ENVIRONMENTAL ASSESSMENT WORKSHEET

Savona EAW

Washington County, Minnesota
April 3, 2013

Prepared For:
Lennar
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Prepared By:
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ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW)

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Savona EAW

Note to preparers: This form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The Environmental Assessment Worksheet provides information about a project that may have the potential for significant environmental effects. The EAW is prepared by the Responsible Governmental Unit or its agents to determine whether an Environmental Impact Statement should be prepared. The project proposer must supply any reasonably accessible data for — but should not complete — the final worksheet. The complete question as well as the answer must be included if the EAW is prepared electronically.

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: Savona EAW

2. Proposer:		**3. RGU:**	
Contact person:	Joe Jablonski	Contact person:	Kyle Klatt
Title:	Development Area Manager	Title:	Planning Director
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4. Reason for EAW Preparation

☐ EIS Scoping ☑ Mandatory EAW ☐ Citizen Petition ☐ RGU Discretion ☐ Proposer Volunteered

If EAW or EIS is mandatory give EQB rule category subpart numbers(s) Part 4410.4300 Subp. 19.D., Residential Development

5. Project Location

County: Washington County, Minnesota
City: Lake Elmo
Twp: T29N, R21W, S34
GPS Coordinates: 44.954093,-92.913716 (Project Center)
Tax Parcel Numbers: 34.029.21.41.0004; 34.029.21.42.0001; 34.029.21.34.0001; 34.029.21.34.0003; 34.029.21.31.0001 (All tax parcels within overall project site are listed.)

Attach copies of each of the following to the EAW:

- County map showing the general location of the project; **See Exhibit 1.**
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); **See Exhibit 2.**
- Site plan showing all significant project and natural features. **See Exhibit 3.**

6. Description

a) Provide a project summary of 50 words or less to be published in the EQB Monitor.

The Savona residential development is proposed on approximately 112.5 acres of primarily agricultural land in the southern portion of Lake Elmo. The project is proposing 190 single-family lots, and 122 multi-family lots. Twenty-seven acres of open space is also planned, which will include buffers, parks, woods and ponds.

b) Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods, and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal, or remodeling of existing structures. Indicate the timing and duration of construction activities.

Lennar is proposing construction of a single and multi-family residential development on approximately 112.5 acres of land. The two parcels that constitute the project are referred to as the Dale (west) and Frandsen (east) Properties, and are approximately 72.5 and 40 acres in size, respectively. The proposed project is located in the S ½ of Section 34, T29N, R21W, City of Lake Elmo, Washington County, Minnesota (Exhibits 1 & 2), and is generally located south of 10th Street North (CSAH 10) and west of Keats Avenue North (CSAH 19).

Project development will convert approximately 112.5 acres of agricultural fields, woodlands, and constructed ponds to streets, homes, lawns, landscaping, parkland, trails, and stormwater ponding. Land use within the site will include construction of up to 190 single-family lots, and 122 multi-family townhome units. Development plans feature 65 to 75-foot wide single-family lots and 28 foot-wide residential streets. The proposed project will have an overall net density of 4.0 units per acre. Potential adverse effects on the environment will be mitigated by preserving and creating approximately 27 acres of open space in the form of buffers, parks, woodlands, and ponds. The project proposes extensive landscaping, buffering, and berming along adjacent roadways to offset possible visual impacts. Each residential lot will be served by City of Lake Elmo sanitary sewer and water systems. No onsite sewage systems and no private wells are proposed. Public streets will service the development including the construction of a minor collector roadway to serve the development, directing traffic east to Keats Avenue for convenient access to the I-94 corridor.

The Metropolitan Council recently approved an amendment to the Lake Elmo Comprehensive Land Use Plan. Under the amended plan, the city agreed to provide an additional 6,600 Residential Equivalent Connections (RECs) of regional sewer service by 2030. In a 2005 Memorandum of Understanding (MOU) with the Metropolitan Council, the city agreed to meet or exceed an average residential density of three units per acre in sewered areas south of 10th Street. Sewered development will be limited to the city's Village area (area surrounding the historic Lake Elmo Village) and the area south of 10th Street along Interstate 94. The proposed development of the study area is consistent with the total level of density guided by the MOU and Land Use Plan. The City of Lake Elmo I-94 Corridor Development Staging Plan map (July 2012) indicates that the project area falls within the Stage I area. While a specific time period has not been attached to these stages, the stages are intended to develop in numeric order from Stage I to Stage III. Stage I represents new sewered development located west of Keats Avenue that will connect to the Metropolitan Council Environmental Services (MCES) Woodbury, Oakdale, Northdale and East Oakdale (WONE) interceptor.

Construction

It is anticipated that the project will be constructed in six phases, with the first phase expected to begin in 2013. Full build-out is anticipated in 2018; however, construction timing will ultimately depend upon market conditions. It is anticipated that construction will entail moving approximately 750,000 cubic yards of soil. Construction dewatering may be conducted on an as-needed and permitted basis to install sanitary sewer, municipal water, and storm sewer. Best Management Practices will be implemented during and after construction to protect water quality and reduce the potential for soil erosion and sedimentation.

c) 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 Savona residential development project is to meet the demand for additional residential housing units within the City of Lake Elmo in accordance with the signed 2005 MOU between the City and the Metropolitan Council. Under this MOU, the City of Lake Elmo committed to adding 6,600 new RECs of regional sewer service by the year 2030. The city also committed to a city-wide population of 24,000 by the year 2030. This project will help meet the city's obligations as outlined within the MOU by providing an additional 312 living units along the I-94 corridor. The project will be constructed and implemented by Lennar, a private developer.

d) Are future stages of this development planned or likely to happen? ☐ Yes ☑ No.
If yes, briefly describe future stages, relationship to the present project, timeline, and plans for environmental review.

There are currently no planned future stages of the Lake Elmo Property residential development project.

e) Is the project a subsequent stage of an earlier project? ☐ Yes ☑ No.
If yes, briefly describe the past development, timeline, and any past environmental review.

The Savona residential development project is not a subsequent stage of an earlier development project.

7. Project Magnitude Data

Total Project Acreage: 112.5

Number of Residential Units: Unattached 190 Attached 122 Maximum Units per Building N/A

Commercial, Industrial, or Institutional Building Area (gross floor space): total square feet N/A

Indicate area of specific uses (in square feet):

Retail/Office	N/A	Other Industrial	N/A
Warehouse	N/A	Institutional	N/A
Light Industrial	N/A	Agricultural	N/A
Manufacturing	N/A		

Other Commercial (specify) N/A

Building Height 1-2 stories; 35' maximum.

If over 2 stories, compare to heights of nearby buildings N/A

8. Permits and Approvals Required

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

Table 8.1. Permits and Approvals Required

Unit of Government	Type of Application	Status
City of Lake Elmo	Concept Plan Approval	Completed
City of Lake Elmo	Preliminary Plat Approval	To be applied for
City of Lake Elmo	Final Plat Approval	To be applied for
City of Lake Elmo	EAW Negative Declaration	To be applied for
City of Lake Elmo	Grading Permit	To be applied for
City of Lake Elmo	Building Permit	To be applied for
City of Lake Elmo	Municipal Water Connection Permit	To be applied for
City of Lake Elmo	Sanitary Sewer Connection Permit	To be applied for
City of Lake Elmo	Rezoning	To be applied for (if needed)
City of Lake Elmo	Wetland Delineation Confirmation	Applied for
City of Lake Elmo	Wetland Conservation Act No-Loss Determination	Applied for
Washington County	Right-of-Way Permit	To be applied for
Washington County	Access Permit	To be applied for
Washington County	Obstruction Permit	To be applied for (if needed)
Washington County	Transportation Permit	To be applied for (if needed)
Metropolitan Council	Sanitary Sewer Connection Permit	To be applied for
Minnesota Department of Health	Water Main Extension Approval	To be applied for
Minnesota DNR Division of Waters	Water Appropriation Permit	To be applied for (if needed)
Minnesota Pollution Control Agency	NPDES / SDS	To be applied for
Minnesota Pollution Control Agency	Sanitary Sewer Extension Approval	To be applied for
U. S. Army Corps of Engineers	Section 404/Letter of No Jurisdiction	Applied for
MN DNR Division of Waters	Water Appropriation Permit(s)	To be applied for if needed
MN Pollution Control Agency	NPDES/SDS General Permit	Covered under general permit; submit NOI prior to

		construction.
Valley Branch Watershed District	Watershed Review/Permit	To be applied for
South Washington Watershed District	Watershed Review/Permit	To be applied for

9. Land Use

Describe current and recent past land use and development on the site and on adjacent lands. Discuss the compatibility of the project with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazard due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

Existing Land Use within the Project Site

Existing land use within, and adjacent to, the project site is depicted in **Exhibit 4** and summarized in Section 10 below.

A Phase I Environmental Site Assessment (ESA) was conducted on the project area in October 2012 by Liesch Associates, Inc. (Liesch). The report indicates that according to historic aerial photography dating from 1936 to 2008, the Dale Property has been under agricultural production since at least 1936. Recent aerial photography (2008) indicates the Dale Property remains under agricultural use; the Frandsen parcel was converted to a golf practice facility, Mulligan Masters, on or around 2002. The golf business is no longer in operation. No farmsteads or buildings are currently located on the property aside for a small plastic storage shed on the Frandsen parcel. A transmission line extends along the northern project boundary, and Liesch observed a gas pipeline on the Frandsen Parcel. The site currently contains 61.2 acres of cropped field, 1.4 acres of developed area/roads, 33.5 acres of golf course driving range, 9.4 acres of upland meadow, 1.8 acres of excavated pond, and 5.2 acres of upland woodland (**Exhibit 5**).

Compatibility with Adjacent and Nearby Land Uses

The Lake Elmo Zoning Map is provided on **Exhibit 6**. The Dale property is currently zoned HD-RR-SRD, which is Rural Residential Sewered Residential Holding District. The Frandsen property is currently zoned HD-A-SRD, which is Agricultural Sewered Residential Holding District. Both parcels are planned and staged for sewered residential development, but will require rezoning to Urban Low Density Residential (LDR) and Urban Medium Density Residential (MDR) prior to project approvals. The properties are located within the I-94 development corridor, which is one of two focused locations within the city for future housing expansion and increased housing density. This will allow existing open space within the rural planning districts of Lake Elmo to be maintained, along with the overall rural flavor of the city.

The project is compatible with adjacent and nearby land uses. Surrounding land use (Exhibit 4) is primarily residential development to the north/northwest, gravel mining to the north/northeast, agricultural land and Keats Avenue to the east, the I-94 corridor to the south, small businesses to the southwest, and agricultural land and a business park to the west. The proposed project will fit into the I-94 construction corridor as a separate but similar land use to existing land uses in the area. As described in the amended Comprehensive Land Use Plan, this portion of the city is guided as an "urbanized zone" that will feature higher density residential development and commercial uses. The proposed project is consistent with the land use guidance. Natural buffer strips, located adjacent to

existing rural development, are proposed along the periphery of the Savona residential development to provide a transition zone between the new project and existing land uses in the area.

Environmental Hazards Associated with Past Land Use

Prior to 2002, the project site was undeveloped and used for agricultural crop production. In 2002, the Frandsen portion of the property (eastern 40 acres) was converted to a golf practice facility, Mulligan Masters. A search on the Minnesota Pollution Control Agency's Web site ("What's In My Neighborhood?") revealed no known potential sources of soil or groundwater contamination. This database contains properties that have already been investigated and cleaned up through federal and state cleanup programs, as well as those currently enrolled in MPCA cleanup programs. The database also includes properties that were thought to be contaminated, but after further investigations were determined to be clean.

Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment completed by Liesch revealed no recognized environmental conditions (RECs) on the properties except for seven observed areas containing evidence of dumping, and surficial debris including: appliances, quart-sized oil containers (empty), metal debris/pieces, rusted drums, plastic containers, crushed PVC pipe, a couch, mattresses, televisions, tires, wood scrap/debris, a chiller unit, glass containers, asphalt piles, soil piles, concrete piles, drain tile, plastic posts, and trash.

Liesch's report indicated that *"although the drums and containers were empty, and no obvious staining was observed in the vicinity of the containers, there is potential that the original contents of the containers may have impacted the Property subsurface. The potential for subsurface impacts from the appliances, televisions, and drums and containers observed…is considered a REC."* As a result, Liesch recommended a Phase II Environmental Site Assessment to assess the dump areas identified during the Phase I ESA, and indicated that *"debris should be managed and disposed of properly according to City, County, and State regulations."*

In addition to the dump areas, Liesch observed the following items of environmental note:

- An irrigation well located on the Frandsen Parcel. Liesch recommended that the well be sealed according to the Minnesota Department of Health well code if it is no longer in use. The well is located in a Special Well Construction Area as identified by the MPCA.

- A septic system with a drain field is present on the Frandsen Parcel, but is no longer in use. Liesch recommended that the septic system be removed / abandoned according to local code requirements.

- Suspect asbestos-containing material (ACM) was not observed on the Property during the site walk-over. However, suspect ACM may be present among debris observed on the Property.

Phase II Environmental Site Assessment

A Phase II ESA was completed for the site as recommended during the Phase I process. Based upon the environmental conditions noted, Liesch completed the following scope of services as part of the subsurface Phase II ESA: (1) prepared a health and safety plan and cleared public and private utilities, (2) excavated 17 test pits throughout areas A, C, and D on the Property to assess for buried

debris and potential environmental impacts due to the presence of appliances, televisions, drums, and containers in these areas, (3) screened soil samples for the presence of organic vapors using a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp, (4) collected five soil samples for laboratory analysis of diesel range organics (DRO) (analyzed by silica gel method), volatile organic compounds (VOCs), the eight Resource Conservation and Recovery Act (RCRA) metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides, (5) observed debris for suspect asbestos containing material (ACM), and (6) prepared a Phase II ESA report with conclusions and recommendations.

Work performed for the Phase II ESA included observing and field screening recovered soil samples, and collection of soil samples for laboratory analysis from soil test pits. Based upon the findings of the Phase II ESA, Liesch confirmed that the debris observed on the Property is mainly surficial. The only areas of deeper debris included concrete in test pit TP-11 and asphalt pieces in test pit TP-12 to approximately 4 feet below grade. General municipal waste was observed to 1.5 feet below grade in test pits TP-15 and TP-16 and to 1 foot below grade in test pits TP-4 and TP-7. Liesch test pit locations are shown in **Appendix A**.

In the RCRA metal analysis, arsenic concentrations were detected above the Residential SRV of 9 mg/kg ranging from 9.2 to 19.9 mg/kg. The Liesch Phase II report indicates that they suspect these concentrations to be within the range of naturally-occurring concentrations for this area. From a regulatory perspective, the MPCA Voluntary Investigation and Cleanup (VIC) Program has not required remedial efforts for arsenic concentrations just above the Residential SRV if the data supports background concentrations. This contention is supported by MPCA Fact Sheet: Best Management Practices for the Off-Site Reuse of Excess Fill from Development Sites dated February 2012, in which the MPCA states that "Naturally occurring concentrations of some metals, such as arsenic, selenium, or copper sometimes exceed the SRV or SLV. Such soils are not considered impacted in the absence of a contaminant source or other field or laboratory indications of contamination." As noted above, the same assertion would be applicable to the selenium concentrations detected on the Property.

The detection of DRO at 153 mg/kg in TP-15 (1') indicates the presence of low level petroleum impacts in the vicinity of TP-15. The extent and magnitude of the DRO impacted soil is unknown. Based upon the findings, Liesch recommended the following: Inform the Property owner of the release of DRO as detected on the Property, and prepare a Construction Contingency Plan to detail management of debris and impacted soils during development.

Lennar will prepare a Construction Contingency Plan for the site prior to site development to manage known debris and impacted soils within the project area. However, the primary areas where test borings were completed will be largely undisturbed in the final development plan (**Appendix A**). The northernmost area (Area A) is located within an existing transmission line easement, and will therefore be largely avoided. Areas C is predominantly located within a tree and open space preservation area, and about 50 percent of Area D will be preserved and avoided by the project design.

Local Soil and Groundwater Contamination

Perfluorochemical (PFC)-containing wastes were disposed of at two land disposal sites, the 3M-Oakdale Disposal Site in Oakdale and the former Washington County Landfill in Lake Elmo, Minnesota between 1956 and 1974. The Oakdale disposal site is located approximately 3.8 miles northwest of the project area, and the Washington County Landfill is located approximately 3.4 miles to the north.

PFCs were released from the two facilities resulting in contamination of groundwater and nearby drinking water wells as outlined in a Public Health Assessment prepared by the U.S. Department of Health and Human Services (August 29, 2008), and the Agency for Toxic Substance and Disease Registry (ATSDR). The Minnesota Department of Health (MDH) has detected PFCs in several surface waterbodies in the Lake Elmo, Oakdale, and Woodbury area through various sampling studies. Surface water bodies north of the project area that have been found to contain PFCs include: Raleigh Creek, Eagle Point Lake, and Lake Elmo. PFCs are suspected to infiltrate into the groundwater from these water body sources. Sunfish Lake was found to contain perfluorobutanoate (PFBA). Goose Lake, located 0.25-miles north of the project area, was sampled by the MDH in 2010 and was found to contain no PFCs.

According to this Public Health Assessment, PFCs have been detected in public and private wells across a wide area of Oakdale and Lake Elmo. In Lake Elmo, approximately 200 homes were connected to municipal water to mitigate exposure to PFCs in the groundwater. Additional homes, approximately 55, have had in home granular activated carbon filter systems installed to mitigate exposure to PFCs in the groundwater. These homes have also been offered bottled drinking water. Groundwater monitoring of PFCs is an ongoing program. The proposed project will mitigate risks to new residents by providing access to municipal drinking water.

10. Cover Types

Estimate the acreage of the site with each of the following cover types before and after development.

Table 10.1. Estimated Before and After Cover Types

Land Cover	Before (acres)	After (acres)
Cropped field	61.2	0.0
Developed/Road	1.4	85.5
Golf Club/Driving Range	33.5	0.0
Upland Meadow	9.4	20.0
Excavated Pond	1.8	0.0
Upland Woodland	5.2	2.0
Stormwater ponds	0.00	5.00
Totals	**112.5**	**112.5**

If **Before** *and* **After** *totals are not equal, explain why:* Before and after totals are equal.

11. Fish, Wildlife, and Ecologically Sensitive Resources

a) Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

Fish and wildlife resources on and near the site are directly related to the composition, quality, size, and connectivity of natural communities including woodlands, wetlands, and grasslands. Westwood Professional Services, Inc. used aerial photography to map the existing cover types (Exhibit 5). Based on this analysis, the site contains four major habitat components: 61.2 acres of cropped field, 9.4 acres of upland meadow, 1.8 acres of excavated pond, and 5.2 acres of upland woodland. These

habitats are used by a variety of animals common to central Minnesota. Wildlife resources that exist throughout the site likely include those species that have adapted to open lands and cropland habitats such as pheasant, meadowlark, field sparrow, cottontail, red fox, and white-tailed deer. The open fields provide seasonal food and cover for these species.

Project development is expected to convert approximately100 acres of cropped field, upland meadow, golf course/driving range, upland meadow, excavated pond, and upland woodland. Preservation of approximately 27 acres of upland woodland, upland meadow, and stormwater ponding is expected to mitigate some of the adverse effects on wildlife. Connections between existing meadow/old field and woodlands will be maintained in the development by retaining buffer strips along the property edges, which will allow travel corridors to remain for use by wildlife on the property and from off-site resource areas.

Conversion of agricultural fields, woodlands, and meadow/old field to residential development is expected to result in some local decline in wildlife abundance. Populations of species that depend upon cropland, woodland and fields, such as ring-necked pheasants, wild turkey, and meadowlarks, will likely be displaced. Migratory birds are expected to respond to the development by looking for alternative nesting sites upon their return from wintering habitats. Some songbirds that readily adapt to suburban habitats may become more numerous. Non-migratory species with small home ranges such as small mammals will experience more adverse effects. These species will compete with other individuals of the same or other species to claim territories in neighboring habitats or succumb to mortality during project construction.

Approximately 24 percent of the 112.5-acre project area will be open space, which is expected to help mitigate adverse effects on wildlife. The project is not expected to result in a regionally significant decline in wildlife abundance or species diversity. Measures to reduce the effects on wildlife include preservation of buffers and adjacent woodland integrated with open space and parkland, and construction of stormwater ponding. These measures are expected to provide additional habitat for wildlife and help mitigate adverse effects on some wildlife.

b) Are any state-listed (endangered, threatened, or special concern) species, rare plant communities or other sensitive ecological resources on or near the site? ☐ Yes ☑ No

If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number and/or Division of Ecological Resources contact number **(#ERDB 20130158)** *from which the data were obtained and attach the response letter from the DNR Division of Ecological Resources. Indicate if any additional survey work has been conducted within the site and describe the results.*

The Minnesota DNR Natural Heritage Program conducted a database search of the Minnesota Natural Heritage Information System (NHIS) to determine if there are listed plants and animals; native plant communities; wildlife aggregations; geological features; or state rare features that are known to occur within or near the project site. The database search did not identify rare features within an approximate one-mile radius of the proposed project. The DNR Natural Heritage Review response letter is provided in **Appendix B**.

Based on the nature and location of the proposed project, the DNR concluded that it does not believe the project will negatively affect any known occurrences of rare features. Therefore, no additional survey work has been or is scheduled to be conducted on the project area, and no measures to avoid or minimize potential impacts appear warranted.

According to the Natural Communities and Rare Species of Washington County Map (Minnesota County Biological Survey, 1990), the project site does not contain rare plant or animal species or other significant natural features.

12. Physical Impacts on Water Resources

Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface water such as a lake, pond, wetland, stream or drainage ditch? ☐ Yes ☑ No If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI: N/A. Describe alternatives considered and proposed mitigation measures to minimize impacts.

The project will not involve the physical or hydrologic alteration of natural surface waters such as lakes, ponds, wetlands, or streams. On September 27, 2012, Arrowhead Environmental Consulting, Inc., (AEC) evaluated the project area for wetlands and other jurisdictional waters. No jurisdictional wetlands or waters were identified within the project boundary.

Prior to delineating the site, the United States Geological Survey (USGS) Map (Lake Elmo Quad), the Minnesota Department of Natural Resources (MN DNR) Public Water Inventory Map (PWI), the Washington County Soil Survey Map, and the National Wetland Inventory (NWI) Map were reviewed. Historical images from 1936, 1953, 1957, 1964, 1991, 2000, 2003, and 2010 were also reviewed. The PWI map indicated no Public Water Wetlands are mapped on the property. The NWI map indicated several wetland basins within the property (PEMCd, PEM1C, PSS1C, PFO1C, PUBFx) (**Exhibit 7**); a PEMC wetland was also mapped along the western property line; however, field review indicated it is located off of the property. According to the Washington County Soil Survey map, non-hydric soil is mapped throughout the property.

AEC reviewed the entire site and focused on four specific areas. Soil samples were collected in each of these areas and reviewed, but in each case the soils observed at the sample point locations were determined to be non-hydric, and no hydrology indicators were observed. Consequently, none of the areas examined met jurisdictional wetland criteria.

The eastern portion of the review area was converted to a golf course in the early 2000's. Several "ponds" were created throughout the golf course; most of the ponds have rubber liners. AEC reviewed historical aerial photography to determine if the ponds were created in historical wetland areas. Based on the aerial analysis, it appears that none of the ponds were created in historical wetland. AEC submits that the pond areas should not be regulated as jurisdictional wetland as they were created in upland and have artificial bottoms (rubber liners). AEC reviewed an area in the agricultural field (just west of the golf course near the center of the review area, an area that is quite evident on 2010 aerial imagery. This area was a stockpile of coarse material (mostly sand and gravel) and was dominated by pigweed (*Amaranthus*) species. The area was determined by AEC not to meet jurisdictional wetland criteria.

Due to the timing of late-season field work, findings have not been reviewed in the field by wetland regulatory agencies, and therefore have not been confirmed in writing by the Technical Evaluation Panel (TEP) for the project area, or the U.S. Army Corps of Engineers. The TEP and the U.S. Army Corps of Engineers will be invited to review and comment on the wetland delineation in spring 2013.

13. Water Use

Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? ☑ Yes ☐ No.

If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on the site, explain methodology used to determine.

Abandonment of water wells

No new water wells are planned for the project. The Minnesota Geological Survey's (MGS) County Well Index (CWI) indicates there is one registered well within the project site. According to the Phase I Environmental Assessment report, no municipal or private water wells were noted on the Property, except for an irrigation well located on the Frandsen Parcel (former golf practice range). According to Minnesota Department of Health well records for Unique Well No. 686580, this irrigation well is 300 feet deep and was installed in 2002 to irrigate the golf course facility (**Appendix C**). This well will be abandoned during construction. If any other active or inactive wells are discovered on the property, they will be field-located, abandoned, and sealed in accordance with Minnesota Department of Health regulations prior to site development.

