Applicants for Minnesota Department of Natural Resources (DNR) Public Waters permits **MUST** use the MPARS online permitting system for submitting applications to the DNR. Applicants can use the information entered into MPARS to substitute for completing parts of this joint application form (see the paragraph on MPARS at the end of the joint application form instructions for additional information). This form is only applicable to the water resource aspects of proposed projects under state and federal regulatory programs; other local applications and approvals may be required. Depending on the nature of the project and the location and type of water resources impacted, multiple authorizations may be required as different regulatory programs have different types of jurisdiction over different types of resources.

Regulatory Review Structure

Federal

The St. Paul District of the U.S. Army Corps of Engineers (Corps) is the federal agency that regulates discharges of dredged or fill material into waters of the United States (wetlands, tributaries, lakes, etc.) under Section 404 of the Clean Water Act (CWA) and regulates work in navigable waters under Section 10 of the Rivers and Harbors Act. Applications are assigned to Corps project managers who are responsible for implementing the Corps regulatory program within a particular geographic area.

State

There are three state regulatory programs that regulate activities affecting water resources. The Wetland Conservation Act (WCA) regulates most activities affecting wetlands. It is administered by local government units (LGUs) which can be counties, townships, cities, watershed districts, watershed management organizations or state agencies (on state-owned land). The Minnesota DNR Division of Ecological and Water Resources issues permits for work in specially-designated public waters via the Public Waters Work Permit Program (DNR Public Waters Permits). The Minnesota Pollution Control Agency (MPCA) under Section 401 of the Clean Water Act certifies that discharges of dredged or fill material authorized by a federal permit or license comply with state water quality standards. One or more of these regulatory programs may be applicable to any one project.

Required Information

Prior to submitting an application, applicants are **strongly encouraged** to seek input from the Corps Project Manager and LGU staff to identify regulatory issues and required application materials for their proposed project. Project proponents can request a pre-application consultation with the Corps and LGU to discuss their proposed project by providing the information required in Sections 1 through 5 of this joint application form to facilitate a meaningful discussion about their project. Many LGUs provide a venue (such as regularly scheduled technical evaluation panel meetings) for potential applicants to discuss their projects with multiple agencies prior to submitting an application. Contact information is provided below.

The following bullets outline the information generally required for several common types of determinations/authorizations.

- For delineation approvals and/or jurisdictional determinations, submit Parts 1, 2 and 5, and Attachment A.
- For activities involving CWA/WCA exemptions, WCA no-loss determinations, and activities not requiring mitigation, submit Parts 1 through 5, and Attachment B.
- For activities requiring compensatory mitigation/replacement plan, submit Parts 1 thru 5, and Attachments C and D.
- For local road authority activities that qualify for the state's local road wetland replacement program, submit Parts 1 through 5, and Attachments C, D (if applicable), and E to both the Corps and the LGU.

Submission Instructions

Send the completed joint application form and all required attachments to:

U.S Army Corps of Engineers. Applications may be sent directly to the appropriate Corps Office. For a current listing of areas of responsibilities and contact information, visit the St. Paul District's website at: http://www.mvp.usace.army.mil/Missions/Regulatory.aspx and select "Minnesota" from the contact Information box. Alternatively, applications may be sent directly to the St. Paul District Headquarters and the Corps will forward them to the appropriate field office.

Section 401 Water Quality Certification: Applicants do not need to submit the joint application form to the MPCA unless specifically requested. The MPCA will request a copy of the completed joint application form directly from an applicant when they determine an individual 401 water quality certification is required for a proposed project.

Wetland Conservation Act Local Government Unit: Send to the appropriate Local Government Unit. If necessary, contact your county Soil and Water Conservation District (SWCD) office or visit the Board of Water and Soil Resources (BWSR) web site (www.bwsr.state.mn.us) to determine the appropriate LGU.

DNR Public Waters Permitting: In 2014 the DNR will begin using the Minnesota DNR Permitting and Reporting System (MPARS) for submission of Public Waters permit applications (https://webapps11.dnr.state.mn.us/mpars/public/authentication/login). Applicants for Public Waters permits **MUST** use the MPARS online permitting system for submitting applications to the DNR. To avoid duplication and to streamline the application process among the various resource agencies, applicants can use the information entered into MPARS to substitute for completing parts of this joint application form. The MPARS print/save function will provide the applicant with a copy of the Public Waters permit application which, at a minimum, will satisfy Parts one and two of this joint application. For certain types of activities, the MPARS application may also provide all of the necessary information required under Parts three and four of the joint application. However, it is the responsibility of the Applicant to make sure that the joint application contains all of the required information, including identification of all aquatic resources impacted by the project (see Part four of the joint application). After confirming that the MPARS application contains all of the required information in Parts one and two the Applicant may attach a copy to the joint application and fill in any missing information in the remainder of the joint application.

PART ONE: Applicant Information

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

Applicant/Landowner Name: Jeff Minea/JMMK, LLC
Mailing Address: 18805 37th Ave. N. Plymouth, MN 55446
Phone: 612-701-7741
E-mail Address: jminea@lee-associates.com

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

Agent Name: Will Effertz, Kjolhaug Environmental Services
Mailing Address: 2500 Shadywood Road #130, Orono MN 55331
Phone: Cell : 952-290-6340
E-mail Address: Will@kjolhaugenv.com

PART TWO: Site Location Information

County: Hennepin **City/Township: Corcoran**
Parcel ID and/or Address: 20130 Larkin Road, #2611923130006
Legal Description (Section, Township, Range): S26 T119N R23W
Lat/Long (decimal degrees): ----------
Attach a map showing the location of the site in relation to local streets, roads, highways.
Approximate size of site (acres) or if a linear project, length (feet): 70 acres

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

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

PART THREE: General Project/Site Information

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

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

Currently agricultural production site and proposing an industrial development. Delineation was performed per the attached map and report. Needing confirmation of wetland boundaries and type for potential impacts per the attached site plan.

Project Name and/or Number:

PART FOUR: Aquatic Resource Impact[1] Summary

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

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

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

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

PART FIVE: Applicant Signature

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

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

Signature:  Date: September 30, 2021

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

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

Project Name and/or Number:

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

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

☒ **Wetland Type Confirmation**

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

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

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

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

Larkin Road Site

Wetland Delineation Report

APPENDIX B

Wetland Delineation Data Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP1-1U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Glencoe Consociation (Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology X significantly disturbed? Are "normal circumstances"
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area was located near ditch, therefore, hydrology is significantly disturbed but normal circumstances were present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Trifolium pratense*	40	Y	FACU
2 *Asclepias syriaca*	20	Y	FACU
3 *Phleum pratense*	20	Y	FACU
4 *Schizachyrium scoparium*	10	N	FACU
5 *Dactylis glomerata*	5	N	FACU
6			
7			
8			
9			
10			
	95	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 3 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95	x 4 =	380
UPL species	0	x 5 =	0
Column totals	95 (A)		380 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP1-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 24	10YR 2/1	100					Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- X Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

Assumed depleted under thick dark surface (A12)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP1-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Glencoe Consociation (Hydric) | NWI Classification: PEM1Cd
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology X significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland 1

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area was located near ditch, therefore, hydrology is significantly disturbed but normal circumstances were present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Acer negundo*	15	Y	FAC
2			
3			
4			
5			
	15	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Phalaris arundinacea*	80	Y	FACW
2 *Urtica dioica*	10	N	FACW
3			
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	105 (A)		225 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP1-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 24	10YR 2/1	95	10YR 4/6	5	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP2 & 3-1U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Glencoe Consociation (Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? N	**Is the sampled area within a wetland?** N
Hydric soil present? Y	f yes, optional wetland site ID:
Indicators of wetland hydrology present? N	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Trifolium pratense*	60	Y	FACU
2 *Phleum pratense*	15	N	FACU
3 *Asclepias syriaca*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	80	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	80	x 4 =	320
UPL species	0	x 5 =	0
Column totals	80 (A)		320 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP2 & 3-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 4	10YR 2/1	100					Clay Loam	
4 to 10	10YR 2/1	97	10YR 4/6	3	C	M	Clay Loam	
10 to 18	10YR 3/1	97	10YR 4/6	3	C	M	Clay Loam	
18 to 24	10YR 3/1	93	10YR 4/6	2	C	M	Clay Loam	
			10YR 4/1	5	D	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP2-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Glencoe Consociation (Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? Y	**Is the sampled area within a wetland?** Y
Hydric soil present? Y	If yes, optional wetland site ID: Wetland 2
Indicators of wetland hydrology present? Y	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Phalaris arundinacea*	60	Y	FACW
2 *Phleum pratense*	10	N	FACU
3 *Carex vulpinoidea*	10	N	FACW
4 *Trifolium pratense*	5	N	FACU
5			
6			
7			
8			
9			
10			
	85	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column totals	85 (A)		200 (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP2-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 24	10YR 2/1	90	10YR 4/6	10	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP3-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Glencoe Consociation (Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? Y	**Is the sampled area within a wetland?** Y
Hydric soil present? Y	f yes, optional wetland site ID: Wetland 3
Indicators of wetland hydrology present? Y	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Phalaris arundinacea*	60	Y	FACW
2 *Phleum pratense*	25	Y	FACU
3 *Carex vulpinoidea*	15	N	FACW
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column totals	100 (A)		250 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP3-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 12	10YR 2/1	95	10YR 4/6	5	C	M	Clay Loam	
12 to 20	10YR 2/1	94	10YR 4/6	3	C	M	Clay Loam	
			10YR 4/1	3	C	M	Clay Loam	
20 to 24	10YR 4/1	97	10YR 4/6	3	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP4-1U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel, overwash-Hamel complex (Partially Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Poa Pratensis*	50	Y	FAC
2 *Trifolium repens*	25	Y	FACU
3 *Phalaris arundinacea*	20	N	FACW
4 *Asclepias syriaca*	20	N	FACU
5			
6			
7			
8			
9			
10			
	115	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	50	x 3 =	150
FACU species	45	x 4 =	180
UPL species	0	x 5 =	0
Column totals	115 (A)		370 (B)

Prevalence Index = B/A = 3.22

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP4-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 10	10YR 2/2	100					Loam	
10 to 16	10YR 2/2	98	10YR 4/6	2	C	M	Loam	
16 to 24	10YR 3/1	94	10YR 4/6	2	C	M	Loam	
			10YR 4/1	2	D	M	Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP4-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel - Glencoe Complex (Predominantly-Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland 4

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Phalaris arundinacea*	60	Y	FACW
2 *Phleum pratense*	20	N	FACU
3 *Carex stipata*	20	N	OBL
4 *Erigeron annuus*	5	N	FACU
5			
6			
7			
8			
9			
10			
	105	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	20	x 1 =	20
FACW species	60	x 2 =	120
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column totals	105 (A)		240 (B)

Prevalence Index = B/A = 2.29

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP4-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 16	10YR 2/1	95	10YR 4/6	5	C	M	Clay Loam	
16 - 24	10YR 3/1	90	10YR 4/6	10	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP5-1U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Lester Consociation (Predominatly Non-Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil X, or hydrology ____ significantly disturbed? Are "normal circumstances" present? No
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? N	**Is the sampled area within a wetland?** N
Hydric soil present? N	f yes, optional wetland site ID:
Indicators of wetland hydrology present? N	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soybean farm field, therefore, soil and vegetation are significantly disturbed and normal circumstances are not present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	90	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column totals	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Sample point located in area dominated with healthy soybean crop

SOIL

Sampling Point: SP5-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 22	10YR 3/1	100					Loam	
22 to 24	10YR 5/2	98	10YR 4/6	2	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP5-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Glencoe Consociation (Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland 5

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Carex stipata*	60	Y	OBL
2 *Phalaris arundinacea*	15	N	FACW
3 *Setaria pumila*	10	N	FAC
4			
5			
6			
7			
8			
9			
10			
	85	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	60	x 1 =	60
FACW species	15	x 2 =	30
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	85 (A)		120 (B)

Prevalence Index = B/A = 1.41

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP5-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 16	10YR 2/1	90	10YR 4/6	10	C	M	Clay Loam	
16 - 22	10YR 2/1	90	10YR 4/6	10	C	M	Clay Loam	
22 - 25	10YR 3/1	97	10YR 4/6	3	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 25 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP5-2U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel, overwash-Hamel complex (Partially Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Poa Pratensis*	40	Y	FAC
2 *Phleum pratense*	30	Y	FACU
3 *Taraxacum officinale*	15	N	FACU
4 *Trifolium pratense*	15	N	FACU
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column totals	100 (A)		360 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP5-2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 22	10YR 2/1	100					Loam	
22 to 24	10YR 3/1	98	10YR 4/6	2	C	M	Loam	
24 to 26	10YR 4/1	97	10YR 4/6	3	C	M	Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 26 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP5-2W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel, overwash-Hamel Complex (Partially Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? Y	**Is the sampled area within a wetland?** Y
Hydric soil present? Y	If yes, optional wetland site ID: Wetland 5
Indicators of wetland hydrology present? Y	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Carex stipata*	40	Y	OBL
2 *Phleum pratense*	15	Y	FACU
3 *Scirpus atrovirens*	15	Y	OBL
4 *Phalaris arundinacea*	15	Y	FACW
5 *Solidago gigantea*	5	N	FACW
6 *Trifolium pratense*	5	N	FACU
7			
8			
9			
10			
	95	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 75.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	55	x 1 =	55
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column totals	95 (A)		175 (B)

Prevalence Index = B/A = 1.84

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP5-2W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 10	10YR 2/1	97	10YR 4/6	3	C	M	Clay Loam	
10 - 22	10YR 2/1	98	10YR 4/6	2	C	M	Clay Loam	
22 - 24	10YR 3/1	98	10YR 4/6	2	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP6-1U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel, overwash-hamel (Partially Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil X, or hydrology ____ significantly disturbed? Are "normal circumstances" present? No
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soy bean farmfield, therefore, soil and vegetation is significantly disturbed and normal circumstances are not present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	90	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column totals	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Sample point located within area dominated with healthy soybean crop.

SOIL

Sampling Point: SP6-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 10	10YR 2/1	100					Loam	
10 to 24	10YR 3/1	98	10YR 4/6	2	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP6-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave
Slope (%): 0 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel, overwash-hamel (Partially Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland 6

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soy bean farmfield, therefore, soil and vegetation is significantly disturbed and normal circumstances are not present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	10	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	10	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column totals	10 (A)		50 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Sample point located within area with drowned out soybean crop, vegetation is assumed based on hydrology indicators.

SOIL

Sampling Point: SP6-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 10	10YR 2/1	98	10YR 4/6	2	C	M	Clay Loam	
10 - 16	10YR 3/1	97	10YR 4/6	3	C	M	Clay Loam	
16 to 24	10YR 4/1	90	10YR 4/6	10	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches. Area was effectively drained with catch basin present, therefore, Geomorphic Positon was not applicable. Coincided with Area H during offsite aerial review and showed 67% wet signatures during normal photos.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP7-1U
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel - Glencoe Complex (Predominantly Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil X, or hydrology ____ significantly disturbed? Are "normal circumstances"
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soy bean farmfield, therefore, soil and vegetation is significantly disturbed and normal circumstances are not present

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	90	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column totals	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Sample point located within area dominated by healthy soybean crop

SOIL

Sampling Point: SP7-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 24	10YR 2/1	100					Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

Assume depleted below thick dark surface (A12)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP7-1W
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Depression/Swale | Local relief (concave, convex, none): Concave
Slope (%): 1 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel - Glencoe Complex (Predominantly Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	Wetland 7

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Phalaris arundinacea*	65	Y	FACW
2 *Persicaria pensylvanica*	15	N	FACW
3 *Phleum pratense*	15	N	FACU
4 *Setaria pumila*	5	N	FAC
5			
6			
7			
8			
9			
10			
	100	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	5	x 3 =	15
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column totals	100 (A)		235 (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP7-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 - 8	10YR 2/1	95	10YR 4/6	5	C	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- X Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Within close proximity to gasline

Depth (inches): 8 inches

Hydric soil present? Y

Remarks:

Assumed depleted below thick dark surface (A12)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 8 inches. Coincided with Area I during offsite aerial review and showed 67% wet signatures during normal photos.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP-AA
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Le Sueur Consociation (Predominatly Non-Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil X, or hydrology ____ significantly disturbed? Are "normal circumstances" present? No
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? N	**Is the sampled area within a wetland?** N
Hydric soil present? Y	f yes, optional wetland site ID:
Indicators of wetland hydrology present? N	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soy bean farmfield, therefore, soil and vegetation is significantly disturbed and normal circumstances are not present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	90	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	90 = Total Cover		
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column totals	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Sample point located within area dominated by healthy soybean crop

SOIL

Sampling Point: SP-AA

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 6	10YR 2/1	100					Loam	
6 to 10	10YR 2/1	85	10YR 5/1	15	D	M	Clay Loam	
10 to 16	10YR 3/1	85	10YR 5/1	15	D	M	Clay Loam	
16 to 24	10YR 4/1	90	10YR 5/1	10	D	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches. Coincided with Area C during offsite aerial review and showed 33% wet signatures during normal photos.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP-BB
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Lester Consociation (Predominatly Non-Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil X, or hydrology ____ significantly disturbed? Are "normal circumstances" present? No
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N
Hydric soil present?	Y
Indicators of wetland hydrology present?	N

Is the sampled area within a wetland? N
If yes, optional wetland site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soybean farm field, therefore, soil and vegetation are significantly disturbed and normal circumstances are not present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	90	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column totals	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Sample point located within area dominated by healthy soybean crop.

SOIL

Sampling Point: SP-BB

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 8	10YR 2/1	97	10YR 4/6	3	C	M	Loam	
8 to 24	10YR 2/1	94	10YR 4/6	3	D	M	Clay Loam	
			10YR 5/1	3	D	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches. Area was effectively drained with catch basin present, therefore, Geomorphic Positon was not applicable. Coincided with Area D during offsite aerial review and showed 50% wet signatures during normal photos.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP-CC
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Lester Consociation (Predominatly Non-Hydric) | NWI Classification: None
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil X, or hydrology ____ significantly disturbed? Are "normal circumstances"
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? No

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	NA		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area located within tilled soy bean farmfield, therefore, soil and vegetation is significantly disturbed and normal circumstances are not present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5 ft Radius)			
1 *Glycine max*	90	Y	UPL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column totals	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? NA

Remarks: (Include photo numbers here or on a separate sheet)

Sample point located within area dominated by healthy soybean

SOIL

Sampling Point: SP-CC

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 8	10YR 2/1	100					Loam	
8 to 20	10YR 2/1	97	10YR 4/6	3	C	M	Clay Loam	
20 to 24	10YR 3/1	85	10YR 4/6	5	C	M	Clay Loam	
			10YR 5/1	10	D	M	Clay Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 24 inches. Area was effectively drained with catch basin present, therefore, Geomorphic Positon was not applicable. Coincided with Area D during offsite aerial review and showed 50% wet signatures during normal photos.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Larkin Road Site | City/County: Corcoran | Sampling Date: 08/19/2021
Applicant/Owner: See Joint Application Form | State: MN | Sampling Point: SP-DD
Investigator(s): Will Effertz | Section, Township, Range: S: 26 T:119N R:23W
Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Linear
Slope (%): 2 to 3 | Lat: ---------- | Long: ---------- | Datum: ----------
Soil Map Unit Name: Hamel, overwash-Hamel (Partially Hydric) | NWI Classification: PEM1Af
Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
Are vegetation X, soil ____, or hydrology X significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

30-day precipitation rolling average drier than normal range. Typical based on precipitation gridded database. Sample area was mowed and close to nearby culvert, therefore, vegetation and hydrology was significantly disturbed but normal circumstances were present.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30 ft Radius)	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15 ft Radius)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5 ft Radius)			
1 *Phalaris arundinacea*	60	Y	FACW
2 *Poa pratensis*	20	Y	FAC
3 *Urtica dioica*	10	N	FACW
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	
Woody vine stratum (Plot size: 30 ft Radius)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	90 (A)		200 (B)

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: SP-DD

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0 to 5	10YR 2/1	85	10YR 4/6	15	C	M	Loam	Gravel inclusions

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L)**
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Compacted Gravel

Depth (inches): 5 inches

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No free water or saturation was observed to a depth of 5 inches. Area was effectively drained with culvert present downslope, therefore, Geomorphic Positon was not applicable. Coincided with Area L during offsite aerial review and showed 17% wet signatures during normal photos.

Larkin Road Site

Wetland Delineation Report

APPENDIX C

Precipitation Information

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Hennepin** township number: **119N**
township name: **Corcoran** range number: **23W**
nearest community: **Corcoran** section number: **26**

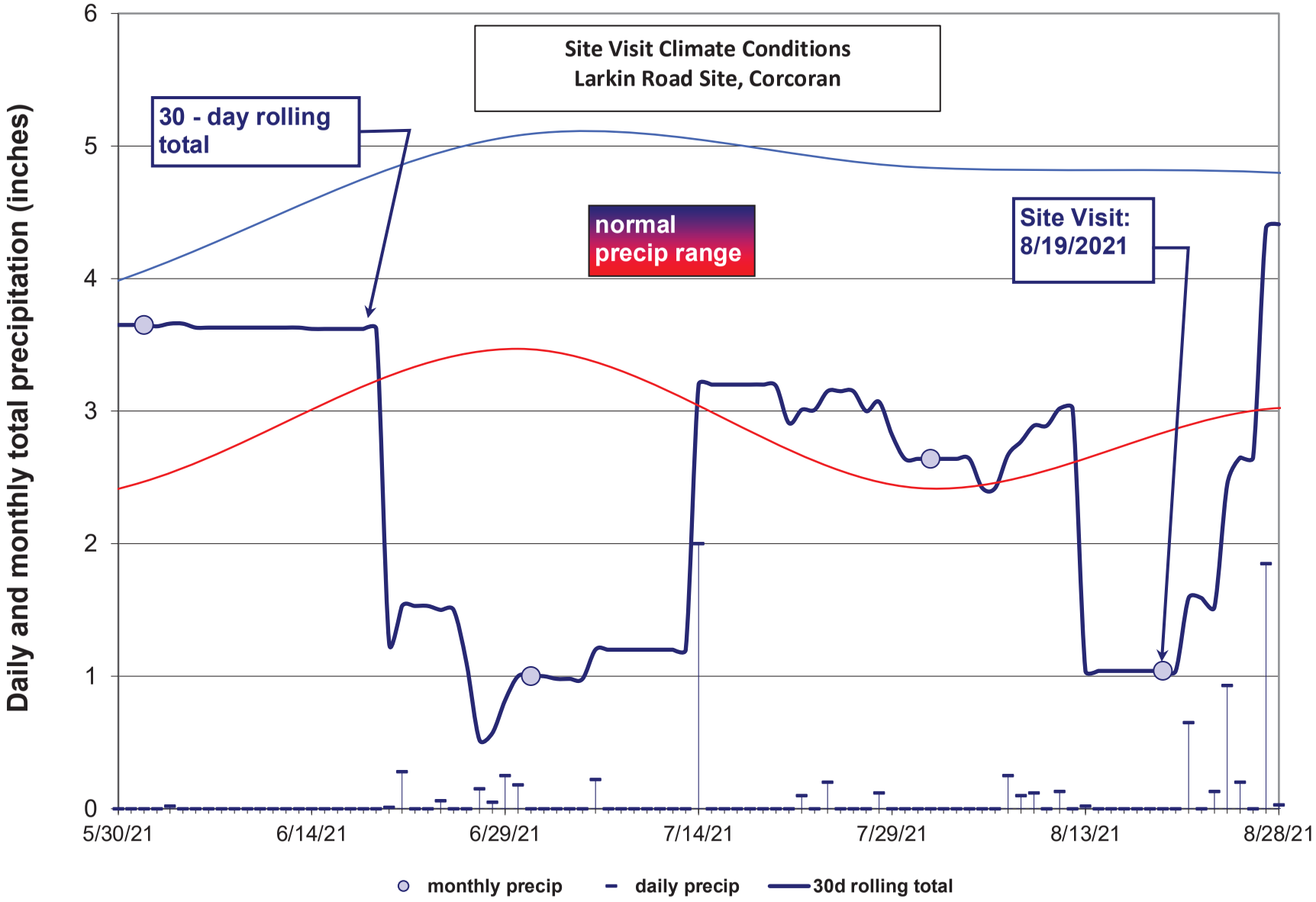
Aerial photograph or site visit date:
Thursday, August 19, 2021

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **July 2021**	second prior month: **June 2021**	third prior month: **May 2021**
estimated precipitation total for this location:	**2.66R**	**1.22R**	**3.30R**
there is a 30% chance this location will have less than:	2.42	3.47	2.44
there is a 30% chance this location will have more than:	4.84	5.08	4.02
type of month: dry normal wet	**normal**	**dry**	**normal**
monthly score	**3 * 2 = 6**	**2 * 1 = 2**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**10 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)


Site Visit Climate Conditions
Larkin Road Site, Corcoran
30 - day rolling total
normal precip range
Site Visit: 8/19/2021
Daily and monthly total precipitation (inches)
6
5
4
3
2
1
0
5/30/21
6/14/21
6/29/21
7/14/21
7/29/21
8/13/21
8/28/21
monthly precip
daily precip
30d rolling total

Larkin Road Site

Wetland Delineation Report

APPENDIX D

Aerial Review for
Offsite Hydrology Assessment

Corcoran, MN: Precipitation Summary
Source: Minnesota Climatology Working Group

Monthly Totals: 2021 (latitude: 45.08758 longitude: 93.55352)
Target: T119 R23 S26

mon	year	cc	tttN	rrW	ss	nnnn	oooooooo	pre (inches)
Jan	2021	27	119N	22W	1	SWCD		.87
Feb	2021	27	119N	22W	1	SWCD		.59
Mar	2021	27	119N	22W	1	SWCD		2.84
Apr	2021	27	119N	22W	31	BYRG		2.38
May	2021	27	119N	22W	31	BYRG		3.65
Jun	2021	27	119N	22W	31	BYRG		1.00
Jul	2021	27	119N	22W	1	SWCD		2.64
Aug	2021	27	119N	22W	31	BYRG		5.16
Sep	2021	27	119N	22W	1	SWCD		3.20

June/July/August Daily Records

Date	Precip.
Jun 1, 2021	0
Jun 2, 2021	0
Jun 3, 2021	.02
Jun 4, 2021	0
Jun 5, 2021	0
Jun 6, 2021	0
Jun 7, 2021	0
Jun 8, 2021	0
Jun 9, 2021	m
Jun 10, 2021	m
Jun 11, 2021	0
Jun 12, 2021	0
Jun 13, 2021	0
Jun 14, 2021	0
Jun 15, 2021	0
Jun 16, 2021	0
Jun 17, 2021	0
Jun 18, 2021	0
Jun 19, 2021	0
Jun 20, 2021	.01
Jun 21, 2021	.28
Jun 22, 2021	0
Jun 23, 2021	0
Jun 24, 2021	.06
Jun 25, 2021	0
Jun 26, 2021	0
Jun 27, 2021	.15
Jun 28, 2021	.05
Jun 29, 2021	.25
Jun 30, 2021	.18

Date	Precip.
Jul 1, 2021	0
Jul 2, 2021	0
Jul 3, 2021	0
Jul 4, 2021	0
Jul 5, 2021	0
Jul 6, 2021	.22
Jul 7, 2021	0
Jul 8, 2021	0
Jul 9, 2021	0
Jul 10, 2021	0
Jul 11, 2021	0
Jul 12, 2021	0
Jul 13, 2021	0
Jul 14, 2021	2.00
Jul 15, 2021	0
Jul 16, 2021	0
Jul 17, 2021	0
Jul 18, 2021	0
Jul 19, 2021	0
Jul 20, 2021	0
Jul 21, 2021	0
Jul 22, 2021	.10
Jul 23, 2021	0
Jul 24, 2021	.20
Jul 25, 2021	0
Jul 26, 2021	0
Jul 27, 2021	0
Jul 28, 2021	.12
Jul 29, 2021	0
Jul 30, 2021	0
Jul 31, 2021	0

Date	Precip.	
Aug 1, 2021	0	
Aug 2, 2021	0	
Aug 3, 2021	0	
Aug 4, 2021	0	
Aug 5, 2021	0	
Aug 6, 2021	0	
Aug 7, 2021	.25	
Aug 8, 2021	.10	
Aug 9, 2021	.12	
Aug 10, 2021	0	
Aug 11, 2021	.13	
Aug 12, 2021	0	
Aug 13, 2021	.02	
Aug 14, 2021	0	
Aug 15, 2021	0	
Aug 16, 2021	0	
Aug 17, 2021	0	
Aug 18, 2021	0	
Aug 19, 2021	0	Site Visit
Aug 20, 2021	0	
Aug 21, 2021	.65	
Aug 22, 2021	0	
Aug 23, 2021	.13	
Aug 24, 2021	.93	
Aug 25, 2021	.20	
Aug 26, 2021	0	
Aug 27, 2021	1.85	
Aug 28, 2021	.03	
Aug 29, 2021	.75	
Aug 30, 2021	T	

1981-2010 Summary Statistics															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.42	0.40	1.16	1.85	2.44	3.47	2.42	3.02	1.88	1.27	1.01	0.57	16.13	25.88	25.96
70%	0.81	0.87	1.94	2.93	4.02	5.08	4.84	4.78	4.40	3.09	2.05	1.41	20.85	31.49	32.06
mean	0.71	0.67	1.62	2.61	3.32	4.32	3.86	4.04	3.34	2.41	1.58	1.06	18.88	29.54	29.36

Exhibit 1 Field data sheet reference (if applicable):_____

Wetland Hydrology from Aerial Imagery – Recording Form

Project Name: Larkin Road Site **Date:** 8/19/2021 **County:** Hennepin County

Investigator: W. Effertz **Legal Description (T, R, S):** S26 T119N R23W

Summary Table

Date Image Taken (M-D-Y)	Image Source	Climate Condition (wet, dry, normal)[1]	Image Interpretation(s)								
			Area: A	Area: B	Area: C	Area: D	Area: E	Area: F	Area: G	Area: H	Area: I
5/11/2020	Google Earth	Normal	NSS	NSS	NSS	SS*	SS*	SS*	NSS	SS*	SS*
7/1/2019	FSA	Normal	NV	NV	DO*	DO*	NV	NV	NSS	DO*	NSS
5/1/2018	Mn Geo	Normal	NSS	NSS	NSS	SS*	SS*	NSS	NSS	NSS	SS*
4/1/2012	Mn Geo	Normal	NSS	NSS	NSS	NSS	SS*	NSS	NSS	SS*	WS*
9/12/2010	FSA	Normal	NV	AP*	AP*	NV	WS*	NV	NSS	SS*	SS*
6/6/2006	Google Earth	Normal	NSS	NSS	NSS	NSS	SS*	NSS	SS*	NSS	NSS
Normal Climate Condition			**Area: A**	**Area: B**	**Area: C**	**Area: D**	**Area: E**	**Area: F**	**Area: G**	**Area: H**	**Area: I**
Number of normal years			6	6	6	6	6	6	6	6	6
Number with wet signatures			0	1	2	3	5	1	1	4	4
Percent with wet signatures			0%	17%	33%	50%	83%	17%	17%	67%	67%

Date Image Taken (M-D-Y)	Image Source	Climate Condition (wet, dry, normal)[1]	Image Interpretation(s)							
			Area: J	Area: K	Area: L					
5/11/2020	Google Earth	Normal	NSS	NSS	NSS					
7/1/2019	FSA	Normal	NSS	NV	DO*					
5/1/2018	Mn Geo	Normal	NSS	NSS	NSS					
4/1/2012	Mn Geo	Normal	NSS	NSS	NSS					
9/12/2010	FSA	Normal	DO*	NV	NV					
6/6/2006	Google Earth	Normal	NSS	SS*	NSS					
Normal Climate Condition			**Area: J**	**Area: K**	**Area: L**					
Number of normal years			6	6	6					
Number with wet signatures			1	1	1					
Percent with wet signatures			17%	17%	17%					

KEY		
WS - wetland signature	SS - soil wetness signature	CS - crop stress
NC - not cropped	AP - altered pattern	NV - normal vegetative cover
DO - drowned out	SW - standing water	NSS – no soil wetness signature
Other labels or comments:		

- Use above key to label image interpretations. It is imperative that the reviewer read and understand the guidance associated with the use of these labels. If alternate labels are used, indicate in box above.
- If less than five (5) images taken during normal climate conditions are available, use an equal number of images taken during wet and dry climate conditions and use as many images as you have available. Describe the results using this methodology in your report.

[i] Use MN State Climatology website to determine climate condition when image was taken.

Exhibit 1 Field data sheet reference (if applicable):_____

Wetland Determination from Aerial Imagery – Recording Form

Project Name: Larkin Road Site **Date:** 8/19/2021 **County:** Hennepin County

Investigator: W. Effertz **Legal Description (T, R, S):** S26 T119N R23W

Use the Decision Matrix below to complete Table 1.

Hydric Soils present[1]	Identified on NWI or other wetland map[2]	Percent with wet signatures from Exhibit 1	Field verification required[3]	Wetland?
Yes	Yes	>50%	No	Yes
Yes	Yes	30-50%	No	Yes
Yes	Yes	<30%	Yes	Yes, if other hydrology indicators present
Yes	No	>50%	No	Yes
Yes	No	30-50%	Yes	Yes, if other hydrology indicators present
Yes	No	<30%	No	No
No	Yes	>50%	No	Yes
No	Yes	30-50%	No	Yes
No	Yes	<30%	No	No
No	No	>50%	Yes	Yes, if other hydrology indicators present
No	No	30-50%	Yes	Yes, if other hydrology indicators present
No	No	<30%	No	No

[1] The presence of hydric soils can be determined from the "Hydric Rating by Map Unit Feature" under "Land Classifications" from the Web Soil Survey. "Not Hydric" is the only category considered to not have hydric soils. Field sampling for the presence/absence of hydric soil indicators can be used in lieu of the hydric rating if appropriately documented by providing completed field data sheets.
[2] At minimum, the most updated NWI data available for the area must be reviewed for this step. Any and all other local or regional wetland maps that are publicly available should be reviewed.
[3] Area should be reviewed in the field for the presence/absence of wetland hydrology indicators per the applicable 87 Manual Regional Supplement, including the D2 indicator (geomorphic position).

Table 1.

Area	Hydric Soils Present	Identified on NWI or other wetland map	Percent with wet signatures from Exhibit 1	Other hydrology indicators present[1]	Wetland?
A	NO	NO	0	N/A	NO
B	NO	NO	17	N/A	NO
C	NO	NO	33	NO	NO
D	YES	NO	50	NO	NO
E	YES	NO	83	YES	Wetland 5
F	YES	NO	17	N/A	NO
G	YES	NO	17	N/A	NO
H	YES	NO	67	YES	Wetland 6
I	YES	NO	67	YES	Wetland 7
J	YES	NO	17	N/A	NO
K	YES	NO	17	N/A	NO
L	YES	YES	17	NO	NO

[1] Answer "N/A" if field verification is not required and was not conducted.

