raSmith

CREATIVITY BEYOND ENGINEERING

MEMORANDUM

DATE: April 4, 2025

TO: Mikko Hilvo, City of Cedarburg Administrator
Eric Ryer, Town of Cedarburg Administrator

FR: Pat Hawley, P.E., PTOE, RSP
Shana Brummond, P.E., PTOE

RE: Cedarburg Traffic & Access Planning Study

INTRODUCTION

The City of Cedarburg and Town of Cedarburg have several undeveloped parcels where development is either planned or anticipated in the future along the WIS 60 corridor. The communities initiated a transportation planning study to achieve the following goals:

1. Coordinate with WisDOT on the future of WIS 60. WIS 60 is a state highway; and therefore, all design and access decisions are WisDOT's responsibility.
2. Identify the future typical sections of the major public roadways and the traffic control and geometry (including roundabouts) at the major intersections in the study area needed to accommodate the planned developments. The ultimate roadway design will be determined by WisDOT.
3. Develop an access plan for the WIS 60 corridor that can be shared with developers to guide their site planning process. Future access locations will be determined by WisDOT.
4. Estimate the geometry of the development access intersections with the public street network based on planned or anticipated development plans. This is intended to provide a preliminary assessment of the intersection geometry and traffic control for planning purposes. WisDOT will ultimately require each development seeking access to WIS 60 to submit a traffic impact analysis (TIA) study to define their specific transportation improvement needs as part of their WisDOT approval. The WisDOT TIA is often also used as part of the municipal approval process.

raSmith was retained by the City and Town to prepare a traffic planning study to identify future developments, traffic forecasts, evaluate potential access locations and preliminary intersection geometry to address the goals outlined above. This technical memorandum summarizes the procedures, findings and recommendations of the study.

STUDY AREA

Based on coordination with the City and Town, the project study area includes the following roadway segments:

- WIS 60 from Horns Corners Road to Keup Road
- Washington Avenue from WIS 60 to Bridge Road
- Sheboygan Road (County I) from WIS 60 to Washington Avenue

The study area roadways are described below.

WIS 60 is an east-west arterial. It is a two-lane undivided roadway that widens to a four-lane median divided roadway east of Forward Way to east of Sheboygan Road/County I. Year 2023 Annual Average Daily Traffic (AADT) volume reported by WisDOT along WIS 60 was 15,700 vehicles per day (vpd) east of Washington Avenue (WIS 181/County NN). The posted speed limit along WIS 60 changes at approximately 1,650 feet west of Washington Avenue (55 miles per hour (mph) to the west and 45 mph to the east).

Washington Avenue is a two-lane undivided roadway with a northwest-southeast orientation within the study area. Washington Avenue is designated as WIS 181 for the section between Sycamore Drive and WIS 60. The roadway is also designated as County NN north of WIS 60. The WisDOT Year 2023 AADT volume was 9,900 vpd between WIS 60 and Sycamore Drive. The posted speed limit along Washington Avenue is 35 mph south of WIS 60 and decreases to 25 mph north of Cambridge Avenue. The posted speed limit is 55 mph to the north of WIS 60.

Sheboygan Road/County I is a two-lane undivided roadway that widens to a four-lane median divided section at the intersection with WIS 60. The WisDOT Year 2023 AADT volume along Sheboygan Road was 3,900 vpd south of WIS 60. The posted speed limit along Sheboygan Road/County I is 25 mph north of Washington Avenue that increases to 45 mph north of Henry Court. The posted speed limit on County I is 55 mph to the north of WIS 60.

The study area includes the following seven intersections, as shown in Exhibit 1:

- WIS 60 & Horns Corners Road – two-way stop control
- WIS 60 & Washington Avenue (WIS 181/County NN) & Covered Bridge Road – traffic signal
- WIS 60 & Sheboygan Road/County I – traffic signal
- WIS 60 & Keup Road – traffic signal
- Washington Avenue & Sycamore Drive – all-way stop control
- Washington Avenue & Sheboygan Road (County I)/Elm Street – one-way stop control
- Washington Avenue & Bridge Road – traffic signal

The existing transportation system is shown in Exhibit 2. The WisDOT has a resurfacing project planned for WIS 60 from Five Corners Drive to 1st Avenue. No geometric modifications are expected as part of the resurfacing project. The project will include replacing the traffic signals at the WIS 60 intersections with Washington Avenue (STH 181/County NN), Sheboygan Road/County I, and Keup Road. Construction is currently scheduled for Year 2030, which may advance to Year 2028 if funding is available.

APPROACH & METHODOLOGY

This study is intended to assist in planning for future developments within the two communities. The study was comprised of four main elements including existing conditions, future developments, future traffic and transportation planning analysis as outlined below.

Existing Conditions

raSmith obtained recent WisDOT daily traffic volumes for the study roadways. Turning movement traffic counts for three of the study intersections were obtained from WisDOT. Traffic counts at the remaining intersections were collected as part of project. raSmith documented the existing geometry for the study area and the intersection traffic control.

Future Developments
The City and Town identified currently planned developments, as well as sites where development is likely to occur by the Year 2050, in each of their communities. The City and Town identified the development locations, the planned/anticipated land use types and their planned/anticipated sizes.

Future Traffic
The Southeastern Wisconsin Regional Planning Commission (SEWRPC) provided Year 2050 daily traffic forecasts for the study corridors and peak hour turning movement forecasts for the study intersections. The SEWRPC forecasts accounted for the future developments identified by the municipalities.

raSmith developed trip generation estimates for the future development sites and assigned peak hour trips to the site driveways. Since the SEWRPC forecasts included the communities' development plans, the raSmith trip assignments were only applied to the developments' driveways, and not to the public study area intersections, to avoid double counting.

SEWRPC's WIS 60 through traffic forecasts at the public intersections were carried to the adjacent site driveways to develop the through traffic volumes at the private driveways. This approach blends two traffic forecasting methodologies, which results in some traffic imbalances along the corridor.

Transportation Planning Analysis
Traffic analysis was conducted for the Year 2050 peak hours for the existing public street intersections and the anticipated development driveway intersections. While overlapping, the goals for the public street intersections and the future development driveway intersections were slightly different.

The goal for the public street intersection analysis was to identify the likely typical section(s) along WIS 60 (two lane undivided vs three-lane TWLTL vs four-lane median divided), future traffic control options, and the functional area of the public intersections. The functional area determination was then used to establish anticipated access windows along WIS 60 for the development sites.

The goal of the development driveway intersection analysis was to estimate the anticipated intersection size and traffic control based on the traffic generated by the assumed land use types and sizes. In addition, the level of access was evaluated to determine if full access or restricted access could be provided based on the operational analysis. The future development access windows were chosen to provide adequate spacing between adjacent intersections and/or to align with access on the opposite side of WIS 60.

Potential improvement options were identified to achieve acceptable traffic operations at all study intersections and driveways. Traffic signals and roundabouts were identified as potential future intersection controls at several intersections. Traffic signal warrants were not conducted, and their identification was based on the peak hour volumes and the intersections' operations under two-way stop control.

It should be stressed this study is a planning level evaluation to provide guidance for future development and access along the WIS 60 corridor. WisDOT will require each development to prepare a traffic impact analysis (TIA) study to analyze the specific conditions of each site. The TIAs will also be used by each municipality as part of their formal review process. The ultimate driveway access locations, design and traffic control will be determined by WisDOT through the TIA process.

EXISTING CONDITIONS

WisDOT provided weekday intersection turning movement traffic counts for three intersections, and raSmith retained Gewalt Hamilton & Associates, Inc. (GHA) to collect weekday peak period turning

movement traffic counts for the remaining intersections. Details of the intersection traffic counts are summarized in Table 1.

Table 1
Intersection Turning Movement Count Collection Summary

Intersection	Weekday Count Period	Count Date	Source
WIS 60 & Horns Corners Road	6:00am to 9:00am and 3:00pm to 6:00pm	9/5/2024	GHA
WIS 60 & Washington Avenue (WIS 181/County NN) & Covered Bridge Road	6:00am to 7:00pm	11/14/2023	WisDOT
WIS 60 & Sheboygan Road/County I	6:00am to 7:00pm	11/14/2023	WisDOT
WIS 60 & Keup Road	6:00am to 7:00pm	11/14/2023	WisDOT
Washington Avenue & Sycamore Drive	6:00am to 9:00am and 3:00pm to 6:00pm	9/5/2024	GHA
Washington Avenue & Sheboygan Road (County I)/ Elm Street	6:00am to 9:00am and 3:00pm to 6:00pm	9/5/2024	GHA
Washington Avenue & Bridge Road	6:00am to 9:00am and 3:00pm to 6:00pm	9/5/2024	GHA

Based on the traffic counts, the existing weekday morning peak hour was identified to be 7:00 to 8:00am and weekday evening peak hour was identified to be 4:30 to 5:30pm. The existing traffic volumes are summarized in Exhibit 3. Traffic counts are provided in Appendix A.

raSmith collected the existing roadway geometrics, speed limits, and traffic control in the study area. The existing transportation system is shown in Exhibit 2.

FUTURE DEVELOPMENTS

The City and Town identified vacant sites in their respective communities where development is currently planned or development is likely to occur at some future time. The communities are currently at different phases of their development plans. The City has several developments in progress. Whereas the Town is in the midst of a zoning code update, and they are using this traffic planning exercise to help identify future potential transportation needs. Exhibit 4 shows the development sites included in the study, Exhibit 5 shows their anticipated land uses, and Table 2 summarizes the land use assumptions used for the traffic study. It should be stressed the land use types and sizes shown in Table 2 are purely assumptions for those sites with a status of “no current plans”, and the actual development plans are yet to be determined.

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Table 2
Future Development Sites

Site	Land Use Type & Size Assumed for the Traffic Study	Potential Access	Status
1	Athlete Performance (62,301 SF) Children's Wisconsin Clinic (9,992 SF)	Utilizes existing access on WIS 60 for Korb Sports Complex.	Athlete Performance opened in 2024.
2*	Commercial (14,400 SF) Office (14,400 SF) Residential (11 homes)	Future access driveway on WIS 60	No current plans
3	Cedarburg Professional Center (30,300 SF)	Plan to utilize existing access on WIS 60 for Korb Sports Complex.	Approved project. Pending plan submittal from developer.
4*	Future Coffee Shop (2,000 SF)	Utilize existing access on WIS 60 for Korb Sports Complex.	No current plans
5*	Commercial (24,200 SF) Restaurant (5,000 SF) Office (29,200 SF) Residential (20 homes)	Future access driveway on WIS 60.	No current plans
6*	Commercial (27,360 SF)	Future access driveway on WIS 60.	No current plans
7*	Commercial (19,200 SF) Office (19,200 SF)	Future access driveway on WIS 60.	No current plans
8*	Commercial (72,250 SF) Restaurant (5,000 SF) Office (25,750 SF) Residential (8 homes)	Future access driveway on WIS 60.	No current plans
9*	Commercial (73,500 SF) Fast Food Restaurant (3,000 SF) Office (25,500 SF) Residential (36 homes)	Future access driveway on WIS 60. Secondary access on County NN (serve residential only)	No current plans
10	Residential (422 homes)	Future access driveway on WIS 60. Secondary access on County I.	Concept plans pending
11	Existing Wilo (250,500 SF) Phillipp Lithographing Co. (30,700 SF) Manufacturing (212,800 SF) Cornerstone Christian Learning Center: Phase 1 (10,650 SF), Phase 2 (5,661 SF)	Utilize Forward Way for access to WIS 60.	Wilo opened in 2022. Phillipp Lithographing Co. and Phase 1 of Cornerstone Christian Learning Center were recently approved.
12	Gas Station with Convenience Market (9,000 SF & 20 VFP) Commercial (145,000 SF) 2 Restaurants (10,000 total SF) Public Park (10 acres)	Future access driveway on WIS 60. Secondary access on Sheboygan Road.	No current plans
13	Residential (300 apartments)	WIS 60 access anticipated to align with Cedar Creek Pkwy. Secondary Sheboygan Rd access anticipated to align with existing median opening.	Concept plans pending
14	Recreational & Complimentary Land Uses (Restaurants, Hotel, Medical Clinic, etc.)	Future access on WIS 181 (1221 Wauwatosa Road driveway)	No current plans
15	Residential (160 homes)	Future access driveway on WIS 181.	No current plans

- Land use assumptions based on draft zoning work being completed by the Town.

Table 2 (continued)
Future Development Sites

Site	Land Use Type & Size Assumed for the Traffic Study	Potential Access	Status
16	Residential (50 homes)	Future access driveway on WIS 181.	No current plans
17	Stone Lake Condominium Development (70 units)	Driveway planned on Susan Lane.	Approved & under construction
18	Residential (71 homes)	Future Sheboygan Rd access on anticipated to align with Colleen Way. Additional access to the south is planned via Holly Lane extension.	Concept plans pending
19	Residential (50 homes)	Future access driveway on Sheboygan Road.	No current plans

* Land use assumptions based on draft zoning work being completed by the Town.

As noted by the asterisks in Table 2, the anticipated land use types and sizes shown for Sites 2, 4, 5, 6, 7, 8 and 9 are for traffic study assumption purposes only based upon the Town's draft zoning work currently underway. The ultimate land uses and project sizes will be determined by final approved zoning and future development project proposals.

FUTURE TRAFFIC

raSmith developed Year 2050 traffic volumes based on the SEWRPC traffic forecasts for the study intersections and trips estimated for the developments along the WIS 60 corridor as discussed in this section.

TRAFFIC FORECASTS

SEWRPC prepared Year 2050 average weekday daily traffic (AWDT) forecasts for the study corridors and peak hour turning movements for the study intersections. The SEWRPC forecasts include the future development sites identified in Table 2. To compare the SEWRPC forecasts to WisDOT's published daily traffic values, the AWDT was converted to AADT. The existing and Year 2050 daily traffic (AADT) forecasts are shown in Exhibit 6. The Year 2050 intersection traffic volumes are shown in Exhibit 7.

SEWRPC's Year 2050 traffic forecast is provided in Appendix B.

