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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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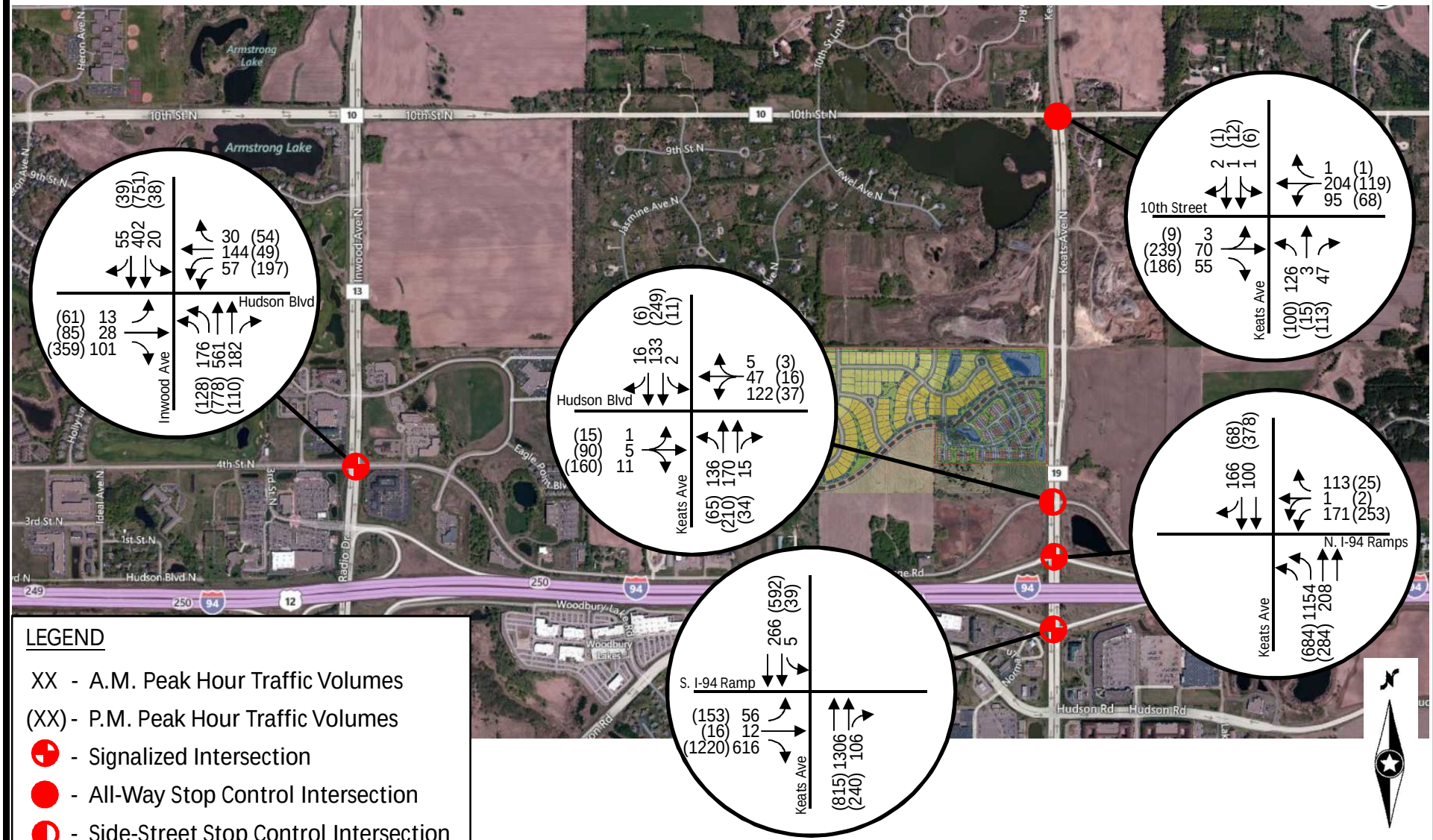
Project Location