Connection to a public water supply system

The City of Lake Elmo currently operates two wells, which are permitted under DNR Water Appropriations Permit No. 611031. The two wells range in depth from 285 to 808 feet deep, and draw water from the Jordan-Mt. Simon and Prairie Du Chien-Jordan aquifers (2010 Drinking Water Report). The City's DNR water appropriations permit allows a total system pumping capacity of 260 million gallons per year (MGY).

According to DNR Water Appropriation records as of 2010, the city reported pumping 103 MGY (average 282,192 gallons per day). The estimated water demand for the proposed development is 34.3 MGY (94,037 gallons per day) based on the assumption that consumption is approximately 110 percent of wastewater generation (see Item 18). Consequently, there are no water supply issues anticipated as a result of adding the development to the city's water supply system. According to the city engineer, water may be supplied to the development either through an existing services agreement with the City of Oakdale or via the Lake Elmo municipal water supply system.

The current Comprehensive Plan calls for municipal water facilities to be extended from the southeast corner of the Eagle Point Business Park along Hudson Boulevard to service this portion of the city.

Dewatering

Dewatering will become necessary if surficial groundwater is encountered during utility installation; however, it is unlikely that dewatering will be necessary because the depth to groundwater exceeds the planned depth of sanitary sewer, municipal water, and storm sewer in most areas within the study area. Based on data gathered from Unique Well No. 686580 upon installation in October 2002, static groundwater levels in the area are approximately 120 feet below grade. The quantity and duration of potential construction dewatering is not known at this time, but it is expected that any necessary dewatering for construction will be temporary. If groundwater is encountered during utility installation, it will be discharged to temporary sediment basins located within the project site.

If construction dewatering and pumping from the proposed development exceeds the 10,000-gallon per day or 1,000,000 gallons per year thresholds, a DNR Water Appropriation Permit will be obtained. If it becomes apparent that construction dewatering will not exceed 50 million gallons in total and duration of one year from the start of pumping, the contractor or project proposer will apply to the DNR Division of Waters for coverage under the amended DNR General Permit 97-0005 for temporary water appropriations. It is not anticipated that construction dewatering or pumping from the proposed development will be extensive or continue long enough to impact domestic or municipal wells.

14. Water-Related Land Use Management District

Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? ☐ Yes ☑ No
If yes, identify the district and discuss project compatibility with district land use restrictions.

The project site is not located within a shoreland zoning district. The site is not within 1,000 feet of a Minnesota DNR Public waterbody or 300 feet of a Minnesota DNR Public Watercourse, which would trigger a shoreland zoning district. According to FEMA Floodplain mapping (2008 Update), the project is located within Flood Panel 27163C0335E; HUC 7010206. The entire project is identified as being outside of either a 100 or 500-year flood zone (Exhibit 7). The site is also not in or adjacent to any state or federally-designated wild or scenic river land use zone.

15. Water Surface Use

Will the project change the number or type of watercraft on any water body? ☐ Yes ☑ No
If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

The project site does not encompass any surface waters that are used by watercraft.

16. Erosion and Sedimentation

Give the acreage to be graded or excavated and the cubic yards of soil to be moved:

Acres: Approximately 100 acres of 112.5 acres will be graded for streets, house pads, and stormwater features.

Cubic Yards: Approximately 750,000 cubic yards of soil will be moved.

Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

The Highly Erodible Land (HEL) List for Washington County, Minnesota (USDA NRCS, 2006) indicates there is one potentially highly erodible soil that covers approximately 23.7 acres in two areas within the study area (**Exhibit 8**). Chetek sandy loam (6-12 percent slopes) is located in the central portion of the western portion and in the southwest corner of the eastern portion of the property.

According to the USDA NRCS SSURGO database for Washington County (Accessed 2013), steep slopes (12 percent or greater) may be associated with the one soil mentioned above. Contour

mapping indicates that the majority of the surface topography is gently undulating. Elevations range from 1,078 feet in the northwestern portion of the site to 950 feet in the eastern portion of the site (Exhibit 2). The western portion of the site drains to the southwest, and the eastern portion drains east-northeast. With the majority of the project area being over 1,000 above mean sea level, the site contains some of the highest elevations in the city.

Because the project will involve disturbance of more than one acre of land, application for coverage under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) General Permit will be submitted to the MPCA prior to initiating earthwork on the site. This permit is required for discharge of stormwater during construction activity and requires that Best Management Practices (BMPs) be used to control erosion, and that all erosion controls be inspected after each rainfall exceeding 0.5 inches in 24 hours. Erosion control practices that will be implemented on the site include:

1. Construction of temporary sediment basins in the locations proposed for stormwater ponding, and development of these basins for permanent use following construction.
2. Silt fence and other erosion control features installed prior to initiation of earthwork and maintained until viable turf or ground cover is established on exposed areas.
3. Periodic street cleaning and installation of a rock construction entrance to reduce tracking of dirt onto public streets.
4. Stabilization of exposed soils, phased with grading, within 7 days for slopes steeper than 3:1, 14 days for slopes less than 3:1 but greater that 10:1, and 21 days for slopes flatter than 10:1.
5. Energy dissipation, such as riprap, installed at storm sewer outfalls.
6. Use of cover crops, native seed mixes, sod, and landscaping to stabilize exposed surface soils after final grading.

Erosion control plans must be reviewed and accepted by the City of Lake Elmo and applicable watersheds prior to project construction. Because the above BMPs will be implemented during and after construction, potential adverse effects from construction-related sediment and erosion on water quality will be minimized.

17. Water Quality: Surface Water Runoff

a) Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

The project must meet the requirements of the city's Storm Water Ordinance. The project also must meet the requirements of the Valley Branch and South Washington Watershed Districts (e.g. infiltration, erosion), where applicable.

The city's Storm Water Ordinance is available on the city's website. Lake Elmo is also a mandatory small MS4 (Municipal Separate Storm Sewer System) city, and is required by federal and state law to obtain and implement a NPDES Stormwater permit administered by the MPCA. MS4s are also required to develop and implement a stormwater pollution prevention plan program (SWPPP), and submit an annual report to the MPCA.

Pre-Development Site Runoff

Existing site runoff likely contains pesticides, herbicides, and fertilizer residues due to the presence of agricultural fields and the golf practice area. There is also likely a minor amount of runoff that flows to the site from Keats Avenue North. However, because the site contains some of the highest elevations in the city, runoff primarily drains away from the site to the southwest and east-northeast. It is expected that a portion of the runoff infiltrates into the site's permeable, silty and sandy soils (see Item 19) and some likely reaches existing onsite stormwater ponds located on the golf course practice area.

Post-Development Site Runoff

The change in land use will decrease the amount of agricultural chemicals and suspended solids, and increase other components typical of urban runoff. It is expected that the volume of runoff will increase during significant storm events as a result of the increase in impervious surface area. It is anticipated that only extreme conditions such as those occurring in connection with 50- or 100-year storm events will result in measurable increases in runoff volume and associated pollutant transport. The preservation and creation of open space in the form of buffers, parks, woodlands, and ponds will help to mitigate potential adverse effects from the increase in impervious surface.

Runoff water quality will be typical of residential developments, and will likely be slightly degraded due to pollutants deposited on roads, roofs, and other impervious surfaces. Similar to current conditions, sediment, nutrient, and other pollutant removal will occur when much of the stormwater filters through upland vegetation, vegetated drainage swales, stormwater ponds, and other best management practices, including infiltration. Preserved and newly seeded vegetation will provide filter strips to help remove sediment and nutrients before runoff discharges to area wetlands and surface waters, mitigating potential effects on water quality.

Potential adverse effects of runoff volume and quality will be further mitigated by the construction of approximately 5.0 acres of stormwater ponds, which will be designed to reduce peak runoff rates and meet all requirements of the City of Lake Elmo, and Valley Branch and South Washington Watershed Districts. The design of ponding areas and the quality of stormwater discharging from the development will meet the requirements of the MPCA General Stormwater Permit for Construction Activity (Minnesota Stormwater Manual, and applicable local regulations. In a storm event, stormwater will be retained in the ponds and discharged at or below existing peak runoff rates.

BMPs will be employed during construction to reduce erosion and sediment loading of stormwater runoff. Inspection and maintenance of BMPs during construction will be consistent with NPDES/SDS General Permit requirements, including site inspection after rainfall events, perimeter sediment control maintenance, and sediment removal.

b) Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

According to available watershed district mapping, the project site is located within the Valley Branch and South Washington Watershed Districts (Exhibit 6). Surface waters generally flow east-northeast towards Lake Elmo, and southwest towards an unnamed creek which connects Armstrong Lake to Wilmes Lake. Because the site represents one of the highest locations in the city, the site does not receive directed runoff from off-site waterbodies such as Raleigh Creek, Eagle Point Lake, or Lake Elmo, and there are no direct hydrologic connections to these waterbodies from the project site.

The goal of the project will be to maintain peak discharge rates at or below the existing condition. Post-construction drainage will follow similar pathways, with minor differences in drainage routes and increases in the volume of road ditches and swale flows. Post-development stormwater runoff will either travel overland, into stormwater ponds, or through storm sewers prior to discharging to receiving waters.

For the following reasons, it is anticipated that site development will have minimal effects on receiving water quality:

- Preservation and creation of approximately 27 acres of buffers, parks, woodlands, and ponds (24 percent of the site).
- Hydraulic storage within sediment basins will be designed, and BMPs implemented, in accordance with the General NPDES/SDS Permit for Construction Activities to protect water quality and control erosion.

18. Water Quality: Wastewaters

a) Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

Only normal domestic wastewater production is expected from the project. The types of wastewater produced will be typical of new residential developments. No onsite municipal or industrial wastewater treatment is anticipated or planned.

Both the MPCA and the Metropolitan Council Environmental Services (MCES) have compiled and documented extensive data that relates wastewater flow generation to population and land use. Sanitary wastewater production for the proposed development was estimated based on the methods outlined in the Service Availability Charge (SAC) Procedure Manual (MCES, 2012). The MCES has established 274 gallons per day (gpd) to be the average daily wastewater production from a typical residential connection. One SAC unit is defined as 274 gallons of wastewater flow volume, which is based on the assumption of 2.74 persons per unit and 100 gallons per capita day (gpcd) of wastewater production.

Each single family residence and townhome was assigned one SAC unit. The estimated maximum potential daily wastewater production for the entire development is 85,488 gpd. The following table provides information on wastewater production based on land use.

Table 18.1
Wastewater Production Predicted

Proposed Use	SAC Rate	Units	SAC Units	Wastewater (gallons/day)
Single Family Homes	1/Unit	190	190	52,060
Townhomes	1/Unit	122	122	33,428
		Total	**312**	**85,488**

b) Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

No on-site sanitary sewage treatment is proposed.

c) If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

According to the city's approved Comprehensive Plan, the project area is situated within a designated sewer service area (see Future Land Use – Sewer Plan, 2012). Current plans call for the proposed development site to be served by municipal sewer extended from the southeast corner of the Eagle Point Business Park along Hudson Boulevard. All wastewater from the proposed project will be discharged to the Woodbury, Oakdale, Northdale, and East Oakdale (WONE) Interceptor. The amended Land Use Plan (2012) forecasts approximately 515 new households connecting to the WONE Interceptor by 2015, and an additional 1,235 households by 2020. From the WONE Interceptor, wastewater from the development would flow to the Metropolitan Wastewater Treatment Plant in St. Paul, Minnesota for treatment; the largest wastewater treatment facility in Minnesota. This facility currently treats approximately 215 million gallons of wastewater each day, and has the capacity to treat up to 250 million gallons per day. The Metropolitan Council projects ample capacity at this plant through 2030. Consequently, no wastewater facility or treatment capacity issues are anticipated (MCES 2007).

19. Geologic Hazards and Soil Conditions

Approximate depth (in feet) to groundwater:	**0**	*minimum*	**~150**	*average*
Approximate depth (in feet) to bedrock:	**~50**	*minimum*	**~125**	*average*

a) Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

Groundwater elevations within the vicinity of the site are around 875 feet above sea level based on The Geologic Atlas of Washington County, Minnesota (1990) C-5, Plate 5. Topographic mapping indicates that elevations on the site range from approximately 1,070 above mean sea level in the northwest corner of the site to 980 above mean sea level towards the eastern border of the site. Consequently, the maximum depth to groundwater is estimated at about 195 feet. Because surficial groundwater is sometimes encountered in seasonally wet areas, the minimum depth to groundwater is estimated at 0 feet. The approximate average depth to groundwater was calculated by averaging the topographic elevations on the site (1,025) and subtracting the anticipated depth shown on the Washington County Atlas (875).

Depth to bedrock was estimated from the record of Unique Well No. 686580 (County Well Index, 2012) (**Appendix C**). The well and boring record completed for this new well in October 2002 indicates that Prairie Du Chien bedrock was reached at a depth of 152 feet below grade. The Geologic Atlas of Washington County, Minnesota (1990) C-5, Plate 4 indicates that the distance to bedrock ranges between approximately 50 and 200 feet below grade.

b) Describe the soils on site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

The Geologic Atlas of Washington County, Minnesota (1990) C-5, Plate 1 indicates there are no known sinkholes, exposed bedrock, springs, or seeps on or near the site. If such features are encountered on the site, actions will be taken to mitigate potential effects such as stormwater routing, soil stabilization, and groundwater protection practices.

Soil Classification

The Soil Survey Geographic (SSURGO) digital database for Washington County (USDA NRCS, Accessed 2013) indicates the soils that occur within the project area (**Exhibit 8**) are classified as summarized in Table 19.1. Soils on the site are predominantly non-hydric silty and sandy loams.

Table 19.1. Soils Classification

Map Symbol	Soil Classification	Hydric[1]	Prime Farmland[2]
264	Freeon silt loam, 1 to 4 percent slopes	Not hydric	All areas are Prime Farmland
153B	Santiago silt loam, 2 to 6 percent slopes	Not hydric	All areas are Prime Farmland
153C	Santiago silt loam, 6 to 15 percent slopes	Not hydric	Farmland of Statewide importance
155C	Chetek sandy loam, 6 to 12 percent slopes	Not hydric	Not Listed
155D	Chetek sandy loam, 12 to 25 percent slopes	Not hydric	Not Listed
342B	Kingsley sandy loam, 2 to 6 percent slopes	Not hydric	All areas are Prime Farmland
49B	Antigo silt loam, 2 to 6 percent slopes	Not hydric	All areas are Prime Farmland

[1] Based on the NRCS List of Hydric Soils of Minnesota (1995).
[2] Based on the USDA/NRCS Prime Farmland of Washington County, Minnesota (2002).

A geotechnical subsurface investigation has been initiated. Results of the investigation will be published separately.

Potential for Groundwater Contamination

The *Geologic Atlas of Washington County, Minnesota* (1990) pollution sensitivity map indicates that the sensitivity of groundwater to pollution in the project areas is generally moderate. Sensitivity of groundwater systems to pollution is defined as the approximate time it takes from the moment a contaminant infiltrates the land surface until it reaches an aquifer. Although shallow groundwater is

highly susceptible to contamination, moderately permeable soils with finer textures will slow or restrict the movement of water, which extends the time needed for chemicals to break down before reaching the water table. As stated in Item 19, the average depth to groundwater on the site is estimated at approximately 150 feet below ground surface, providing a significant buffer between the soil surface and the groundwater aquifer.

Because development will be typical of residential uses, no unusual wastes or chemicals are anticipated to be spread or spilled that would cause significant groundwater contamination. The proposed project may offer continued groundwater protection by providing adequate stormwater treatment and vegetated infiltration areas such as rain gardens, and buffers to help capture runoff and filter pollutants.

The project will adhere to the Valley Branch and South Washington Watershed Districts infiltration requirements for stormwater. Because of the site's elevated position in the overall landscape, the propensity for runoff to drain away from rather than towards the site, and the absence of surface water connections to known PFC-contaminated waterbodies (i.e. Raleigh Creek, Eagle Point Lake, and Lake Elmo), the potential for infiltrating contaminated surface waters on the site is low.

Special Well and Boring Construction Area

According to the Minnesota Department of Health, 2012, a special well and boring construction area is "a mechanism which provides for controls on the drilling or alteration of public and private water supply wells, and monitoring wells in an area where groundwater contamination has, or may, result in risks to the public health. The purpose of a Special Well and Boring Construction Area is to inform the public of potential health risks in areas of groundwater contamination, provide for the construction of safe water supplies, and prevent the spread of contamination due to the improper drilling of wells or borings." Contractors proposing to drill a well or boring in an advisory area must first contact the Minnesota Department of Health, Well Management Section to determine proper procedures for installation. As previously discuss, Perfluorochemical (PFC)-groundwater contamination exists near the project area. While the project is located in a Special Well and Boring Construction Area, installation of new groundwater wells is not planned by the project.

Groundwater Protection and Mitigation Measures

The Savona residential development will offer a higher level of groundwater protection than exists under current conditions. Chemical applications can be high in agriculturally-dominated landscapes. The conversion of the site to urban uses will ensure greater protection of groundwater by: (1) covering exposed soils with turf and landscape plants to reduce infiltration of nutrients and pesticides; (2) reducing hazardous materials on the property to include only household quantities; (3) providing 27 acres of park, woodland, and open space; (4) providing stormwater treatment systems; (5) abandoning an existing irrigation well; and (6) not drilling any new wells for the project.

20. Solid Wastes, Hazardous Wastes, and Storage Tanks

a) Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

Construction activities will generate wastes typical of residential development operations. No solid or hazardous wastes, including solid animal manure, sludge, and ash, will be produced during construction and/or operation. The contractor will dispose of wastes generated at the site in an approved method by using commercial dumpsters and disposing construction wastes at an MPCA-permitted landfill. The contractor will recycle construction waste that can be recycled, when feasible.

Following project construction, solid waste generation will be typical of occupied residential developments of this size. It is not anticipated that the proposed project will generate significant amounts of wastes that would be considered hazardous aside from typical household cleaners, paints, lubricants, and fuel storage for small power equipment. The majority of the solid waste generated will include materials such as paper, organics (food wastes, wood, and rubber products), yard waste, and inert solids. The remaining wastes will likely include plastics, metals, and glass.

According to the Metropolitan Solid Waste Management Policy Plan 2010-2030 (MPCA, 2011), a Minnesota family of five generates approximately six tons of garbage per year, or 1.2 tons per occupant. The following residential solid waste generation rates were based on the conservative figures that the average single-family dwelling consists of 2.9 persons based on 2010 City of Lake Elmo census data. The household occupant number was then multiplied by 1.2 tons per person per year, based on the MPCA estimate for Minnesota families. Using these conservative figures, the proposed development could generate as much as 1,086 tons per year (312 units X 2.9 people/unit X 1.2 tons/person/year) of residential municipal solid waste per year.

Residents within the new development will contract individually with waste haulers for solid waste collection and recycling services under the city's open trash and recycling collection system. According to the cities web page, there are currently five licensed waste haulers. Curbside recycling, including paper, plastics, glass, and metals, is available to Lake Elmo residents through their solid waste collector. Participation in the recycling program by future residents of the project area is expected to reduce costs for solid waste trucking and disposal.

Waste generated in Washington County is delivered to the Resource Recovery Facility in Newport, Minnesota. The majority of the waste is processed into Refuse Derived Fuel (RDF). This fuel is burned in place of coal at Xcel's power plants in either Red Wing or Mankato, Minnesota.

b) Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

Only normal construction and household hazardous wastes are anticipated. Toxic or hazardous material such as fuel for construction equipment and materials used during the normal construction process of residential units (paint, adhesives, stains, acids, bases, herbicides, and pesticides) will

likely be used in typical quantities during site preparation and unit construction. Builders and contractors are responsible for proper management and disposal of wastes generated during construction, which is typically handled by using construction dumpsters and the appropriate certified landfills. No known hazardous materials are currently located onsite. Use of toxic or hazardous materials, outside of vehicle fuels, standard household cleaners, and lawn care chemicals, is not anticipated within the project area in conjunction with the proposed residential development.

c) Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

As described in Item 9, a Phase I Environmental Site Assessment was conducted by Liesch Associates, Inc. in October 2012. No underground storage tanks or aboveground storage tanks were observed on the property, or reported to Liesch. It is currently not anticipated that above or below ground tanks for storage of petroleum or other materials will be located on the project site. However, if above or below ground tanks are proposed on the site, they will be installed according to MPCA regulations, and consideration will be given to spill and leak detection and prevention technologies, as well as double-walled tank construction.

21. Traffic

Parking spaces added:	0
Existing spaces (if project involves expansion):	0
Estimated total average daily traffic generated:	2,518
Estimated maximum peak hour traffic generated and time of occurrence:	253 trips (Peak hour approximately 4:30 to 5:30 PM)
Indicate source of trip generation rates used in the estimates.	Trip Generation, 9th Edition

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. Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance *(available at: http://www.dot.state.mn.us/accessmanagement/pdf/manualchapters/chapter5.pdf)* or a similar local guidance, provide an estimate of the impact 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.

A traffic study was completed for the proposed project in April 2013. The traffic study examined the potential traffic-related impacts of the proposed project on the adjacent roadway system and key intersections near the site. A copy of the traffic study is included in Appendix E, and summarized below.

Trip Generation

The trip generation for the proposed project was determined based on the standard trip generation rates contained in Trip Generation, 9th Edition (Institute of Transportation Engineers, 2012). The trip generation estimates for the proposed project are shown in Table 21.1.

Table 21.1
Trip Generation Summary

Land Use	Development Units	Daily Trips (Trip Ends)	A.M. Peak Hour (Approx. 7:15 – 8:15 A.M.)			P.M. Peak Hour (Approx. 4:30 – 5:30 P.M.)		
			In	Out	Total	In	Out	Total
Single-Family Residential	190 DUs	1,810	36	107	143	120	70	190
Multi-Family Residential	122 DUs	708	9	45	54	42	21	63
Totals	**312 DUs**	**2,518**	**45**	**152**	**197**	**162**	**91**	**253**

As shown in Table 21.2, the proposed project is expected to generate a total of 2,518 trips on a daily basis, 197 trips during the a.m. peak hour (with 45 inbound and 152 outbound), and 253 trips during the p.m. peak hour (with 162 inbound and 91 outbound). The values listed under the "Daily" column represent total trip ends. A trip end is one movement to or from a location. For example, a resident leaving home in the morning to drive to work produces one morning trip end from the house. The return trip home in the afternoon produces a second trip end to that house.

Access and Trip Assignment

Access for the proposed project will be provided via a newly constructed collector roadway (5th Street North) which will then intersect with Keats Avenue (CSAH 19). The newly constructed roadway was originally identified in the City of Lake Elmo's Comprehensive Transportation Plan. The Transportation Plan suggested a new east-west roadway between 10th Street (CSAH 10) and the I-94 frontage road be added to the transportation system. This new roadway alignment has been incorporated into the site plans of the proposed project and represents the southern boundary of the single-family residential development. *"Designated as a minor collector, this route would allow local traffic to access the north-south county roads. Rather than a straight shot between points, this roadway would likely curve between new developments to provide access."* According to the City's Transportation Plan, this new east-west roadway is expected to handle approximately 5,000 vpd by the year 2030 between Keats Avenue and Inwood Avenue to the west. Once extended through to Inwood Avenue, some traffic flowing east to Keats Avenue would likely be re-directed west to Inwood Avenue for access to the I-94 corridor. This new east-west roadway will also likely reduce the traffic volumes along 10th Street to levels where capacity improvements will not likely be needed by the year 2030.

The trips generated by the proposed project were distributed to the adjacent roadway system using the following directional distribution:

- 15 percent to/from the north via Keats Avenue (CSAH 19)
- 10 percent to/from the south via Keats Avenue (CSAH 19)
- 20 percent to/from the east via I-94
- 40 percent to/from the west via I-94
- 15 percent to/from the west via Hudson Boulevard

Existing Conditions

An operations analysis was conducted for the a.m. and p.m. peak hours at the following key intersections in order to determine how traffic conditions currently operate in the study area:

- Keats Avenue (CSAH 19) at 10th Street (CSAH 10)
- Keats Avenue (CSAH 19) at Hudson Boulevard
- Keats Avenue (CSAH 19) at I-94 West Ramps
- Keats Avenue (CSAH 19) at I-94 East Ramps
- Inwood Avenue (CSAH 13) at Hudson Boulevard

The Keats Avenue (CSAH 19) intersections with the I-94 West and East Ramps are signalized, as well as the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard. The Keats Avenue intersection with 10th Street (CSAH 10) is all-way stop controlled, and the Keats Avenue (CSAH 19) intersection with Hudson Boulevard is side-street stop controlled.