DEVELOPMENT TRAFFIC

Trip Generation

Development traffic for each site was estimated using ITE's *Trip Generation Manual*, 11th Edition. The driveway trips were not adjusted for linked and pass-by trips to provide a more conservative trip estimate. Trip generation for sites with future access to WIS 60 (Sites 1 through 13) are provided in Appendix C. For the sites with no direct access to WIS 60 (Sites 14 through 19), trip generation and assignment were not conducted. The approach for sites 14 through 19 is consistent with the overall study goals and methodology. The traffic generated by sites 14 through 19 is included in SEWRPC's forecasts (as are sites 1 through 13), but without direct access to WIS 60, their driveway volumes will not impact the WIS 60 typical section or the WIS 60 intersections' functional areas.

Trip Distribution & Assignment

The following trip distribution was developed based on the existing traffic patterns and anticipated traffic patterns with future developments.

West of WIS 181/County NN/Covered Bridge Road:

- WIS 60 to/from the east: 65%
- WIS 60 to/from the west: 35%

East of WIS 181/County NN/Covered Bridge Road:

- WIS 60 to/from the east: 55%
- WIS 60 to/from the west: 45%

Trips generated by future development sites were assigned to their access driveway based on the above trip distribution, as shown in Exhibits 8A and 8B.

All the development trips were assigned to WIS 60 for the purpose of this study. It is anticipated that Sites 8, 9, 10, 12 and 13 may have some type of access to the side streets.

As noted previously, development trips were not assigned to the public street intersections since the SEWRPC traffic forecasts included future developments in the area. The WIS 60 through traffic from the SEWRPC forecasts was used to develop the through traffic for the adjacent driveways.

TRANSPORTATION PLANNING ANALYSIS

Transportation planning analysis was conducted for the following two scenarios:

- Year 2050 operations without improvements. This scenario analyzes the public street intersections only (no driveways) utilizing the existing intersection geometrics and traffic control. This analysis scenario provides a baseline for the study intersections without improvements.
- Year 2050 operations with improvements. The improvements analysis includes both the public street and the driveway intersections. It includes future access locations and recommends potential improvement options.

It should be noted both scenarios utilize identical Year 2050 traffic volumes at the public street intersections. The two differences are the inclusion of the anticipated development driveways and the inclusion of intersection improvements for the second scenario

The study intersections were analyzed using the procedures set forth in the Highway Capacity Manual 7th Edition (HCM7). The signalized and stop controlled intersections were analyzed with Synchro and the roundabouts were analyzed with HCS. Level of Service (LOS) is a quantitative measure from the HCM referring to the overall quality of flow at an intersection. LOS ranges from very good, represented by LOS “A,” to very poor, represented by LOS “F.” For analysis and design purposes, LOS “D” was used to define acceptable peak hour operating conditions.

The planning analysis was based on the following parameters:

- Analysis of the driveways utilized defaults for peak hour factor (0.92) and heavy vehicle percentages (2%).
- Maintaining the existing four-lane median divided section on WIS 60 between Forward Way and approximately 1,150 feet east of Sheboygan Road/County I.
- Future traffic signals between Site 5 Driveway/Site 6 Driveway and Sheboygan Road/County I would operate as a coordinated signal system. The coordinated signal system analysis does not include pedestrian phase (walk/flashing don’t walk) to cross WIS 60 or side streets. The pedestrian phases are anticipated to be push button activated.

YEAR 2050 OPERATIONS WITHOUT IMPROVEMENTS (PUBLIC STREETS ONLY, NO DRIVEWAYS)

The Year 2050 traffic analysis for the public street intersections with the existing transportation system is shown in Exhibit 9. While the development traffic is included in the Year 2050 traffic volumes, the development driveways were not analyzed in this scenario.

Based on the Year 2050 traffic analysis, the southbound approach of the WIS 60 intersections with Horns Corners Road is expected to operate at LOS F conditions during the weekday evening peak hour. The WIS 60 intersection with Washington Avenue (WIS 181/County NN) & Covered Bridge Road is expected to have several movements operating at LOS E/F conditions during the peak hours. The WIS 60 intersection with Keup Road is expected to have movements operating at LOS E/F conditions. Improvements to address the unacceptable traffic operations are provided in the improvements section.

Details of the Year 2050 traffic operational analysis with existing transportation system are provided in Appendix D.

YEAR 2050 OPERATIONS WITH IMPROVEMENTS (INCLUDES DRIVEWAYS)

The Year 2050 total traffic analysis with improvements included the study intersections and the development driveways. Exhibits 10,11 and 12 show the anticipated sites, recommended access windows and potential improvement options anticipated to accommodate the Year 2050 total traffic conditions. The potential improvements options and access locations are detailed below.

Potential Improvement Options

Some of the future driveways are expected to operate unacceptably with the existing two-lane undivided WIS 60 cross section. As part of the WisDOT TIA process, an intersection control evaluation (ICE) will analyze different intersection control options and determine the recommended intersection control. For this planning study, the following intersection control options were evaluated for the WIS 60 intersections and driveways.

Two-Way Stop Control With Raised Median: A raised median could be constructed on WIS 60 to provide storage to perform northbound and southbound left-turn and through movements in two stages (proceed from the stop bar to the median in stage 1, and accelerate from the median into the WIS 60 travel lane in stage 2). WisDOT recommends a minimum 24-foot wide median to accommodate two-stage left-turn and through movements.

Traffic Signal: A future traffic signal could be installed when warranted.

Roundabout: A future roundabout could be constructed when traffic signal warrants are met. WisDOT currently requires traffic signal warrants to be met to consider a roundabout. Roundabouts are not recommended in close proximity of a signalized intersection due to the dispersion of platoons created by traffic signals.

The results of the Year 2050 total traffic analysis with improvements is provided in Appendix E. As shown in Appendix E, the intersections are expected to operate acceptably with the improvement options shown in Exhibits 10, 11 and 12. The intersection type and traffic control is highlighted in the following sections, while the intersections' specific recommended geometry is shown in Exhibits 10-12.

WIS 60 & Horns Corners Road Intersection

- Two-Way Stop Control Option:
    - Consider providing a raised median section on the WIS 60 approaches to accommodate two-stage crossing.

- Roundabout Option:
    - Consider a single lane roundabout. *Traffic signal volume warrants are not expected to be met with the Year 2050 volumes based on the land use assumptions used in this study. A roundabout may be warranted based on safety needs.*

WIS 60 & Site 2 Driveway Intersection

- The Site 2 Driveway is anticipated to operate under one-way stop control. Based on Year 2050 traffic analysis, the southbound approach is expected to operate at LOS E conditions during the weekday evening peak period. HCM can overestimate delays for stop controlled intersections, and for the purposes of this study, it is shown with stop control. The site's future WisDOT TIA will identify the specific improvement requirements.

WIS 60 & Korb Sports Complex Driveway Intersection

- One-Way Stop Control Option:
    - Consider providing a raised median section on the WIS 60 approaches to accommodate two-stage crossing.
- Roundabout Option:
    - Consider a single lane roundabout. *Traffic signal volume warrants are not expected to be met with the Year 2050 volumes based on the land use assumptions. A roundabout may be warranted based on safety needs.*

WIS 60 & Site 5 Driveway/Site 6 Driveway Intersection

- Traffic Signal Control Option:
    - Consider installing a traffic signal when warrants are met. Coordinate future traffic signal with the adjacent traffic signals on WIS 60 to improve corridor operations.
- Roundabout Option:
    - Consider a single lane roundabout.
    - A roundabout at Site 5 Driveway/Site 6 Driveway would likely require the WIS 60 intersection with Washington Avenue to operate under roundabout control as well.

WIS 60 & Site 7 Driveway/Site 8 Driveway Intersection

- Traffic Signal Control Option:
    - Consider installing a traffic signal when warrants are met. Coordinate future traffic signal with the adjacent traffic signal at the WIS 60 intersection with Washington Avenue (WIS181/County NN) and Covered Bridge Road to improve corridor operations.
- Roundabout Option:
    - Consider a single lane roundabout.
    - A roundabout at Site 7 Driveway/Site 8 Driveway would likely require the WIS 60 intersection with Washington Avenue to operate under roundabout control as well.

WIS 60 & Washington Avenue (WIS 181/County NN) & Covered Bridge Road Intersection

- The intersection is expected to operate with several movements at LOS E/F conditions with the existing geometry. A four-lane WIS 60 is anticipated to be needed to accommodate the Year 2050 volumes at the five-legged intersection.
- Coordinate traffic signal with the adjacent future traffic signals on WIS 60.

A multi-lane roundabout would be challenging at this five-legged intersection due to the skews of the roadways and the right-of-way impacts anticipated with the realignment of the skewed approach legs. Maintaining a signalized intersection at five-corners may limit the ability to introduce roundabouts along the WIS 60 corridor.

WIS 60 & Site 9 Driveway Intersection

- Traffic Signal Control Option:
  - Consider installing a traffic signal when warrants are met. Coordinate future traffic signal with the adjacent traffic signal at the WIS 60 intersection with Washington Avenue (WIS 181/County NN) and Covered Bridge Road to improve corridor operations.
- Roundabout Option:
  - Consider a single lane roundabout.
  - A roundabout at Site 9 Driveway would likely require the WIS 60 intersections with Washington Avenue and Forward Way to operate under roundabout control as well.

WIS 60 & Forward Way/Site 10 Driveway Intersection

- Traffic Signal Control Option:
  - Consider installing a traffic signal when warrants are met. Coordinate future traffic signal with the adjacent traffic signal at the WIS 60 intersection with Sheboygan Road/County I to improve corridor operations.
- Roundabout Option:
  - Consider a single lane roundabout.
  - A roundabout at Forward Way/Site 10 Driveway would likely require the WIS 60 intersection with Sheboygan Road/County I to operate under roundabout control as well.

WIS 60 & Site 12 Driveway Intersection

- One-Way Stop Control Option:
  - Restrict the left-out movement with a raised median that allows left-in, right-in and right-out movements. The left-out movement was shown to operate unacceptably under the Year 2050 volumes.
  - The left-out traffic was redistributed to the WIS 60 intersection with Sheboygan Road/County I.
- Roundabout Option:
  - Consider a roundabout with two entry lanes for the eastbound and westbound approaches.
  - A roundabout allows for full access.
  - A roundabout at Site 12 would likely require the WIS 60 intersections with Forward Way and Sheboygan Road/County I to operate under roundabout control as well.

WIS 60 & Sheboygan Road/County I Intersection

- Traffic Signal Option:
  - Coordinate traffic signal with future traffic signals on WIS 60 to improve corridor operations. Based on preliminary analysis, the intersection has surplus capacity and could operate at acceptable levels with fewer travel lanes.
- Roundabout Option:
  - Consider a roundabout with two entry lanes for the eastbound and westbound approaches

WIS 60 & Site 13 Driveway Intersection

- Align driveway with Cedar Creek Parkway and the existing median opening. The future intersection is anticipated to operate under two-way stop control.

WIS 60 & Keup Road Intersection

- Traffic Signal Option:
  - The intersection is planned to continue to operate as an isolated signal due to spacing from adjacent signalized intersections.
- Roundabout Option:
  - Consider a roundabout with two entry lanes for the westbound approach.

Details of the Year 2050 total traffic operational analysis with improvements are provided in Appendix E.

Potential Access Locations

Future access along WIS 60 was evaluated based on WisDOT preferred intersection spacing and the functional area of the existing public street intersections. The functional area was calculated for each approach based on queues from the Year 2050 traffic analysis with improvements and deceleration related to the posted speed limit. raSmith utilized the traffic queues for the following intersection control analysis:

- WIS 60 & Horns Corners Road – future two-way stop control with raised median
- WIS 60 & Washington Avenue (WIS 181/County NN) & Covered Bridge Road – future coordinated traffic signal with improvements
- WIS 60 & Forward Way/Site 10 Driveway – future coordinated traffic signal with improvements
- WIS 60 & Sheboygan Road/County I – future coordinated traffic signal with improvements
- WIS 60 & Keup Road – uncoordinated traffic signal with improvements

The development driveways are recommended to be located outside of the functional areas of adjacent intersections.

WisDOT desires traffic signals be spaced at one quarter to one half mile spacing to provide optimal progression. WisDOT prefers roundabouts be located at the same quarter mile minimum spacing, but there may be instances where shorter intersection spacing is allowed due to roundabout's smaller functional area.

The recommended access windows for the driveways are shown in Exhibits 10, 11 and 12.

IMPROVEMENT TIMEFRAME CONSIDERATIONS

This planning study looked at a Year 2050 analysis year, which assumed all developments were constructed and open; and the study identified the improvements needed to accommodate the total future traffic conditions. In reality, the developments will occur over time over the next 25 years, and interim improvements will likely be needed for each development.

The typical process is for each developer to construct the public roadway improvements triggered by their development based on the WisDOT TIA process and the municipality's approval process. WisDOT outlines the required improvements in an improvement letter issued to the municipality after acceptance of the TIA.

RECOMMENDATIONS AND CONCLUSIONS

The transportation plan and access windows are expected to accommodate the planned and anticipated developments in the City and Town. The improvements identified are based on planning level analysis of the anticipated future developments.