Savona Development Traffic Study
Lake Elmo, MN

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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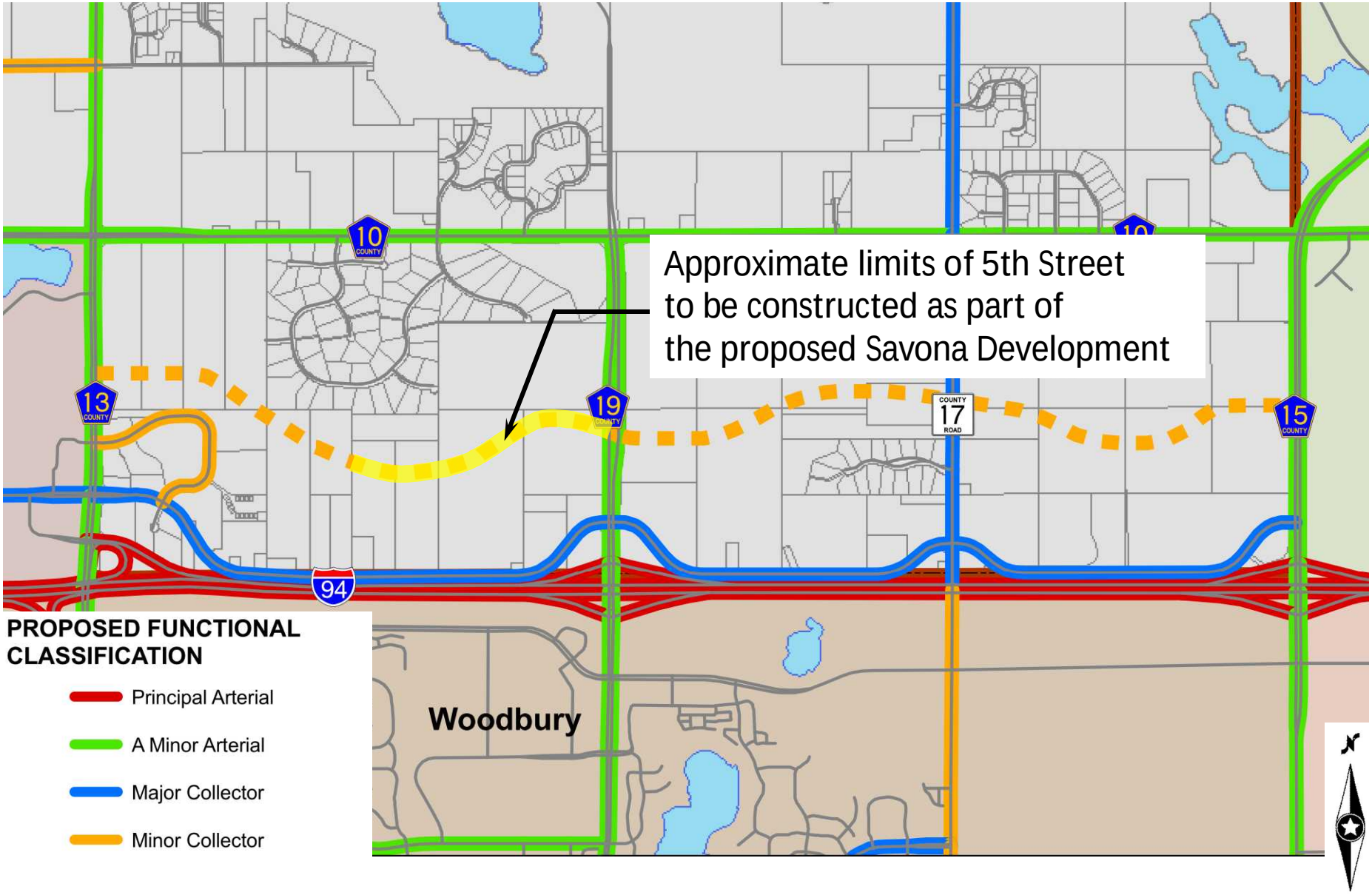
Figure
3



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.

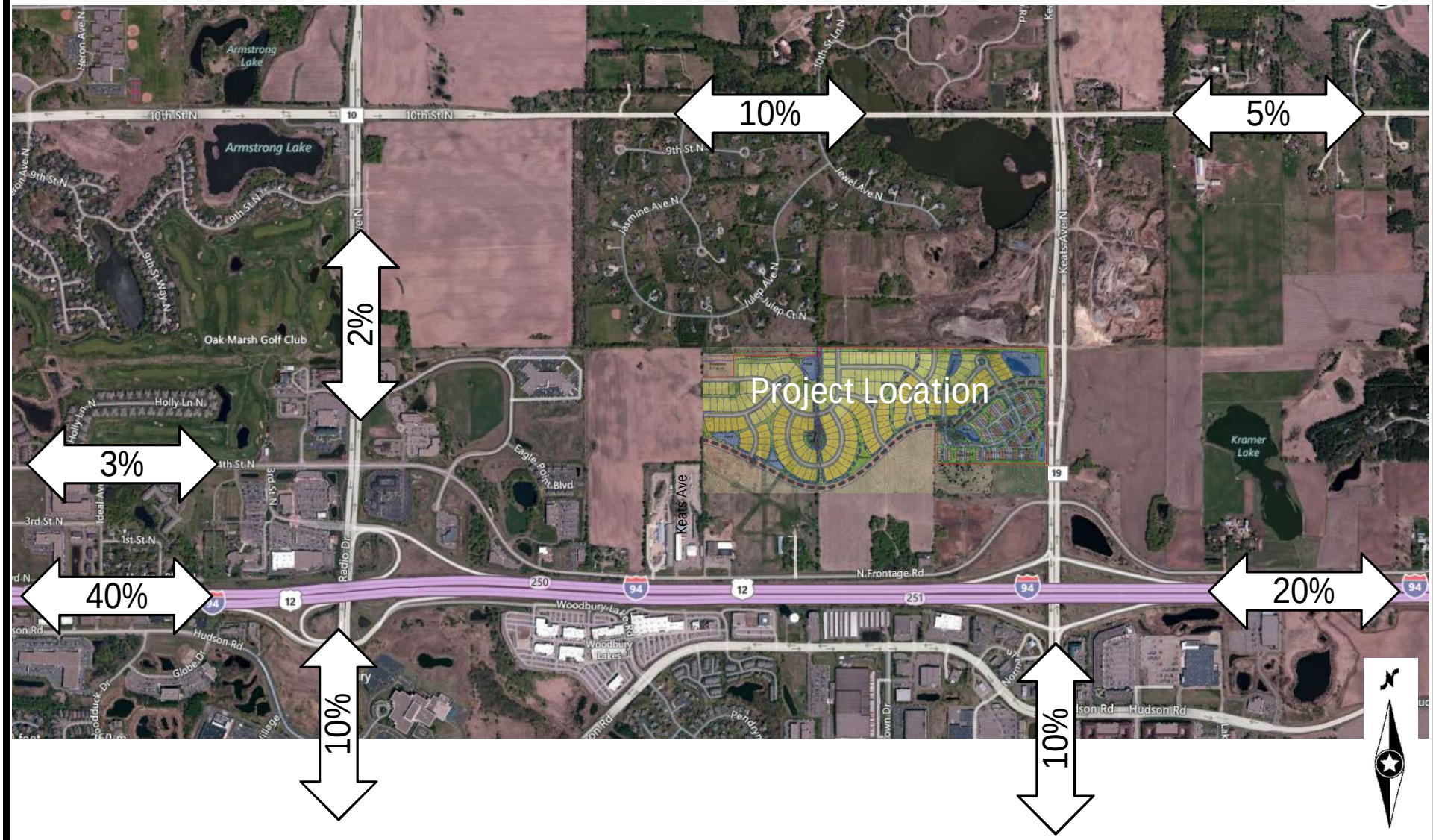
Table 3
Trip Generation Estimate: Savona Residential Development [(1)]