The existing conditions analysis revealed that all five (5) of the key intersections currently operate at acceptable level of service (LOS) C or better during the a.m. and p.m. peak hour with existing geometrics and traffic control.

Future Conditions

It is anticipated that the proposed project will be fully built-out by the year 2018. Therefore, an operations analysis was also completed for the year 2018 in order to determine the traffic-related impacts of the proposed development on the adjacent roadway system. Two future year development scenarios were analyzed: year 2018 no-build, and year 2018 build. The year 2018 no-build conditions assume that the proposed project is not built; however, background traffic growth in the study area is assumed to grow at a 1.7 percent annual growth rate. The year 2018 no-build conditions is used as a future year base from which the year 2018 build traffic volumes were developed. The year 2018 build conditions assume that the proposed project is fully build-out. In addition to the five (5) key intersections analyzed as part of the existing conditions analysis, the proposed east-west roadway (5th Street) intersection with Keats Avenue (CSAH 19) was also analyzed as part of the year 2018 build conditions operations analysis.

The year 2018 no-build conditions analysis revealed that all of the five (5) key intersections continue to operate at acceptable LOS C or better during the a.m. and p.m. peak hours, with existing geometrics and traffic control.

The analysis results for the year 2018 build-out conditions revealed that even with the addition of the traffic generated by the proposed development, the five (5) key study intersections as well as the Keats Avenue (CSAH 19) intersection with the proposed 5th Street will operate at an acceptable LOS C or better during the a.m. and p.m. peak hours, with existing geometrics and traffic control.

Conclusions

While the proposed development will increase traffic volumes on adjacent roadways, the increase will not have an adverse impact on traffic operations since the adjacent roadways have enough reserve capacity to accommodate the site-related traffic. Therefore, with the exception of the proposed east-west collector roadway (5th Street) that will serve as the primary access to the proposed development, no additional improvements are needed to the existing roadway system to accommodate the proposed project.

22. Vehicle-Related Air Emissions

Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts.

Increased traffic will generate a relatively small corresponding increase in carbon monoxide levels and other vehicle-related air emissions. The project is expected to have a negligible impact on air quality. Consequently, baseline air quality monitoring, or predictive air quality modeling, has not been scheduled at this time, and no measures to mitigate air quality impacts have been considered.

23. Stationary Source Air Emissions

Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult EAW Guidelines for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

Because development of heavy industrial facilities is not proposed on this site, no stationary source air emissions are anticipated as a result of this project.

24. Odors, Noise and Dust

Will the project generate odors, noise or dust during construction or during operation? ☑ Yes ☐ No
If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

Project development will not generate odors, noise or dust in excess of levels emitted during typical construction practices of suburban developments. Any odors, noise, or dust produced during construction will meet the requirements of the MPCA and applicable local regulations.

Odors

The project will not generate significant odors during construction or operation. The emission of odor by any use shall be in compliance with City Code Section 96.03, 4(a).

Noise

The project will be constructed in accordance with the city's established noise ordinance as outlined in City Code Sections 130.45 to 130.47. It is anticipated that noise levels will temporarily increase locally during project construction, but are expected to return to normal levels following project completion. Noise levels on and adjacent to the site will vary considerably during construction depending on the pieces of construction equipment being operated simultaneously, the percent of time in operation, and the distance from the equipment to the receptors. The nearest receptors to the proposed project are several single-family residences located to the north along Julep Avenue North, and commercial businesses to the south and west along both Eagle Point and Hudson Boulevards. In accordance with Section 130.47 of the City Code, construction equipment will not be operated between the hours of 6:00 pm and 7:00 am on weekdays, and during any hours on Saturdays, Sundays, and state and federal holidays.

Dust

The construction process is expected to generate some dust, but it is not anticipated that fugitive dust will be generated in objectionable quantities. Consideration will be given to suppression of airborne dust by application of water if significant fugitive dust generation occurs during site grading and equipment operation. In general, incidental dust emissions generated during site construction will be consistent with City Code Section 96.03, 4(a).

25. Nearby Resources

Are any of the following resources on or in proximity to the site?
If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

Archaeological, historical or architectural resources? ☐ Yes ☑ No

The Minnesota State Historic Preservation Office (SHPO) conducted a search of the Minnesota Archaeological Inventory and Historic Structure Inventory for the project area (**Appendix D**). Based on their review, no previously-recorded archaeological sites or historic structures were identified in the database for the project area. Consequently, no further review of archaeological, historical or architectural resources is considered warranted at this time.

Prime or unique farmlands or land within an agricultural preserve? ☑ Yes ☐ No

According to the Natural Resources Conservation Service (NRCS), four of the eight soil types found on the site are classified as prime farmland (Table 19.1). These soils comprise 73.0 acres or approximately 65 percent of the site area.

Prime farmlands consist of land that has the best combination of physical and chemical characteristics for producing food, feed, forage, and oilseed crops. According to the NRCS, prime farmlands have "an adequate and dependable water supply from precipitation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content and few or no rocks." This does not mean all soils listed as prime farmland produce exceptionally high crop yields.

No farmland preservation measures have been considered. Because the site is guided for development, no clear alternatives to conversion of prime farmland are readily identifiable.

Designated parks, recreation areas or trails? ☐ Yes ☑ No

There are currently no designated parks, recreation areas, or trails within the project boundaries. Lake Elmo Regional Park Reserve is located less than a mile north of the proposed project site. Stonegate Park, located approximately 1,000 feet northwest of the project area, contains a playground and athletic fields.

Scenic views and vistas? ☐ Yes ☑ No

There are no scenic views or vistas located on or near the property.

Other unique resources? ☐ Yes ☑ No

26. Visual Impacts

Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? ☐ Yes ☑ No. If yes, explain.

The project will not create adverse visual impacts. The proposed residential land use is consistent with other established uses in the area, and therefore will not create a significant change in visual aesthetics. Measures to soften visual transitions include providing buffers between existing homes and gravel mining operations to the north, preservation of tree cover where possible, and providing berms, buffers and landscaping adjacent to proposed collector streets and other adjacent land uses.

27. Compatibility with Plans and Land Use Regulations

Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? ☑ Yes ☐ No. If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

The project is subject to the City of Lake Elmo's Comprehensive Plan and Zoning Ordinance. As described in the recently amended Land Use Plan, the city plans to grow its population by increasing the total number of households from 2,779 to 3,519 by 2015. In accordance with a Memorandum of Understanding with the Metropolitan Council, the city has committed to providing 6,600 additional Residential Equivalent Connections (RECs) by 2030. This will be partially achieved by increasing residential density within the I-94 corridor. The Comprehensive Plan includes a land use and staging plan map that guides future community growth and improvement. The City of Lake Elmo zoning map designates the Dale property as HD-RR-SRD, which is a Rural Residential/Sewered Residential Holding District. The Frandsen property is currently zoned HD-A-SRD, which is an Agricultural/ Sewered Residential Holding District. Both are consistent with the proposed use, although re-zoning the properties to the appropriate LDR and MDR zoning will be required prior to development. The Lake Elmo I-94 Development Staging Plan map (2012) designates the project area as being within Stage I (new sewered development located west of Keats Avenue that will connect to the MCES WONE interceptor). Consequently, the proposed project is consistent with the goals and plans of both the City of Lake Elmo and the Metropolitan Council for this area.

28. Impact on Infrastructure and Public Services

Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? ☑ Yes ☐ No.

If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see EAW Guidelines for details.)

Public and private infrastructure improvements will need to be constructed in association with this development. These include but are not limited to: roadways, trails, stormwater systems, electrical lines, telephone lines, and continued improvements and upgrades to the sanitary sewer and water supply systems. The Comprehensive Plan calls for municipal sewer and water facilities to be extended from the southeast corner of the Eagle Point Business Park along Hudson Boulevard to service this portion of the city and proposed new residential development. The project will also require construction of a collector roadway along the southern portion of the property boundary that

would intersect with Keats Avenue North to the east for proper site access and traffic control. This collector road will eventually be extended west as those properties develop as guided. Impacts related to public improvements directly associated with the proposed development project are discussed throughout this document.

29. Cumulative Impacts

Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement.

Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative potential effects. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.)

Describe 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 (or discuss each cumulative potential effect under appropriate item(s) elsewhere on this form).

The changes in regional land use in the Lake Elmo area from open space and agricultural land to more urbanized uses is expected to have a cumulative impact on the area. Cumulative effects of this and future projects on natural resources and infrastructure are expected to be roughly proportional to the impacts discussed in this EAW, or somewhat greater if future projects are developed at a higher density. The City of Lake Elmo has planned for future growth and development in this particular area as part of its Amended Comprehensive Land Use Plan (2012), utility plans, stormwater management plans, and administration of zoning ordinances. These efforts will ensure that the cumulative impacts of future growth and development to the environment, and to the city's service capacity, are anticipated and mitigated.

The project proposer does not currently own or have options on adjacent lands. Consequently, the precise timing and nature of future development in the project vicinity is unknown. However, land adjacent to the project site is eventually expected to develop, per the city's Land Use Plan, thereby converting existing open space and agricultural lands to residential and commercial uses. The City of Lake Elmo's Amended Comprehensive Land Use Plan (2012) anticipates and guides the intensity of development within the city and directs necessary infrastructure improvements to support the planned development.

Parcels to the south, west, and northeast of the proposed project area are currently undeveloped and zoned HD-A-SRD or HD-RR-SRD. In keeping with the city's Comprehensive Plan, and the MOU with the Metropolitan Council, these parcels are expected to develop in the future to mediumdensity residential and/or commercial uses. Undeveloped parcels immediately surrounding the proposed development site contain similar land uses and land features as the project site. Existing land cover on these properties is primarily agricultural, with grasslands, wooded tree lines, and small wetlands interspersed. The proposed project will not result in conversion of jurisdictional wetland to upland, but will result in minor tree removal and conversion of agricultural lands to non-agricultural uses. Consequently, cumulative impacts to natural resources are anticipated to be minimal, and have been purposefully concentrated in this portion of the city to preserve an agricultural core to the north of 10th Street (CSAH 10).

Development of surrounding parcels will also result in cumulative impacts to city infrastructure such as roads, sewer, and water. These cumulative impacts have been thoughtfully contemplated and addressed in the city's Comprehensive, Transportation, Wastewater, and Water Plans. As the surrounding properties develop, they will be evaluated under the Minnesota Environmental Policy Act (MEPA) rules, and will adhere to guidelines presented in the city's approved zoning and comprehensive plans for the area.

Mitigation for anticipated minor cumulative impacts in the area will include providing approximately 27 acres of open space (24 percent of the site), providing buffers from surrounding developments, protecting woodlands to the extent practicable, pretreating stormwater and controlling stormwater rates, providing adequate municipal facilities such as potable water and wastewater treatment, and addressing future traffic issues. These provisions will help minimize potential cumulative effects of past developments and future developments within the region.

30. Other Potential Environmental Impacts

If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

No other adverse environmental impacts are anticipated as a result of this project. Potential environmental impacts have been addressed in Items 1 through 29.

31. Summary of Issues

Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW.

List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

Table 31.1. Summary of Issues and Mitigation Measures

Item	Title	Mitigation Measures
8	Permits and Approvals Required	Apply for and receive all applicable permits prior to project construction.
9	Land Use	Abandon existing septic system on Frandsen parcel according to local code requirements. Prepare a Construction Contingency Plan to detail management of debris and impacted soils during development.
11	Fish, Wildlife, and Ecologically Sensitive Resources	Preservation and creation of approximately 27 acres of open space, stormwater ponding, woodland, and buffers.
13	Water Use	Sealing and abandonment of one irrigation well on the Frandsen parcel; compliance with DNR Water Appropriation Permit requirements; connection to the municipal water supply system.

Table 31.1. Summary of Issues and Mitigation Measures

Item	Title	Mitigation Measures
16	Erosion and Sedimentation	Minimize the potential for erosion by BMP implementation; compliance with the city's Erosion and Sediment Control Ordinance and NPDES/SDS General Permit requirements; preparation of a SWPP plan.
17	Water Quality: Surface Water Runoff	Creation of stormwater ponds and BMP's to manage stormwater runoff and adhere to the city's Storm Water Ordinance and watershed rules.
21	Traffic	Detailed traffic recommendations are provided within the conclusions portion of Section 21 of this document.

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 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature_____ Date _____

Title: Kyle Klatt, Planning Director, City of Lake Elmo

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for *EAW Guidelines*, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-201-2492, or http://www.eqb.state.mn.us

Exhibits 1 - 8

Savona EAW
Washington County, Minnesota

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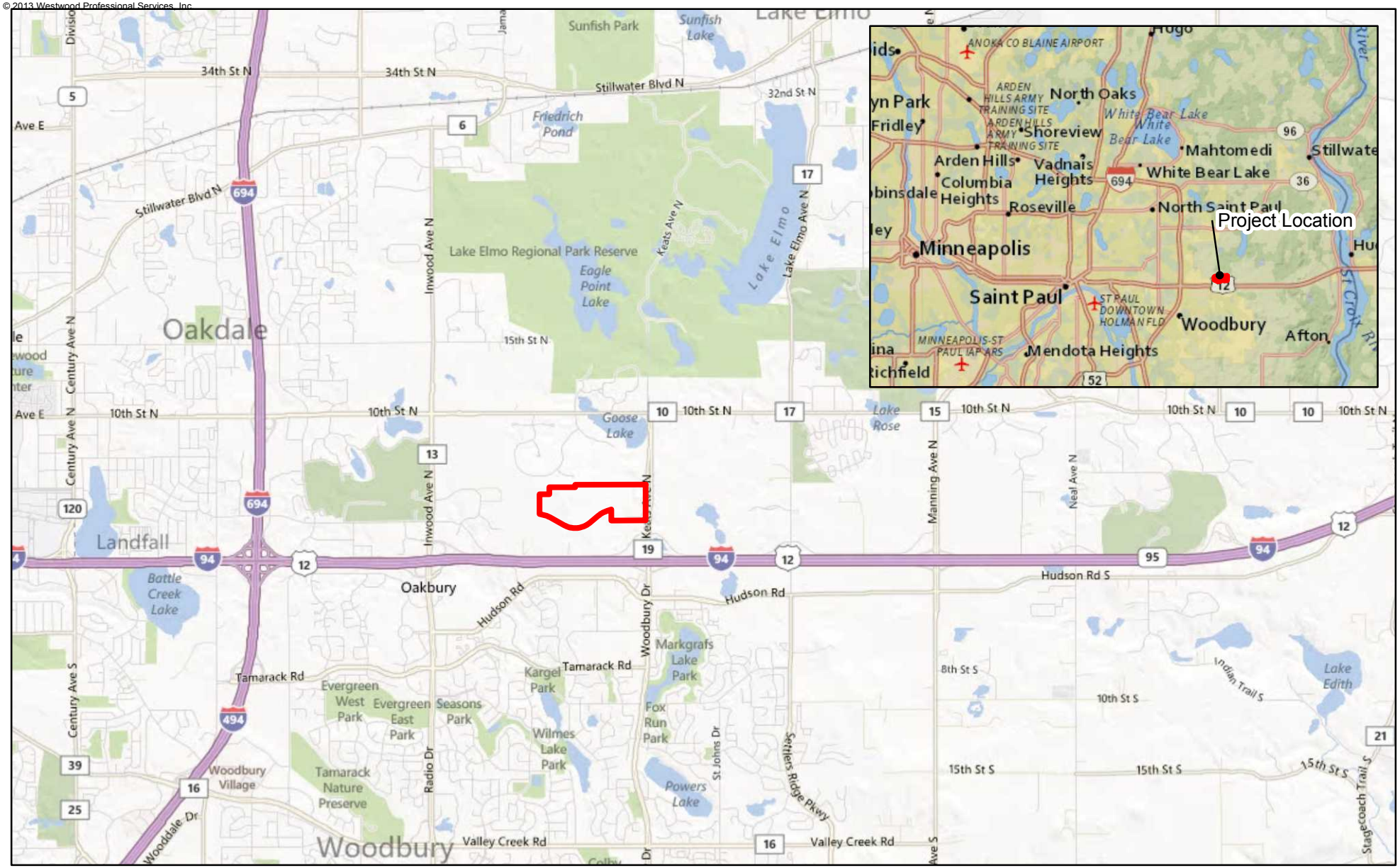
Map Document: P:\20121161\GIS\EAW\LakeElmoEAW_loc01A.mxd 4/1/2013 3:30:22 PM



Data Source(s): Westwood Professional Services Survey Data (2012), USGS DRG (ESRI Basemap, Accessed 2012)

Savona EAW

Lake Elmo, Minnesota

Site Location

EXHIBIT 1

Westwood

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

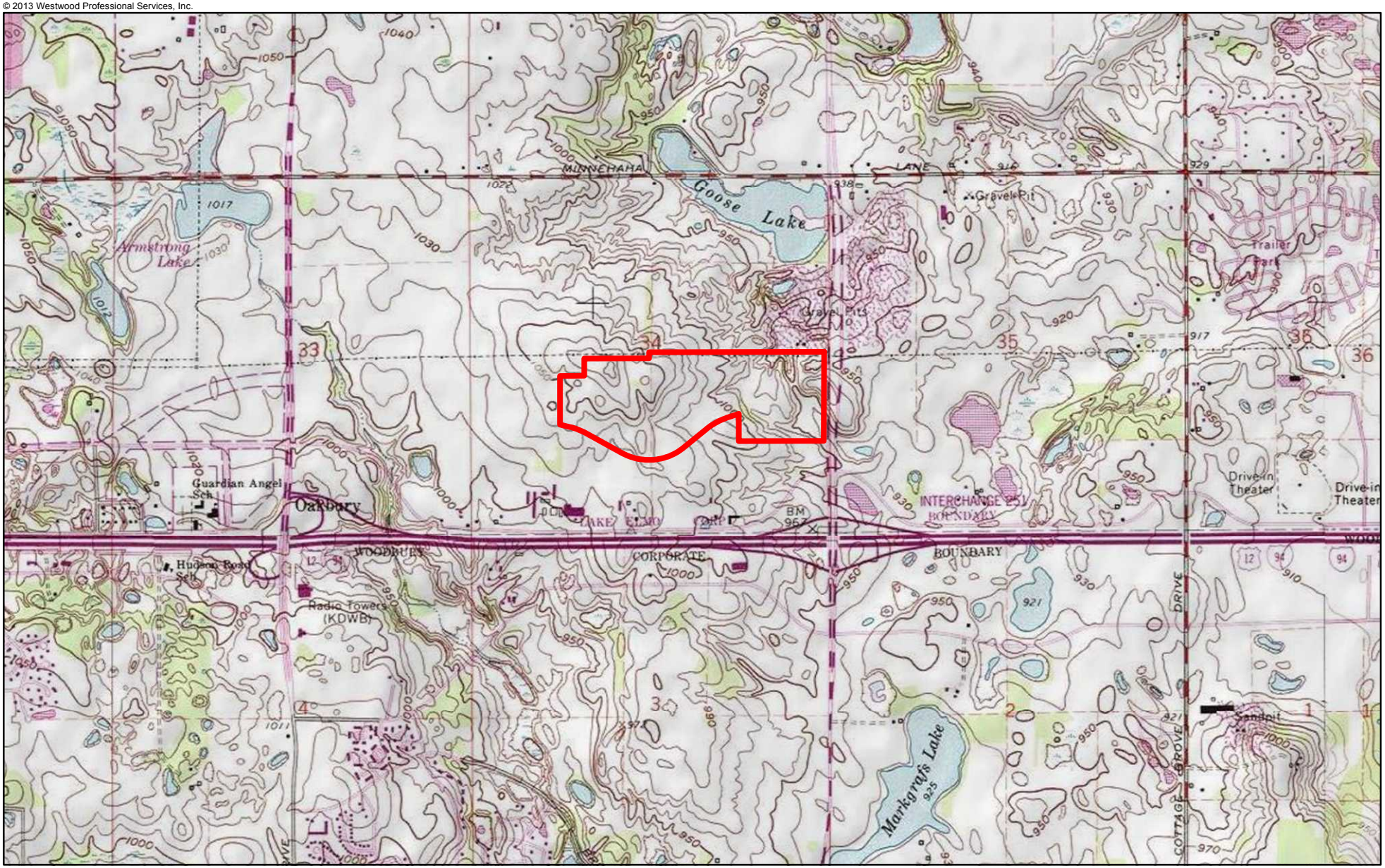
N

0 Feet 5,000

Legend

EAW Project Boundary

Map Document: P:\20121161\GIS\EAW\LakeElmoEAW_DRG01A.mxd 4/1/2013 3:31:45 PM



Data Source(s): Westwood Professional Services Survey Data (2012), USGS DRG (ESRI Basemap, Accessed 2012)

Savona EAW

Lake Elmo, Minnesota

USGS Topography

EXHIBIT 2

Westwood

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
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TOLL FREE 1-888-937-5150

www.westwoodps.com

N

0 Feet 2,000

Legend

EAW Project Boundary

Map Document: P:\20121161\GIS\EAW\LakeElmoEAW_Plan01A.mxd 4/1/2013 3:56:16 PM

CONCEPT DATA

Gross Site Area:	**112.5 ac**
Lennar Single Family Residential:	*91.5 ac +/-*
Lennar Multi Family Residential:	*21.0 ac +/-*
Collector Road ROW:	**7.9 ac**
Open Space:	**27.0 ac**
(includes buffers, parks, woods, ponds, greens, esmts, etc)	
Net Developed Area:	**77.6 ac**
-Single Family net area	62.0 ac +/-
- Multi-Family net area	15.6 ac +/-
Proposed Single Fam Lots:	**190 lots**
65' wide x 140' deep typical:	99 lots
75' wide x 140' deep typical:	91 lots
Proposed Single Family Setbacks:	
Front Setback:	25'
Side Setbacks:	5/10' (15' total)
Proposed Multi Fam Units:	**122 homes**
Row Townhomes:	44 homes
Back-Back Townhomes:	78 homes
Overall Proposed Homes:	**312 homes**
Overall Gross Density:	**2.77 un/ac**
-Single Family Gross Density:	2.07 un/ac
-Multi Family Gross Denisty:	5.81 un/ac
Overall Net Density:	**4.0 un/ac**
-Single Family Net Density:	3.1 un/ac
-Multi Family Net Density:	7.8 un/ac

Aerial photography from State of Minnesota; Topography from State LIDAR

Data Source(s): Westwood Professional Services Survey Data (2012), USGS DRG (ESRI Basemap, Accessed 2012)

Savona EAW

Lake Elmo, Minnesota

Proposed Site Plan

EXHIBIT 3

Westwood

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

N

0 400 Feet

Map Document: P:\20121161\GIS\EAW\LakeElmoEAW_ALU01A.mxd 4/1/2013 2:58:11 PM

Data Source(s): Westwood Professional Services Survey Data (2012), USGS DRG (ESRI Basemap, Accessed 2012)

Savona EAW

Lake Elmo, Minnesota

Adjacent Land Use

EXHIBIT 4

Westwood

Westwood Professional Services, Inc.
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Eden Prairie, MN 55344

PHONE 952-937-5150
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N

0 1,000 Feet

Legend

EAW Project Boundary

Map Document: P:\20121161\GIS\EAW\LakeElmoEAW_CLU01A.mxd 4/1/2013 3:00:41 PM

Data Source(s): Westwood Professional Services Survey Data (2012), USGS DRG (ESRI Basemap, Accessed 2012)

Savona EAW

Lake Elmo, Minnesota

Cover Type Mapping

EXHIBIT 5

0 400 Feet

N

Legend

- EAW Project Boundary 112.5 Acres
- Cropped Field 61.2 Acres
- Developed/Road 1.4 Acres
- Golf Course Driving Range 33.5 Acres
- Upland Meadow 9.4 Acres
- Excavated Pond 1.8 Acres
- Upland Woodland 5.2 Acres
- Natural Gas Pipeline Easement

