

Kaukauna Middle School Development Traffic Impact Analysis

City of Kaukauna
Outagamie County, Wisconsin

June 19, 2025

TRAFFIC IMPACT STUDY FOR:

KAUKAUNA MIDDLE SCHOOL

CITY OF KAUKAUNA, OUTAGAMIE COUNTY, WISCONSIN

DATE SUBMITTED: June 19, 2025

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CHAPTER I – INTRODUCTION & EXECUTIVE SUMMARY

PART A – PURPOSE OF REPORT AND STUDY OBJECTIVES

The Kaukauna Area School District is planning to construct a new Middle School to be located on a vacant parcel of land east of State Trunk Highway (STH) 55, south of County Trunk Highway (CTH) CE and southwest of the current high school in the City of Kaukauna and the Town of Buchanan, Outagamie County, Wisconsin. A new middle school with two outlots for potential future development, which are expected to include commercial and residential land uses along with a connection roadway to the Kaukauna High School, are being proposed for the development site.

As part of the proposed middle school plans, WisDOT, Outagamie County and the City of Kaukauna have requested a traffic impact analysis be conducted to determine the additional traffic expected to be generated by the proposed middle school and to identify roadway modifications, if any, attributed to the new school for the Build traffic volume scenario. Traffic volumes from the identified offsite developments, located within the western portion of the site along STH 55, were also included in the Total traffic volume scenario used in this study.

This report documents the procedures, findings, and conclusions of the traffic impact analysis. The analysis identifies recommended modifications based on existing intersection geometrics, existing traffic volumes and additional traffic expected to be generated by the anticipated middle school and potential off-site developments located within the limits of the study area.

PART B - EXECUTIVE SUMMARY

The executive summary includes a description of the study area, descriptions of the proposed middle school and potential off-site developments and conclusions based on the findings of the TIA.

B1. Location of Study Site with Respect to Area Roadway Network

A street map illustrating the location of the existing and proposed schools is shown in Exhibit 1-1. A copy of the conceptual site plan for the proposed middle school is illustrated in Exhibit 1-2A and a conceptual site plan showing the potential off-site development areas is provided in Exhibit 1-2B. As identified by the study team, the study area for the proposed middle school includes the following intersections:

- STH 55/Crooks Avenue with Ann Street (two-way stop control)
- STH 55/Crooks Avenue with CTH CE/College Avenue (roundabout control)
- STH 55/Crooks Avenue with Morningside Drive/Proposed West Access Drive (current one-way stop control)
- STH 55/Crooks Avenue with Ridgecrest Lane (one-way stop control)
- STH 55/Crooks Avenue with CTH KK/Calumet Street (roundabout control)
- CTH CE/College Avenue with Fieldcrest Drive (two-way stop control)
- CTH CE/College Avenue with Konkapot Trail Road/Forefront Dermatology Access Driveway (two-way stop control)
- CTH CE/College Avenue with the High School West (and future Middle School) Access Driveway (one-way stop control)
- Loderbauer Road with CTH CE/College Avenue (traffic signal control)

- Loderbauer Road with the High School northern (and future Middle School) Access Driveway (traffic signal control)
- Loderbauer Road with the High School middle (and future Middle School) Access Driveway (one-way stop control)
- Loderbauer Road with the Proposed South Access Driveway (one-way stop control)

B2. On-Site Development Description

As shown on the conceptual site plan in Exhibit 1-2A, the middle school is proposed within the southeast portion of the overall site with parking lots proposed on the west and south sides of the middle school. Sports fields are proposed to the south of the school building. The following land uses are assumed for the proposed middle school site:

• Middle School – 1,200 students

The numbers of students shown are the anticipated maximum population at the proposed middle school. A map showing the limits of the student population for the Kaukauna School District is provided in the appendix.

It is anticipated that construction of the school will occur over a two-year period starting in the year 2026. Therefore, full build out of the development site is expected by the start of the fall semester in the year 2028. Therefore, traffic volumes from the proposed middle school were included in the Full Build traffic volumes.

B3. Off-site Development Description

As shown on the conceptual site plan in Exhibit 1-2B, two off-site development areas were identified within the limits of the development site; specifically, two outlots located immediately east of STH 55 and west of the proposed middle school. There are no known plans for the development of these two 30-acre parcels; however, for planning purposes, the following land uses were assumed on the parcels:

West Parcel

- Shopping Plaza (40-150k Supermarket No), ITE LU821 100,000 square feet (sf)
- Strip Retail Plaza (<40k), ITE LU822 20,000 sf
- General Office Building ITE LU710 15,000 sf

East Parcel

• Multifamily Housing (Low-Rise/Not Close to Rail Transit), ITE LU220 – 200 units

As stated above, the timing for the build out of these two parcels is unknown at this time. For purposes of this study, it was assumed that the parcels would be fully built out within the next ten years. Therefore, traffic volumes from these developments were included in the Total traffic volumes.

B4. Site Generated Traffic

The traffic volumes expected to be generated by the proposed middle schools were calculated based on the trip rates for a middle school (LU522) as published in the *Institute of Transportation Engineer's (ITE) Trip Generation Manual*, 11th Edition.

Under full build (highest student population) conditions and based on data provided by the school district, the proposed middle school development is expected to generate 2,270 weekday

daily trips: with 780 new trips in the AM peak hour, 380 new trips in the PM peak hour and 210 during a typical weekday sporting event at the middle school. See Exhibit 4-3A for calculations.

The potential off-site development area is expected to generate 6,750 weekday daily trips: with 290 new trips in the AM peak hour, 565 new trips in the PM peak hour and 565 during a typical weekday sporting event at the middle school. See Exhibit 4-3B for calculations.

B5. Proposed Access

As shown in Exhibit 1-2A, two access connections are proposed for the school development site. The main access is proposed as a full access driveway onto a new roadway connection to Crooks Avenue/STH 55 directly across from the existing three-legged, one-way stop sign controlled STH 55 intersection with Morningside Drive. A second driveway is proposed to connect to the high school site located northeast of the proposed middle school site with further existing connections from the high school onto CTH CE/College Avenue and Loderbauer Road. An additional driveway is proposed along Loderbauer Road, immediately south of the high school. Finally, even though not proposed as this time, a future connection via a new north/south connection onto CTH CE to the north and Speedway Lane to the southwest is also planned for at some point in the future.

B6. Recommended Modifications

The study area intersections were analyzed based on the procedures set forth in the *Highway Capacity Manual* (HCM) 7th *Edition*. Intersection operation is defined by "level of service." Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A,' to very poor, represented by LOS 'F.' For the purpose of this study, LOS D or better was used to define acceptable peak hour operating conditions.

Modifications to address traffic impacts are shown in Exhibit 1-3 for the following traffic volume scenarios:

- ""Background Traffic" These modifications are expected to be necessary to accommodate the Existing/Background traffic volumes.
- "Full Build Traffic" These modifications are expected to be necessary to accommodate the Full Build traffic volumes which includes full build out of the proposed Middle School but does not include the identified off-site development areas.
- "Total Traffic" These modifications are expected to be necessary to accommodate the Total traffic volumes which includes full build out of the proposed Middle School as well as the identified off-site development areas.

The analysis was conducted using existing intersection geometrics and traffic control and the existing traffic signal timings. The following modifications, as shown in Exhibit 1-3, are recommended to accommodate the Existing/Background, Full Build, and Total traffic volumes, respectively. Modifications are for jurisdictional consideration and are not legally binding. WisDOT, Outagamie County and the City of Kaukauna reserve the right to determine alternative solutions.

Node 100: STH 55/Crooks Avenue with Ann Street

- Background Traffic:
 - Reconstruct the median to restrict through and left-turn exiting movements from the east and west approaches, thereby allowing left-in/right-in/rightout access at this intersection. The restricted movements would either

- divert to other intersections or make a right-turn movement and then traverse the adjacent roundabout to continue to their ultimate destination.
- o Maintain stop control on the east and west approaches.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 200: CTH CE/College Avenue with Fieldcrest Drive

- Background Traffic:
 - Reconstruct the median to restrict through and left-turn exiting movements from the north and south approaches, thereby allowing left-in/rightin/right-out access at this intersection. The restricted movements would either divert to other intersections or make a right-turn movement and then traverse the adjacent roundabout to continue to their ultimate destination.
 - o Maintain stop control on the north and south approaches.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 300: STH 55/Crooks Avenue with CTH CE/College Avenue

- Background Traffic: No modifications.
- Full Build Traffic.
 - Consider roundabout modification to provide a right-turn bypass lane on the north, south and east approaches.
- Total Traffic:
 - O Depending on the build out plans for the off-site development area, consider reconstructing the roundabout to provide a multi-lane roundabout with three lane approaches on the north and south approaches, a two-lane approach with a bypass lane on the west approach and a three-lane approach with a bypass lane on the east approach. A future traffic study should be completed for this intersection as development plans move forward in the future to determine the optimal modifications for this intersection.

Node 400: CTH CE/College Avenue with Konkapot Trail Road/Forefront Dermatology <u>Access Driveway</u>

- Background Traffic:
 - Construct a raised median through the limits of the intersection to allow only right-in/right-out access at this intersection. The restricted movements would either divert to other intersections or make a right-turn movement and then traverse the adjacent intersection to continue to their ultimate destination.
 - o Maintain stop control on the north and south approaches.
- Full Build Traffic: No additional modifications.

• *Total Traffic:* No additional modifications.

Node 500: CTH CE/College Avenue with High School West Driveway

- Background Traffic:
 - Consider restricting all exiting northbound movements at this intersection during the weekday afternoon peak period (see discussion below).
 Diverted traffic would be expected to utilize the signalized intersections at Loderbauer Road.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 600: Loderbauer Road with CTH CE/College Avenue

- *Background Traffic:* No modifications.
- Full Build Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.
- Total Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.

Node 700: STH 55/Crooks Avenue with Morningside Drive/Proposed West Access Drive

- Background Traffic: No modifications.
- Full Build Traffic. Two modification options are recommended for consideration (see discussion below):
 - Option 1 Two-way stop control.
 - No modifications recommended on the west approach.
 - Provide a shared through /left-turn lane and a dedicated right-turn lane on the east approach.
 - Provide a dedicated left-turn lane, a through lane and right-turn taper on the north and south approaches (two lanes plus taper on each approach).
 - Depending on the location of the pedestrian tunnel under STH 55, consider providing pedestrian crosswalk pavement markings along all approaches of the intersection.
 - Option 2 Construct a single lane roundabout with single entrance lanes on all approaches.
- *Total Traffic:* Two modification options are recommended for consideration (see discussion below):
 - \circ Option 1 Two-way stop control.
 - No modifications recommended on the west approach.
 - Provide a shared through /left-turn lane and a dedicated right-turn lane on the east approach.

- Provide a dedicated left-turn lane, a through lane and right-turn taper on the north and south approaches (two lanes plus taper on each approach).
- Depending on the location of the pedestrian tunnel under STH 55, consider providing pedestrian crosswalk pavement markings along all approaches of the intersection
- Option 2 Modify roundabout to provide an additional northbound lane (two lanes) on the south approach with two northbound lanes through the roundabout. All other approaches to remain as single lane approaches.
 - Even though not needed from an operations perspective, consideration could be given to providing two southbound lanes through the roundabout to match the existing two southbound lanes along STH 55 to the north.

Node 800: STH 55/Crooks Avenue with Ridgecrest Lane

- *Background Traffic:* No modifications.
- Full Build Traffic: No modifications.
- *Total Traffic:* No modifications.

Node 900: STH 55/Crooks Avenue with CTH KK/Calumet Street

- Background Traffic: No modifications.
- Full Build Traffic: No modifications.
- *Total Traffic:* No modifications.

Node 1000: Loderbauer Road with High School North Driveway

- *Background Traffic:* No modifications.
- Full Build Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.
- Total Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.

Node 1100: Loderbauer Road with High School Middle Driveway

- Background Traffic: No modifications.
- Full Build Traffic: No modifications.
- *Total Traffic:* No modifications.

Node 1200: Loderbauer Road with Proposed South Access Driveway

- Background Traffic: No modifications.
- Full Build Traffic:
 - Construct a full access driveway with stop sign control on the west approach.
- *Total Traffic:* No additional modifications.

Higher delays (LOS F) are expected for several movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) even with the recommended geometry listed above under two-way stop control and under Full Build traffic volume conditions. Specifically, higher delays (LOS F) are expected during the weekday morning and afternoon peak periods and LOS E during the special event peak hour for all eastbound movements and the westbound through/left-turn movements at the intersection. However, as with most school sites, higher delays are only expected during about a 20 to 30 minute "surge" during the morning arrival and afternoon dismissal peak periods which can be considered typical for a school location. In addition, to alleviate some of the higher delays and queueing expected for the westbound through and left turn movements exiting the school during the typical weekday, exploration of an internal site connection to Speedway Lane to the south is expected to provide for another access alternative for vehicles to/from the south of the proposed school.

In addition, very high delays (LOS F/gridlock conditions) and very long queues are expected for several movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700), under Total traffic volume conditions, even with the recommended geometry listed above under two-way stop control. To provide for safe overall operations as well as realistic queue lengths under the off-site build-out assumptions, a higher level of traffic control should be considered under Total traffic volume conditions as future development moves forward.

A traffic signal warrant analysis was completed for the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) under Full Build and Total traffic volume conditions. Based on the warrant analysis, neither Warrant 1 (8-Hour) nor Warrant 2 (4-Hour) are expected to be met at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive under Full Build traffic conditions. Specifically, only 1 hour of the required 8 hours under Warrant 1 (8-Hour) and only 1 hour of the required 4 hours under Warrant 2 (4-Hour) are expected to be met. In addition, even though close to being met under the Total traffic volume condition, Warrant 1 (8-Hour) and Warrant 2 (4-Hour) are also not expected to be met under the Total traffic volume condition. Specifically, only 7 hours of the required 8 hours under Warrant 1 (8-Hour) and only 3 hours of the required 4 hours under Warrant 2 (4-Hour) are met. Therefore, unless the build out assumptions for the off-site development are more intense than assumed in this study, traffic signal control should not be considered at this intersection under the Build (with proposed school only) traffic volume conditions nor with Total (with proposed school plus off-site) traffic volume conditions.

Per the WisDOT Facilities Development Manual (FDM), if an intersection warrants traffic signal control, a modern roundabout should also be evaluated. As stated above, traffic signals are not expected to be warranted, even under the Total traffic volume conditions which includes full build out of both the on-site and off-site assumptions used in this study. However, since higher delays are expected under the Total traffic volume condition under two-way stop control, and to provide for acceptable delays and queues and overall safe operations, roundabout control was also considered at the proposed intersection under Total traffic volume conditions. Based on the ICE analysis, roundabout control provides the only viable option under the Total traffic conditions to provide for acceptable delays with reasonable queuing and is therefore recommended for the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive. Under the Build (with proposed school only) traffic volume conditions, two-way stop control with lane modifications is recommended at the intersection.

Higher delays (LOS E/F) are expected for several movements at the STH 55/Crooks Avenue intersection with CTH CE/College Avenue (node 300) under the current dual lane roundabout controlled intersection under Full Build and Total traffic volume conditions. The recommended bypass lane additions under the Full Build traffic volume conditions and the recommended reconstruction to a 3-lane roundabout with bypass lanes under the Total traffic volume conditions are expected to provide acceptable operation for most movements; however, higher delays (LOS E) are still expected for some movements during the typical weekday morning peak period noting that the delays are only slightly higher that acceptable (about 6 seconds) and the reported queueing is expected to be reasonable (all less than 225 feet). Without the bypass lanes recommended under the Full Build traffic conditions, higher delays (about 60 seconds) are expected for several movements during the weekday morning peak school peak hour with maximum queues of about 400 feet (16 vehicles) or less. As with many schools, the morning peak period "surge" last about 20 to 30 minutes. However, acceptable delays are expected during all other hours of the typical weekday, including the typical school afternoon school discharge and weekday evening commuter peak hours. Since development plans for the off-site development area are unknown at this time and the build out assumptions were used for planning purposes only and with this study showing the need for a three lane roundabout at the STH 55/Crooks Avenue intersection with CTH CE/College Avenue, which is not typically acceptable by WisDOT, a future traffic study should be completed in the future as development plans move forward for the off-site area.