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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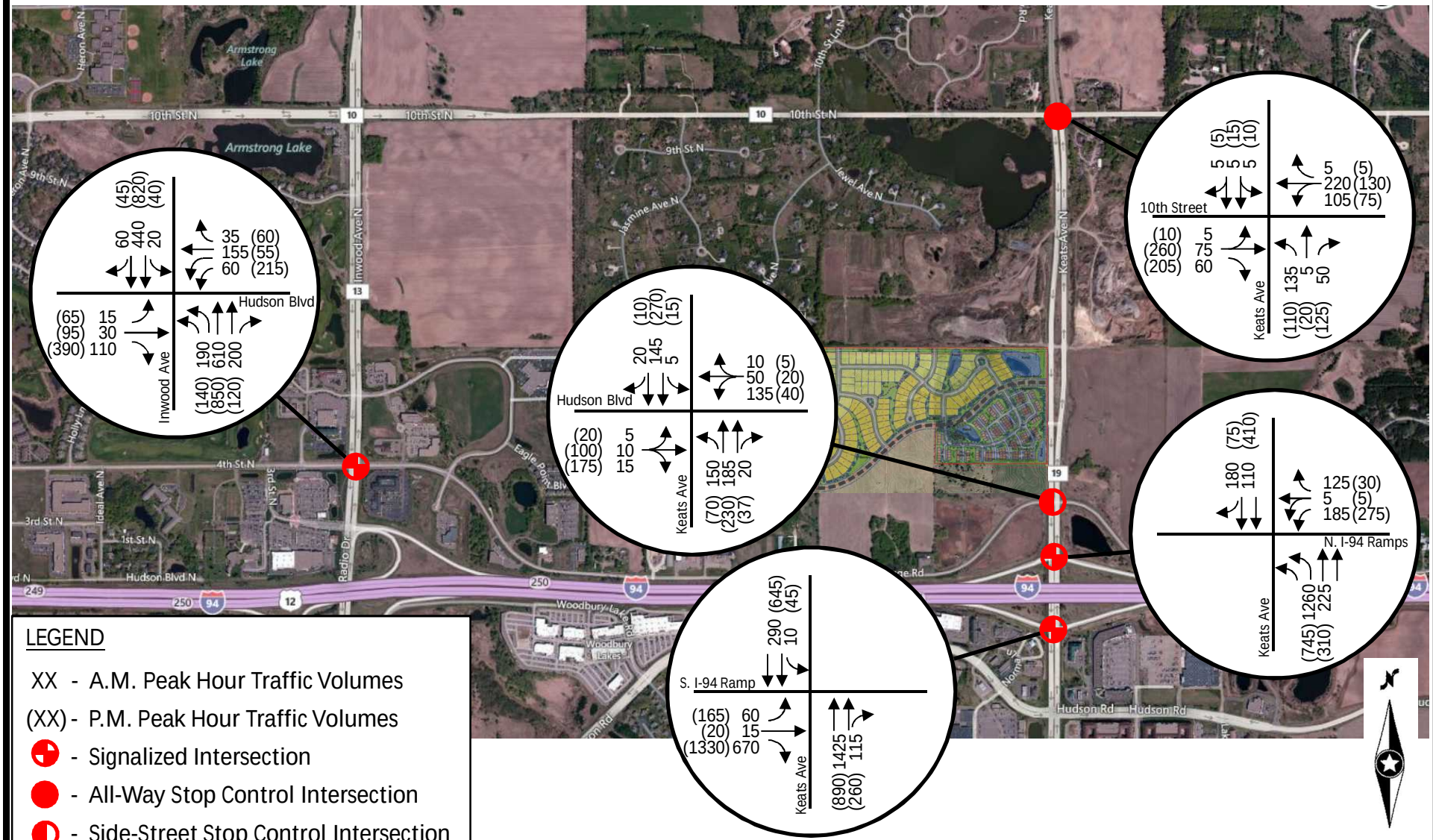