Offsite Hydrology Assessment Areas : Google Earth - June, 2006 (Normal Year)

N

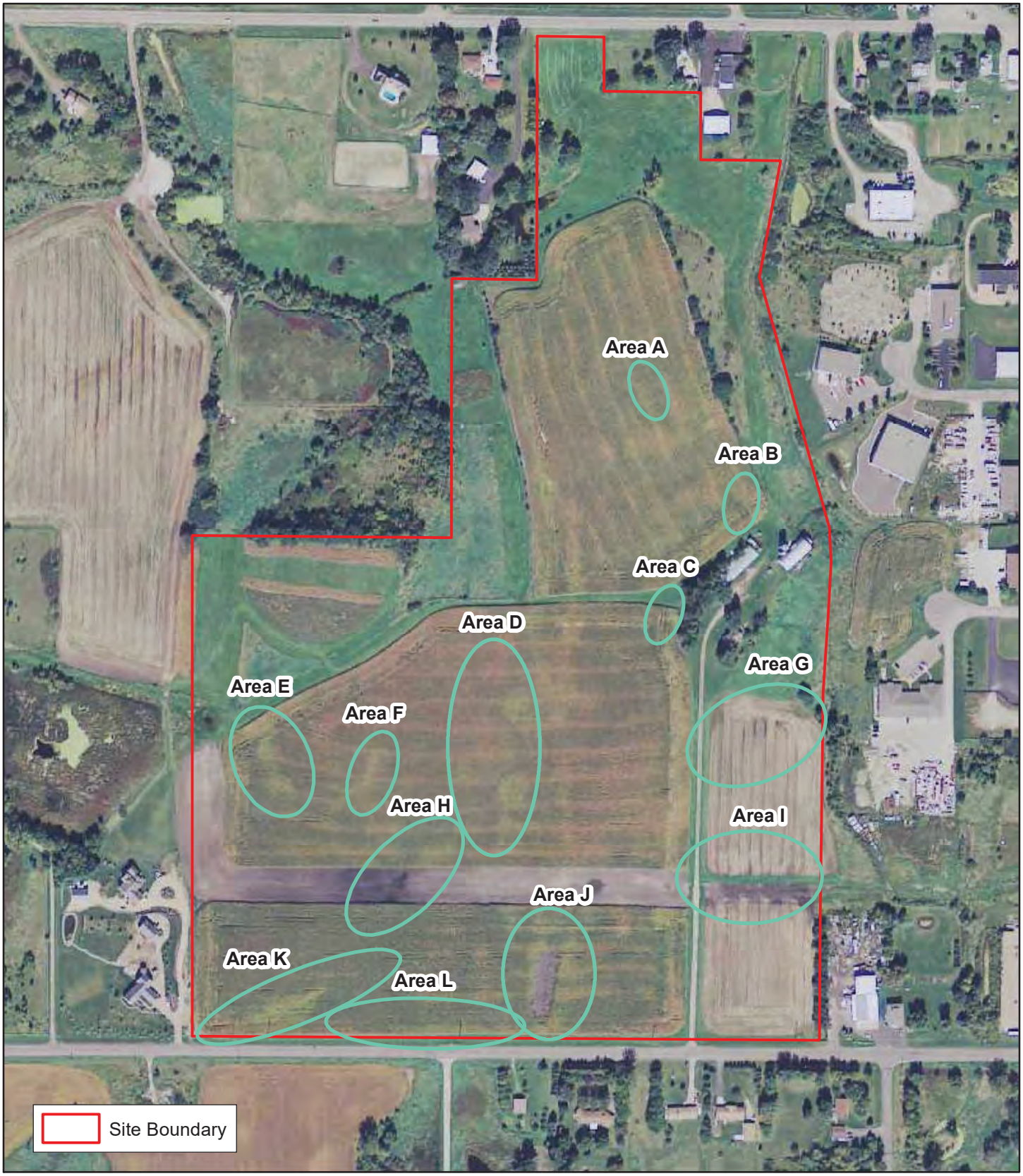
0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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



Offsite Hydrology Assessment Areas : FSA - September, 2010 (Normal Year)

N

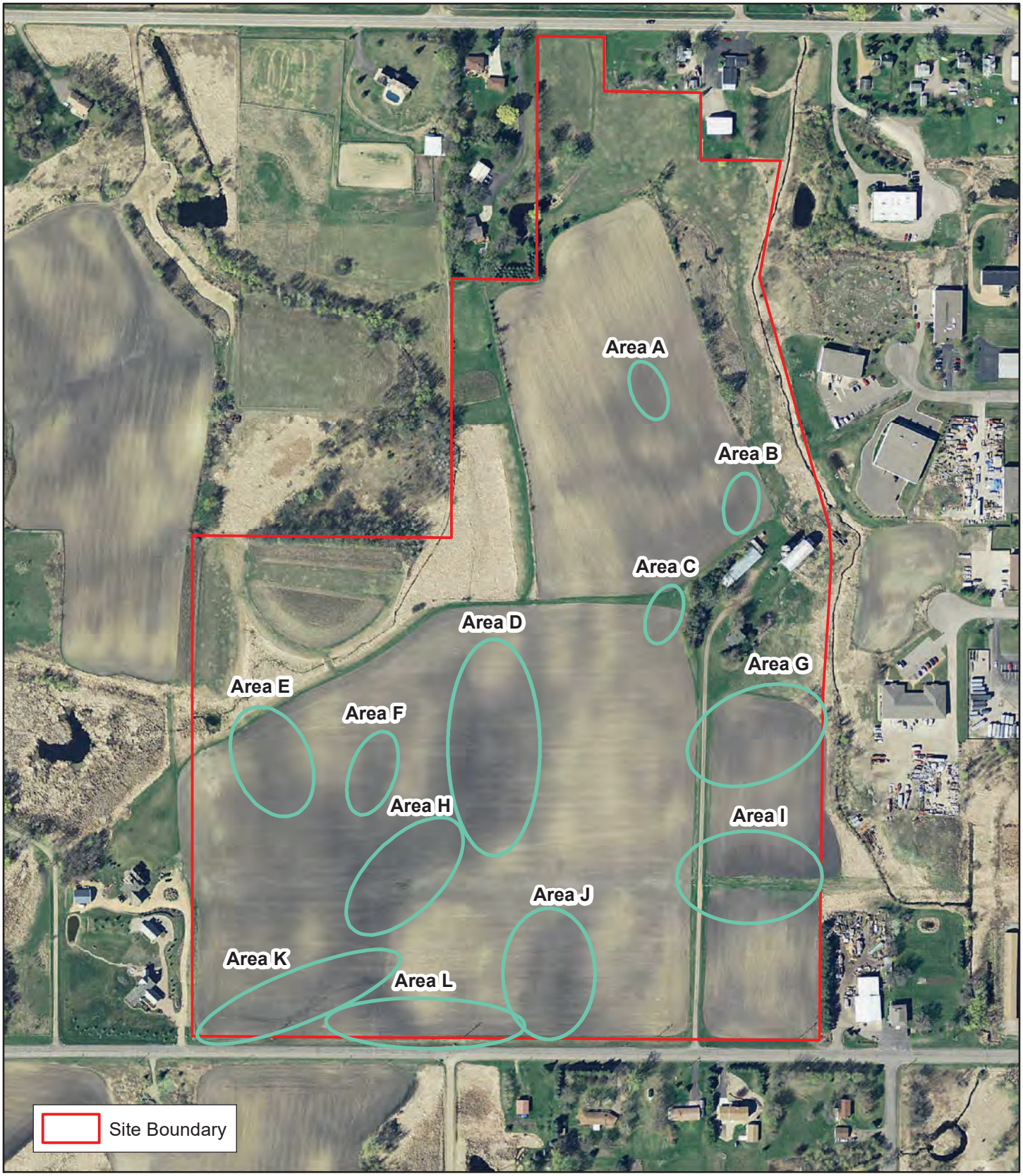
0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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



Offsite Hydrology Assessment Areas : Mn Geo - April, 2012 (Normal Year)

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Offsite Hydrology Assessment Areas : Mn Geo - May, 2018 (Normal Year)

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Offsite Hydrology Assessment Areas : FSA - July, 2019 (Normal Year)

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

Offsite Hydrology Assessment Areas : Google Earth - May, 2020 (Normal Year)

N

0 350 Feet

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

Larkin Road Site (KES 2021-166)
Corcoran, Minnesota

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

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit: City of Corcoran	**County:** Hennepin
Applicant Name: Jeff Minea – LMMK, LLC	**Applicant Representative:** N/A
Project Name: 20130 Larkin Road	**LGU Project No. (if any):**
Date Complete Application Received by LGU: 10/25/2021	
Date of LGU Decision: 11/17/2021	
Date this Notice was Sent: 11/30/2021	

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: NA ☐ Bank Credits: NA
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
List Conditions:

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 decision[1].

☐ Attachment(s) (specify):
☒ Summary: Will Effertz of Kjolhaug submitted a completed wetland boundary/type application on behalf of Jeff Minea on October 25, 2021. The site was reviewed by Lucas Mueller (LGU), Paul Stewart (Hennepin County), and Will Effertz (Kjolhaug) on October 22, 2021. The TEP generally agreed with the wetland boundaries and types depicted in the Kjolhaug report but requested three changes after observing Wetlands 4 and 5 in the field.

- Reduction of Wetland 4 to better fit the topography on the site
- Extension of northern portion of Wetland 5 to better fit topography
- Addition of ditch feature within Wetland 5

Kjolhaug made the changes based on the TEPs recommendations and submitted a revised Existing Conditions figure on October 26, 2021. The LGU approves the updated Wetland Boundary/Type Application as submitted by Kjolhaug on 10/26/2021.

[1] *Findings must consider any TEP recommendations.*

Attached Project Documents

☐ Site Location Map ☒ Project Plan(s)/Descriptions/Reports (specify): No Loss Application

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?

☐ Yes[1] ☒ No

[1]*If 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)

Notice Distribution (include name)

Required on all notices:

☒ SWCD TEP Member: Stacey Lijewski , Hennepin SWCD	☒ BWSR TEP Member: Ben Carlson
☒ LGU TEP Member (if different than LGU contact): Kevin Mattson – City of Corcoran	
☒ DNR Representative: Wes Saunders-Pearce	
☒ Watershed District or Watershed Mgmt. Org.: Elm Creek Watershed District	
☒ Applicant: Jeff Minea	☒ Agent/Consultant: Will Effertz-Kjolhaug

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:** 11/30/2021

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.

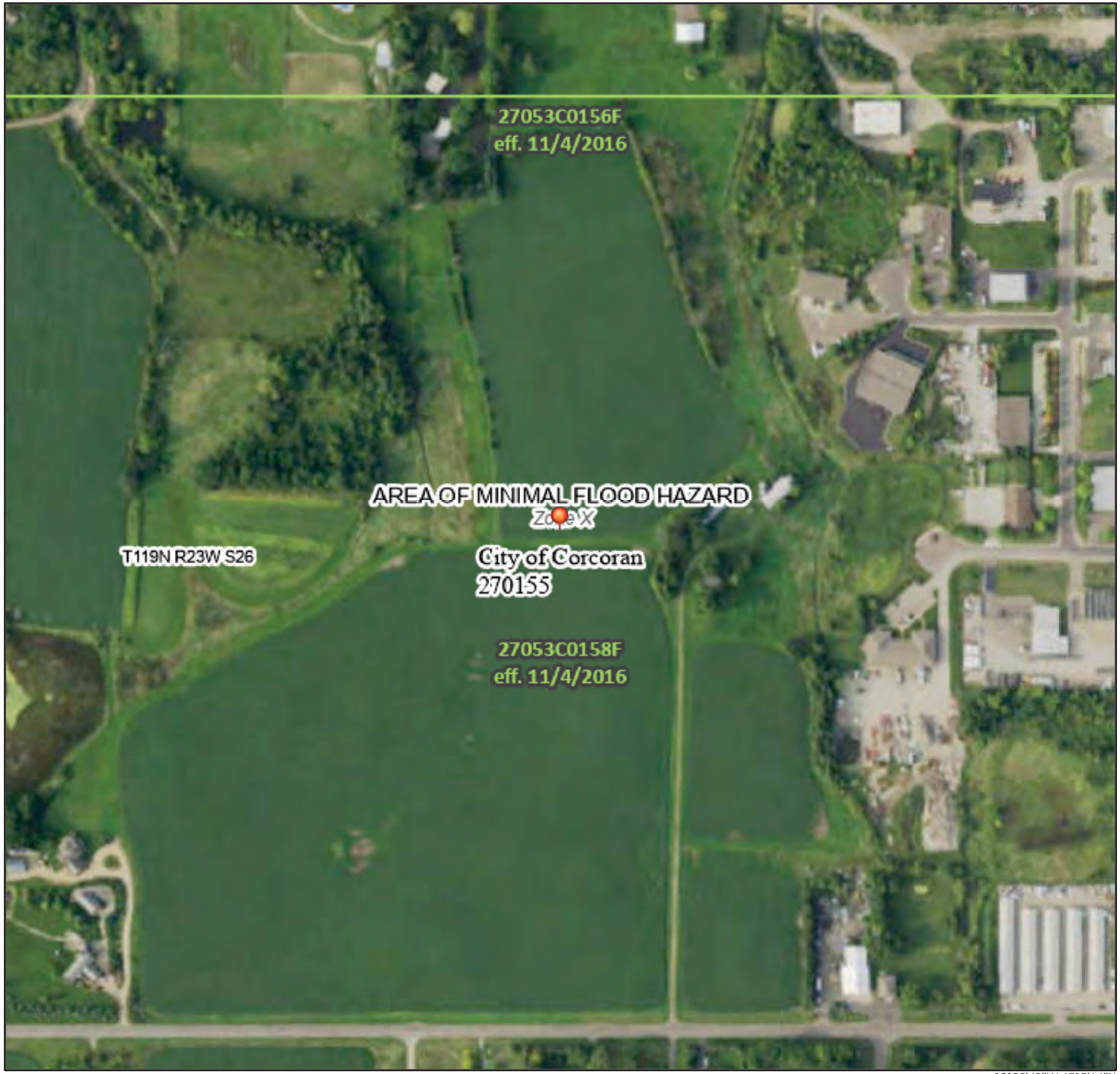
Appendix C

FEMA FIRMette

National Flood Hazard Layer FIRMette

FEMA

93°33'26"W 45°5'40"N



93°32'48"W 45°5'14"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/28/2022 at 4:23 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Appendix D

MDH Well Log Reports

Minnesota Unique Well Number

104845

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
OLEK, RON	119	23	W	26	ABAABD

Elevation 963 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 20123 50 CR CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	25	YELLOW	MEDIUM
CLAY W/GRAVEL	25	45	GRAY	MEDIUM
GRAVEL & SAND	45	60	BROWN	SOFT
CLAY (GRAVELLY)	60	78	BROWN	MEDIUM
CLAY (GRAVELLY)	78	151	GRAY	MEDIUM
SHALE W/SANDROCK	151	162	GREEN	MEDIUM
SANDROCK	162	203	GRN/WHT	HARD

Remarks

Well Depth 203 ft. **Depth Completed** 203 ft. **Date Well Completed** 08/12/1976

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. To 162 ft.	11 lbs./ft.	4 in. To 203 ft.

Open Hole From 162 ft. To 203 ft.

Screen? ☐ **Type** **Make**

Static Water Level
55 ft. land surface Measure 08/12/1976

Pumping Level (below land surface)
75 ft. 5 hrs. Pumping at 60 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		0 ft.	162 ft.
cuttings		ft.	ft.

Nearest Known Source of Contamination
50 feet Southwes Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name FLINT & WALLING
Model Number 5BA8 HP 0.5 Volt 230
Length of drop pipe 96 ft Capacity 12 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer St.Lawrence-
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 151 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 456834 Y 4993611
Unique Number Verification Address verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Ruppert & Son	27086	CLARK, F.

Minnesota Unique Well Number

118887

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
ETZEL, GERG	119	23	W	26	ABAABC

Elevation 961 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 20137 50 CR HAMEL MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOP SOIL	0	7	BLACK	SOFT
CLAY	7	43	BLUE	SOFT
GRAVEL DIRTY	43	117		
CLAY	117	140	BLUE	SOFT
CLAY & GRAVEL DIRTY	140	166		HARD
ROCK	166	197		HARD

Remarks

Well Depth 197 ft. **Depth Completed** 197 ft. **Date Well Completed** 02/26/1976

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. To 166 ft.	11 lbs./ft.	4 in. To 197 ft.

Open Hole From 166 ft. To 197 ft.

Screen? ☐ **Type** **Make**

Static Water Level
60 ft. land surface Measure 02/20/1976

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination
50 feet East Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 02/26/1976
Manufacturer's name RED JACKET
Model Number BV-75 HP 0.5 Volt 230
Length of drop pipe 84 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer St.Lawrence
Last Strat St.Lawrence Formation Depth to Bedrock 166 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 456806 Y 4993618
Unique Number Verification Address verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor
Pumarlo Well Co. 27023 PUMARLO, F.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

148105

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 11/16/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
SCHUTTE, PHIL	119	23	W	26	BAADDA

Elevation 956 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 20225 50 CR CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	140		
SANDROCK	140	232		SOFT
ROCK	232	323		

Remarks

Well Depth 323 ft. **Depth Completed** 323 ft. **Date Well Completed** 12/13/1977

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 233 ft.	lbs./ft.	4 in. To 323 ft.

Open Hole From 233 ft. To 323 ft.

Screen? ☐ **Type** **Make**

Static Water Level
150 ft. land surface Measure 12/13/1977

Pumping Level (below land surface)
160 ft. 3 hrs. Pumping at 70 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
well grouted, type unknown		ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name AERMOTOR
Model Number HP 0.75 Volt
Length of drop pipe 126 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan-Tunnel City Aquifer Tunnel City
Last Strat Tunnel City Group Depth to Bedrock 140 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 456462 Y 4993468
Unique Number Verification Information from Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Torgerson Well Co.	27056	TORGERSON, S.

Minnesota Unique Well Number

168654

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 11/16/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MELCHER,	119	23	W	26	DBBCDA

Elevation 965 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 20204 CIMARRON CI CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	18	YELLOW	MEDIUM
CLAY	18	45	BLUE	MEDIUM
CLAY & ROCK	45	68	RED/BRN	MEDIUM
SAND & GRAVEL	68	75	YELLOW	SOFT

Remarks

Well Depth 75 ft. **Depth Completed** 75 ft. **Date Well Completed** 10/11/1979

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter **Weight**
4 in. To 70 ft. lbs./ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	12	5 ft.	70 ft.	75 ft.

Static Water Level
20 ft. land surface Measure 10/11/1979

Pumping Level (below land surface)
20 ft. 2 hrs. Pumping at 20 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		0 ft.	70 ft.

Nearest Known Source of Contamination
50 feet Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/11/1979
Manufacturer's name AERMOTOR
Model Number SD1250 HP 0.5 Volt 230
Length of drop pipe 42 ft Capacity 20 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer Quat. buried
Last Strat sand +larger-yellow Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 456568 Y 4992687
Unique Number Verification Name on mailbox Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Mc Alpine's Well Co.	27186	MCALPINE, G.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

192837

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 07/22/1992
Update Date 11/24/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
ASEHLIMEN	119	23	W	26	CABAAD

Elevation 994 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 20417 LARKIN RD CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	20	YELLOW	MEDIUM
CLAY	20	70	BLUE	MEDIUM
SAND	70	83	BROWN	M.HARD
CLAY	83	89	BROWN	MEDIUM
SAND	89	106	BROWN	MEDIUM
CLAY	106	182	BLUE	MEDIUM
SHALE & SANDROCK	182	185	BLU/GRY	HARD
SANDROCK AND	185	231	GRAY	HARD

Remarks

Well Depth 231 ft. **Depth Completed** 231 ft. **Date Well Completed** 05/03/1983

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. To 185 ft.	11 lbs./ft.	6.2 in. To 185 ft.
		4 in. To 231 ft.

Open Hole From 185 ft. To 231 ft.

Screen? ☐ **Type** **Make**

Static Water Level
80 ft. land surface Measure 05/03/1983

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer St.Lawrence
Last Strat St.Lawrence Formation Depth to Bedrock 182 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 456248 Y 4992788
Unique Number Verification Tax Records Input Date 11/16/2015

Angled Drill Hole

Well Contractor
Ruppert & Son 27086 RUPPERT, G.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

259743

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 04/22/2003
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
CORCORAN	119	23	W	23	DCCD

Elevation 951 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

Stratigraphy Information

Remarks

Well Depth null **Depth Completed** null **Date Well Completed**

Drill Method **Drill Fluid**

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Open Hole From ft. To ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456563 Y 4993728
Unique Number Verification Info/GPS from data Input Date 07/05/2002

Angled Drill Hole

Well Contractor

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

421780

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/24/1991
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FEEHAN, JIM	119	23	W	26	BAAADB

Elevation 972 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 20305 50 CR CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	36	YEL/BLU	MEDIUM
SAND & CLAY	36	90	GRY/BRN	MEDIUM
CLAY	90	140	GRAY	HARD
CLAY ROCKS SHALE	140	182	GRY/GRN	MEDIUM
SHALE	182	240	GREEN	HARD
SANDROCK	240	315	WHITE	HARD

Remarks

Well Depth 315 ft. **Depth Completed** 315 ft. **Date Well Completed** 06/12/1986

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. To 197 ft.	11 lbs./ft.	6 in. To 197 ft.
		4 in. To 315 ft.

Open Hole From 197 ft. To 315 ft.

Screen? ☐ **Type** **Make**

Static Water Level
55 ft. land surface Measure 06/12/1986

Pumping Level (below land surface)
55 ft. 3 hrs. Pumping at 50 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		0 ft.	197 ft.

Nearest Known Source of Contamination
75 feet East Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/16/1986
Manufacturer's name MCDONALD
Model Number 18 KL HP 1 Volt 230
Length of drop pipe 84 ft Capacity 18 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence-Tunnel City Aquifer St.Lawrence-
Last Strat Tunnel City/Mazomanie Depth to Bedrock 182 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 456421 Y 4993592
Unique Number Verification Information from Input Date 06/02/2000

Angled Drill Hole

Well Contractor
Mc Alpine's Well Co. 27186 MCALPINE, G.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

470764

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 07/22/1992
Update Date 02/02/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
CHANNEL, ED	119	23	W	26	ABBAAA

Elevation 957 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W 20209 50 CR CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	24	YELLOW	MEDIUM
CLAY	24	42	BLUE	MEDIUM
GRAVEL	42	68	GRAY	M.HARD
GRAVEL/ CLAY	68	89	BROWN	M.HARD
CLAY	89	150	GRAY	MEDIUM
CLAY	150	170	BLUE	MEDIUM
SHALE	170	200	BLU/GRY	MEDIUM
SANDROCK	200	254	GRAY	HARD

Remarks

Well Depth 254 ft. **Depth Completed** 254 ft. **Date Well Completed** 11/16/1990

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. To 204 ft.	20 lbs./ft.	6.2 in. To 204 ft.
		4.2 in. To 254 ft.

Open Hole From 204 ft. To 254 ft.

Screen? ☐ **Type** **Make**

Static Water Level
53 ft. land surface Measure 11/16/1990

Pumping Level (below land surface)
70 ft. 3 hrs. Pumping at 40 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
cuttings		ft. 204	ft.
bentonite		ft. 204	ft.

Nearest Known Source of Contamination
50 feet Northwes Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/20/1990
Manufacturer's name RED JACKET
Model Number 50CN1- HP 0.5 Volt 230
Length of drop pipe 90 ft Capacity 12 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☒ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer Tunnel City
Last Strat Tunnel City Group Depth to Bedrock 170 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456652 Y 4993619
Unique Number Verification Address verification Input Date 08/22/2014

Angled Drill Hole

Well Contractor
Ruppert & Son 27086 RUPPERT JR. A
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

479959

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 03/29/1993
Update Date 12/18/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
PATNODE,	119	23	W	26	ABBBBB

Elevation 973 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W 20239 50 CR CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	28	YELLOW	MEDIUM
CLAY	28	76	BLUE	MEDIUM
CLAY	76	130	BROWN	MEDIUM
CLAY	130	210	GRAY	MEDIUM
SANDSTONE	210	252	GRY/GRN	M.HARD

Remarks

Well Depth 252 ft. **Depth Completed** 252 ft. **Date Well Completed** 07/13/1992

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 217 ft.	11 lbs./ft.	6.2 in. To 217 ft.
		4 in. To 252 ft.

Open Hole From 217 ft. To 252 ft.

Screen? ☐ **Type** **Make**

Static Water Level
65 ft. land surface Measure 07/13/1992

Pumping Level (below land surface)
80 ft. 14 hrs. Pumping at 35 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model 4X5.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
cuttings		ft.	217 ft.

Nearest Known Source of Contamination
50 feet Southwes Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 08/02/1992
Manufacturer's name MYERS
Model Number J712 HP 0.75 Volt 230
Length of drop pipe 93 ft Capacity 12 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Tunnel City Group Aquifer Tunnel City
Last Strat Tunnel City Group Depth to Bedrock 210 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456480 Y 4993615
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Ruppert & Son	27086	CORDELL, T.

Minnesota Unique Well Number

511975

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 07/22/1992
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MALJEWSKI,	119	23	W	26	ABABBC

Elevation 958 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W 20201 50 CR CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	27	YELLOW	MEDIUM
CLAY	27	42	BLUE	
GRAVEL	42	67	GRAY	M.HARD
GRAVEL / CLAY	67	89	BROWN	M.HARD
CLAY	89	149	GRAY	MEDIUM
SHALE	149	171	BLU/GRY	MEDIUM
SANDROCK/ SHALE	171	230	BLU/GRY	HARD

Remarks

Well Depth 230 ft. **Depth Completed** 230 ft. **Date Well Completed** 03/05/1990

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. To 176 ft.	11 lbs./ft.	6.2 in. To 176 ft.
		4 in. To 230 ft.

Open Hole From 176 ft. To 230 ft.

Screen? ☐ **Type** **Make**

Static Water Level
55 ft. land surface Measure 03/05/1990

Pumping Level (below land surface)
75 ft. 2.5 hrs. Pumping at 40 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MONITOR Model 5
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
cuttings		ft.	76 ft.

Nearest Known Source of Contamination
50 feet South Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 03/13/1990
Manufacturer's name GOULD
Model Number 11AM07-412 HP 0.75 Volt
Length of drop pipe 90 ft Capacity 15 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☒ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan-St.Lawrence Aquifer St.Lawrence-
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 149 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456686 Y 4993599
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Ruppert & Son	27086	RUPPERT, A.

Minnesota Unique Well Number

551597

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 12/10/1996
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
	119	23	W	26	ACAACD

Elevation 970 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20150 75TH AV N CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	31	BROWN	
SANDY CLAY	31	56	BROWN	
SAND & CLAY	56	70	GRAY	SOFT
SAND & GRAVEL	70	86	GRAY	SOFT
CLAY	86	135	GRAY	
FINE SAND	135	150	GRAY	SOFT
CLAY	150	168	BROWN	
FRANCONIA	168	180	LT. GRY	SOFT
FRANCONIA	180	240	GREEN	

Remarks

Well Depth 240 ft. **Depth Completed** 240 ft. **Date Well Completed** 02/22/1995

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 180 ft.	10.7 lbs./ft.	8.7 in. To 30 ft.
		6.2 in. To 101 ft.
		4 in. To 240 ft.

Open Hole From 181 ft. To 240 ft.

Screen? ☐ **Type** **Make**

Static Water Level
65 ft. land surface Measure 02/22/1995

Pumping Level (below land surface)
85 ft. 3 hrs. Pumping at 30 g.p.m.

Wellhead Completion
Pitless adapter manufacturer BAKER Model SNAPPY
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	2.3 Cubic yards	ft.	180 ft.

Nearest Known Source of Contamination
100 feet North Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 03/01/1995
Manufacturer's name GRUNDFOS
Model Number 25S15-9 HP 1.5 Volt 230
Length of drop pipe 105 ft Capacity 26 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer St.Lawrence-
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 168 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456798 Y 4993127
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Renner E.H. Well	71015	PRAUGHT, V.

Minnesota Unique Well Number

563093

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/08/1997
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HICKS	119	23	W	26	AACCCA

Elevation 978 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 7545 COMMERCE ST CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	17	YELLOW	SOFT
CLAY	17	36	GRAY	MEDIUM
GRAVEL	36	64	BROWN	MEDIUM
CLAY & GRAVEL	64	92	RED/BRN	MEDIUM
CLAY	92	103	GRAY	MEDIUM
CLAY HARD STICKY	103	172	BLUE	
SHALE	172	176	LT. BLU	MEDIUM
SANDSTONE / SHALE	176	205	BRN/TAN	MEDIUM
SHALE HARD STICKY	205	208	BROWN	
SANDSTONE / SHALE	208	212	BLUE	MEDIUM
SANDSTONE GREEN	212	237	VARIED	HARD
SANDSTONE PINK	237	253	VARIED	HARD

Remarks

Well Depth 253 ft. **Depth Completed** 253 ft. **Date Well Completed** 09/17/1996

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 180 ft.	lbs./ft.	8 in. To 30 ft.
		6.2 in. To 180 ft.
		3 in. To 253 ft.

Open Hole From 180 ft. To 253 ft.

Screen? ☐ **Type** **Make**

Static Water Level
68 ft. land surface Measure 09/17/1996

Pumping Level (below land surface)
68 ft. 2 hrs. Pumping at 60 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model SU4X5.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	4 Sacks	ft.	30 ft.

Nearest Known Source of Contamination
162 feet South Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/17/1996
Manufacturer's name AERMOTOR
Model Number A 35-300 HP 3 Volt 230
Length of drop pipe 126 ft Capacity 35 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer St.Lawrence-
Last Strat Tunnel City Group Depth to Bedrock 172 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456903 Y 4993251
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor
Stevens Well Co. 27194 NEMITZ, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

592153

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/04/1998
Update Date 12/18/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
STEINE, GENE	119	23	W	26	ABDBAD

Elevation 976 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20125 AUGER AV CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	15	BROWN	MEDIUM
CLAY / GRAVEL	15	69	BROWN	MEDIUM
SAND / GRAVEL	69	83	BROWN	SOFT

Remarks

Well Depth 83 ft. **Depth Completed** 83 ft. **Date Well Completed** 02/03/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 73 ft.	lbs./ft.	6.2 in. To 83 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** CRESTLINE

Diameter	Slot/Gauze	Length	Set
4 in.	18	10 ft.	73 ft. 83 ft.

Static Water Level

55 ft. land surface Measure 02/03/1997

Pumping Level (below land surface)

70 ft. 3 hrs. Pumping at 15 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MAAS Model JC-4

☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
cuttings		40 ft.	73 ft.
high solids bentonite	2.5 Sacks	ft.	40 ft.

Nearest Known Source of Contamination

75 feet South Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 02/03/1997

Manufacturer's name MEYERS

Model Number J711P HP 0.75 Volt 230

Length of drop pipe 68 ft Capacity 12 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer Quat. buried

Last Strat sand +larger-brown Depth to Bedrock ft

Located by Minnesota Geological Survey

Locate Method GPS SA Off (averaged) (15 meters)

System UTM - NAD83, Zone 15, Meters X 456764 Y 4993385

Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Ruppert & Son	27086	RUPPERT, C.

Minnesota Unique Well Number

594127

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/21/1997
Update Date 09/08/2020
Received Date

Well Name	Township	Range	Dir	Section	Subsection
	119	23	W	26	BDCDAC

Elevation 981 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20400 LARKIN RD CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	30	BROWN	SOFT
CLAY	30	84	GRAY	SOFT
SILTY CLAY	84	130	RED	MEDIUM
CLAY	130	175	GRAY	MEDIUM
SANDSTONE / SHALE	175	193	WHT/BLU	MEDIUM
CLAY / ROCK	193	195	RED	HARD

Remarks

SEALED 07-19-2005 BY 30714

Well Depth 195 ft. **Depth Completed** 195 ft. **Date Well Completed** 03/07/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 175 ft.	lbs./ft.	8 in. To 30 ft.
		6 in. To 195 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make**

Diameter	Slot/Gauze	Length	Set	
4 in.	10	20 ft.	175 ft.	195 ft.

Static Water Level

65 ft. land surface Measure 03/07/1997

Pumping Level (below land surface)

85 ft. 2 hrs. Pumping at 25 g.p.m.

Wellhead Completion

Pitless adapter manufacturer WHITEWATER Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
high solids bentonite	3 Sacks	ft.	30 ft.

Nearest Known Source of Contamination

50 feet Northwes Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 03/12/1997

Manufacturer's name RED JACKET

Model Number HP 0.75 Volt 230

Length of drop pipe 100 ft Capacity 10 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer Jordan-St.

Last Strat St.Lawrence Formation Depth to Bedrock 175 ft

Located by Minnesota Geological Survey

Locate Method GPS SA Off (averaged) (15 meters)

System UTM - NAD83, Zone 15, Meters X 456230 Y 4992897

Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bergerson-Caswell	27058	HOLMEN, G.

Minnesota Unique Well Number

597473

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/04/1998
Update Date 11/05/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
	119	23	W	26	ABDAAC

Elevation 974 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20110 AUGER AV CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	8	BROWN	
SAND	8	13		
CLAY	13	36	BROWN	
GRAVEL	36	68		
CLAY W/ GRAVEL	68	95	BROWN	
STICKY CLAY	95	181	GRAY	
HARD & STICKY CLAY	181	192	RED/BLU	
SHALE W/ SANDSTONE	192	251	BLUE	

Remarks

Well Depth 251 ft. **Depth Completed** 251 ft. **Date Well Completed** 07/24/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 233 ft.	lbs./ft.	8.5 in. To 30 ft.
		6.5 in. To 191 ft.
		4.5 in. To 233 ft.
		4 in. To 251 ft.

Open Hole From 233 ft. To 251 ft.

Screen? ☐ **Type** **Make**

Static Water Level
70 ft. land surface Measure 06/06/1997

Pumping Level (below land surface)
ft. hrs. Pumping at 25 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
high solids bentonite	3 Sacks	ft.	40 ft.