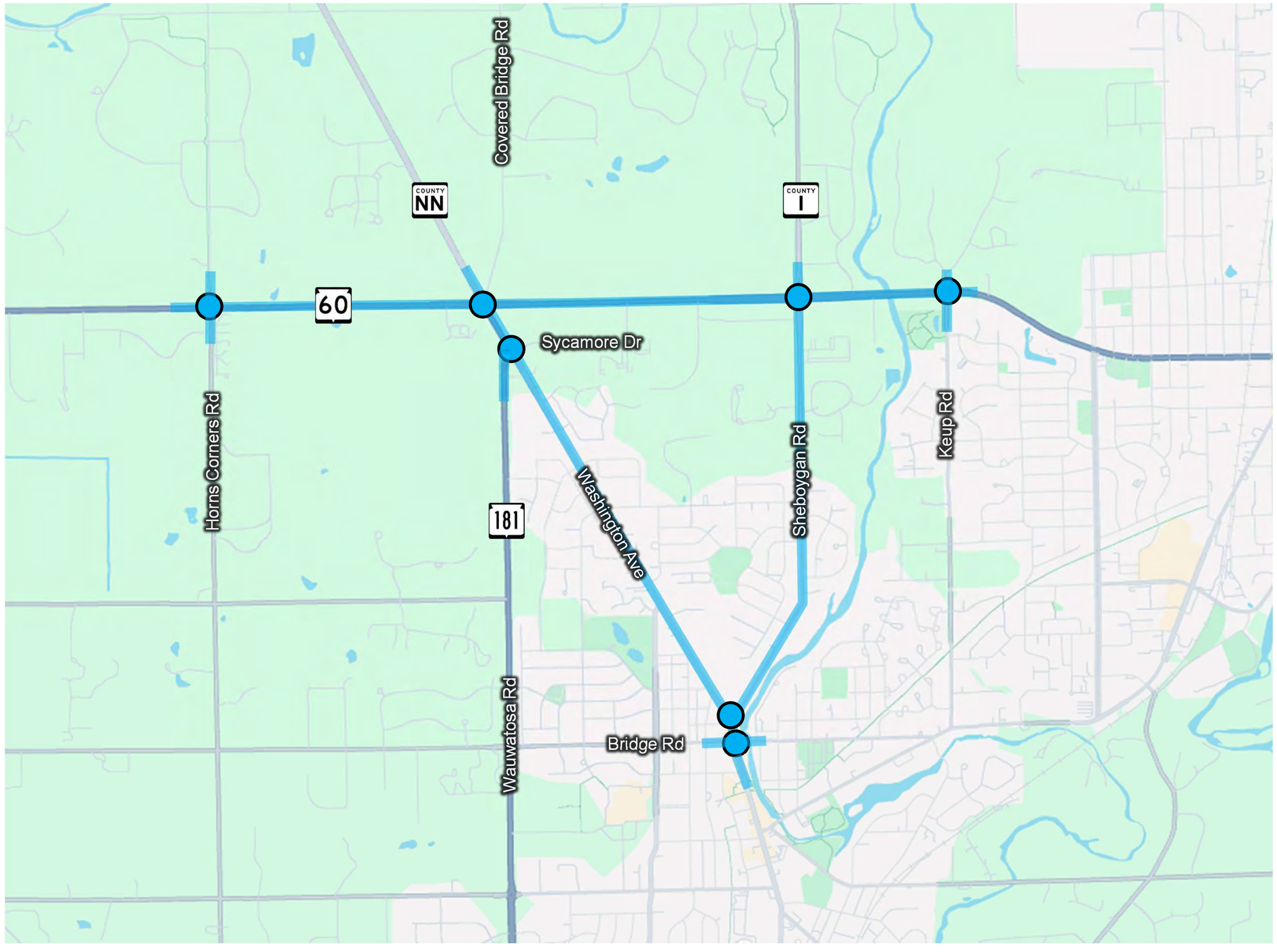
As shown in Exhibits 10-12, a two-lane WIS 60 is expected to accommodate future traffic growth through the Year 2050 west of the Washington Avenue intersection. The Washington Avenue intersection has existing operational challenges due to its five-legged configuration and skewed approaches. Compensating for these challenges will require WIS 60 to operate as a four-lane roadway at the intersection, which will have right-of-way impacts. The intersection is likely to remain signalized under its five-legged configuration. A multi-lane roundabout would be challenging to construct due to the five legs, skews of the roadways and right-of-way impacts resulting from realigning the skewed legs. Maintaining traffic signal control at this intersection may limit the ability to introduce roundabouts elsewhere along the WIS 60 corridor. WIS 60 could operate acceptably as a two-lane roadway east of the Washington Avenue intersection. Considering the existing Sheboygan Road (County I) intersection is already constructed with a four-lane WIS 60, it may not be cost effective to downsize the intersection, despite its surplus capacity.

Each development requesting new access on WIS 60 will be required by WisDOT to conduct a TIA as part of their approval process to determine their access and improvements. WisDOT will seek to limit access to WIS 60 via alternative access to side streets and cross access between adjacent parcels where available.

The findings and conclusions presented in this study are based on the current land use assumptions provided by the City and Town, and it provides a vision for the WIS 60 corridor under these assumptions. It is very likely these assumptions will change over time, and thus the study is not binding to the City or Town. The planning study was conducted in such a way that its recommendations are expected to accommodate some modifications to the land use types and sizes. Moderate to major changes in the assumed land use types or intensities could alter the overall recommendations.

EXHIBITS

APPENDICES



N
W E
S

Legend

● = Study Intersection ▬ = Study Area Roadway Segment

Study Location Map

Exhibit
1

raSmith

(4,230') (675') (2,565') (1,280') (1,805') (2,650')

N W E S

(Not to Scale)

Washington Ave

COUNTY NN

Covered Bridge Rd

60

COUNTY I

Continuous

Horns Corners Rd

Five Corners Dr

181

Hilltop Dr

Forward Way

Sheboygan Rd

Keup Rd

Sycamore Dr

Wauwatosa Rd

Elm St

Bridge Rd

(1,035')

(7,655')

(320')

(1,645')

(2,940')

Legend

= Lane Geometry = Stop Sign = Yield Sign

= Traffic Signal XXX' = Turn Bay Storage Length, ft

= Raised Median (XXX') = Intersection Spacing (Centerline-to-Centerline, ft)

Existing Transportation System

Exhibit **2**

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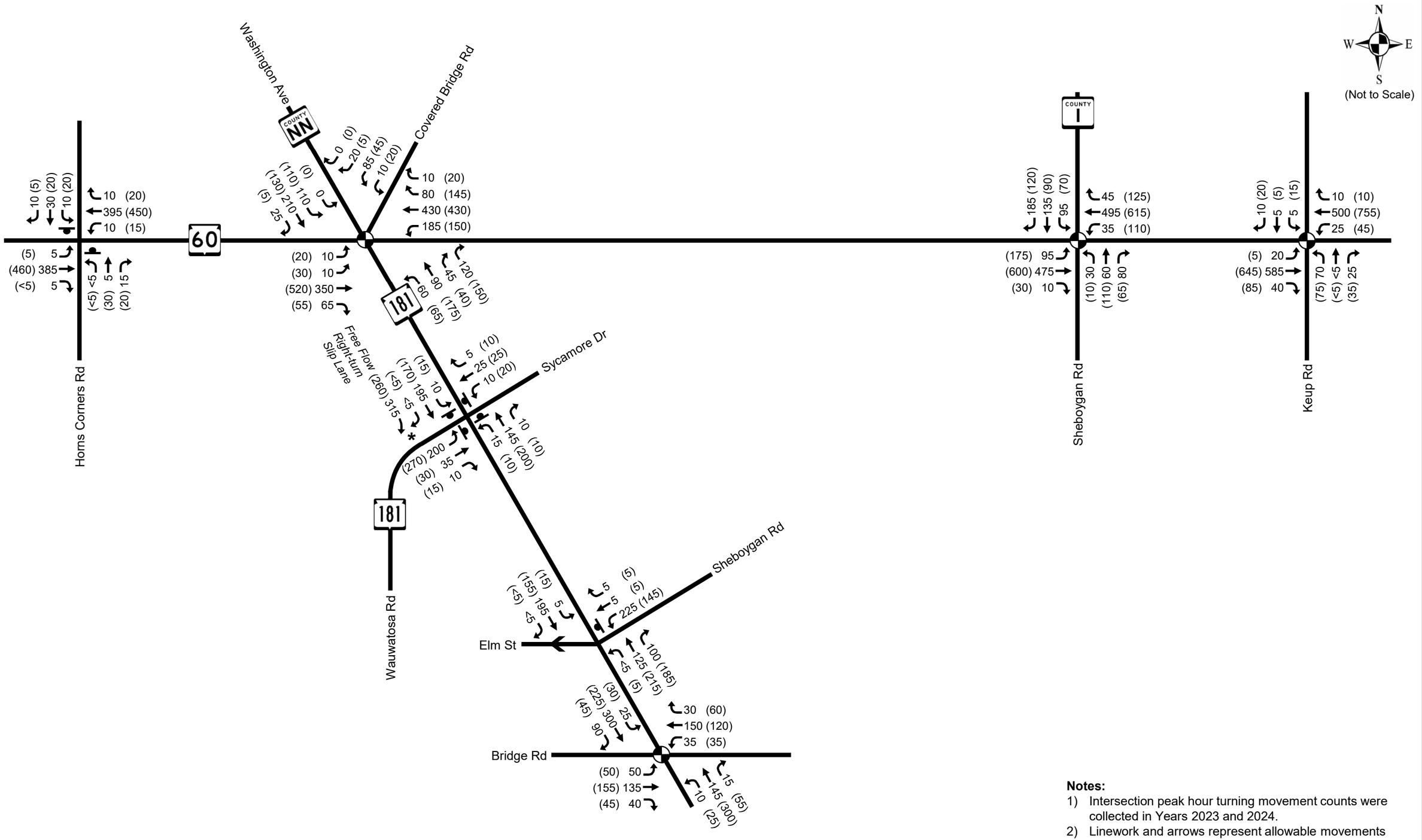


Notes:

1) Intersection peak hour turning movement counts were collected in Years 2023 and 2024.
2) Linework and arrows represent allowable movements and do not represent actual geometry.

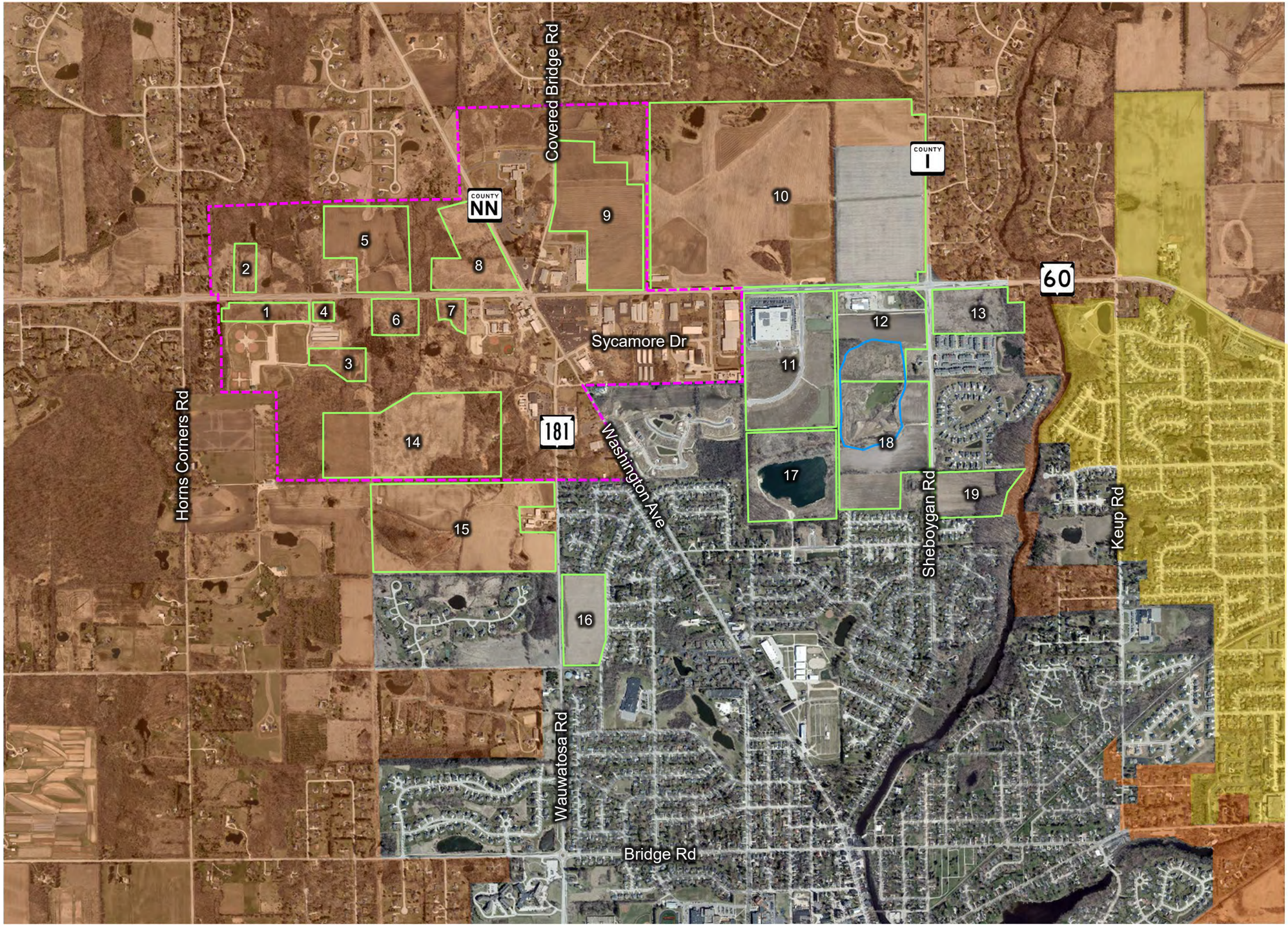
Legend

XX = Weekday Morning Peak Hour Volume (7:00 – 8:00 am)
(XX) = Weekday Evening Peak Hour Volume (4:30 – 5:30 pm)
= Traffic Signal
= Stop Sign