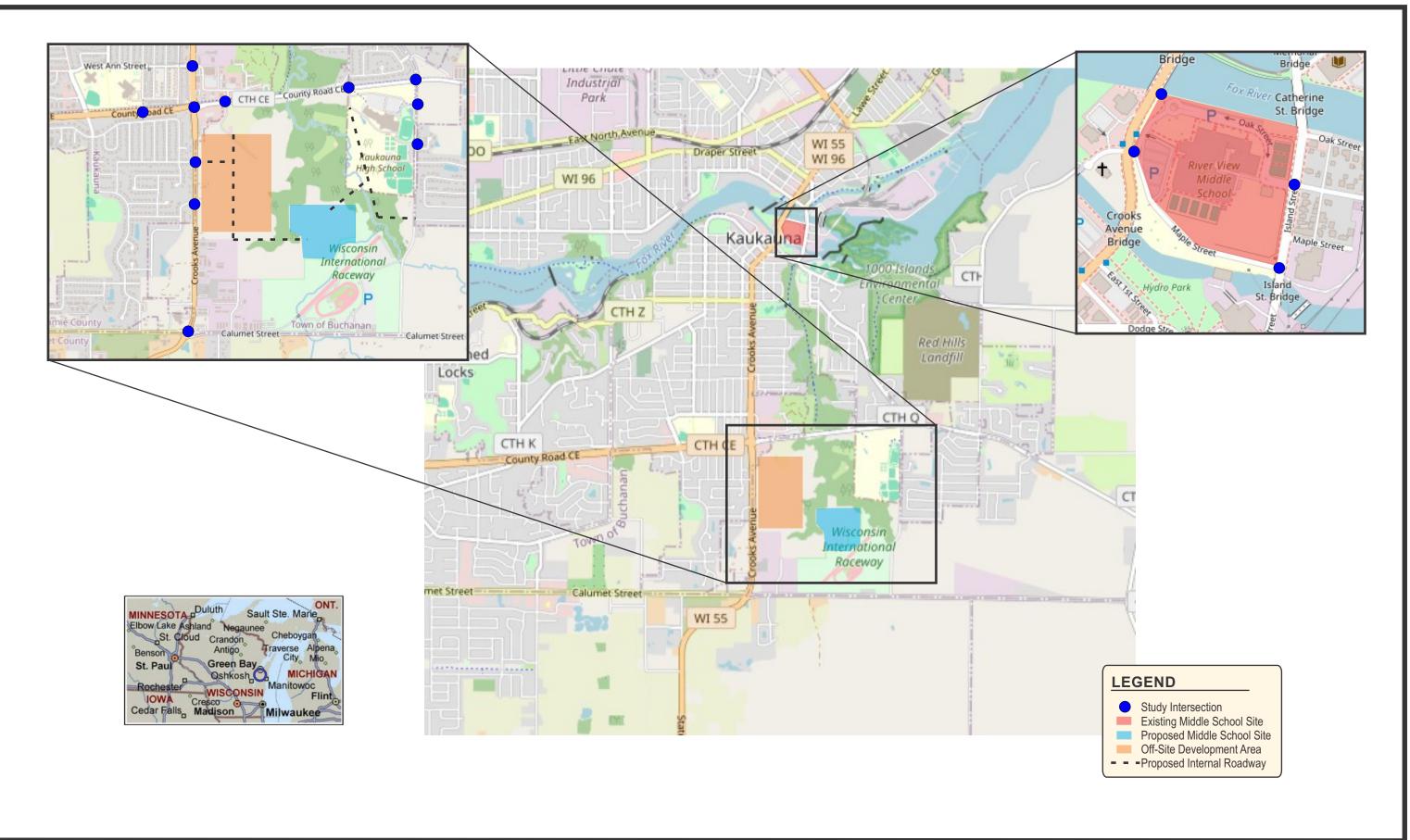
Higher delays (LOS F) are also expected at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) under Existing, Full Build and Total traffic conditions during the typical weekday afternoon peak period. Since the higher delays are only currently being experienced during the typical weekday afternoon peak and are expected to increase during this evening peak period, restricting these movements during this weekday afternoon peak period, with diverted traffic utilizing the signalized intersection at Loderbauer Road, would allow this and all adjacent study area intersections to operate acceptably under all peak periods. Restrictions could include signage, gating and/or the use of temporary cones placed daily by school staff to restrict exiting traffic during the weekday afternoon discharge peak period. A separate analysis was completed for this scenario (with restricted/diverted traffic) that shows that the existing traffic signals at the College Avenue/CTH CE intersection with Loderbauer Road and the existing traffic signals at the Loderbauer Road intersection with the High School North Driveway are expected to operate acceptably with acceptable delays and queueing during the typical weekday afternoon peak period even with the diverted traffic from the High School West Driveway.

Even though the existing traffic signal timings at the College Avenue/CTH CE intersection with Loderbauer Road and the existing traffic signals at the Loderbauer Road intersection with the High School North Driveway are expected to provide acceptable operations and queueing under both Full Build and Total traffic volume conditions, optimized traffic signal timings and offsets were implemented as part of the analysis as provided in the outputs provided in the appendix of this report.

B7. Conclusion

To accommodate the full build out of the proposed middle school, recommended modifications are expected to be necessary to the transportation network. Except as noted, all movements at the study area intersections are expected to operate safely and efficiently with the modifications identified in this TIA with the proposed middle school site and identified off-site development areas. Since development plans for the off-site development area are unknown at this time and

the build-out assumptions were used for planning purposes only, a future traffic study should be completed in the future as development plans move forward for the off-site area.









Proposed South Driveway (onto Loderbauer Road)

NEW MIDDLE SCHOOL SITE KAUKAUNA AREA SCHOOL DISTRICT 03.27.25

B Point of Beginning Land Surveying
Engineering
Landscape Architecture

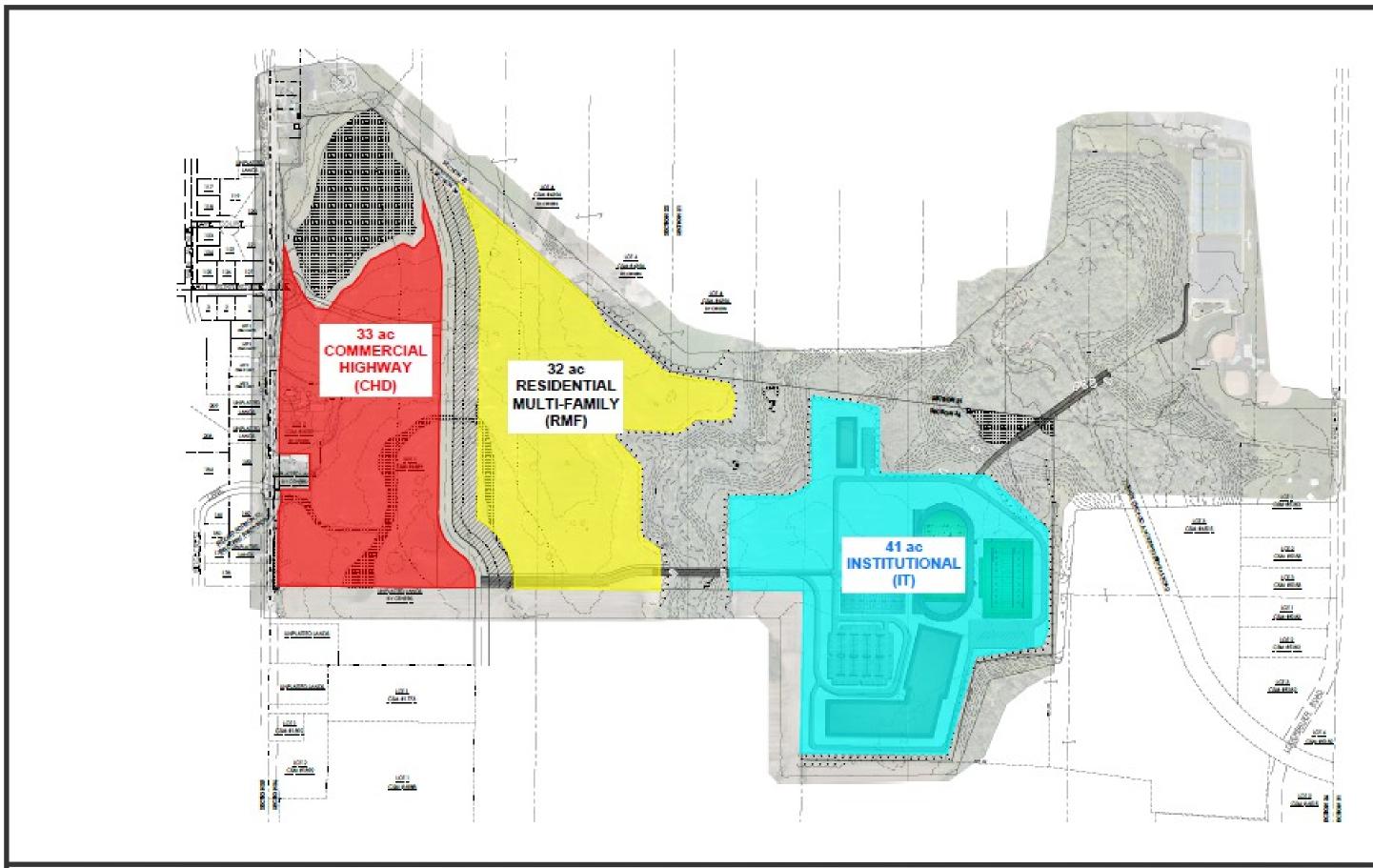
4941 Kirschling Drive
Stevens Point, WI 54481
715 344 9992191 715 344 99926

TRAFFIC ANALYSIS & DESIGN, INC.
3422 ~ 6-19-2025

Proposed West Driveway (onto STH 55 at Morningside Drive)

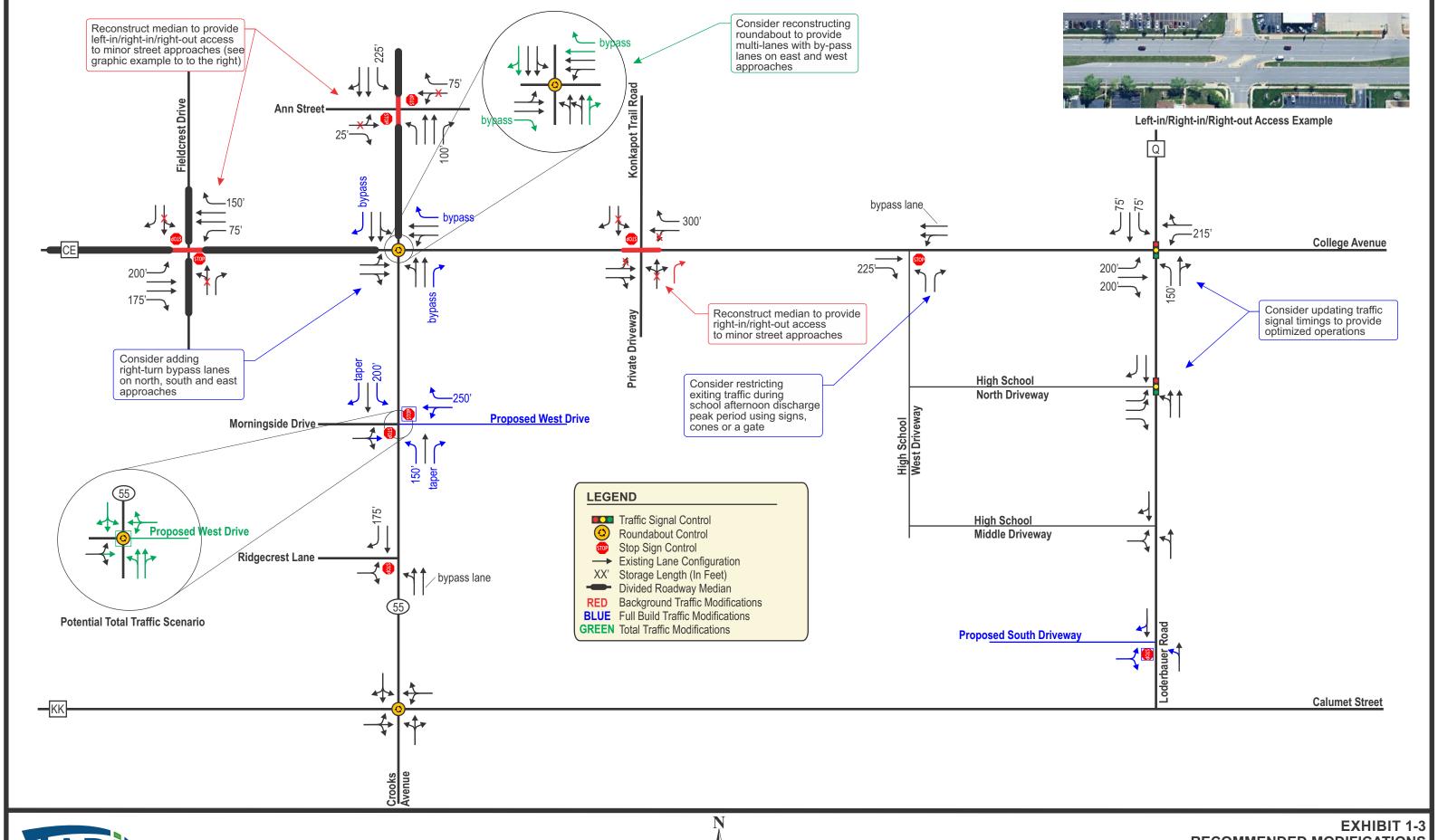


EXHIBIT 1-2A CONCEPTUAL SITE PLAN PROPOSED SCHOOL AREA













CHAPTER II – PROPOSED DEVELOPMENT

PART A – DEVELOPMENT SITE

A1. Development Description and Site Location

The Kaukauna Area School District is planning to construct a new Middle School to be located on a vacant parcel of land east of State Trunk Highway (STH) 55, south of County Trunk Highway (CTH) CE and southwest of the current high school in the City of Kaukauna and the Town of Buchana, Outagamie County, Wisconsin. A new middle school with two outlots for potential future development, which are expected to include commercial and residential land uses along with a connection roadway to the Kaukauna High School, are being proposed for the development site. A street map illustrating the locations of the existing and proposed schools is shown in Exhibit 2-1.

A2. Land Use and Intensity

The proposed middle school site is currently being utilized for agricultural uses with several large, wooded areas located throughout. A river also runs through the site. The overall site is bordered by residential uses to the east, west and north with a few additional residential houses immediately to the south along the south side of CTH KK. The Kaukauna High School is located immediately to the northeast. Commercial uses currently exist adjacent to the site, to the north (along both sides of CTH CE) and to the southwest along STH 55. Light industrial land uses also exists to the southwest along STH 55. The Wisconsin International Raceway is located immediately to the southeast, adjacent to the site.

A3. Site Plan

A copy of the conceptual site plan for the proposed middle school is illustrated in Exhibit 2-2A. The middle school is proposed within the southeast portion of the overall site with parking lots proposed on the west and south sides of the middle school. Sports fields are proposed to the south of the school building. Two access connections are proposed for the school development site. The main access is proposed as a full access driveway onto a new roadway connection to Crooks Avenue/STH 55 directly across from the existing three-legged, one-way stop sign controlled STH 55 intersection with Morningside Drive. A second driveway is proposed to connect to the high school site located northeast of the proposed middle school site with further existing connections from the high school onto CTH CE/College Avenue and Loderbauer Road. An additional driveway is proposed along Loderbauer Road, immediately south of the high school. Finally, even though not proposed as this time, a future connection via a new north/south connection onto CTH CE to the north and Speedway Lane to the southwest is also planned for at some point in the future.

A4. Development Phasing and Timing

The following land uses are assumed for the proposed middle school site:

• Middle School – 1,200 students

The numbers of students shown are the anticipated maximum population at the proposed middle school. A map showing the limits of the student population for the Kaukauna School District is provided in the appendix.

It is anticipated that construction of the school will occur over a two-year period starting in the year 2026. Therefore, full build out of the development site is expected by the start of the fall semester in the year 2028. Therefore, traffic volumes from the proposed middle school were included in the Full Build traffic volumes.