Nearest Known Source of Contamination
50 feet North Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/24/1997
Manufacturer's name STA-RITE
Model Number HP 0.75 Volt
Length of drop pipe 120 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock St.Lawrence-Tunnel City Aquifer St.Lawrence-
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 192 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456843 Y 4993385
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor
Torgerson Well Co. 27056 TORGERSON, R.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report | **597473** | Printed on 04/28/2022 HE-01205-15

Minnesota Unique Well Number

607761

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/03/1998
Update Date 12/18/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
CHRISTOPHER,	119	23	W	26	ABADBA

Elevation 965 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20175 50 CR CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	59	BROWN	MEDIUM
CLAY	59	76	GRAY	SOFT
CLAY	76	140	BROWN	MEDIUM
SAND	140	178	BROWN	SOFT

Remarks

Well Depth 178 ft. **Depth Completed** 178 ft. **Date Well Completed** 11/15/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 158 ft.	lbs./ft.	6.7 in. To 178 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** CRESTLINE

Diameter	Slot/Gauze	Length	Set
4 in.	15	10 ft.	158 ft. 178 ft.

Static Water Level

65 ft. land surface Measure 11/15/1997

Pumping Level (below land surface)

120 ft. 2 hrs. Pumping at 35 g.p.m.

Wellhead Completion

Pitless adapter manufacturer WHITEWATER Model SAU45.5
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
high solids bentonite	2 Sacks	ft.	35 ft.

Nearest Known Source of Contamination

50 feet South Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/15/1997
Manufacturer's name MEYERS
Model Number 3NFL7-12 HP 0.75 Volt 230
Length of drop pipe 120 ft Capacity 12 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer Quat. buried
Last Strat sand-brown Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456819 Y 4993510
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Ruppert & Son 27086 RUPPERT, C.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report | **607761** | Printed on 04/28/2022 HE-01205-15

Minnesota Unique Well Number

638346

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 07/19/2000
Update Date 12/18/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
PATNODE, TOM	119	23	W	26	ABBBBB

Elevation 974 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W 20239 50 CR CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	86	BROWN	MEDIUM
SAND	86	94	BROWN	SOFT
CLAY/ GRAVEL	94	155	GRAY	MEDIUM
SAND/GRAVEL	155	167	BROWN	SOFT

Remarks

Well Depth 167 ft. **Depth Completed** 167 ft. **Date Well Completed** 12/30/1999

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 157 ft.	2 lbs./ft.	6.7 in. To 167 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** BIG FOOT

Diameter	Slot/Gauze	Length	Set
4 in.	15	10 ft.	157 ft. 167 ft.

Static Water Level

64 ft. land surface Measure 12/30/1999

Pumping Level (below land surface)

130 ft. 3 hrs. Pumping at 40 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MAASS Model JC-4
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
high solids bentonite	4 Sacks	0 ft.	40 ft.
cuttings		40 ft.	157 ft.

Nearest Known Source of Contamination

50 feet South Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 01/11/2000
Manufacturer's name STA RITE
Model Number HP 1 Volt 230
Length of drop pipe 100 ft Capacity 12 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer Quat. buried
Last Strat sand +larger-brown Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456472 Y 4993615
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
A. Ruppert Well	30714	RUPPERT, C.

Minnesota Unique Well Number

728690

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 01/02/2007
Update Date 02/04/2015
Received Date 07/24/2006

Well Name	Township	Range	Dir	Section	Subsection
	119	23	W	26	BDCACD

Elevation 979 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20410 LARKIN RD CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	24	BROWN	MEDIUM
CLAY	24	146	GRAY	MEDIUM
ROCKY CLAY	146	164	GRAY	MEDIUM
SAND & ROCK	164	187	VARIED	SOFT

Remarks

Well Depth 187 ft. **Depth Completed** 187 ft. **Date Well Completed** 09/21/2005

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 167 ft.	0 lbs./ft.	8.7 in. To 20 ft.
		6.2 in. To 187 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make**

Diameter	Slot/Gauze	Length	Set
4 in.	10	ft.	ft. 187 ft.
4 in.	15	20 ft.	167 ft. ft.

Static Water Level

65 ft. land surface Measure 09/15/2005

Pumping Level (below land surface)

150 ft. 2 hrs. Pumping at 30 g.p.m.

Wellhead Completion

Pitless adapter manufacturer WHITEWATER Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	4 Sacks	ft. 50	ft.

Nearest Known Source of Contamination

50 feet Northeas Direction Sewer Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 09/21/2006

Manufacturer's name RED JACKET
Model Number HP 1.5 Volt 220
Length of drop pipe 100 ft Capacity 20 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer Quat. buried
Last Strat sand +larger Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456207 Y 4992945
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

Bergerson Caswell, Inc. 1767 LESTER, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

728994

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date
Update Date 11/05/2015
Received Date 09/26/2005

Well Name	Township	Range	Dir	Section	Subsection
	119	23	W	26	BDCDAB

Elevation 980 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20400 LARKIN RD CORCORAN MN 55340

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	32	BROWN	SOFT
CLAY & GRAVEL	32	81	GRAY	SOFT
CLAY & GRAVEL	81	130	RED	MEDIUM
CLAY	130	178	GRAY	MEDIUM
SANDROCK / SHALE	178	250	GREEN	MEDIUM

Remarks

Well Depth 250 ft. **Depth Completed** 250 ft. **Date Well Completed** 07/19/2005

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 186 ft.	0 lbs./ft.	6.7 in. To 186 ft.
		4.5 in. To 250 ft.

Open Hole From 186 ft. To 250 ft.

Screen? ☐ **Type** **Make**

Static Water Level
60 ft. land surface Measure 07/19/2005

Pumping Level (below land surface)
150 ft. 3 hrs. Pumping at 20 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MAASS Model JC-4
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
high solids bentonite	3 Sacks	0 ft.	40 ft.
cuttings		40 ft.	166 ft.
neat cement		166 ft.	186 ft.

Nearest Known Source of Contamination
50 feet South Direction Sewer Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/19/2005
Manufacturer's name STA RITE
Model Number HP 0.75 Volt 230
Length of drop pipe 100 ft Capacity 12 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan-Tunnel City Aquifer Jordan-Tunnel
Last Strat Jordan-Tunnel City Depth to Bedrock 178 ft
Located by Minnesota Geological Survey
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 456224 Y 4992902
Unique Number Verification Address verification Input Date 09/05/2014

Angled Drill Hole

Well Contractor

A. Ruppert Well	30714	RUPPERT, C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

755332

County Hennepin
Quad Hamel
Quad ID 121D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 05/14/2008
Update Date 11/24/2015
Received Date 04/22/2008

Well Name	Township	Range	Dir	Section	Subsection
GAZELLE	119	23	W	26	ABDDAB

Elevation 975 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 20115 AUGER AV CORCORAN MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	16	YELLOW	
CLAY	16	34	GRAY	
SAND / GRAVEL	34	52	ORANGE	
GRAVEL W/ CLAY	52	106	GRAY	
CLAY	106	162	BROWN	
SHALE / SILTSTONE	162	209	BRN/GRN	
SILTSTONE	209	252	BRN/GRN	

Remarks

Well Depth 252 ft. **Depth Completed** 252 ft. **Date Well Completed** 01/15/2008

Drill Method Non-specified Rotary **Drill Fluid** Qwik gel

Use industrial **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 172 ft.	lbs./ft.	6.7 in. To 172 ft.
		4 in. To 252 ft.

Open Hole From 172 ft. To 252 ft.

Screen? ☐ **Type** **Make**

Static Water Level
65 ft. land surface Measure 12/28/2007

Pumping Level (below land surface)
ft. hrs. Pumping at 75 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model SU4
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	4 Sacks	ft.	42 ft.

Nearest Known Source of Contamination
55 feet Northwes Direction Sewer Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/29/2007
Manufacturer's name AY MCDONALD
Model Number 23075D3SJL HP 0.75 Volt 230
Length of drop pipe 105 ft Capacity 10 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan-St.Lawrence Aquifer Jordan-Tunnel
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 162 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 456839 Y 4993303
Unique Number Verification Address verification Input Date 11/16/2015

Angled Drill Hole

Well Contractor
TL Stevens Well Co., Inc. 1838 STEVENS, J.
Licensee Business Lic. or Reg. No. Name of Driller

Appendix E

Feasibility Study Report

Stantec

Corcoran Farms Business Park
Feasibility Study

May 2022

Prepared for:

City of Corcoran
8200 County Road 116
Corcoran, MN 55340

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1.0 INTRODUCTION

Lee and Associates is proposing to construct a business park consisting of five buildings totaling over 700,000 square feet. The site is consistent with the City's Master Sewer and Water Plans and will develop approximately 70-acres in Southeast Corcoran that is currently agricultural. The main access will be on Larkin Road. The site layout is somewhat affected by a 50-foot gas-line easement crosses the site east/west along the southern portion of the property.

This Feasibility Study is the basis for identifying infrastructure improvements to support the development and City infrastructure. The Feasibility Study is incorporated into an ongoing Environmental Assessment Worksheet (EAW).

2.0 TRANSPORTATION

2.1 BACKGROUND

This study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development at the following intersections:

- CSAH 10/CR 116
- CSAH 10/CSAH 50
- CR 116/Larkin Road
- Larkin Road/Blue Bonnet Drive/development access

2.2 PROPOSED DEVELOPMENT CHARACTERISTICS

For purpose of the traffic impact analysis, the proposed development is assumed to consist of the following uses:

- Building A – 15,423 square feet of office and 61,693 square feet of warehouse
- Building B – 23,892 square feet of office and 95,570 square feet of warehouse
- Building C – 33,703 square feet of office and 134,814 square feet of warehouse
- Building D – 19,411 square feet of office and 77,644 square feet of warehouse
- Building E – 52,849 square feet of office and 211,397 square feet of warehouse

2.3 EXISTING CONDITIONS

The proposed project site is currently used for agricultural purposes. The site is bounded by Larkin Road on the south, existing residential uses on the west and north, and existing commercial uses on the east.

Near the site location, Larkin Road is a two-lane rural section roadway. CSAH 10, CSAH 50, and CR 116 are two lane roadways with turn lanes and traffic signal control at major intersections. Blue Bonnet Drive is a local two-lane roadway.

Existing conditions near the proposed project location are described below.

CSAH 10/CR 116 - This four-way intersection is controlled with a traffic signal. The northbound and southbound approaches provide one left turn lane and one through/right turn lane. The eastbound approach provides one left turn lane and one through/right turn lane. The westbound approach provides one left turn lane, one through lane, and one right turn lane.

CSAH 10/CSAH 50 - This three-way intersection is controlled with a stop sign on the eastbound approach. The eastbound approach provides one left turn/right turn lane. The northbound approach provides one left turn lane and one through lane. The southbound approach provides one shared lane for left turn and through movements.

CR 116/Larkin Road - This four-way intersection is controlled with stop signs on the eastbound and westbound approaches. The northbound and southbound approaches provide one left turn/through lane and one through/right turn bypass lane. The eastbound and westbound approaches provide one left turn/through/right turn lane.

Weekday traffic volume data was recorded at the existing intersections in March, 2022. Existing traffic volume data is presented later in this report.

2.4 TRAFFIC FORECASTS

To adequately address the impacts of the proposed project, forecasts and analyses were completed for the years 2027 and 2040. Specifically, weekday a.m. and p.m. peak hour traffic forecasts were completed for the following scenarios:

- *2022 Existing*. Existing volumes were determined through traffic counts at the subject intersections. The existing volume information includes trips generated by the uses near the project site.

- *2027 No-Build*. Existing volumes at the subject intersections were increased by 2.5 percent per year to determine 2027 No-Build volumes. The 2.5 percent per year growth rate was calculated based on traffic forecast information presented in the 2040 Corcoran Comprehensive Plan.

- *2027 Build*. Trips generated by the proposed development were added to the 2027 No-Build volumes to determine 2027 Build volumes.

- *2040 No-Build*. Existing volumes at the subject intersections were increased by 2.5 percent per year to determine 2040 No-Build volumes. The 2.5 percent per year growth rate was calculated based on traffic forecast information presented in the 2040 Corcoran Comprehensive Plan.

- *2040 Build*. Trips generated by the proposed development were added to the 2040 No-Build volumes to determine 2040 Build volumes.

The expected new development trips were calculated based on data presented in Trip Generation, Eleventh Edition, published by the Institute of Transportation Engineers. These calculations represent total trips that will be generated by the proposed development. The resultant trip generation estimates are shown in Table 1.

Table 1: Weekday Trip Generation for Proposed Project

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily
		In	**Out**	**Total**	**In**	**Out**	**Total**	**Total**
Office	145,278 SF	194	27	221	35	174	209	1575
Warehouse	581,118 SF	76	23	99	29	76	105	497
Totals		**270**	**50**	**320**	**64**	**250**	**314**	**2072**

Note: SF=square feet

Trip distribution percentages for the subject development trips were established based on the nearby roadway network, existing and expected future traffic patterns, and location of the subject development in relation to major attractions and population concentrations.

The distribution percentages for trips generated by the proposed development are described below:

- 30 percent to/from the east on CSAH 10
- 30 percent to/from the south on CR 116
- 20 percent to/from the north on CR 116
- 10 percent to/from the west on CSAH 10
- 10 percent to/from the west on Larkin Road

Development trips from Table 1 were assigned to the surrounding roadway network using the preceding trip distribution percentages. Traffic volumes were established for all the forecasting scenarios described earlier during the weekday a.m. and p.m. peak hours. The resultant peak hour volumes are shown in Tables 2 and 3.

Table 2: Weekday A.M. Peak Hour Traffic Volumes

CSAH 10/CR 116	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	19	205	93	16	65	37	22	67	26	56	269	30
2027 No-Build	21	232	105	18	74	42	25	76	29	63	304	34
2027 Build	21	232	131	23	74	42	29	86	31	63	358	34
2040 No-Build	30	320	145	25	101	58	34	104	41	87	420	47
2040 Build	30	320	171	30	101	58	38	114	43	87	474	47
CSAH 10/CSAH 50	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	1	-	167	-	-	-	72	40	-	-	191	1
2027 No-Build	1	-	189	-	-	-	81	45	-	-	216	1
2027 Build	1	-	189	-	-	-	81	49	-	-	242	1
2040 No-Build	2	-	260	-	-	-	112	62	-	-	298	2
2040 Build	2	-	260	-	-	-	112	66	-	-	324	2
CR 116/Larkin Road	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	10	17	4	20	4	10	1	103	9	0	354	7
2027 No-Build	11	19	5	23	5	11	1	117	10	0	401	8
2027 Build	27	33	20	23	81	11	82	117	10	0	401	93
2040 No-Build	16	27	6	31	6	16	2	161	14	0	552	11
2040 Build	32	41	21	31	82	16	83	161	14	0	552	96
Larkin Rd/Blue Bonnet Dr/access	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	-	31	0	0	12	-	0	-	0	-	-	-
2027 No-Build	-	35	0	0	14	-	0	-	0	-	-	-
2027 Build	23	35	0	0	14	200	0	0	0	92	0	11
2040 No-Build	-	48	0	0	19	-	0	-	0	-	-	-
2040 Build	23	48	0	0	19	200	0	0	0	92	0	11

Table 3: Weekday P.M. Peak Hour Traffic Volumes

CSAH 10/CR 116	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2022 Existing	35	106	32	19	251	49	105	336	15	34	83	35
2027 No-Build	40	120	36	21	284	55	119	380	17	38	94	40
2027 Build	40	120	41	23	284	55	143	430	22	38	107	40
2040 No-Build	55	165	50	30	391	76	164	524	23	53	129	55
2040 Build	55	165	55	32	391	76	188	574	28	53	142	55
CSAH 10/CSAH 50	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	6	-	101	-	-	-	213	202	-	-	53	4
2027 No-Build	7	-	114	-	-	-	241	229	-	-	60	5
2027 Build	7	-	114	-	-	-	241	253	-	-	65	5
2040 No-Build	9	-	158	-	-	-	332	315	-	-	83	6
2040 Build	9	-	158	-	-	-	332	339	-	-	88	6
CR 116/Larkin Road	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	8	6	5	12	11	4	6	417	26	7	126	16
2027 No-Build	9	7	6	14	12	5	7	472	29	8	143	18
2027 Build	88	77	81	14	30	5	27	472	29	8	143	38
2040 No-Build	12	9	8	19	17	6	9	650	41	11	197	25
2040 Build	91	79	83	19	35	6	29	650	41	11	197	45
Larkin Rd/Blue Bonnet Dr/access	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
2022 Existing	-	19	0	0	33	-	0	-	0	-	-	-
2027 No-Build	-	21	0	0	37	-	0	-	0	-	-	-
2027 Build	6	21	0	0	37	58	0	0	0	224	0	26
2040 No-Build	-	30	0	0	51	-	0	-	0	-	-	-
2040 Build	6	30	0	0	51	58	0	0	0	224	0	26

2.5 TRAFFIC ANALYSIS

Traffic analyses were completed for the subject intersections for all scenarios described earlier during the weekday a.m. and p.m. peak hours using Synchro software. Initial analysis was completed using existing geometrics and intersection control.

Capacity analysis results are presented in terms of level of service (LOS), which is defined in terms of traffic delay at the intersection. LOS ranges from A to F. LOS A represents the best intersection operation, with little delay for each vehicle using the intersection. LOS F represents the worst intersection operation with excessive delay. The following is a detailed description of the conditions described by each LOS designation:

- Level of service A corresponds to a free flow condition with motorists virtually unaffected by the intersection control mechanism. For a signalized or an unsignalized intersection, the average delay per vehicle would be approximately 10 seconds or less.

- Level of service B represents stable flow with a high degree of freedom, but with some influence from the intersection control device and the traffic volumes. For a signalized intersection, the average delay ranges from 10 to 20 seconds. An unsignalized intersection would have delays ranging from 10 to 15 seconds for this level.

- Level of service C depicts a restricted flow which remains stable, but with significant influence from the intersection control device and the traffic volumes. The general level of comfort and convenience changes noticeably at this level. The delay ranges from 20 to 35 seconds for a signalized intersection and from 15 to 25 seconds for an unsignalized intersection at this level.

- Level of service D corresponds to high-density flow in which speed and freedom are significantly restricted. Though traffic flow remains stable, reductions in comfort and convenience are experienced. The control delay for this level is 35 to 55 seconds for a signalized intersection and 25 to 35 seconds for an unsignalized intersection.

- Level of service E represents unstable flow of traffic at or near the capacity of the intersection with poor levels of comfort and convenience. The delay ranges from 55 to 80 seconds for a signalized intersection and from 35 to 50 seconds for an unsignalized intersection at this level.

- Level of service F represents forced flow in which the volume of traffic approaching the intersection exceeds the volume that can be served. Characteristics often experienced include long queues, stop-and-go waves, poor travel times, low comfort and convenience, and increased accident exposure. Delays over 80 seconds for a signalized intersection and over 50 seconds for an unsignalized intersection correspond to this level of service.

The LOS results for the study intersections are presented below.

2022 Existing

Table 4: **Weekday A.M. and P.M. Peak Hour LOS Results**

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	B/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/A
CR 116/Larkin Road	EB/WB stop	A/B	A/C
Larkin Road/Blue Bonnet Dr	NB stop	A/A	A/A

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS C or better during the a.m. and p.m. peak hours.

2027 No-Build

Table 5: **Weekday A.M. and P.M. Peak Hour LOS Results**

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/A
CR 116/Larkin Road	EB/WB stop	A/B	A/C
Larkin Road/Blue Bonnet Dr	NB stop	A/A	A/A

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS C or better during the a.m. and p.m. peak hours.

2027 Build

Table 6: **Weekday A.M. and P.M. Peak Hour LOS Results**

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/B
CR 116/Larkin Road	EB/WB stop	A/D	A/D
Larkin Road/Blue Bonnet Dr/access	NB stop	A/B	A/B

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours.

2040 No-Build

Table 7: **Weekday A.M. and P.M. Peak Hour LOS Results**

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/D	C/D
CSAH 10/CSAH 50	EB stop	A/B	A/B
CR 116/Larkin Road	EB/WB stop	A/C	A/C
Larkin Road/Blue Bonnet Dr	NB stop	A/A	A/A

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours.

2040 Build

Table 8: **Weekday A.M. and P.M. Peak Hour LOS Results**

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/D	C/D
CSAH 10/CSAH 50	EB stop	A/B	A/B
CR 116/Larkin Road	EB/WB stop	B/F	C/F
Larkin Road/Blue Bonnet Dr/access	NB stop	A/B	A/B

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

The eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better during the a.m. and p.m. peak hours.

Traffic Signal Warrants at CR 116/Larkin Road

As shown above, the eastbound movements operate at LOS F during the 2040 Build scenarios at the CR 116/Larkin Road intersection. In order to accommodate traffic generated by the proposed development, traffic signal control was considered at this location.

The traffic forecasts for the 2027 Build and 2040 Build scenarios were used to analyze the peak hour and four-hour traffic signal warrants. These volumes include trips from the proposed project as well as other background traffic.

The traffic volume forecasts were used to determine if specific warrants are satisfied based on published criteria outlined in the Minnesota Manual of Uniform Traffic Control Devices (MMUTCD). Warrant 2 (Four-Hour Vehicular Volume) and Warrant 3 (Peak Hour Volume) were assessed. Since the posted speed limits on CR 116 is 50 mph, the analyses presented consider reductions for speeds greater than 40 mph.

The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County.

Intersection Operations at CR 116/Larkin Road with Traffic Signal Control

A potential mitigation measure for the operational issues shown at the CR 116/Larkin Road intersection is traffic signal control. The updated intersection operation results assuming traffic signal control are shown below.

Table 9: **Weekday A.M. and P.M. Peak Hour LOS Results at CR 116/Larkin Road with Traffic Signal Control**

Scenario	AM Peak Hour LOS	PM Peak Hour LOS
2027 Build	B/B	B/B
2040 Build	B/C	B/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All movements and the overall intersection operate at LOS C or better during the a.m. and p.m. peak hours under both scenarios.

2.6 FINDINGS

- The proposed development is expected to generate 320 trips during the a.m. peak hour, 314 trips during the p.m. peak hour, and 2,072 trips daily.

- All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours under the 2022, 2027 No-Build, 2027 Build, and 2040 No-Build scenarios. Under the 2040 Build scenario, the eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better.

- The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County.

- Based on the traffic forecasts and operations analysis for each intersection, the following mitigation measures are recommended:
    - CSAH 10/CR 116
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CSAH 10/CSAH 50
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CR 116/Larkin Road
        - Short term – Widen the eastbound and westbound approaches to accommodate a left turn lane and a through/right turn lane. Widen the northbound and southbound approaches to accommodate a left turn lane, through lane, and right turn lane.
        - Long term – Monitor traffic volumes to determine when signal control is warranted.
    - Larkin Road/Blue Bonnet Drive/development access
        - Short term – Intersection should be constructed as required per City practice for new development projects. Construct westbound left turn land and westbound right turn lane. Construct eastbound left turn lane. Construct southbound approach with a dedicated left turn land and a through/right turn lane.
        - Long term – Construct eastbound right turn lane with additional development to the south.

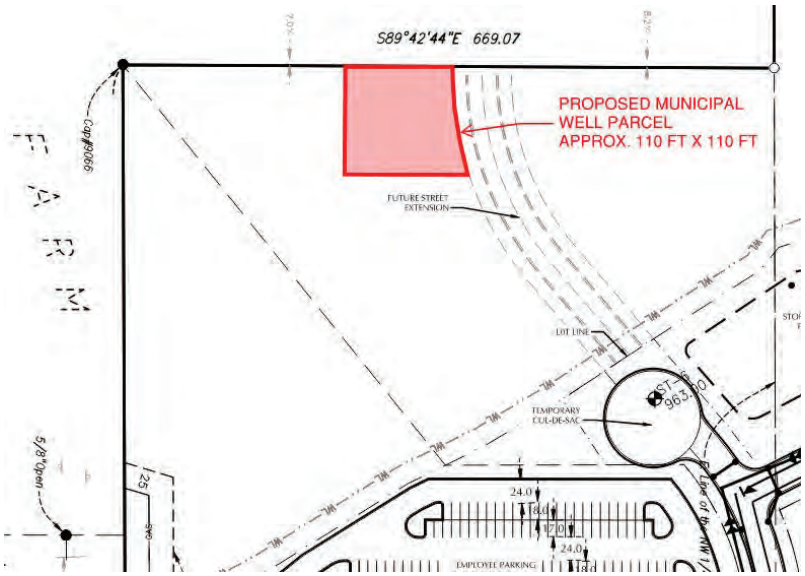
3.0 WATER

3.1 BACKGROUND

The water supply for the Corcoran Farms Business Park development will be the same as planned for all of SE Corcoran. Under a contract to provide water service, Maple Grove will continue to supply SE Corcoran with up to a peak of 5 million gallons per day (MGD).

Multiple service options were evaluated, each consisting of varying watermain layouts and sizes within and outside of the development. Evaluations were conducted using the computer modeling software WaterCAD, which simulates the water system's response to average and peak demands and firefighting scenarios. Each condition creates different responses in the water system. The modeling results help to identify and evaluate the various options for supplying water to the Corcoran Farms Business Park development.

It is noted that the City is requesting that the developer provide a parcel to the City for locating a future municipal well within Corcoran Farms Business Park (approximately 110 by 110 feet in size). Also, as discussed in the SE Corcoran water supply analysis draft report (Stantec draft report dated April 5, 2022), this may be a good location for one of the three initial test wells recommended for long-term supply within SE Corcoran. Figure 1 shows the location of the proposed municipal well parcel within the development.



Proposed Municipal Well Parcel

3.2 MODEL AND WATER SYSTEM CHARACTERISTICS

A map of the pipe network that was used for this modeling work is shown on Figure 2. The water system performance was evaluated just before and after the point at which the future water tower and booster station would be constructed. Per the most recent SE Corcoran Water Supply Analysis, a 1-million-gallon (MG) water tower would be constructed near the point at which the maximum day demand (MDD) reaches 1,250 gpm (1.8 MGD). This was the total demand placed on the modeled pipe network used for this study. The water tower was assumed to be constructed somewhere just east of the downtown area, and the booster station would be constructed concurrently with the tower at a location just inside Corcoran at the Maple Grove connection (i.e., near node J-C2 as shown on Figure 2). For modeling purposes, the hydraulic grade line at the Maple Grove Connection was assumed to be 1098 ft MSL (as confirmed by a review of the Maple Grove WaterCAD model), and for scenarios including the water tower, the water level within the tank was assumed to be 1146 ft MSL (i.e., three-quarters full).

The southern boundary of Corcoran Farms Business Park coincides with the route of a planned 16-inch trunk main that is a critical part of the long-term SE water supply system. This evaluation considers the construction of this trunk water main concurrent with this development, which provides the opportunity to open trench this pipe along the edge of the business park, thus avoiding future disturbance. This alternative is evaluated in Scenarios 3, 6 and 9. Scenarios 1, 4 and 7 evaluate fire flow and pressures within the development without any looping (connecting to the 12-inch near County Road 50), and Scenarios 2, 5 and 8 evaluate the looping proposed by the developer, between the existing 12-inch south of County Road 50 and the 8-inch on 75th Ave North.

Additionally, sub-scenarios were evaluated to determine the effect of different watermain diameters within the development (scenarios denoted with the suffix “a” included all 8-inch pipes within the development and those denoted with the suffix “b” include a 12-inch pipe bisecting the development from north to south), and the effect of the planned 12-inch trunk watermain along the north side of Shamrock Golf Course (along Larkin Rd), which will provide an additional distribution pipe between the Maple Grove connection and the Western Water Loop along County Road 116 (scenarios 4-6 were run with the 12-inch connection turned on in the model, but without the water tower and booster station).

For commercial/industrial areas, a target fire flow of 3,000 gpm (3-hour duration) during the maximum day was assumed. New commercial/industrial buildings are assumed to be sprinklered and, as such, most of these buildings will ultimately have a lower acceptable target. However, 3,000 gpm is deemed a reasonable overall target, and allows for some conservatism in this safety-driven parameter.

3.3 SCENARIOS 1-3: WITHOUT PLANNED 12-INCH ALONG NORTH SIDE OF SHAMROCK GOLF COURSE

All scenarios described in this section were performed with the planned 12-inch main along Larkin between J-C15 and J-C11 turned off, reflecting current conditions.

Scenarios 1a, 2a, and 3a evaluated the watermain looping within the development, with all three scenarios assuming an 8-inch main connecting to the 12-inch watermain near County Road 50 (J-D4) and extending to the southern edge of the development at the intersection of Larkin Rd and Blue Bonnet Dr (Node J-L4). Scenario 1a included no looped piping (a single dead-end pipe), while Scenario 2a included an 8-inch loop to the existing 8-inch stub on 75th Ave N (J-D9) and Scenario 3a included the 16-inch loop along Larkin Rd to connect J-L4 to the 16-inch main on County Road 116 (J-C11). The results for these scenarios are shown in Table 10.

Table 10: 8-Inch Scenario Results, without 12-Inch along Golf Course

Node	Elevation (ft MSL)	Scenario 1a		Scenario 2a		Scenario 3a	
		Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)
J-D4	955	59.3	1,998	59.3	1,978	59.3	1,951
J-D9	975	50.6	1,864	50.6	1,906	50.6	1,887
J-L1	980	48.4	1,192	48.4	1,685	48.4	1,856
J-L2	968	53.6	1,155	53.6	1,767	53.6	1,891
J-L3	972	51.9	1,042	51.9	1,768	51.9	1,862
J-L4	970	52.8	997	52.8	1,548	52.7	1,827

As shown in Table 10, maximum day pressures are within the ideal range of 45-60 psi. Modeling also indicates that during the peak hour (of the maximum day, a condition of rare occurrence), pressures in the downtown area fall by approximately 7-8 psi. This means the lowest expected pressure within Corcoran Farms Business Park for these scenarios is approximately 42 psi, which is above the recommended minimum of 35 psi.

However, fire flows are below the 3,000-gpm target, even for the two looped scenarios. Note that J-D4, which is representative of most of the existing downtown nodes, is capped at approximately 2,000 gpm fire flow.

Scenarios 1b, 2b, and 3b were the same as 1a, 2a, and 3a except that the model assumed 12-inch main instead of 8-inch main bisecting the development from J-D4 to J-L4. Connecting loops retained the same diameter pipe as before (8-inch between J-L3 and J-D9, and 16-inch between J-L4 and J-C11). The results for these scenarios are shown in Table 11. Figures 3 and 4 show the fire flow and pressure results, respectively, for Scenario 2b.

Table 11: 12-Inch Scenario Results, without 12-Inch along Golf Course

Node	Elevation (ft MSL)	Scenario 1b		Scenario 2b		Scenario 3b	
		Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)
J-D4	955	59.3	1,998	59.3	1,973	59.2	1,928
J-D9	975	50.6	1,864	50.6	1,918	50.6	1,903
J-L1	980	48.4	1,975	48.4	1,964	48.4	1,909
J-L2	968	53.6	1,975	53.6	1,962	53.6	1,900
J-L3	972	51.9	1,951	51.9	1,961	51.9	1,887
J-L4	970	52.8	1,927	52.8	1,961	52.7	1,877

As shown in Table 11, the 12-inch improved fire flow for the stubbed scenario (1a vs. 1b), but fire flows remain below the 3,000-gpm target for all scenarios. It is noted that most of the existing downtown nodes are capped at approximately 2,000 gpm fire flow, indicating a potential bottleneck within the system in conveying high flows from the Maple Grove connection to this general area within Corcoran.

3.4 SCENARIOS 4-6: WITH PLANNED 12-INCH ALONG NORTH SIDE OF SHAMROCK GOLF COURSE

All scenarios described in this section were performed with the planned 12-inch main along Larkin between J-C15 and J-C11 turned on, reflecting planned future conditions. Given the results of Scenarios 1-3, Scenarios 4-6 were evaluated to see if fire flows in the downtown area, including the Corcoran Farms Business Park, could be improved to meet the 3,000-gpm target.

Scenarios 4a, 5a, and 6a were the same as 1a, 2a, and 3a except for the addition of the 12-inch along the north side of the golf course. All mains within Corcoran Farms Business Park were assumed to be 8-inch. The results for these scenarios are shown in Table 12.

Table 12: 8-Inch Scenario Results, with 12-Inch along Golf Course

Node	Elevation (ft MSL)	Scenario 4a		Scenario 5a		Scenario 6a	
		Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)
J-D4	955	60.6	3,161	60.6	3,555	60.6	3,603
J-D9	975	52	2,564	51.9	2,914	52	2,578
J-L1	980	49.7	1,337	49.8	2,058	49.8	2,425
J-L2	968	54.9	1,273	55	2,194	55	2,719
J-L3	972	53.2	1,136	53.2	2,138	53.3	3,080
J-L4	970	54.1	1,080	54.1	1,798	54.1	3,296

As shown in Table 12, maximum day pressures are marginally improved over those of Scenarios 1-3, improving by about 1 psi at all nodes. Modeling also indicates that during the peak hour (of the maximum day), pressures in the downtown area fall by approximately 3-4 psi. This means the lowest expected pressure within the Corcoran Farms Business Park for these scenarios is approximately 47 psi, which is above the recommended minimum of 35 psi.

More importantly, fire flows in the downtown area approach or exceed the 3,000-gpm target. However, nodes within the Corcoran Farms Business Park remain short of the target, even for the looped scenarios (e.g., 2,425 gpm at J-L1 for Scenario 6a). This suggests that 8-inch watermain within the development is not sufficient to meet target fire flow prior to the construction of the water tower.

Scenarios 4b, 5b, and 6b were the same as 4a, 5a, and 6a except that the model assumed 12-inch main instead of 8-inch main bisecting the development from J-D4 to J-L4. The results for these scenarios are shown in Table 13. Figures 5 and 6 show the fire flow and pressure results, respectively, for Scenario 5b. Figure 7 shows the fire flow results for Scenario 6b.

Table 13: 12-Inch Scenario Results, with 12-Inch along Golf Course

Node	Elevation (ft MSL)	Scenario 4b		Scenario 5b		Scenario 6b	
		Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)	Pressure (psi)	Fire Flow (gpm)
J-D4	955	60.6	3,162	60.6	3,449	60.6	3,465
J-D9	975	52	2,564	51.9	3,043	52	2,584
J-L1	980	49.8	2,492	49.8	2,954	49.8	3,382
J-L2	968	54.9	2,492	55	2,992	55	3,366
J-L3	972	53.2	2,373	53.2	2,979	53.3	3,353
J-L4	970	54.1	2,322	54.1	2,860	54.1	3,344

As shown in Table 13, the results of Scenario 4b indicate that a non-looped distribution system within the development would not be acceptable from a fire flow perspective, in addition to water quality concerns associated with long dead ends.

However, fire flow results for Scenarios 5b and 6b effectively meet or exceed the 3,000-gpm target for most nodes except those at dead end nodes (i.e., J-L4 for Scenario 5b and J-D9 for Scenario 6b). Note that in the case of J-L4, this dead-end stub would ultimately be connected to the planned trunk watermain along Larkin Rd. Comparing the results of Scenario 2b and Scenario 5b demonstrates the effect of the 12-inch main along the northern edge of Shamrock Golf Course – its construction would greatly improve available fire flows in and around downtown Corcoran, including Corcoran Farms Business Park.