Westwood

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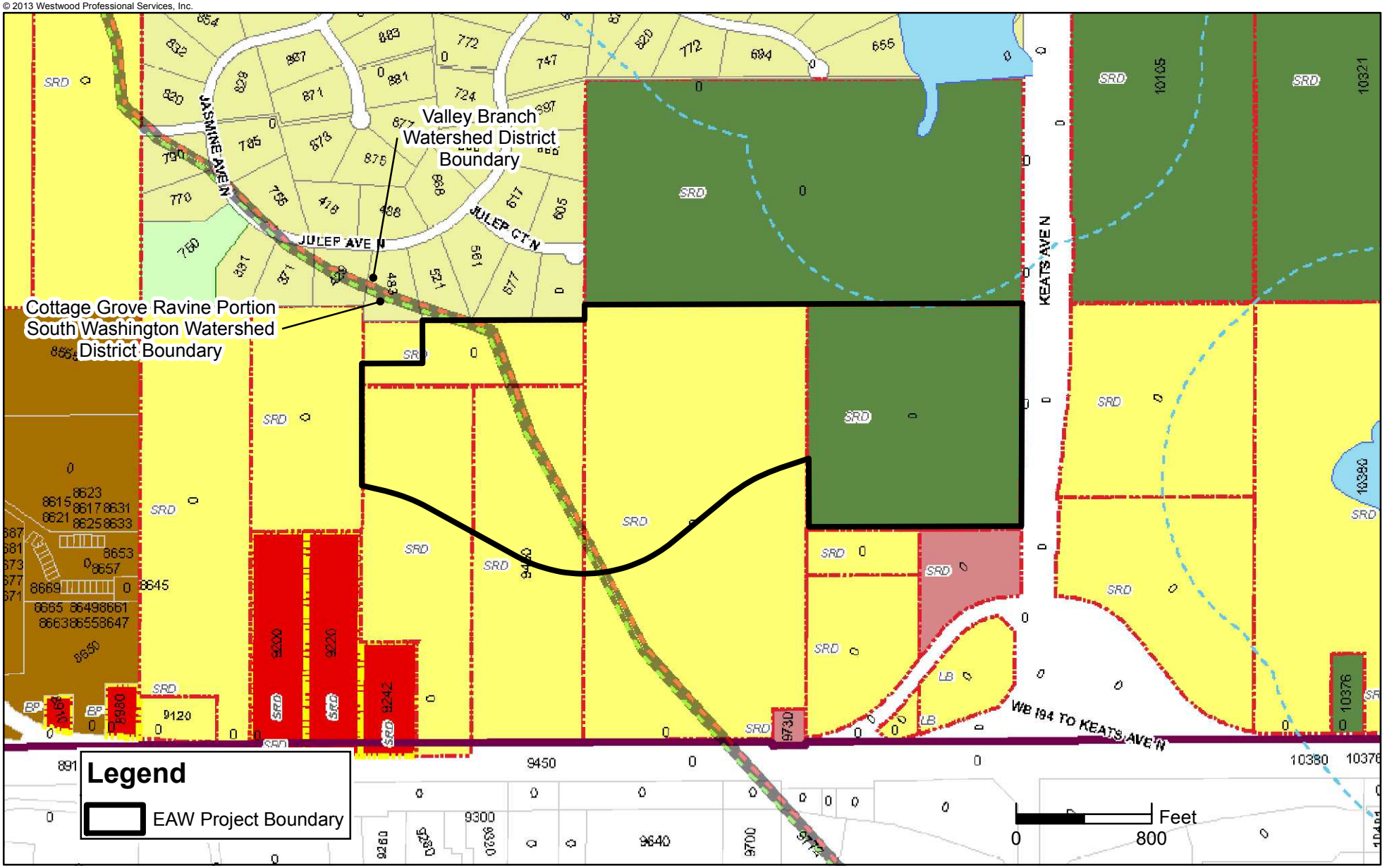
PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

Map Document: P:\20121161\GIS\EAW\LakeElmoZoning01A.mxd 4/1/2013 3:43:28 PM



Data Source(s): Westwood Professional Services Survey Data (2012), City of Lake Elmo Zoning Map (Accessed 2012)

Savona EAW

Lake Elmo, Minnesota

Zoning Map

EXHIBIT 6

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

N

Legend

General
- Village_Area
- Lakes
- Lake Elmo Boundary
- Shoreland District Boundary

Watershed Districts
- Browns Creek
- Cottage Grove Ravine
- Valley Branch

Zoning Districts
- A
- A-Baytown
- OP/OS
- BP
- P/PF
- R1
- R2-PUD
- R3
- RE
- RR
- GB
- HB
- LB
- LB-PUD
- I-94 HOLDING DISTRICT (see holding districts inset)
- VR-A
- VR-GB
- VR-RR
- VR-R1

How to Determine I-94 Holding District Designations

Map created by the Lake Elmo Planning Department - February 2012

THE CITY OF LAKE ELMO

Map Document: P:\20121161\GIS\EAW\LakeElmo_WaterRes01A.mxd 4/1/2013 2:55:51 PM

Data Source(s): Westwood Professional Services Survey Data (2012),
USFWS NWI (1991), MN DNR Minor Watershed Boundaries (2002)
FEMA Floodplain Data (2008) USGS DRG (ESRI Basemap, Accessed 2012)

0 Feet 700

N

Legend

- EAW Project Boundary
- MN DNR Minor Watershed Boundary
- Mapped 100-Year Floodplain
- NWI Mapped Wetland

Westwood

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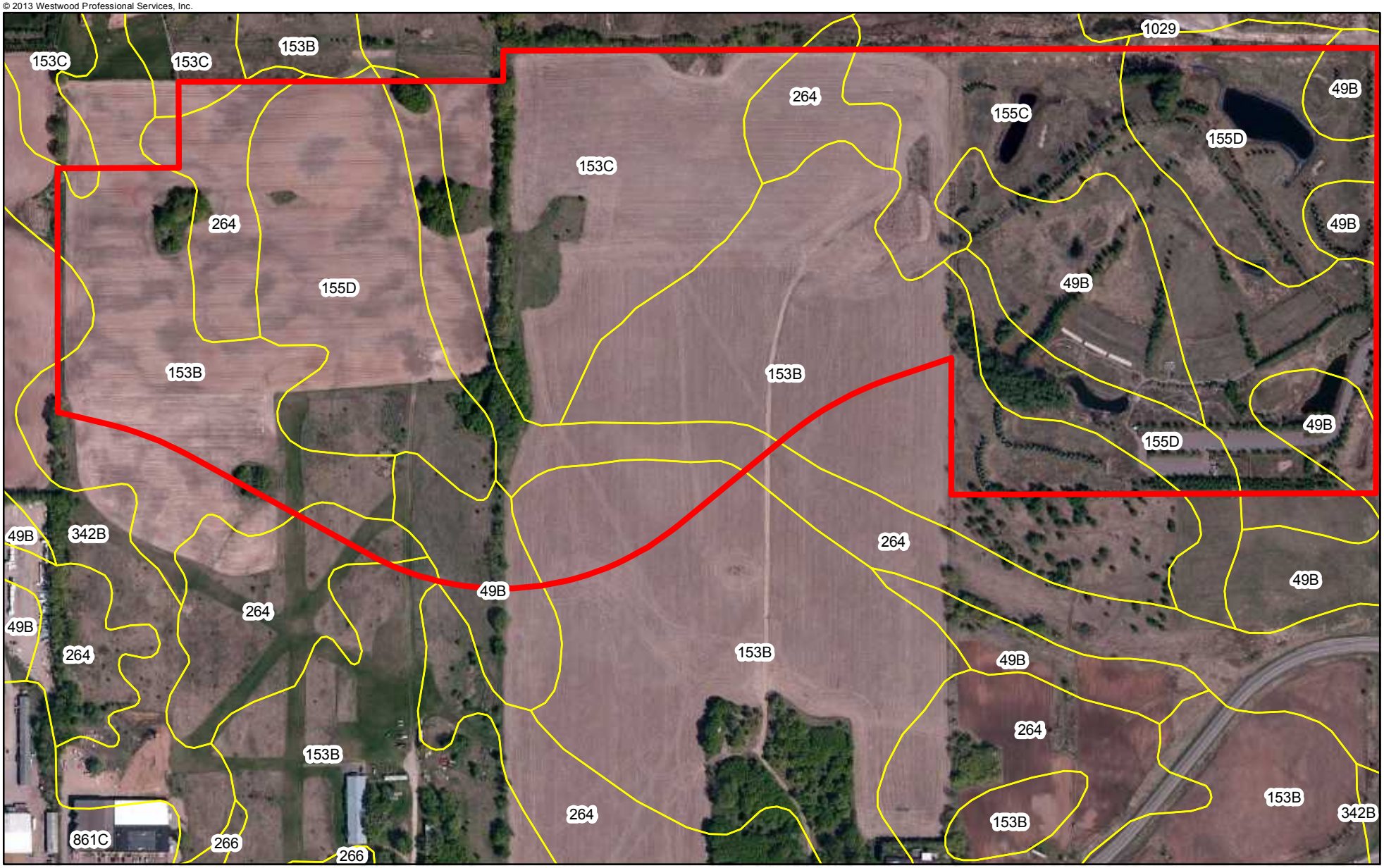
Savona EAW

Lake Elmo, Minnesota

Water Resources Mapping

EXHIBIT 7

Map Document: P:\20121161\GIS\EAW\LakeElmo_Soil01A.mxd 4/1/2013 2:50:04 PM



Data Source(s): Westwood Professional Services Survey Data (2012),
SURRGO Soils of Washington County (2004) USGS DRG (ESRI Basemap, Accessed 2012)

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

N

0 400 Feet

Legend

- EAW Project Boundary
- Hydric Soil Unit
- Non-Hydric Soil Unit

Savona EAW

Lake Elmo, Minnesota

Soils Mapping

EXHIBIT 8

Appendix A

Liesch Test Pit Location Map

Savona EAW
Washington County, Minnesota

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Source: MS Virtual Earth
Projection: NAD83 UTM Zone 15N

0 75 150 Feet

N

w:\sa\6203611\GIS\Fig4.mxd w:\sa\6203611\Figures\Fig4.pdf

www.liesch.com

LIESCH

Hydrogeologists · Engineers · Environmental Scientists

Minneapolis · Los Angeles · Milwaukee · Phoenix

Lake Elmo, MN	Nov 12
Test Pit Locations	Figure 4

Appendix B

DNR Natural Heritage Database Search

Savona EAW
Washington County, Minnesota

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Minnesota Department of Natural Resources
Division of Ecological and Water Resources, Box 25
500 Lafayette Road
St. Paul, Minnesota 55155-4025
Phone: (651) 259-5109 E-mail: lisa.joyal@state.mn.us

December 19, 2012 **Correspondence # ERDB 20130158**

Mr. David Weetman
Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

RE: Natural Heritage Review of the proposed Lake Elmo Property;
T29N R21W Section 34; Washington County

Dear Mr. Weetman,

As requested, the above project has been reviewed for potential effects to known occurrences of rare features. A search of the Minnesota Natural Heritage Information System did identify rare features within an approximate one-mile radius of the proposed project, but these records did not include any federally listed species and were either historical or not of concern given the project details that were provided with the data request form. As such, I do not believe the proposed project will adversely affect any known occurrences of rare features.

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.

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 (noted above) and project description provided on the NHIS Data Request Form. Please contact me if project details change or if an updated review is needed.

Please note that locations of the gray wolf (*Canis lupus*), state-listed as special concern, and the Canada lynx (*Lynx canadensis*), federally-listed as threatened, are not currently tracked in the NHIS. As such, the Natural Heritage Review does not address these species.

Furthermore, the Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. Additional rare features for which we have no data may be present in the project area, or there may be other natural resource concerns associated with the proposed project. For these concerns, please contact your DNR Regional Environmental Assessment Ecologist (contact information available at http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

Samantha Bump
NHIS Review Technician

Appendix C

County Well Index Well Log

Savona EAW
Washington County, Minnesota

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Minnesota Unique Well No.
686580

County Washington
Quad Lake Elmo
Quad ID 102B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 11/13/2002
Update Date 05/13/2010
Received Date

Well Name M.M. GOLF ONE

Township	Range	Dir	Section	Subsections	Elevation
29	21	W	34	DACDAC	961 ft.

Elevation Method: 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
300 ft.	300 ft.	10/10/2002

Drilling Method: Non-specified Rotary

Well Address
400 KEATS AV
LAKE ELMO MN 55042

Drilling Fluid: Other

Well Hydrofractured? ☐ Yes ☑ No
From Ft. to Ft.

Use: Irrigation

Geological Material	Color	Hardness	From	To
SAND/GRAVEL	BROWN	MEDIUM	0	152
LIME	YELLOW	SOFT	152	300

Casing Type: Steel (black or low carbon) Joint: Welded Drive Shoe? ☑
Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
20 in. to 15 ft.	78.6 lbs./ft.	20 in. to 20 ft.
10 in. to 152 ft.	40.48 lbs./ft.	15 in. to 152 ft.

Open Hole from 152 ft. to 300 ft.

Screen NO Make Type

Diameter Slot/Gauze Length Set Between

Static Water Level
120 ft. from Land surface Date Measured 10/03/2002

PUMPING LEVEL (below land surface)
150 ft. after 6 hrs. pumping 300 g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
WELL INSPECTION BY MDH FOUND ONLY 15 FT. OF 20 IN. CASING IN THE WELL.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 152 ft. 5 yrds.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: N/A
Input Date: 11/03/2003
System: *UTM - Nad83, Zone15, Meters*
X: 507375 **Y:** 4977762

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/10/2002
Manufacturer's name BERKELEY Model number 7-T120-15
__ HP 15 Volts 230
Length of drop Pipe 189 ft. Capacity 250 g.p.m Type Submersible Material

Abandoned Wells 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

First Bedrock Prairie Du Chien Group
Last Strat Prairie Du Chien Group
Aquifer Prairie Du Chien Group
Depth to Bedrock 152 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Kimmes-BauerDrilling	19738	MILLER, M.

County Well Index Online Report **686580** Printed 11/27/2012
HE-01205-07

Appendix D

State Historic Preservation Office Correspondence

Savona EAW
Washington County, Minnesota

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David Weetman

From: Dean Sather
Sent: Wednesday, November 28, 2012 3:02 PM
To: David Weetman
Subject: FW: Property Search

From: Thomas Cinadr [mailto:thomas.cinadr@mnhs.org]
Sent: Wednesday, November 28, 2012 2:18 PM
To: Dean Sather
Subject: Re: Property Search

THIS EMAIL IS NOT A PROJECT CLEARANCE.

This message simply reports the results of the cultural resources database search you requested. The database search produced results for only previously known archaeological sites and historic properties. Please read the note below carefully.

No archaeological sites or historic structures were identified in a search of the Minnesota Archaeological Inventory and Historic Structures Inventory for the search area requested.

The result of this database search provides a listing of recorded archaeological sites and historic architectural properties that are included in the current SHPO databases. Because the majority of archaeological sites in the state and many historic architectural properties have not been recorded, important sites or structures may exist within the search area and may be affected by development projects within that area. Additional research, including field survey, may be necessary to adequately assess the area's potential to contain historic properties.

If you require a comprehensive assessment of a project's potential to impact archaeological sites or historic architectural properties, you may need to hire a qualified archaeologist and/or historian. If you need assistance with a project review, please contact Kelly Gragg-Johnson in Review and Compliance @ 651-259-3455 or by email at kelly.graggjohnson@mnhs.org.

The Minnesota SHPO Survey Manuals and Database Metadata and Contractor Lists can be found at
http://www.mnhs.org/shpo/survey/inventories.htm

Tom Cinadr

Survey and Information Management Coordinator
Minnesota State Historic Preservation Office
Minnesota Historical Society
345 Kellogg Blvd. West
St. Paul, MN 55102

651-259-3453

On Wed, Nov 21, 2012 at 10:32 AM, Dean Sather <Dean.Sather@westwoodps.com> wrote:

Mr. Cinadr,

I am requesting a Cultural Resource Database search for the following property located in Washington County:

Township 29 North

Range 21 West

Section 34

Please let me know if you have any questions or concerns regarding this request.

Thank you,

Dean T. Sather, MA, RPA

Archaeologist / Principal Investigator

Licensure MN #11-007

Westwood Professional Services

Serving clients across the Nation

DIRECT 952-906-7488

Appendix E

Traffic Impact Study

Savona EAW
Washington County, Minnesota

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Westwood

7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 888-937-5150

www.westwoodps.com

DRAFT

MEMORANDUM

Date: April 9, 2013

Re: **Savona: Traffic Study**
Lake Elmo, Minnesota
File 20121161.00

To: Joe Jablonski, Land Development Manager,
Lennar

From: John M. Hagen, P.E., PTOE, Senior Transportation Engineer
Cindie Flaig, Traffic Specialist

Executive Summary

As part of the on-going Environmental Assessment Worksheet (EAW) for the proposed Savona development, the City of Lake Elmo requested that a traffic study be completed in order to determine the traffic-related impacts associated with the proposed Savona residential development located in the northwest quadrant of the Keats Avenue (CSAH 19) intersection with Hudson Boulevard in Lake Elmo, Minnesota. The proposed development will consist of 190 single-family and 122 multi-family lots. The study results are summarized in the following paragraphs, with detailed information provided in the body of the memorandum.

Existing Conditions: Results of the traffic operations analysis indicate that all of the key intersections are currently operating at an acceptable LOS C or better during the a.m. and p.m. peak hours, with the existing traffic control and geometric layouts.

A review of the vehicular queues revealed that vehicles in the southbound through lanes currently back up past the existing left- and right-turn lanes approximately 2 percent of the p.m. peak hour. However, the existing lagging left-turn signal phase helps to minimize the negative operational impacts of this occasional blockage of the southbound turn lanes.

Proposed Development: It is anticipated that the proposed Savona residential development will be fully build-out by the year 2018. The proposed development will consist of 190 single-family and 122 multi-family lots. Access to the proposed development will be via a new east-west minor collector located between 10th Street (CSAH 10) and Hudson Boulevard. This new east-west collector roadway was initially identified in the City of Lake Elmo's Transportation Plan. As part of this project, the east-west collector roadway will be constructed from Keats Avenue (CSAH 19) to the western edge of the proposed Savona residential development (or approximately 3/4-mile west of Keats Avenue). Ultimately, the east-west collector roadway will

be extended to connect to Inwood Avenue (CSAH 13). However, the completion of this future connection will be dependent on the development of the adjacent properties.

The proposed Savona development will generate an estimated 2,518 trips on an average weekday, 197 trips during the a.m. peak hour (with 45 inbound and 152 outbound trips), and 253 trips during the p.m. peak hour (with 162 inbound and 91 outbound trips).

A comparison of the proposed development with the assumed land uses in the City of Lake Elmo's transportation plan revealed that the proposed Savona residential development appears to be consistent with the land use assumptions included in the Lake Elmo Comprehensive Plan.

Future Year 2018 No-Build Conditions: The year 2018 no-build analysis revealed that all intersections are expected to continue to operate at acceptable LOS C or better during the peak hours under the year 2018 no-build conditions with existing geometrics and signal timing.

Not surprisingly, the review of the vehicular queues revealed the same minor queuing issues reported during the existing conditions on the southbound approach of Inwood Avenue (CSAH 13) at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard during the p.m. peak hour will continue under the year 2018 no-build. Under year 2018 no-build conditions, the vehicular queues from the southbound through movement will back up past the existing left- and right-turn lanes approximately 6 percent of the p.m. peak hour (versus 2 percent under existing conditions). However, once again the existing lagging left-turn signal phase helps to minimize the negative operational impacts of this occasional blockage of the southbound turn lanes.

The increase in the background traffic from the existing conditions and the year 2018 no-build conditions result in another potential queuing issue in the future during the p.m. peak hour. The review of the vehicular queues also revealed that vehicles in the heavy eastbound to southbound movement from I-94 to CSAH 19 spill-out beyond the long eastbound dual right-turn lane approximately 1 percent of the p.m. peak hour. The existing traffic signal timing at the Keats Avenue (CSAH 19) intersection with the South I-94 Ramps should be monitored and may need to be adjusted in the future in order to minimize the likelihood of the vehicular queues of this heavy eastbound to southbound movement from spilling beyond the existing dual right-turn lanes and blocking access to the eastbound shared left-turn/through lane during the p.m. peak hour.

Future Year 2018 Full Build-out Conditions: The analysis results for year 2018 full build-out conditions indicate that all of the key intersections will continue to operate at an acceptable LOS C or better during the a.m. and p.m. peak hours, with the existing traffic control and geometric layouts.

Similar to the no-build conditions, a review of the year 2018 full build-out conditions vehicular queues revealed that the same minor queuing issues reported on the southbound approach of Inwood Avenue (CSAH 13) at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard; and the eastbound approach of the I-94 South Ramps at the Keats Avenue (CSAH 19) intersection during the p.m. peak hour. Under year 2018 build conditions, the vehicular queues from the southbound through movement at the Inwood Avenue (CSAH 13)

intersection with Hudson Boulevard will back up past the existing left- and right-turn lanes approximately 8 percent of the p.m. peak hour (versus 6 percent under no-build conditions); and the eastbound right-turning vehicles from I-94 to southbound CSAH 19 will continue to spill-out beyond the existing eastbound dual right-turn lane approximately 1 percent of the p.m. peak hour. The existing lagging left-turn signal phase at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard will continue to help minimize the negative operational impacts of this occasional blockage of the southbound turn lanes. The existing traffic signal timing at the Keats Avenue (CSAH 19) intersection with the South I-94 Ramps should be monitored and may need to be adjusted in the future in order to minimize the likelihood of the vehicular queues of this heavy eastbound to southbound movement from spilling beyond the existing dual right-turn lanes and blocking access to the eastbound shared left-turn/through lane during the p.m. peak hour. This potential signal timing adjustment would be needed with or without the proposed Savona development.

Secondary Access to Inwood Avenue (CSAH 13) or Hudson Boulevard: The proposed Savona residential development will construct a portion of 5th Street from Keats Avenue (CSAH 19) to the western limits of their site. As the remaining available land north of I-94 between Keats Avenue (CSAH 19) and Inwood Avenue (CSAH 13 develops, a secondary access may be needed to either Inwood Avenue (CSAH 13) to the west or Hudson Boulevard to the south, in order to relieve pressure on the proposed Keats Avenue (CSAH 19) intersection with 5th Street.

Based on the results of the traffic operations analysis, the intersection of Keats Avenue (CSAH 19) and 5th Street can accommodate 100 percent (or the full build-out) of the ultimate 796 dwelling units assumed by the City's comprehensive plan to be directly served by the proposed east-west collector (5th Street) before a secondary access is needed to relieve pressure on the intersection.

Conclusions/Recommendations: The existing roadway system and traffic control will be able to accommodate the proposed Savona residential development, assuming the construction of the proposed 5th Street from Keats Avenue (CSAH 19) to the western limits of the project to provide access in/out of the site.

Existing Conditions

The proposed development is located in the northwest quadrant of the Keats Avenue (CSAH 19) intersection with Hudson Boulevard in Lake Elmo, Minnesota (see Figure 1: Project Location). Keats Avenue (CSAH 19), in the vicinity of the proposed development, is a divided four-lane roadway with an existing speed limit of 55 mph north of Hudson Boulevard and 50 mph south of Hudson Boulevard.

Hudson Boulevard is a two-lane undivided roadway, and serves as north frontage road to I-94. The existing speed limit along Hudson Boulevard is 50 mph.

Inwood Avenue (CSAH 13), to the west of the proposed development, is a divided four-lane roadway with an existing speed limit of 45 mph north in the vicinity of Hudson Boulevard.

An operations analysis was conducted for the a.m. and p.m. peak hours at the following key intersections in order to determine how traffic conditions currently operates in the study area:

- Keats Avenue (CSAH 19) at 10th Street (CSAH 10)
- Keats Avenue (CSAH 19) at Hudson Boulevard
- Keats Avenue (CSAH 19) at North I-94 Ramps
- Keats Avenue (CSAH 19) at South I-94 Ramps
- Inwood Avenue (CSAH 13) at Hudson Boulevard

All key intersections were analyzed using Synchro/SimTraffic software. The existing signal timing (provided by the Washington County) was used in the analysis. Existing peak hour turning movement counts were collected by Westwood Professional Services in March 2013 at the Keats Avenue (CSAH 19) intersections with 10th Street (CSAH 10), Hudson Boulevard, and the North I-94 Ramps. Washington County staff provided year 2010 counts at the Keats Avenue (CSAH 19) intersection with the South I-94 Ramps and the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard. Since there have been no major changes in this area and relatively stagnant economic conditions since the year 2010 traffic counts were taken by the County, the year 2010 traffic volumes were deemed to be a reasonable reflection of existing conditions at these two intersections

Current geometrics and peak hour traffic volumes at the key intersections are shown in Figure 2. Copies of the raw turning movement count data at each of the key intersections are provided in Appendix A.

Using the roadway geometric and traffic volume data described above as input, traffic operational analysis was performed per the standards set out in the 2010 Highway Capacity Manual, published by the Transportation Research Board. Synchro/SimTraffic 7 was used to complete the analysis.