PART B – STUDY AREA

B1. Influence Area

Based on the type of proposed land uses and the location of the site, the proposed middle school development is expected to draw from a local and regional customer base. Therefore, the areas of significant influence include the City of Kaukauna and other surrounding cities, villages, and towns that are part of the Kaukauna Area School District. A map showing the limits of the school district in relation to the proposed middle school site is provided in the appendix.

B2. Area of Significant Traffic Impact

As identified by the study team, the study area for the proposed middle school includes the following intersections:

- STH 55/Crooks Avenue with Ann Street (two-way stop control)
- STH 55/Crooks Avenue with CTH CE/College Avenue (roundabout control)
- STH 55/Crooks Avenue with Morningside Drive/Proposed West Access Drive (current one-way stop control)
- STH 55/Crooks Avenue with Ridgecrest Lane (one-way stop control)
- STH 55/Crooks Avenue with CTH KK/Calumet Street (roundabout control)
- CTH CE/College Avenue with Fieldcrest Drive (two-way stop control)
- CTH CE/College Avenue with Konkapot Trail Road/Forefront Dermatology Access Driveway (two-way stop control)
- CTH CE/College Avenue with the High School West (and future Middle School) Access Driveway (one-way stop control)
- Loderbauer Road with CTH CE/College Avenue (traffic signal control)
- Loderbauer Road with the High School northern (and future Middle School) Access Driveway (traffic signal control)
- Loderbauer Road with the High School middle (and future Middle School) Access Driveway (one-way stop control)
- Loderbauer Road with the Proposed South Access Driveway (one-way stop control)

PART C – OFF-SITE LAND USE AND DEVELOPMENT

As shown on the conceptual site plan in Exhibit 1-2B, two off-site development areas were identified within the limits of the development site; specifically, two outlots located immediately east of STH 55 and west of the proposed middle school. There are no known plans for the development of these two 30-acre parcels; however, for planning purposes, the following land uses were assumed on the parcels:

West Parcel

- Shopping Plaza (40-150k Supermarket No), ITE LU821 100,000 square feet (sf)
- Strip Retail Plaza (<40k), ITE LU822 20,000 sf
- General Office Building ITE LU710 15,000 sf

East Parcel

 Multifamily Housing (Low-Rise/Not Close to Rail Transit), ITE LU220 – 200 units

As stated above, the timing for the build out of these two parcels is unknown at this time. For purposes of this study, it was assumed that the parcels would be fully built out within the next ten years. Therefore, traffic volumes from these developments were included in the Total traffic volumes.

PART D – SITE ACCESSIBILITY

D1. Study Area Roadways

The study area roadways for the proposed site include the following:

Crooks Avenue (STH 55) is a four-lane divided north/south principal arterial highway north of CTH KK and an undivided minor arterial to the south. The highway widens to provide a raised median section from immediately north of Ann Street to a point immediately south of the roundabout at CTH CE. The highway also transitions to a two-lane undivided cross section to the south of Morningside Drive. The posted speed limit on STH 55 is 25-mph north of CTH CE, 35-mph south of CTH CE, 45-mph between Morningside Drive and CTH KK and 55-mph to the south, starting at a point about ¼-mile south of CTH KK. According to the Wisconsin Department of Transportation (WisDOT), the Year 2023 average annual daily traffic volumes (AADT's) on STH 55 were approximately 14,700 vehicles per day (vpd) north of 16th Street, 14,100-vpd to the north of CTH CE, 10,700-vpd to the south of Ridgecrest Lane, and 4,800-vpd (2016 count) to the south of CTH KK. Sidewalks are provided along both sides of STH 55 to the north of CTH CE and exist only for a short distance to the south, up through the Forefront Dermatology driveway.

College Avenue (CTH CE) is a four-lane divided east/west principal arterial highway to the west of STH 55 and a two-lane undivided minor arterial to the east of STH 55. The posted speed limit on CTH CE is 45-mph to the west of STH 55 and to the east of a point about 850 feet east of Konkapot Trail Road. For the short section of highway between STH 55 and this point, the speed limit on CTH CE is 35-mph. The Year 2023 WisDOT AADT volumes on CTH CE were approximately 15,800-vpd west of Fieldcrest Drive, 14,200-vpd to the west of STH 55, 9,300-vpd to the west of Loderbauer Road, and 4,800-vpd (2019 count) to the east. The CE multi-use trail currently exists along the north side CTH CE within the study limits. The CE Trail is a 5.8-mile paved trail that runs between Appleton and Kaukauna.

Calumet Street (CTH KK) is a two-lane undivided east/west minor arterial highway to the west of STH 55 and a major collector to the east of STH 55. The posted speed limit on CTH KK is 45-mph to the west of STH 55 and 55-mph to the east. The Year 2023 WisDOT AADT volumes on CTH KK were approximately 7,200 vpd west of STH 55 and 5,600-vpd (2019 count) to the east. Sidewalks are not currently provided along either side of CTH KK within the study limits.

Hillcrest Drive (CTH Q) is a two-lane undivided north/south minor arterial north of CTH CE with a posted speed limit of 25-mph within the study area. South of CTH CE the roadway is designated as Loderbauer Road. The Year 2016 WisDOT AADT volumes on Hillcrest Drive were approximately 2,800 vpd north of CTH CE. Sidewalks are provided along the west side of Hillcrest Drive within the study limits.

Loderbauer Road is a four-lane undivided north/south local street immediately south of CTH CE that transitions to a two-lane undivided cross section to the south of the high school's north driveway. The roadway also changes from an urban cross section to the north of Bear Paw Trail

(adjacent neighborhood street) to a rural cross section to the south. North of CTH CE the roadway is designated as Hillcrest Drive. The posted speed limit on Loderbauer Road is 35-mph within the study area. No AADT's are currently available for Loderbauer Road. Sidewalks are provided along the west side of Loderbauer Road within the limits of the high school property (from CTH CE down to a point near Bear Paw Trail) and along the east side of Loderbauer Road from the residential properties north of Andrea Michelle Court down to White Dove Lane.

Ann Street is a two-lane undivided east/west major collector with a posted speed limit of 25-mph within the study area. The Year 2019 WisDOT AADT volumes on Ann Street were approximately 1,600 vpd west of STH 55. Sidewalks are provided along both sides of Ann Street, west of STH 55 and along the south side of Ann Street to the east.

Konkapot Trail Road is a two-lane undivided north/south local street with a posted speed limit of 25-mph within the study area. No AADT's are currently available for Konkapot Trail Road. Sidewalks are provided along both sides of Konkapot Trail Road within the study limits.

Fieldcrest Drive is a two-lane undivided north/south major collector with a posted speed limit of 25-mph within the study area. The Year 2019 WisDOT AADT volumes on Fieldcrest Drive were approximately 2,500 vpd north of CTH CE. Sidewalks are provided along both sides of Fieldcrest Drive to the north of CTH CE; however, sidewalks are not currently provided on either side to the south.

Morningside Drive is a two-lane undivided east/west local residential street with a posted speed limit of 25-mph within the study area. No AADT's are currently available for Morningside Drive. Sidewalks are provided along both sides of Morningside Drive within the study limits.

Ridgecrest Lane is a two-lane undivided east/west local residential street with a posted speed limit of 25-mph within the study area. No AADT's are currently available for Ridgecrest Lane. Sidewalks are provided along both sides of Ridgecrest Lane within the study limits.

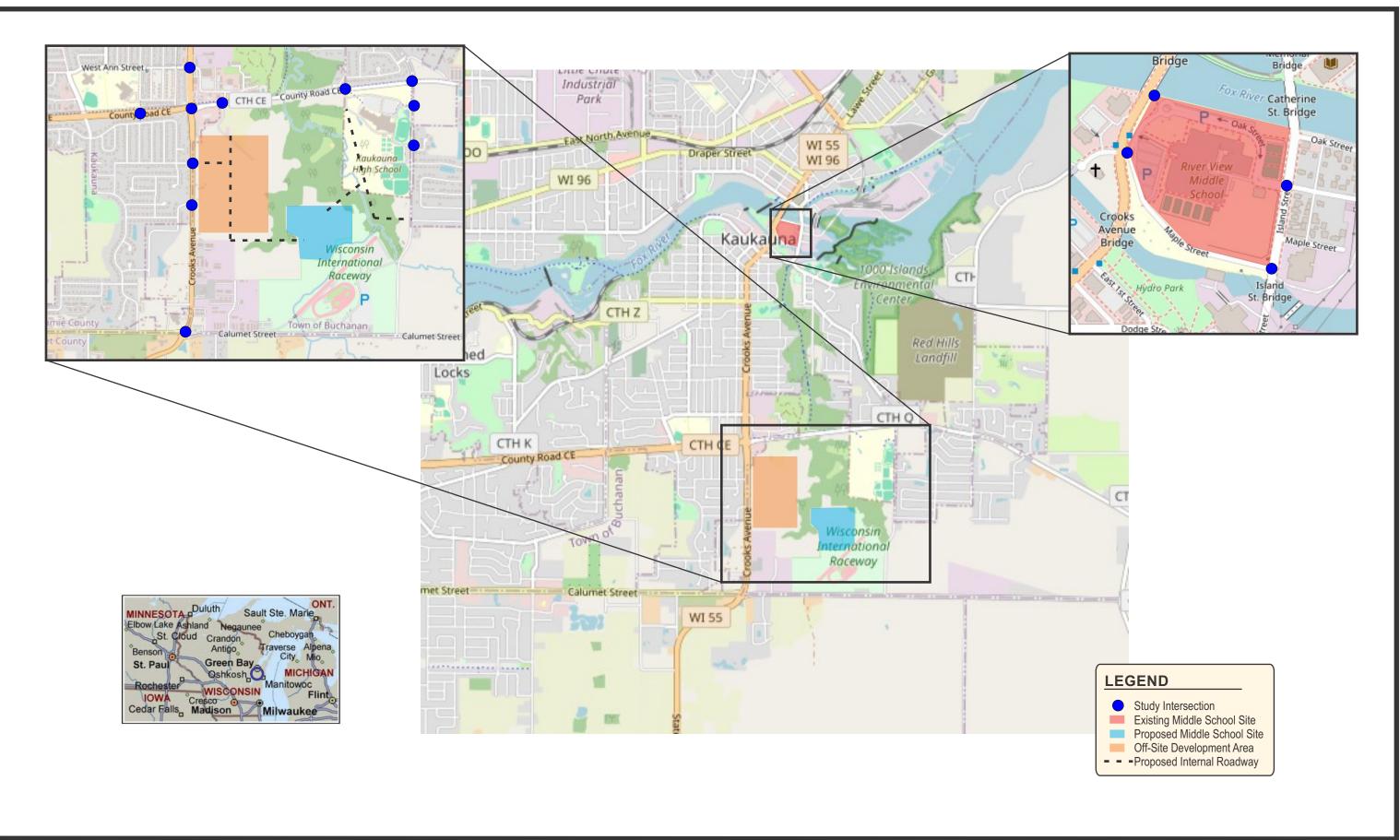
D2. Anticipated Infrastructure Projects

Based on information provided by WisDOT, NE Region, and Outagamie County, two improvement projects were identified within the general study area. A mill/overlay project (WisDOT ID 4050-21-71) is planned along STH 55 between USH 10 and Ridgecrest Road during the year 2028 construction season. A Highway Safety Improvement Project (HSIP) under WisDOT ID 4160-07-00/70 is planned to provide a modified RCUT intersection at the CTH CE intersection with Fieldcrest Drive. Construction for this project will likely start in the spring of 2028.

D3. Alternative Modes of Transportation

As described above, sidewalks and a multi-use trail (CE Trail) are currently provided along many of the roadways within the study area. No designated on-street bicycle facilities were identified.

Due to the location of the proposed school in relation to the residential neighborhoods within the Kaukauna area, and with sidewalks and the CE Trail currently provided near the school, it was assumed that a fair number of students will walk or ride bikes to/from the school on a daily basis. See trip generation discussion in *Chapter IV* for further assumptions concerning students walking to school.









Proposed South Driveway (onto Loderbauer Road)

NEW MIDDLE SCHOOL SITE KAUKAUNA AREA SCHOOL DISTRICT 03.27.25

Boint of Beginning

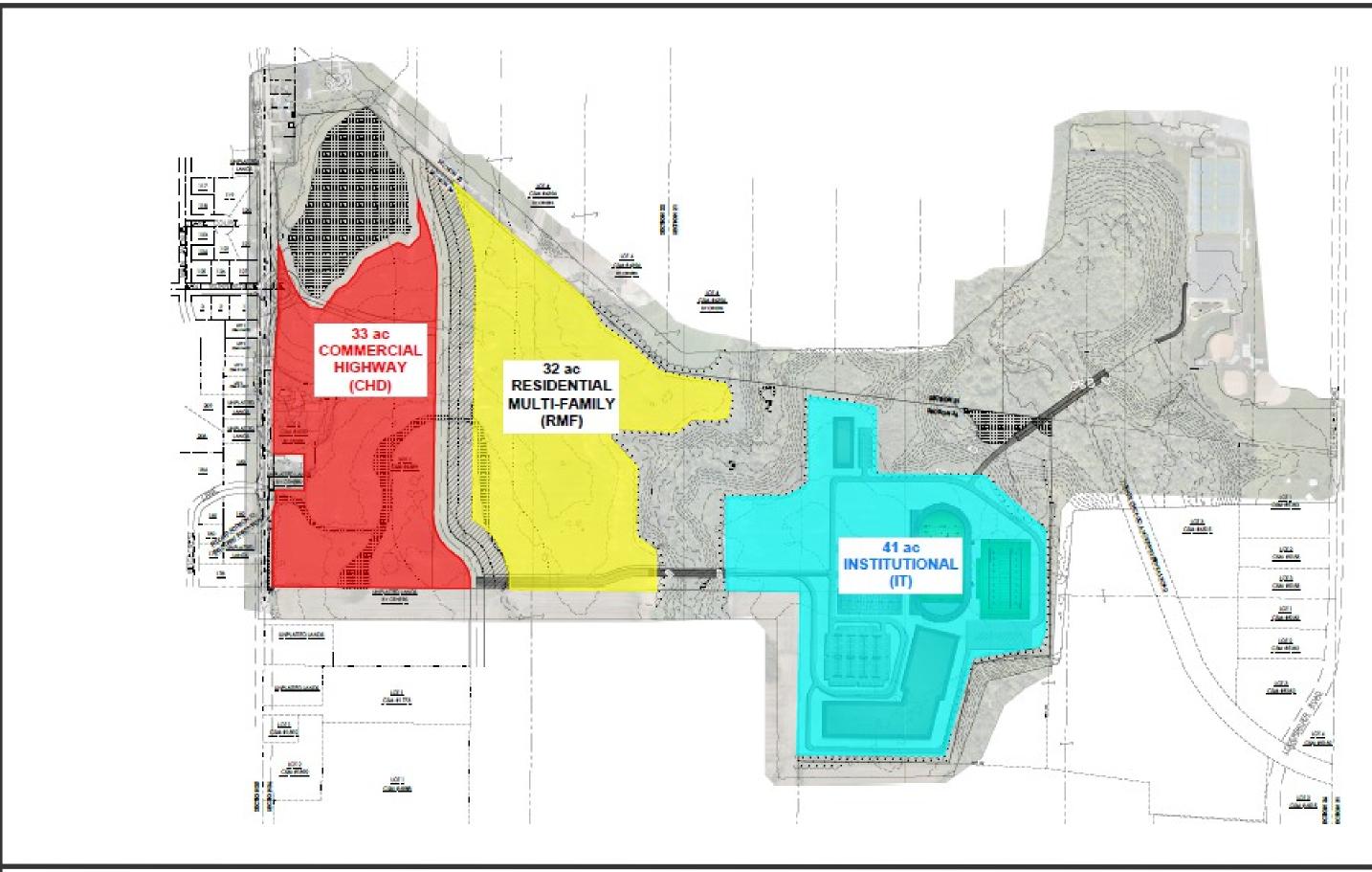
Land Surveying
Engineering
Landscape Architecture
4941 Kirschling Drive
Stevens Point, WI 54481
715.344.9999(Ph) 715.344.9922(F)



Proposed West Driveway (onto STH 55 at Morningside Drive)



EXHIBIT 2-2A CONCEPTUAL SITE PLAN PROPOSED SCHOOL AREA







CHAPTER III – ANALYSIS OF EXISTING CONDITIONS

PART A - PHYSICAL CHARACTERISTICS

Exhibit 3-1 shows the existing transportation detail for the study area intersections. More specifically, the exhibit illustrates intersection lane configurations, intersection traffic controls, distances between intersections, and posted speed limits within the study area.