Although both looping options can provide the desired 3,000 gpm fire flow within the development once the 12-inch is installed along the golf course, Scenario 6b (with the 16-inch along Larkin Rd) provides approximately 400-500 gpm additional fire flow at each node within the business park. An additional benefit to this alternative is that it would avoid future disturbance along the edge of the business park when this trunk main ultimately needs to be constructed to serve the greater SE Corcoran water system.

3.5 SCENARIOS 7-9: POST-TOWER AND BOOSTER STATION

For scenarios 7-9, the same in-development looping and pipe sizing scenarios were modeled as described above, but with the water tower and booster station, along with the 12-inch main along Larkin between J-C15 and J-C11, turned on. These scenarios represent the planned future conditions just after the construction of SE Corcoran's first water tower, which is expected once total system MDD reaches approximately 1.8 MGD.

For all scenarios with the water tower and booster station on, pressures within Corcoran Farms Business Park range from 72-80 psi on the maximum day. Apart from the non-looped scenarios with 8-inch dead ends, available fire flow exceeded the 3,000-gpm target for all nodes within downtown, including Corcoran Farms Business Park.

These results indicate that adding the currently planned 1 MG tower with a hydraulic grade line of 1,156 feet (with the accompanying booster station) will provide acceptable results for all pressure and fire flow scenarios that were evaluated, with the exception of non-looped 8-inch dead ends.

3.6 FINDINGS

The following key findings and recommendation are made:

- Looping of watermain within the development is required; for example, by looping between the existing 12-inch south of County Road 50 and the 8-inch on 75th Ave North, such as shown on the developer's submitted utility plan, or by extending the planned 16-inch trunk watermain from County Road 116 along Larkin Rd and connecting to the development at the Larkin Rd and Blue Bonnet Dr intersection.
- While fire flow within the business park is not necessarily a driver for installing the 16-inch main along Larkin Rd, the development presents an opportunity to open trench this pipe (which is a critical part of the long-term SE water supply system) now to avoid future disturbance.
- If the planned 16-inch trunk main along Larkin Rd is not constructed concurrently with this development, provide an easement for future construction of this trunk watermain along the development boundary on Larkin Rd.
- 12-inch watermain within the development is required, running north-south through the development between connection to the 12-inch near County Road 50 and the connection (or stub) to the planned 16-inch trunk main at the intersection of Larkin Rd and Blue Bonnet Dr.
- Construction of the planned 12-inch trunk watermain along the north side of Shamrock Golf Course (along Larkin Rd) is critical to ensure future target fire flows of 3,000 gpm can be provided to downtown areas including Corcoran Farms Business Park. It is assumed that this pipe will be constructed prior to the first water tower in SE Corcoran, however timing is uncertain.

- It is noted that the City is requesting that the developer provide a parcel to the City for locating a future municipal well within Corcoran Farms Business Park (approximately 110 by 110 feet in size). Also, as discussed in the SE Corcoran Water Supply Analysis draft report, this may be a good location for one of the three initial test wells recommended for long-term supply within SE Corcoran.

4.0 SEWER

4.1 SEWER LAYOUT

Sewer service for the proposed development will be via a tie-in to the existing 18-inch trunk sewer located near the northeast corner of the parcel. In accordance with the City's 2040 Comprehensive Plan, the developer will construct 18-inch sewer southward through the development to the southern parcel line along Larkin Road (Figure 8). Utilizing the two sewer slopes shown on Figure 8 should yield a sewer invert at Larkin Road that meets the target invert in the Comprehensive Plan (942.5).

In addition to the primary 18-inch trunk sewer, two sewer stubs must also be constructed in accordance with the Comprehensive Plan (see Figure 8). A 12-inch trunk sewer stub to the west parcel line must be constructed at approximately the same installation depth as the 18-inch sewer (i.e., as deep as possible, allowing for proper tie-in at the tee manhole). This will provide service to new developments located to the west of this development. An 8-inch sewer lateral to the southeast corner of the parcel must also be constructed to serve the parcels located further east (e.g., future connection of Larkin Road parcels). The sewer invert at the southeast corner should be 950.0 (approximately 20-foot depth), and a drop manhole may be utilized at the tie-in to the 18-inch trunk sewer, as appropriate.

In order to avoid overloading the City's existing and planned wastewater infrastructure, the developer must limit the total wastewater volume from all lots combined to not more than 0.064 mgd (average day). This is the volume of wastewater that has been planned for in the MCES-approved Comprehensive Plan. This is particularly important given that the Rush Creek Reserve development (located north of this proposed development and downstream in the local sewershed) is in the process of building a new wastewater lift station to replace the previously used lift station on County Road 10. The new lift station is adequately sized to accommodate *planned* wastewater flows from this and other developments, but any *unplanned* increase could potentially exceed this lift station's design capacity.

Permanent easements for the trunk and lateral sewers will be dedicated to the City. Where both sewer and potable water utilities are being installed in parallel, the easements must be wide enough to accommodate the required separation distance between sewer and potable water lines.

Upsize credits will apply for the trunk sewer segments that are constructed by the developer (12- and 18-inch sewer).

4.2 FINDINGS

The following key findings and recommendations are made:

- Developer to construct the 18-inch trunk sewer as shown on Figure 8.
- Developer to construct the 12-inch trunk sewer stub to the west and the 8-inch lateral sewer stub to the east as shown on Figure 1.

- Developer must limit the total wastewater volume from all lots combined to not more than 0.064 mgd (average day).
- Permanent easements for the trunk and lateral sewers will be dedicated to the City.
- Upsize credits will apply for the trunk sewer segments that are constructed by the developer (12- and 18-inch sewer).
- Developer shall provide stubs to adjacent parcels.

5.0 WATER RESOURCES

5.1 REGULATORY OVERVIEW

Stormwater management regulations in the proposed project area would be guided or directed by Corcoran's Local Surface Water Management Plan (Local Plan) the City's Guidelines, Stormwater Pollution Prevention Plan (SWPPP) and MS4 requirements. Each of these documents has a larger regulatory context:

The Local Plan reflects the goals, policies and rules of the Elm Creek Watershed Management Commission's Third Generation Watershed Management Plan (Commission's WMP).

The SWPPP is a requirement of the City's stormwater permit, also known as the Municipal Separate Storm Sewer System (MS4) permit. The MS4 permit is issued by the Minnesota Pollution Control Agency (MPCA) which was reissued in October of 2021.

Among other goals, both documents include plans to meet pollutant load reductions calculated in the Elm Creek Watershed Total Maximum Daily Load (TMDL) study. TMDL studies are required for surface waters that are designated as impaired – in other words, those that do not meet one or more state water quality standards.

City guidelines lay out the required modeling parameters, preferred BMPs and some construction materials. City approval is required prior to application for the WMO approval process. Further City review occurs with construction plan approval process.

5.2 WATERSHED SETTING AND LAND USE

The proposed development is situated in the South Fork of Rush Creek watershed, and drains east, northwest and eventually north towards the City Park and the South Fork of Rush Creek. Existing land use in the proposed development is agricultural and topography is gently rolling/flat with a maximum topography difference of approximately 25 feet. The urbanizing MUSA areas undergo changes from agricultural to non-agricultural land use that presents challenges where land use will change from row crops to commercial/industrial.

5.3 STORMWATER MANAGEMENT

The development on the parcel was agricultural use of the land would cease, replaced by both pervious open space and impervious surfaces that will impact stormwater runoff.

Although elimination of agriculture can benefit water quality by reducing export of nutrients and sediments through onsite ponding and filtration (Best Management Practices or BMPs), construction of additional impervious surfaces, such as the roads, driveways, rooftops, and sidewalks increase the volume to nearby surface waters. Turn lane improvements to HWY 55 and Pioneer Trail would also increase

impervious surface area and, like neighborhood roads and driveways, would require practices to mitigate the impacts.

Mitigation is accomplished by aligning development plans with City requirements and WMO/MS4 stormwater regulations. Corcoran's Local Plan, in agreement with the Commission's WMP, requires that development plans over 1-acre disturbed area be submitted to the City and the Commission for review. The purpose of the review is to ensure that the developer's plans for stormwater management during and after construction meet the Commission's rules regarding the rate, volume and pollutant load of stormwater runoff, along with other rules regarding wetland alteration, erosion and sediment control and other aspects of surface water protection. The City focuses on rates of discharge, downstream impacts and long-term construction sustainability.

This adherence to Commission rules on water quality (BMPs) is one of the strategies Corcoran has chosen to also meet its TMDL obligations to reduce nutrients. The implementation plan calls on Corcoran to apply these standards when land use changes, a strategy that is predicted to have the net result of improving, or not further degrading, the water quality of stormwater runoff. Stormwater modeling guidelines are in Appendix B and may be updated prior to development's final construction plan approval.

Complementing the Local Plan, Corcoran's SWPPP requires plan review, construction site erosion and sediment control, and post-construction stormwater management. Construction site inspections by the City's consultant will begin with land-disturbing activity and end with final stabilization of exposed soils and City acceptance of the development. After construction, the City would enter an agreement with tany developer's common area association or similar group to ensure that stormwater Best Management Practices continue to function and are maintained as intended.

5.4 FINDINGS

Onsite

- Stormwater improvements are necessary within the development to meet City guidelines and in accordance with regulations of the WMO.
- To move towards meeting load reduction goals, the City's Local Surface Water Plan identifies that improvements to water resources will occur with development.
- Ponding areas and limits will be closely reviewed for adjacent properties

Offsite

Offsite conveyance impacts for the development will be further explored as follows:

- Drainage path along the north side of to ensure CR 50 conveyance is free flowing

The City is exploring a stormwater fee that may be incorporated in 2022.

6.0 FINANCING

Financing options of the development necessary for infrastructure and to mitigate impacts typically follow the approach of:

- On-site infrastructure is managed by the developer
- Trunk sewer, water and potentially stormwater area charges are due at time of final plat.
    - Oversizing for sewer and water piping receive credit against the TLAC fees associated with piping,
- Off-site projects are typically managed by the by City (engineering, bidding and construction management) through an escrow provided by developer.

The financial package will be further detailed and negotiated as the project moves forward and culminates in the overall Developer Agreement with the overall preliminary plat approval which is updated for each phase of the development.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following infrastructure improvements are feasible and necessary to manage the development. These improvements are consistent with similar requirements for other developments in Corcoran.

Transportation

- The proposed development is expected to generate 320 trips during the a.m. peak hour, 314 trips during the p.m. peak hour, and 2,072 trips daily.

- All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours under the 2022, 2027 No-Build, 2027 Build, and 2040 No-Build scenarios. Under the 2040 Build scenario, the eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better.

- The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County.

- Based on the traffic forecasts and operations analysis for each intersection, the following mitigation measures are recommended:

    - CSAH 10/CR 116
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CSAH 10/CSAH 50
        - Short term – No improvements needed.
        - Long term – No improvements needed.
    - CR 116/Larkin Road
        - Short term – Widen the eastbound and westbound approaches to accommodate a left turn lane and a through/right turn lane. Widen the northbound and southbound approaches to accommodate a left turn lane, through lane, and right turn lane.
        - Long term – Monitor traffic volumes to determine when signal control is warranted.
    - Larkin Road/Blue Bonnet Drive/development access
        - Short term – Intersection should be constructed as required per City practice for new development projects. Construct westbound left turn lane and westbound right turn lane. Construct eastbound left turn lane. Construct southbound approach with a dedicated left turn land and a through/right turn lane.
        - Long term – Construct eastbound right turn lane with additional development to the south.

Water

The following key findings and recommendation are made:

- Looping of watermain within the development is required; for example, by looping between the existing 12-inch south of County Road 50 and the 8-inch on 75th Ave North, such as shown on the developer's submitted utility plan, or by extending the planned 16-inch trunk watermain from County Road 116 along Larkin Rd and connecting to the development at the Larkin Rd and Blue Bonnet Dr intersection.
- While fire flow within the business park is not necessarily a driver for installing the 16-inch main along Larkin Rd, the development presents an opportunity to open trench this pipe (which is a critical part of the long-term SE water supply system) now to avoid future disturbance.
- If the planned 16-inch trunk main along Larkin Rd is not constructed concurrently with this development, provide an easement for future construction of this trunk watermain along the development boundary on Larkin Rd.
- 12-inch watermain within the development is required, running north-south through the development between connection to the 12-inch near County Road 50 and the connection (or stub) to the planned 16-inch trunk main at the intersection of Larkin Rd and Blue Bonnet Dr.
- Construction of the planned 12-inch trunk watermain along the north side of Shamrock Golf Course (along Larkin Rd) is critical to ensure future target fire flows of 3,000 gpm can be provided to downtown areas including Corcoran Farms Business Park. It is assumed that this pipe will be constructed prior to the first water tower in SE Corcoran, however timing is uncertain.
- It is noted that the City is requesting that the developer provide a parcel to the City for locating a future municipal well within Corcoran Farms Business Park (approximately 110 by 110 feet in size). Also, as discussed in the SE Corcoran Water Supply Analysis draft report, this may be a good location for one of the three initial test wells recommended for long-term supply within SE Corcoran.

Sewer

The following key findings and recommendations are made:

- Developer to construct the 18-inch trunk sewer as shown on Figure 8.
- Developer to construct the 12-inch trunk sewer stub to the west and the 8-inch lateral sewer stub to the east as shown on Figure 1.
- Developer must limit the total wastewater volume from all lots combined to not more than 0.064 mgd (average day).
- Permanent easements for the trunk and lateral sewers will be dedicated to the City.

- Upsize credits will apply for the trunk sewer segments that are constructed by the developer (12- and 18-inch sewer).
- Developer shall provide stubs to adjacent parcels

Water Resources

Onsite

- Stormwater improvements are necessary within the development to meet City guidelines and in accordance with regulations of the WMO.
- To move towards meeting load reduction goals, the City's Local Surface Water Plan identifies that improvements to water resources will occur with development.
- Ponding areas and limits will be closely reviewed for adjacent properties

Offsite

Offsite conveyance impacts for the development will be further explored as follows:

- Drainage path along the north side of to ensure CR 50 conveyance is free flowing

The City is exploring a stormwater fee that may be incorporated in 2022.

FIGURES

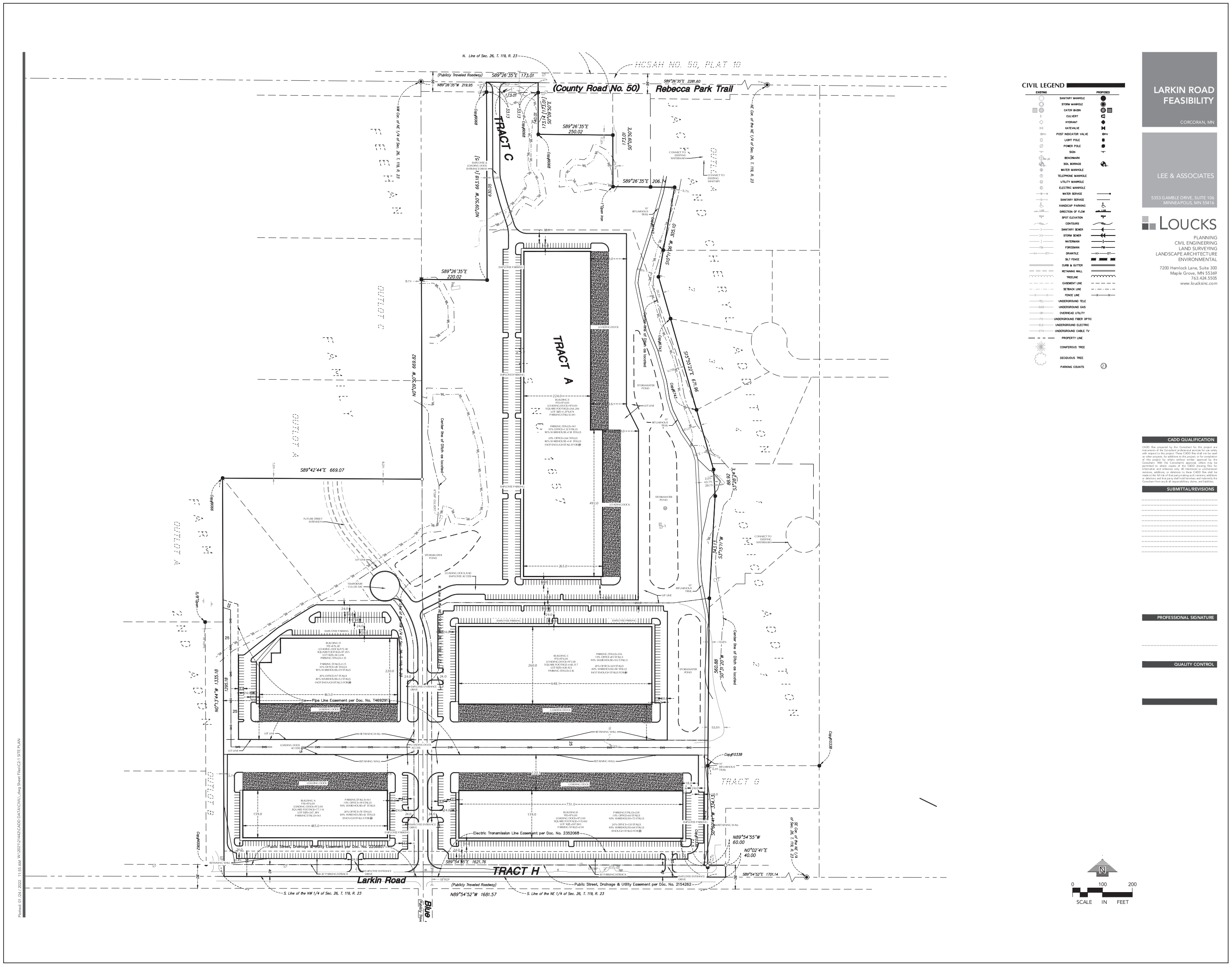


Figure No.
1

Title
Site Plan

Client/Project
City of Corcoran
Corcoran Farms Business Park

227704868

Project Location
Corcoran, Hennepin Co., MN

Prepared by JCS on 2022-05-05

Notes
1. Coordinate System:
2. Data Sources: Loucks
3. Background: Site Plan

Stantec

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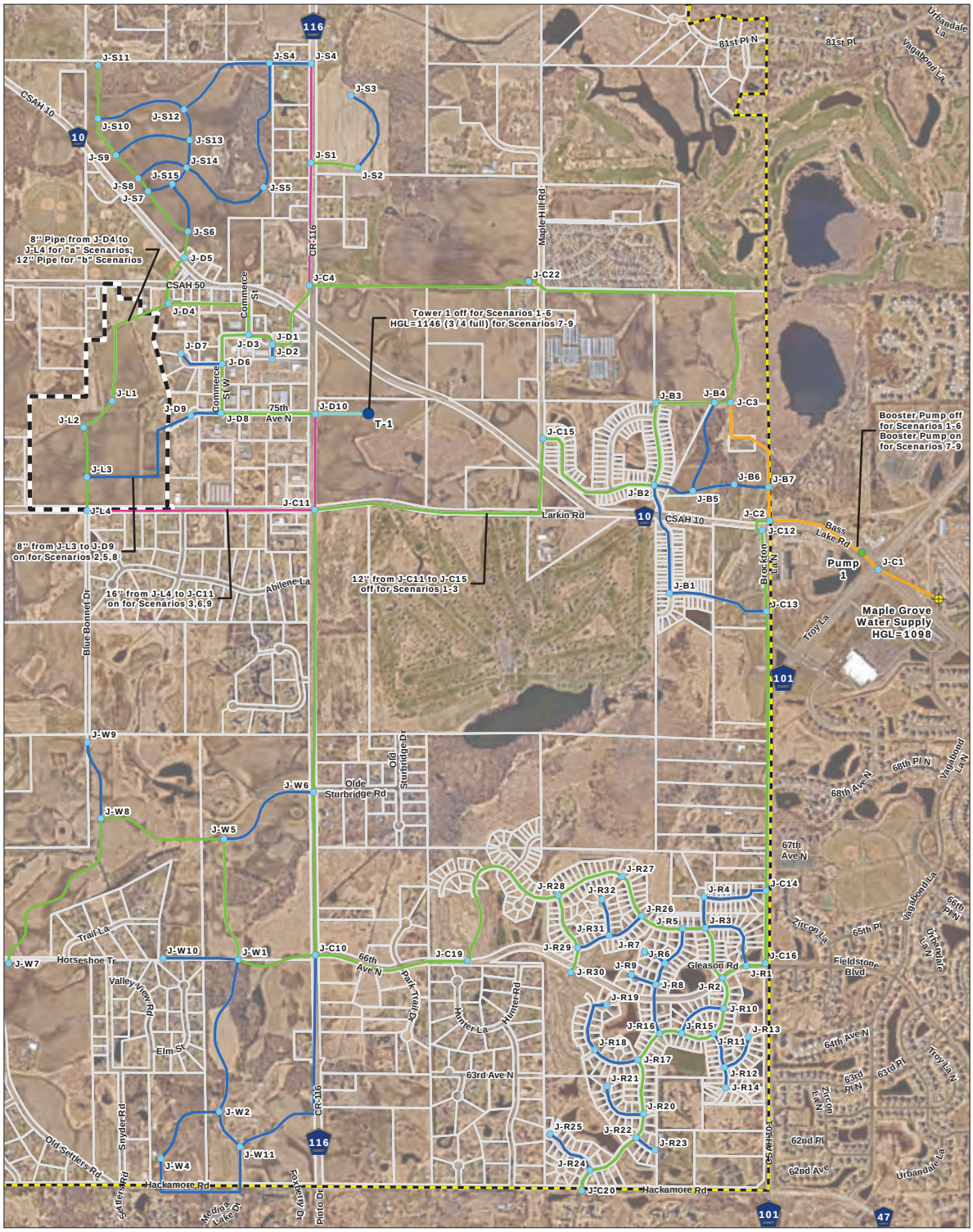
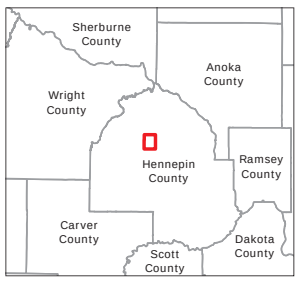




Legend

- Larkin Industrial Development
- Municipal Boundary
- Parcels
- 8" Watermain
- 12" Watermain
- 16" Watermain
- 20" Watermain
- 24" Watermain
- Water Nodes
- Pump
- Tank
- Wells

0 1,200 2,400 Feet

(At original document size of 11x17)
1:14,400

N

Notes

1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Imagery

Stantec

Project Location
Corcoran, Hennepin Co., MN

Prepared by JCS on 2022-05-05

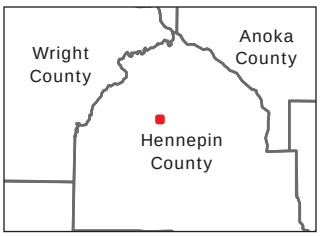
Client/Project
227704868

City of Corcoran
Corcoran Farms Business Park

Figure No.
2

Title
Water System Layout

V:\227\active\227704868\03_data\gis_cad\gis\prod\ls.aprx Revised: 2022-05-05 By: jshuck



Legend

- Project Area
- County Parcels
- Existing Sewer
- Existing Sanitary Manhole
- Proposed Sewer Lines
- Proposed Manholes

0 200 400 Feet

(At original document size of 8.5x11)
1:4,800

N

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Aerial Photograph

Stantec

Project Location
T119N, R23W, S25
Corcoran, Hennepin Co., MN

Prepared by JCS on 2022-05-05

Client/Project
City of Corcoran
Corcoran Farms Business Park

227704868

Figure No.
8

Title
Sewer Layout

V:\227\active\227704868\03_data\gis_cad\gis\pro\tsfs.aprx Revised: 2022-05-05 By: jshuck

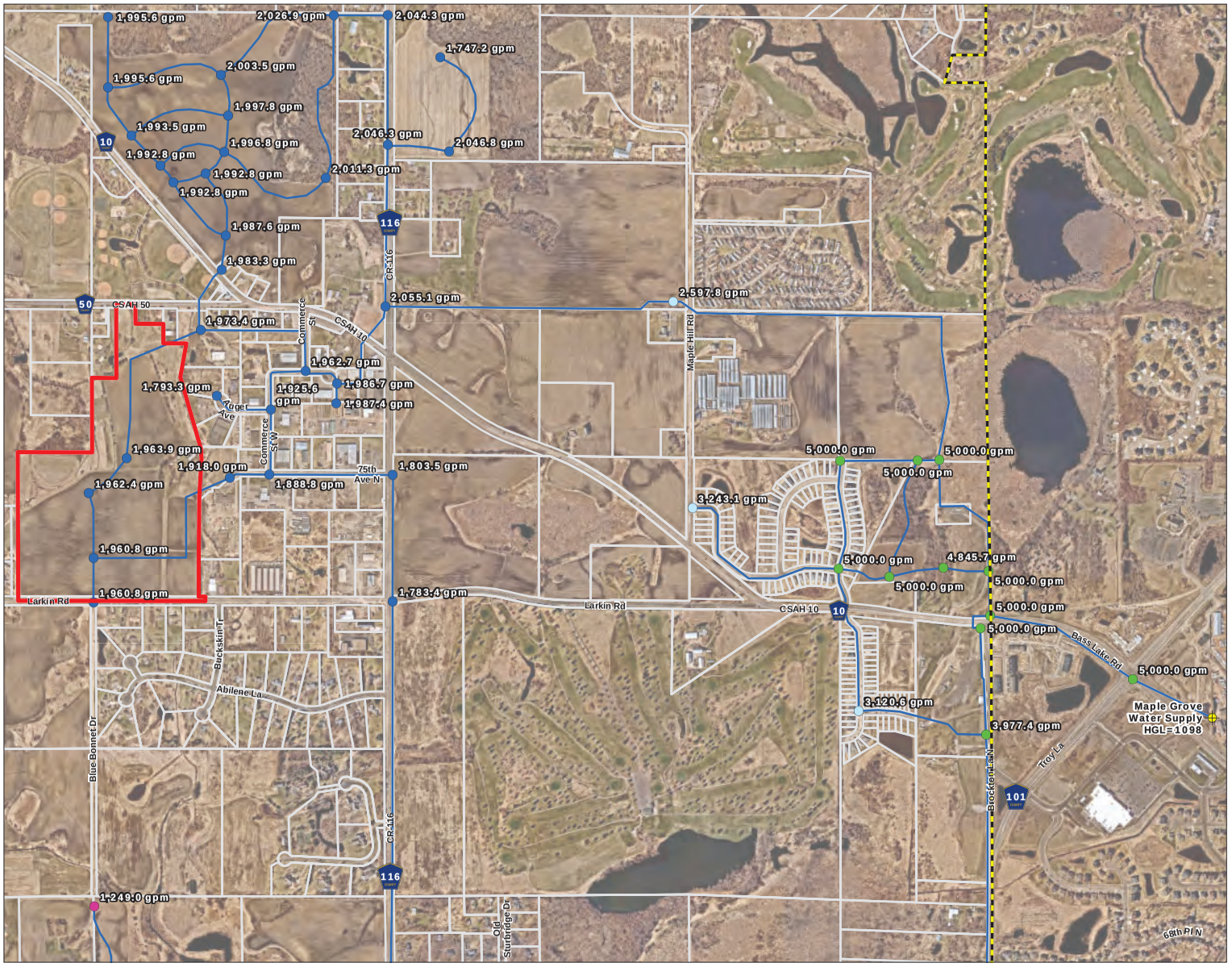


Figure No.
3

Title
Scenario 2b Fire Flow

Client/Project 227704868
City of Corcoran
Corcoran Farms Business Park

Project Location
Corcoran, Hennepin Co., MN

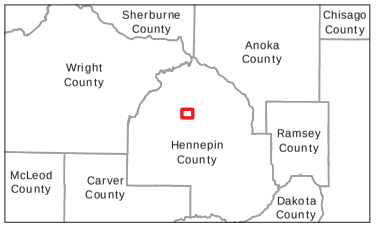
Prepared by JCS on 2022-05-05

N

0 450 900 Feet
(At original document size of 11x17)
1:10,800

Legend
- Municipal Boundary
- Larkin Industrial Development
- Parcels
- Water Supply

Available Fire Flow
- >3,500 gpm
- 2,500-3,500 gpm
- 1,500-2,500 gpm
- 500-1,500 gpm
- Pipes



Notes
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2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Imagery

Stantec

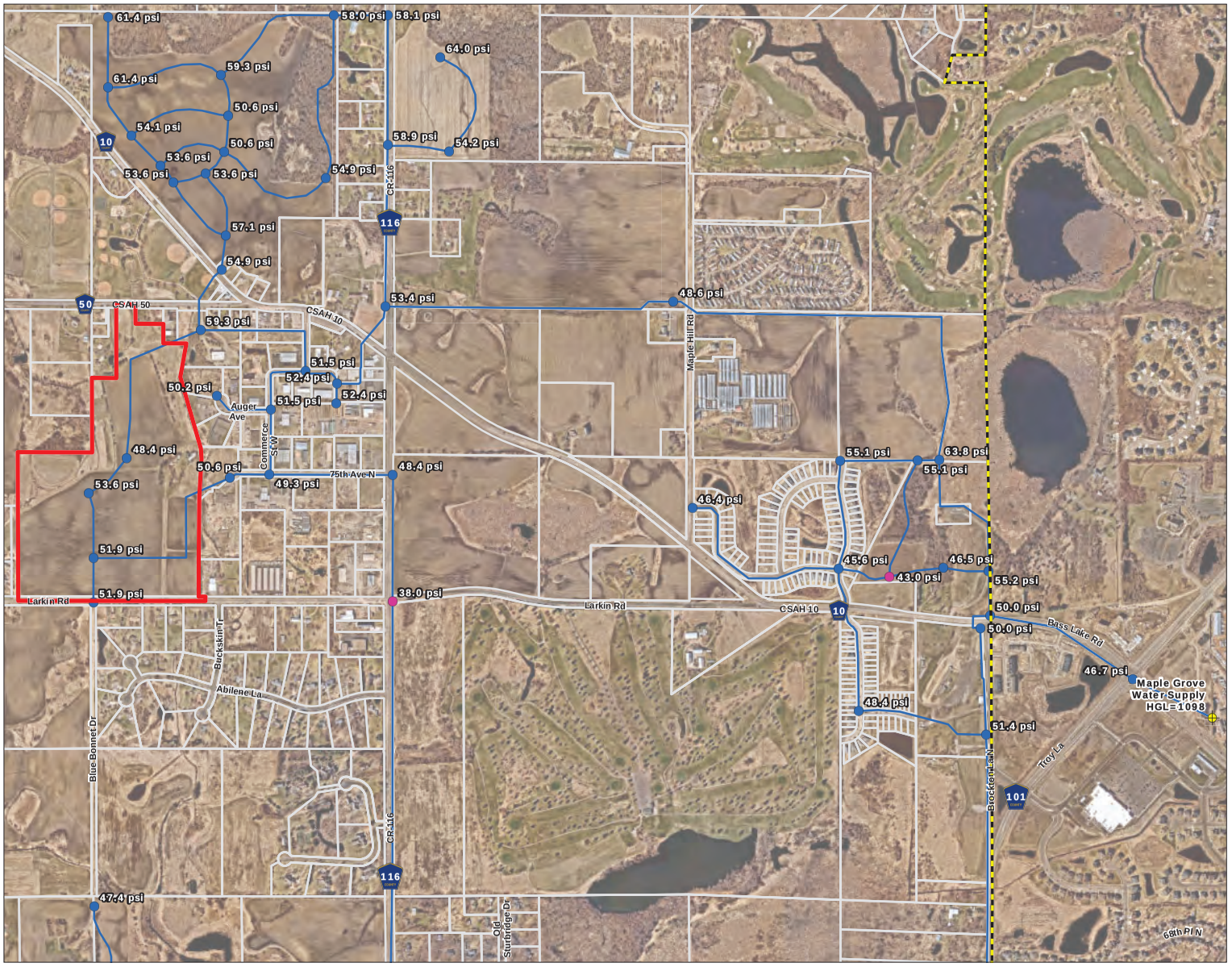


Figure No.
4

Title
Scenario 2b Pressure

Client/Project 227704868
City of Corcoran
Corcoran Farms Business Park

Project Location
Corcoran, Hennepin Co., MN

Prepared by JCS on 2022-05-05

N

0 450 900 Feet
(At original document size of 11x17)
1:10,800

Legend
- Municipal Boundary
- Larkin Industrial Development
- Parcels
- Water Supply