Base map source: Bing Maps, Microsoft Corporation, 2013

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Project Location

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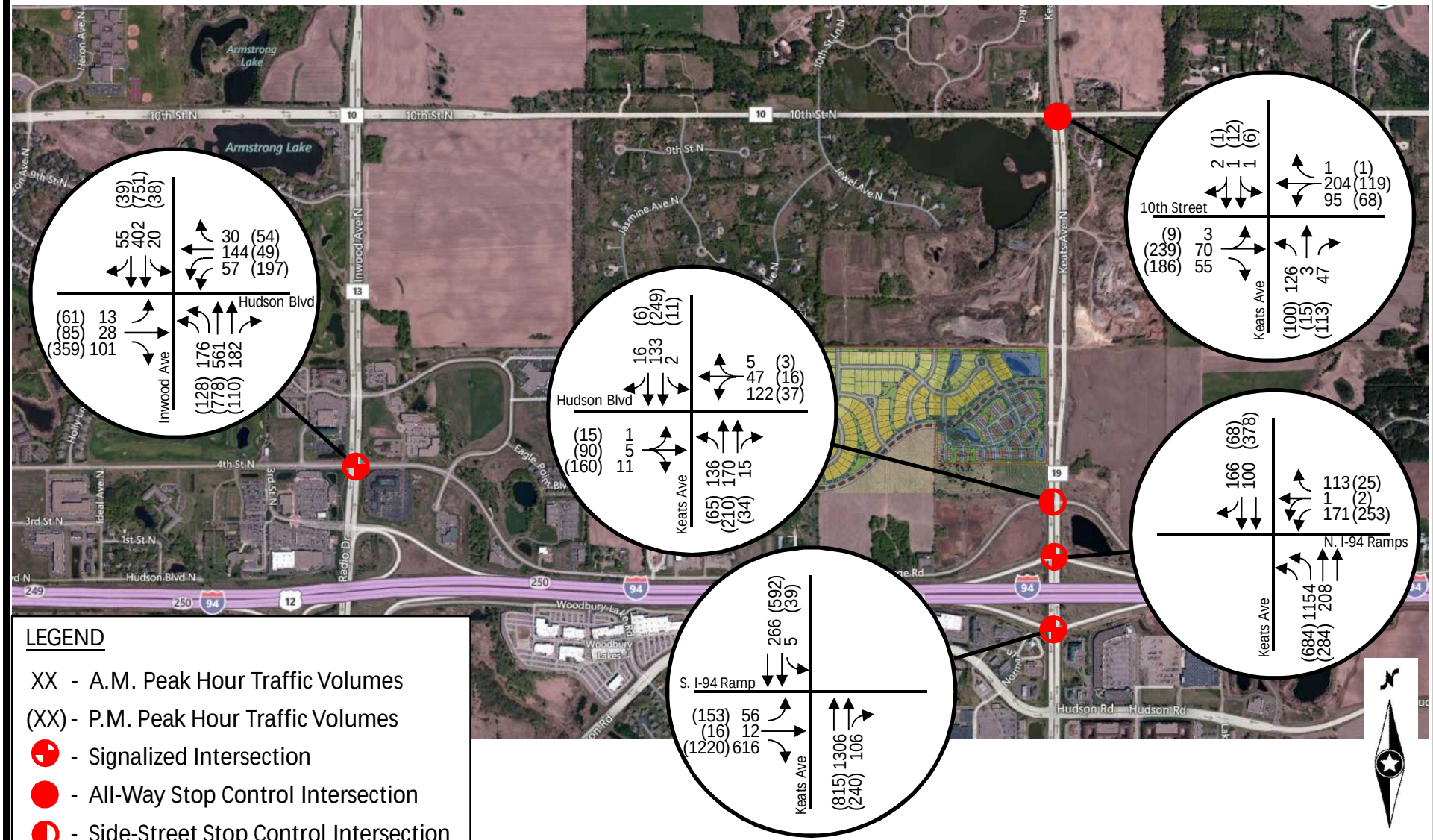
Figure
1



LEGEND

XX - A.M. Peak Hour Traffic Volumes

(XX) - P.M. Peak Hour Traffic Volumes

- Signalized Intersection
- All-Way Stop Control Intersection
- Side-Street Stop Control Intersection

Base map source: Bing Maps, Microsoft Corporation, 2013

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Existing Conditions

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Figure
2

Two fundamental outputs from the operations analysis are typically used to characterize traffic flow. The first is Level of Service (LOS), a letter grade ranging from "A" (free flow) to "F" (demand exceeds capacity). Generally, LOS D represents the threshold for acceptable overall intersection operating conditions during a peak hour in the Twin Cities metro area. An average of five SimTraffic simulation runs is reported in the tables in the following sections within the body of this report. Level of service results from SimTraffic are reported in the Appendix.

The second important output to consider from the operations analysis is queuing. A queue is a line of vehicles waiting to pass through an intersection. While an intersection may be reported as operating at an acceptable level of service, queues from the intersection extending to upstream intersections or driveways could create a potential safety issue. The 95th percentile queue is typically considered the standard for design purposes. The micro simulation component of the model, SimTraffic, is best suited for reviewing vehicular queues between closely-spaced intersections. Any 95th percentile queues that extend to an upstream intersection/driveway are reported in the text below as well as in the detailed results tables presented in the Appendix B.

Results of the Synchro/SimTraffic analysis shown in Table 1 indicate that all of the key intersections are currently operating at an acceptable LOS C or better during the a.m. and p.m. peak hours, with the existing traffic control and geometric layouts.

Table 1
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service [(1)]	
		A.M. Peak	P.M. Peak
Keats Avenue (CSAH 19) at 10th Street (CSAH 10)	All-Way Stop	A / *B*	A / *B*
Keats Avenue (CSAH 19) at Hudson Boulevard	Keats Ave. – Free Flow Hudson Blvd. – Stop	A / *B*	A / *C*
Keats Avenue (CSAH 19) at North I-94 Ramps	Traffic Signal	B	C
Keats Avenue (CSAH 19) at South I-94 Ramps	Traffic Signal	B	B
Inwood Avenue (CSAH 13) at Hudson Boulevard	Traffic Signal	B	C

[(1)]For signalized intersections, the letter reported represents the LOS for the entire intersection. For unsignalized intersections, the first letter reported is the LOS of the entire intersection, while the second letter (in italics) is the LOS of the worst operating approach.

A review of the vehicular queues revealed some existing minor queuing issues on the southbound approach of Inwood Avenue (CSAH 13) at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard during the p.m. peak hour. The vehicular queues from the southbound through movement currently backs up past the existing left- and right-turn lanes

approximately 2 percent of the p.m. peak hour. However, the existing lagging left-turn signal phase helps to minimize the negative operational impacts of this occasional blockage of the southbound turn lanes. The LOS results for the year 2018 full build-out conditions are provided in Appendix B.

Proposed Development and Site Access

The proposed Savona residential development is located in the northwest quadrant of the Keats Avenue (CSAH 19) intersection with Hudson Boulevard in Lake Elmo, Minnesota. Based on the conceptual site plan dated April 1, 2013 (shown in Figure 3), the proposed development will consist of 190 single-family and 122 multi-family lots. It is anticipated that proposed development will be fully built-out by the year 2018.

As shown in Figure 3, the conceptual site plan indicates that access to the proposed development will be via a new east-west minor collector located between 10th Street (CSAH 10) and Hudson Boulevard. This new east-west collector roadway (hereafter referred to as 5th Street) was initially identified in the City of Lake Elmo's *Year 2030 Comprehensive Transportation Plan*. As part of this project, 5th Street will be constructed as a two-lane divided roadway with turn lanes provided at major intersections, from Keats Avenue (CSAH 19) to the western edge of the proposed Savona residential development (or approximately 3/4-mile west of Keats Avenue). Ultimately, 5th Street will be extended to connect to Inwood Avenue (CSAH 13). However, the completion of this future connection will be dependent on the development of the adjacent properties. Figure 4 illustrates the future minor collector roadway identified in the City of Lake Elmo's Year 2030 Comprehensive Transportation Plan and the portion of the roadway (5th Street) that will be constructed as part of the proposed Savona development.

Comparison of Proposed Development to Lake Elmo Comprehensive Plan

In order to determine if the proposed development is consistent with the land use assumptions included in the City of Lake Elmo's Comprehensive Transportation Plan, a land use comparison was completed. The proposed development is located within the transportation analysis zone (TAZ) 1229C. As shown in Table 2, TAZ 1229C is anticipated to have 796 households by the year 2030, according to the Lake Elmo 2030 Comprehensive Transportation Plan.

Table 2
Assumed Development with TAZ 1229C
Year 2030 Lake Elmo Comprehensive Transportation Plan

Lake Elmo TAZ	Households	
	2000	2030
1229C	2	796

Source: The City of Lake Elmo *2030 Comprehensive Transportation Plan.*

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Conceptual Site Plan

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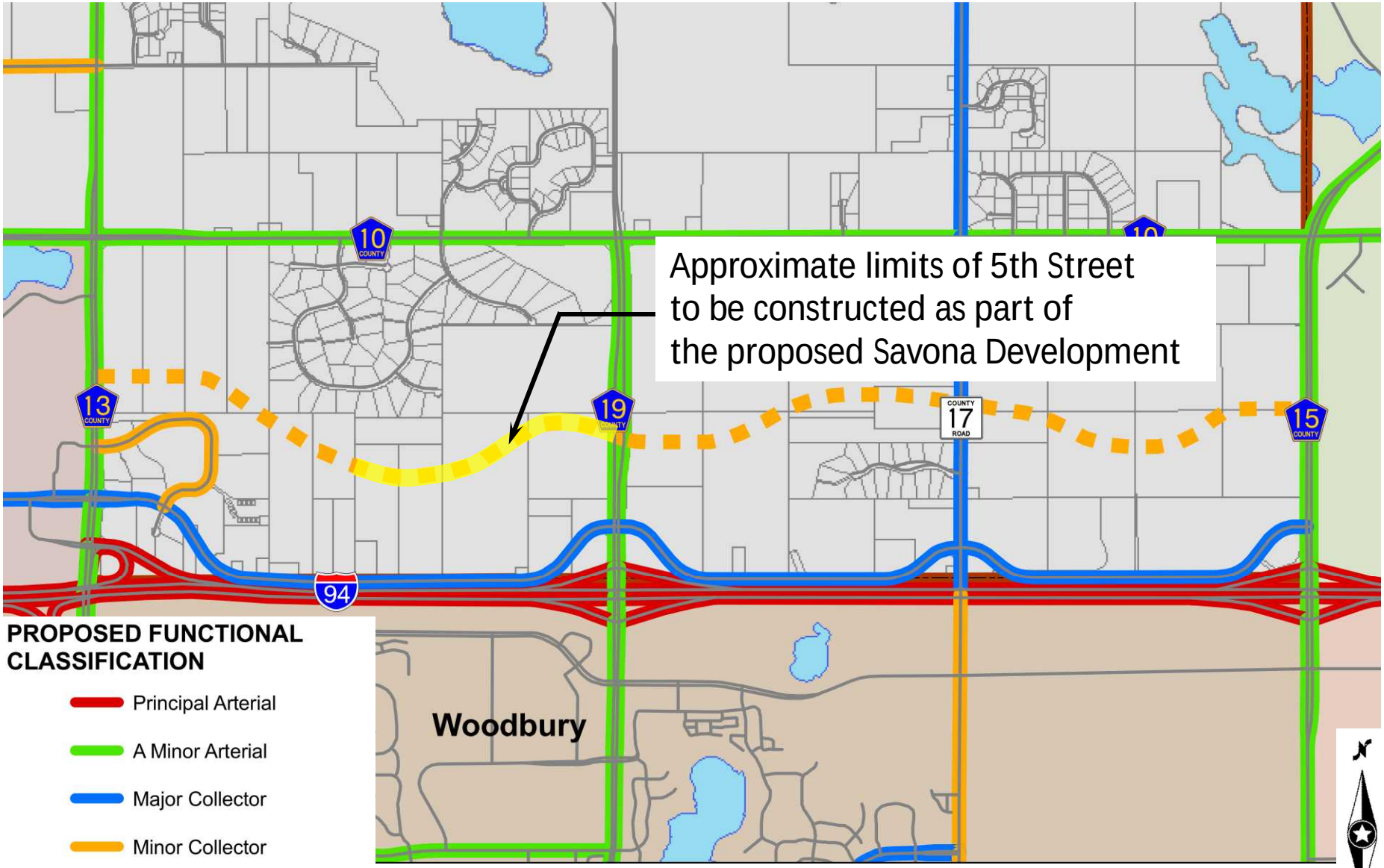
Figure
3



Note: Dashed lines represent future roadways not currently in place.

Source: City of Lake Elmo's, 2030 Comprehensive Transportation Plan

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Future Minor Collector Roadway

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Figure
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The Savona residential development is proposing 312 new households to TAZ 1229C. This represents less than 40 percent of the assumed number of households in TAZ by the year 2030. This means that more than 60 percent of the assumed 796 households is still available for the remaining land in TAZ 1229C that is guided for residential land uses. Figure 4 shows the proposed land uses in and around TAZ 1229C. As shown in Figure 5, the proposed development accounts for more than half of the land area within TAZ 1229C that is guided residential. Therefore, the proposed Savona residential development appears to be consistent with the land use assumptions included in the Lake Elmo Comprehensive Plan.

Traffic Forecasts

Since the full build-out of the proposed development is assumed by the year 2018, future traffic volumes were developed for the year 2018. Year 2030 average daily traffic volumes on area roadways (based on the City of Lake Elmo and Washington County Transportation Plans) will also be presented for informational purposes.

Year 2018 – No-Build Traffic Volumes

The year 2018 no-build scenario assumes that the Savona site does not develop. Existing traffic volumes were increased at a rate of 1.7 percent per year in order to account for background traffic growth in the area. This growth rate was based on the current traffic volume projection factors for Washington County published by MnDOT.

Year 2018 – Full Build-Out Traffic Volumes

The year 2018 full build-out scenario assumes that the proposed Savona residential development is fully built-out. Future year 2018 full build-out volumes were developed by adding the development-related traffic from the Savona development to the Year 2018 no-build traffic volumes.

Year 2030 – Traffic Volumes

Washington County staff requested that forecast year 2030 traffic volumes on area roadways (based on City/County comprehensive plans) be included in the traffic study for informational purposes. Forecast year 2030 volumes were taken from the City of Lake Elmo's *Year 2030 Comprehensive Transportation Plan* and Washington County's *2030 Comprehensive: A Policy Guide to 2030 – Transportation*.

Source: City of Lake Elmo's, 2030 Comprehensive Plan

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Comprehensive Plan Land Uses
within TAZ 1229C

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Figure
5

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Trip Generation

Trip generation estimates for the a.m. and p.m. peak periods and on a daily basis were calculated for the proposed Savona residential development. The trip generation estimates were developed based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition. The trip generation estimates for the proposed development are shown in Table 3.

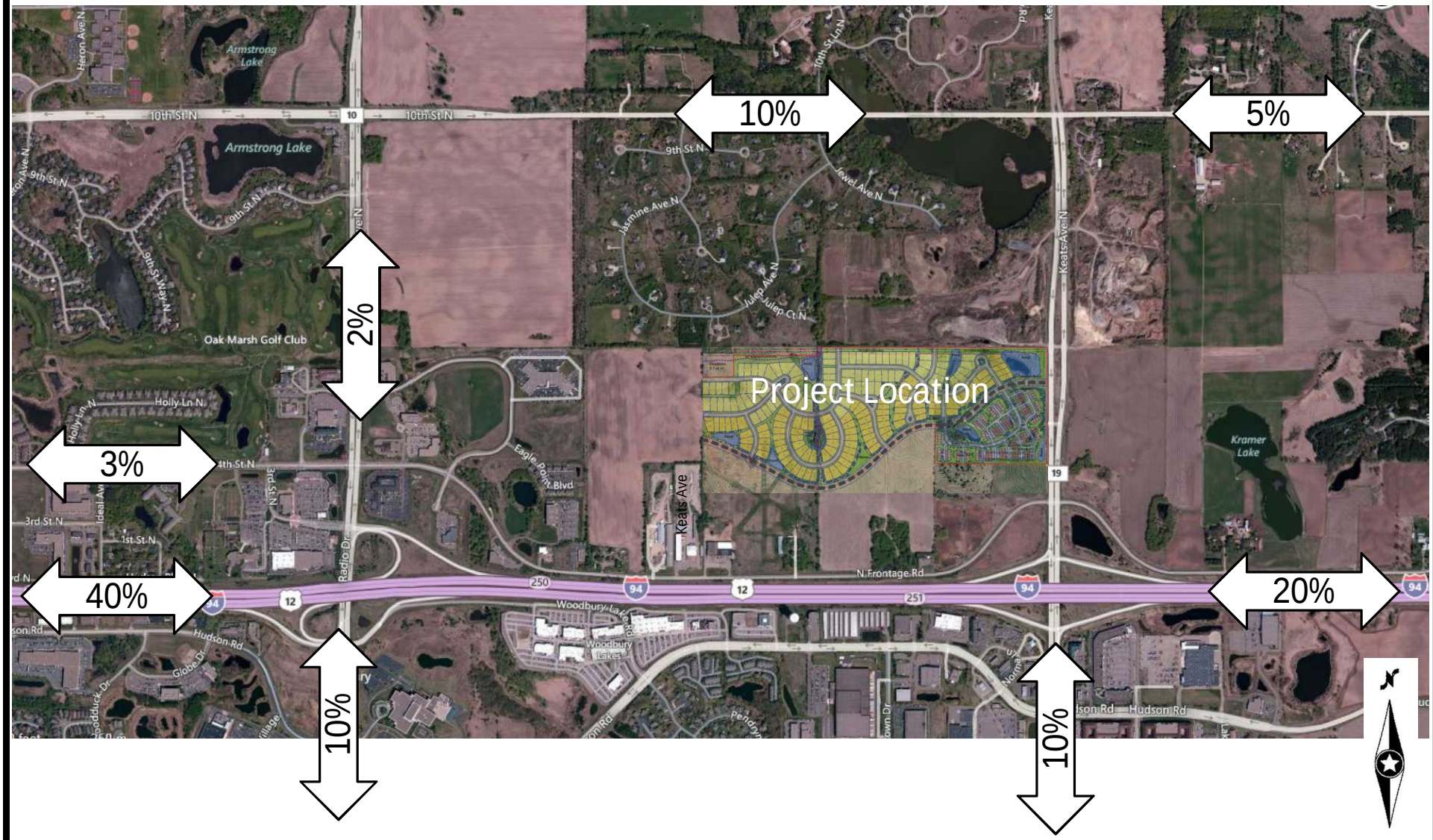
Table 3
Trip Generation Estimate: Savona Residential Development [(1)]

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Single-Family Residential	190 DUs	1,810	36	107	143	120	70	190
Multi-Family Residential	122 DUs	708	9	45	54	51	48	99
Net New Trips		**2,518**	**45**	**152**	**197**	**162**	**91**	**253**

[(1)]The trip generation estimates were based on the 2012 ITE *Trip Generation Manual*, 9th Edition.

As shown in Table 3, the proposed Savona residential development would generate approximately 2,518 trips on an average weekday, 197 trips during the a.m. peak hour (with 45 inbound and 152 outbound trips), and 253 trips during the p.m. peak hour (with 162 inbound and 91 outbound trips).

The trips generated by the proposed development were assigned to the adjacent roadway system using the directional distribution shown in Figure 6. The directional distribution shown in Figure 6 was based on existing population, traffic patterns, and adjacent roadways system. The resultant year 2018 no-build and traffic volumes are shown in Figures 7 and 8, respectively. The forecast year 2030 traffic volumes on area roadways (based on the City of Lake Elmo and Washington County Transportation Plans) are shown in Figure 9.



Base map source: Bing Maps, Microsoft Corporation, 2013

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Directional Distribution

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Figure
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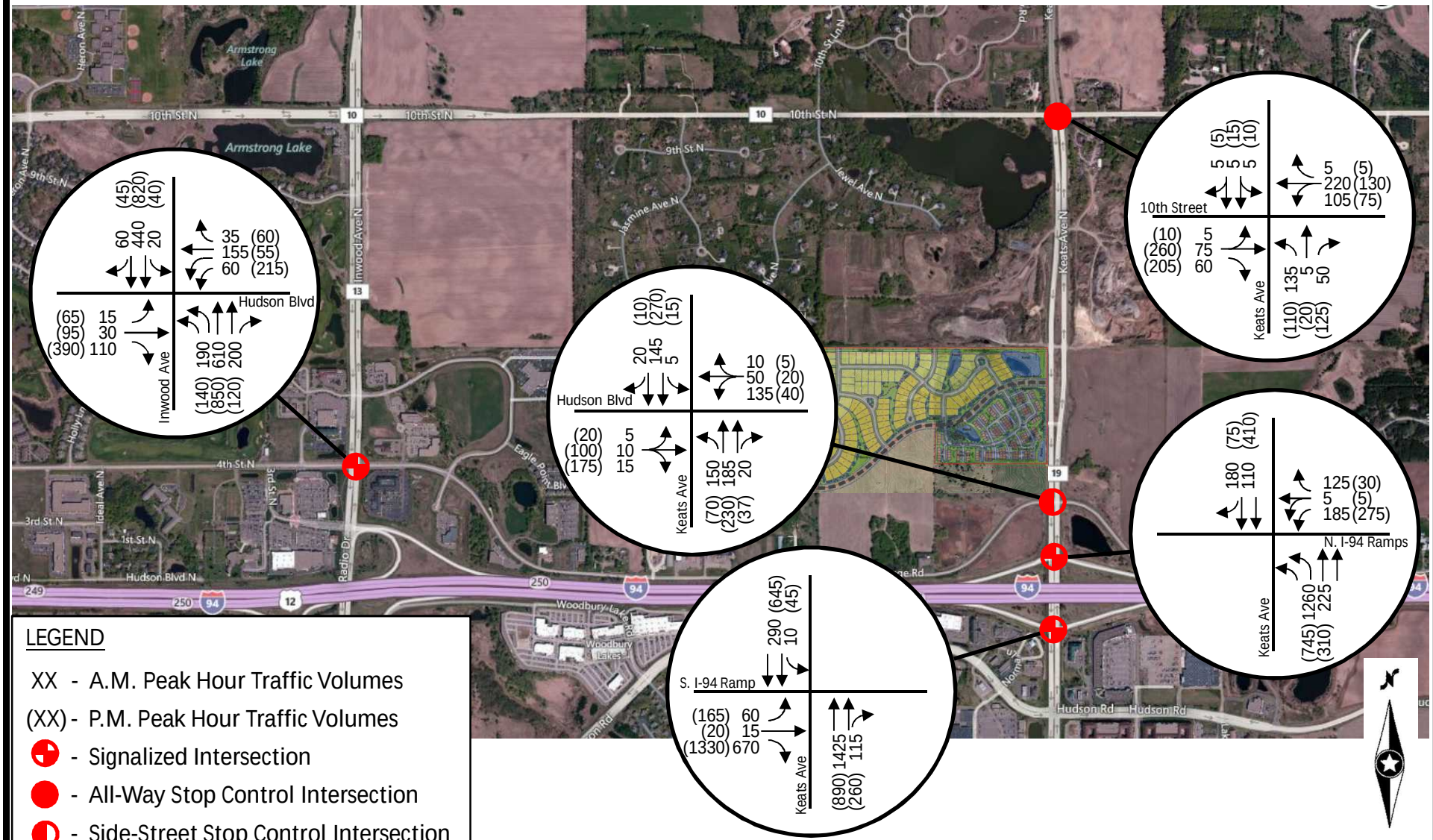

LEGEND

XX - A.M. Peak Hour Traffic Volumes

(XX) - P.M. Peak Hour Traffic Volumes

- Signalized Intersection

- All-Way Stop Control Intersection

- Side-Street Stop Control Intersection

Base map source: Bing Maps, Microsoft Corporation, 2013

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Year 2018 No-Build Conditions