PART B – TRAFFIC VOLUMES

The weekday morning and weekday evening peak hours are expected to drive the improvements needed to adequately accommodate the proposed middle school development, as they represent the highest trip generation for the site and the highest volumes along the adjacent highways. TADI conducted weekday morning (6:30-8:30am) and weekday evening (2:30-6:00pm) peak hour turning movement traffic counts at the existing study area intersections in mid-February of 2025.

In addition, to calculate local middle school trip generation rates for this study, TADI conducted weekday morning (6:30-8:30am) and weekday evening (2:30-6:00pm) peak hour turning movement traffic and pedestrian counts at the existing intersections/locations adjacent to the existing Riverview Middle School located along the Fox River in early-February of 2025. Specifically, counts were conducted at the following intersections/locations noting that the westerly entrance to the school off of STH 55 was blocked to vehicular traffic by bollards with all traffic accessing the site along Island Street to the east:

- Island Street with Maple Street School Access
- Island Street with Elm Street School Access
- STH 55/Crooks Avenue with pedestrian access tunnel (pedestrian count only)
- STH 55/Crooks Avenue with pedestrian access to the parking lot (pedestrian count only)

The existing peak hour traffic volumes (including pedestrian volumes) at these four intersections/locations adjacent to the existing Riverview Middle School are shown in Exhibit 3-2A.

Based on the turning movement counts and the expected school bell schedule, the weekday morning and weekday afternoon peak hours were identified as being 7:00 to 8:00 am and 3:15 to 4:15 pm; respectively. These peak hours coincide with the expected school start and end times of 7:55 am and 3:20 pm, respectively. A separate weekday evening special event peak hour, identified as 4:30 to 5:30 pm, was also evaluated as part of the study. This peak hour is expected to coincide with a boy's middle school basketball game. Details and calculations for this peak hour are provided in the appendix of this study. The existing peak hour traffic volumes at the study area intersections, raw data/unbalanced, are shown in Exhibit 3-2B. The existing peak hour traffic volumes at the study area intersections, balanced along the study area corridors, are shown in Exhibit 3-2C. The traffic counts used to determine peak hour factors and truck percentages have been included in the appendix of this study.

PART C - CAPACITY LEVEL OF SERVICE

C1. Level of Service Definitions

The study area intersections were analyzed based on the procedures set forth in the *Highway Capacity Manual* (HCM), 7th *Edition*. Intersection operation is defined by "level of service." Level of service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A,' to very poor, represented by LOS 'F.' For the purpose of this study, LOS D was used to define acceptable peak hour operating

conditions. Peak hour factors (PHF's) in the modeling software were adjusted down slightly to calibrate the models to actual queues observed during data collection. The same PHF's at the existing middle school intersection were utilized at the intersections adjacent to the new middle school to allow for a more accurate build condition. Descriptions of the various levels of service are as follows:

LOS A is the highest level of service that can be achieved. Under this condition, intersection approaches appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation. At signalized and unsignalized intersections, average delays are less than 10 seconds.

LOS B represents stable operation. At signalized intersections, average vehicle delays are 10 to 20 seconds. At unsignalized intersections, average delays are 10 to 15 seconds.

LOS C still represents stable operation, but periodic backups of a few vehicles may develop behind turning vehicles. Most drivers begin to feel restricted, but not objectionably so. At signalized intersections, average vehicle delays are 20 to 35 seconds. At unsignalized intersections, average delays are 15 to 25 seconds.

LOS D represents increasing traffic restrictions as the intersection approaches instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but periodic clearance of long lines occurs, thus preventing excessive backups. At signalized intersections, average vehicle delays are 35 to 55 seconds. At unsignalized intersections, average delays are 25 to 35 seconds.

LOS E represents the capacity of the intersection. At signalized intersections, average vehicle delays are 55 to 80 seconds. At unsignalized intersections, average delays are 35 to 50 seconds.

LOS F represents jammed conditions where the intersection is over capacity and acceptable gaps for unsignalized intersections in the mainline traffic flow are minimal. At signalized intersections, average vehicle delays exceed 80 seconds. At unsignalized intersections, average delays exceed 50 seconds.

C2. Existing Traffic Operations

Exhibit 3-3 shows the existing traffic peak hour operating conditions at the study area intersections at the proposed school location. The existing traffic analysis was conducted using the existing lane configurations shown in Exhibit 3-1, the existing traffic signal timings and the existing traffic volumes shown in Exhibit 3-2C.

As shown in Exhibit 3-3, all movements are currently operating acceptably at LOS D or better at the study area intersections under the existing traffic volumes conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods except the following:

- The eastbound and westbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with Ann Street (node 100) which are currently operating at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.
- The northbound through/left-turn movements at the College Avenue/CTH CE intersection with Fieldcrest Drive (node 200) which are currently operating at LOS E during the typical weekday morning peak period.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Konkapot Trail Road (node 400) which are currently operating at LOS E/F during the typical weekday morning and afternoon peak periods.

• The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is currently operating at LOS F during the typical weekday afternoon peak period.

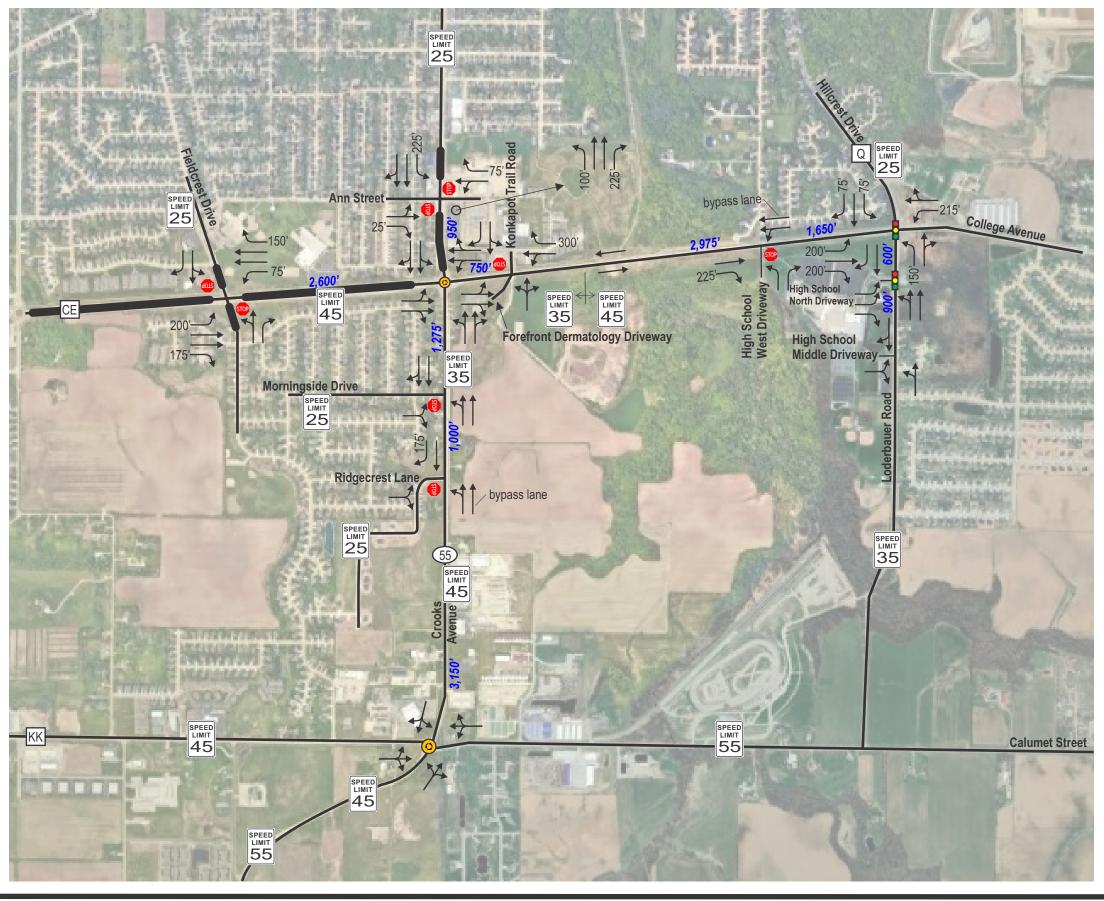
PART D – SOURCES OF DATA

The following sources of data were obtained for use in conducting this traffic study:

- Turning movement traffic counts TADI
- Existing transportation details TADI along with Google Earth
- Existing Traffic Signal Timings City of Kaukauna
- On-Site Development information Point of Beginning and the Kaukauna Area School District
- Off-Site Development information City of Kaukauna

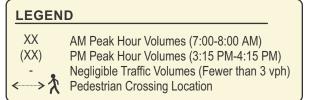
LEGEND

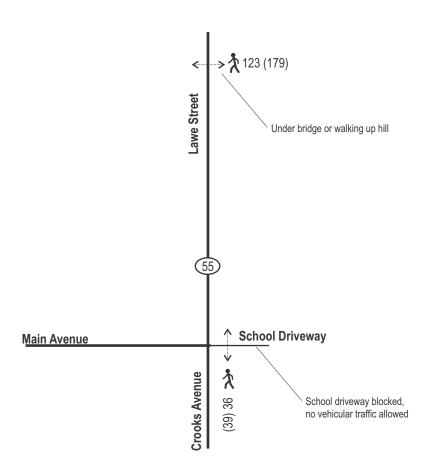
- Traffic Signal Control
 Stop Sign Control
 Roundabout Control
 Existing Lane Configuration
 XX' Existing Storage Length (in Feet)
 XY' Distance Between Roadways (in Feet)
 Divided Roadway Median