Pressure
- 45-65 psi
- 30-45 psi
- Pipes

Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Imagery

Stantec

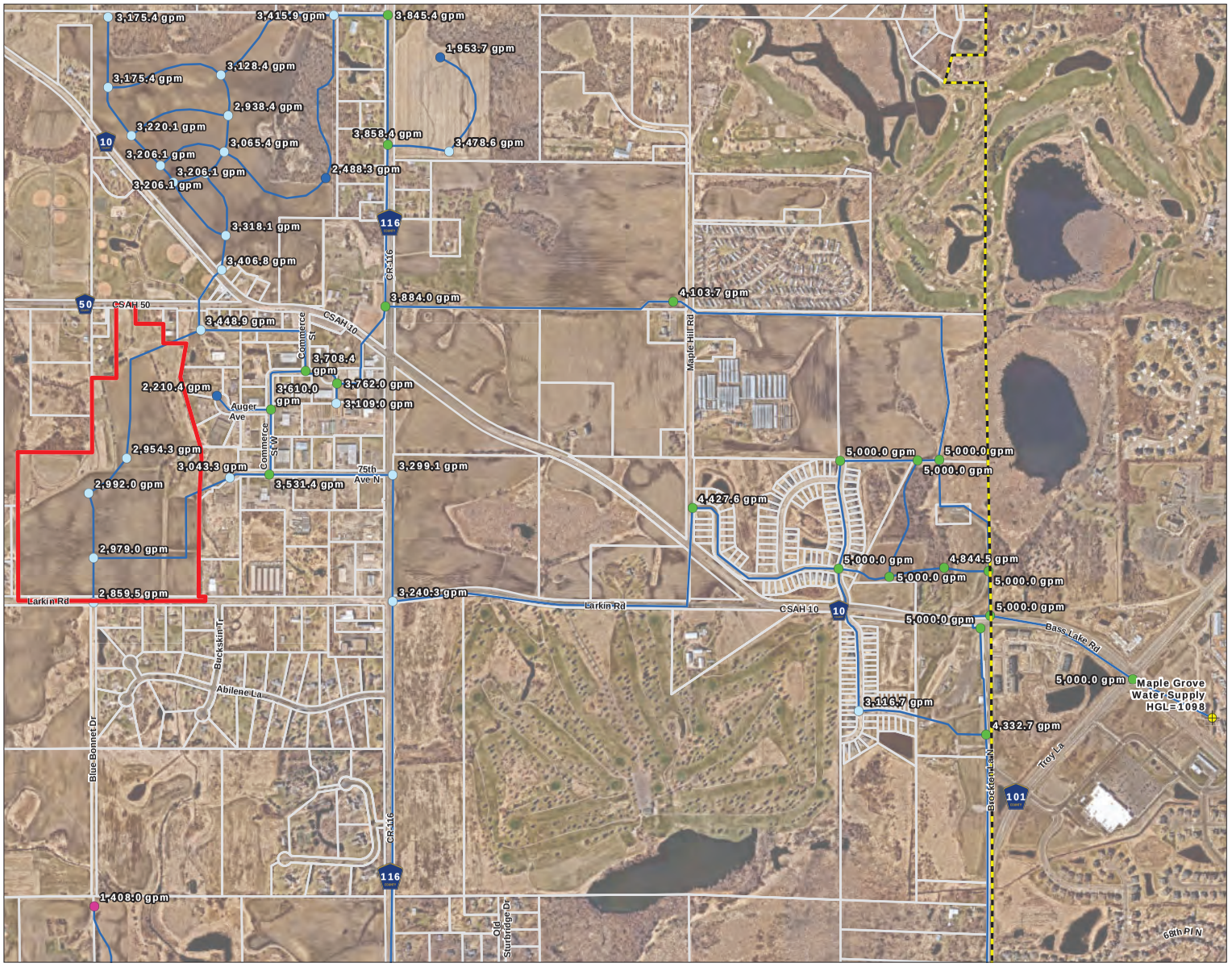


Figure No.
5

Title
Scenario 5b Fire Flow

Client/Project 227704868
City of Corcoran
Corcoran Farms Business Park

Project Location
Corcoran, Hennepin Co., MN

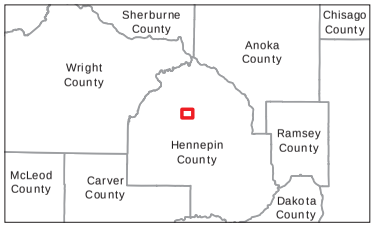
Prepared by JCS on 2022-05-05

N

0 450 900 Feet
(At original document size of 11x17)
1:10,800

Legend
- Municipal Boundary
- Larkin Industrial Development
- Parcels
- Water Supply

Available Fire Flow
- >3,500 gpm
- 2,500-3,500 gpm
- 1,500-2,500 gpm
- 500-1,500 gpm
- Pipes



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Imagery

Stantec

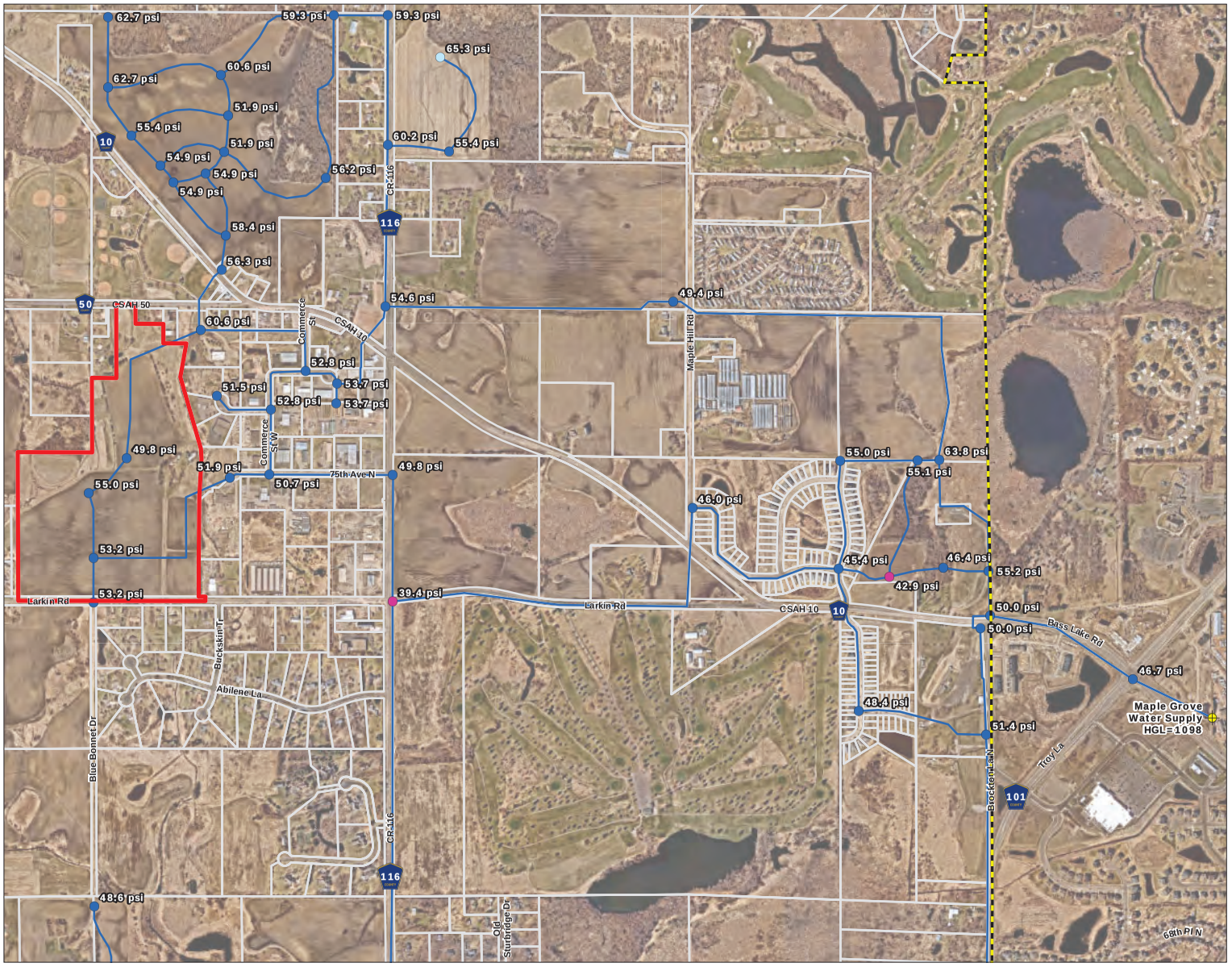


Figure No.
6

Title
Scenario 5b Pressure

Client/Project 227704868
City of Corcoran
Corcoran Farms Business Park

Project Location
Corcoran, Hennepin Co., MN

Prepared by JCS on 2022-05-05

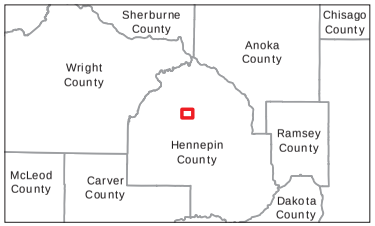
N

0 450 900 Feet
(At original document size of 11x17)
1:10,800

Legend
- Municipal Boundary
- Larkin Industrial Development
- Parcels
- Water Supply
- Pipes

Pressure
- 65-85 psi
- 45-65 psi
- 30-45 psi

Note: Pressures for Scenario 6b are similar



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Imagery

Stantec

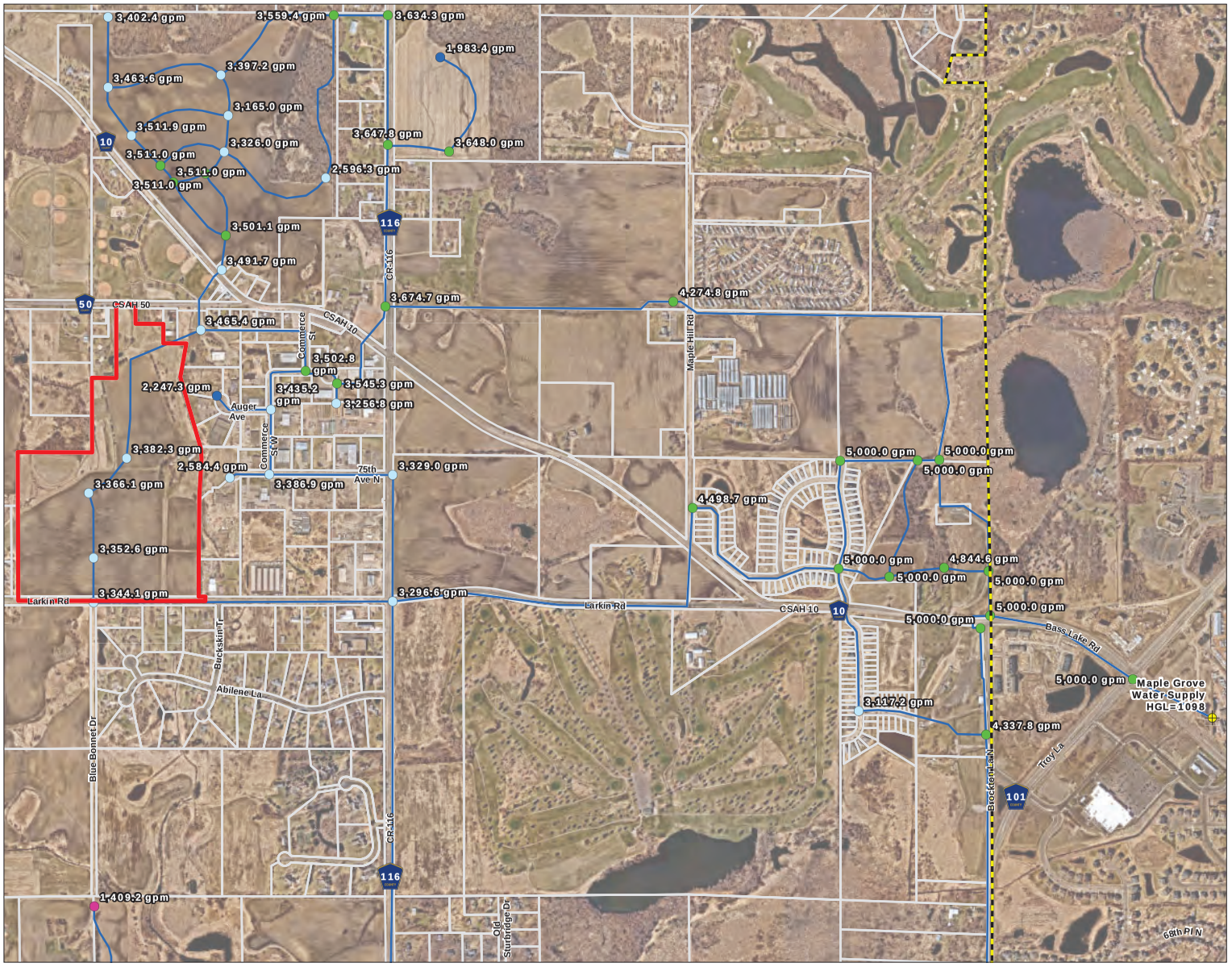


Figure No.
7

Title
Scenario 6b Fire Flow

Client/Project 227704868
City of Corcoran
Corcoran Farms Business Park

Project Location
Corcoran, Hennepin Co., MN

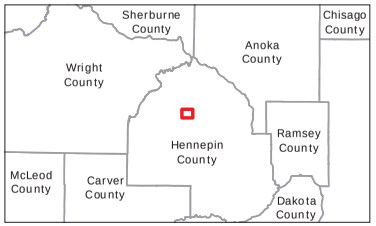
Prepared by JCS on 2022-05-05

N

0 450 900 Feet
(At original document size of 11x17)
1:10,800

Legend
- Municipal Boundary
- Larkin Industrial Development
- Parcels
- Water Supply
- Pipes

Available Fire Flow
- >3,500 gpm
- 2,500-3,500 gpm
- 1,500-2,500 gpm
- 500-1,500 gpm

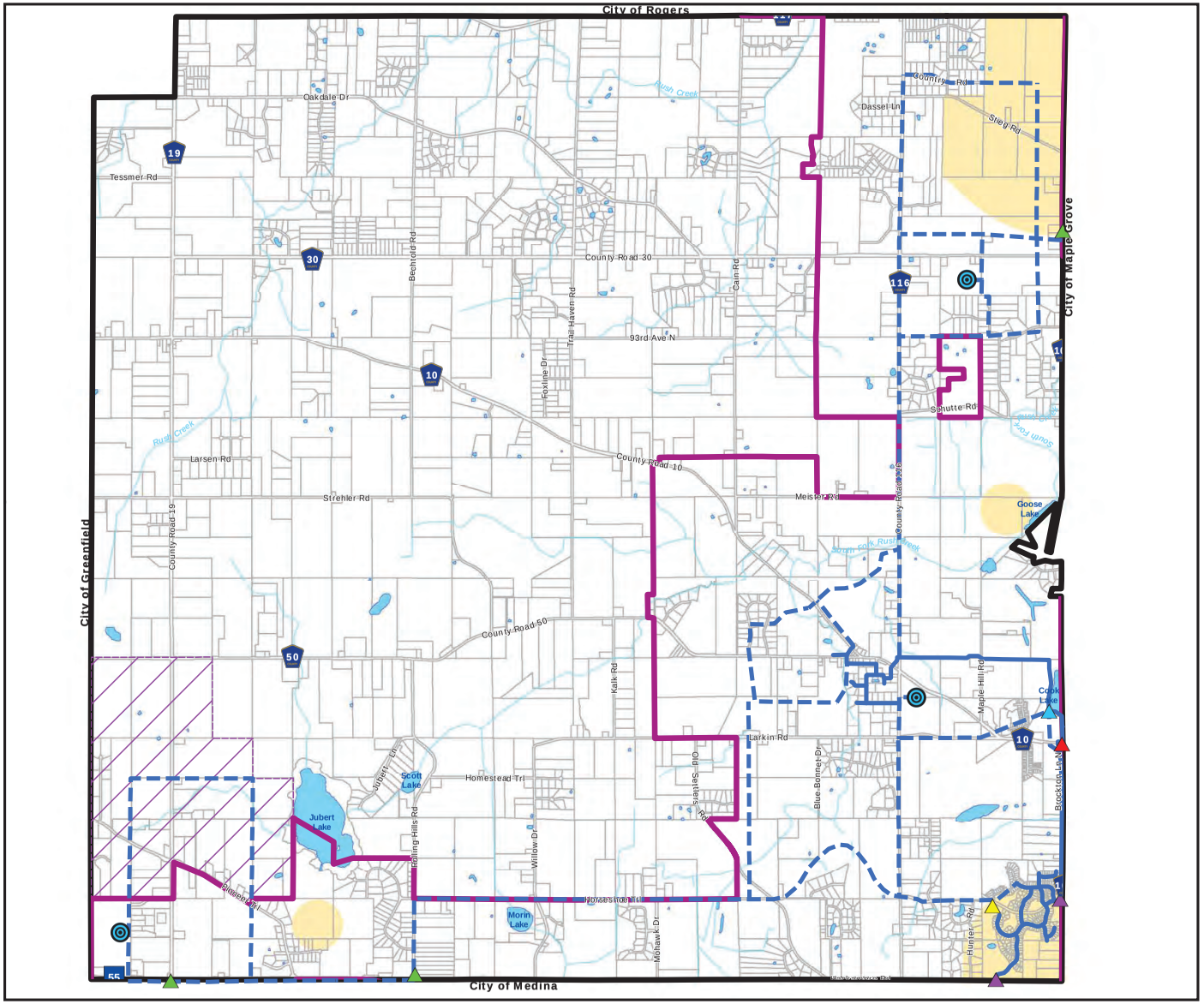


Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: Hennepin County
3. Background: Hennepin County 2020 Imagery

Stantec

APPENDIX A

Comprehensive Sewer and Water Plans



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

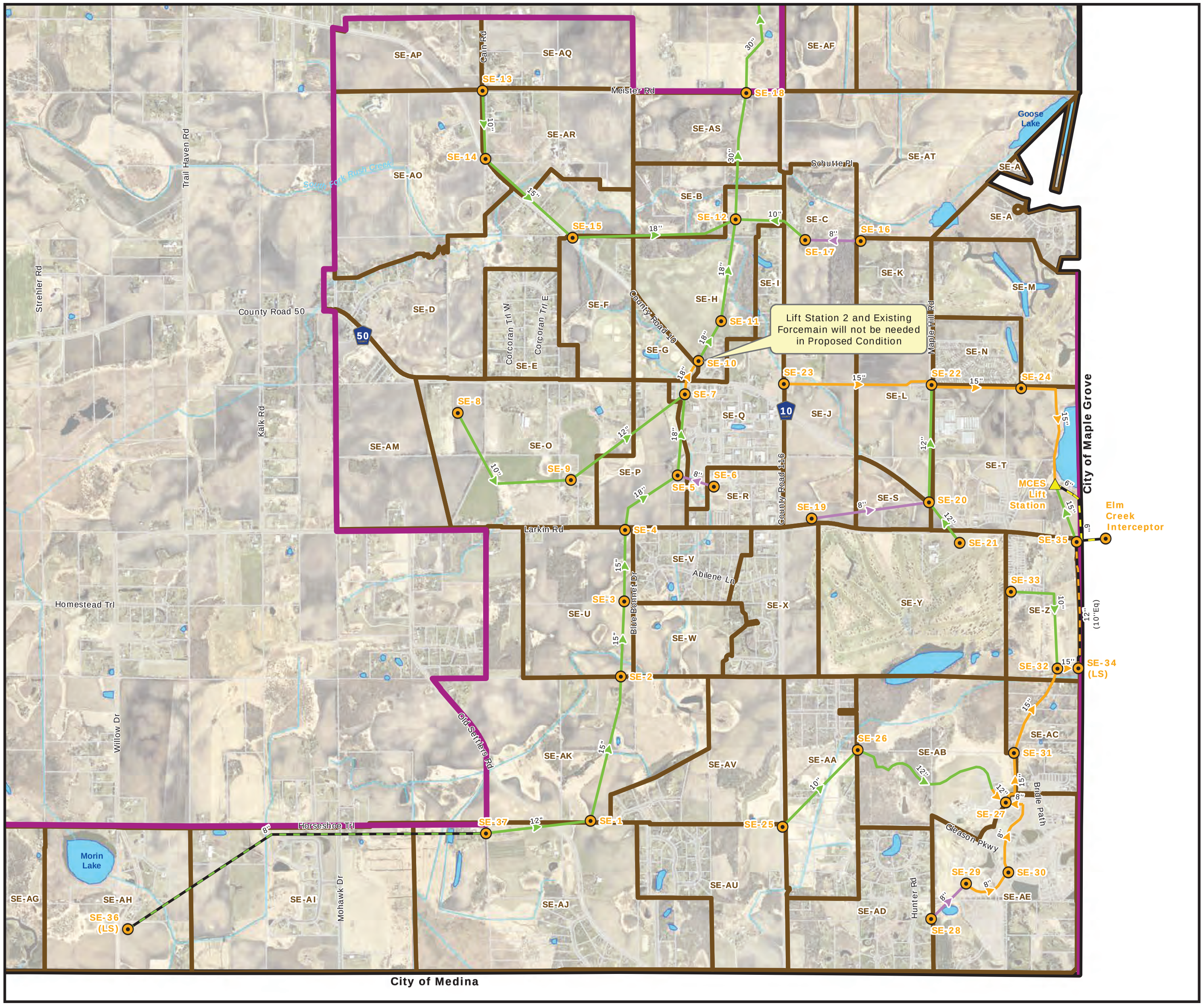
Map 9-2
Trunk Water System

- Existing Watermain
- Proposed Watermain
- Potential Water Tower Locations
- Existing Supply Connection with Neighboring Communities
- Proposed Supply Connection with Neighboring Communities
- Emergency Connection with Neighboring Communities (Normally Closed)
- Potential Water Storage
- Potential Booster Station
- Potential Future Well Exploration Areas
- Municipal Boundary
- 2040 MUSA
- Future MUSA Expansion Area
- Parcel Boundaries
- Streams
- Lake/Open Water

3,000 1,500 0 3,000
Feet

N

Path: L:\2294\100\2040CompPlan\Trunk Water System.mxd
Date: 1/15/2019 Time: 1:36:40 PM User: ShuJC0243



CITY OF CORCORAN

2040 COMPREHENSIVE PLAN

Map 7-3
Proposed Trunk Sanitary
Sewer System - SE District

- Existing Gravity
- Proposed Gravity
- Proposed Gravity (Lateral)
- Existing Forcemain
- Proposed Forcemain
- Existing MCES Forcemain (Interim Size Shown)
- MCES Lift Station
- Sewer Node (LS) = Lift Station
- Sewer Subdistricts
- Municipal Boundary
- 2040 MUSA
- Parcel Boundaries
- Streams
- Lake/Open Water

1,800 900 0 1,800
Feet

N

Path: L:\2294\100\2040CompPlan\SE Proposed Trunk Sanitary Sewer.mxd
Date: 1/15/2019 Time: 1:32:33 PM User: ShuJC0243

APPENDIX B
Stormwater Guidelines

Stantec

Stormwater Guidelines for Development
March 2019

Issue

Cities changing from rural to urban development are challenged by the additional stormwater generated due to construction of impervious surfaces, along with the offsite infrastructure, or lack thereof, to manage effectively. To standardize the modeling and review process, the guidelines below were created for efficiency.

Note: A watershed approval is required per Elm Creek WMO rules, which also reviews flow rates, water quality and volume management.

Modeling

Watershed Information

- Provide an aerial photo of the development that includes the overall watershed and subwatershed boundaries
- Provide a summary of the acreage to each discharge point leaving the site. Any increase (or decrease) shall be identified.
- Show any floodplain adjacent to project or within the project
- Show downstream water bodies and flow paths
    - Downstream flow paths and water bodies typically need to have elevations, inverts, and condition identified.

Subwatersheds

A HydroCAD model (typically used) has inputs that can vary by user. To minimize resubmittals, review time and effort, the following data shall be utilized.

- Electronic model shall be submitted
- Hydrologic Soil Group (HSG) shall be lowered one category due to the mass grading and compaction of the soils. For example, an existing B soil, shall be modeled as a proposed C soil (unless it remains undisturbed)
- Wetlands, filtration basins, and ponds shall be modeled at CN of 98
- Identify peak rates for storm events and proposed shall be equal or less than existing rates.
    - Note: There are certain conditions where at City's discretion the off-site conditions require a reduction in flow rate from existing rates.
- SWMM (i.e. EPA-, XP-, or PC-) models can be submitted for review, however these increase review time.

Model Setup for Outlet Control Structures, NWLs and Infiltration

- The model's flow control structures (OCS, culverts, etc.) shall match the construction plan information. During the plan and model review both may be modified and revised
- Individual detail plates are required for each OCS, and individual plates shall have inverts identified
- A pond or wetland NWL (and model starting elevation) shall be set at the constructed outlet control elevation.
    - No live storage shall be utilized below the controlling OCS elevation.
    - No live storage shall be used for filtration shelves on ponds below controlling OCS elevation
- If a pond or wetland has an NWL (wet surface), infiltration shall not be used in flood routing.
- If a pond has filtration BMP causing drawdown below the NWL, this drawdown elevation shall not be used as the NWL for flood routing. (Filtration has a slower release time and during wet periods is not available as live storage).

Construction Plans

Catch Basins

- Street drainage shall be sufficient to manage the 10-year event

- Typical a CB inlet capacity is 2 to 2.5 CFS, and CBs shall be spaced accordingly
- Three inches (0.25 feet) of head on a CB will inundate a street centerline (2% slope).
- Spacing is 200 to 250 feet using longitudinal street dimensions of 40 feet from road centerline to half the house footprint (assumes rear half of house drains to rear yard). Dimensions equal 10,000 SF.
- CBs may be required on both sides of ped ramps to capture flows

Natural Drainage Features

- Waterbodies receiving urban drainage (wetlands, ditches, gullies) may need to have OCS installed, erosion protection, or reduced flow rates to allow the feature to function over the long term due to more consistent flows from increased impervious via development
- Offsite work may be necessary and City will assist with coordination, easements, etc.

HWLs and EOFs

- The freeboard requirements are:
    - Low Opening is a minimum of two feet above the HWL
    - Low Opening is a minimum of two feet above the EOF
- EOFs shall be accurately shown and as builts are required. The highest point shall be the EOF (for example top of curb) since this is the controlling elevation
    - In certain instances, channel calculations of the swale may be required to show the EOF has capacity to manage estimated flow
- Overland EOFs are preferred, however if a second pipe serves as an EOF then modeling will include a 100-year event using the second pipe (EOF) as the only outlet (primary outlet plugged).

Rear Yards

- Rear yards or swales less than 2% shall have draintile. Typically, every two to three lots will require rear yard CBs.

Sump Connections

- Houses adjoining a wetland or pond do not need individual sump connection
- Others will have access to rear yard stormsewer.

Offsite Impacts

Adjacent Parcels

- City will review adjacent parcels (downstream and upstream) for impacts from volume, point discharge, etc. and may require off site improvements. City will assist in coordination of any off site work.
- Off site water quality improvement projects may be determined by the City for assistance with compliance with City's TMDL approach of implementing improvements upon development.
- FEMA modifications may be necessary due to development and implemented by City.

Appendix F

DNR NHIS Concurrence and USFWS IPaC Query

DEPARTMENT OF NATURAL RESOURCES

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: Corcoran Farms Business Park

Project Proposer: JMMK, LLC (JMMK)

Project Type: Development, Commercial/Institutional/Industrial

Project Type Activities: Tree Removal;Structure Removal or Bridge Removal;Wetland impacts (e.g., discharge, runoff, sedimentation, fill, excavation)

TRS: T119 R23 S26

County(s): Hennepin

DNR Admin Region(s): Central

Reason Requested: State EAW

Project Description: The Project proposes to construct an industrial park consisting of five buildings with a combined area of 726,000 square feet. Project components include ...

Existing Land Uses: The Project Area is currently utilized for agricultural production. Surrounding land uses include commercial/industrial uses to the east, agricultural ...

Landcover / Habitat Impacted: The Project will convert existing agricultural land into an industrial park. It is anticipated that tree clearing (approx. 0.75-1 acre) will be required.

Waterbodies Affected: A DNR Public Water Watercourse (County Ditch 16) extends along the eastern boundary of the Project Area. Seven wetlands were delineated within the Project ...

Groundwater Resources Affected: No impacts to groundwater are anticipated.

Previous Natural Heritage Review: No

Previous Habitat Assessments / Surveys: No

SUMMARY OF AUTOMATED RESULTS

Category	Results	Response By Category
Project Details	No Comments	No Further Review Required
Ecologically Significant Area	No Comments	No Further Review Required
State-Listed Endangered or Threatened Species	No Comments	No Further Review Required
State-Listed Species of Special Concern	Comments	Recommendations
Federally Listed Species	No Records	Visit IPaC For Federal Review

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

April 29, 2022

Natural Heritage Review #: 2022-00293

Erin Sejkora
Stantec Consulting Services, Inc.
7500 Olson Memorial Highway, Suite 300
Golden Valley , MN 55427-4886

RE: Automated Natural Heritage Review of the proposed Corcoran Farms Business Park
See Cover Page for location and project details.

Dear Erin Sejkora,

As requested, the above project has been reviewed for potential effects to rare features. Based on this review, the following rare features may be adversely affected by the proposed project:

Project Type and/or Project Type Activity Comments

- 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 below, all seven of Minnesota's bats, including the federally threatened northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. 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 during the months of June and July.

Ecologically Significant Area

No ecologically significant areas have been documented in the vicinity of the project.

State-Listed Endangered or Threatened Species

No state-listed endangered or threatened species have been documented in the vicinity of the project.

State-Listed Species of Special Concern

Taxonomic Group	Common Name	Scientific Name	Water Regime	Habitat	Federal Status
Vertebrate Animal	Trumpeter Swan	Cygnus buccinator		Littoral Zone of Lake, Marsh	

- The above table identifies state-listed species of special concern that have been documented in the vicinity of your project. If suitable habitat for any of these species occurs within your project footprint or activity impact area, the project may negatively impact those species. To avoid impacting state-listed species of special concern, the DNR recommends modifying the location of project activities to avoid suitable habitat or modifying the timing of project activities to avoid the presence of the species. 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. For further assistance, please contact the appropriate DNR Regional Nongame Specialist or Regional Ecologist. Species-specific comments, if any, appear below.

Federally Listed Species

The Natural Heritage Information System does not contain any records for federally listed species within one mile of the proposed project. However, to ensure compliance with federal law, please conduct a federal regulatory review using the U.S. Fish and Wildlife Service's online Information for Planning and Consultation (IPaC) tool.

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 the project description provided on the cover page. If project details change or construction has not occurred within one year, please resubmit the project for review.

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 effects to these rare features. 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,

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: USFWS Information for Planning and Consultation (IPaC) tool
Information for Planning and Consultation (IPaC) tool
DNR Regional Environmental Assessment Ecologist Contact Info
https://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html

Corcoran Farms Business Park

Aerial Imagery With Locator Map

N
W E
S

0 0.15 0.3 0.6 0.9 1.2 Miles

Project Boundary

Project Type: Development, Commercial/Institutional/Industrial

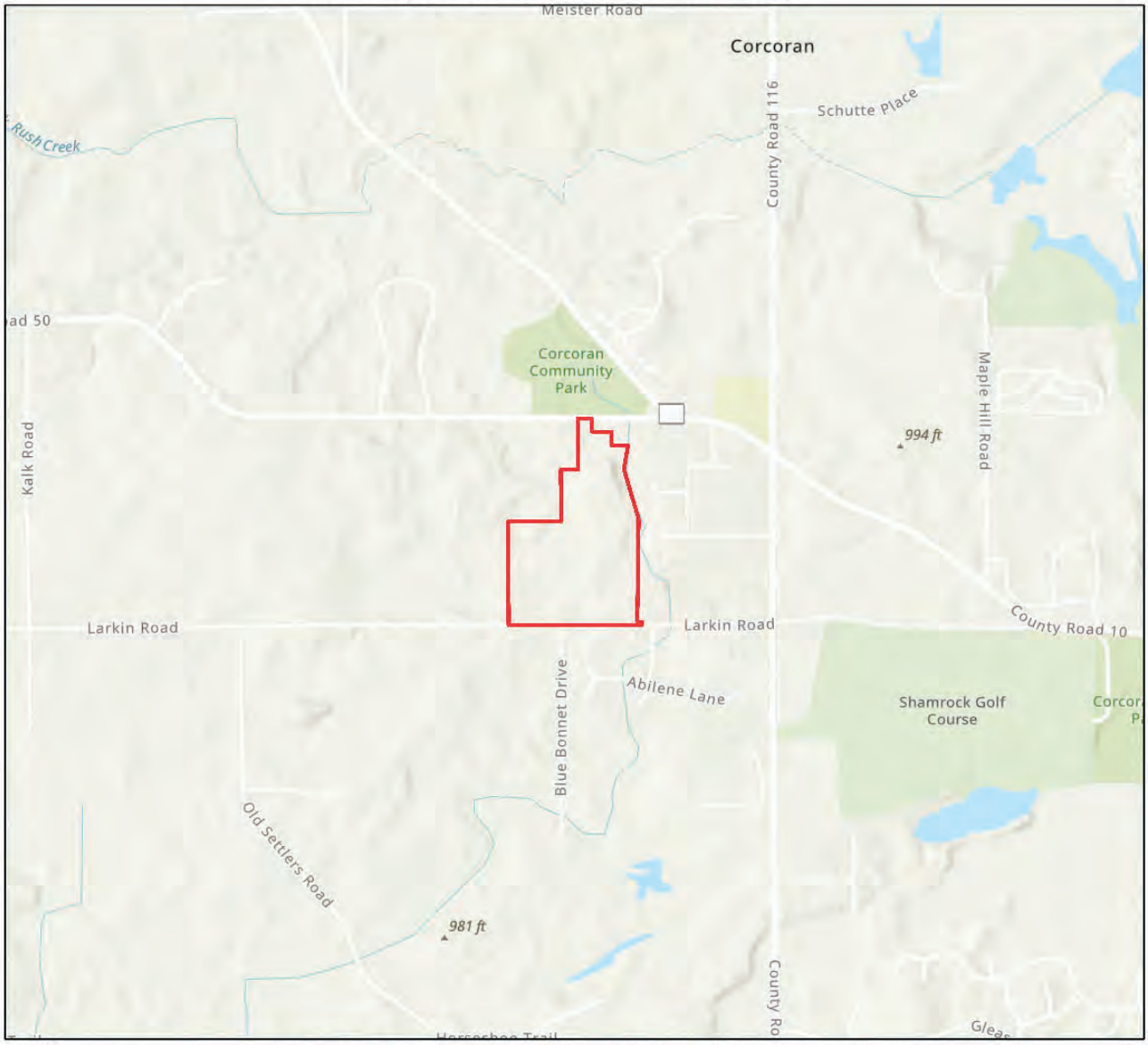
Project Size (acres): 70.41

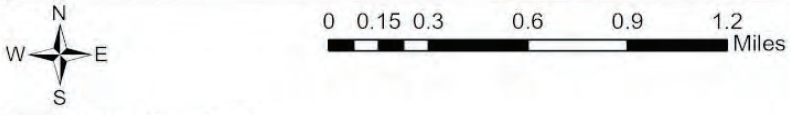
County(s): Hennepin

TRS: T119 R23 S26

Corcoran Farms Business Park

USA Topo Basemap With Locator Map





Project Boundary

Project Type: Development, Commercial/Institutional/Industrial

Project Size (acres): 70.41

County(s): Hennepin

TRS: T119 R23 S26

Stantec Consulting Services Inc.
7500 Olson Memorial Highway Suite 300, Golden Valley MN 55427-4886

April 29, 2022
File: 227704868

Attention: NHIS Review
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
Saint Paul, MN 55155

Good afternoon,

Reference: Corcoran Farms Business Park EAW – NHIS Concurrence Request

Stantec Consulting Services Inc. (Stantec) on behalf of JMMK, LLC (JMMK) is assisting the City of Corcoran with developing an Environmental Assessment Worksheet (EAW) for the proposed Corcoran Farms Business Park (Project). The Project is located on an approximately 70-acre parcel at 20130 Larkin Road in the City of Corcoran, Hennepin County, Minnesota in Township 119N, Range 23W, Section 26 (Project Area; Figure 1). The purpose of this letter is to seek concurrence on the determinations of state-listed species within the Project Area and a one-mile buffer.