Existing Traffic Volumes

Exhibit **3**

raSmith



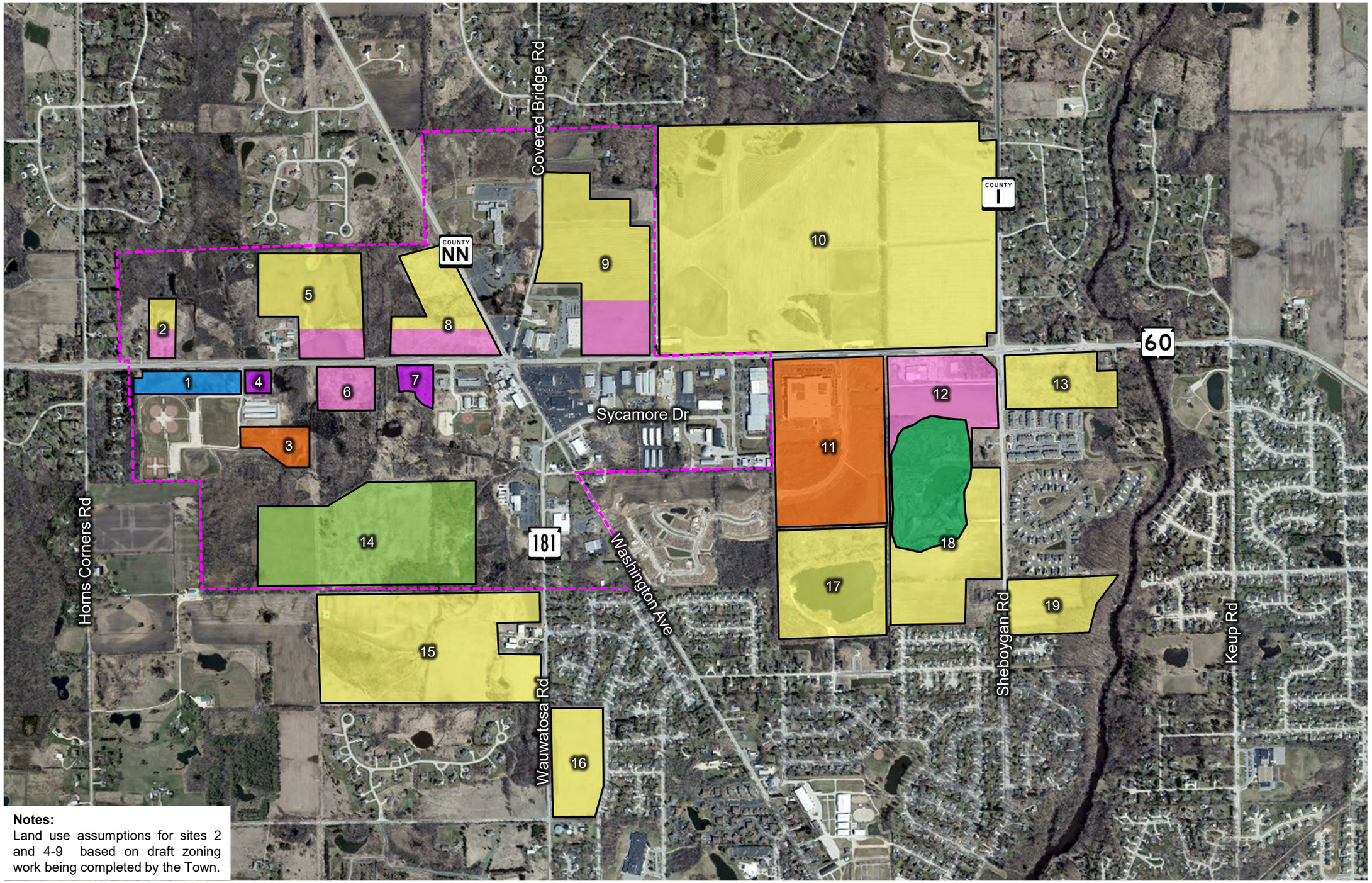
Legend

- = Future Development Site
- = Future Park Site
- XX = Development Site Number
- = Five Corners Business District
- = City of Cedarburg
- = Town of Cedarburg
- = Village of Grafton

Future Development Sites

Exhibit **4**

raSmith



Notes:
Land use assumptions for sites 2 and 4-9 based on draft zoning work being completed by the Town.

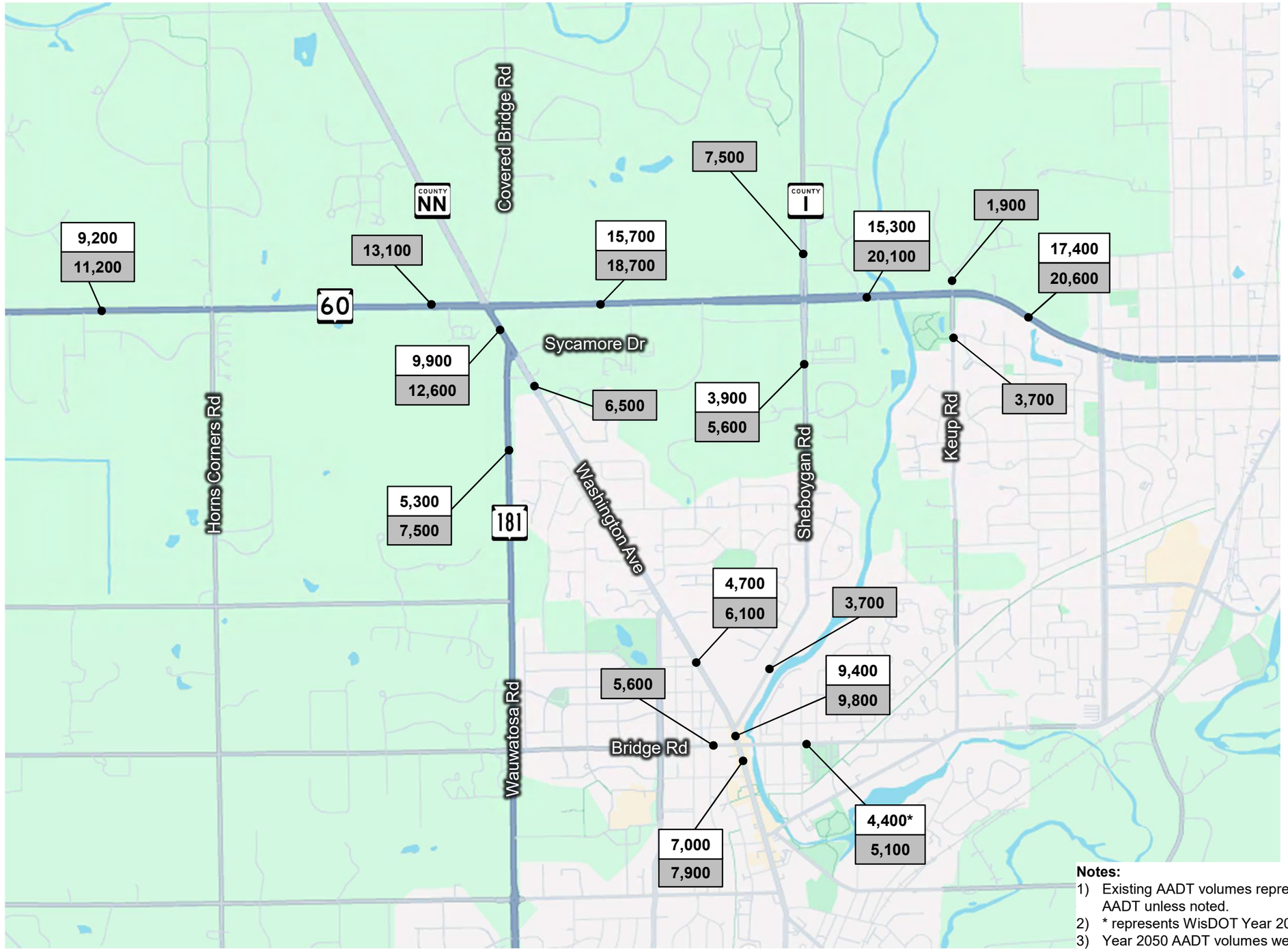
Legend

- = Residential
- = Recreational
- = Mixed Use
- = Retail / Restaurant
- = Public Park
- = Recreational & Complimentary Uses
- = Business Park/ Manufacturing
- XX = Development Site Number
- = Five Corners Business District

Future Development Sites
Anticipated Land Uses

Exhibit
5

raSmith



Notes:
1) Existing AADT volumes represent WisDOT's Year 2023 AADT unless noted.
2) * represents WisDOT Year 2019 AADT.
3) Year 2050 AADT volumes were converted from SEWRPC's Year 2050 AWDT

Legend

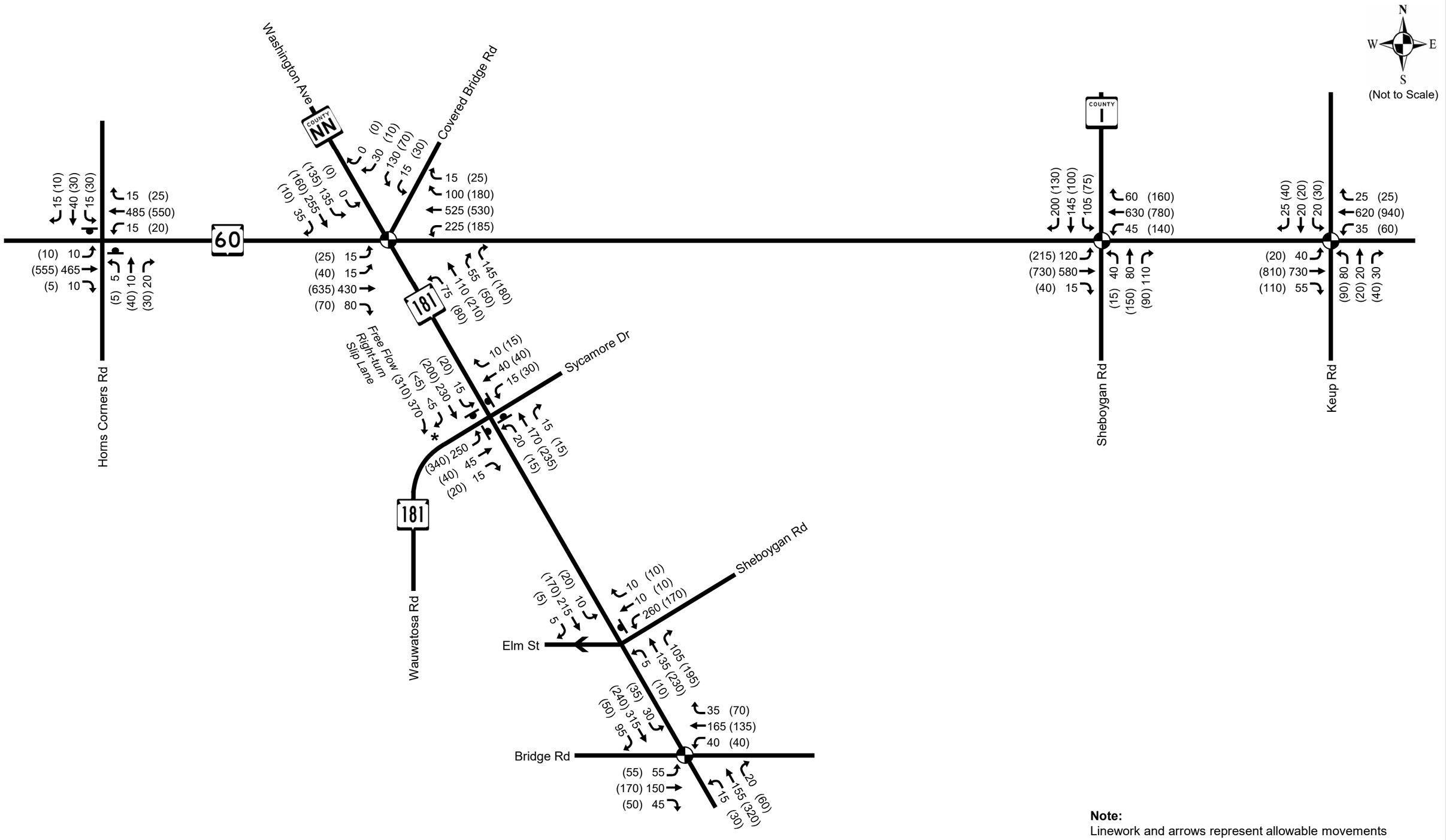
XXX = Existing Annual Average Daily Traffic (AADT) Volume (vpd)

XXX = Year 2050 Estimated Annual Average Daily Traffic (AADT) Volume (vpd)

Existing & Year 2050 Daily Traffic Volumes

Exhibit **6**

raSmith



Note:
Linework and arrows represent allowable movements and do not represent actual geometry.