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Figure 7

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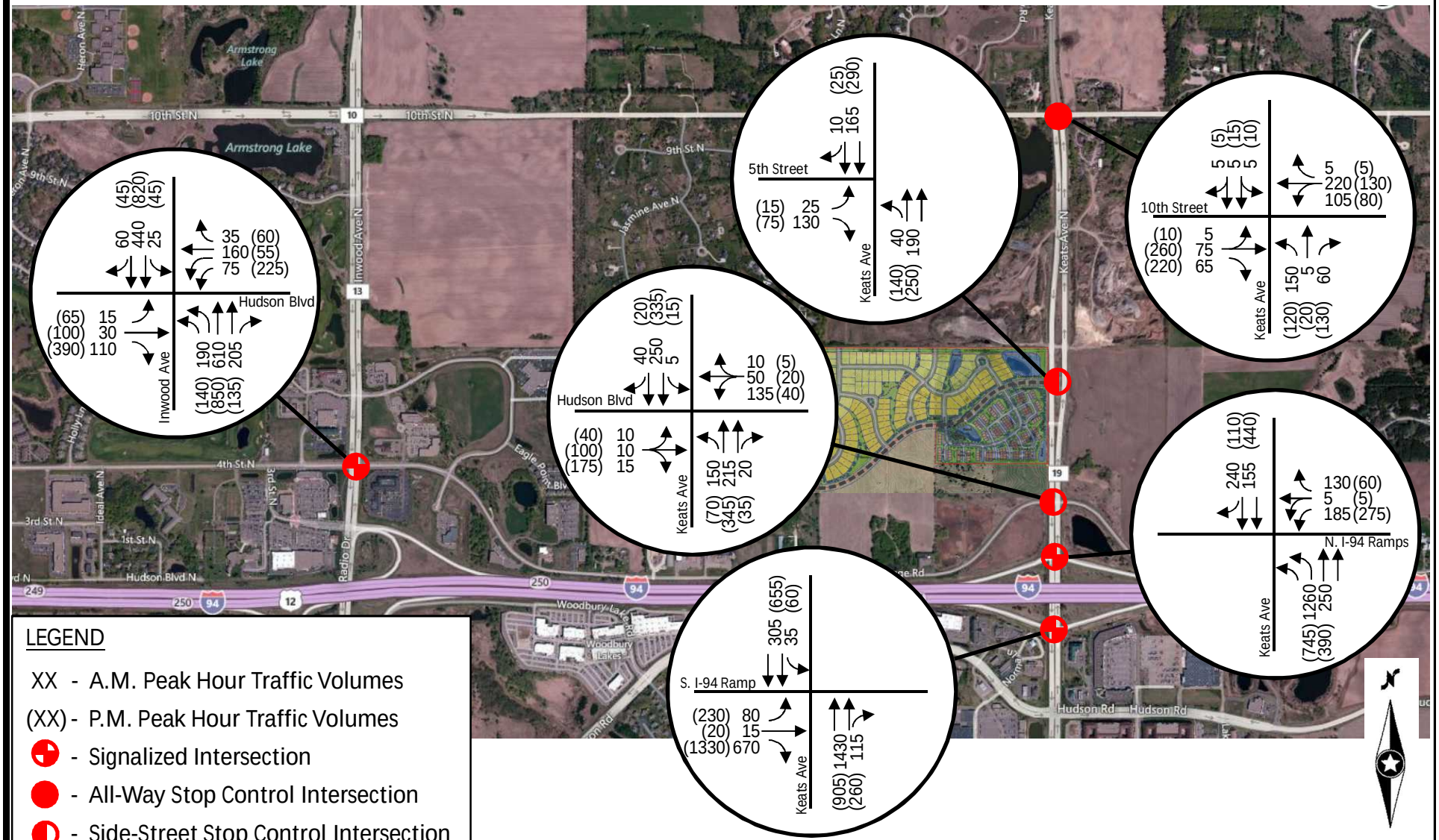

LEGEND

XX - A.M. Peak Hour Traffic Volumes

(XX) - P.M. Peak Hour Traffic Volumes

- Signalized Intersection

- All-Way Stop Control Intersection

- Side-Street Stop Control Intersection

Base map source: Bing Maps, Microsoft Corporation, 2013

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Year 2018 Build Conditions

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Figure
8

LEGEND

XX - Lake Elmo Transportation Plan 2030 Volumes

(XX) - Washington County Transportation Plan 2030 Volumes

Base map source: Bing Maps, Microsoft Corporation, 2013

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Year 2030 Traffic Volumes
On Area Roadway System

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Figure
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Future Conditions

To determine how well the existing roadway system would accommodate the future traffic volumes, an a.m. and p.m. peak hour operations analysis was conducted for the year 2018 no-build and full build-out conditions.

Year 2018 No-Build Conditions

As shown in Table 4, all intersections are expected to continue to operate at acceptable LOS C or better during the peak hours under the year 2018 no-build conditions with existing geometrics and signal timing.

Table 4
Year 2018 No-Build Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service (1)	
		A.M. Peak	P.M. Peak
Keats Avenue (CSAH 19) at 10th Street (CSAH 10)	All-Way Stop	A / *B*	A / *B*
Keats Avenue (CSAH 19) at Hudson Boulevard	Keats Ave. – Free Flow Hudson Blvd. – Stop	A / *B*	A / *C*
Keats Avenue (CSAH 19) at North I-94 Ramps	Traffic Signal	C	C
Keats Avenue (CSAH 19) at South I-94 Ramps	Traffic Signal	B	C
Inwood Avenue (CSAH 13) at Hudson Boulevard	Traffic Signal	B	C

(1)For signalized intersections, the letter reported represents the LOS for the entire intersection. For unsignalized intersections, the first letter reported is the LOS of the entire intersection, while the second letter (in italics) is the LOS of the worst operating approach.

Not surprisingly, the review of the vehicular queues revealed that the same minor queuing issues reported during the existing conditions on the southbound approach of Inwood Avenue (CSAH 13) at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard during the p.m. peak hour will continue under the year 2018 no-build. Under year 2018 no-build conditions, the vehicular queues from the southbound through movement will back up past the existing left- and right-turn lanes approximately 6 percent of the p.m. peak hour (versus 2 percent under existing conditions). However, once again the existing lagging left-turn signal phase helps to minimize the negative operational impacts of this occasional blockage of the southbound turn lanes.

The increase in the background traffic from the existing conditions and the year 2018 no-build conditions result in another potential queuing issue in the future. The review of the vehicular queues also revealed that vehicles on the eastbound dual right-turn lane of the South I-94 Ramp

approach to the Keats Avenue (CSAH 19) intersection will extend approximately 590 feet back from the intersection. This is primarily due to the high number of existing (1,220) and future year 2018 (1,330) eastbound right-turning vehicles from I-94 to southbound CSAH 19 during the p.m. peak hour. However, since the existing eastbound dual right-turn lane currently has 540 feet of storage provided, the vehicular queues will only spill-out beyond the eastbound dual right-turn lane approximately 1 percent of the p.m. peak hour. The existing traffic signal timing at the Keats Avenue (CSAH 19) intersection with the South I-94 Ramps should be monitored and may need to be adjusted in the future in order to minimize the likelihood of the vehicular queues of this heavy eastbound to southbound movement from spilling beyond the existing dual right-turn lanes and blocking access to the eastbound shared left-turn/through lane during the p.m. peak hour. The LOS results for the year 2018 no-build conditions are provided in Appendix C.

Year 2018 Full Build-Out Conditions

A year 2018 full build-out analysis was conducted in order to determine how the existing roadway system can accommodate the proposed development-related traffic volumes. It should be noted that the year 2018 full build-out scenario assumes the existing roadway system and intersection traffic control at the key study intersections with the exception of the new intersection of Keats Avenue (CSAH 19) with 5th Street.

For the purposes of the year 2018 full build-out analysis, the following lane configuration and traffic control assumptions where included at the Keats Avenue (CSAH 19) intersection with 5th Street:

<u>Assumptions for the Keats Avenue (CSAH 19)/5th Street Intersection:</u>

- Northbound Keats Avenue (CSAH 19) Approach:
  - Free-flow
  - Three (3) approach lanes (consisting of 1 – left-turn lane & 2 – through lanes)
- Southbound Keats Avenue (CSAH 19) Approach:
  - Free-flow
  - Three (3) approach lanes (consisting of 2 – through lanes & 1 – right-turn lane)
- Eastbound 5th Street Approach:
  - Stop-Controlled
  - Two (2) approach lanes (consisting of 1 – left-turn lane & 1 – right-turn lane)

The results of the year 2018 full build-out analysis are shown in Table 5. As shown in Table 5, all intersections are expected to continue to operate at acceptable LOS C or better during the peak hours under the year 2018 full build-out conditions with the existing geometrics and signal timing, and the proposed 5th Street.

Table 5
Year 2018 Full Build-Out Peak Hour Capacity Analysis
Level of Service Results

Intersection	Intersection Control	Level of Service [(1)]	
		A.M. Peak	P.M. Peak
Keats Avenue (CSAH 19) at 10th Street (CSAH 10)	All-Way Stop	A / *B*	A / *B*
Keats Avenue (CSAH 19) at 5th Street	Keats Ave. – Free Flow 5th Street – Stop	A / *A*	A / *A*
Keats Avenue (CSAH 19) at Hudson Boulevard	Keats Ave. – Free Flow Hudson Blvd. – Stop	A / *B*	A / *C*
Keats Avenue (CSAH 19) at I-94 North Ramps	Traffic Signal	C	C
Keats Avenue (CSAH 19) at I-94 South Ramps	Traffic Signal	C	C
Inwood Avenue (CSAH 13) at Hudson Boulevard	Traffic Signal	B	C

[(1)]For signalized intersections, the letter reported represents the LOS for the entire intersection. For unsignalized intersections, the first letter reported is the LOS of the entire intersection, while the second letter (in italics) is the LOS of the worst operating approach.

Similar to the no-build conditions, a review of the year 2018 full build-out conditions vehicular queues revealed that the same minor queuing issues reported on the southbound approach of Inwood Avenue (CSAH 13) at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard, and the eastbound approach of the I-94 South Ramps at the Keats Avenue (CSAH 19) intersection during the p.m. peak hour. Under year 2018 no-build conditions, the vehicular queues from the southbound through movement at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard will back up past the existing left- and right-turn lanes approximately 8 percent of the p.m. peak hour (versus 6 percent under no-build conditions); and the eastbound right-turning vehicles from I-94 to southbound CSAH 19 will continue to spill-out beyond the existing eastbound dual right-turn lane approximately 1 percent of the p.m. peak hour. As previously mentioned, the existing lagging left-turn signal phase at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard helps to minimize the negative operational impacts of this occasional blockage of the southbound turn lanes. The existing traffic signal timing at the Keats Avenue (CSAH 19) intersection with the South I-94 Ramps should continue to be monitored and adjusted as needed in order to minimize the likelihood of the vehicular queues of this heavy eastbound to southbound movement from spilling beyond the existing dual right-turn lanes and blocking access to the eastbound shared left-turn/through lane during the p.m. peak hour. The LOS results for the year 2018 full build-out conditions are provided in Appendix D.

Secondary Access to Inwood Avenue (CSAH 13) or Hudson Boulevard

As mentioned previously, the proposed Savona residential development will construct a portion of 5th Street from Keats Avenue (CSAH 19) to the western limits of their site. As the remaining available land north of I-94 between Keats Avenue (CSAH 19) and Inwood Avenue (CSAH 13 develops, a secondary access may be needed to either Inwood Avenue (CSAH 13) to the west or Hudson Boulevard to the south, in order to relieve pressure on the proposed Keats Avenue (CSAH 19) intersection with 5th Street. Consistent with the City's transportation plan, the Inwood Avenue (CSAH 13) connection will ultimately be completed as the remaining land to the west develops. Therefore, this additional analysis will focus on identifying when a secondary access to 5th Street via Hudson Boulevard may be needed based on the future traffic operations at the Keats Avenue (CSAH 19) intersection with 5th Street.

The following methodology was utilized to estimate when a secondary access to 5th Street via Hudson Boulevard may be needed based on the future traffic operations at the Keats Avenue (CSAH 19) intersection with 5th Street. The forecast year 2018 full build-out traffic volumes were used as a base. The traffic volumes in/out of 5th Street were increased in 10 percent increments until the traffic operations at the Keats Avenue (CSAH 19) intersection with 5th Street falls below acceptable LOS D. The resultant increase in traffic will then be documented, and an equivalent build-out percentage of the available land within TAA 1229C be identified.

Based on the results of this iterative analysis, the Keats Avenue (CSAH 19) intersection with 5th Street can accommodate approximately 200 percent additional traffic to/from 5th Street than the year 2018 full build-out traffic volumes before the traffic operations of the eastbound left-turn from 5th Street to northbound Keats Avenue (CSAH 19) breakdowns during the p.m. peak hour and delays for this movement become unacceptable. This 200 percent additional traffic during the p.m. peak period corresponds to approximately 500 additional single-family homes build-out of the available land in TAZ 1229C. Since the City of Lake Elmo's transportation plan assumed 796 households in TAZ 1229C by the year 2030, and the proposed Savona development accounts for 312 of the assumed 796 dwelling units, a total of 484 households remain in the TAZ's allotment before it exceeds the development level assumed in the comprehensive plan. These 484 dwelling units are approximately equal to the equivalent number of additional single-family homes that will generate enough traffic to either trigger the need for a secondary access to 5th Street, or require improvements to the Keats Avenue (CSAH 19) intersection with 5th Street. Therefore, the intersection of Keats Avenue (CSAH 19) and 5th Street can accommodate 100 percent (or the full build-out) of the assumed 796 dwelling units in TAZ 1229C before a secondary access is needed to relieve pressure on the intersection.

It should be noted that this analysis looked exclusively at traffic operations as a trigger for the future need of a potential secondary access to serve the development along 5th Street. Other items such as fire, life, and public safety issues will also need to be considered when considering the timing/need for a secondary access.

Conclusions and Recommendations

Based on our review of the proposed Savona residential development, we offer the following conclusions and recommendations for your consideration:

- All of the key intersections are currently operating at an acceptable LOS C or better during the a.m. and p.m. peak hours, with the existing traffic control and geometric layouts.
- The proposed Savona residential development will consist of 190 single-family and 122 multi-family lots. It is anticipated that the proposed Savona residential development will be fully build-out by the year 2018.
- The proposed Savona development will generate an estimated 2,518 trips on an average weekday, 197 trips during the a.m. peak hour (with 45 inbound and 152 outbound trips), and 253 trips during the p.m. peak hour (with 162 inbound and 91 outbound trips).
- Under year 2018 no-build conditions, all of the key intersections will continue to operate at an acceptable LOS C or better during the a.m. and p.m. peak hours, with the existing traffic control and geometric layouts.
- Under year 2018 full build-out conditions, all of the key intersections will continue to operate at an acceptable LOS C or better during the a.m. and p.m. peak hours, with the existing traffic control and geometric layouts.
- A review of the vehicular queues revealed some minor queuing issues reported on the southbound approach of Inwood Avenue (CSAH 13) at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard; and the eastbound approach of the I-94 South Ramps at the Keats Avenue (CSAH 19) intersection during the p.m. peak hour under the existing, year 2018 no-build, and the year 2018 build conditions. The vehicular queues from the southbound through movement at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard will back up past the existing left- and right-turn lanes approximately 2 to 8 percent of the p.m. peak hour (depending on the analysis year); and the eastbound right-turning vehicles from I-94 to southbound CSAH 19 will continue to spill-out beyond the existing eastbound dual right-turn lane approximately 1 percent of the p.m. peak hour under year 2018 no-build and build conditions.

  The existing lagging left-turn signal phase at the Inwood Avenue (CSAH 13) intersection with Hudson Boulevard helps to minimize the negative operational impacts of the occasional blockage of the southbound turn lanes. The existing traffic signal timing at the Keats Avenue (CSAH 19) intersection with the South I-94 Ramps should be monitored and may need to be adjusted in the future in order to minimize the likelihood of the vehicular queues of this heavy eastbound to southbound movement from spilling beyond the existing dual right-turn lanes and blocking access to the eastbound shared left-turn/through lane during the p.m. peak hour. This potential signal timing adjustment would be needed with or without the proposed Savona development.

- Based on the results of the traffic operations analysis, the intersection of Keats Avenue (CSAH 19) and 5th Street can accommodate 100 percent (or the full build-out) of the ultimate 796 dwelling units assumed by the City's comprehensive plan to be directly served by the proposed east-west collector (5th Street) before a secondary access is needed to relieve pressure on the intersection.

Therefore, the existing roadway system and traffic control will be able to accommodate the proposed Savona residential development, assuming the construction of the proposed 5th Street from Keats Avenue (CSAH 19) to the western limits of the project to provide access in/out of the site.

Attachments: Appendices A – D (Traffic Counts and Detailed Operations Analysis)

cc: Kyle Klatt, Lake Elmo Planning Director
Jack Griffin, Lake Elmo City Engineer
Joe Gustafson, Washington County Transportation Engineer

P:\20121161\docs\Traffic\Report\DRAFT Savona TIS_4-09-2013.docx

Appendix A

Peak Hour Turning Movement Volumes

Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 3
Site Code : 00003001
Start Date : 3/27/2013
Page No : 1

Groups Printed- Unshifted - Bank 1

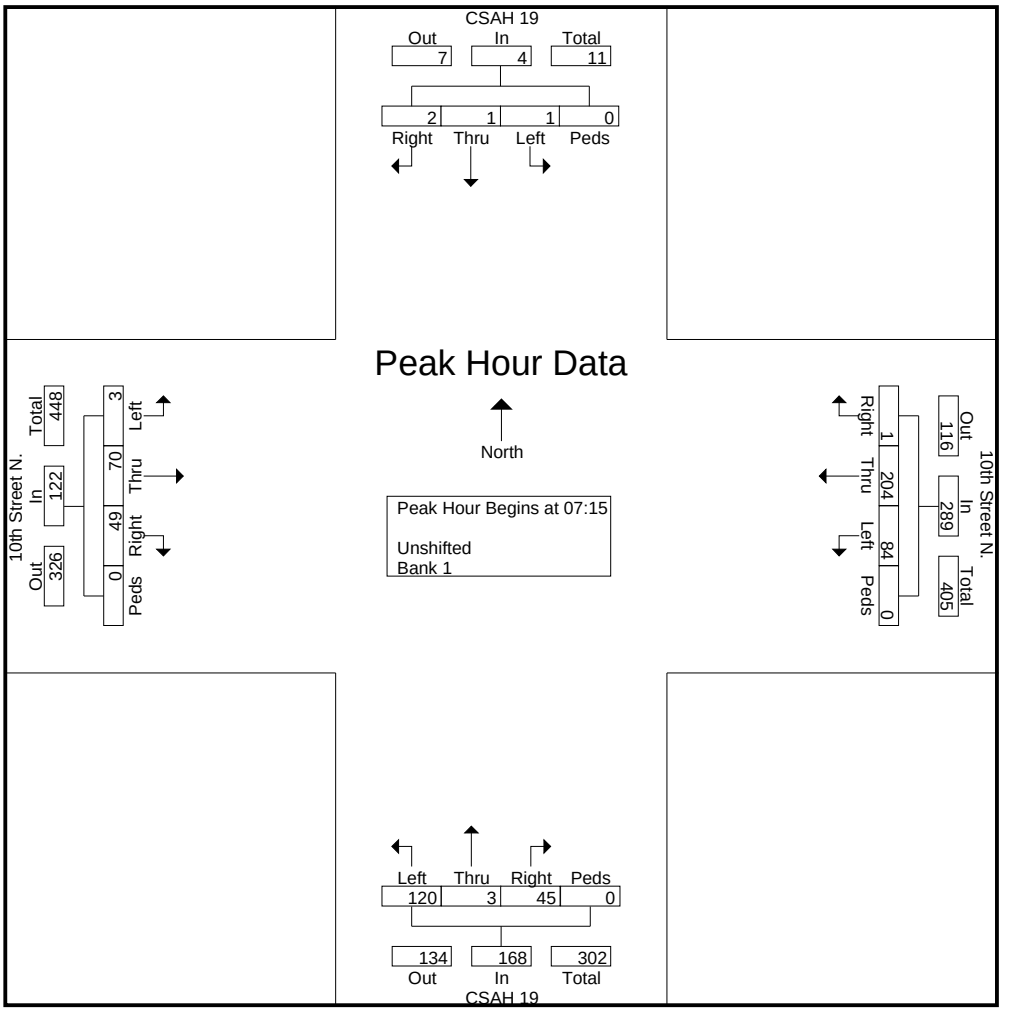
	CSAH 19 Southbound					10th Street N. Westbound					CSAH 19 Northbound					10th Street N. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30	0	0	0	0	0	19	27	0	0	46	15	0	8	0	23	0	12	5	0	17	86
06:45	0	0	0	0	0	13	36	0	0	49	24	0	2	0	26	0	6	9	0	15	90
Total	0	0	0	0	0	32	63	0	0	95	39	0	10	0	49	0	18	14	0	32	176
07:00	0	0	0	0	0	18	39	0	0	57	28	1	5	0	34	1	11	5	0	17	108
07:15	0	1	0	0	1	27	63	0	0	90	31	0	11	0	42	0	21	6	0	27	160
07:30	0	0	0	0	0	17	55	0	0	72	30	1	20	0	51	1	16	11	0	28	151
07:45	0	0	1	0	1	21	58	1	0	80	33	2	10	0	45	1	21	15	0	37	163
Total	0	1	1	0	2	83	215	1	0	299	122	4	46	0	172	3	69	37	0	109	582
08:00	1	0	1	0	2	19	28	0	0	47	26	0	4	0	30	1	12	17	0	30	109
08:15	0	0	1	0	1	17	49	3	0	69	20	0	9	0	29	1	16	12	0	29	128
*** BREAK ***																					
Total	1	0	2	0	3	36	77	3	0	116	46	0	13	0	59	2	28	29	0	59	237
*** BREAK ***																					
16:00	1	0	1	0	2	19	21	0	0	40	24	3	22	0	49	1	36	25	0	62	153
16:15	2	2	1	0	5	10	23	1	0	34	24	5	18	0	47	1	43	38	0	82	168
16:30	2	1	1	0	4	14	37	0	0	51	31	1	34	0	66	4	53	52	1	110	231
16:45	0	4	0	0	4	20	27	0	0	47	26	3	24	1	54	2	60	41	0	103	208
Total	5	7	3	0	15	63	108	1	0	172	105	12	98	1	216	8	192	156	1	357	760
17:00	2	3	0	0	5	15	27	0	0	42	15	5	24	0	44	1	68	41	0	110	201
17:15	2	4	0	1	7	18	28	1	0	47	24	5	27	0	56	2	58	49	0	109	219
17:30	2	2	2	0	6	12	33	1	0	46	22	4	35	0	61	1	61	35	0	97	210
17:45	2	2	4	0	8	11	19	1	0	31	29	1	14	0	44	3	56	27	0	86	169
Total	8	11	6	1	26	56	107	3	0	166	90	15	100	0	205	7	243	152	0	402	799
Grand Total	14	19	12	1	46	270	570	8	0	848	402	31	267	1	701	20	550	388	1	959	2554
Apprch %	30.4	41.3	26.1	2.2		31.8	67.2	0.9	0		57.3	4.4	38.1	0.1		2.1	57.4	40.5	0.1		
Total %	0.5	0.7	0.5	0	1.8	10.6	22.3	0.3	0	33.2	15.7	1.2	10.5	0	27.4	0.8	21.5	15.2	0	37.5	
Unshifted	14	19	12	1	46	270	570	8	0	848	402	31	267	1	701	20	550	388	1	959	2554
% Unshifted	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 3
Site Code : 00003001
Start Date : 3/27/2013
Page No : 2

	CSAH 19 Southbound					10th Street N. Westbound					CSAH 19 Northbound					10th Street N. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	0	**1**	0	0	1	**27**	**63**	0	0	**90**	31	0	11	0	42	0	**21**	6	0	27	160
07:30	0	0	0	0	0	17	55	0	0	72	30	1	**20**	0	**51**	**1**	16	11	0	28	151
07:45	0	0	**1**	0	1	21	58	**1**	0	80	**33**	**2**	10	0	45	1	21	15	0	**37**	**163**
08:00	**1**	0	1	0	**2**	19	28	0	0	47	26	0	4	0	30	1	12	**17**	0	30	109
Total Volume	1	1	2	0	4	84	204	1	0	289	120	3	45	0	168	3	70	49	0	122	583
% App. Total	25	25	50	0		29.1	70.6	0.3	0		71.4	1.8	26.8	0		2.5	57.4	40.2	0		
PHF	.250	.250	.500	.000	.500	.778	.810	.250	.000	.803	.909	.375	.563	.000	.824	.750	.833	.721	.000	.824	.894