LEGEND

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

Savona Development Traffic Study
Lake Elmo, MN

Figure 7

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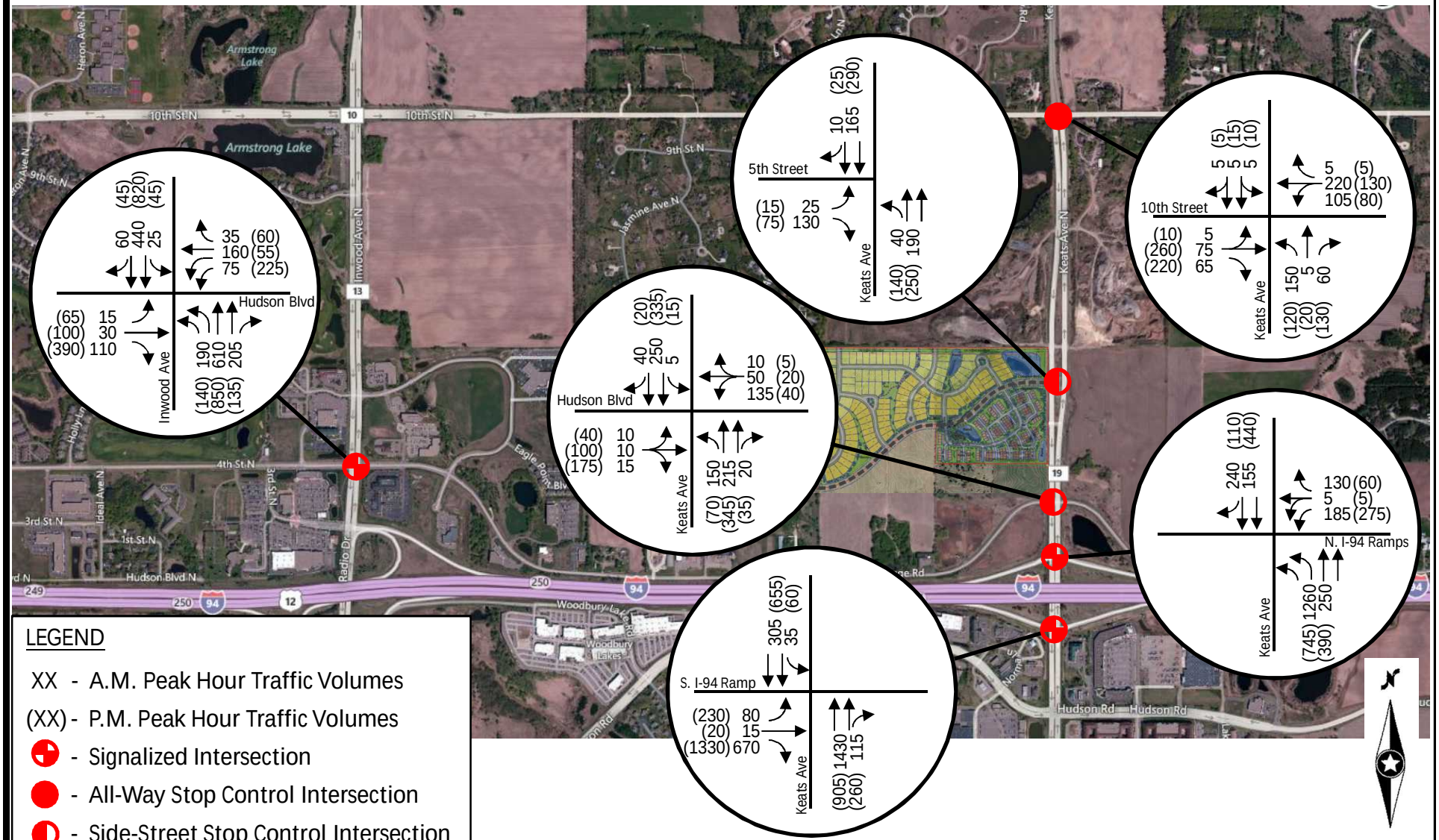

LEGEND

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

Savona Development Traffic Study
Lake Elmo, MN

Figure 8

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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

Savona Development Traffic Study
Lake Elmo, MN

Figure
9

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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