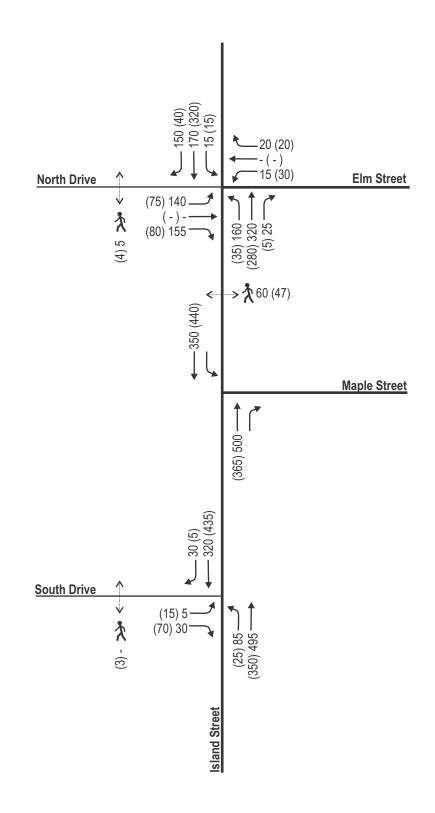






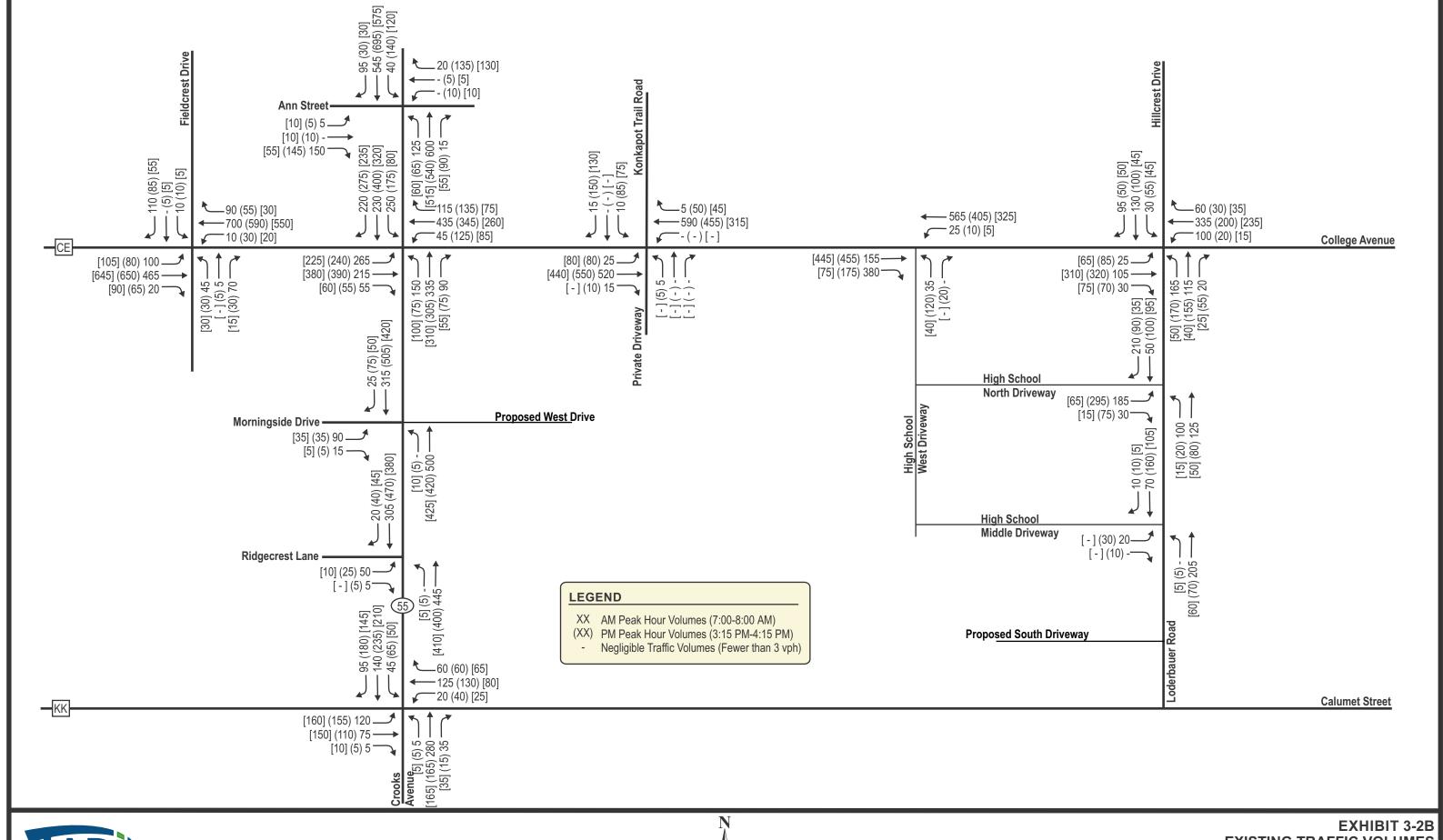
















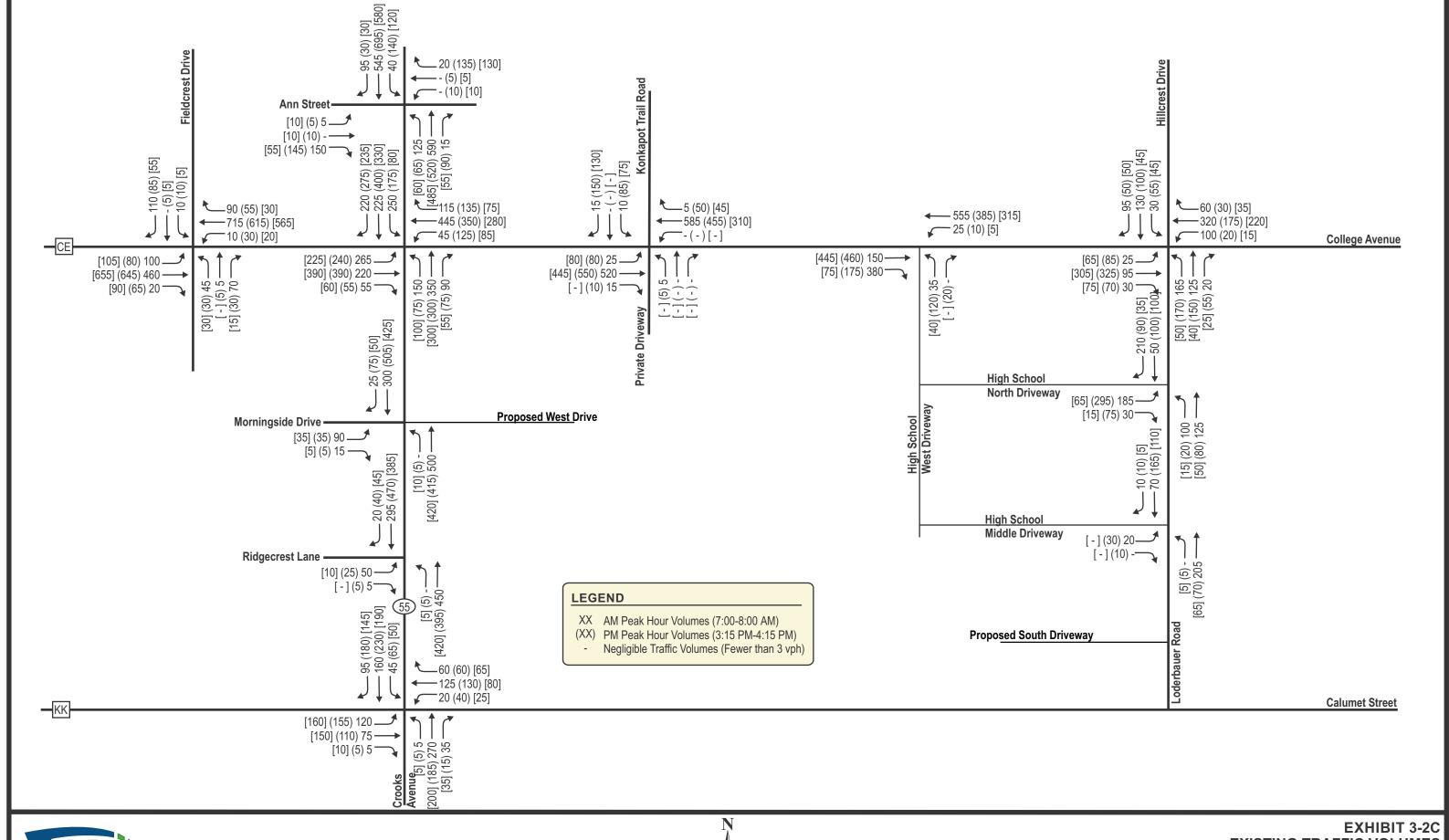
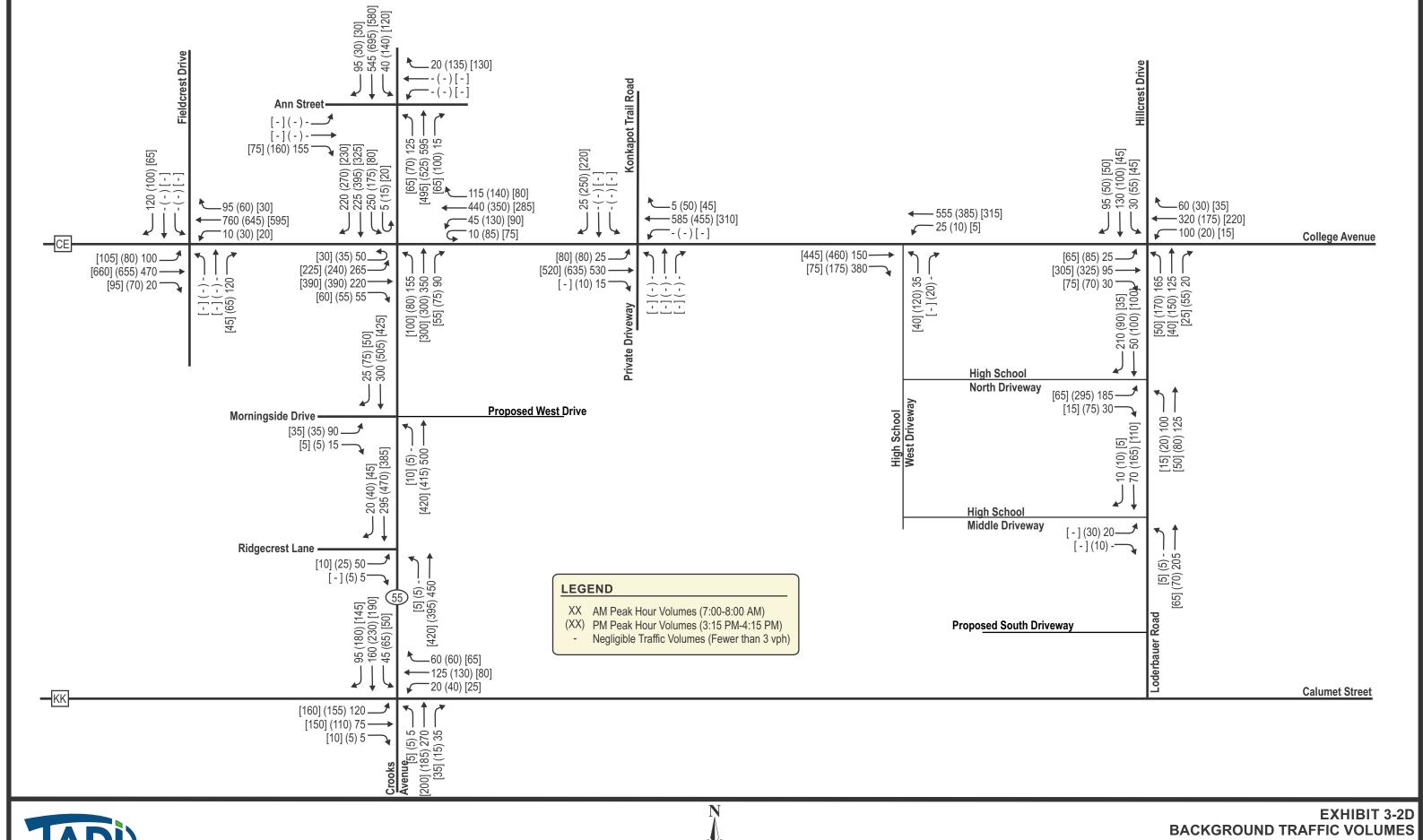