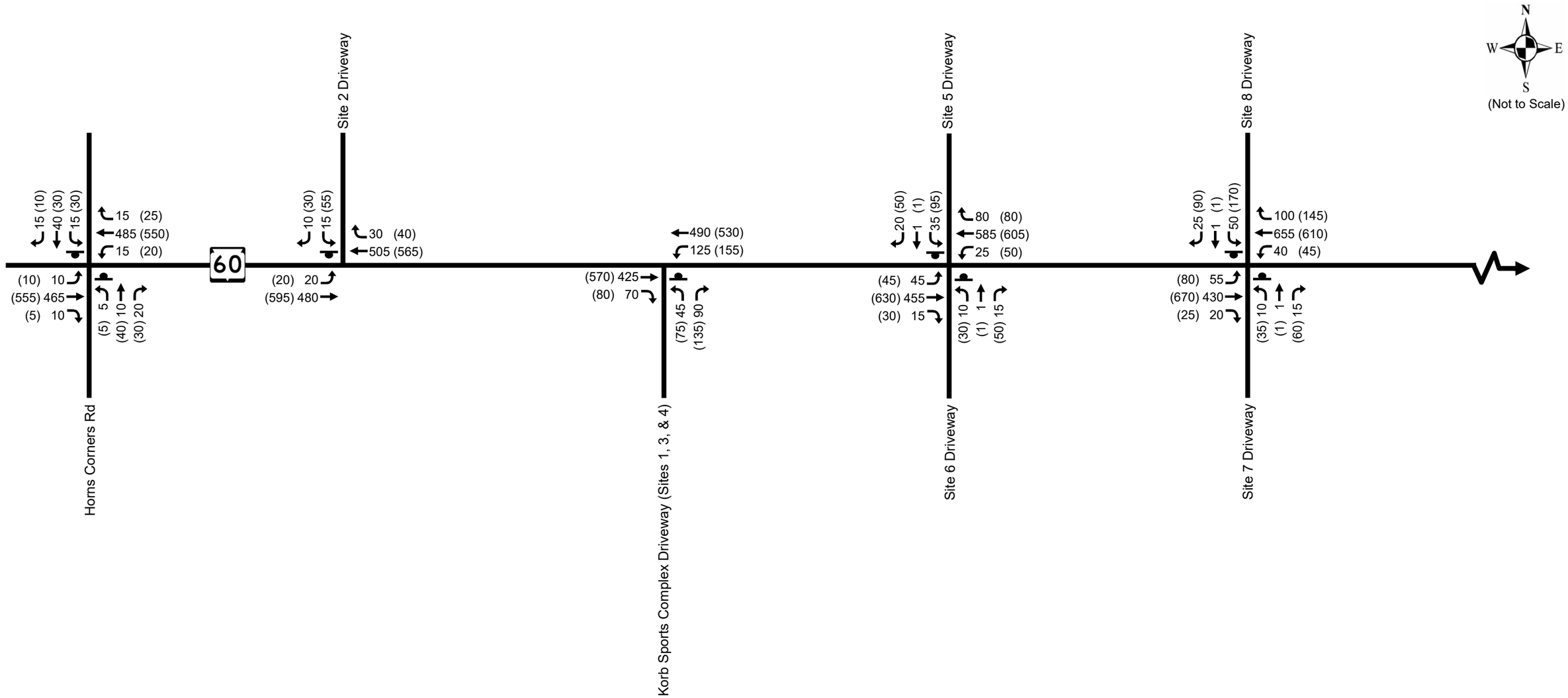
Legend

XX = Weekday Morning Peak Hour Volume (7:00 – 8:00 am)
(XX) = Weekday Evening Peak Hour Volume (4:30 – 5:30 pm)
= Traffic Signal
= Stop Sign

Year 2050 Traffic Volumes

Exhibit **7**

raSmith



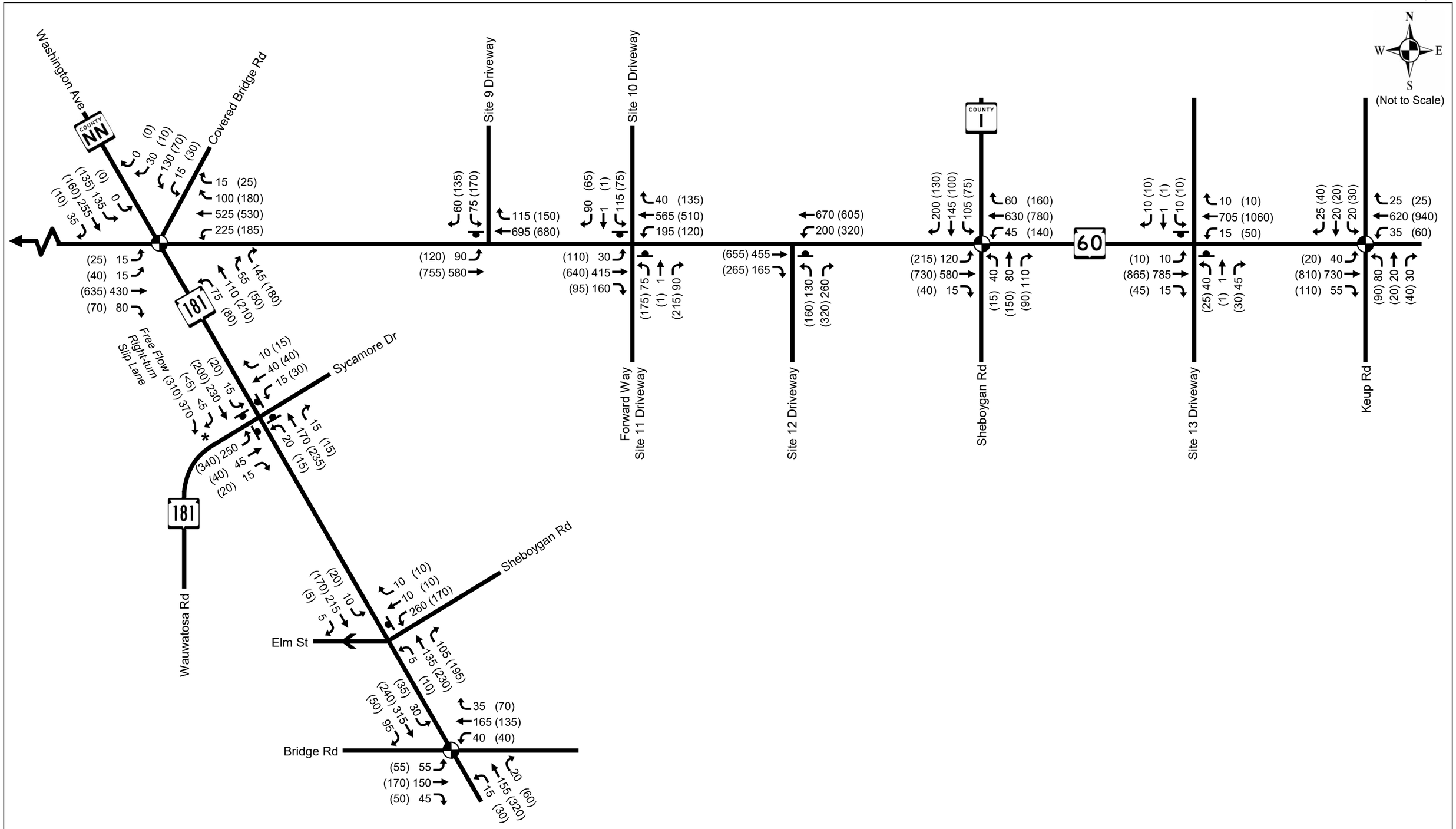
Legend

XX = Weekday Morning Peak Hour Volume (7:00 – 8:00 am)
(XX) = Weekday Evening Peak Hour Volume (4:30 – 5:30 pm)
= Traffic Signal
= Stop Sign

Year 2050 Total Traffic Volumes

Exhibit **8A**

raSmith



Legend

XX = Weekday Morning Peak Hour Volume (7:00 – 8:00 am)
(XX) = Weekday Evening Peak Hour Volume (4:30 – 5:30 pm)
= Traffic Signal
= Stop Sign

Year 2050 Total Traffic Volumes

Exhibit **8B**

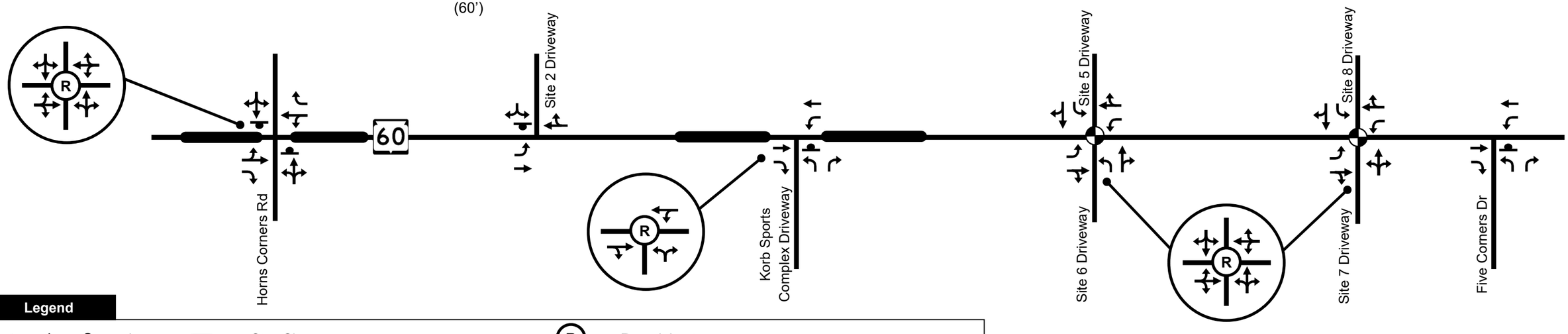
raSmith

Intersection	Traffic Control	Peak Hour	Parameter	Level of Service (LOS) per Movement by Approach												Overall Intersection LOS
				Eastbound			Westbound			Northbound			Southbound			
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
WIS 60 & Horns Corners Rd	Two-Way Stop Control	AM	LOS	A	A	(A)	A	A	(A)	C	C	C	D	D	D	N/A
			Delay, sec	8.7	8.7	0.0	8.7	8.7	0.0	21.3	21.3	21.3	33.4	33.4	33.4	
			Queue, ft	<25	<25	0	<25	<25	0	<25	<25	<25	45	45	45	
		PM	LOS	A	A	(A)	A	A	(A)	D	D	D	**F**	**F**	**F**	N/A
			Delay, sec	8.8	8.8	0.0	8.8	8.8	0.0	34.7	34.7	34.7	72.1	72.1	72.1	
			Queue, ft	<25	<25	0	<25	<25	0	45	45	45	80	80	80	
WIS 60 & CTH I/ Sheboygan Rd	Traffic Signal	AM	LOS	B	A	A	B	A	A	B	B	B	B	B	B	B
			Delay, sec	13.6	8.3	6.3	11.1	8.5	6.5	18.1	14.6	14.6	17.1	16.2	15.4	
			Queue, ft	75	140	<25	25	150	<25	35	75	75	80	130	130	
		PM	LOS	B	A	A	B	A	A	C	C	C	C	C	C	B
			Delay, sec	18.8	7.2	5.3	12.7	7.4	5.6	23.1	21.7	21.7	25.0	21.7	21.7	
			Queue, ft	200	150	<25	90	165	35	<25	90	90	60	90	90	
WIS 60 & Keup Rd	Traffic Signal	AM	LOS	C	C	A	C	B	A	**E**	**E**	B	C	C	B	C
			Delay, sec	25.7	24.3	9.9	32.0	17.5	9.7	69.4	69.4	16.6	21.7	21.7	16.5	
			Queue, ft	<25	345	<25	<25	260	<25	90	90	25	45	45	<25	
		PM	LOS	D	C	B	D	**E**	B	**F**	**F**	B	D	D	B	**E**
			Delay, sec	45.0	30.0	10.5	42.3	62.3	10.1	287.9	287.9	19.5	37.4	37.4	19.6	
			Queue, ft	<25	435	30	35	675	<25	95	95	30	50	50	30	
Washington Ave & Sycamore Dr	All-Way Stop Control	AM	LOS	C	C	C	B	B	B	B	B	B	B	B	B	B
			Delay, sec	16.1	16.1	16.1	10.3	10.3	10.3	12.1	12.1	12.1	13.0	13.0	13.0	
			Queue, ft	90	90	90	<25	<25	<25	45	45	45	55	55	55	
		PM	LOS	C	C	C	B	B	B	B	B	B	B	B	B	C
			Delay, sec	19.1	19.1	19.1	10.4	10.4	10.4	13.4	13.4	13.4	12.6	12.6	12.6	
			Queue, ft	120	120	120	<25	<25	<25	55	55	55	45	45	45	
Washington Ave & Sheboygan Rd/ Elm St	One-Way Stop Control	AM	LOS	--	--	--	C	A	A	A	A	A	A	A	A	N/A
			Delay, sec	--	--	--	20.0	9.5	9.5	7.8	7.8	7.8	7.8	7.8	7.8	
			Queue, ft	--	--	--	85	<25	<25	<25	<25	<25	<25	<25	<25	
		PM	LOS	--	--	--	C	B	B	A	A	A	A	A	A	N/A
			Delay, sec	--	--	--	17.3	10.2	10.2	7.6	7.6	7.6	8.3	8.3	8.3	
			Queue, ft	--	--	--	45	<25	<25	<25	<25	<25	<25	<25	<25	
Washington Ave & Bridge Rd	Traffic Signal	AM	LOS	C	C	C	C	C	C	B	B	A	B	B	A	B
			Delay, sec	24.6	20.8	20.8	23.7	20.9	20.9	10.4	10.4	8.9	12.7	12.7	9.4	
			Queue, ft	45	130	130	35	130	130	80	80	<25	165	165	30	
		PM	LOS	C	C	C	C	C	C	B	B	A	B	B	A	B
			Delay, sec	23.0	20.4	20.4	22.9	20.2	20.2	11.8	11.8	9.1	11.1	11.1	9.1	
			Queue, ft	45	135	135	35	130	130	155	155	<25	120	120	<25	

Intersection	Traffic Control	Peak Hour	Parameter	Operating Conditions per Movement by Approach																		Overall Int. LOS
				Eastbound (WIS 60)				Westbound (WIS 60)				Northbound (Washington Ave)				Southbound (CTH NN)			Southbound (Covered Bridge Rd)			
				Hrd LT	LT	TH	RT	LT	TH	RT	Hrd RT	LT	TH	RT	Hrd RT	LT	TH	RT	LT	TH	RT	
				to CTH NN	to Covered Bridge Rd	WIS 60	to Washington Ave	to Washington Ave	WIS 60	to CTH NN	to Covered Bridge Rd	WIS 60	to CTH NN	to Covered Bridge Rd	WIS 60	WIS 60	to Washington Ave	WIS 60	WIS 60	to Washington Ave	WIS 60	
WIS 60 & STH 181/ CTH NN/Covered Bridge Rd	Traffic Signal	AM	LOS	**E**	**E**	**E**	D	**E**	**E**	**E**	**E**	**F**	**E**	**F**	**F**	D	**E**	D	**F**	**F**	**F**	**E**
			Delay, sec	61.5	61.5	74.5	45.8	69.5	56.1	56.1	56.1	82.4	72.8	88.8	88.8	50.4	55	45.7	94.5	94.5	94.5	
			Queue, ft	75	75	>500	130	425	>500	>500	>500	160	210	275	275	205	390	50	380	380	380	
		PM	LOS	**F**	**F**	**F**	D	**E**	D	D	D	**E**	**F**	**F**	**F**	D	D	D	**F**	**F**	**F**	**E**
			Delay, sec	94.9	94.9	89.3	42.2	74.7	53.2	53.2	53.2	76.4	91.9	87.5	87.5	54.9	49.9	44.3	95.6	95.6	95.6	
			Queue, ft	195	195	>500	115	355.0	>500	>500	>500	165.0	375	295	295	205	240	<25	220.0	220	220	