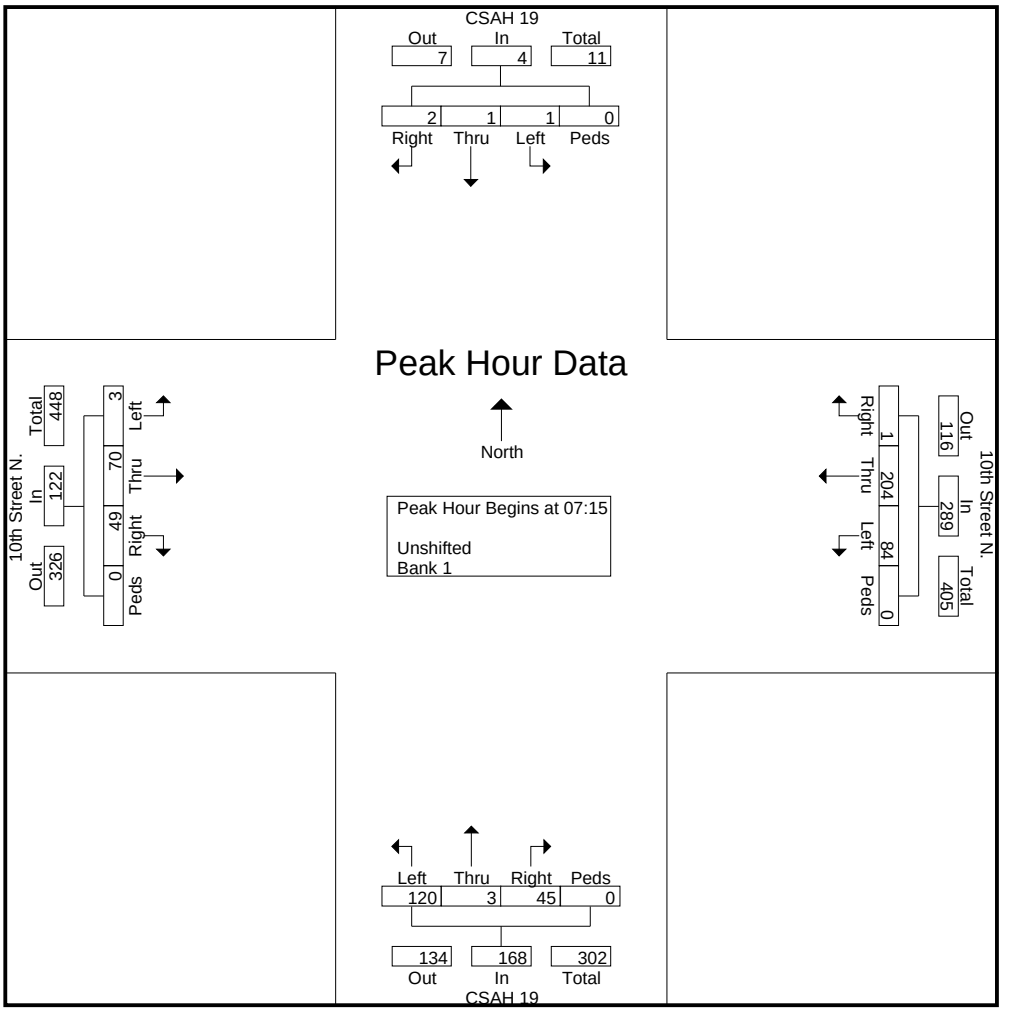
	CSAH 19 Southbound					10th Street N. Westbound					CSAH 19 Northbound					10th Street N. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30	0	0	0	0	0	19	27	0	0	46	15	0	8	0	23	0	12	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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7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 3
Site Code : 00003001
Start Date : 3/27/2013
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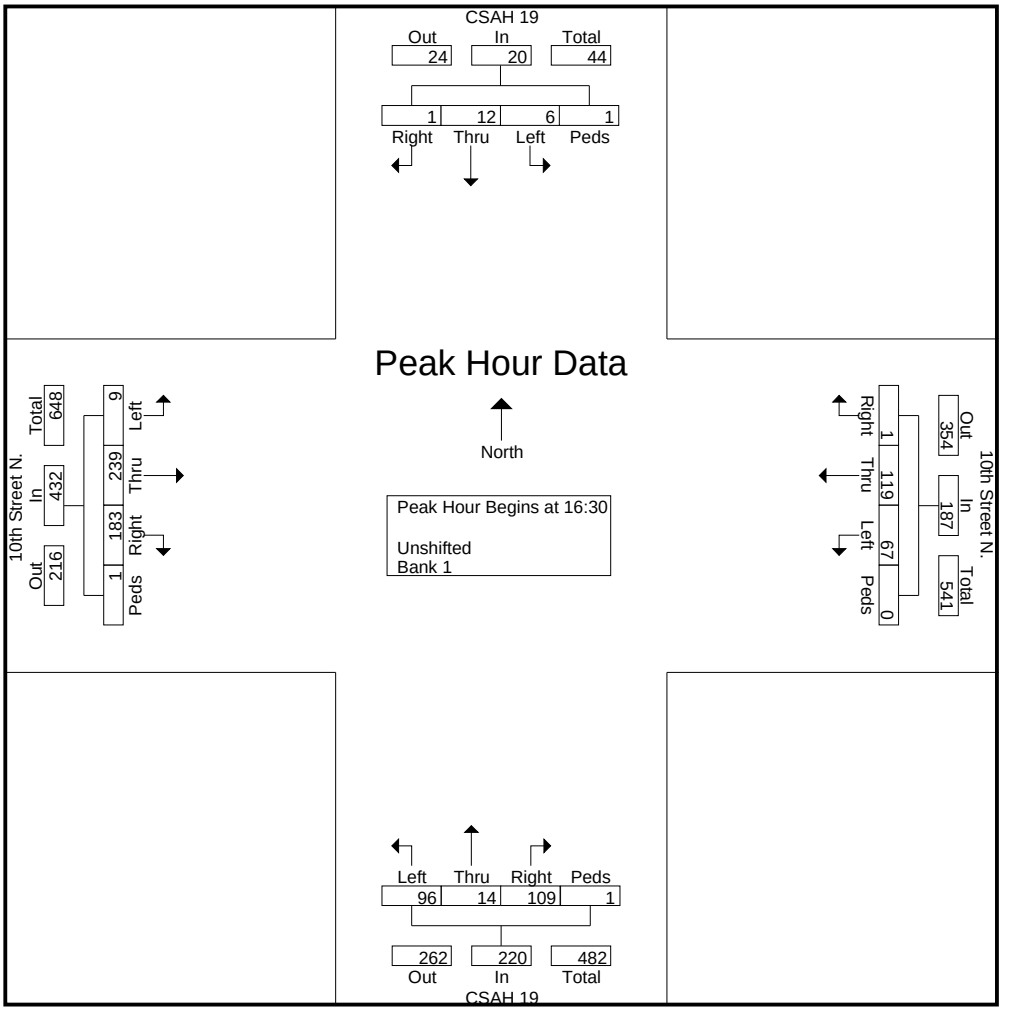
	CSAH 19 Southbound					10th Street N. Westbound					CSAH 19 Northbound					10th Street N. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 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