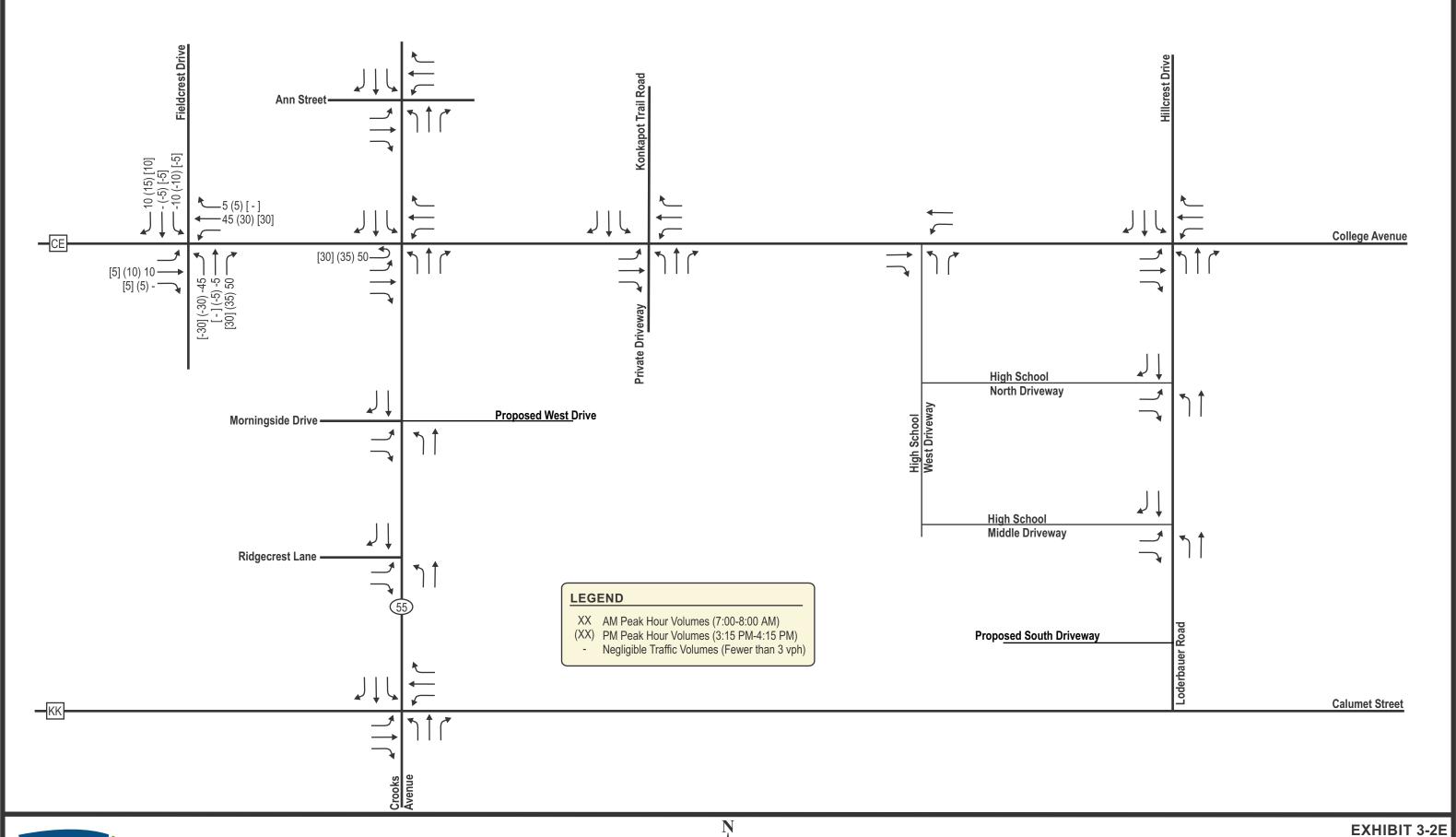


EXHIBIT 3-2C EXISTING TRAFFIC VOLUMES PROPOSED MIDDLE SCHOOL SITE - BALANCED



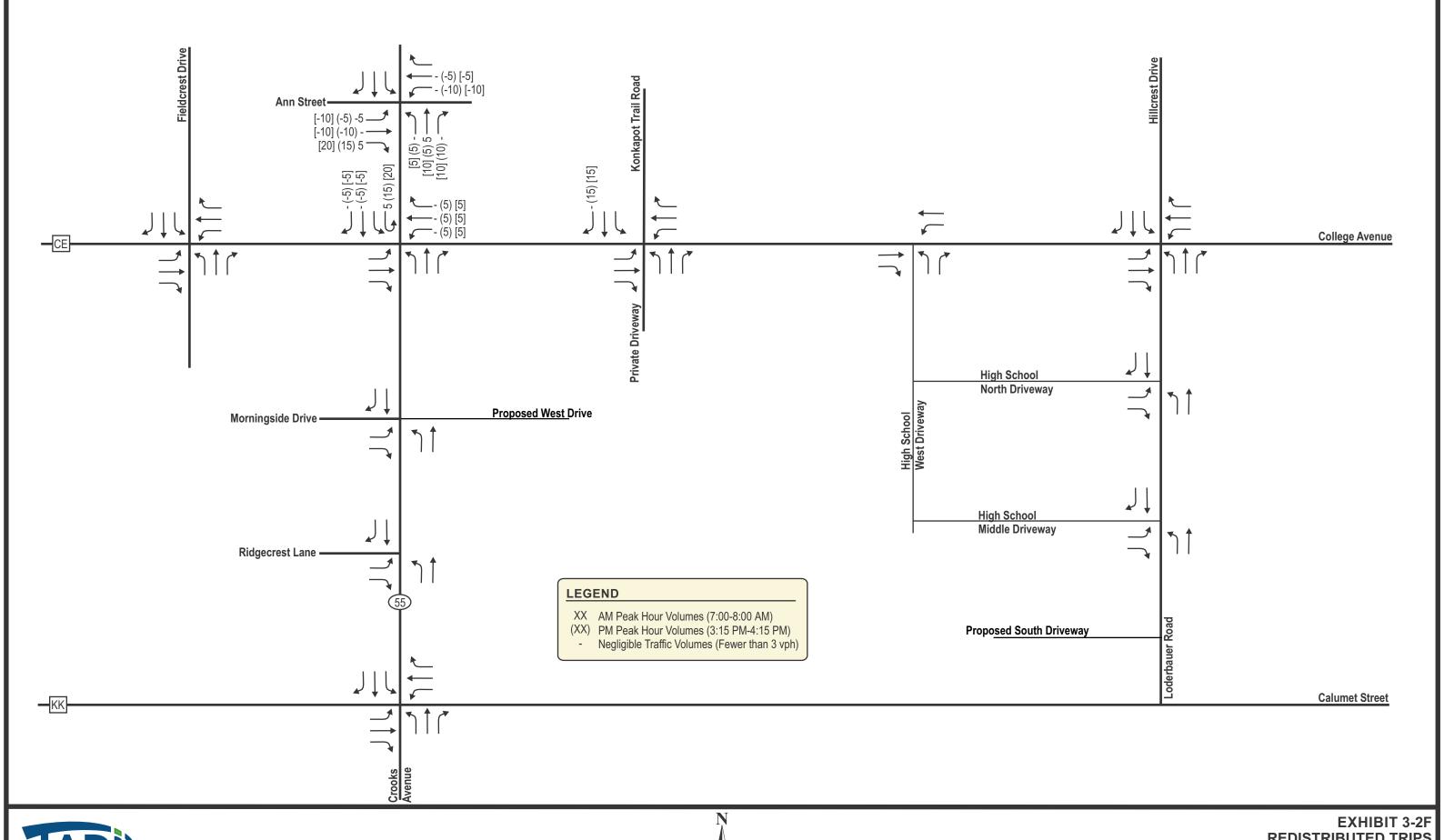






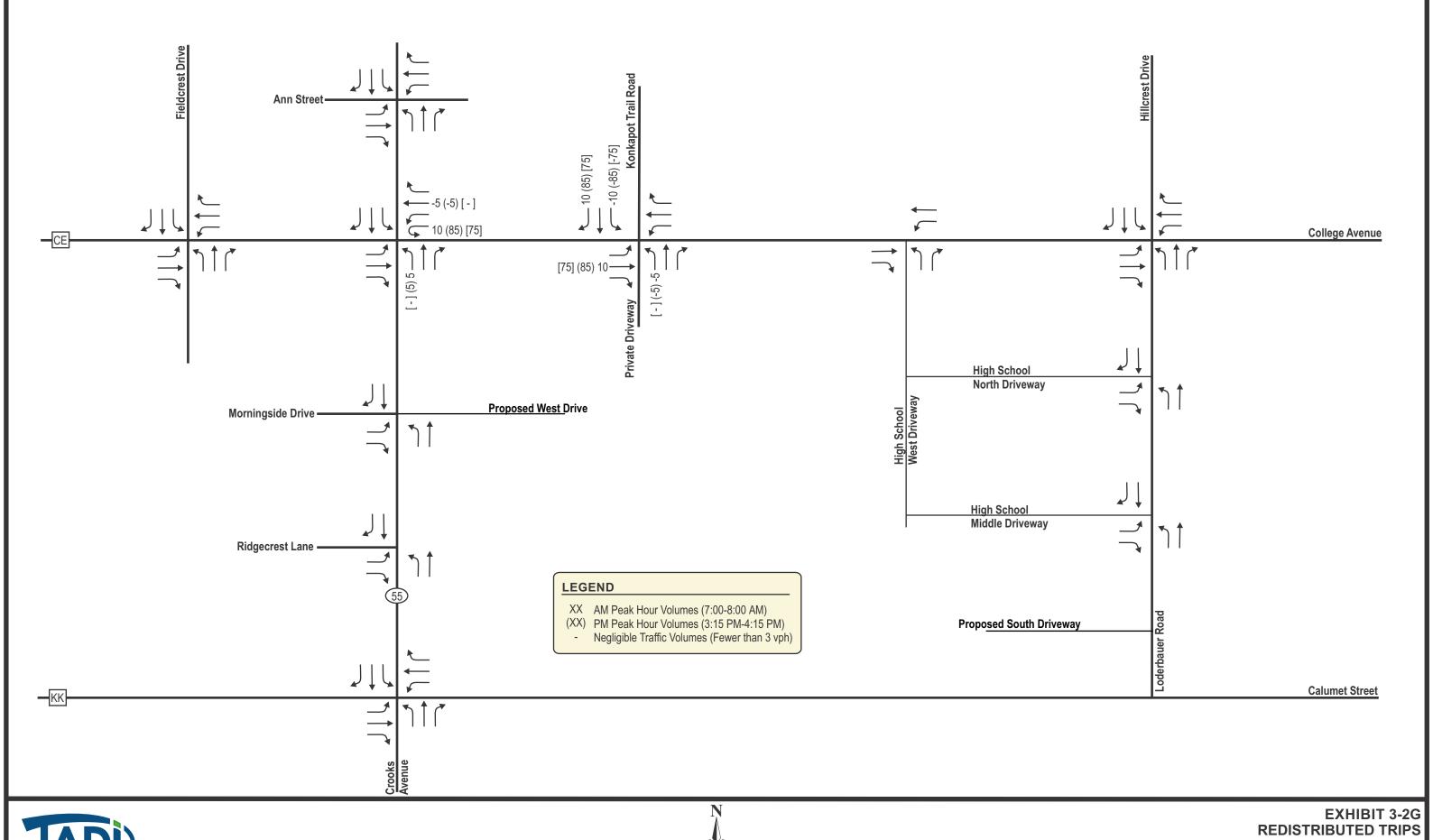
















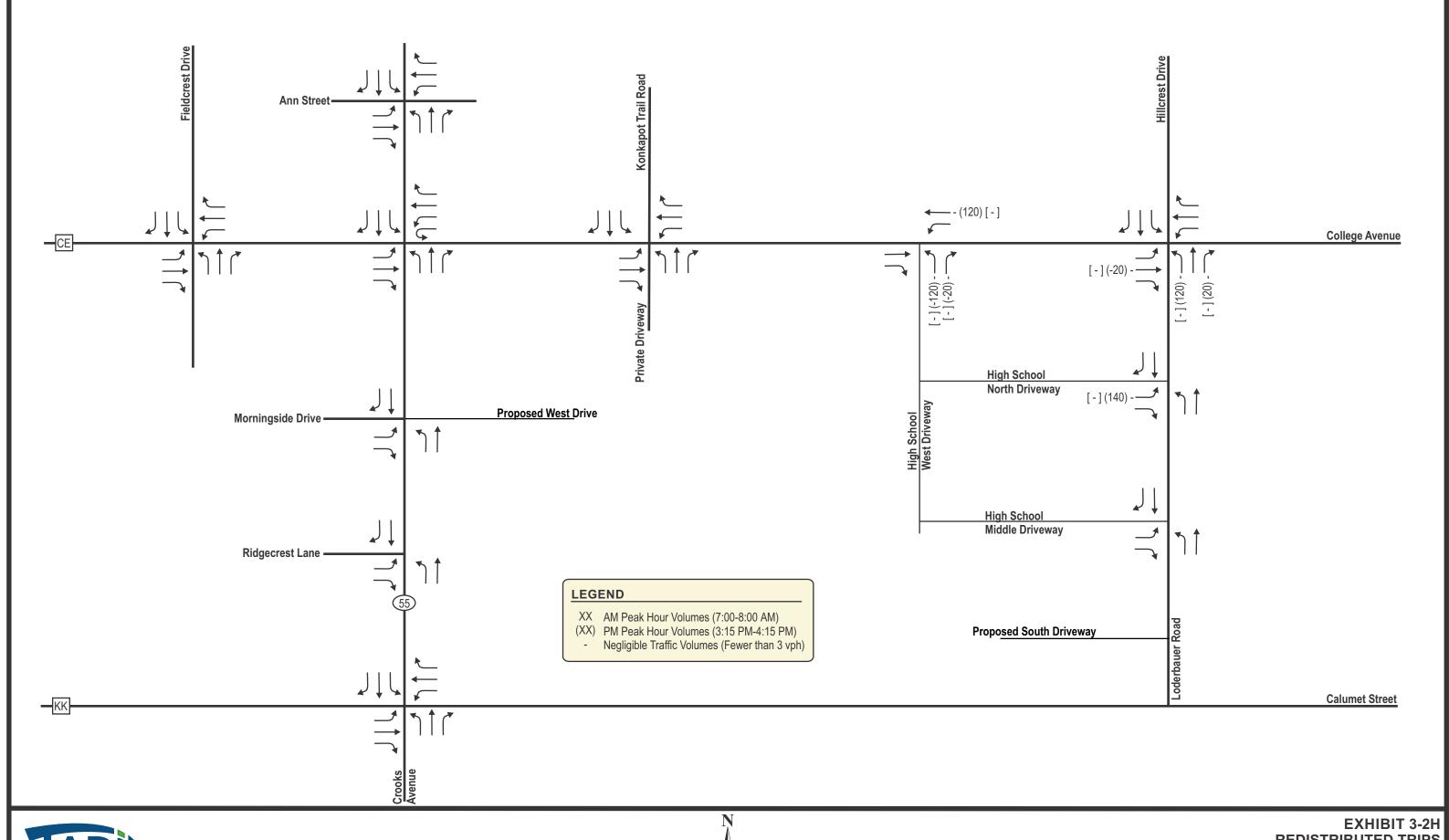






EXHIBIT 3-2H REDISTRIBUTED TRIPS NO EXIT AT HIGH SCHOOL WEST DRIVEWAY (DURING AFTERNOON PEAK HOUR)

Exhibit 3-3
Existing Traffic Peak Hour Operating Conditions
With Existing Geometrics and Traffic Control

		With Ex	risting								t by A	nnr00	o b		1/0
	Peak		E			f Servi	estbou					_		und	I/S LOS &
Intersection	Hour	Metric	ZI ZI	stbou	na V	VV€	÷stbou	Ina K	NO	rthboi	una 7	20	uthbo	una	Delay
IIItersection	rioui	Lanes->		1	1		1	1	1	2	1	1	_	2	Delay
Node 100: STH 55/Crooks Avenue	-	LOS		=	В	_	=	В	В	*	*	Á		*	
& Ann Street		Delay		1.4	14.4		1.1	11.4	10.8	*	*	9.7		*	1
Two-Way Stop Control	AM	v/c		16	-	_	07	-	-	-	-	-		-	1
The Truy Grop Conner.		Queue		5'	40'		5'	25'	25'	*	*	25'		*	1
		LOS		F	В		=	В	Α	*	*	Α		*	
	D.4	Delay	12	5.0	13.5	12	0.9	11.5	9.9	*	*	9.8	1	*	1
	PM	√/c	0.	37	-	0.	36	-	-	-	-	-	2	-	1
		Queue	3	5'	30'		5'	25'	25'	*	*	25'		*	
		LOS			В		F	В	Α	*	*	Α		*	
	PMSE	Delay		3.5	10.9	_	2.2	11.0	9.2	*	*	9.2	1	*	
	""	v/c		26	-		17	-	-	-	-	-		-	
		Queue	-	5'	25'	-	5'	25'	25'	*	*	25'		*	
		Lanes->	1	2	1	1	2	1			1	_	1	1	
Node 200: CTH CE/College Avenue	1	LOS	В	*	*	Α	*	*			В		D	В	l
& Fieldcrest Drive	AM	Delay	11.6	*	*	8.8	*	*	_	.6	10.9	_	3.1	13.5	
Two-Way Stop Control		√/c	-	*	*	-	*	*	0.4		-		-	-	
	_	Queue	25'	*	*	25'	*	*		5'	25'		:5'	25'	_
	DM	LOS	Α	*	*	Α	*	*	27		B		C	B	
	PM	Delay	9.5	*	*	9.4	*	*		7.8 5'	10.8		3.0 !5'	11.2	1
	\vdash	Queue	25'	*	*	25'	*	*	2		25'		:5°	25'	_
	PMSE		A	*	*	A 9.6	*	*		0.6	_	_	1.4	_	ł
	PIVISE		9.4	*	*	25'	*	*		5'	10.8		1.4 15'	10.8	ł
	_	Queue Lanes->		1	1	25		1	1		1	_	1	1	
Node 300: STH 55/Crooks Avenue	-	LOS		3	В			C			C		<u></u>	C	_
& CTH CE/ College Avenue**	AM	Delay		.0	11.1		.6	21.5		9.3	19.2		9.3	19.9	1
Roundabout Control	AIVI	Queue		0'	65'		20'	135')5'	120'		25'	140'	1
Noundabout Control	-	LOS		3	C		3	В	_	3	В	_	В	C	
	PM	Delay		5.0	15.2		.5	11.6		2.8	12.5	_	1.6	15.4	1
		Queue		5'	95'		0'	65'		0'	55'		05'	120'	1
		LOS		1	A		4	A	1		A		Ą	A	
	PMSE			.5	9.8		.7	8.6		.9	9.7		.7	9.0	1
		Queue		5'	60'		5'	35'		0'	45'		5'	55'	1
		Lanes->			1	-	1	1		1	10	_	1	1	
Node 400: CTH CE/College Avenue	-	LOS		1	*		4	*		F			E	С	
& Konkapot Trail Road	1	Delay	9	.8	*	9	.3	*		72.0		41	1.9	15.8	1
Two-Way Stop Control	AM	w/c		-	-		-	-		0.16		0.	14	-	1
5 0		Queue	2	5'	*	2	5'	*		25'		2	:5'	25'	1
		LOS	-	A	-	1	A	-		F			F	С	
	PM	Delay	9	.2	-	9	.0	-		73.6		71	1.1	15.5	
	FIVE	v/c		-	12		-	(3 4)		0.14		0.	70	-	
		Queue	_	5'	-	_	5'	-		25'		_	05'	40'	
		LOS	_	4	-	_	4			С			С	В	
	PMSE	Delay		.3	-		.3	-		20.4		_	3.1	11.4	
		Queue	2	5'	-	-	5'	-		25'		3	0'	25'	
	<u> </u>	Lanes->	-	1	1	-	1	-	1	-	1	_	-		
Node 500: CTH CE/College Avenue		LOS	-	*	*	_	4	-	D	-	A		-		
& High School West D/W	AM	Delay	-	*	*		.4	-	25.0	-	9.4	_	-	-	-
One-Way Stop Control	_	Queue	-	*	*		5'	-	25'	-	25'		-	- 8	
		LOS	-	*	*	_	.8	-	F 70.5	-	13.0		-	-	1
	PM	Delay v/c	-	-	-	-	-	-	0.81	-	-	-		7/2	ł
		Queue	-	*	*		5'	-	145'	-	25'	-		- 12	1
	_	LOS	-	*	*		<u> </u>	-	C	-	B	_	-		_
	PMSE		-	*	*	_	.6	-	17.9	-	11.4	-			1
	I WIGE	Queue	-	*	*		5'	-	25'	-	25'		-		1
		Lanes->	1	1	1	1		_	1	_	1	1	1	1	
Node 600: Loderbauer Road & CTH		LOS	В	A	A	В	_	3	В	_	В	В	C	В	В
	AM	Delay	17.6	9.4	8.6	11.5		1.6	13.7		1.7	18.5	21.6		14.5
CE/College Avenue	7	Queue	25'	65'	25'	70'		30'	105'		95'	40'	125'		1.7.5
			В	В	A	В		3	В		В	C	C	C	В
	\vdash	LOS							_			_			15.1
	PM	LOS Delav		14.8	9.5	18.1	11	1.9	14.5	13	3.5	21.7	23.0	20.4	10.1
	РМ	Delay	16.2	14.8 215'	9.5 35'	18.1 25'		1.9 30'	14.5 105'			21.7 65'	23.0	20.4	13.1
CE/College Avenue Traffic Signal Control	PM	Delay Queue	16.2 65'	215'	35'	18.1 25'	13		105'	1:	3.5 25'	21.7 65'	23.0 100'	-	В
	PM PMSE	Delay Queue LOS	16.2			25'	13	30'		1:	25'	65'	100'	40' B	

Exhibit 3-3
Existing Traffic Peak Hour Operating Conditions
With Existing Geometrics and Traffic Control

				Le	evel of	Service	(LOS) p	er Mov	/emen	t by A	pproa	ch		I/S
	Peak		Ea	stbou	nd	Westk	ound	No	rthbou	ınd	So	uthbo	und	LOS
Intersection	Hour	Metric	7	→	Z	K (- K	K	1	7	И	1	K	Dela
		Lanes->		1					2	-	-	- 2	2	
Node 700: STH 55/Crooks Avenue		LOS		С					A	-		.1	*	
& Morningside Drive	AM	Delay		19.1			•	8	3.1	-	-		*	1
One-Way Stop Control		Queue		35'				1 2	25'	_	-	,	*	1
,p		LOS		С		-			A	-	-	,	*	
	PM	Delay		20.5			.s	9	0.0	_	-	- 2	k	1
	1837560 9	Queue		25'				1 2	25'	-	-	,	k	1
	-	LOS		С					A	_	-	.1	k	
	PMSE	Delay		18.7				_	3.6	-	-	,	k	1
		Queue		25'					25'	2	- 2		*	1
		Lanes->	-	1		-	50		2	-	-	1	1	
Node 800: STH 55/Crooks Avenue		LOS		В				_	<u> </u>	-	-	-	-	
& Ridgecrest Lane	AM	Delay	-	13.9		-			3.1	-	-	-	-	ł
One-Way Stop Control	/	Queue	_	25'					25'		-	-	-	1
one-rray drop control		LOS		C					A	-	-	-	-	
	PM	Delay	\vdash	16.2				_	3.7	-	-	2	-	1
	1	Queue	-	25'					25'	-		-	-	ł
	\vdash	LOS	-	В		-		_	A	_	-	-	-	\vdash
	PMSE	Delay		14.1				_	3.4	-	-	-	-	ł
	I WILL	Queue	_	25'			9		25'	-	-		-	ł
	-		\vdash	1		1		+	1	-	_	1	-	\vdash
Node 900: STH 55/Crooks Road	\vdash	Lanes->	_	A		-		_	A		_	A		
with CTH KK/Calumet Street	AM			5.5		7.		+	7.0			6.2		-
	AIVI	Delay	_	25'		30			40'		_	35'		1
Roundabout Control	\vdash	Queue	_	A		3		+	40 A		_	A		
	PM	LOS		7.0		6.			6.7			8.4		
	PIVI	Delay		35'		30		+	25'		_	65'		ł
	\vdash	Queue	_					+			_			-
	DMCE	LOS	_	7.1		6.		+	A 7.2		_	A 6.4		
	PMSE	Delay	_			2:		+-	7.2		_	40'		-
	-	Queue	_	40'	-			+		_		_		-
Node 1000 Loded Book 6	\vdash	Lanes->	2	2	1	-			2	-	-	1	1	٠.
Node 1000: Loderbauer Road &		LOS	Α	-	Α		· · · · · · · · · · · · · · · · · · ·	_	A	-	-	Α	Α	Α
High School North Access D/W	AM	Delay	9.7	ੂ	8.8	-			3.7		-	6.8	8.2	8.6
Traffic Signal Control	\vdash	Queue	30'	- 12	25'		9		30'	-	-	25'	40'	<u>.</u>
	D.4	LOS	В	-	A	-		_	<u>A</u>	-	-	Α	A	A
	PM	Delay	11.0	-	9.1		2.0	_	3.0	-	-	8.5	8.0	9.6
	\vdash	Queue	45'		25'	-		_	25'	-	-	40'	25'	-
	D	LOS	A	-	Α	-	<u> </u>	_	A		-	Α	Α	A
	PMSE		9.7		9.4	-		_	5.6	9	-	6.3	5.5	7.0
	-	Queue	25'	-	25'			_	25'	-	-	25'	25'	_
		Lanes->		1		-	(I)		1	-	-			_
Node 1100: Loderbauer Road &	10,500,000	LOS		В		-		_	A	-	-	া		1
High School Middle Access D/W	AM	Delay		13.5		-			7.5		-	307	Ar .	1
One-Way Stop Control		Queue		25'		-	0	_	25'	-	-		k .	_
	1979	LOS		В		-	0		A	-	-		*	
	PM	Delay		12.5			in the second		3.0	-	-		*]
		Queue		25'		-		2	25'	-	-		*	
		LOS		Α					A	12	-	1.5		
	PMSE	Delay		9.4		137		7	.5	-	-	,	*	1
	1	Queue		25'		81	Co.	-	25'	2	30000		*	1

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.