Year 2050 Peak Hour Operating Conditions with Existing Transportation System

Exhibit **9**



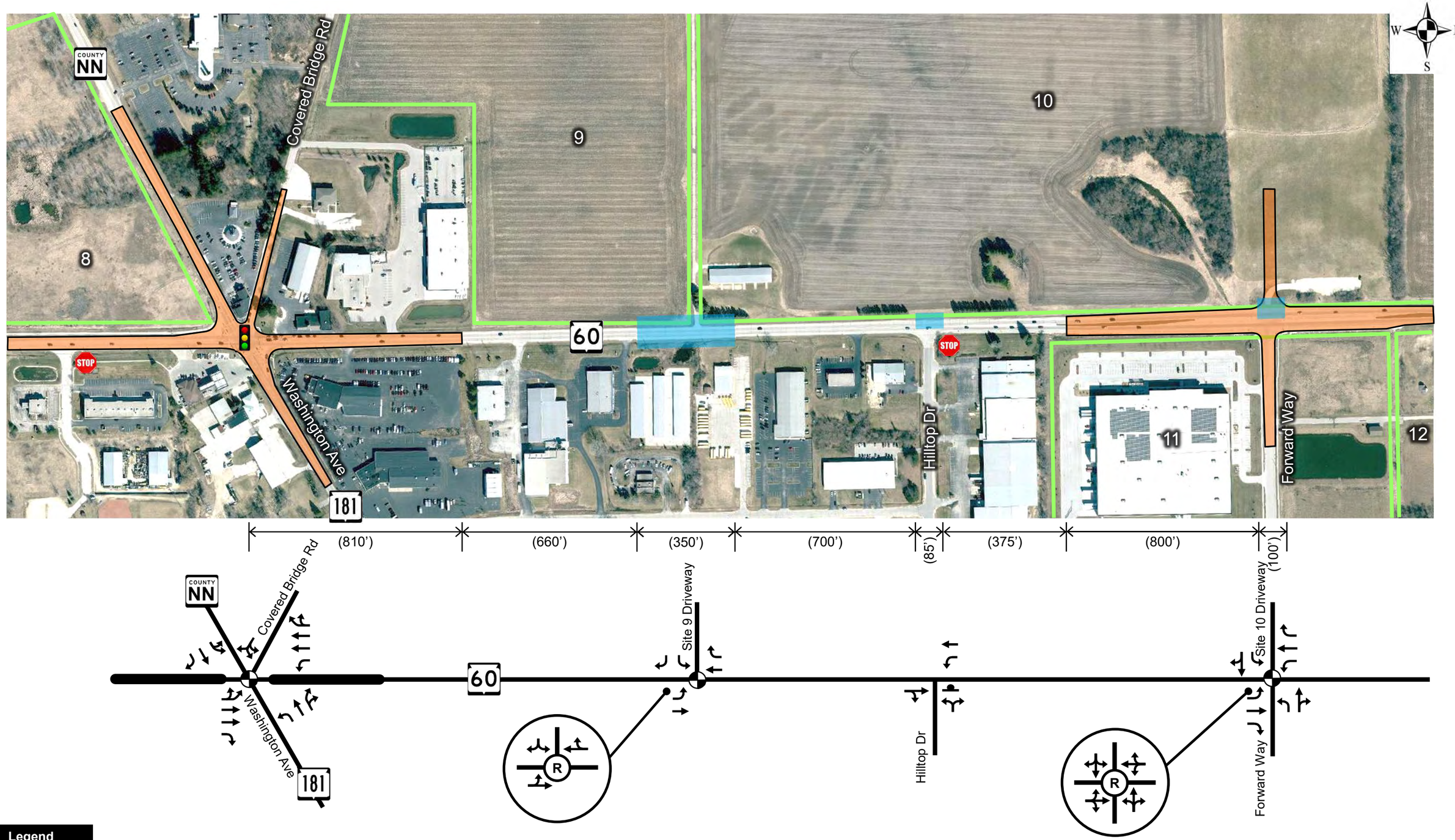
Legend

- = Lane Geometry
- = Traffic Signal
- = Raised Median
- = Stop Sign
- = Intersection Functional Area
- = Recommended WIS 60 Access Window
- R = Roundabout
- = Development Site Boundary
- XX = Development Site Number

WIS 60 Transportation Plan Considerations (West Section)

Exhibit **10**

raSmith



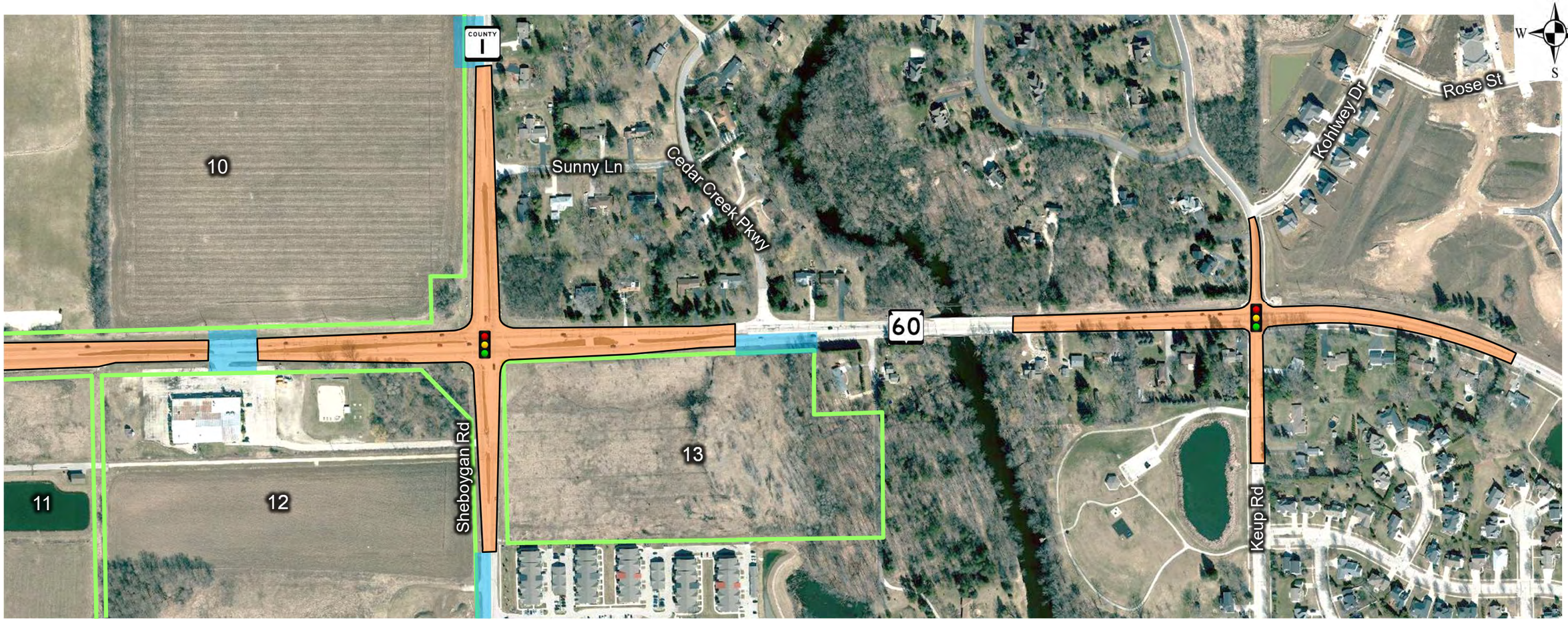
Legend

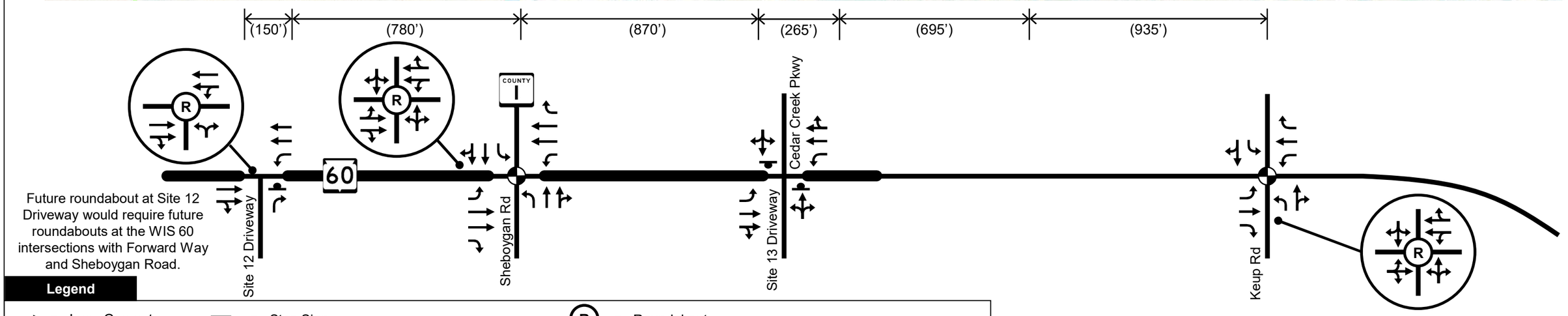
- = Lane Geometry
- = Traffic Signal
- = Raised Median
- = Stop Sign
- = Intersection Functional Area
- = Recommended WIS 60 Access Window
- R = Roundabout
- = Development Site Boundary
- XX = Development Site Number

WIS 60 Transportation Plan Considerations (Center Section)

Exhibit **11**

raSmith





Legend

- → = Lane Geometry
- = Traffic Signal
- = Raised Median
- = Stop Sign
- = Intersection Functional Area
- = Recommended WIS 60 Access Window
- R = Roundabout
- = Development Site Boundary
- XX = Development Site Number

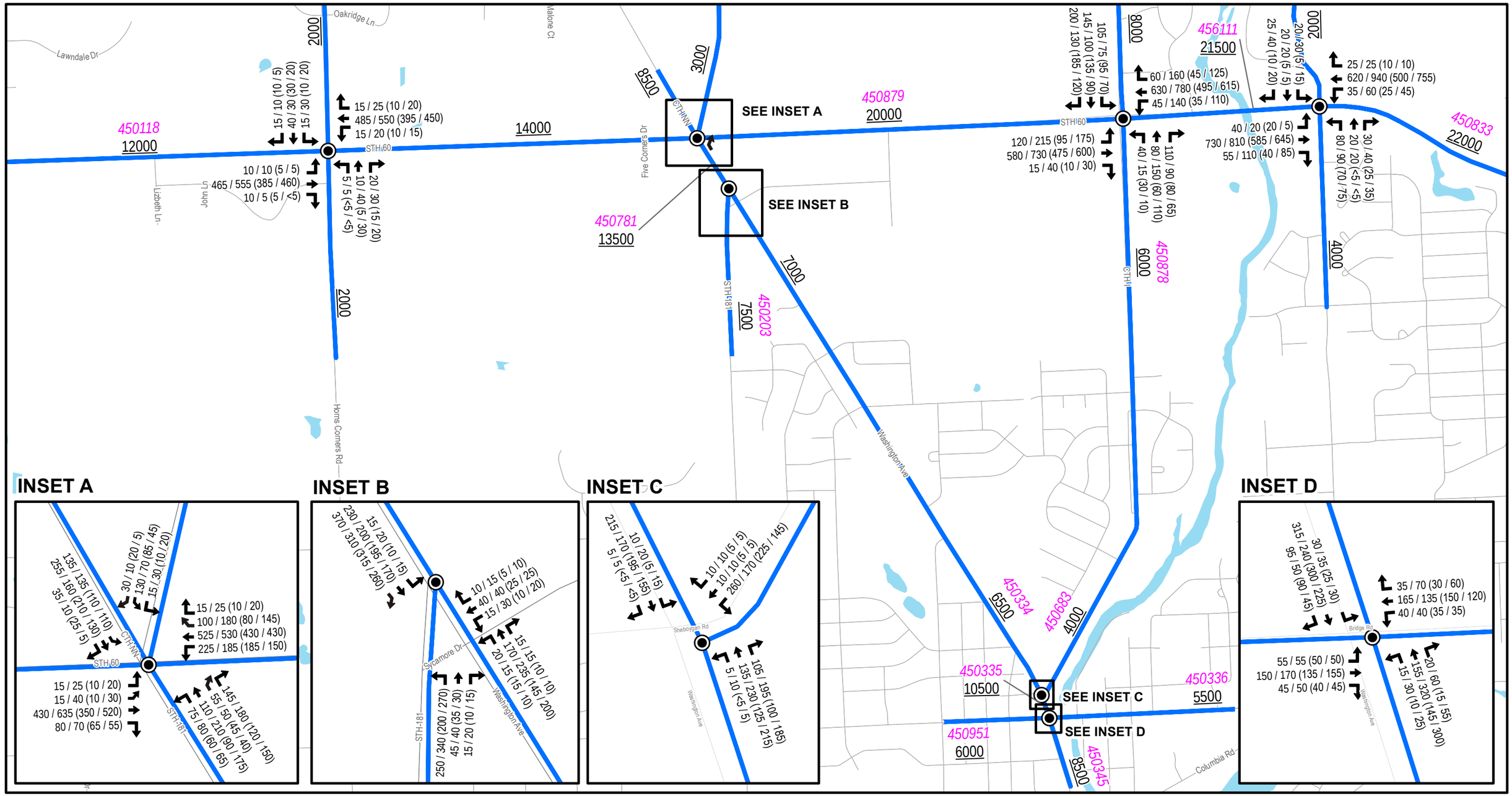
WIS 60 Transportation Plan Considerations (East Section)

Exhibit **12**

raSmith

APPENDIX B

SEWRPC Forecasts



INSET A

INSET B

INSET C

INSET D

CEDARBURG TRAFFIC STUDY

FORECAST YEAR 2050 AVERAGE WEEKDAY TRAFFIC (AWDT) AND PEAK-HOUR TURN MOVEMENT VOLUMES

FORECAST WORK ORDER:
MASTER CONTRACT:
ROUTE(S): STH 60 / WASHINGTON AVE
LOCATION DESCRIPTION: BRIDGE RD/KEUP RD
COUNTY(IES): OZAUKEE
FORECAST YEARS: 2050
SEWRPC PROJECT ID: 200-1000
PREPARED BY: G. ALE
DATE: 12/19/2024

0 0.1 0.2 Miles

FORECAST FACILITY
XXXXXX TRADAS_ID
XXXXX FORECAST YEAR 2050 AWDT VOLUME ON A ROADWAY SEGMENT

AVERAGE WEEKDAY PEAK-HOUR TURN MOVEMENT VOLUMES
XXX / **XXX** (XXX / XXX) FORECAST YEAR 2050 (COUNT YEAR 2023/2024) AM / PM PEAK-HOUR VOLUMES

NOTES

(A) THE FORECASTS ARE PREPARED WITHIN THE CONTEXT OF THE VISION 2050 LAND USE AND TRANSPORTATION SYSTEM PLAN AND UTILIZE THE COMMISSION'S 5TH GENERATION TRAVEL DEMAND MODELS AND TIME-OF-DAY ASSIGNMENTS.