Project Description

The Project proposes to construct an industrial park consisting of five buildings with a combined area of 726,000 square feet. Project components include construction of warehouse/office buildings, parking areas, access roads, trail facility, sewer/water utility improvements, and stormwater ponds, Demolition of existing farm buildings and structures will be required. The Project Area is currently utilized for agricultural production. Seven wetlands were delineated within the Project Area, primarily on the outer edges of the Project Area boundary. Impacts to wetland will be minimized to the extent possible. It is anticipated that the Project would primarily impact wetlands in the center portion of the Project Area. A DNR Public Water Watercourse extends along the eastern boundary of the Project Area. Figure 1 shows water resources and wetlands in the vicinity of the Project Area. The surrounding land use includes agricultural use to the west and southwest; an industrial business park to the east; and residents that border the south, west, and north of the Project Area.

NHIS Review

Stantec used it's Minnesota Department of Natural Resources (MDNR) Natural Heritage Information System (NHIS) Limited License Agreement (LA-1005) in March 2022 to identify species and habitats within the Project Area and a one-mile buffer. Based on a review on the MDNR NHIS, one state-listed species that is known to occur or potentially occur within the Project Area is the Trumpeter Swan *(Cygnus buccinator; state special concern species).*

The NHIS informs of habitats such as native plant communities, Regionally Significant Ecological Areas (RSEAs), and biodiversity sites within the Project Area and within a one-mile buffer.

Reference: **Corcoran Farms Business Park EAW – NHIS Concurrence Request**

- No native plant communities are found within the Project Area or within the one-mile buffer.
- No RSEAs were identified within the Project Area, but one RSEA with outstanding significance was identified 0.65 miles northeast of the Project Area.
- No sites of biodiversity significance were identified within the Project Area or within the one-mile buffer.

Trumpeter Swan *(Cygnus buccinator)*

During the breeding season, trumpeter swans use small ponds and lakes or bays on larger water bodies that have approximately 100 meters of open water for take-off and have extensive beds of emergent vegetation such as cattails, bulrushes, and sedges. They will commonly use muskrat houses, beaver lodges, exposed hummocks, small islands, and floating platforms to construct their nests. Adult trumpeter swans are primarily herbivorous but will occasionally feed on small crustaceans, fish, and fish eggs. Currently, the leading threat to their population is lead poisoning from lead shot and fishing sinkers. Other threats include degradation of wetland habitat, power line collisions, and illegal hunting. Although repopulation efforts have continued to be successful, the trumpeter swam was included on Minnesota's List of Endangered and Threatened Species with the status of special concern due to continued threats to their population. (DNR 2022)[1].

The Project Area consists of active agricultural land and does not contain suitable breeding or feeding habitat for the trumpeter swan such as small ponds and lakes. Based on a review of the NHIS data, occurrences of trumpeter swans were associated with an unnamed waterbody which is approximately 0.85 miles southeast of the Project Area. Due to the lack of suitable habitat, the Project will have no impact on the trumpeter swam.

Conclusion

The Project Area does not contain potential suitable habitat for listed plants, animals, native plant communities, and other rare features. Therefore, it is not anticipated that significant impacts to state-listed species or habitat would result from the proposed industrial park.

Per Stantec's license agreement and the requirements of the state environmental review, Stantec is requesting the DNR's concurrence with our review and assessment of the potential impacts from the Project on known species documented in the NHIS database. The specific NHIS data evaluated as part of this review will not be distributed, mapped, or used within the Scoping EAW document or publicly distributed.

Please do not hesitate to contact me at 763.252.6802 or Erin.Sejkora@stantec.com should you have any questions. Thank you for your time.

[1] DNR 2022b. Rare Species Guide Trumpeter Swan. Available at: Cygnus buccinator: Trumpeter Swan | Rare Species Guide | Minnesota DNR (state.mn.us). Accessed March 2022.

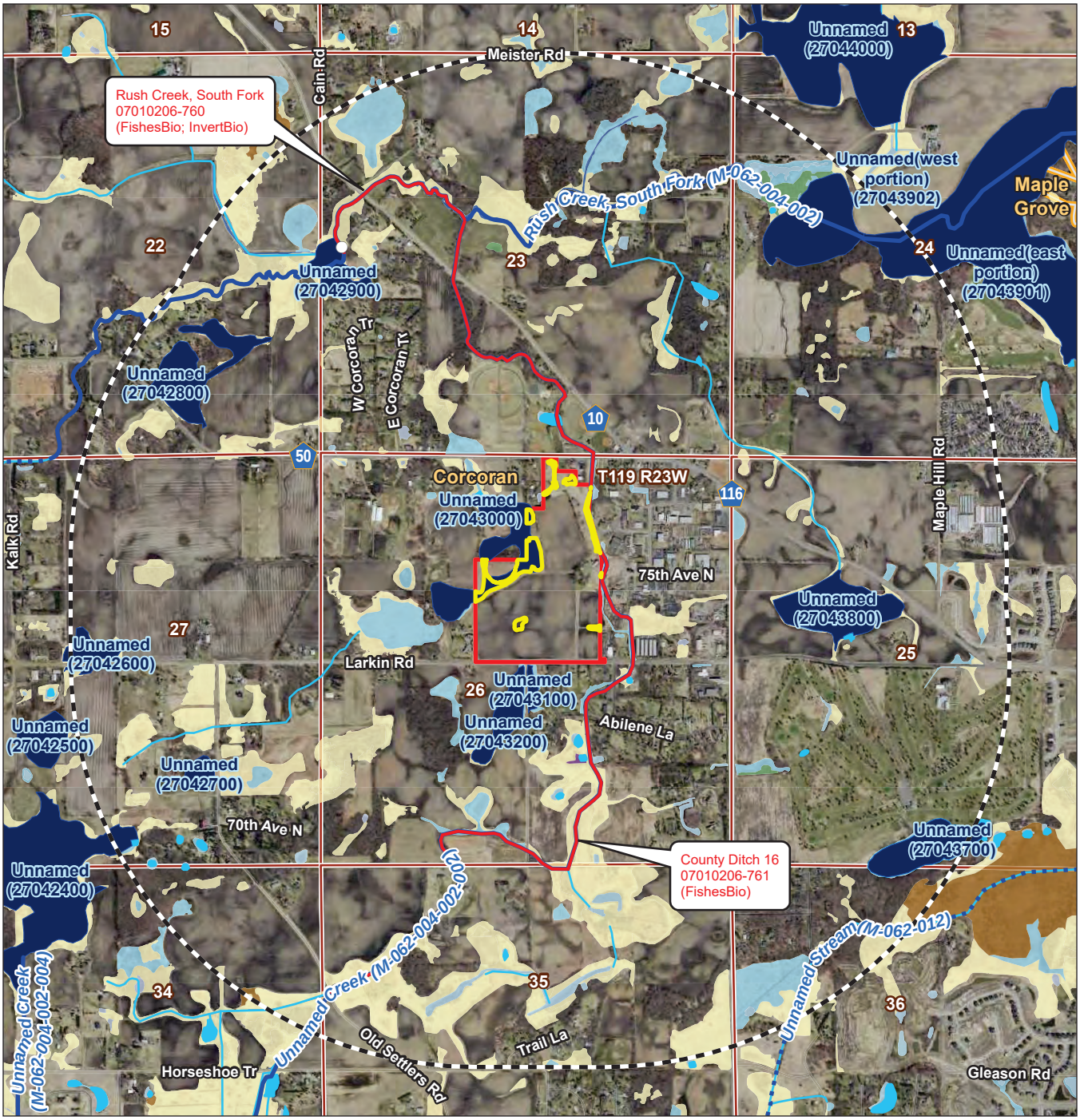
Reference: **Corcoran Farms Business Park EAW – NHIS Concurrence Request**

Regards,

Stantec Consulting Services Inc.

Erin Sejkora
Project Manager, Senior Planner
Phone: 763.252.6802
Erin.Sejkora@stantec.com

Attachment: Project Location Figure



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: City of Corcoran, MNDNR, MNDOT
3. Background: MnGeo 2020 7-county

Legend

- 1 Mile Radius
- Project Area
- Field Delineated Wetland
- 2022 MPCA Impaired Streams (Draft)

Minnesota Public Waters Delineations

- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Public Waters Basins
- NHD - Flowline
- NHD - Waterbody

NWI Circular 39 Class

- 1 - Seasonally Flooded Basin or Flat
- 2 - Wet Meadow
- 3 - Shallow Marsh
- 4 - Deep Marsh
- 5 - Shallow Open Water
- 6 - Shrub Swamp
- 7 - Wooded Swamp
- 8 - Bog
- Riverine Systems

0 1,000 2,000 Feet

(At original document size of 8.5x11)
1:24,000

N

Stantec

Project Location
T119N, R23W, S26
Corcoran, Hennepin Co., MN

Prepared by KJM on 2022-04-01

Client/Project
City of Corcoran, MN
Corcoran Farms Business Park
EAW

227704868

Figure No.
1

Title
Water Resources Map

V:\2277\active\227704868\03_data\gis_cad\gis\pro\eaw\eaw.aprx Revised: 2022-04-01 By: kjmueller

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Hennepin County, Minnesota

Local office

Minnesota-Wisconsin Ecological Services Field Office

(952) 252-0092
(952) 646-2873

MAILING ADDRESS
4101 American Blvd E
Bloomington, MN 55425-1665

PHYSICAL ADDRESS
4101 American Blvd E

-}
Bloomington, MN 55425-1665

http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. 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.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* 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
Lesser Yellowlegs *Tringa flavipes* 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

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 and understand the FAQ

"Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

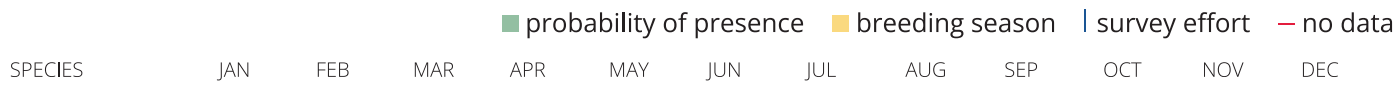
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald Eagle Non-BCC Vulnerable (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.)

Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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 AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

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.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix G

Traffic Impact Study

File #227704868
April 28, 2022

Traffic Impact Study for Corcoran Farms Business Park in Corcoran, MN

Prepared for:

City of Corcoran, MN

8200 CR 116
Corcoran, MN 55340

Prepared by:

Stantec Consulting Services Inc.
1800 Pioneer Creek Center
Maple Plain, MN 55359
Phone: 7963-479-4200
Fax: 763-479-4242

Table of Contents

FIGURES

I hereby certify that this 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.

_____ DATE: April 28, 2022
Edward F. Terhaar
License No. 24441

1.0 Executive Summary

The purpose of this Traffic Impact Study is to evaluate the impacts of a proposed business park development located in Corcoran, MN. This study is part of an Environmental Assessment Worksheet (EAW) for the proposed project. The project site is generally located on the north side of Larkin Road at Blue Bonnet Drive.

Based on discussions with City, this study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development at the following intersections:

- CSAH 10/CR 116
- CSAH 10/CSAH 50
- CR 116/Larkin Road
- Larkin Road/Blue Bonnet Drive/development access

The most intense development alternative consists of the following uses:

- Building A – 15,423 square feet of office and 61,693 square feet of warehouse
- Building B – 23,892 square feet of office and 95,570 square feet of warehouse
- Building C – 33,703 square feet of office and 134,814 square feet of warehouse
- Building D – 19,411 square feet of office and 77,644 square feet of warehouse
- Building E – 52,849 square feet of office and 211,397 square feet of warehouse

One access point will be provided on Larkin Road at Blue Bonnet Drive. For purpose of this study, the development is expected to be completed in 2027.

The conclusions drawn from the information and analyses presented in this report are as follows:

- The proposed development is expected to generate 320 trips during the a.m. peak hour, 314 trips during the p.m. peak hour, and 2,072 trips daily.

- All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours under the 2022, 2027 No-Build, 2027 Build, and 2040 No-Build scenarios. Under the 2040 Build scenario, the eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better.

- The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal control is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County.

- Based on the traffic forecasts and operations analysis for each intersection, the following mitigation measures are recommended:

    - CSAH 10/CR 116
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CSAH 10/CSAH 50
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CR 116/Larkin Road
        - Short term – Widen the eastbound and westbound approaches to accommodate a left turn lane and a through/right turn lane. Widen the northbound and southbound approaches to accommodate a left turn lane, through lane, and right turn lane.
        - Long term – Monitor traffic volumes to determine when signal control is warranted.

    - Larkin Road/Blue Bonnet Drive/development access
        - Short term – Construct a westbound right turn lane.
        - Long term – No additional improvements needed.

2.0 Purpose and Background

The purpose of this Traffic Impact Study is to evaluate the impacts of a proposed business park development located in Corcoran, MN. This study is part of an Environmental Assessment Worksheet (EAW) for the proposed project. The project site is generally located on the north side of Larkin Road at Blue Bonnet Drive. The project location is shown in **Figure 1**.

Based on discussions with City, this study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development at the following intersections:

- CSAH 10/CR 116
- CSAH 10/CSAH 50
- CR 116/Larkin Road
- Larkin Road/Blue Bonnet Drive/development access

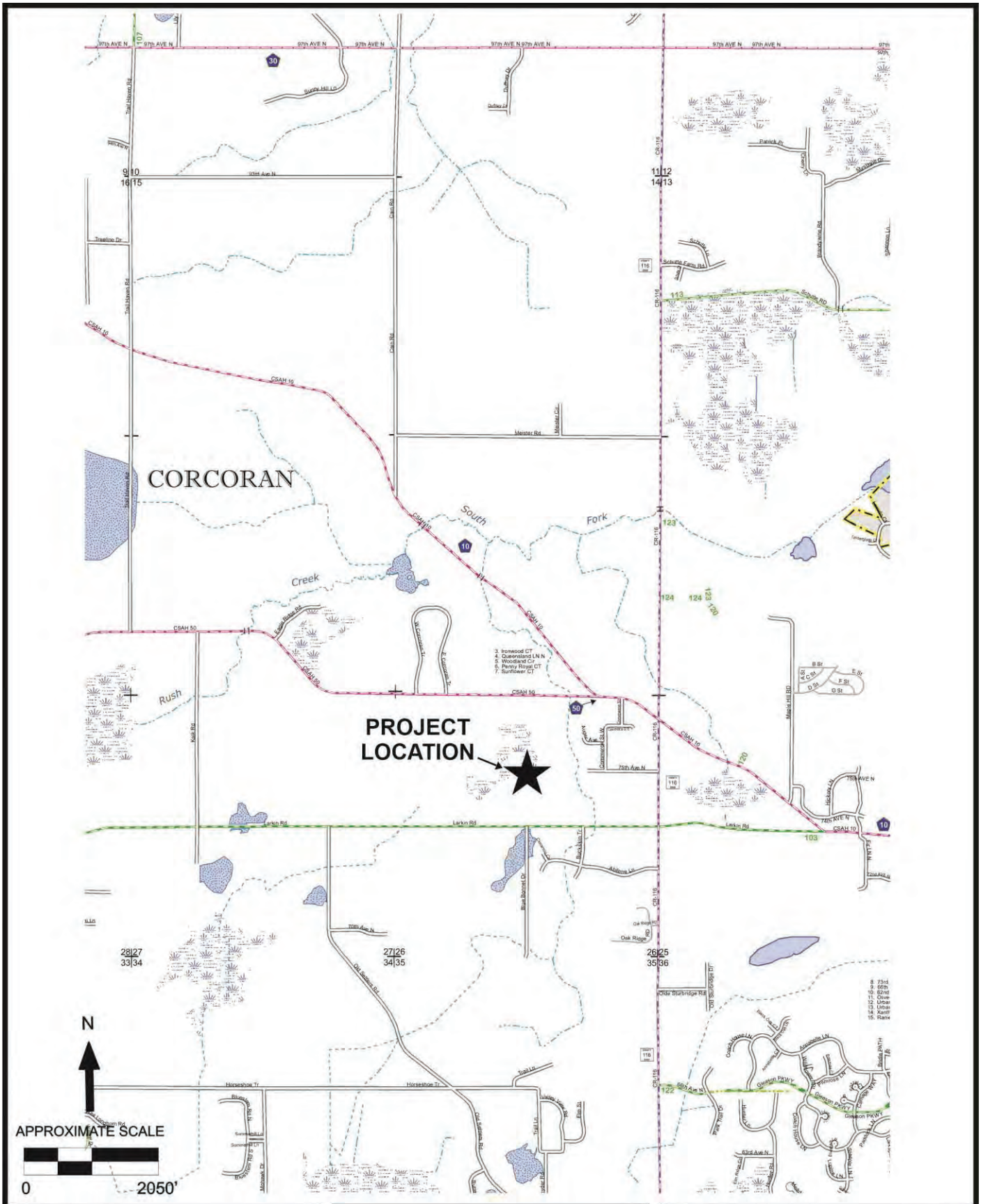
Proposed Development Characteristics

The most intense development alternative consists of the following uses:

- Building A – 15,423 square feet of office and 61,693 square feet of warehouse
- Building B – 23,892 square feet of office and 95,570 square feet of warehouse
- Building C – 33,703 square feet of office and 134,814 square feet of warehouse
- Building D – 19,411 square feet of office and 77,644 square feet of warehouse
- Building E – 52,849 square feet of office and 211,397 square feet of warehouse

One access point will be provided on Larkin Road at Blue Bonnet Drive.

For purpose of this study, the development is expected to be completed in 2027. The proposed development plan is shown in **Figure 2**.

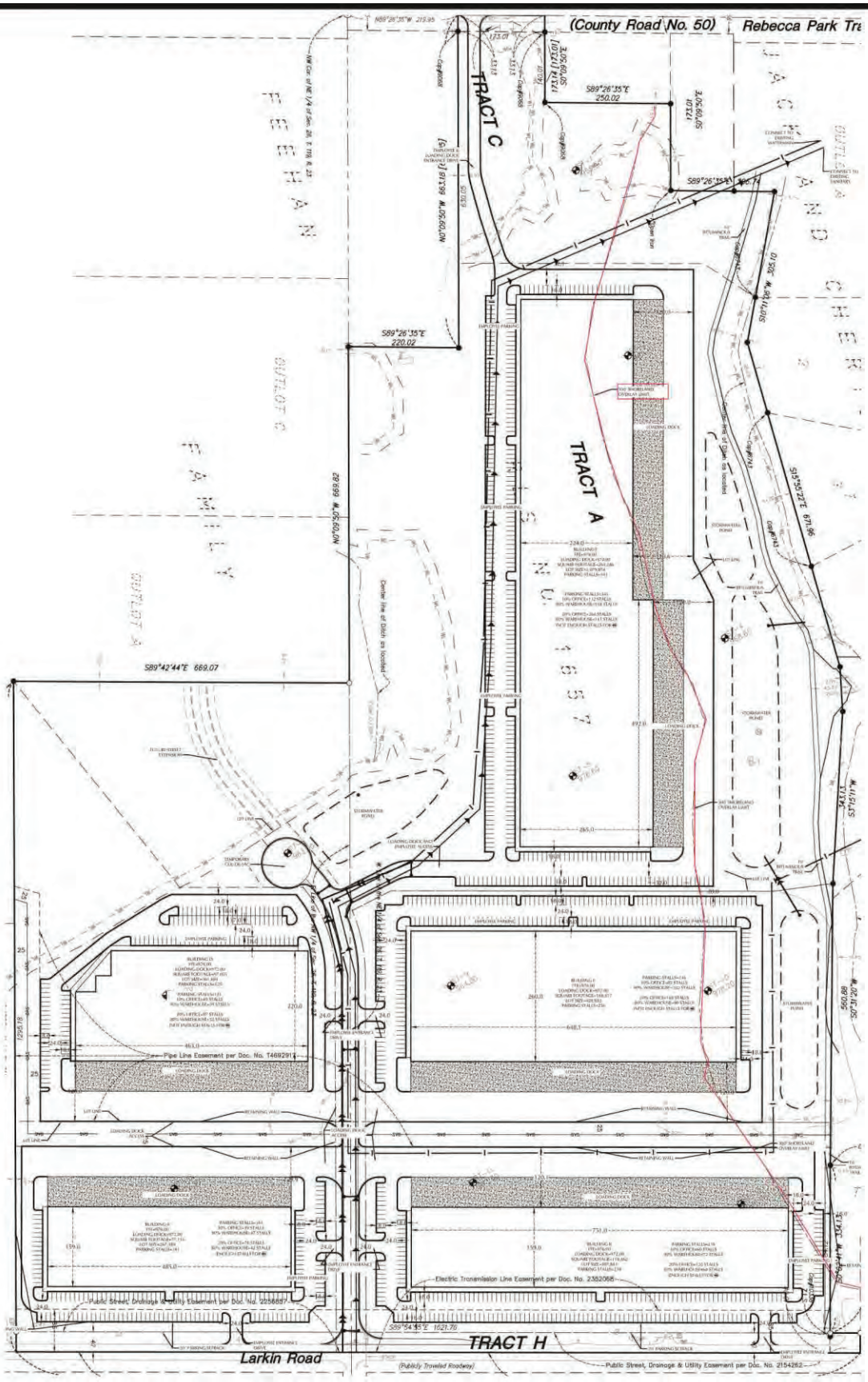


Stantec

TRAFFIC IMPACT STUDY
FOR CORCORAN FARMS
BUSINESS PARK
IN CORCORAN, MN

FIGURE 1

PROJECT LOCATION



Stantec

TRAFFIC IMPACT STUDY
FOR CORCORAN FARMS
BUSINESS PARK
IN CORCORAN, MN

FIGURE 2

SITE PLAN

3.0 Existing Conditions

The proposed project site is currently used for agricultural purposes. The site is bounded by Larkin Road on the south, existing residential uses on the west and north, and existing commercial uses on the east.

Near the site location, Larkin Road is a two lane rural section roadway. CSAH 10, CSAH 50, and CR 116 are two lane roadways with turn lanes and traffic signal control at major intersections. Blue Bonnet Drive is a local two-lane roadway.

Existing conditions near the proposed project location are shown in **Figure 3** and described below.

CSAH 10/CR 116

This four-way intersection is controlled with a traffic signal. The northbound and southbound approaches provide one left turn lane and one through/right turn lane. The eastbound approach provides one left turn lane and one through/right turn lane. The westbound approach provides one left turn lane, one through lane, and one right turn lane.

CSAH 10/CSAH 50

This three-way intersection is controlled with a stop sign on the eastbound approach. The eastbound approach provides one left turn/right turn lane. The northbound approach provides one left turn lane and one through lane. The southbound approach provides one shared lane for left turn and through movements.

CR 116/Larkin Road

This four-way intersection is controlled with stop signs on the eastbound and westbound approaches. The northbound and southbound approaches provide one left turn/through lane and one through/right turn bypass lane. The eastbound and westbound approaches provide one left turn/through/right turn lane.

Larkin Road/Blue Bonnet Drive

This three-way intersection is controlled with a stop sign on the northbound approach. The eastbound approach provides one through/right turn lane. The westbound approach provides one left turn/through lane. The northbound approach provides one shared lane for left turn and right turn movements.

Traffic Volume Data

Weekday traffic volume data was recorded at the existing intersections in March, 2022. Existing traffic volume data is presented later in this report.

Stantec

TRAFFIC IMPACT STUDY
FOR CORCORAN FARMS
BUSINESS PARK
IN CORCORAN, MN

FIGURE 3

EXISTING CONDITIONS

4.0 Traffic Forecasts

Traffic Forecast Scenarios

To adequately address the impacts of the proposed project, forecasts and analyses were completed for the years 2027 and 2040. Specifically, weekday a.m. and p.m. peak hour traffic forecasts were completed for the following scenarios:

- *2022 Existing*. Existing volumes were determined through traffic counts at the subject intersections. The existing volume information includes trips generated by the uses near the project site.

- *2027 No-Build*. Existing volumes at the subject intersections were increased by 2.5 percent per year to determine 2027 No-Build volumes. The 2.5 percent per year growth rate was calculated based on traffic forecast information presented in the 2040 Corcoran Comprehensive Plan.

- *2027 Build*. Trips generated by the proposed development were added to the 2027 No-Build volumes to determine 2027 Build volumes.

- *2040 No-Build*. Existing volumes at the subject intersections were increased by 2.5 percent per year to determine 2040 No-Build volumes. The 2.5 percent per year growth rate was calculated based on traffic forecast information presented in the 2040 Corcoran Comprehensive Plan.

- *2040 Build*. Trips generated by the proposed development were added to the 2040 No-Build volumes to determine 2040 Build volumes.

Trip Generation for Proposed Project

The expected new development trips were calculated based on data presented in Trip Generation, Eleventh Edition, published by the Institute of Transportation Engineers. These calculations represent total trips that will be generated by the proposed development. The resultant trip generation estimates are shown in **Table 4-1**.

Table 4-1
Weekday Trip Generation for Proposed Project

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekday Daily
		In	Out	Total	In	Out	Total	Total
Office	145,278 SF	194	27	221	35	174	209	1575
Warehouse	581,118 SF	76	23	99	29	76	105	497
Totals		**270**	**50**	**320**	**64**	**250**	**314**	**2072**

Note: SF=square feet

Trip Distribution Percentages

Trip distribution percentages for the subject development trips were established based on the nearby roadway network, existing and expected future traffic patterns, and location of the subject development in relation to major attractions and population concentrations.

The distribution percentages for trips generated by the proposed development are described below:

- 30 percent to/from the east on CSAH 10
- 30 percent to/from the south on CR 116
- 20 percent to/from the north on CR 116
- 10 percent to/from the west on CSAH 10
- 10 percent to/from the west on Larkin Road

Traffic Volumes

Development trips from Table 4-1 were assigned to the surrounding roadway network using the preceding trip distribution percentages. Traffic volumes were established for all the forecasting scenarios described earlier during the weekday a.m. and p.m. peak hours. The resultant peak hour volumes are shown in **Figures 4 and 5**.

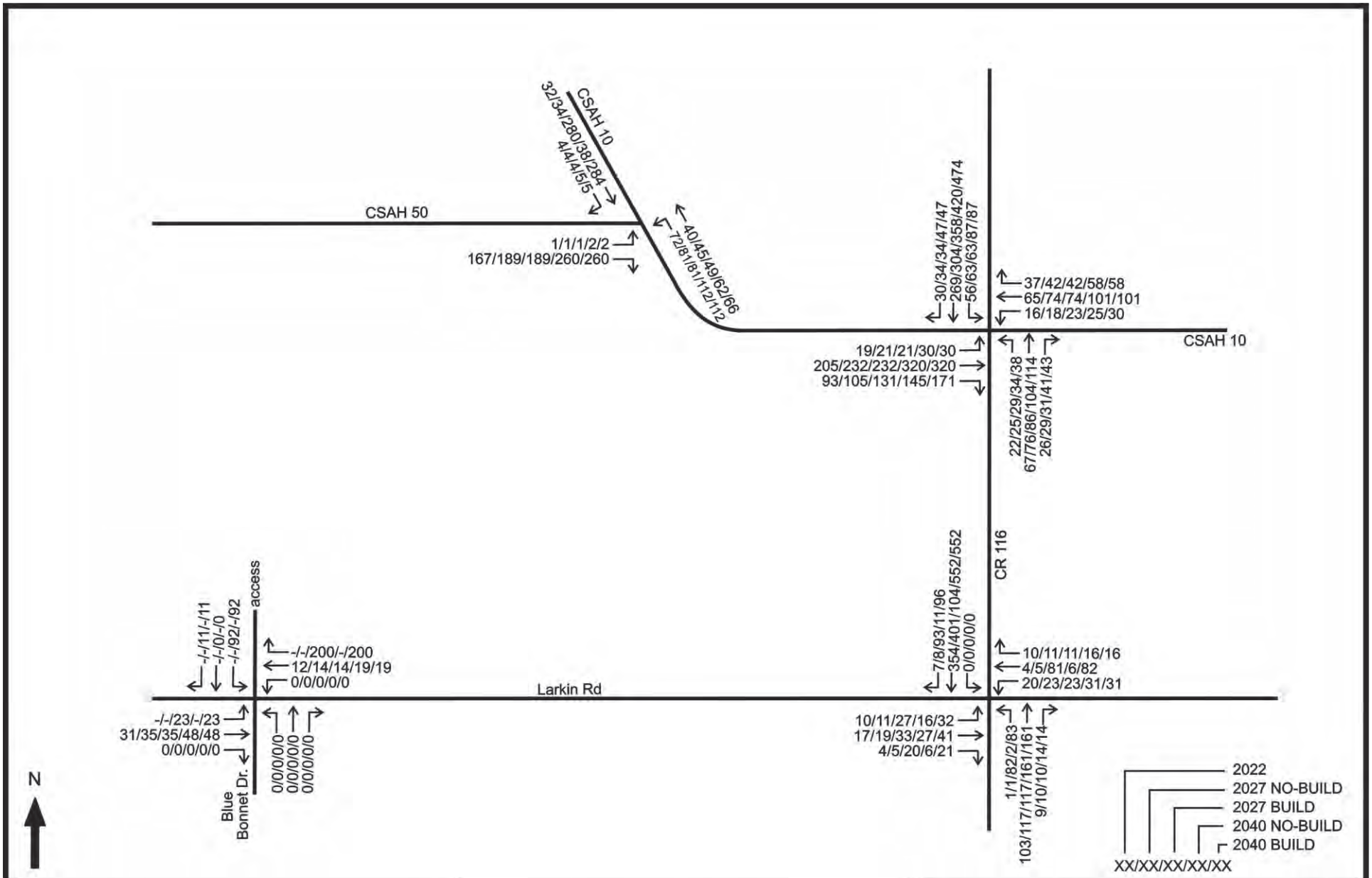


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FIGURE 4

WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

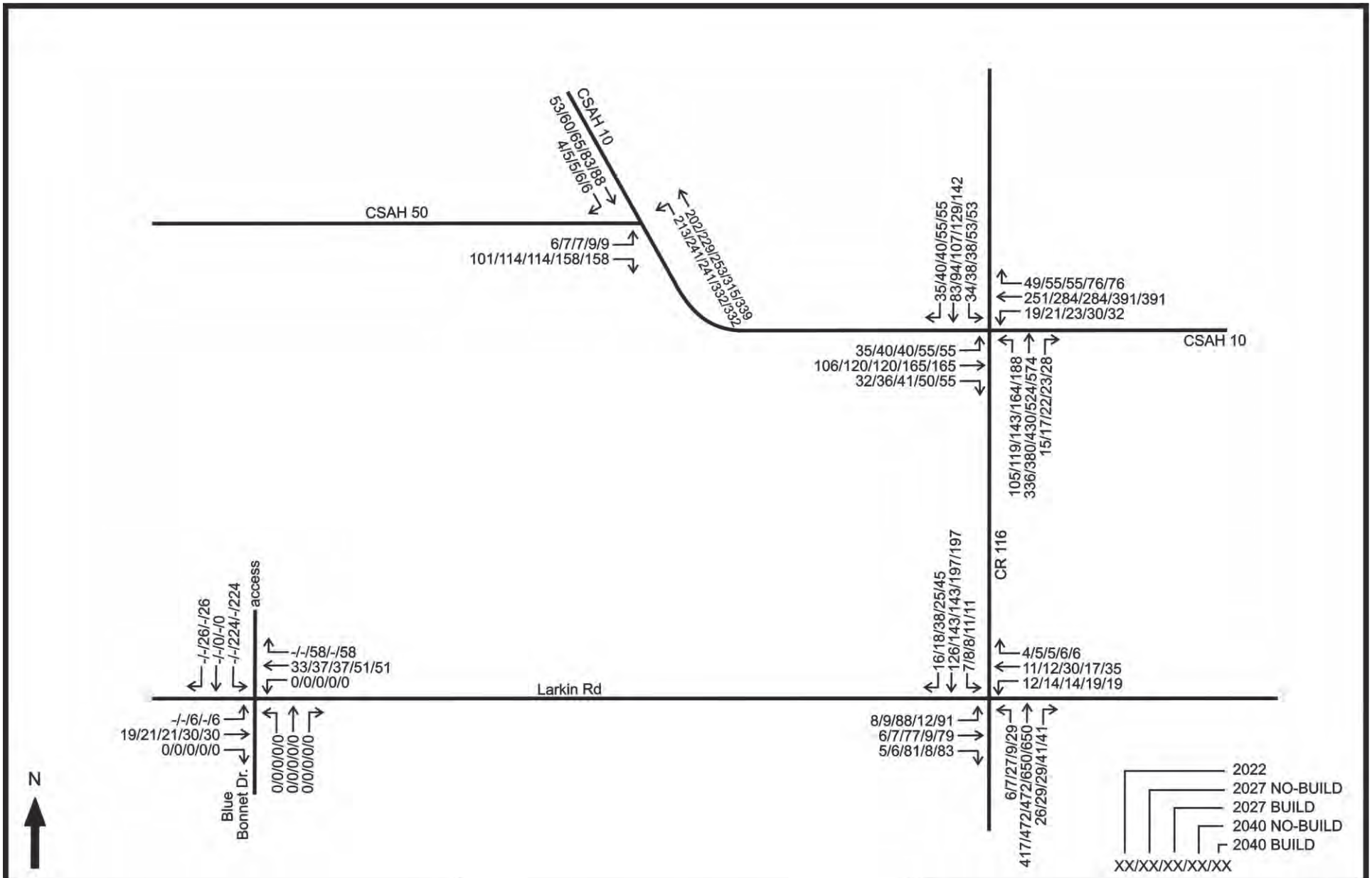

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FIGURE 5

WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

5.0 Traffic Analysis

Intersection Level of Service Analysis

Traffic analyses were completed for the subject intersections for all scenarios described earlier during the weekday a.m. and p.m. peak hours using Synchro software. Initial analysis was completed using existing geometrics and intersection control.

Capacity analysis results are presented in terms of level of service (LOS), which is defined in terms of traffic delay at the intersection. LOS ranges from A to F. LOS A represents the best intersection operation, with little delay for each vehicle using the intersection. LOS F represents the worst intersection operation with excessive delay. The following is a detailed description of the conditions described by each LOS designation:

- Level of service A corresponds to a free flow condition with motorists virtually unaffected by the intersection control mechanism. For a signalized or an unsignalized intersection, the average delay per vehicle would be approximately 10 seconds or less.

- Level of service B represents stable flow with a high degree of freedom, but with some influence from the intersection control device and the traffic volumes. For a signalized intersection, the average delay ranges from 10 to 20 seconds. An unsignalized intersection would have delays ranging from 10 to 15 seconds for this level.

- Level of service C depicts a restricted flow which remains stable, but with significant influence from the intersection control device and the traffic volumes. The general level of comfort and convenience changes noticeably at this level. The delay ranges from 20 to 35 seconds for a signalized intersection and from 15 to 25 seconds for an unsignalized intersection at this level.

- Level of service D corresponds to high-density flow in which speed and freedom are significantly restricted. Though traffic flow remains stable, reductions in comfort and convenience are experienced. The control delay for this level is 35 to 55 seconds for a signalized intersection and 25 to 35 seconds for an unsignalized intersection.