^{**} node 300 dual lane roundabout, left values in table per approach are inside shared lanes and right values are outside shared lanes

Exhibit 4-3A

On-Site Trip Generation Table¹

			_									
	ITE		Weekday		AM Peal	k		PM Peal	k	Specia	al Event	Peak ³
Land Use	Code	Proposed Size	Daily	In	Out	Total	In	Out	Total	In	Out	Total
Middle School/Junior High School	522	1200 Students	2,520	445	345	790	110	250	360	105	105	210
(Maximum Expected Student Population)	322	1200 Students	(2.10)	(56%)	(44%)	(0.66)	(30%)	(70%)	(0.30)	(50%)	(50%)	TADI
Total Trips			2,520	445	345	790	110	250	360	105	105	210
Minus Linked Trips ²	(522)	10%	-250	-45	-35	-80	-10	-25	-35	0	0	0
Total New Trips			2,270	400	310	710	100	225	325	105	105	210

^{1/}ITE Trip Rates (X.XX) and/or Fitted Curve Equations (FCE) are from the ITE Trip Generation Manual, 11th Edition; note rates including a variety of walking/busing sites in US

TRIP DISTRIBUTION (New Trips)

	100%	227 0	400	310	100	22 5	105	105	
North on Fieldcrest Drive	6%	135	25	20	5	20	5	5	
West on Ann Street	1%	25	5	5	0	5	0	0	
West on Ridgecrest Lane	1%	25	5	0	0	0	0	0	
West on Morningside Drive	5%	115	20	15	5	10	5	5	
North on Hillcrest Drive	5%	115	20	15	5	10	5	5	
East on Calumet Street/CTH KK	3%	70	10	10	5	5	5	5	
West on Calumet Street/CTH KK	3%	70	10	10	5	5	5	5	
South on Crooks Avenue/STH 55	12%	265	50	35	10	25	10	10	
North on Crooks Avenue/STH 55	47%	1065	190	145	45	105	50	50	
East on College Avenue/CTH CE	9%	205	35	30	10	20	10	10	
West on College Avenue/CTH CE	8%	180	30	25	10	20	10	10	

Exhibit 4-3B

Off-Site Trip Generation Table¹

	011 0110 1	mp como	unon	IUDIO							
ITE		Weekday		AM Peal	,		PM Peal	(Specia	al Event	Peak ²
Code	Proposed Size	Daily	In	Out	Total	In	Out	Total	In	Out	Total
220	200 Unito	1,360	20	65	85	65	40	105	65	40	105
220	200 Offits	FCE	(24%)	(76%)	FCE	(63%)	(37%)	FCE	(63%)	(37%)	FCE
821	100 000 v 1 000 SE	6,750	110	65	175	255	265	520	255	265	520
021	100.000 X 1,000 SI	(67.52)	(62%)	(38%)	(1.73)	(49%)	(51%)	(5.19)	(49%)	(51%)	(5.19)
822	20 000 v 1 000 SE	1,090	25	20	45	65	60	125	65	60	125
022	20.000 X 1,000 SI	(54.45)	(60%)	(40%)	(2.36)	(50%)	(50%)	FCE	(50%)	(50%)	FCE
710	15 000 v 1 000 SE	220	30	5	35	5	30	35	5	30	35
710	15.000 X 1,000 SF	FCE	(88%)	(12%)	FCE	(17%)	(83%)	FCE	(17%)	(83%)	FCE
		9,420	185	155	340	390	395	785	390	395	785
(220)	2%: 14% (14%)	-190	0	0	0	-10	-5	-15	-10	-5	-15
(821)	2%: 14% (14%)	-950	0	0	0	-35	-35	-70	-35	-35	-70
(822)	2%: 14% (14%)	-150	0	0	0	-10	-10	-20	-10	-10	-20
(710)	2%: 14% (14%)	-30	0	0	0	0	-5	-5	0		-5
		-1,320	0	0	0	-55	-55	-110	-55	-55	-110
		8,100	185	155	340	335	340	675	335	340	675
(220)	0%: 0% (0%)	0	0	0	0	0	0	0	0	0	0
(821)	20%: 20% (20%)	-1,160	-20	-20	-40	-45	-45	-90	-45	-45	-90
(822)	20%: 20% (20%)	-190	-5	-5	-10	-10	-10	-20	-10	-10	-20
(710)	0%: 0% (0%)	0	0	0	0	0	0	0	0	0	0
		-1,350	-25	-25	-50	-55	-55	-110	-55	-55	-110
·	·	6,750	160	130	290	280	285	565	280	285	565
	Code 220 821 822 710 (220) (821) (822) (710) (220) (821) (822)	TTE Code Proposed Size 220 200 Units 821 100.000 x 1,000 SF 822 20.000 x 1,000 SF 710 15.000 x 1,000 SF (220) 2%: 14% (14%) (821) 2%: 14% (14%) (710) 2%: 14% (14%) (710) 2%: 14% (14%) (720) 0%: 0% (0%) (821) 20%: 20% (20%) (822) 20%: 20% (20%)	TTE	TTE Code Proposed Size Daily In	Code Proposed Size Daily In Out 220 200 Units 1,360 FCE (24%) (76%) (76%) 20 65 (24%) (76%) (76%) 821 100.000 x 1,000 SF (67.52) (62%) (62%) (38%) 110 65 (62%) (62%) (38%) 822 20.000 x 1,000 SF (54.45) (60%) (60%) (40%) 25 20 (60%) (40%) 710 15.000 x 1,000 SF FCE (88%) (12%) 88% (12%) 9,420 185 155 155 (220) 2%: 14% (14%) -950 0 0 0 (821) 2%: 14% (14%) -30 0 0 0 (710) 2%: 14% (14%) -30 0 0 0 -1,320 0 0 0 (220) 0%: 0% (0%) 0% (0%) 0 0 (821) 20%: 20% (20%) -1,160 -20 -20 (20%) (82) 20%: 20% (20%) -1,160 -20 -20 -20 (822) 20%: 20% (20%) -1,160 -20 -5 -5 (50%) (710) 0%: 0% (0%) 0	TTE Code Proposed Size Daily In Out Total	TTE Code Proposed Size Daily In Out Total In	TTE	TTE Code Proposed Size Daily In Out Total In Out Out	TTE Code Proposed Size Daily In Out Total In Out Out	TTE Code Proposed Size Daily In Out Total In Out Ou

¹ ITE Trip Rates (X.XX) and/or Fitted Curve Equations (FCE) are from the ITE Trip Generation Manual, 11th Edition

TRIP DISTRIBUTION (New Trips)

	100%	6750	160	130	280	2 85	280	2 85	
North on Fieldcrest Drive	6%	405	10	10	15	15	15	15	
West on Ann Street	3%	205	5	5	10	10	10	10	
West on Ridgecrest Lane	2%	135	5	5	5	5	5	5	
West on Morningside Drive	1%	70	0	0	5	5	5	5	
North on Hillcrest Drive	6%	405	10	10	15	15	15	15	
East on Calumet Street/CTH KK	5%	340	10	5	15	15	15	15	
West on Calumet Street/CTH KK	12%	810	20	15	35	35	35	35	
South on Crooks Avenue/STH 55	8%	540	10	10	20	25	20	25	
North on Crooks Avenue/STH 55	23%	1550	35	30	65	65	65	65	
East on College Avenue/CTH CE	9%	605	15	10	25	25	25	25	
West on College Avenue/CTH CE	25%	1685	40	30	70	70	70	70	
TRIP DISTRIBUTION (New Tr	i <u>ps)</u>								



Peak hour of generator rates used for expected school traffic to account for worst case (highest volume) traffic scenario.

²Linked trips expected between Middle School and High School due to multiple children in single family and/or carpooling Special Event peak hour assumes middle school high school basketball game. See appendix for detailed calculations.

² For off-site development trip generation, even though school dismissal peak hour expected to be less than peak hour of adjacent street traffic, school dismissal peak hour assumed same as special event peak hour as worst case (highest traffic volume) condition, also see special event peak hour note in Exhibit 4-3A.

CHAPTER IV - FORECASTED TRAFFIC

PART A - TRAFFIC FORECASTING

To address any potential future traffic impacts along study area roadways and at the intersections adjacent to the proposed middle schools, it is necessary to identify the hourly and daily volume of traffic generated by the projected school's student population. The traffic volumes expected to be generated by the proposed middle schools were calculated two ways. The first method calculated the rates based on the vehicle and pedestrian counts that were conducted at the existing Riverview Middle School located about 2 miles north of the proposed new school site. To provide a comparison, the rates were also calculated based on the trip rates for a middle school (LU522) as published in the *Institute of Transportation Engineer's (ITE) Trip Generation Manual, 11th Edition.* For both methods, the trip rates were calculated based the expected student population for the peak hour of generator instead of the peak hour of adjacent street traffic to account for the worst-case (highest volume) school traffic conditions.

As shown in Appendix A, using the current student population of 1,150 students, a weekday morning trip generation rate of 0.66 trips per student and a weekday afternoon trip generation rate of 0.30 trips per student were calculated based on traffic counts conducted on a typical weekday in early-February at the access driveways to the existing school. Appendix A also shows a comparison of the local rates when compared to the national ITE rates. As shown, the ITE rate weekday morning trips are calculated as being about 11-percent higher than the local trip volumes and the ITE weekday afternoon trips are calculated as being about 19-percent higher than the local trip volumes. Since the ITE calculations were similar but slightly higher, it is recommended to use the ITE rate calculations for this study as a worst-case (highest volume) traffic condition. The number of students that are currently walking or riding to school is also included in the calculations. As shown, about 225 students were counted walking to school during a typical weekday morning in early February of 2025. In addition, about 270 students were counted walking home from school during a typical weekday afternoon in early February of 2025. With both the existing middle school and the proposed middle school being located in close proximity to a high density of residential neighborhoods, it was felt that a similar percentage of students will walk to the new school site as previously walked to the existing Riverview Middle School site.

The Special Event peak hour is expected to coincide with a boy's middle school basketball game. A boy's middle school basketball game was chosen for the special event peak hour since it is the highest regularly scheduled event expected at the school. Vehicle trips for this peak hour were calculated based on the expected attendance and expected number of teams/players. Details and calculations for this peak hour are provided in the appendix of this study.

A1. Trip Generation

The proposed middle school development trip generation and distribution tables are shown in Exhibit 4-3A. As shown, using ITE trip generation rates as described above under full build out and after linked trip reductions, the proposed middle school development is expected to generate 2,270 weekday daily trips; with 780 new trips in the AM peak hour, 380 new trips in the PM peak hour and 210 during a typical weekday sporting event at the middle school.

The potential off-site development area trip generation and distribution tables are shown in Exhibit 4-3B. As shown, under full build out and after linked and pass-by trip reductions, the potential off-site development area is expected to generate 6,750 weekday daily trips; with 290 new trips in the AM peak hour, 565 new trips in the PM peak hour and 565 during a typical weekday sporting event at the middle school. It is noted that the evening peak hour volumes for

the potential off-site development area were based on peak hour of adjacent street traffic, which more closely aligns with the special event peak hour. Since the school discharge PM peak hour is earlier than the adjacent street traffic peak hour, the new trips for the school discharge peak hour can be considered a worst case (highest volume) condition.

A2. Mode Split

Pedestrians and bicyclists are expected to continue to use their respective modes to access the proposed middle school.

Due to the proximity of the proposed middle school to the existing high school located adjacent to the site, the school development site is expected to include linked trips. A linked trip occurs when a patron of one school visits the second school prior to exiting the site (e.g., students from one family or car poolers from several families who attend both schools). It is estimated that approximately 10 percent of the new school trips are expected to be linked trips. Due to the proposed school land use, pass-by trips are not expected for the site. Pass-by trips occur when motorists already on the highway system stop at a development site prior to continuing on their intended route (e.g., an existing motorist northbound on STH 55 stops at the school prior to continuing northbound on STH 55).

The off-site development site is expected to include both linked trips and pass-by trips. Using NCHRP 684 and based on calculations provided in the appendix of this study, it is estimated that approximately 2 percent of the weekday morning new trips and 14 percent of the weekday evening new trips are expected to be linked trips. In addition, approximately 20 percent of the potential retail driveway trips are expected to be pass-by trips. No pass-by trip reduction was included for the apartment or office land uses.

A3. Trip Distribution

The trip distribution for the proposed middle school development, listed below and shown in table format in Exhibit 4-3A and graphically in Exhibit 4-4 was determined based on the existing traffic patterns at the adjacent study area intersections, the school's location in proximity to the adjacent highways and the overall location of the Kaukauna Area School District school populations which are expected to feed the proposed middle schools. Utilizing the boundary limits for the school district, population density clusters were identified, and percentages were distributed onto the adjacent highways. A map showing the limits of the Kaukauna Area School District boundary is included in the appendix of this report. The trip distribution for the proposed middle school is as follows:

- 8% to/from the west on CTH CE
- 9% to/from the east on CTH CE
- 47% to/from the north on STH 55
- 12% to/from the south on STH 55
- 3% to/from the west on CTH KK
- 3% to/from the east on CTH KK
- 5% to/from the north on Hillcrest Drive
- 5% to/from the west on Morningside Drive
- 1% to/from the west on Ridgecrest Drive
- 1% to/from the west on Ann Street
- 6% to/from the north on Fieldcrest Drive

The trip distribution for the potential future off-site development areas, listed below and shown in table format in Exhibit 4-3B and graphically in Exhibit 4-4 was determined based on the

existing traffic patterns at the adjacent study area intersections, the development site in proximity to the adjacent highways and the population areas within the overall area. The trip distribution for the potential future off-site development areas is as follows:

- 25% to/from the west on CTH CE
- 9% to/from the east on CTH CE
- 23% to/from the north on STH 55
- 8% to/from the south on STH 55
- 12% to/from the west on CTH KK
- 5% to/from the east on CTH KK
- 6% to/from the north on Hillcrest Drive
- 1% to/from the west on Morningside Drive
- 2% to/from the west on Ridgecrest Drive
- 3% to/from the west on Ann Street
- 6% to/from the north on Fieldcrest Drive

A4. Trip Assignment

New trips expected to be generated proposed middle school development, and the potential future off-site development areas were assigned based on the trip distribution shown in tabular format in Exhibits 4-3A&B and graphically in Exhibit 4-4. As shown in the table at the bottom of the trip generation exhibits, new trips were assigned to the study corridors for the typical school day. The new trips for the proposed middle school development are shown graphically in Exhibit 4-5A&B.

Due to existing operational concerns at the CTH CE/College Avenue intersection with Fieldcrest Drive, two access scenarios were evaluated as part of this study to look at the operation of the Fieldcrest Drive under restricted movement assumptions. The following scenarios were evaluated:

Scenario 1 – Fieldcrest Drive intersection approaches operating with full access movements; that is, no restrictions to movements. New Trips for the proposed middle school under this scenario are shown in Exhibit 4-5A. New Trips for the potential future off-site development areas under this scenario are shown in Exhibit 4-9A.

Scenario 2 – Fieldcrest Drive intersection approaches operating under left-in/right-in/right-out access movements; that is no northbound or southbound through or left-turn movements allowed from Fieldcrest Drive. Vehicles wanting to make a northbound or southbound through or left-turn movement would either make a right-turn movement and then utilize/traverse the roundabouts located to the east or west to continue their route; or would divert within the neighborhoods to an adjacent intersection. New Trips for the proposed middle school under this scenario are shown in Exhibit 4-5B. New Trips for the potential future off-site development areas under this scenario are shown in Exhibit 4-9B. In addition, Redistributed Trips, existing movements that would need to divert based on the restricted movements at the Fieldcrest Drive intersection, are shown in Exhibit 3-2E.