	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
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

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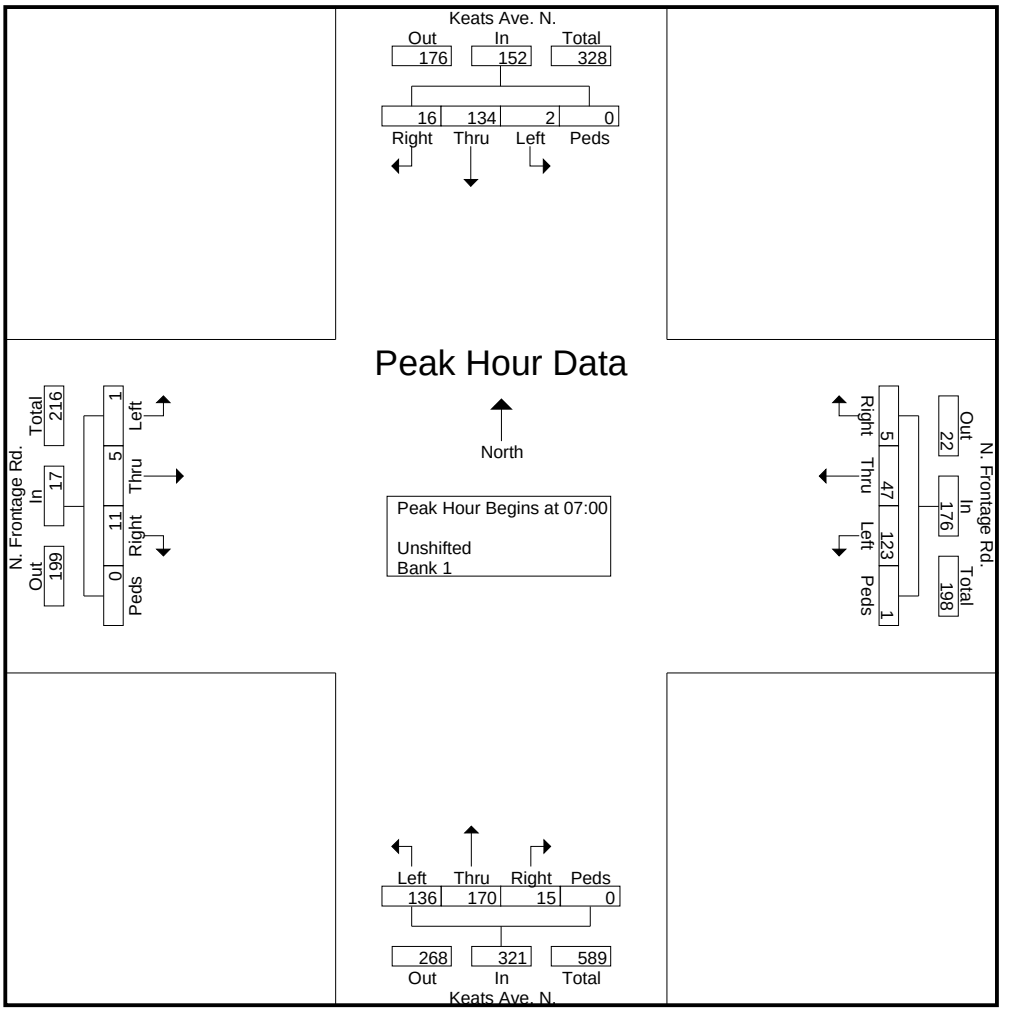
7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 1
Site Code : 00001001
Start Date : 3/21/2013
Page No : 2

	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



Westwood Professional Services, Inc.