- Level of service E represents unstable flow of traffic at or near the capacity of the intersection with poor levels of comfort and convenience. The delay ranges from 55 to 80 seconds for a signalized intersection and from 35 to 50 seconds for an unsignalized intersection at this level.

- Level of service F represents forced flow in which the volume of traffic approaching the intersection exceeds the volume that can be served. Characteristics often experienced include long queues, stop-and-go waves, poor travel times, low comfort and convenience, and increased accident exposure. Delays over 80 seconds for a signalized intersection and over 50 seconds for an unsignalized intersection correspond to this level of service.

The LOS results are shown in **Figures 6 and 7** and described below. All LOS worksheets are included in the Appendix for further detail.

2022 Existing

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	B/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/A
CR 116/Larkin Road	EB/WB stop	A/B	A/C
Larkin Road/Blue Bonnet Dr	NB stop	A/A	A/A

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS C or better during the a.m. and p.m. peak hours.

2027 No-Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/A
CR 116/Larkin Road	EB/WB stop	A/B	A/C
Larkin Road/Blue Bonnet Dr	NB stop	A/A	A/A

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS C or better during the a.m. and p.m. peak hours.

2027 Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/C	C/C
CSAH 10/CSAH 50	EB stop	A/B	A/B
CR 116/Larkin Road	EB/WB stop	A/D	A/D
Larkin Road/Blue Bonnet Dr/access	NB stop	A/B	A/B

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours.

2040 No-Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/D	C/D
CSAH 10/CSAH 50	EB stop	A/B	A/B
CR 116/Larkin Road	EB/WB stop	A/C	A/C
Larkin Road/Blue Bonnet Dr	NB stop	A/A	A/A

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours.

2040 Build

Weekday A.M. and P.M. Peak Hour LOS Results

Intersection	Traffic Control	AM Peak Hour LOS	PM Peak Hour LOS
CSAH 10/CR 116	Signal	C/D	C/D
CSAH 10/CSAH 50	EB stop	A/B	A/B
CR 116/Larkin Road	EB/WB stop	B/F	C/F
Larkin Road/Blue Bonnet Dr/access	NB stop	A/B	A/B

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

The eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better during the a.m. and p.m. peak hours.

Traffic Signal Warrants at CR 116/Larkin Road

As shown above, the eastbound movements operate at LOS F during the 2040 Build scenarios at the CR 116/Larkin Road intersection. In order to accommodate traffic generated by the proposed development, traffic signal control was considered at this location.

The traffic forecasts for the 2027 Build and 2040 Build scenarios were used to analyze the peak hour and four-hour traffic signal warrants. These volumes include trips from the proposed project as well as other background traffic.

The traffic volume forecasts were used to determine if specific warrants are satisfied based on published criteria outlined in the Minnesota Manual of Uniform Traffic Control Devices (MMUTCD). Warrant 2 (Four-Hour Vehicular Volume) and Warrant 3 (Peak Hour Volume) were assessed. Since the posted speed limits on CR 116 is 50 mph, the analyses presented consider reductions for speeds greater than 40 mph.

The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County.

Intersection Operations at CR 116/Larkin Road with Traffic Signal Control

A potential mitigation measure for the operational issues shown at the CR 116/Larkin Road intersection is traffic signal control. The updated intersection operation results assuming traffic signal control are shown below.

Weekday A.M. and P.M. Peak Hour LOS Results at CR 116/Larkin Road with Traffic Signal Control

Scenario	AM Peak Hour LOS	PM Peak Hour LOS
2027 Build	B/B	B/B
2040 Build	B/C	B/C

Note: Level of service results presented with overall intersection LOS followed by worst movement LOS.

All movements and the overall intersection operate at LOS C or better during the a.m. and p.m. peak hours under both scenarios.

Recommended Mitigation

Based on the traffic forecasts and operations analysis for each intersection, the following mitigation measures are recommended:

- CSAH 10/CR 116
  - Short term – No improvements needed.
  - Long term – No improvements needed.

- CSAH 10/CSAH 50
  - Short term – No improvements needed.
  - Long term – No improvements needed.

- CR 116/Larkin Road
  - Short term – Widen the eastbound and westbound approaches to accommodate a left turn lane and a through/right turn lane. Widen the northbound and southbound approaches to accommodate a left turn lane, through lane, and right turn lane.
  - Long term – Monitor traffic volumes to determine when signal control is warranted.

- Larkin Road/Blue Bonnet Drive/development access
  - Short term – Construct a westbound right turn lane.
  - Long term – No additional improvements needed.

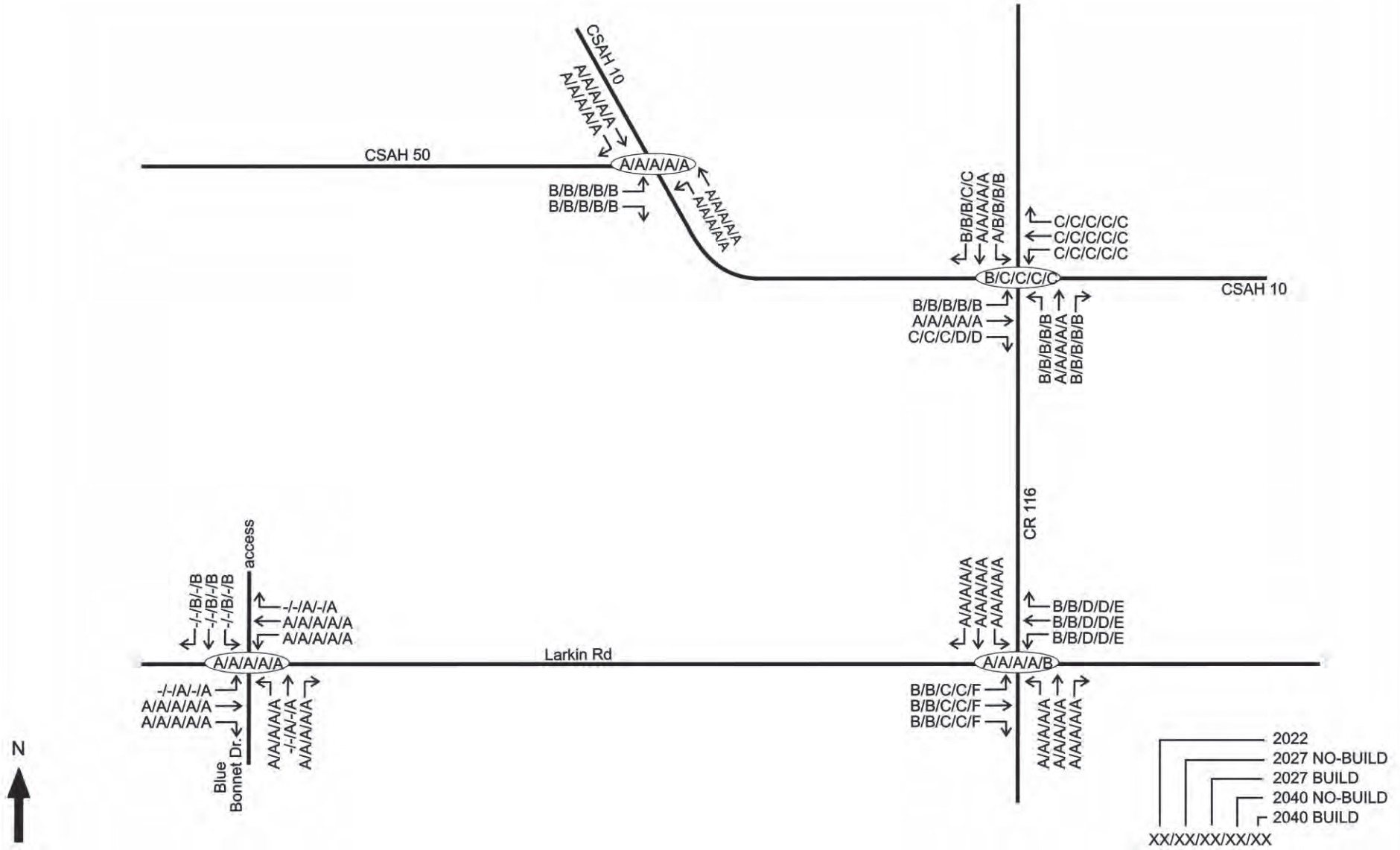

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FIGURE 6

WEEKDAY AM PEAK HOUR LEVEL OF SERVICE RESULTS

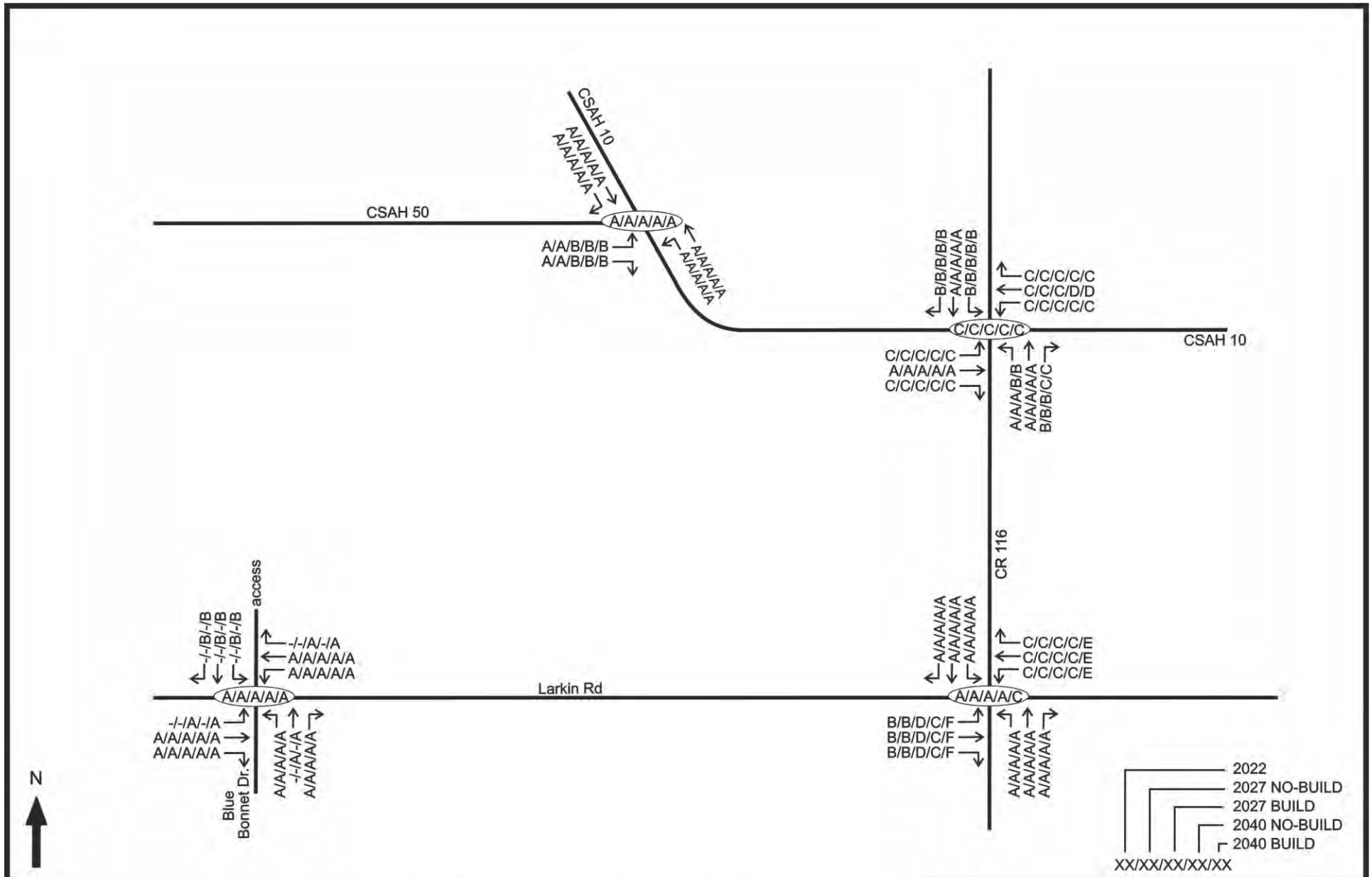

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FIGURE 7

WEEKDAY PM PEAK HOUR LEVEL OF SERVICE RESULTS

6.0 Conclusions and Recommendations

The conclusions drawn from the information and analyses presented in this report are as follows:

- The proposed development is expected to generate 320 trips during the a.m. peak hour, 314 trips during the p.m. peak hour, and 2,072 trips daily.

- All intersections and movements operate at LOS D or better during the a.m. and p.m. peak hours under the 2022, 2027 No-Build, 2027 Build, and 2040 No-Build scenarios. Under the 2040 Build scenario, the eastbound movements at CR 116/Larkin Road operate at LOS F during the a.m. and p.m. peak hours. All other movements and intersections operate at LOS D or better.

- The results of the signal warrant analysis for the 2027 Build condition indicate the warrants are not met at the intersection. Using the 2040 Build volumes, the warrants are met. Based on this review, the traffic volumes at this intersection should be monitored as additional development occurs in this area to determine when traffic signal is needed. Any changes to the intersection control must be reviewed and approved by Hennepin County.

- Based on the traffic forecasts and operations analysis for each intersection, the following mitigation measures are recommended:

    - CSAH 10/CR 116
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CSAH 10/CSAH 50
        - Short term – No improvements needed.
        - Long term – No improvements needed.

    - CR 116/Larkin Road
        - Short term – Widen the eastbound and westbound approaches to accommodate a left turn lane and a through/right turn lane. Widen the northbound and southbound approaches to accommodate a left turn lane, through lane, and right turn lane.
        - Long term – Monitor traffic volumes to determine when signal control is warranted.

    - Larkin Road/Blue Bonnet Drive/development access
        - Short term – Construct a westbound right turn lane.
        - Long term – No additional improvements needed.

7.0 Appendix

- Level of Service Worksheets

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	167	72	40	191	1
Future Vol, veh/h	1	167	72	40	191	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	186	80	44	212	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	417	213	213	0	-	0
Stage 1	213	-	-	-	-	-
Stage 2	204	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	592	827	1357	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	557	827	1357	-	-	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	830	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1357	-	825	-	-
HCM Lane V/C Ratio	0.059	-	0.226	-	-
HCM Control Delay (s)	7.8	-	10.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	17	4	20	4	10	1	103	9	1	354	7
Future Vol, veh/h	10	17	4	20	4	10	1	103	9	1	354	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	19	4	22	4	11	1	114	10	1	393	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	460	525	201	329	524	62	401	0	0	124	0	0
Stage 1	399	399	-	121	121	-	-	-	-	-	-	-
Stage 2	61	126	-	208	403	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	485	456	806	600	457	990	1154	-	-	1461	-	-
Stage 1	598	601	-	870	795	-	-	-	-	-	-	-
Stage 2	943	791	-	775	598	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	475	455	806	577	456	990	1154	-	-	1461	-	-
Mov Cap-2 Maneuver	475	455	-	577	456	-	-	-	-	-	-	-
Stage 1	597	600	-	869	794	-	-	-	-	-	-	-
Stage 2	926	790	-	746	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	11	0.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1154	-	-	489	635	1461	-	-
HCM Lane V/C Ratio	0.001	-	-	0.07	0.059	0.001	-	-
HCM Control Delay (s)	8.1	0	-	12.9	11	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	31	0	0	12	0	0
Future Vol, veh/h	31	0	0	12	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	0	0	13	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	34	0	47	34
Stage 1	-	-	-	-	34	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1578	-	963	1039
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1578	-	963	1039
Mov Cap-2 Maneuver	-	-	-	-	963	-
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	1010	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1578	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
9: CR 116 & CR 10

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	205	93	16	65	37	22	67	26	56	269	30
Future Volume (veh/h)	19	205	93	16	65	37	22	67	26	56	269	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	228	103	18	72	41	24	74	29	62	299	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	391	279	126	191	422	358	523	577	226	727	785	87
Arrive On Green	0.02	0.23	0.23	0.02	0.23	0.23	0.03	0.45	0.45	0.05	0.47	0.47
Sat Flow, veh/h	1781	1220	551	1781	1870	1585	1781	1279	501	1781	1655	183
Grp Volume(v), veh/h	21	0	331	18	72	41	24	0	103	62	0	332
Grp Sat Flow(s),veh/h/ln	1781	0	1771	1781	1870	1585	1781	0	1780	1781	0	1837
Q Serve(g_s), s	0.6	0.0	12.8	0.6	2.2	1.5	0.5	0.0	2.4	1.3	0.0	8.4
Cycle Q Clear(g_c), s	0.6	0.0	12.8	0.6	2.2	1.5	0.5	0.0	2.4	1.3	0.0	8.4
Prop In Lane	1.00		0.31	1.00		1.00	1.00		0.28	1.00		0.10
Lane Grp Cap(c), veh/h	391	0	405	191	422	358	523	0	803	727	0	871
V/C Ratio(X)	0.05	0.00	0.82	0.09	0.17	0.11	0.05	0.00	0.13	0.09	0.00	0.38
Avail Cap(c_a), veh/h	485	0	701	290	740	627	611	0	803	775	0	871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	26.4	21.8	22.5	22.2	10.3	0.0	11.5	9.3	0.0	12.2
Incr Delay (d2), s/veh	0.1	0.0	4.1	0.2	0.2	0.1	0.0	0.0	0.3	0.0	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	5.6	0.2	1.0	0.5	0.2	0.0	1.0	0.5	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	30.5	22.0	22.6	22.3	10.3	0.0	11.8	9.4	0.0	13.4
LnGrp LOS	C	A	C	C	C	C	B	A	B	A	A	B
Approach Vol, veh/h		352			131			127			394	
Approach Delay, s/veh		29.9			22.4			11.5			12.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	37.0	6.0	20.9	6.4	38.6	6.2	20.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	32.5	5.5	28.5	5.5	32.5	5.5	28.5
Max Q Clear Time (g_c+I1), s	3.3	4.4	2.6	14.8	2.5	10.4	2.6	4.2
Green Ext Time (p_c), s	0.0	0.5	0.0	1.7	0.0	2.0	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	189	81	45	216	1
Future Vol, veh/h	1	189	81	45	216	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	210	90	50	240	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	471	241	241	0	-	0
Stage 1	241	-	-	-	-	-
Stage 2	230	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	551	798	1326	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	514	798	1326	-	-	-
Mov Cap-2 Maneuver	514	-	-	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	808	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	5.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1326	-	796	-	-
HCM Lane V/C Ratio	0.068	-	0.265	-	-
HCM Control Delay (s)	7.9	-	11.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	19	5	23	5	11	1	117	10	1	401	8
Future Vol, veh/h	11	19	5	23	5	11	1	117	10	1	401	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	21	6	26	6	12	1	130	11	1	446	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	523	596	228	374	595	71	455	0	0	141	0	0
Stage 1	453	453	-	138	138	-	-	-	-	-	-	-
Stage 2	70	143	-	236	457	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	437	415	775	558	416	977	1102	-	-	1440	-	-
Stage 1	556	568	-	851	781	-	-	-	-	-	-	-
Stage 2	932	778	-	746	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	427	414	775	532	415	977	1102	-	-	1440	-	-
Mov Cap-2 Maneuver	427	414	-	532	415	-	-	-	-	-	-	-
Stage 1	555	567	-	850	780	-	-	-	-	-	-	-
Stage 2	913	777	-	712	565	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	11.6	0.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1102	-	-	448	586	1440	-	-
HCM Lane V/C Ratio	0.001	-	-	0.087	0.074	0.001	-	-
HCM Control Delay (s)	8.3	0	-	13.8	11.6	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	35	0	0	14	0	0
Future Vol, veh/h	35	0	0	14	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	0	0	16	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	39	0	55	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	16	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1571	-	953	1033
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	1007	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1571	-	953	1033
Mov Cap-2 Maneuver	-	-	-	-	953	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	1007	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1571	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	232	105	18	74	42	25	76	29	63	304	34
Future Volume (veh/h)	21	232	105	18	74	42	25	76	29	63	304	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	258	117	20	82	47	28	84	32	70	338	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	414	308	140	190	468	396	464	556	212	688	748	84
Arrive On Green	0.03	0.25	0.25	0.02	0.25	0.25	0.03	0.43	0.43	0.05	0.45	0.45
Sat Flow, veh/h	1781	1218	553	1781	1870	1585	1781	1290	492	1781	1651	186
Grp Volume(v), veh/h	23	0	375	20	82	47	28	0	116	70	0	376
Grp Sat Flow(s),veh/h/ln	1781	0	1771	1781	1870	1585	1781	0	1782	1781	0	1837
Q Serve(g_s), s	0.7	0.0	14.9	0.6	2.6	1.7	0.6	0.0	2.9	1.6	0.0	10.5
Cycle Q Clear(g_c), s	0.7	0.0	14.9	0.6	2.6	1.7	0.6	0.0	2.9	1.6	0.0	10.5
Prop In Lane	1.00		0.31	1.00		1.00	1.00		0.28	1.00		0.10
Lane Grp Cap(c), veh/h	414	0	448	190	468	396	464	0	768	688	0	832
V/C Ratio(X)	0.06	0.00	0.84	0.11	0.18	0.12	0.06	0.00	0.15	0.10	0.00	0.45
Avail Cap(c_a), veh/h	491	0	702	271	741	628	533	0	768	723	0	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	26.4	21.4	21.9	21.6	11.5	0.0	12.9	10.4	0.0	14.0
Incr Delay (d2), s/veh	0.1	0.0	5.2	0.2	0.2	0.1	0.1	0.0	0.4	0.1	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	6.6	0.3	1.1	0.6	0.2	0.0	1.2	0.6	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.9	0.0	31.6	21.6	22.1	21.7	11.6	0.0	13.3	10.5	0.0	15.8
LnGrp LOS	B	A	C	C	C	C	B	A	B	B	A	B
Approach Vol, veh/h		398			149			144			446	
Approach Delay, s/veh		30.9			21.9			13.0			14.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	36.6	6.2	23.3	6.7	38.2	6.4	23.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.3	32.1	5.1	29.5	5.1	32.3	5.1	29.5
Max Q Clear Time (g_c+I1), s	3.6	4.9	2.6	16.9	2.6	12.5	2.7	4.6
Green Ext Time (p_c), s	0.0	0.6	0.0	1.9	0.0	2.2	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	189	81	49	242	1
Future Vol, veh/h	1	189	81	49	242	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	210	90	54	269	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	504	270	270	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	528	769	1293	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	491	769	1293	-	-	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1293	-	767	-	-
HCM Lane V/C Ratio	0.07	-	0.275	-	-
HCM Control Delay (s)	8	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	33	20	23	81	11	82	117	10	1	401	93
Future Vol, veh/h	27	33	20	23	81	11	82	117	10	1	401	93
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	37	22	26	90	12	91	130	11	1	446	103

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	792	823	275	562	869	71	549	0	0	141	0	0
Stage 1	500	500	-	318	318	-	-	-	-	-	-	-
Stage 2	292	323	-	244	551	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	280	307	722	410	289	977	1017	-	-	1440	-	-
Stage 1	521	541	-	668	652	-	-	-	-	-	-	-
Stage 2	692	649	-	738	514	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	188	277	722	331	261	977	1017	-	-	1440	-	-
Mov Cap-2 Maneuver	188	277	-	331	261	-	-	-	-	-	-	-
Stage 1	470	540	-	603	589	-	-	-	-	-	-	-
Stage 2	523	586	-	666	513	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.2	26.3	3.6	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1017	-	-	275	294	1440	-	-
HCM Lane V/C Ratio	0.09	-	-	0.323	0.435	0.001	-	-
HCM Control Delay (s)	8.9	0.2	-	24.2	26.3	7.5	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.4	2.1	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	35	0	0	14	200	0	0	0	92	0	11
Future Vol, veh/h	23	35	0	0	14	200	0	0	0	92	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	39	0	0	16	222	0	0	0	102	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	238	0	0	39	0	0	224	329	39	218	218	127
Stage 1	-	-	-	-	-	-	91	91	-	127	127	-
Stage 2	-	-	-	-	-	-	133	238	-	91	91	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1329	-	-	1571	-	-	732	590	1033	738	680	923
Stage 1	-	-	-	-	-	-	916	820	-	877	791	-
Stage 2	-	-	-	-	-	-	870	708	-	916	820	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1329	-	-	1571	-	-	712	578	1033	727	666	923
Mov Cap-2 Maneuver	-	-	-	-	-	-	712	578	-	727	666	-
Stage 1	-	-	-	-	-	-	898	804	-	859	791	-
Stage 2	-	-	-	-	-	-	858	708	-	898	804	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.1	0	0	10.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1329	-	-	1571	-	-	744
HCM Lane V/C Ratio	-	0.019	-	-	-	-	-	0.154
HCM Control Delay (s)	0	7.8	0	-	0	-	-	10.7
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.5

HCM 6th Signalized Intersection Summary
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	232	131	23	74	42	29	86	31	63	358	34
Future Volume (veh/h)	21	232	131	23	74	42	29	86	31	63	358	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	258	146	26	82	47	32	96	34	70	398	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	439	302	171	193	508	431	400	552	195	653	734	70
Arrive On Green	0.03	0.27	0.27	0.03	0.27	0.27	0.03	0.42	0.42	0.05	0.44	0.44
Sat Flow, veh/h	1781	1121	635	1781	1870	1585	1781	1319	467	1781	1681	160
Grp Volume(v), veh/h	23	0	404	26	82	47	32	0	130	70	0	436
Grp Sat Flow(s),veh/h/ln	1781	0	1756	1781	1870	1585	1781	0	1786	1781	0	1841
Q Serve(g_s), s	0.7	0.0	16.8	0.8	2.6	1.7	0.8	0.0	3.5	1.7	0.0	13.4
Cycle Q Clear(g_c), s	0.7	0.0	16.8	0.8	2.6	1.7	0.8	0.0	3.5	1.7	0.0	13.4
Prop In Lane	1.00		0.36	1.00		1.00	1.00		0.26	1.00		0.09
Lane Grp Cap(c), veh/h	439	0	473	193	508	431	400	0	747	653	0	804
V/C Ratio(X)	0.05	0.00	0.85	0.13	0.16	0.11	0.08	0.00	0.17	0.11	0.00	0.54
Avail Cap(c_a), veh/h	513	0	675	262	719	609	461	0	747	686	0	804
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	26.6	21.1	21.3	21.0	12.8	0.0	14.0	11.4	0.0	16.0
Incr Delay (d2), s/veh	0.0	0.0	7.5	0.3	0.1	0.1	0.1	0.0	0.5	0.1	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	7.6	0.3	1.1	0.6	0.3	0.0	1.4	0.6	0.0	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	0.0	34.1	21.5	21.4	21.1	12.9	0.0	14.5	11.4	0.0	18.6
LnGrp LOS	B	A	C	C	C	C	B	A	B	B	A	B
Approach Vol, veh/h		427			155			162			506	
Approach Delay, s/veh		33.3			21.3			14.2			17.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	36.6	6.6	25.2	7.0	38.0	6.4	25.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.3	32.1	5.1	29.5	5.1	32.3	5.1	29.5
Max Q Clear Time (g_c+I1), s	3.7	5.5	2.8	18.8	2.8	15.4	2.7	4.6
Green Ext Time (p_c), s	0.0	0.7	0.0	1.9	0.0	2.5	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	23.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	260	112	62	298	2
Future Vol, veh/h	2	260	112	62	298	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	289	124	69	331	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	649	332	333	0	-	0
Stage 1	332	-	-	-	-	-
Stage 2	317	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	434	710	1226	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	738	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	390	710	1226	-	-	-
Mov Cap-2 Maneuver	390	-	-	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	738	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	5.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1226	-	706	-	-
HCM Lane V/C Ratio	0.102	-	0.412	-	-
HCM Control Delay (s)	8.3	-	13.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	2	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	27	6	31	6	16	2	161	14	1	552	11
Future Vol, veh/h	16	27	6	31	6	16	2	161	14	1	552	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	30	7	34	7	18	2	179	16	1	613	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	718	820	313	515	818	98	625	0	0	195	0	0
Stage 1	621	621	-	191	191	-	-	-	-	-	-	-
Stage 2	97	199	-	324	627	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	316	308	683	443	309	939	952	-	-	1375	-	-
Stage 1	442	477	-	792	741	-	-	-	-	-	-	-
Stage 2	899	735	-	662	474	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	304	307	683	405	308	939	952	-	-	1375	-	-
Mov Cap-2 Maneuver	304	307	-	405	308	-	-	-	-	-	-	-
Stage 1	441	477	-	790	740	-	-	-	-	-	-	-
Stage 2	872	734	-	614	474	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.1	13.8	0.1	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	952	-	-	328	469	1375	-	-
HCM Lane V/C Ratio	0.002	-	-	0.166	0.126	0.001	-	-
HCM Control Delay (s)	8.8	0	-	18.1	13.8	7.6	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.4	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	0	0	19	0	0
Future Vol, veh/h	48	0	0	19	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	0	0	21	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	53	0	74	53
Stage 1	-	-	-	-	53	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1553	-	930	1014
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	1002	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1553	-	930	1014
Mov Cap-2 Maneuver	-	-	-	-	930	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	1002	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1553	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	320	145	25	101	58	34	104	41	87	420	47
Future Volume (veh/h)	30	320	145	25	101	58	34	104	41	87	420	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	356	161	28	112	64	38	116	46	97	467	52
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	481	395	179	179	600	508	285	475	188	564	648	72
Arrive On Green	0.03	0.32	0.32	0.03	0.32	0.32	0.04	0.37	0.37	0.05	0.39	0.39
Sat Flow, veh/h	1781	1220	552	1781	1870	1585	1781	1274	505	1781	1653	184
Grp Volume(v), veh/h	33	0	517	28	112	64	38	0	162	97	0	519
Grp Sat Flow(s),veh/h/ln	1781	0	1771	1781	1870	1585	1781	0	1779	1781	0	1837
Q Serve(g_s), s	1.0	0.0	22.8	0.9	3.5	2.3	1.1	0.0	5.1	2.7	0.0	19.6
Cycle Q Clear(g_c), s	1.0	0.0	22.8	0.9	3.5	2.3	1.1	0.0	5.1	2.7	0.0	19.6
Prop In Lane	1.00		0.31	1.00		1.00	1.00		0.28	1.00		0.10
Lane Grp Cap(c), veh/h	481	0	574	179	600	508	285	0	663	564	0	720
V/C Ratio(X)	0.07	0.00	0.90	0.16	0.19	0.13	0.13	0.00	0.24	0.17	0.00	0.72
Avail Cap(c_a), veh/h	534	0	665	239	702	595	334	0	663	592	0	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	0.0	26.4	20.8	20.1	19.7	16.7	0.0	17.7	14.4	0.0	21.1
Incr Delay (d2), s/veh	0.1	0.0	14.1	0.4	0.1	0.1	0.2	0.0	0.9	0.1	0.0	6.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	11.4	0.4	1.5	0.9	0.4	0.0	2.2	1.1	0.0	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	0.0	40.5	21.2	20.2	19.8	16.9	0.0	18.6	14.5	0.0	27.2
LnGrp LOS	B	A	D	C	C	B	B	A	B	B	A	C
Approach Vol, veh/h		550			204			200			616	
Approach Delay, s/veh		39.1			20.2			18.3			25.2	
Approach LOS		D			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	35.0	6.9	31.0	7.4	36.6	7.1	30.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.7	30.5	5.1	30.7	5.1	31.1	5.1	30.7
Max Q Clear Time (g_c+I1), s	4.7	7.1	2.9	24.8	3.1	21.6	3.0	5.5
Green Ext Time (p_c), s	0.0	0.9	0.0	1.7	0.0	2.3	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	260	112	66	324	2
Future Vol, veh/h	2	260	112	66	324	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	289	124	73	360	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	682	361	362	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	415	684	1197	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	684	1197	-	-	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	735	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	5.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1197	-	680	-	-
HCM Lane V/C Ratio	0.104	-	0.428	-	-
HCM Control Delay (s)	8.4	-	14.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	2.2	-	-

Intersection	
Int Delay, s/veh	10.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	41	21	31	82	16	83	161	14	1	552	96
Future Vol, veh/h	32	41	21	31	82	16	83	161	14	1	552	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	46	23	34	91	18	92	179	16	1	613	107

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	988	1048	360	703	1093	98	720	0	0	195	0	0
Stage 1	669	669	-	371	371	-	-	-	-	-	-	-
Stage 2	319	379	-	332	722	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	201	226	637	324	213	939	877	-	-	1375	-	-
Stage 1	413	454	-	622	618	-	-	-	-	-	-	-
Stage 2	667	613	-	655	429	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	112	199	637	235	188	939	877	-	-	1375	-	-
Mov Cap-2 Maneuver	112	199	-	235	188	-	-	-	-	-	-	-
Stage 1	364	454	-	549	545	-	-	-	-	-	-	-
Stage 2	481	541	-	567	429	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	50	47.6	3.3	0
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	877	-	-	179	220	1375	-	-
HCM Lane V/C Ratio	0.105	-	-	0.583	0.652	0.001	-	-
HCM Control Delay (s)	9.6	0.3	-	50	47.6	7.6	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	3.1	4	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	48	0	0	19	200	0	0	0	92	0	11
Future Vol, veh/h	23	48	0	0	19	200	0	0	0	92	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	53	0	0	21	222	0	0	0	102	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	243	0	0	53	0	0	243	348	53	237	237	132
Stage 1	-	-	-	-	-	-	105	105	-	132	132	-
Stage 2	-	-	-	-	-	-	138	243	-	105	105	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1323	-	-	1553	-	-	711	576	1014	717	664	917
Stage 1	-	-	-	-	-	-	901	808	-	871	787	-
Stage 2	-	-	-	-	-	-	865	705	-	901	808	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1323	-	-	1553	-	-	691	564	1014	706	651	917
Mov Cap-2 Maneuver	-	-	-	-	-	-	691	564	-	706	651	-
Stage 1	-	-	-	-	-	-	883	792	-	854	787	-
Stage 2	-	-	-	-	-	-	853	705	-	883	792	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0	0	10.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1323	-	-	1553	-	-	724
HCM Lane V/C Ratio	-	0.019	-	-	-	-	-	0.158
HCM Control Delay (s)	0	7.8	0	-	0	-	-	10.9
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.6