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Eden Prairie, MN 55344

File Name : 3
Site Code : 00003001
Start Date : 3/27/2013
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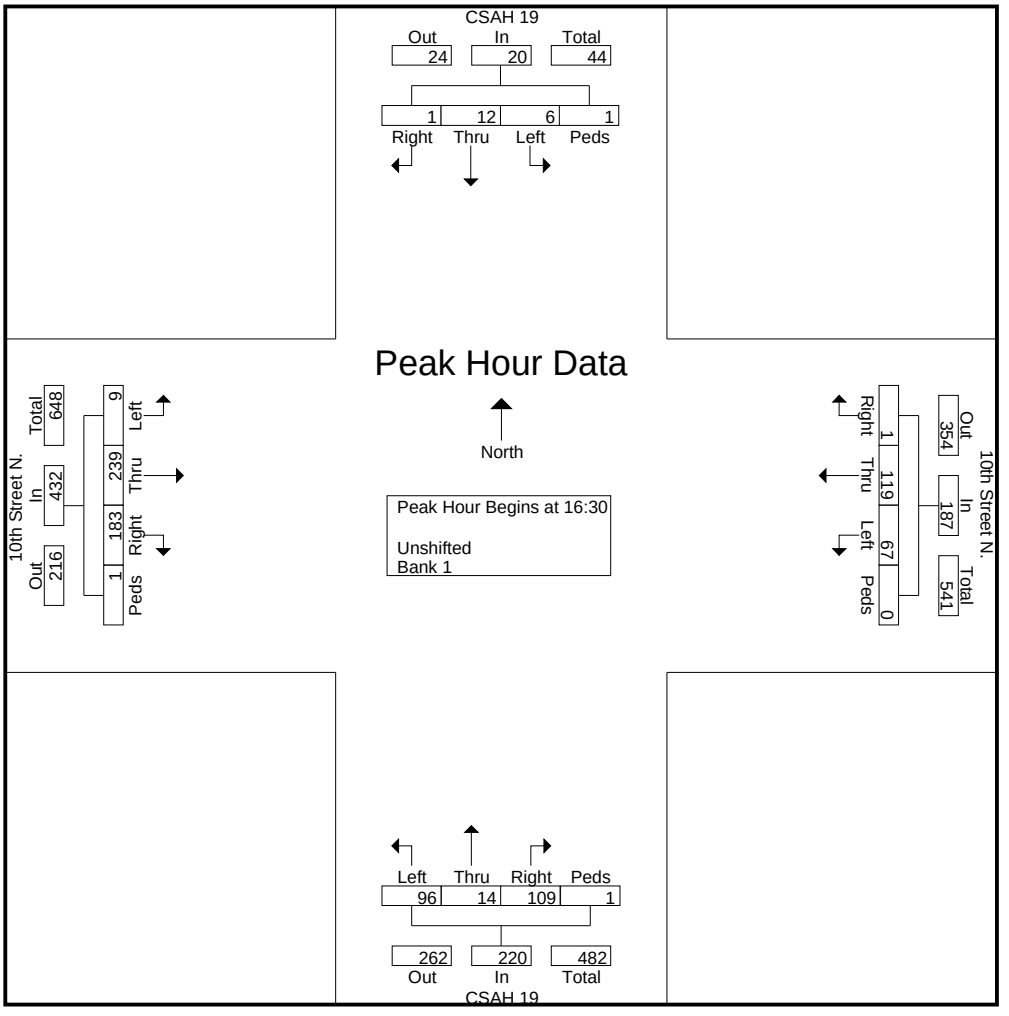
	CSAH 19 Southbound					10th Street N. Westbound					CSAH 19 Northbound					10th Street N. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	**2**	1	**1**	0	4	14	**37**	0	0	**51**	**31**	1	**34**	0	**66**	**4**	53	**52**	**1**	**110**	**231**
16:45	0	**4**	0	0	4	**20**	27	0	0	47	26	3	24	**1**	54	2	60	41	0	103	208
17:00	2	3	0	0	5	15	27	0	0	42	15	**5**	24	0	44	1	**68**	41	0	110	201
17:15	2	4	0	**1**	**7**	18	28	**1**	0	47	24	5	27	0	56	2	58	49	0	109	219
Total Volume	6	12	1	1	20	67	119	1	0	187	96	14	109	1	220	9	239	183	1	432	859
% App. Total	30	60	5	5		35.8	63.6	0.5	0		43.6	6.4	49.5	0.5		2.1	55.3	42.4	0.2		
PHF	.750	.750	.250	.250	.714	.838	.804	.250	.000	.917	.774	.700	.801	.250	.833	.563	.879	.880	.250	.982	.930



Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 1
Site Code : 00001001
Start Date : 3/21/2013
Page No : 1

Groups Printed- Unshifted - Bank 1

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Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30	0	16	3	0	19	24	2	0	0	26	19	20	3	0	42	0	0	2	0	2	89
06:45	0	23	2	0	25	21	7	1	0	29	28	26	4	0	58	0	0	2	0	2	114
Total	0	39	5	0	44	45	9	1	0	55	47	46	7	0	100	0	0	4	0	4	203
07:00	0	30	1	0	31	28	19	0	0	47	23	46	3	0	72	0	2	3	0	5	155
07:15	0	26	2	0	28	39	8	2	1	50	29	30	3	0	62	1	0	2	0	3	143
07:30	0	33	6	0	39	31	7	1	0	39	44	54	3	0	101	0	2	4	0	6	185
07:45	2	45	7	0	54	25	13	2	0	40	40	40	6	0	86	0	1	2	0	3	183
Total	2	134	16	0	152	123	47	5	1	176	136	170	15	0	321	1	5	11	0	17	666
08:00	2	22	3	0	27	28	7	1	0	36	36	25	3	0	64	0	0	4	0	4	131
08:15	0	40	4	0	44	26	11	0	0	37	28	38	4	0	70	1	0	2	0	3	154
*** BREAK ***																					
Total	2	62	7	0	71	54	18	1	0	73	64	63	7	0	134	1	0	6	0	7	285
*** BREAK ***																					
16:00	1	42	2	0	45	12	9	0	0	21	19	59	10	0	88	5	11	28	0	44	198
16:15	2	48	2	0	52	10	1	0	0	11	13	55	6	0	74	4	17	31	0	52	189
16:30	0	43	1	0	44	10	6	0	0	16	14	55	1	0	70	7	13	44	0	64	194
16:45	3	65	4	0	72	13	2	0	0	15	13	57	9	0	79	3	17	44	0	64	230
Total	6	198	9	0	213	45	18	0	0	63	59	226	26	0	311	19	58	147	0	224	811
17:00	1	50	1	0	52	10	2	2	0	14	17	42	9	0	68	7	22	48	0	77	211
17:15	5	80	0	0	85	5	8	1	0	14	16	54	10	0	80	4	20	43	0	67	246
17:30	2	57	1	0	60	10	4	0	0	14	19	55	6	0	80	1	31	27	0	59	213
17:45	2	70	1	0	73	11	8	0	0	19	15	58	10	0	83	3	12	29	0	44	219
Total	10	257	3	0	270	36	22	3	0	61	67	209	35	0	311	15	85	147	0	247	889
Grand Total	20	690	40	0	750	303	114	10	1	428	373	714	90	0	1177	36	148	315	0	499	2854
Apprch %	2.7	92	5.3	0		70.8	26.6	2.3	0.2		31.7	60.7	7.6	0		7.2	29.7	63.1	0		
Total %	0.7	24.2	1.4	0	26.3	10.6	4	0.4	0	15	13.1	25	3.2	0	41.2	1.3	5.2	11	0	17.5	
Unshifted	20	690	40	0	750	303	114	10	1	428	373	714	90	0	1177	36	148	315	0	499	2854
% Unshifted	100	100	100	0	100	100	100	100	100	100	100	100	100	0	100	100	100	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 1
Site Code : 00001001
Start Date : 3/21/2013
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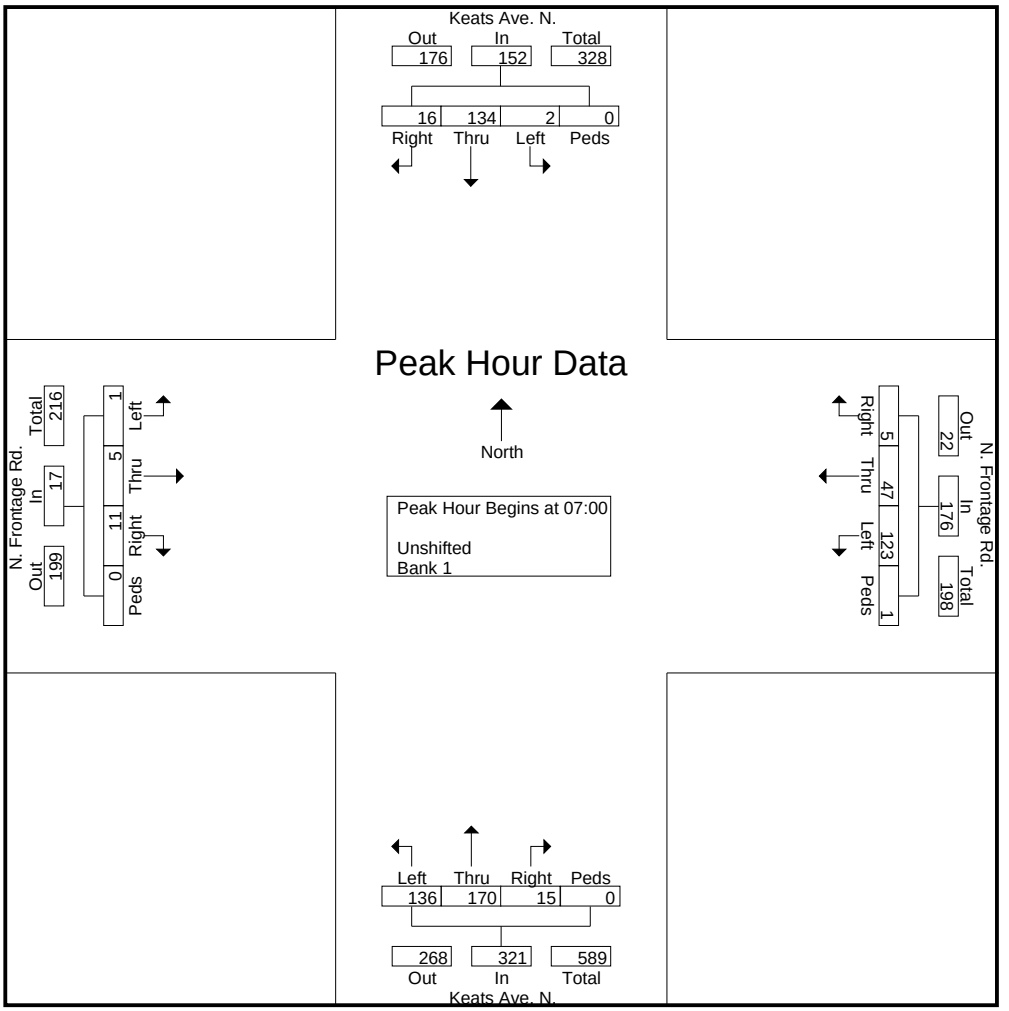
	Keats Ave. N. Southbound					N. Frontage Rd. Westbound					Keats Ave. N. Northbound					N. Frontage Rd. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	30	1	0	31	28	**19**	0	0	47	23	46	3	0	72	0	**2**	3	0	5	155
07:15	0	26	2	0	28	**39**	8	**2**	**1**	**50**	29	30	3	0	62	**1**	0	2	0	3	143
07:30	0	33	6	0	39	31	7	1	0	39	**44**	**54**	3	0	**101**	0	2	**4**	0	**6**	**185**
07:45	**2**	**45**	**7**	0	**54**	25	13	2	0	40	40	40	**6**	0	86	0	1	2	0	3	183
Total Volume	2	134	16	0	152	123	47	5	1	176	136	170	15	0	321	1	5	11	0	17	666
% App. Total	1.3	88.2	10.5	0		69.9	26.7	2.8	0.6		42.4	53	4.7	0		5.9	29.4	64.7	0		
PHF	.250	.744	.571	.000	.704	.788	.618	.625	.250	.880	.773	.787	.625	.000	.795	.250	.625	.688	.000	.708	.900



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7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 1
Site Code : 00001001
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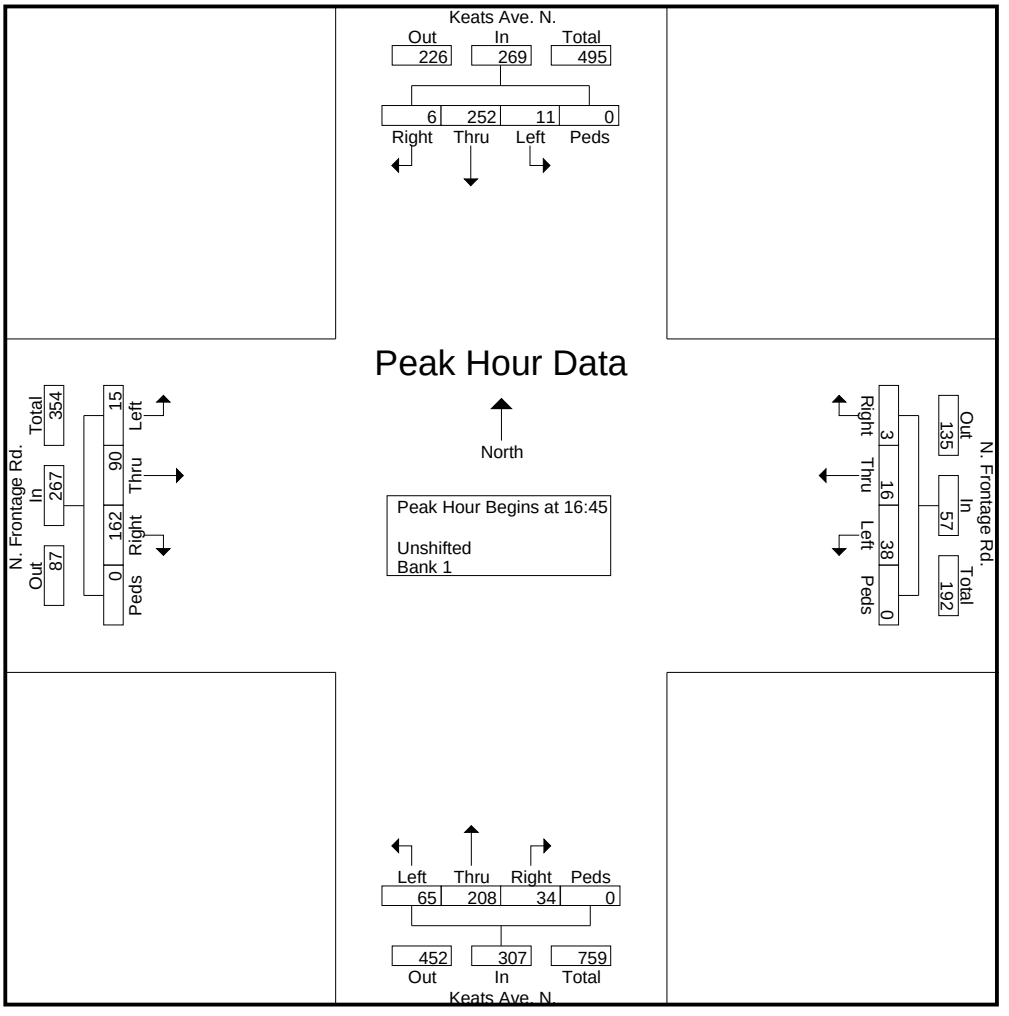
Page No : 3

	Keats Ave. N. Southbound					N. Frontage Rd. Westbound					Keats Ave. N. Northbound					N. Frontage Rd. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:45																					
16:45	3	65	**4**	0	72	**13**	2	0	0	**15**	13	**57**	9	0	79	3	17	44	0	64	230
17:00	1	50	1	0	52	10	2	**2**	0	14	17	42	9	0	68	**7**	22	**48**	0	**77**	211
17:15	**5**	**80**	0	0	**85**	5	**8**	1	0	14	16	54	**10**	0	**80**	4	20	43	0	67	**246**
17:30	2	57	1	0	60	10	4	0	0	14	**19**	55	6	0	80	1	**31**	27	0	59	213
Total Volume	11	252	6	0	269	38	16	3	0	57	65	208	34	0	307	15	90	162	0	267	900
% App. Total	4.1	93.7	2.2	0		66.7	28.1	5.3	0		21.2	67.8	11.1	0		5.6	33.7	60.7	0		
PHF	.550	.788	.375	.000	.791	.731	.500	.375	.000	.950	.855	.912	.850	.000	.959	.536	.726	.844	.000	.867	.915



Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 2
Site Code : 00002001
Start Date : 3/21/2013
Page No : 1

Groups Printed- Unshifted - Bank 1

	Keats Ave. N. Southbound					I-94 WB Off-Ramp Westbound					Keats Ave. N. Northbound					I-94 WB On-Ramp Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30	0	8	33	0	41	20	0	10	0	30	244	31	0	0	275	0	0	0	0	0	346
06:45	0	16	32	0	48	38	0	20	0	58	225	41	0	0	266	0	0	0	0	0	372
Total	0	24	65	0	89	58	0	30	0	88	469	72	0	0	541	0	0	0	0	0	718
07:00	0	11	48	0	59	27	0	19	0	46	284	45	0	0	329	0	0	0	0	0	434
07:15	0	19	50	0	69	35	0	22	0	57	305	44	0	0	349	0	0	0	0	0	475
07:30	0	25	41	0	66	44	0	32	0	76	284	68	0	0	352	0	0	0	0	0	494
07:45	0	37	37	0	74	42	0	34	0	76	277	59	0	0	336	0	0	0	0	0	486
Total	0	92	176	0	268	148	0	107	0	255	1150	216	0	0	1366	0	0	0	0	0	1889
08:00	0	19	37	0	56	50	1	25	1	77	288	38	0	0	326	0	0	0	0	0	459
08:15	0	31	38	0	69	31	0	17	0	48	243	52	0	0	295	0	0	0	0	0	412
*** BREAK ***																					
Total	0	50	75	0	125	81	1	42	1	125	531	90	0	0	621	0	0	0	0	0	871
*** BREAK ***																					
16:00	0	55	16	0	71	43	1	3	0	47	148	87	0	0	235	0	0	0	0	0	353
16:15	0	76	20	0	96	69	0	5	0	74	125	69	0	0	194	0	0	0	0	0	364
16:30	0	77	21	0	98	73	1	12	0	86	158	60	0	0	218	0	0	0	0	0	402
16:45	0	99	17	0	116	74	0	3	0	77	131	75	0	0	206	0	0	0	0	0	399
Total	0	307	74	0	381	259	2	23	0	284	562	291	0	0	853	0	0	0	0	0	1518
17:00	0	91	23	0	114	74	0	5	1	80	168	61	0	0	229	0	0	0	0	0	423
17:15	0	114	12	0	126	75	1	4	0	80	179	74	0	0	253	0	0	0	0	0	459
17:30	0	77	12	0	89	46	0	8	0	54	163	78	1	0	242	0	0	0	0	0	385
17:45	0	90	20	0	110	58	1	8	0	67	174	71	0	0	245	0	0	0	0	0	422
Total	0	372	67	0	439	253	2	25	1	281	684	284	1	0	969	0	0	0	0	0	1689
Grand Total	0	845	457	0	1302	799	5	227	2	1033	3396	953	1	0	4350	0	0	0	0	0	6685
Apprch %	0	64.9	35.1	0		77.3	0.5	22	0.2		78.1	21.9	0	0		0	0	0	0		
Total %	0	12.6	6.8	0	19.5	12	0.1	3.4	0	15.5	50.8	14.3	0	0	65.1	0	0	0	0	0	
Unshifted	0	845	457	0	1302	799	5	227	2	1033	3396	953	1	0	4350	0	0	0	0	0	6685
% Unshifted	0	100	100	0	100	100	100	100	100	100	100	100	100	0	100	0	0	0	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

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Site Code : 00002001
Start Date : 3/21/2013
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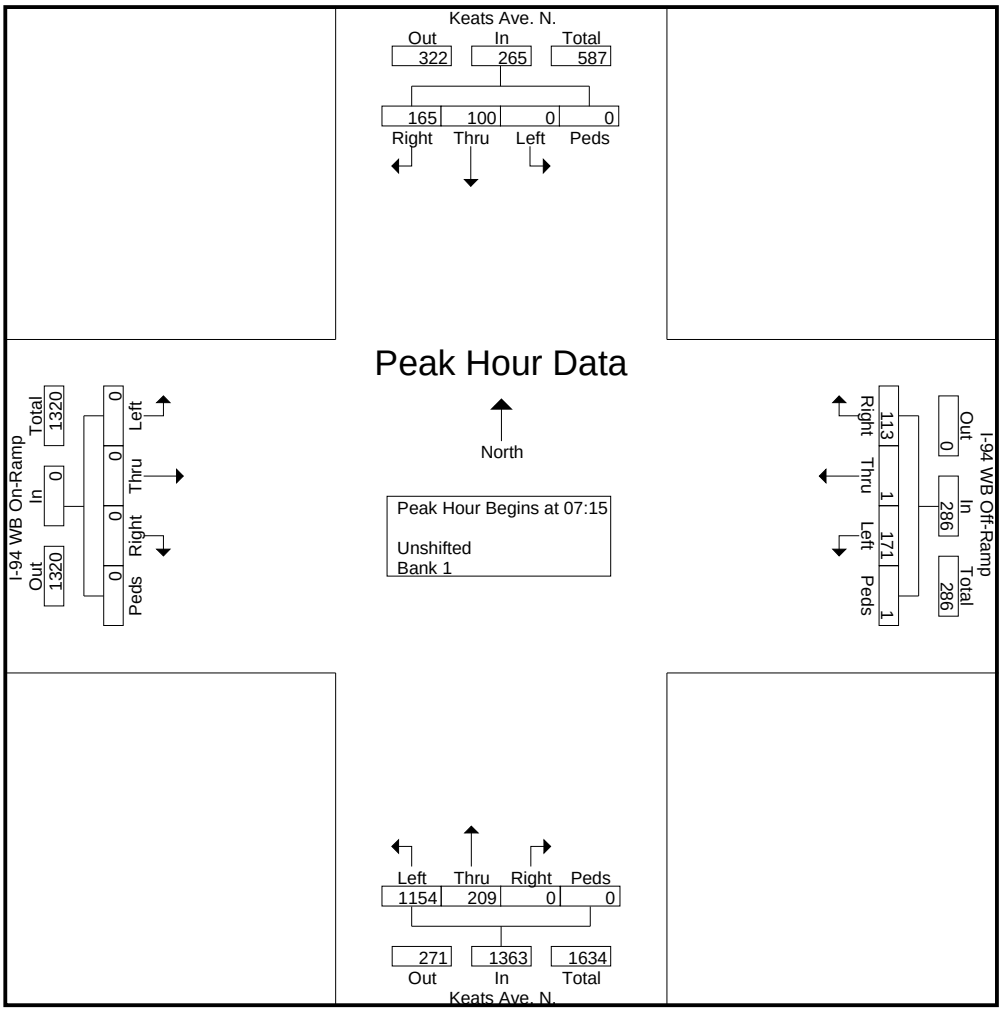
	Keats Ave. N. Southbound					I-94 WB Off-Ramp Westbound					Keats Ave. N. Northbound					I-94 WB On-Ramp Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	0	19	**50**	0	69	35	0	22	0	57	**305**	44	0	0	349	0	0	0	0	0	475
07:30	0	25	41	0	66	44	0	32	0	76	284	**68**	0	0	**352**	0	0	0	0	0	**494**
07:45	0	**37**	37	0	**74**	42	0	**34**	0	76	277	59	0	0	336	0	0	0	0	0	486
08:00	0	19	37	0	56	**50**	**1**	25	**1**	**77**	288	38	0	0	326	0	0	0	0	0	459
Total Volume	0	100	165	0	265	171	1	113	1	286	1154	209	0	0	1363	0	0	0	0	0	1914
% App. Total	0	37.7	62.3	0		59.8	0.3	39.5	0.3		84.7	15.3	0	0		0	0	0	0		
PHF	.000	.676	.825	.000	.895	.855	.250	.831	.250	.929	.946	.768	.000	.000	.968	.000	.000	.000	.000	.000	.969



Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 2
Site Code : 00002001
Start Date : 3/21/2013
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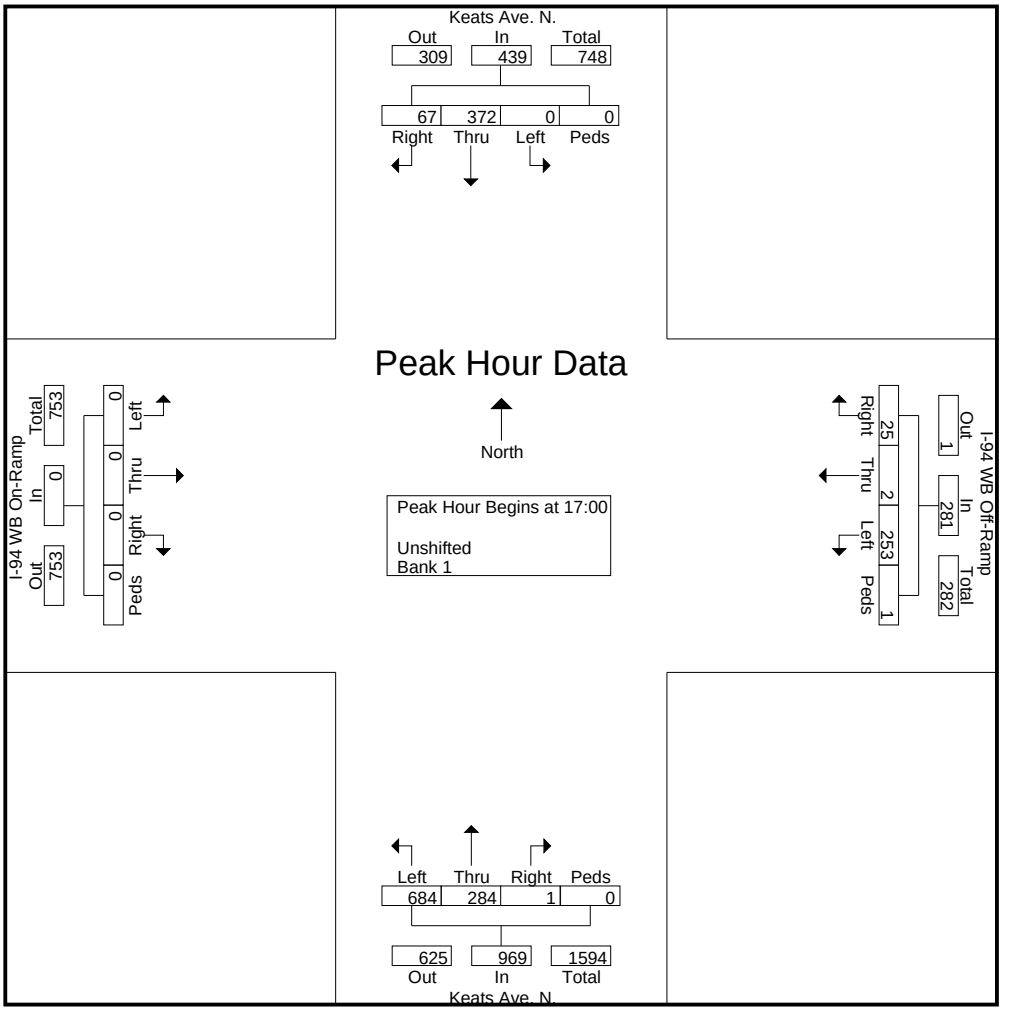
	Keats Ave. N. Southbound					I-94 WB Off-Ramp Westbound					Keats Ave. N. Northbound					I-94 WB On-Ramp Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	0	91	**23**	0	114	74	0	5	**1**	**80**	168	61	0	0	229	0	0	0	0	0	423
17:15	0	**114**	12	0	**126**	**75**	**1**	4	0	80	**179**	74	0	0	**253**	0	0	0	0	0	**459**
17:30	0	77	12	0	89	46	0	**8**	0	54	163	**78**	**1**	0	242	0	0	0	0	0	385
17:45	0	90	20	0	110	58	1	8	0	67	174	71	0	0	245	0	0	0	0	0	422
Total Volume	0	372	67	0	439	253	2	25	1	281	684	284	1	0	969	0	0	0	0	0	1689
% App. Total	0	84.7	15.3	0		90	0.7	8.9	0.4		70.6	29.3	0.1	0		0	0	0	0		
PHF	.000	.816	.728	.000	.871	.843	.500	.781	.250	.878	.955	.910	.250	.000	.958	.000	.000	.000	.000	.000	.920



Appendix B

Traffic Operations Analysis Summary – Existing Conditions

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
7	I-94 South Ramps & CSAH 19 (Signalized -- Cycle Length: 120)													
	Lanes	<↑		→→					↑↑	→	←	↑↑		
	Volume	56	12	616					1,306	106	5	266		
	Phasing			Perm						Perm	Prot			
	SimTraffic Delay	52.3		14.1					10.5	2.4	93.6	4.1		
	SimTraffic LOS	D		B					B	A	F	A		B
	Storage / *Link Dist.	*1,478		540					*837	400	460			
	SimTraffic 95th Queue	110		108					321		25			
	Queue Block Time (%)													
8	I-94 North Ramps & CSAH 19 (Signalized -- Cycle Length: 120)													
	Lanes				←	<↑	→	←←	↑↑			↑↑	→	
	Volume				171	1	113	1,154	208			100	166	
	Phasing				Perm		Perm	Prot					Perm	
	SimTraffic Delay				48.1	19.1	7.0	16.6	6.0			34.4	24.0	
	SimTraffic LOS				D	B	A	B	A			C	C	B
	Storage / *Link Dist.				470	*1,374	470	485	*768			*581	300	
	SimTraffic 95th Queue				121	121	46	271	59			71	147	
	Queue Block Time (%)													
39	Hudson Blvd. & CSAH 19 (Unsignalized)													
	Lanes	<↑>			<↑>			←	↑↑	→	←	↑↑	→	
	Volume	1	5	11	122	47	5	136	170	15	2	133	16	
	Sign Control	Stop			Stop				Free			Free		
	SimTraffic Delay	11.0			14.3			2.9	1.3	0.9	2.6	1.1	0.1	
	SimTraffic LOS	B			B			A	A	A	A	A	A	A
	Storage / *Link Dist.	*2,650			*2,879			300		300	300	*823	300	
	SimTraffic 95th Queue	21			83			44			3	3		
	Queue Block Time (%)													
42	10th Street N. & CSAH 19 (All-way stop)													
	Lanes	<↑		→	<↑		→	←	↑	→	←	↑>		
	Volume	3	70	55	95	204	1	126	3	47	1	1	2	
	Sign Control	Stop			Stop				Stop			Stop		
	SimTraffic Delay	9.7		4.8	12.3		7.0	4.3	9.5	1.5	5.2	9.9		
	SimTraffic LOS	A		A	B		A	A	A	A	A	A		A
	Storage / *Link Dist.	*2,670		300	*2,159		300	300	*3,518	*3,518	300	*2,139		
	SimTraffic 95th Queue	39		40	72		8	45	12	28	8	13		
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
1	4th St & Inwood Ave #13 (Signalized -- Cycle Length: 110)													
	Lanes	←	↑	→	←←	↑	→	←←	↑↑	→	←	↑↑	→	
	Volume	13	28	101	57	144	30	176	561	182	20	402	55	
	Phasing	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
	SimTraffic Delay	59.3	43.4	5.2	52.0	39.2	9.9	30.0	5.1	2.5	63.2	15.9	8.5	
	SimTraffic LOS	E	D	A	D	D	A	C	A	A	E	B	A	B
	Storage / *Link Dist.	215	*1,451	*1,451	250	*1,258	250	200	*574	300	200	*1,381	200	
	SimTraffic 95th Queue	38	54	56	53	154	29	110	85	23	57	145	39	
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
7	I-94 South Ramps & CSAH 19 (Signalized -- Cycle Length: 150)													
	Lanes	<↑		→→					↑↑	→	←	↑↑		
	Volume	153	16	1,220					815	240	39	592		
	Phasing			Perm						Perm	Prot			
	SimTraffic Delay	71.6		26.4					10.2	4.2	119.0	6.3		
	SimTraffic LOS	E		C					B	A	F	A		B
	Storage / *Link Dist.	*1,479		540					*837	400	460	*768		
	SimTraffic 95th Queue	247		355					271		88	11		
	Queue Block Time (%)													
8	I-94 North Ramps & CSAH 19 (Signalized -- Cycle Length: 150)													
	Lanes				←	<↑	→	←←	↑↑			↑↑	→	
	Volume				253	2	25	684	284			378	68	
	Phasing				Perm		Perm	Prot					Perm	
	SimTraffic Delay				58.0	84.9	6.3	10.8	8.6			45.8	13.1	
	SimTraffic LOS				E	F	A	B	A			D	B	C
	Storage / *Link Dist.				470	*1,374	470	485	*768			*588	300	
	SimTraffic 95th Queue				167	167	28	167	92			203	62	
	Queue Block Time (%)													
39	Hudson Blvd. & CSAH 19 (Unsignalized)													
	Lanes	<↑>			<↑>			←	↑↑	→	←	↑↑	→	
	Volume	15	90	160	37	16	3	65	210	34	11	249	6	
	Sign Control	Stop			Stop				Free			Free		
	SimTraffic Delay	15.6			11.1			4.1	3.0	2.0	1.0	1.1	0.1	
	SimTraffic LOS	C			B			A	A	A	A	A	A	A
	Storage / *Link Dist.	*2,603			*2,882			300		300	300	*812	300	
	SimTraffic 95th Queue	107			38			43		10	8	3	3	
	Queue Block Time (%)													
43	10th Street N. & CSAH 19 (All-way stop)													
	Lanes	<↑		→	<↑		→	←	↑	→	←	↑>		
	Volume	9	239	186	68	119	1	100	15	113	6	12	1	
	Sign Control	Stop			Stop				Stop			Stop		
	SimTraffic Delay	13.7		7.0	10.6		3.4	5.9	10.8	4.7	6.1	8.2		
	SimTraffic LOS	B		A	B		A	A	B	A	A	A		A
	Storage / *Link Dist.	*2,627		300	*2,215		300	300	*3,549	*3,549	300	*2,130		
	SimTraffic 95th Queue	65		57	49		3	56	25	57	19	26		
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
1	4th St & Inwood Ave #13 (Signalized -- Cycle Length: 140)													
	Lanes	←	↑	→	←←	↑	→	←←	↑↑	→	←	↑↑	→	
	Volume	60	85	359	197	49	54	125	778	110	36	751	39	
	Phasing	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
	SimTraffic Delay	57.3	57.8	23.3	65.9	60.9	14.3	44.9	9.3	4.3	82.4	19.0	8.4	
	SimTraffic LOS	E	E	C	E	E	B	D	A	A	F	B	A	C
	Storage / *Link Dist.	215	*1,451	*1,451	250	*1,258	250	200	*574	300	200	*1,381	200	
	SimTraffic 95th Queue	103	125	258	141	92	46	109	135	26	108	252	69	
	Queue Block Time (%)											2		

Appendix C

Traffic Operations Analysis Summary – Year 2018 No-Build Conditions

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
7	I-94 South Ramps & CSAH 19 (Signalized -- Cycle Length: 120)													
	Lanes	<↑		→→					↑↑	→	←	↑↑		
	Volume	61	13	671					1,424	116	5	290		
	Phasing			Perm						Perm	Prot			
	SimTraffic Delay	58.3		16.9					14.9	2.6	95.6	4.2		
	SimTraffic LOS	E		B					B	A	F	A		B
	Storage / *Link Dist.	*1,478		540					*837	400	460	*768		
	SimTraffic 95th Queue	123		130					457		21	7		
	Queue Block Time (%)													
8	I-94 North Ramps & CSAH 19 (Signalized -- Cycle Length: 120)													
	Lanes				←	<↑	→	←←	↑↑			↑↑	→	
	Volume				186	1	123	1,258	227			109	181	
	Phasing				Perm		Perm	Prot					Perm	
	SimTraffic Delay				48.2	54.2	7.2	19.0	7.5			34.3	24.1	
	SimTraffic LOS				D	D	A	B	A			C	C	C
	Storage / *Link Dist.				470	*1,374	470	485	*768			*581	300	
	SimTraffic 95th Queue				131	131	45	302	77			71	157	
	Queue Block Time (%)													
39	Hudson Blvd. & CSAH 19 (Unsignalized)													
	Lanes	<↑>			<↑>			←	↑↑	→	←	↑↑	→	
	Volume	1	5	12	133	51	5	148	185	16	2	145	17	
	Sign Control	Stop			Stop				Free			Free		
	SimTraffic Delay	9.6			14.8			3.1	1.7	1.0	0.1	1.1	0.1	
	SimTraffic LOS	A			B			A	A	A	A	A	A	A
	Storage / *Link Dist.	*2,650			*2,879			300		300	300		300	
	SimTraffic 95th Queue	20			93			46						
	Queue Block Time (%)													
42	10th Street N. & CSAH 19 (All-way stop)													
	Lanes	<↑		→	<↑		→	←	↑	→	←	↑>		
	Volume	3	76	60	104	222	1	137	3	51	1	1	2	
	Sign Control	Stop			Stop				Stop			Stop		
	SimTraffic Delay	9.9		4.7	13.0		7.5	5.2	8.8	1.7	3.7	8.1		
	SimTraffic LOS	A		A	B		A	A	A	A	A	A		A
	Storage / *Link Dist.	*2,670		300	*2,159		300	300	*3,518	*3,518	300	*2,139		
	SimTraffic 95th Queue	42		42	74		5	51	11	30	7	13		
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
1	4th St & Inwood Ave #13 (Signalized -- Cycle Length: 110)													
	Lanes	←	↑	→	←←	↑	→	←←	↑↑	→	←	↑↑	→	
	Volume	13	28	101	57	144	30	176	561	182	20	402	55	
	Phasing	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
	SimTraffic Delay	61.0	46.3	5.1	52.5	42.0	13.2	29.6	5.8	3.3	50.7	17.2	8.8	
	SimTraffic LOS	E	D	A	D	D	B	C	A	A	D	B	A	B
	Storage / *Link Dist.	215	*1,451	*1,451	250	*1,258	250	200	*574	300	200	*1,381	200	
	SimTraffic 95th Queue	45	52	57	59	176	34	110	103	23	51	160	42	
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
7	I-94 South Ramps & CSAH 19 (Signalized -- Cycle Length: 150)													
	Lanes	<↑		→→					↑↑	→	←	↑↑		
	Volume	167	17	1,330					888	262	43	645		
	Phasing			Perm						Perm	Prot			
	SimTraffic Delay	73.6		47.3					11.0	4.6	118.1	6.7		
	SimTraffic LOS	E		D					B	A	F	A		C
	Storage / *Link Dist.	*1,479		540					*837	400	460	*768		
	SimTraffic 95th Queue	661		589					323		93	23		
	Queue Block Time (%)			1										
8	I-94 North Ramps & CSAH 19 (Signalized -- Cycle Length: 150)													
	Lanes				←	<↑	→	←←	↑↑			↑↑	→	
	Volume				276	2	27	746	310			412	74	
	Phasing				Perm		Perm	Prot					Perm	
	SimTraffic Delay				60.2	55.3	6.4	11.3	9.1			49.2	18.0	
	SimTraffic LOS				E	E	A	B	A			D	B	C
	Storage / *Link Dist.				470	*1,374	470	485	*768			*588	300	
	SimTraffic 95th Queue				176	176	29	184	106			230	70	
	Queue Block Time (%)													
39	Hudson Blvd. & CSAH 19 (Unsignalized)													
	Lanes	<↑>			<↑>			←	↑↑	→	←	↑↑	→	
	Volume	16	98	174	40	17	3	71	229	37	12	271	7	
	Sign Control	Stop			Stop				Free			Free		
	SimTraffic Delay	17.3			11.6			4.9	3.1	1.8	0.9	1.4		
	SimTraffic LOS	C			B			A	A	A	A	A	A	A
	Storage / *Link Dist.	*2,603			*2,882			300		300	300		300	
	SimTraffic 95th Queue	113			48			45		8	10			
	Queue Block Time (%)													
43	10th Street N. & CSAH 19 (All-way stop)													
	Lanes	<↑		→	<↑		→	←	↑	→	←	↑>		
	Volume	10	261	203	74	130	1	109	16	123	7	13	1	
	Sign Control	Stop			Stop				Stop			Stop		
	SimTraffic Delay	14.8		7.6	11.4		5.8	6.7	10.4	6.2	6.7	8.3		
	SimTraffic LOS	B		A	B		A	A	B	A	A	A		A
	Storage / *Link Dist.	*2,627		300	*2,215		300	300	*3,549	*3,549	300	*2,130		
	SimTraffic 95th Queue	78		57	58		9	61	26	70	21	27		
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
1	4th St & Inwood Ave #13 (Signalized -- Cycle Length: 140)													
	Lanes	←	↑	→	←←	↑	→	←←	↑↑	→	←	↑↑	→	
	Volume	65	93	391	215	53	59	136	848	120	39	819	43	
	Phasing	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
	SimTraffic Delay	57.3	54.0	30.4	64.0	56.2	15.1	44.8	11.9	4.8	71.5	24.6	8.7	
	SimTraffic LOS	E	D	C	E	E	B	D	B	A	E	C	A	C
	Storage / *Link Dist.	215	*1,451	*1,451	250	*1,258	250	200	*574	300	200	*1,381	200	
	SimTraffic 95th Queue	120	130	350	156	86	47	118	163	35	120	322	67	
	Queue Block Time (%)											6		

Appendix D

Traffic Operations Analysis Summary – Year 2018 Build Conditions

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
7	I-94 South Ramps & CSAH 19 (Signalized -- Cycle Length: 120)													
	Lanes	<↑		→→					↑↑	→	←	↑↑		
	Volume	79	13	671					1,428	116	35	305		
	Phasing			Perm						Perm	Prot			
	SimTraffic Delay	59.9		16.9					27.3	3.1	86.2	4.4		
	SimTraffic LOS	E		B					C	A	F	A		C
	Storage / *Link Dist.	*1,478		540					*837	400	460	*768		
	SimTraffic 95th Queue	148		121					867		78	12		
	Queue Block Time (%)								1					
8	I-94 North Ramps & CSAH 19 (Signalized -- Cycle Length: 120)													
	Lanes				←	<↑	→	←←	↑↑			↑↑	→	
	Volume				186	1	131	1,258	249			154	242	
	Phasing				Perm		Perm	Prot					Perm	
	SimTraffic Delay				48.6	46.4	7.4	19.7	8.9			36.0	27.0	
	SimTraffic LOS				D	D	A	B	A			D	C	C
	Storage / *Link Dist.				470	*1,374	470	485	*768			*581	300	
	SimTraffic 95th Queue				122	122	48	294	98			95	191	
	Queue Block Time (%)													
34	5th Street & CSAH 19 (Unsignalized)													
	Lanes	←		→				←	↑↑			↑↑	→	
	Volume	23		129				38	191			164	7	
	Sign Control	Stop							Free			Free		
	SimTraffic Delay	8.5		3.0				1.3	0.4			1.5	1.0	
	SimTraffic LOS	A		A				A	A			A	A	A
	Storage / *Link Dist.	300		*1,829				300					300	
	SimTraffic 95th Queue	35		43				27						
	Queue Block Time (%)													
39	Hudson Blvd. & CSAH 19 (Unsignalized)													
	Lanes	<↑>			<↑>			←	↑↑	→	←	↑↑	→	
	Volume	8	5	12	133	51	5	148	216	16	2	251	40	
	Sign Control	Stop			Stop				Free			Free		
	SimTraffic Delay	15.0			23.0			4.8	1.8	0.7	1.1	1.5	0.5	
	SimTraffic LOS	B			C			A	A	A	A	A	A	A
	Storage / *Link Dist.	*2,650			*2,879			300		300	300	*818	300	
	SimTraffic 95th Queue	27			148			63			3	3	8	
	Queue Block Time (%)													
42	10th Street N. & CSAH 19 (All-way stop)													
	Lanes	<↑		→	<↑		→	←	↑	→	←	↑>		
	Volume	3	76	65	106	222	1	152	3	59	1	1	2	
	Sign Control	Stop			Stop				Stop			Stop		
	SimTraffic Delay	9.6		4.7	12.9		9.5	5.4	8.4	1.6	5.3	6.6		
	SimTraffic LOS	A		A	B		A	A	A	A	A	A		A
	Storage / *Link Dist.	*2,670		300	*2,159		300	300	*3,512	*3,512	300	*2,139		
	SimTraffic 95th Queue	38		43	77		7	55	11	27	6	12		
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
1	4th St & Inwood Ave #13 (Signalized -- Cycle Length: 110)													
	Lanes	←	↑	→	←←	↑	→	←←	↑↑	→	←	↑↑	→	
	Volume	14	32	110	77	162	36	192	611	203	23	438	60	
	Phasing	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
	SimTraffic Delay	54.7	49.6	6.0	49.8	39.7	10.9	30.2	5.7	2.8	56.8	18.0	8.8	
	SimTraffic LOS	D	D	A	D	D	B	C	A	A	E	B	A	B
	Storage / *Link Dist.	215	*1,451	*1,451	250	*1,258	250	200	*574	300	200	*1,381	200	
	SimTraffic 95th Queue	41	60	61	62	165	35	109	101	23	66	159	41	
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
7	I-94 South Ramps & CSAH 19 (Signalized -- Cycle Length: 150)													
	Lanes	<↑		→→					↑↑	→	←	↑↑		
	Volume	232	17	1,330					904	262	61	654		
	Phasing			Perm						Perm	Prot			
	SimTraffic Delay	81.7		44.4					11.9	4.7	118.4	7.0		
	SimTraffic LOS	F		D					B	A	F	A		C
	Storage / *Link Dist.	*1,479		540					*837	400	460	*768		
	SimTraffic 95th Queue	742		528					381		122	22		
	Queue Block Time (%)			1										
8	I-94 North Ramps & CSAH 19 (Signalized -- Cycle Length: 150)													
	Lanes				←	<↑	→	←←	↑↑			↑↑	→	
	Volume				276	2	60	745	391			439	109	
	Phasing				Perm		Perm	Prot					Perm	
	SimTraffic Delay				60.1	56.0	7.5	10.4	10.7			51.5	18.2	
	SimTraffic LOS				E	E	A	B	B			D	B	C
	Storage / *Link Dist.				470	*1,374	470	485	*768			*588	300	
	SimTraffic 95th Queue				186	186	42	173	161			248	87	
	Queue Block Time (%)													
34	5th Street & CSAH 19 (Unsignalized)													
	Lanes	←		→				←	↑↑			↑↑	→	
	Volume	14		77				138	248			290	24	
	Sign Control	Stop							Free			Free		
	SimTraffic Delay	12.4		2.7				3.9	0.8			1.6	1.0	
	SimTraffic LOS	B		A				A	A			A	A	A
	Storage / *Link Dist.	300		*1,815				300					300	
	SimTraffic 95th Queue	30		34				63					5	
	Queue Block Time (%)													
39	Hudson Blvd. & CSAH 19 (Unsignalized)													
	Lanes	<↑>			<↑>			←	↑↑	→	←	↑↑	→	
	Volume	40	98	174	40	17	3	71	343	37	12	334	21	
	Sign Control	Stop			Stop				Free			Free		
	SimTraffic Delay	21.1			12.8			5.3	3.4	2.0	3.8	1.6	0.3	
	SimTraffic LOS	C			B			A	A	A	A	A	A	A
	Storage / *Link Dist.	*2,603			*2,882			300	*588	300	300		300	
	SimTraffic 95th Queue	145			38			44	3	9	16		3	
	Queue Block Time (%)													
43	10th Street N. & CSAH 19 (All-way stop)													
	Lanes	<↑		→	<↑		→	←	↑	→	←	↑>		
	Volume	10	261	219	82	130	1	118	16	129	7	13	1	
	Sign Control	Stop			Stop				Stop			Stop		
	SimTraffic Delay	15.1		7.9	11.4		5.2	6.4	8.8	5.1	6.3	8.1		
	SimTraffic LOS	C		A	B		A	A	A	A	A	A		A
	Storage / *Link Dist.	*2,627		300	*2,215		300	300	*3,542	*3,542	300	*2,130		
	SimTraffic 95th Queue	77		64	62		4	58	25	60	20	24		
	Queue Block Time (%)													

Node	Intersection	Eastbound			Westbound			Northbound			Southbound			Overall
1	4th St & Inwood Ave #13 (Signalized -- Cycle Length: 140)													
	Lanes	←	↑	→	←←	↑	→	←←	↑↑	→	←	↑↑	→	
	Volume	65	98	391	224	56	61	136	848	136	42	819	43	
	Phasing	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
	SimTraffic Delay	54.2	50.6	28.3	67.5	62.0	16.4	41.7	13.3	5.9	74.8	25.6	9.2	
	SimTraffic LOS	D	D	C	E	E	B	D	B	A	E	C	A	C
	Storage / *Link Dist.	215	*1,451	*1,451	250	*1,258	250	200	*574	300	200	*1,381	200	
	SimTraffic 95th Queue	110	136	311	165	99	49	112	179	47	100	321	34	
	Queue Block Time (%)											8		