7699 Anagram Drive
Eden Prairie, MN 55344

File Name : 1
Site Code : 00001001
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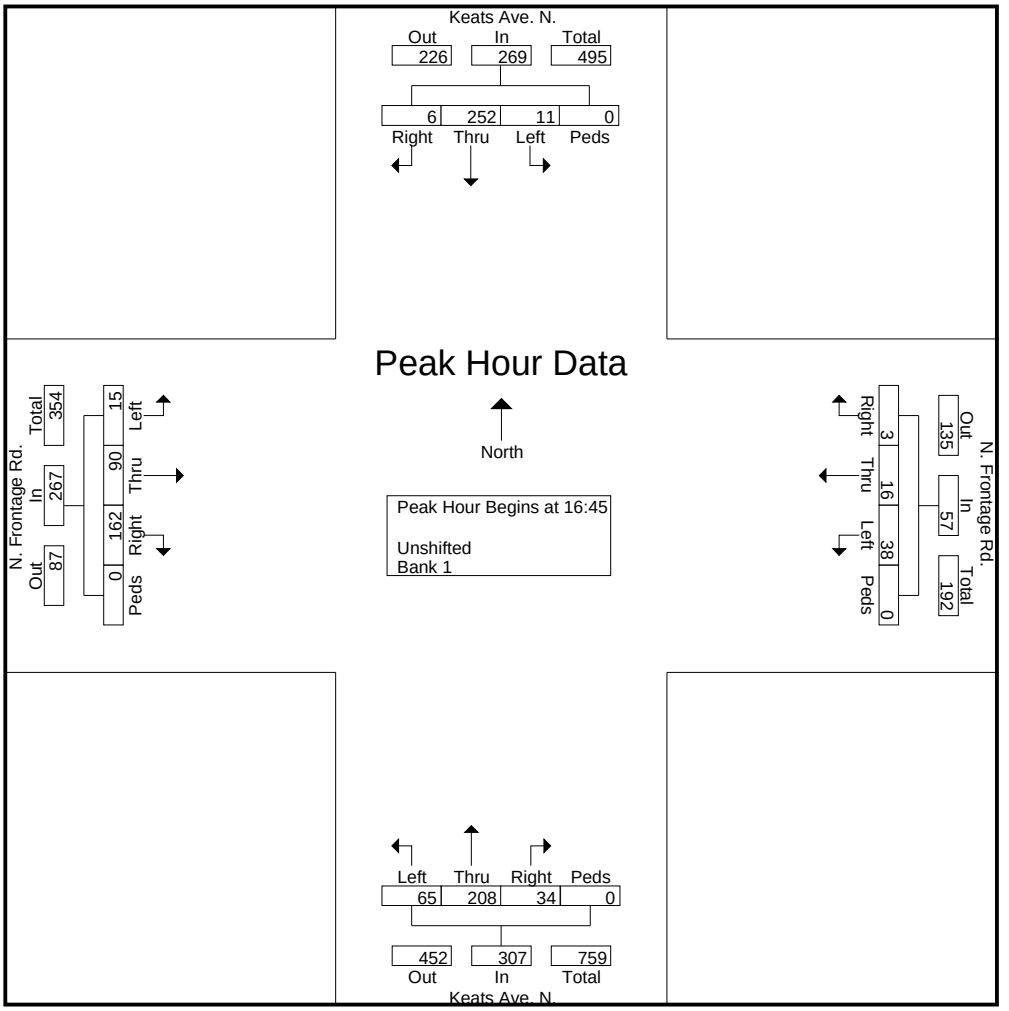
	Keats Ave. N. Southbound					N. Frontage Rd. Westbound					Keats Ave. N. Northbound					N. Frontage Rd. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 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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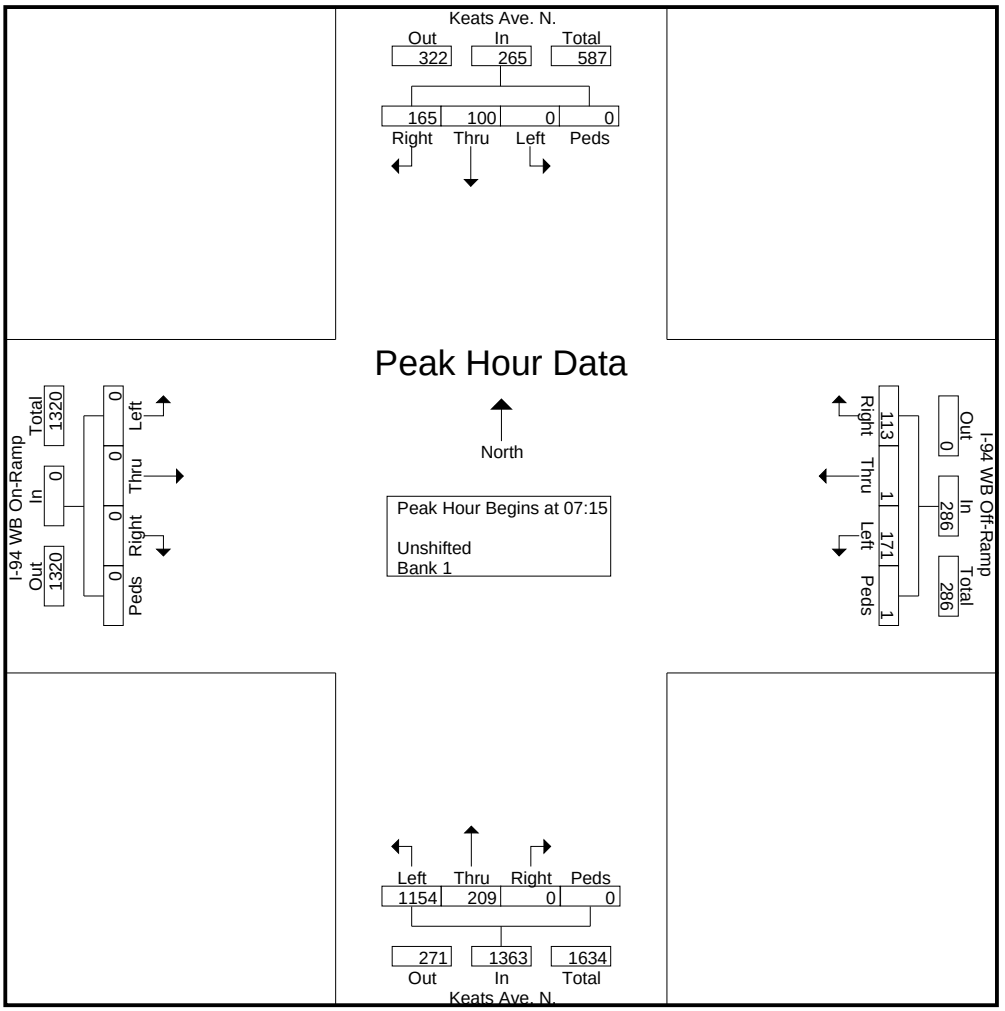