HCM 6th Signalized Intersection Summary
9: CR 116 & CR 10

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	320	171	30	101	58	38	114	43	87	474	47
Future Volume (veh/h)	30	320	171	30	101	58	38	114	43	87	474	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	356	190	33	112	64	42	127	48	97	527	52
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	484	376	201	161	612	519	248	492	186	555	663	65
Arrive On Green	0.03	0.33	0.33	0.03	0.33	0.33	0.04	0.38	0.38	0.05	0.40	0.40
Sat Flow, veh/h	1781	1148	612	1781	1870	1585	1781	1293	489	1781	1675	165
Grp Volume(v), veh/h	33	0	546	33	112	64	42	0	175	97	0	579
Grp Sat Flow(s),veh/h/ln	1781	0	1760	1781	1870	1585	1781	0	1782	1781	0	1841
Q Serve(g_s), s	1.0	0.0	26.1	1.0	3.7	2.4	1.2	0.0	5.8	2.8	0.0	23.9
Cycle Q Clear(g_c), s	1.0	0.0	26.1	1.0	3.7	2.4	1.2	0.0	5.8	2.8	0.0	23.9
Prop In Lane	1.00		0.35	1.00		1.00	1.00		0.27	1.00		0.09
Lane Grp Cap(c), veh/h	484	0	576	161	612	519	248	0	677	555	0	728
V/C Ratio(X)	0.07	0.00	0.95	0.20	0.18	0.12	0.17	0.00	0.26	0.17	0.00	0.80
Avail Cap(c_a), veh/h	533	0	581	210	618	523	287	0	677	577	0	728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	28.3	22.2	20.8	20.3	18.1	0.0	18.4	14.9	0.0	23.0
Incr Delay (d2), s/veh	0.1	0.0	24.8	0.6	0.1	0.1	0.3	0.0	0.9	0.1	0.0	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	14.5	0.4	1.6	0.9	0.5	0.0	2.5	1.1	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	0.0	53.1	22.8	20.9	20.4	18.5	0.0	19.3	15.1	0.0	31.8
LnGrp LOS	B	A	D	C	C	C	B	A	B	B	A	C
Approach Vol, veh/h		579			209			217			676	
Approach Delay, s/veh		51.1			21.1			19.2			29.4	
Approach LOS		D			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	37.3	7.2	32.8	7.7	38.6	7.2	32.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.6	32.8	5.1	28.5	5.1	33.3	5.1	28.5
Max Q Clear Time (g_c+I1), s	4.8	7.8	3.0	28.1	3.2	25.9	3.0	5.7
Green Ext Time (p_c), s	0.0	1.0	0.0	0.2	0.0	2.3	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
3: CR 116 & Larkin

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	33	20	23	81	11	82	117	10	1	401	93
Future Volume (veh/h)	27	33	20	23	81	11	82	117	10	1	401	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	30	37	22	26	90	12	91	130	11	1	446	103
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	310	123	73	340	174	23	429	779	660	603	634	537
Arrive On Green	0.04	0.11	0.11	0.03	0.11	0.11	0.08	0.42	0.42	0.00	0.34	0.34
Sat Flow, veh/h	1781	1099	654	1781	1616	215	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	30	0	59	26	0	102	91	130	11	1	446	103
Grp Sat Flow(s),veh/h/ln	1781	0	1753	1781	0	1832	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.6	0.0	1.3	0.5	0.0	2.2	1.2	1.8	0.2	0.0	8.5	1.9
Cycle Q Clear(g_c), s	0.6	0.0	1.3	0.5	0.0	2.2	1.2	1.8	0.2	0.0	8.5	1.9
Prop In Lane	1.00		0.37	1.00		0.12	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	0	196	340	0	197	429	779	660	603	634	537
V/C Ratio(X)	0.10	0.00	0.30	0.08	0.00	0.52	0.21	0.17	0.02	0.00	0.70	0.19
Avail Cap(c_a), veh/h	486	0	792	523	0	827	572	1941	1645	838	1895	1606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	16.7	15.4	0.0	17.3	8.1	7.5	7.0	8.9	11.8	9.6
Incr Delay (d2), s/veh	0.1	0.0	0.9	0.1	0.0	2.1	0.2	0.1	0.0	0.0	1.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	0.2	0.0	0.9	0.4	0.5	0.0	0.0	3.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	0.0	17.6	15.5	0.0	19.4	8.3	7.6	7.0	8.9	13.2	9.7
LnGrp LOS	B	A	B	B	A	B	A	A	A	A	B	A
Approach Vol, veh/h		89			128			232			550	
Approach Delay, s/veh		16.9			18.6			7.8			12.5	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	21.6	5.8	9.1	7.7	18.4	5.9	8.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	42.5	5.5	18.5	6.5	41.5	5.5	18.5
Max Q Clear Time (g_c+I1), s	2.0	3.8	2.5	3.3	3.2	10.5	2.6	4.2
Green Ext Time (p_c), s	0.0	0.8	0.0	0.2	0.1	3.4	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
3: CR 116 & Larkin

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	34	20	24	81	12	82	123	11	1	423	93
Future Volume (veh/h)	28	34	20	24	81	12	82	123	11	1	423	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	31	38	22	27	90	13	91	137	12	1	470	103
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	304	122	71	334	170	24	422	800	678	611	657	557
Arrive On Green	0.04	0.11	0.11	0.03	0.11	0.11	0.08	0.43	0.43	0.00	0.35	0.35
Sat Flow, veh/h	1781	1111	643	1781	1598	231	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	31	0	60	27	0	103	91	137	12	1	470	103
Grp Sat Flow(s),veh/h/ln	1781	0	1755	1781	0	1829	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.6	0.0	1.3	0.6	0.0	2.2	1.3	1.9	0.2	0.0	9.1	1.9
Cycle Q Clear(g_c), s	0.6	0.0	1.3	0.6	0.0	2.2	1.3	1.9	0.2	0.0	9.1	1.9
Prop In Lane	1.00		0.37	1.00		0.13	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	304	0	193	334	0	194	422	800	678	611	657	557
V/C Ratio(X)	0.10	0.00	0.31	0.08	0.00	0.53	0.22	0.17	0.02	0.00	0.72	0.19
Avail Cap(c_a), veh/h	473	0	773	510	0	806	559	1893	1604	840	1849	1567
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	0.0	17.2	15.8	0.0	17.8	8.1	7.4	6.9	8.8	11.8	9.5
Incr Delay (d2), s/veh	0.1	0.0	0.9	0.1	0.0	2.2	0.3	0.1	0.0	0.0	1.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	0.2	0.0	0.9	0.4	0.6	0.0	0.0	3.2	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	0.0	18.1	15.9	0.0	20.0	8.3	7.5	6.9	8.8	13.3	9.6
LnGrp LOS	B	A	B	B	A	C	A	A	A	A	B	A
Approach Vol, veh/h		91			130			240			574	
Approach Delay, s/veh		17.4			19.2			7.8			12.6	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	22.5	5.9	9.1	7.8	19.2	6.0	9.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	42.5	5.5	18.5	6.5	41.5	5.5	18.5
Max Q Clear Time (g_c+I1), s	2.0	3.9	2.6	3.3	3.3	11.1	2.6	4.2
Green Ext Time (p_c), s	0.0	0.8	0.0	0.2	0.1	3.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	114	241	229	60	5
Future Vol, veh/h	7	114	241	229	60	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	125	265	252	66	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	851	69	71	0	-	0
Stage 1	69	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	330	994	1529	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	273	994	1529	-	-	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1529	-	862	-	-
HCM Lane V/C Ratio	0.173	-	0.154	-	-
HCM Control Delay (s)	7.8	-	9.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.6	-	0.5	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	9	7	6	14	12	5	7	472	29	8	143	18
Future Vol, veh/h	9	7	6	14	12	5	7	472	29	8	143	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	8	7	15	13	5	8	519	32	9	157	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	467	752	89	652	746	276	177	0	0	551	0	0
Stage 1	185	185	-	551	551	-	-	-	-	-	-	-
Stage 2	282	567	-	101	195	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	479	338	951	353	340	721	1396	-	-	1015	-	-
Stage 1	799	746	-	486	514	-	-	-	-	-	-	-
Stage 2	701	505	-	894	738	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	455	332	951	340	334	721	1396	-	-	1015	-	-
Mov Cap-2 Maneuver	455	332	-	340	334	-	-	-	-	-	-	-
Stage 1	793	739	-	482	510	-	-	-	-	-	-	-
Stage 2	672	501	-	870	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	15.7	0.1	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1396	-	-	466	369	1015	-	-
HCM Lane V/C Ratio	0.006	-	-	0.052	0.092	0.009	-	-
HCM Control Delay (s)	7.6	0	-	13.1	15.7	8.6	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	19	0	0	33	0	0
Future Vol, veh/h	19	0	0	33	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	0	0	36	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	21	0	57	21
Stage 1	-	-	-	-	21	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1595	-	950	1056
Stage 1	-	-	-	-	1002	-
Stage 2	-	-	-	-	986	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1595	-	950	1056
Mov Cap-2 Maneuver	-	-	-	-	950	-
Stage 1	-	-	-	-	1002	-
Stage 2	-	-	-	-	986	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1595	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
9: CR 116 & CR 10

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	120	36	21	284	55	119	380	17	38	94	40
Future Volume (veh/h)	40	120	36	21	284	55	119	380	17	38	94	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	132	40	23	312	60	131	418	19	42	103	44
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	304	92	308	386	327	707	846	38	465	564	241
Arrive On Green	0.04	0.22	0.22	0.03	0.21	0.21	0.06	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1781	1378	417	1781	1870	1585	1781	1775	81	1781	1244	531
Grp Volume(v), veh/h	44	0	172	23	312	60	131	0	437	42	0	147
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1781	1870	1585	1781	0	1856	1781	0	1775
Q Serve(g_s), s	1.4	0.0	6.2	0.8	12.0	2.4	2.9	0.0	12.2	0.9	0.0	3.7
Cycle Q Clear(g_c), s	1.4	0.0	6.2	0.8	12.0	2.4	2.9	0.0	12.2	0.9	0.0	3.7
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.04	1.00		0.30
Lane Grp Cap(c), veh/h	214	0	396	308	386	327	707	0	884	465	0	805
V/C Ratio(X)	0.21	0.00	0.43	0.07	0.81	0.18	0.19	0.00	0.49	0.09	0.00	0.18
Avail Cap(c_a), veh/h	273	0	614	388	635	538	755	0	884	525	0	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	25.3	22.7	28.5	24.7	9.7	0.0	13.5	10.7	0.0	12.3
Incr Delay (d2), s/veh	0.5	0.0	0.8	0.1	4.1	0.3	0.1	0.0	2.0	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.6	0.3	5.6	0.9	1.0	0.0	5.1	0.3	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	26.1	22.8	32.6	25.0	9.8	0.0	15.5	10.8	0.0	12.8
LnGrp LOS	C	A	C	C	C	C	A	A	B	B	A	B
Approach Vol, veh/h		216			395			568			189	
Approach Delay, s/veh		25.5			30.9			14.2			12.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	40.5	6.4	21.2	9.2	38.7	7.5	20.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.4	5.3	25.8	6.7	34.2	5.5	25.6
Max Q Clear Time (g_c+I1), s	2.9	14.2	2.8	8.2	4.9	5.7	3.4	14.0
Green Ext Time (p_c), s	0.0	2.7	0.0	0.8	0.1	0.8	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	114	241	229	60	5
Future Vol, veh/h	7	114	241	229	60	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	125	265	252	66	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	851	69	71	0	-	0
Stage 1	69	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	330	994	1529	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	273	994	1529	-	-	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1529	-	862	-	-
HCM Lane V/C Ratio	0.173	-	0.154	-	-
HCM Control Delay (s)	7.8	-	9.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.6	-	0.5	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	9	7	6	14	12	5	7	472	29	8	143	18
Future Vol, veh/h	9	7	6	14	12	5	7	472	29	8	143	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	8	7	15	13	5	8	519	32	9	157	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	467	752	89	652	746	276	177	0	0	551	0	0
Stage 1	185	185	-	551	551	-	-	-	-	-	-	-
Stage 2	282	567	-	101	195	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	479	338	951	353	340	721	1396	-	-	1015	-	-
Stage 1	799	746	-	486	514	-	-	-	-	-	-	-
Stage 2	701	505	-	894	738	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	455	332	951	340	334	721	1396	-	-	1015	-	-
Mov Cap-2 Maneuver	455	332	-	340	334	-	-	-	-	-	-	-
Stage 1	793	739	-	482	510	-	-	-	-	-	-	-
Stage 2	672	501	-	870	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	15.7	0.1	0.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1396	-	-	466	369	1015	-	-
HCM Lane V/C Ratio	0.006	-	-	0.052	0.092	0.009	-	-
HCM Control Delay (s)	7.6	0	-	13.1	15.7	8.6	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	21	0	0	37	0	0
Future Vol, veh/h	21	0	0	37	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	0	0	41	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	23	0	64	23
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	41	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1592	-	942	1054
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	981	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1592	-	942	1054
Mov Cap-2 Maneuver	-	-	-	-	942	-
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	981	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1592	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
9: CR 116 & CR 10

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	120	36	21	284	55	119	380	17	38	94	40
Future Volume (veh/h)	40	120	36	21	284	55	119	380	17	38	94	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	132	40	23	312	60	131	418	19	42	103	44
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	304	92	308	386	327	707	846	38	465	564	241
Arrive On Green	0.04	0.22	0.22	0.03	0.21	0.21	0.06	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1781	1378	417	1781	1870	1585	1781	1775	81	1781	1244	531
Grp Volume(v), veh/h	44	0	172	23	312	60	131	0	437	42	0	147
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1781	1870	1585	1781	0	1856	1781	0	1775
Q Serve(g_s), s	1.4	0.0	6.2	0.8	12.0	2.4	2.9	0.0	12.2	0.9	0.0	3.7
Cycle Q Clear(g_c), s	1.4	0.0	6.2	0.8	12.0	2.4	2.9	0.0	12.2	0.9	0.0	3.7
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.04	1.00		0.30
Lane Grp Cap(c), veh/h	214	0	396	308	386	327	707	0	884	465	0	805
V/C Ratio(X)	0.21	0.00	0.43	0.07	0.81	0.18	0.19	0.00	0.49	0.09	0.00	0.18
Avail Cap(c_a), veh/h	273	0	614	388	635	538	755	0	884	525	0	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	25.3	22.7	28.5	24.7	9.7	0.0	13.5	10.7	0.0	12.3
Incr Delay (d2), s/veh	0.5	0.0	0.8	0.1	4.1	0.3	0.1	0.0	2.0	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.6	0.3	5.6	0.9	1.0	0.0	5.1	0.3	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	26.1	22.8	32.6	25.0	9.8	0.0	15.5	10.8	0.0	12.8
LnGrp LOS	C	A	C	C	C	C	A	A	B	B	A	B
Approach Vol, veh/h		216			395			568			189	
Approach Delay, s/veh		25.5			30.9			14.2			12.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	40.5	6.4	21.2	9.2	38.7	7.5	20.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	35.4	5.3	25.8	6.7	34.2	5.5	25.6
Max Q Clear Time (g_c+I1), s	2.9	14.2	2.8	8.2	4.9	5.7	3.4	14.0
Green Ext Time (p_c), s	0.0	2.7	0.0	0.8	0.1	0.8	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	114	241	253	65	5
Future Vol, veh/h	7	114	241	253	65	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	125	265	278	71	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	882	74	76	0	-	0
Stage 1	74	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	317	988	1523	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	438	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	262	988	1523	-	-	-
Mov Cap-2 Maneuver	262	-	-	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	3.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1523	-	852	-	-
HCM Lane V/C Ratio	0.174	-	0.156	-	-
HCM Control Delay (s)	7.9	-	10	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.6	-	0.6	-	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	77	81	14	30	5	27	472	29	8	143	38
Future Vol, veh/h	88	77	81	14	30	5	27	472	29	8	143	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	97	85	89	15	33	5	30	519	32	9	157	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	532	807	100	734	812	276	199	0	0	551	0	0
Stage 1	196	196	-	595	595	-	-	-	-	-	-	-
Stage 2	336	611	-	139	217	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	430	314	936	308	312	721	1371	-	-	1015	-	-
Stage 1	787	737	-	458	491	-	-	-	-	-	-	-
Stage 2	652	482	-	850	722	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	378	301	936	212	299	721	1371	-	-	1015	-	-
Mov Cap-2 Maneuver	378	301	-	212	299	-	-	-	-	-	-	-
Stage 1	762	730	-	443	475	-	-	-	-	-	-	-
Stage 2	583	467	-	673	715	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.8	20.7	0.5	0.4
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1371	-	-	428	283	1015	-	-
HCM Lane V/C Ratio	0.022	-	-	0.632	0.19	0.009	-	-
HCM Control Delay (s)	7.7	0.1	-	26.8	20.7	8.6	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	4.2	0.7	0	-	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	6	21	0	0	37	58	0	0	0	224	0	26
Future Vol, veh/h	6	21	0	0	37	58	0	0	0	224	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	23	0	0	41	64	0	0	0	246	0	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	23	0	0	125	142	23	110	110	73
Stage 1	-	-	-	-	-	-	37	37	-	73	73	-
Stage 2	-	-	-	-	-	-	88	105	-	37	37	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1486	-	-	1592	-	-	849	749	1054	868	780	989
Stage 1	-	-	-	-	-	-	978	864	-	937	834	-
Stage 2	-	-	-	-	-	-	920	808	-	978	864	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1486	-	-	1592	-	-	821	745	1054	865	776	989
Mov Cap-2 Maneuver	-	-	-	-	-	-	821	745	-	865	776	-
Stage 1	-	-	-	-	-	-	973	860	-	932	834	-
Stage 2	-	-	-	-	-	-	893	808	-	973	860	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	0	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1486	-	-	1592	-	-	876
HCM Lane V/C Ratio	-	0.004	-	-	-	-	-	0.314
HCM Control Delay (s)	0	7.4	0	-	0	-	-	11
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	1.3

HCM 6th Signalized Intersection Summary
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	120	41	23	284	55	143	430	22	38	107	40
Future Volume (veh/h)	40	120	41	23	284	55	143	430	22	38	107	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	132	45	25	312	60	157	473	24	42	118	44
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	211	290	99	301	383	325	703	851	43	426	584	218
Arrive On Green	0.04	0.22	0.22	0.03	0.20	0.20	0.07	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1781	1334	455	1781	1870	1585	1781	1765	90	1781	1299	484
Grp Volume(v), veh/h	44	0	177	25	312	60	157	0	497	42	0	162
Grp Sat Flow(s),veh/h/ln	1781	0	1789	1781	1870	1585	1781	0	1854	1781	0	1783
Q Serve(g_s), s	1.5	0.0	6.6	0.8	12.2	2.4	3.6	0.0	14.5	0.9	0.0	4.2
Cycle Q Clear(g_c), s	1.5	0.0	6.6	0.8	12.2	2.4	3.6	0.0	14.5	0.9	0.0	4.2
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.05	1.00		0.27
Lane Grp Cap(c), veh/h	211	0	389	301	383	325	703	0	894	426	0	802
V/C Ratio(X)	0.21	0.00	0.45	0.08	0.81	0.18	0.22	0.00	0.56	0.10	0.00	0.20
Avail Cap(c_a), veh/h	259	0	585	371	612	519	747	0	894	480	0	802
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	26.0	23.2	29.1	25.2	9.8	0.0	14.0	11.3	0.0	12.8
Incr Delay (d2), s/veh	0.5	0.0	0.8	0.1	4.5	0.3	0.2	0.0	2.5	0.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.8	0.4	5.7	0.9	1.3	0.0	6.2	0.4	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	0.0	26.9	23.3	33.6	25.5	10.0	0.0	16.5	11.4	0.0	13.3
LnGrp LOS	C	A	C	C	C	C	A	A	B	B	A	B
Approach Vol, veh/h		221			397			654			204	
Approach Delay, s/veh		26.3			31.7			15.0			12.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	41.5	6.6	21.2	9.9	39.0	7.5	20.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.3	36.5	5.1	25.1	7.3	34.5	5.1	25.1
Max Q Clear Time (g_c+I1), s	2.9	16.5	2.8	8.6	5.6	6.2	3.5	14.2
Green Ext Time (p_c), s	0.0	3.2	0.0	0.8	0.1	0.9	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	20.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	158	332	315	83	6
Future Vol, veh/h	9	158	332	315	83	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	174	365	346	91	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1171	95	98	0	-	0
Stage 1	95	-	-	-	-	-
Stage 2	1076	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	213	962	1495	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	327	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	161	962	1495	-	-	-
Mov Cap-2 Maneuver	161	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	327	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	4.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1495	-	759	-	-
HCM Lane V/C Ratio	0.244	-	0.242	-	-
HCM Control Delay (s)	8.2	-	11.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	1	-	0.9	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	9	8	19	17	6	9	650	41	11	197	25
Future Vol, veh/h	12	9	8	19	17	6	9	650	41	11	197	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	10	9	21	19	7	10	714	45	12	216	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	641	1033	122	894	1024	380	243	0	0	759	0	0
Stage 1	254	254	-	757	757	-	-	-	-	-	-	-
Stage 2	387	779	-	137	267	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	360	231	906	236	234	618	1320	-	-	848	-	-
Stage 1	728	696	-	366	414	-	-	-	-	-	-	-
Stage 2	608	404	-	852	687	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	327	224	906	221	227	618	1320	-	-	848	-	-
Mov Cap-2 Maneuver	327	224	-	221	227	-	-	-	-	-	-	-
Stage 1	719	685	-	361	409	-	-	-	-	-	-	-
Stage 2	567	399	-	818	676	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.8	23	0.1	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1320	-	-	338	246	848	-	-
HCM Lane V/C Ratio	0.007	-	-	0.094	0.188	0.014	-	-
HCM Control Delay (s)	7.7	0	-	16.8	23	9.3	0.1	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.7	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	0	0	51	0	0
Future Vol, veh/h	30	0	0	51	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	0	0	56	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	33	0	89	33
Stage 1	-	-	-	-	33	-
Stage 2	-	-	-	-	56	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1579	-	912	1041
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	967	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1579	-	912	1041
Mov Cap-2 Maneuver	-	-	-	-	912	-
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	967	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1579	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	165	50	30	391	76	164	524	23	53	129	55
Future Volume (veh/h)	55	165	50	30	391	76	164	524	23	53	129	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	181	55	33	430	84	180	576	25	58	142	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	379	115	334	491	416	605	766	33	296	491	207
Arrive On Green	0.05	0.28	0.28	0.03	0.26	0.26	0.08	0.43	0.43	0.04	0.39	0.39
Sat Flow, veh/h	1781	1377	418	1781	1870	1585	1781	1779	77	1781	1248	527
Grp Volume(v), veh/h	60	0	236	33	430	84	180	0	601	58	0	202
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1781	1870	1585	1781	0	1856	1781	0	1775
Q Serve(g_s), s	2.0	0.0	9.1	1.1	18.2	3.4	4.8	0.0	22.6	1.6	0.0	6.5
Cycle Q Clear(g_c), s	2.0	0.0	9.1	1.1	18.2	3.4	4.8	0.0	22.6	1.6	0.0	6.5
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.04	1.00		0.30
Lane Grp Cap(c), veh/h	205	0	494	334	491	416	605	0	800	296	0	698
V/C Ratio(X)	0.29	0.00	0.48	0.10	0.88	0.20	0.30	0.00	0.75	0.20	0.00	0.29
Avail Cap(c_a), veh/h	234	0	568	384	589	499	638	0	800	326	0	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	25.0	21.4	29.3	23.8	12.7	0.0	19.9	16.0	0.0	17.2
Incr Delay (d2), s/veh	0.8	0.0	0.7	0.1	12.3	0.2	0.3	0.0	6.4	0.3	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	3.8	0.5	9.5	1.3	1.8	0.0	10.5	0.6	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	0.0	25.8	21.5	41.5	24.0	13.0	0.0	26.3	16.3	0.0	18.2
LnGrp LOS	C	A	C	C	D	C	B	A	C	B	A	B
Approach Vol, veh/h		296			547			781			260	
Approach Delay, s/veh		25.3			37.7			23.2			17.8	
Approach LOS		C			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	40.2	7.2	27.3	11.3	37.1	8.2	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	35.7	5.0	26.2	8.3	32.5	5.1	26.1
Max Q Clear Time (g_c+I1), s	3.6	24.6	3.1	11.1	6.8	8.5	4.0	20.2
Green Ext Time (p_c), s	0.0	3.1	0.0	1.1	0.1	1.2	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	158	332	339	88	6
Future Vol, veh/h	9	158	332	339	88	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	120	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	174	365	373	97	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1204	101	104	0	-	0
Stage 1	101	-	-	-	-	-
Stage 2	1103	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	203	954	1488	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	153	954	1488	-	-	-
Mov Cap-2 Maneuver	153	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	318	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	4.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1488	-	744	-	-
HCM Lane V/C Ratio	0.245	-	0.247	-	-
HCM Control Delay (s)	8.2	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	1	-	1	-	-

Intersection	
Int Delay, s/veh	16.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	91	79	83	19	35	6	29	650	41	11	197	45
Future Vol, veh/h	91	79	83	19	35	6	29	650	41	11	197	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	100	87	91	21	38	7	32	714	45	12	216	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	705	1088	133	977	1090	380	265	0	0	759	0	0
Stage 1	265	265	-	801	801	-	-	-	-	-	-	-
Stage 2	440	823	-	176	289	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	323	214	892	205	214	618	1296	-	-	848	-	-
Stage 1	717	688	-	344	395	-	-	-	-	-	-	-
Stage 2	566	386	-	809	672	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	261	201	892	117	201	618	1296	-	-	848	-	-
Mov Cap-2 Maneuver	261	201	-	117	201	-	-	-	-	-	-	-
Stage 1	686	676	-	329	378	-	-	-	-	-	-	-
Stage 2	481	369	-	622	661	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	70.8	38.1	0.5	0.5
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1296	-	-	303	173	848	-	-
HCM Lane V/C Ratio	0.025	-	-	0.918	0.381	0.014	-	-
HCM Control Delay (s)	7.8	0.2	-	70.8	38.1	9.3	0.1	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	8.8	1.6	0	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	30	0	0	51	58	0	0	0	224	0	26
Future Vol, veh/h	6	30	0	0	51	58	0	0	0	224	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	33	0	0	56	64	0	0	0	246	0	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	120	0	0	33	0	0	150	167	33	135	135	88
Stage 1	-	-	-	-	-	-	47	47	-	88	88	-
Stage 2	-	-	-	-	-	-	103	120	-	47	47	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1468	-	-	1579	-	-	818	726	1041	836	756	970
Stage 1	-	-	-	-	-	-	967	856	-	920	822	-
Stage 2	-	-	-	-	-	-	903	796	-	967	856	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1468	-	-	1579	-	-	791	722	1041	833	752	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	791	722	-	833	752	-
Stage 1	-	-	-	-	-	-	962	852	-	915	822	-
Stage 2	-	-	-	-	-	-	876	796	-	962	852	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	0	11.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1468	-	-	1579	-	-	845
HCM Lane V/C Ratio	-	0.004	-	-	-	-	-	0.325
HCM Control Delay (s)	0	7.5	0	-	0	-	-	11.3
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	165	55	32	391	76	188	574	28	53	142	55
Future Volume (veh/h)	55	165	55	32	391	76	188	574	28	53	142	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	181	60	35	430	84	207	631	31	58	156	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	362	120	321	482	408	608	779	38	264	508	195
Arrive On Green	0.04	0.27	0.27	0.03	0.26	0.26	0.09	0.44	0.44	0.04	0.39	0.39
Sat Flow, veh/h	1781	1344	446	1781	1870	1585	1781	1768	87	1781	1286	495
Grp Volume(v), veh/h	60	0	241	35	430	84	207	0	662	58	0	216
Grp Sat Flow(s),veh/h/ln	1781	0	1790	1781	1870	1585	1781	0	1855	1781	0	1781
Q Serve(g_s), s	2.1	0.0	9.6	1.2	18.7	3.5	5.5	0.0	26.3	1.6	0.0	7.1
Cycle Q Clear(g_c), s	2.1	0.0	9.6	1.2	18.7	3.5	5.5	0.0	26.3	1.6	0.0	7.1
Prop In Lane	1.00		0.25	1.00		1.00	1.00		0.05	1.00		0.28
Lane Grp Cap(c), veh/h	197	0	482	321	482	408	608	0	818	264	0	703
V/C Ratio(X)	0.31	0.00	0.50	0.11	0.89	0.21	0.34	0.00	0.81	0.22	0.00	0.31
Avail Cap(c_a), veh/h	225	0	521	368	542	459	656	0	818	293	0	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	26.1	22.2	30.3	24.6	12.4	0.0	20.6	17.0	0.0	17.6
Incr Delay (d2), s/veh	0.9	0.0	0.8	0.1	15.8	0.2	0.3	0.0	8.5	0.4	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	4.1	0.5	10.2	1.3	2.1	0.0	12.5	0.6	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	0.0	26.9	22.3	46.0	24.9	12.7	0.0	29.1	17.4	0.0	18.8
LnGrp LOS	C	A	C	C	D	C	B	A	C	B	A	B
Approach Vol, veh/h		301			549			869			274	
Approach Delay, s/veh		26.4			41.3			25.2			18.5	
Approach LOS		C			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	41.8	7.3	27.3	12.1	37.9	8.3	26.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	37.3	5.0	24.6	9.9	32.5	5.1	24.5
Max Q Clear Time (g_c+I1), s	3.6	28.3	3.2	11.6	7.5	9.1	4.1	20.7
Green Ext Time (p_c), s	0.0	3.0	0.0	1.1	0.1	1.2	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
3: CR 116 & Larkin

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	77	81	14	30	5	27	472	29	8	143	38
Future Volume (veh/h)	88	77	81	14	30	5	27	472	29	8	143	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	97	85	89	15	33	5	30	519	32	9	157	42
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	436	143	149	296	174	26	578	703	595	307	659	559
Arrive On Green	0.08	0.17	0.17	0.02	0.11	0.11	0.04	0.38	0.38	0.01	0.35	0.35
Sat Flow, veh/h	1781	837	876	1781	1587	240	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	97	0	174	15	0	38	30	519	32	9	157	42
Grp Sat Flow(s),veh/h/ln	1781	0	1713	1781	0	1827	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.0	0.0	4.0	0.3	0.0	0.8	0.4	10.2	0.5	0.1	2.5	0.8
Cycle Q Clear(g_c), s	2.0	0.0	4.0	0.3	0.0	0.8	0.4	10.2	0.5	0.1	2.5	0.8
Prop In Lane	1.00		0.51	1.00		0.13	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	436	0	292	296	0	200	578	703	595	307	659	559
V/C Ratio(X)	0.22	0.00	0.60	0.05	0.00	0.19	0.05	0.74	0.05	0.03	0.24	0.08
Avail Cap(c_a), veh/h	565	0	769	492	0	777	746	1841	1560	516	1841	1560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	16.3	16.3	0.0	17.2	8.2	11.5	8.5	9.7	9.7	9.2
Incr Delay (d2), s/veh	0.3	0.0	1.9	0.1	0.0	0.5	0.0	1.5	0.0	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	1.5	0.1	0.0	0.3	0.1	3.5	0.2	0.0	0.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	18.2	16.4	0.0	17.7	8.2	13.0	8.5	9.7	9.9	9.2
LnGrp LOS	B	A	B	B	A	B	A	B	A	A	A	A
Approach Vol, veh/h		271			53			581			208	
Approach Delay, s/veh		17.1			17.3			12.5			9.8	
Approach LOS		B			B			B			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.0	20.5	5.3	11.8	6.0	19.5	7.9	9.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	41.9	5.5	19.1	5.5	41.9	6.5	18.1
Max Q Clear Time (g_c+I1), s	2.1	12.2	2.3	6.0	2.4	4.5	4.0	2.8
Green Ext Time (p_c), s	0.0	3.8	0.0	0.7	0.0	1.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
3: CR 116 & Larkin

04/21/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	79	83	19	35	6	29	650	41	11	197	45
Future Volume (veh/h)	91	79	83	19	35	6	29	650	41	11	197	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	87	91	21	38	7	32	714	45	12	216	49
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	372	124	130	241	154	28	622	881	746	265	843	714
Arrive On Green	0.07	0.15	0.15	0.03	0.10	0.10	0.04	0.47	0.47	0.02	0.45	0.45
Sat Flow, veh/h	1781	837	876	1781	1536	283	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	100	0	178	21	0	45	32	714	45	12	216	49
Grp Sat Flow(s),veh/h/ln	1781	0	1713	1781	0	1819	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.6	0.0	5.2	0.6	0.0	1.2	0.5	17.3	0.8	0.2	3.8	0.9
Cycle Q Clear(g_c), s	2.6	0.0	5.2	0.6	0.0	1.2	0.5	17.3	0.8	0.2	3.8	0.9
Prop In Lane	1.00		0.51	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	372	0	254	241	0	183	622	881	746	265	843	714
V/C Ratio(X)	0.27	0.00	0.70	0.09	0.00	0.25	0.05	0.81	0.06	0.05	0.26	0.07
Avail Cap(c_a), veh/h	414	0	587	364	0	620	727	1554	1317	407	1554	1317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.1	0.0	21.4	20.5	0.0	21.9	7.2	12.0	7.6	10.1	9.0	8.2
Incr Delay (d2), s/veh	0.4	0.0	3.5	0.2	0.0	0.7	0.0	1.9	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	2.2	0.2	0.0	0.5	0.2	6.1	0.2	0.1	1.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	0.0	24.9	20.7	0.0	22.6	7.3	13.8	7.6	10.2	9.2	8.3
LnGrp LOS	B	A	C	C	A	C	A	B	A	B	A	A
Approach Vol, veh/h		278			66			791			277	
Approach Delay, s/veh		23.0			22.0			13.2			9.1	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	29.4	5.8	12.3	6.4	28.3	8.3	9.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	43.9	5.0	18.1	5.0	43.9	5.1	18.0
Max Q Clear Time (g_c+I1), s	2.2	19.3	2.6	7.2	2.5	5.8	4.6	3.2
Green Ext Time (p_c), s	0.0	5.6	0.0	0.7	0.0	1.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Appendix H

SHPO Response Letter

DEPARTMENT OF ADMINISTRATION
STATE HISTORIC PRESERVATION OFFICE

May 4, 2022

Kendra Lindahl
City Planner
City of Corcoran
8200 County Road 116
Corcoran, MN 55340

RE: Corcoran Farms Business Park
T119 R23 S26, Corcoran, Hennepin County
SHPO Number: 2022-1337

Dear Kendra Lindahl:

Thank you for consulting with our office during the preparation of an Environmental Assessment Worksheet for the above-referenced project.

Based on our review of the project information, we conclude that there are no properties listed in the National or State Registers of Historic Places and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If this project is considered for federal financial assistance, or requires a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency. Be advised that comments and recommendations provided by our office for this state-level review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

Please contact Kelly Gragg-Johnson in our Environmental Review Program at kelly.graggjohnson@state.mn.us if you have any questions regarding our review of this project.

Sincerely,

Sarah J. Beimers
Environmental Review Program Manager