(B) AM PEAK HOUR IS **7:00 – 8:00 AM** AND PM PEAK HOUR IS **4:30 – 5:30 PM**.

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
KENOSHA·MILWAUKEE·OZAUKEE·RACINE·WALWORTH·WASHINGTON·WAUKESHA

12/19/2024
R:\G506mr270_Cedbg\Analysis\Forecasts\Cedarburg_VISION2050_Forecasts.mxd

APPENDIX C

Development Trip Generation

Trip Generation Summary

Site	Weekday	AM Peak			PM Peak		
	Daily Trips	In	Out	Total	In	Out	Total
1,3 & 4	2,780	195	135	330	235	210	445
2	1,180	50	25	75	60	85	145
5	1,385	40	25	65	80	80	160
6	2,485	125	55	180	125	145	270
7	1,320	60	25	85	70	95	165
8	5,870	155	75	230	225	260	485
9	7,115	205	135	340	270	305	575
10	3,795	70	205	275	245	140	385
11	3,965	355	165	520	215	390	605
12	15,305	365	290	655	585	580	1,165
13	2,000	30	85	115	95	55	150

Sites 1, 3 & 4 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
492	Health/Fitness Club (Site 1)	62,301	SF		N/A	**40**	51%	**40**	49%	**80**	1.31	**125**	57%	**90**	43%	**215**	3.45
630	Clinic (Site 1)	9,992	SF	**395**	FCE	**25**	81%	**5**	19%	**30**	FCE	**10**	30%	**25**	70%	**35**	3.69
770	Business Park (Site 3)	30,300	SF	**1,035**	FCE	**40**	85%	**5**	15%	**45**	FCE	**15**	26%	**35**	74%	**50**	FCE
937	Coffee/Donut Shop w/ Drive-Thru (Site 4)	2,000	SF	**1,065**	533.37	**85**	51%	**85**	49%	**170**	85.88	**40**	50%	**40**	50%	**80**	38.99
488	Soccer Complex (Existing Korb Sports Complex)	4	Fields	**285**	71.33	**5**	61%	**0**	39%	**5**	0.99	**45**	66%	**20**	34%	**65**	16.43
Total				**2,780**		**195**		**135**		**330**		**235**		**210**		**445**	
	Linked (XXX)		0%														
Driveway Trips				**2,780**		**195**		**135**		**330**		**235**		**210**		**445**	
	Pass-by (XXX)		0%														
Total New Trips				**2,780**		**195**		**135**		**330**		**235**		**210**		**445**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
	%	195	135	235	210
T/F West WIS 60	35%	70	45	80	75
T/F East WIS 60	65%	125	90	155	135
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		195	135	235	210
		OK	OK	OK	OK

Site 2 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
822	Strip Retail Plaza (<40K)	14,400	SF	**835**	FCE	**20**	60%	**15**	40%	**35**	2.36	**50**	50%	**50**	50%	**100**	FCE
710	General Office Building	14,400	SF	**215**	FCE	**25**	88%	**5**	12%	**30**	FCE	**5**	17%	**30**	83%	**35**	FCE
210	Single-Family Detached Housing	11	DU	**130**	FCE	**5**	26%	**5**	74%	**10**	FCE	**5**	63%	**5**	37%	**10**	FCE
Total				**1,180**		**50**		**25**		**75**		**60**		**85**		**145**	
Linked (XXX)			0%														
Driveway Trips				**1,180**		**50**		**25**		**75**		**60**		**85**		**145**	
Pass-by (XXX)			0%														
Total New Trips				**1,180**		**50**		**25**		**75**		**60**		**85**		**145**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
%		50	25	60	85
T/F West WIS 60	35%	20	10	20	30
T/F East WIS 60	65%	30	15	40	55
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		50	25	60	85
		OK	OK	OK	OK

Site 5 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
822	Strip Retail Plaza (<40K)	24,200	SF	**1,320**	54.45	**35**	60%	**20**	40%	**55**	2.36	**75**	50%	**70**	50%	**145**	FCE
932	High Turnover (Sit-Down) Restaurar	5,000	SF	**535**	107.2	**30**	55%	**20**	45%	**50**	9.57	**25**	61%	**20**	39%	**45**	9.05
710	General Office Building	29,200	SF	**400**	FCE	**55**	88%	**5**	12%	**60**	FCE	**10**	17%	**50**	83%	**60**	FCE
210	Single-Family Detached Housing	20	DU	**230**	FCE	**5**	26%	**10**	74%	**15**	FCE	**15**	63%	**5**	37%	**20**	FCE
Total				**2,485**		**125**		**55**		**180**		**125**		**145**		**270**	
	Linked (XXX)		0%														
Driveway Trips				**2,485**		**125**		**55**		**180**		**125**		**145**		**270**	
	Pass-by (XXX)		0%														
Total New Trips				**2,485**		**125**		**55**		**180**		**125**		**145**		**270**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
%		125	55	125	145
T/F West WIS 60	35%	45	20	45	50
T/F East WIS 60	65%	80	35	80	95
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		125	55	125	145
		OK	OK	OK	OK

Small Sample Size < 5

Site 6 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
822	Strip Retail Plaza (<40K)	27,360	SF	**1,385**	FCE	**40**	60%	**25**	40%	**65**	2.36	**80**	50%	**80**	50%	**160**	FCE
Total				**1,385**		**40**		**25**		**65**		**80**		**80**		**160**	
Linked (XXX)			0%														
Driveway Trips				**1,385**		**40**		**25**		**65**		**80**		**80**		**160**	
Pass-by (XXX)			0%														
Total New Trips				**1,385**		**40**		**25**		**65**		**80**		**80**		**160**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
%		40	25	80	80
T/F West WIS 60	35%	15	10	30	30
T/F East WIS 60	65%	25	15	50	50
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		40	25	80	80
		OK	OK	OK	OK

Site 7 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
822	Strip Retail Plaza (<40K)	19,200	SF	**1,045**	54.45	**25**	60%	**20**	40%	**45**	2.36	**65**	50%	**60**	50%	**125**	FCE
710	General Office Building	19,200	SF	**275**	FCE	**35**	88%	**5**	12%	**40**	FCE	**5**	17%	**35**	83%	**40**	FCE
Total				**1,320**		**60**		**25**		**85**		**70**		**95**		**165**	
Linked (XXX)			0%														
Driveway Trips				**1,320**		**60**		**25**		**85**		**70**		**95**		**165**	
Pass-by (XXX)			0%														
Total New Trips				**1,320**		**60**		**25**		**85**		**70**		**95**		**165**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
%		60	25	70	95
T/F West WIS 60	35%	20	10	25	35
T/F East WIS 60	65%	40	15	45	60
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		60	25	70	95
		OK	OK	OK	OK

Small Sample Size < 5

Site 8 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
821	Shopping Plaza (40-150K)	72,250	SF	**4,880**	67.52	**80**	62%	**45**	38%	**125**	1.73	**185**	49%	**190**	51%	**375**	5.19
932	High Turnover (Sit-Down) Restaurant	5,000	SF	**535**	107.2	**30**	55%	**20**	45%	**50**	9.57	**25**	61%	**20**	39%	**45**	9.05
710	General Office Building	25,750	SF	**355**	FCE	**45**	88%	**5**	12%	**50**	FCE	**10**	17%	**45**	83%	**55**	FCE
210	Single-Family Detached Housing	8	DU	**100**	FCE	**0**	26%	**5**	74%	**5**	FCE	**5**	63%	**5**	37%	**10**	FCE
Total				**5,870**		**155**		**75**		**230**		**225**		**260**		**485**	
	Linked (XXX)		0%														
Driveway Trips				**5,870**		**155**		**75**		**230**		**225**		**260**		**485**	
	Pass-by (XXX)		0%														
Total New Trips				**5,870**		**155**		**75**		**230**		**225**		**260**		**485**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
	%	155	75	225	260
T/F West WIS 60	35%	55	25	80	90
T/F East WIS 60	65%	100	50	145	170
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		155	75	225	260
		OK	OK	OK	OK

Site 9 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
821	Shopping Plaza (40-150K)	73,500	SF	**4,965**	67.52	**80**	62%	**45**	38%	**125**	1.73	**185**	49%	**195**	51%	**380**	5.19
734	Fast Food Restaurant w/ Drive-Thru	3,000	SF	**1,400**	467.48	**70**	51%	**65**	49%	**135**	44.61	**50**	52%	**50**	48%	**100**	33.03
710	General Office Building	25,500	SF	**355**	FCE	**45**	88%	**5**	12%	**50**	FCE	**10**	17%	**45**	83%	**55**	FCE
210	Single-Family Detached Housing	36	DU	**395**	FCE	**10**	26%	**20**	74%	**30**	FCE	**25**	63%	**15**	37%	**40**	FCE
Total				**7,115**		**205**		**135**		**340**		**270**		**305**		**575**	
Linked (XXX)			0%														
Driveway Trips				**7,115**		**205**		**135**		**340**		**270**		**305**		**575**	
Pass-by (XXX)			0%														
Total New Trips				**7,115**		**205**		**135**		**340**		**270**		**305**		**575**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
	%	205	135	270	305
T/F West WIS 60	45%	90	60	120	135
T/F East WIS 60	55%	115	75	150	170
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		205	135	270	305
		OK	OK	OK	OK

Site 10 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
210	Single-Family Detached Housing	422	DU	**3,795**	FCE	**70**	26%	**205**	74%	**275**	FCE	**245**	63%	**140**	37%	**385**	FCE
Total				**3,795**		**70**		**205**		**275**		**245**		**140**		**385**	
Linked (XXX)			0%														
Driveway Trips				**3,795**		**70**		**205**		**275**		**245**		**140**		**385**	
Pass-by (XXX)			0%														
Total New Trips				**3,795**		**70**		**205**		**275**		**245**		**140**		**385**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
%		70	205	245	140
T/F West WIS 60	45%	30	90	110	65
T/F East WIS 60	55%	40	115	135	75
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		70	205	245	140
		OK	OK	OK	OK

Site 11 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
140	Manufacturing (Wilo)	250,000	SF	**1,145**	FCE	**120**	76%	**40**	24%	**160**	FCE	**60**	31%	**140**	69%	**200**	FCE
140	Manufacturing	212,800	SF	**1,005**	FCE	**105**	76%	**35**	24%	**140**	FCE	**55**	31%	**115**	69%	**170**	FCE
770	Business Park	30,700	SF	**1,040**	FCE	**40**	85%	**5**	15%	**45**	FCE	**15**	26%	**35**	74%	**50**	FCE
565	Day Care Center Phase 1	10,650	SF	**505**	47.62	**60**	53%	**55**	47%	**115**	11.00	**55**	47%	**65**	53%	**120**	11.12
565	Day Care Center Phase 2	5,661	SF	**270**	47.62	**30**	53%	**30**	47%	**60**	11.00	**30**	47%	**35**	53%	**65**	11.12
Total				**3,965**		**355**		**165**		**520**		**215**		**390**		**605**	
	Linked (XXX)		0%														
Driveway Trips				**3,965**		**355**		**165**		**520**		**215**		**390**		**605**	
	Pass-by (XXX)		0%														
Total New Trips				**3,965**		**355**		**165**		**520**		**215**		**390**		**605**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
	%	355	165	215	390
T/F West WIS 60	45%	160	75	95	175
T/F East WIS 60	55%	195	90	120	215
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		355	165	215	390
		OK	OK	OK	OK

Site 12 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
WisDOT	Gas Station with Convenience Market	9,000 20	SF VFP	**4,350**		**160**	51%	**150**	49%	**310**		**160**	50%	**160**	50%	**320**	
821	Shopping Plaza (40-150K)	145,000	SF	**9,790**	67.52	**155**	62%	**95**	38%	**250**	1.73	**370**	49%	**385**	51%	**755**	5.19
932	High Turnover (Sit-Down) Restaurants (2)	10,000	SF	**1,070**	107.2	**50**	55%	**45**	45%	**95**	9.57	**55**	61%	**35**	39%	**90**	9.05
411	Public Park	10	Acres	**95**	FCE	**0**	59%	**0**	41%	**0**	0.02	**0**	55%	**0**	45%	**0**	0.11
Total				**15,305**		**365**		**290**		**655**		**585**		**580**		**1,165**	
Linked (XXX)			0%														
Driveway Trips				**15,305**		**365**		**290**		**655**		**585**		**580**		**1,165**	
Pass-by (XXX)			0%														
Total New Trips				**15,305**		**365**		**290**		**655**		**585**		**580**		**1165**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
	%	365	290	585	580
T/F West WIS 60	45%	165	130	265	260
T/F East WIS 60	55%	200	160	320	320
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		365	290	585	580
		OK	OK	OK	OK