	Keats Ave. N. Southbound					I-94 WB Off-Ramp Westbound					Keats Ave. N. Northbound					I-94 WB On-Ramp Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 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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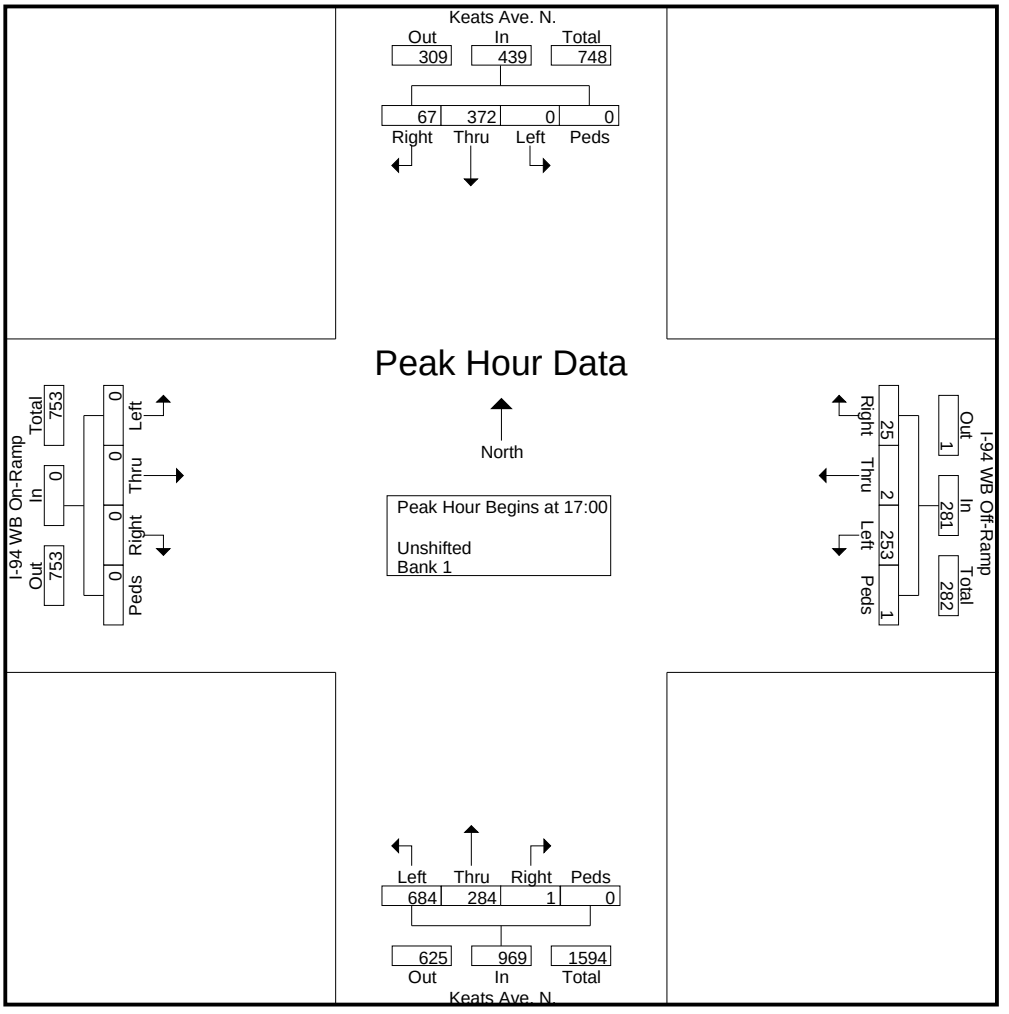
	Keats Ave. N. Southbound					I-94 WB Off-Ramp Westbound					Keats Ave. N. Northbound					I-94 WB On-Ramp Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 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		