Small Sample Size ≤ 5

Site 13 Trip Generation

ITE Code	Land Use	Size	Unit	Weekday		AM Peak						PM Peak					
				Daily Trips	Rate or FCE	In	%	Out	%	Total	Rate or FCE	In	%	Out	%	Total	Rate or FCE
220	Multi-Family Housing (Low-Rise)	300	DU	**2,000**	FCE	**30**	24%	**85**	76%	**115**	FCE	**95**	63%	**55**	37%	**150**	FCE
Total				**2,000**		**30**		**85**		**115**		**95**		**55**		**150**	
Linked (XXX)			0%														
Driveway Trips				**2,000**		**30**		**85**		**115**		**95**		**55**		**150**	
Pass-by (XXX)			0%														
Total New Trips				**2,000**		**30**		**85**		**115**		**95**		**55**		**150**	

		Distribution			
		AM		PM	
		IN	OUT	IN	OUT
%		30	85	95	55
T/F West WIS 60	45%	15	40	45	25
T/F East WIS 60	55%	15	45	50	30
		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
		30	85	95	55
		OK	OK	OK	OK

APPENDIX E

Year 2050 Total Traffic Analysis with Improvements

Intersection	Traffic Control	Peak Hour	Parameter	Level of Service (LOS) per Movement by Approach												Overall Intersection LOS
				Eastbound			Westbound			Northbound			Southbound			
				LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
WIS 60 & Horns Corners Rd	Two-Way Stop Control	AM	LOS	A	(A)	(A)	A	(A)	(A)	B	B	B	C	C	C	N/A
			Delay, sec	8.7	0.0	0.0	8.6	0.0	0.0	14.8	14.8	14.8	18.3	18.3	18.3	
		PM	LOS	A	(A)	(A)	A	(A)	(A)	C	C	C	C	C	C	N/A
			Delay, sec	9.0	0.0	0.0	8.8	0.0	0.0	20.2	20.2	20.2	24.6	24.6	24.6	
WIS 60 & Horns Corners Rd	Roundabout	AM	LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
			Delay, sec	7.9	7.9	7.9	7.7	0.7	0.7	5.4	5.4	5.4	7.6	7.6	7.6	
		PM	LOS	A	A	A	A	A	A	B	B	B	B	B	B	A
			Delay, sec	8.3	8.3	8.3	8.4	8.4	8.4	10.1	10.1	10.1	10.4	10.4	10.4	
WIS 60 & Site 2 Driveway	One-Way Stop Control	AM	LOS	A	(A)	--	--	(A)	(A)	--	--	--	C	--	C	N/A
			Delay, sec	8.8	0.0	--	--	0.0	0.0	--	--	--	20.0	--	20.0	
		PM	LOS	A	(A)	--	--	(A)	(A)	--	--	--	**E**	--	**E**	N/A
			Delay, sec	9.2	0.0	--	--	0.0	0.0	--	--	--	45.0	--	45.0	
WIS 60 & Korb Sports Complex Driveway	One-Way Stop Control	AM	LOS	--	(A)	(A)	A	(A)	--	C	--	B	--	--	--	N/A
			Delay, sec	--	0.0	0.0	9.0	0.0	--	21.4	--	12.2	--	--	--	
		PM	LOS	--	(A)	(A)	A	(A)	--	D	--	C	--	--	--	N/A
			Delay, sec	--	0.0	0.0	10.0	0.0	--	34.1	--	15.5	--	--	--	
WIS 60 & Korb Sports Complex Driveway	Roundabout	AM	LOS	--	A	A	A	A	--	A	--	A	--	--	--	A
			Delay, sec	--	7.8	7.8	8.3	8.3	--	5.8	--	5.8	--	--	--	
		PM	LOS	--	B	B	A	A	--	A	--	A	--	--	--	B
			Delay, sec	--	11.0	11.0	9.9	9.9	--	8.5	--	8.5	--	--	--	
WIS 60 & Site 5 / 6 Driveways	Traffic Signal	AM	LOS	A	A	A	A	A	A	D	D	D	D	D	D	A
			Delay, sec	2.6	3.7	3.7	0.5	1.2	1.2	43.0	42.1	42.1	43.9	42.4	42.4	
		PM	LOS	A	A	A	A	A	A	D	D	D	D	D	D	A
			Delay, sec	3.6	6.4	6.4	2.1	1.3	1.3	42.1	40.0	40.0	46.1	40.0	40.0	
WIS 60 & Site 5 / 6 Driveways	Roundabout	AM	LOS	A	A	A	A	A	A	A	A	A	A	A	A	A
			Delay, sec	7.2	7.2	7.2	9.7	9.7	9.7	5.0	5.0	5.0	6.0	6.0	6.0	
		PM	LOS	B	B	B	B	B	B	A	A	A	A	A	A	B
			Delay, sec	12.1	12.1	12.1	11.0	11.0	11.0	7.6	7.6	7.6	8.3	8.3	8.3	
WIS 60 & Site 7 / 8 Driveways	Traffic Signal	AM	LOS	A	A	A	A	A	A	D	D	D	D	D	D	A
			Delay, sec	0.3	0.6	0.6	0.1	0.9	0.1	42.9	41.7	41.7	44.3	42.2	42.2	
		PM	LOS	A	A	A	A	A	A	D	C	C	D	D	D	A
			Delay, sec	0.5	1.7	1.7	0.3	1.2	0.1	38.2	34.1	34.1	43.6	35.1	35.1	
WIS 60 & Site 7 / 8 Driveways	Roundabout	AM	LOS	A	A	A	B	B	B	A	A	A	A	A	A	A
			Delay, sec	7.4	7.4	7.7	12.1	12.1	12.1	5.0	5.0	5.0	7.0	7.0	7.0	
		PM	LOS	C	C	C	B	B	B	A	A	A	B	B	B	B
			Delay, sec	17.8	17.8	17.8	14.0	14.0	14.0	9.7	9.7	9.7	11.7	11.7	11.7	
WIS 60 & Site 9 Driveway	Traffic Signal	AM	LOS	A	A	--	--	A	A	--	--	--	D	--	D	A
			Delay, sec	0.4	0.6	--	--	1.2	0.1	--	--	--	44.8	--	42.8	
		PM	LOS	A	A	--	--	A	A	--	--	--	D	--	D	A
			Delay, sec	3.9	0.7	--	--	1.9	0.2	--	--	--	49.8	--	42.1	
WIS 60 & Site 9 Driveway	Roundabout	AM	LOS	A	A	--	--	B	B	--	--	--	A	--	A	B
			Delay, sec	9.7	9.7	--	--	13.4	13.4	--	--	--	8.2	--	8.2	
		PM	LOS	C	C	--	--	C	C	--	--	--	B	--	B	C
			Delay, sec	21.0	21.0	--	--	15.3	15.3	--	--	--	13.1	--	13.1	
WIS 60 & Forward Way / Site 10 Driveway	Traffic Signal	AM	LOS	A	A	A	A	A	A	D	D	D	D	D	D	B
			Delay, sec	4.8	6.3	4.9	6.3	1.1	0.1	42.6	37.3	37.3	45.2	37.3	37.3	
		PM	LOS	B	A	A	A	C	C	D	D	D	D	C	C	C
			Delay, sec	11.8	2.7	0.1	9.0	31.9	21.3	40.8	38.9	38.9	46.4	31.7	31.7	
WIS 60 & Forward Way / Site 10 Driveway	Roundabout	AM	LOS	B	B	B	B	B	B	A	A	A	B	B	B	B
			Delay, sec	14.2	14.2	14.2	13.6	13.6	13.6	7.5	7.5	7.5	12.4	12.4	12.4	
		PM	LOS	C	C	C	C	C	C	D	D	D	A	A	A	C
			Delay, sec	21.0	21.0	21.0	22.1	22.1	22.1	25.9	25.9	25.9	9.6	9.6	9.6	
WIS 60 & Site 12 Driveway	One-Way Stop Control	AM	LOS	--	(A)	(A)	A	(A)	--	--	--	B	--	--	--	N/A
			Delay, sec	--	0.0	0.0	9.4	0.0	--	--	--	10.6	--	--	--	
		PM	LOS	--	(A)	(A)	B	(A)	--	--	--	B	--	--	--	N/A
			Delay, sec	--	0.0	0.0	13.0	0.0	--	--	--	11.9	--	--	--	
WIS 60 & Site 12 Driveway	Roundabout	AM	LOS	--	A	A	A	A	--	B	--	B	--	--	--	A
			Delay, sec	--	5.9	5.9	6.6	6.6	--	11.3	--	11.3	--	--	--	
		PM	LOS	--	A	A	A	A	--	D	--	D	--	--	--	B
			Delay, sec	--	9.4	9.4	7.3	7.3	--	26.4	--	26.4	--	--	--	
WIS 60 & Sheboygan Rd	Traffic Signal	AM	LOS	C	B	B	B	B	A	D	C	C	C	C	C	C
			Delay, sec	29.9	19.2	13.6	19.5	13.1	9.8	42.2	26.6	26.6	31.6	28.5	28.5	
		PM	LOS	B	C	C	B	C	B	D	C	C	D	C	C	**C**
			Delay, sec	16.3	32.4	21.7	14.9	20.3	14.7	44.3	31.1	31.1	36.4	31.1	31.1	
WIS 60 & Sheboygan Rd	Roundabout	AM	LOS	A	A	A	A	A	A	B	B	B	D	D	D	B
			Delay, sec	8.0	8.0	8.0	7.4	7.4	7.4	13.9	13.9	13.9	28.4	28.4	28.4	
		PM	LOS	A	A	A	B	B	B	C	C	C	C	C	C	B
			Delay, sec	9.8	9.8	9.8	12.5	12.5	12.5	21.6	21.6	21.6	24.2	24.2	24.2	
WIS 60 & Cedar Creek Pkwy / Site 13 Driveway	Two-Way Stop Control	AM	LOS	A	(A)	(A)	A	(A)	(A)	B	B	B	B	B	B	N/A
			Delay, sec	9.4	0.0	0.0	8.8	0.0	0.0	14.2	14.2	14.2	14.9	14.9	14.9	
		PM	LOS	B	(A)	(A)	A	(A)	(A)	C	C	C	C	C	C	N/A
			Delay, sec	11.1	0.0	0.0	9.4	0.0	0.0	16.7	16.7	16.7	23.6	23.6	23.6	
WIS 60 & Keup Rd	Traffic Signal	AM	LOS	B	B	A	B	A	A	B	B	B	B	B	B	B
			Delay, sec	13.7	10.5	5.1	17.3	8.8	5.0	18.7	16.8	16.8	17.5	16.8	16.8	
		PM	LOS	C	A	A	B	B	A	C	C	C	C	C	C	B
			Delay, sec	21.6	9.9	4.5	17.5	14.8	4.3	24.7	21.7	21.7	22.9	21.8	21.8	
WIS 60 & Keup Rd	Roundabout	AM	LOS	B	B	B	A	A	A	C	C	C	B	B	B	A
			Delay, sec	13.6	13.6	13.6	5.8	5.8	5.8	23.0	23.0	23.0	10.2	10.2	10.2	
		PM	LOS	C	C	C	A	A	A	B	B	B	B	B	B	B
			Delay, sec	22.8	22.8	22.8	7.7	7.7	7.7	11.0	11.0	11.0	13.3	13.3	13.3	
Washington Ave & Sycamore Dr	All-Way Stop Control	AM	LOS	C	C	C	B	B	B	B	B	B	B	B	B	B
			Delay, sec	16.1	16.1	16.1	10.3	10.3	10.3	12.1	12.1	12.1	13.0	13.0	13.0	
		PM	LOS	C	C	C	B	B	B	B	B	B	B	B	B	C
			Delay, sec	19.1	19.1	19.1	10.4	10.4	10.4	13.4	13.4	13.4	12.6	12.6	12.6	
Washington Ave & Sheboygan Rd / Elm St	One-Way Stop Control	AM	LOS	--	--	--	C	A	A	A	A	A	A	A	A	N/A
			Delay, sec	--	--	--	20.0	9.5	9.5	7.8	7.8	7.8	7.8	7.8	7.8	
		PM	LOS	--	--	--	C	B	B	A	A	A	A	A	A	N/A
			Delay, sec	--	--	--	17.3	10.2	10.2	7.6	7.6	7.6	8.3	8.3	8.3	
Washington Ave & Bridge Rd	Traffic Signal	AM	LOS	C	C	C	C	C	C	B	B	A	B	B	A	B
			Delay, sec	24.6	20.8	20.8	23.7	20.9	20.9	10.4	10.4	8.9	12.7	12.7	9.4	
		PM	LOS	C	C	C	C	C	C	B	B	A	B	B	A	B
			Delay, sec	23.0	20.4	20.4	22.9	20.2	20.2	11.8	11.8	9.1	11.1	11.1	9.1	

Intersection	Traffic Control	Peak Hour	Parameter	Operating Conditions per Movement by Approach																		Overall Int. LOS
				Eastbound (WIS 60)				Westbound (WIS 60)				Northbound (Washington Ave)				Southbound (CTH NN)			Southbound (Covered Bridge Rd)			
				Hrd LT	LT	TH	RT	LT	TH	RT	Hrd RT	LT	TH	RT	Hrd RT	LT	TH	RT	LT	TH	RT	
				to CTH NN	to Covered Bridge Rd	WIS 60	to Washington Ave	to Washington Ave	WIS 60	to CTH NN	to Covered Bridge Rd	WIS 60	to CTH NN	to Covered Bridge Rd	WIS 60	WIS 60	to Washington Ave	WIS 60	WIS 60	to Washington Ave	WIS 60	
WIS 60 & STH 181/ CTH NN/Covered Bridge Rd	Traffic Signal	AM	LOS	C	C	D	C	**D**	**C**	**B**	**B**	**D**	**D**	**D**	**D**	C	**C**	C	**D**	**D**	**D**	D
			Delay, sec	32.4	32.4	40.5	30.9	39.7	21.0	18.6	18.6	49.7	43.1	54.6	54.6	32.4	35.0	26.5	54.7	54.7	54.7	
		PM	LOS	C	C	D	C	**D**	B	B	B	**D**	**D**	**D**	**D**	D	C	C	**D**	**D**	**D**	D
			Delay, sec	32.5	32.5	46.2	26.7	38.6	15.8	15.1	15.1	44.2	54.8	52.1	52.1	35.7	29.5	24.7	54.7	54.7	54.7	

Year 2050 Improved Transportation System Peak Hour Operating Conditions

Appendix **E**