In addition, due to existing operational concerns at the STH 55/Crooks Avenue intersection with Ann Street and the CTH CE/College Avenue intersection with Konkapot Trail Road/Forefront Dermatology Access Driveway, restricted movement assumptions were also considered at these two intersections under the improvement/modification scenarios analyzed as part of this study. Redistributed Trips at the Ann Street intersection are shown in Exhibit 3-2F and Redistributed Trips at the Konkapot Trail Road intersection are shown in Exhibit 3-2G.

Finally, due to existing and future operational concerns at the STH 55/Crooks Ave CTH CE/College Avenue intersection with the High School West Driveway during the typical school afternoon discharge peak hour, restricted movement assumptions were also considered at this intersection under the improvement/modification scenarios analyzed as part of this study. Redistributed Trips at the High School West Driveway intersection during the typical school afternoon discharge peak hour are shown in Exhibit 3-2H.

PART B - BACKGROUND, FULL BUILD & TOTAL TRAFFIC

B1. Background Traffic

The Existing traffic volumes, Exhibit 3-2C, were added to the redistributed (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) trips shown in Exhibit 3-2E, the redistributed (Left-in/Right-in/Right-out at Ann Street) trips shown in Exhibit 3-2F, and the redistributed (Left-in/Right-in/Right-out at Konkapot Trail Road) trips shown in Exhibit 3-2G, to determine the Background (Left-in/Right-in/Right-out at Fieldcrest Drive, Ann Street and Konkapot Trail) traffic volumes (Exhibit 3-2D).

B2. Full Build Traffic

The Existing traffic volumes, Exhibit 3-2C, were added to the on-site (Access Scenario 1 - Full Access at Fieldcrest Drive) new trips shown in Exhibit 4-5A, to determine the Full Build (Access Scenario 1 - Full Access at Fieldcrest Drive) traffic volumes (Exhibit 4-11A).

The Existing traffic volumes, Exhibit 3-2C, were added to the on-site (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) new trips shown in Exhibit 4-5B, and the redistributed (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) trips shown in Exhibit 3-2E, to determine the Full Build (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes (Exhibit 4-11B).

Under the recommended modifications scenario, the Full Build (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes, Exhibit 4-11B, the redistributed (Left-in/Right-in/Right-out at Ann Street) trips shown in Exhibit 3-2F, and the redistributed (Left-in/Right-in/Right-out at Konkapot Trail Road) trips shown in Exhibit 3-2G, to determine the Full Build (Left-in/Right-in/Right-out at Fieldcrest Drive, Ann Street and Konkapot Trail, Full Access at High School West Driveway) traffic volumes (Exhibit 4-11C).

Under the recommended modifications scenario with additional access restrictions at the west high school driveway, the Full Build (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes, Exhibit 4-11B, the redistributed (Left-in/Right-in/Right-out at Ann Street) trips shown in Exhibit 3-2F, the redistributed (Left-in/Right-in/Right-out at Konkapot Trail Road) trips shown in Exhibit 3-2G, and the redistributed (No exit at High School West Driveway) trips shown in Exhibit 3-2H to determine the Full Build (Left-in/Right-in/Right-out at Fieldcrest Drive, Ann Street and Konkapot Trail, No exit at High School West Driveway) traffic volumes (Exhibit 4-11D).

B3. Total Traffic

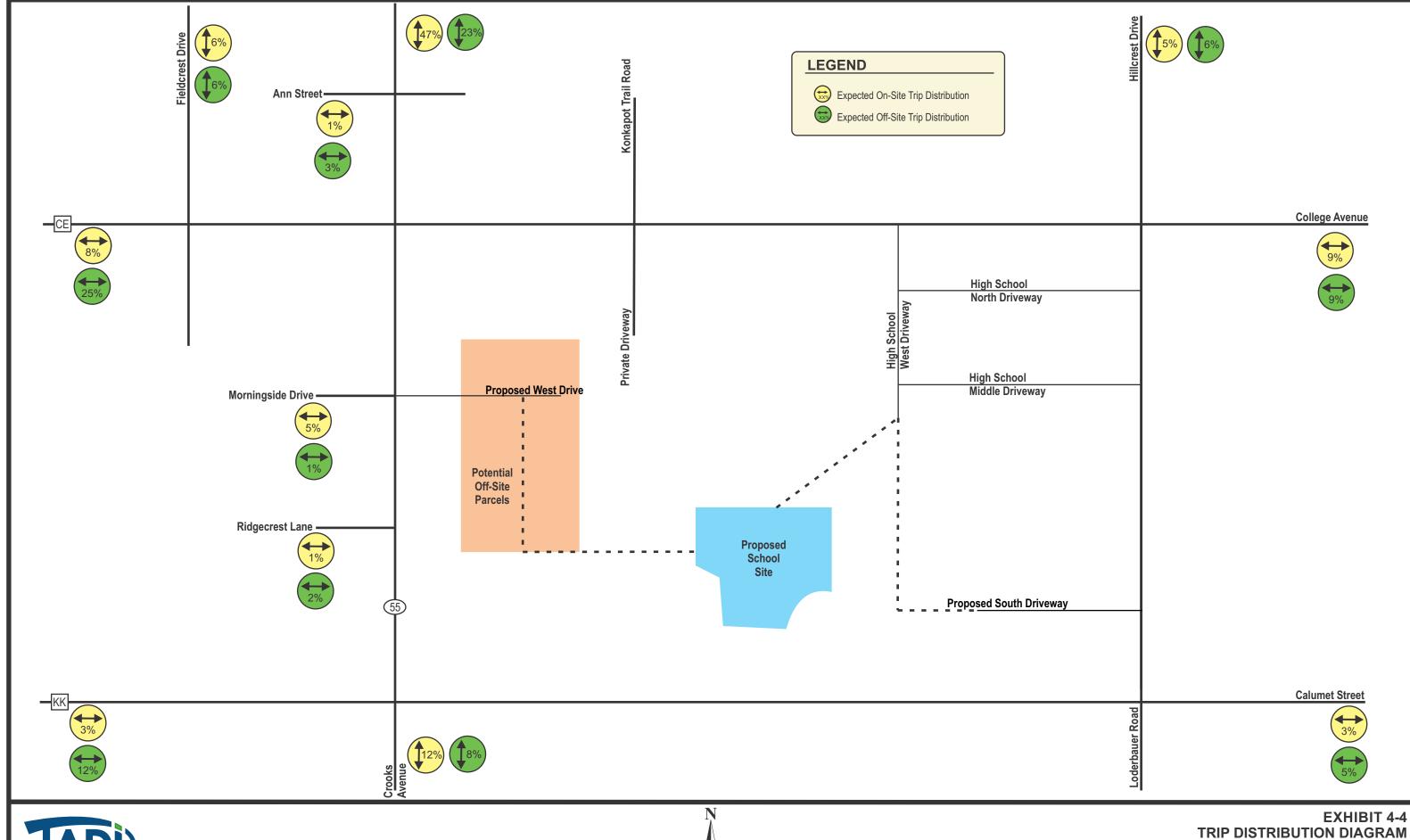
The Full Build (Access Scenario 1 - Full Access at Fieldcrest Drive) traffic volumes, Exhibit 4-11A, were added to the off-site (Access Scenario 1 - Full Access at Fieldcrest Drive) new trips shown in Exhibit 4-9A, to determine the Total (Access Scenario 1 - Full Access at Fieldcrest Drive) traffic volumes (Exhibit 4-14A).

The Full Build (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes, Exhibit 4-11B were added to the off-site (Access Scenario 2 - Left-in/Right-in/Right-out

at Fieldcrest Drive) new trips shown in Exhibit 4-9B, to determine the Total (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes (Exhibit 4-14B).

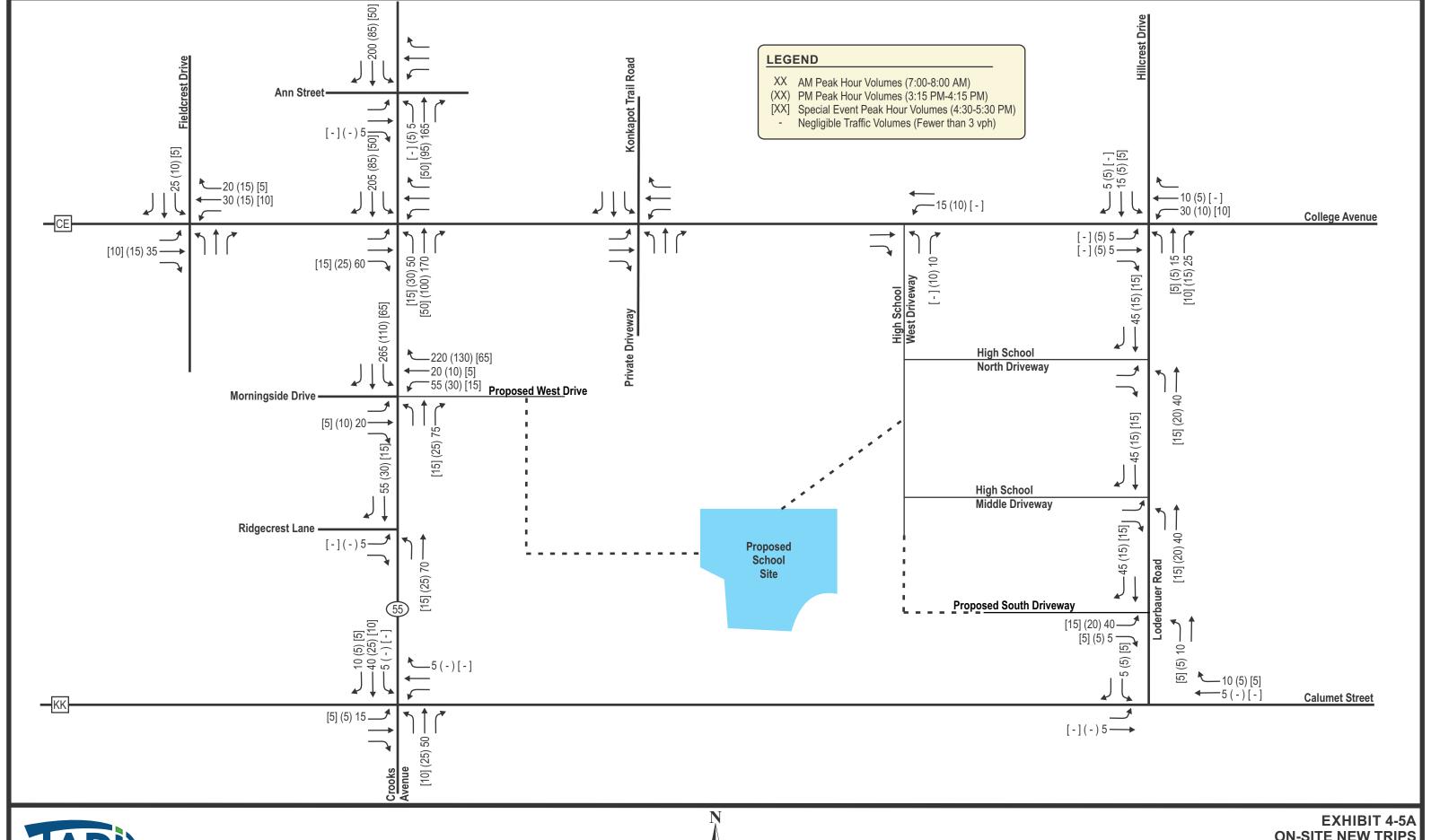
Under the recommended modifications scenario, the Total (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes, Exhibit 4-14B, the redistributed (Left-in/Right-in/Right-out at Ann Street) trips shown in Exhibit 3-2F, and the redistributed (Left-in/Right-in/Right-out at Konkapot Trail Road) trips shown in Exhibit 3-2G, to determine the Total (Left-in/Right-in/Right-out at Fieldcrest Drive, Ann Street and Konkapot Trail, Full Access at High School West Driveway) traffic volumes (Exhibit 4-14C).

Under the recommended modifications scenario with additional access restrictions at the west high school driveway, the Total (Access Scenario 2 - Left-in/Right-in/Right-out at Fieldcrest Drive) traffic volumes, Exhibit 4-14B, the redistributed (Left-in/Right-in/Right-out at Ann Street) trips shown in Exhibit 3-2F, and the redistributed (Left-in/Right-in/Right-out at Konkapot Trail Road) trips shown in Exhibit 3-2G, and the redistributed (No exit at High School West Driveway) trips shown in Exhibit 3-2H to determine the Total (Left-in/Right-in/Right-out at Fieldcrest Drive, Ann Street and Konkapot Trail, No exit at High School West Driveway) traffic volumes (Exhibit 4-14D).





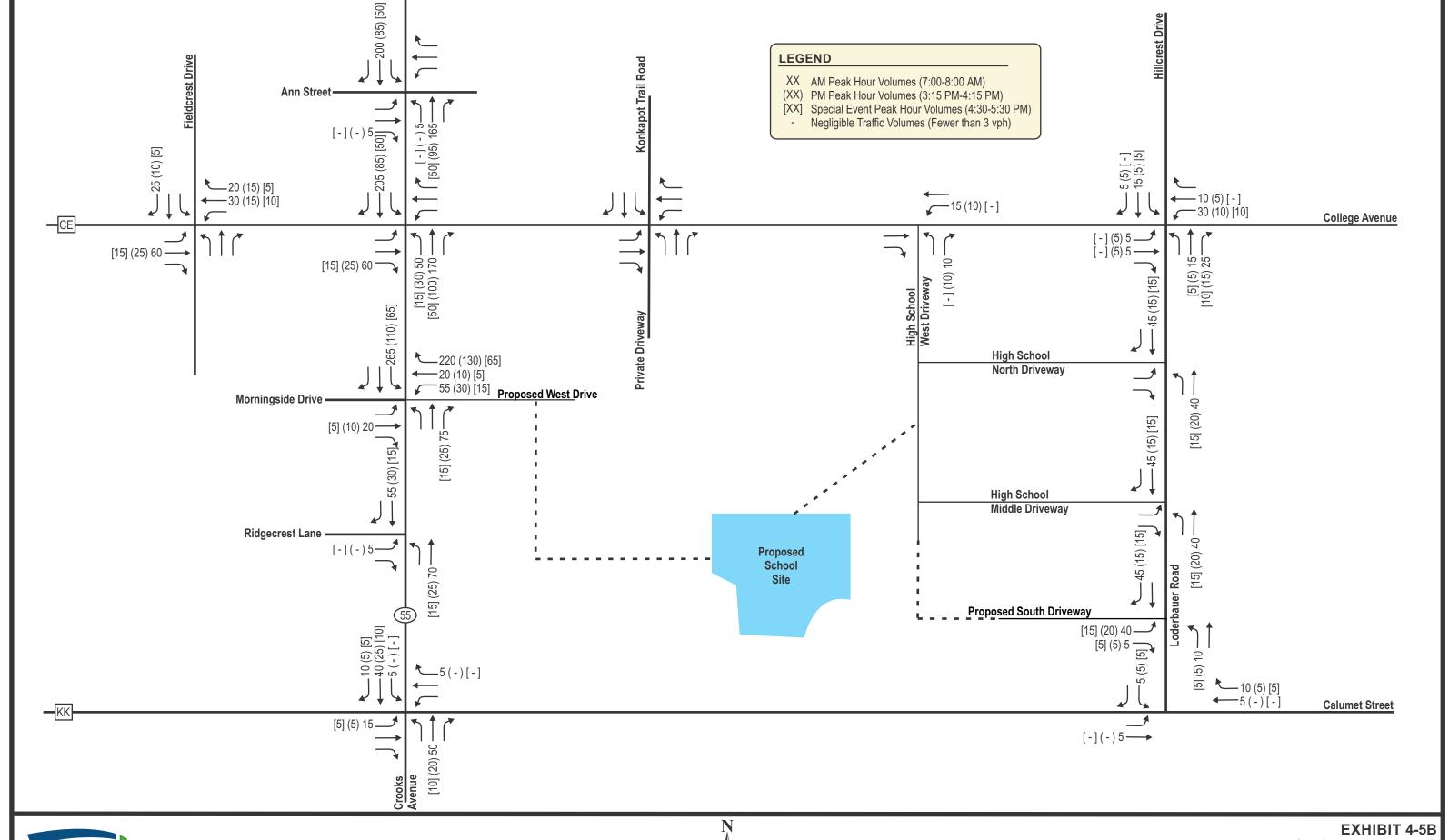








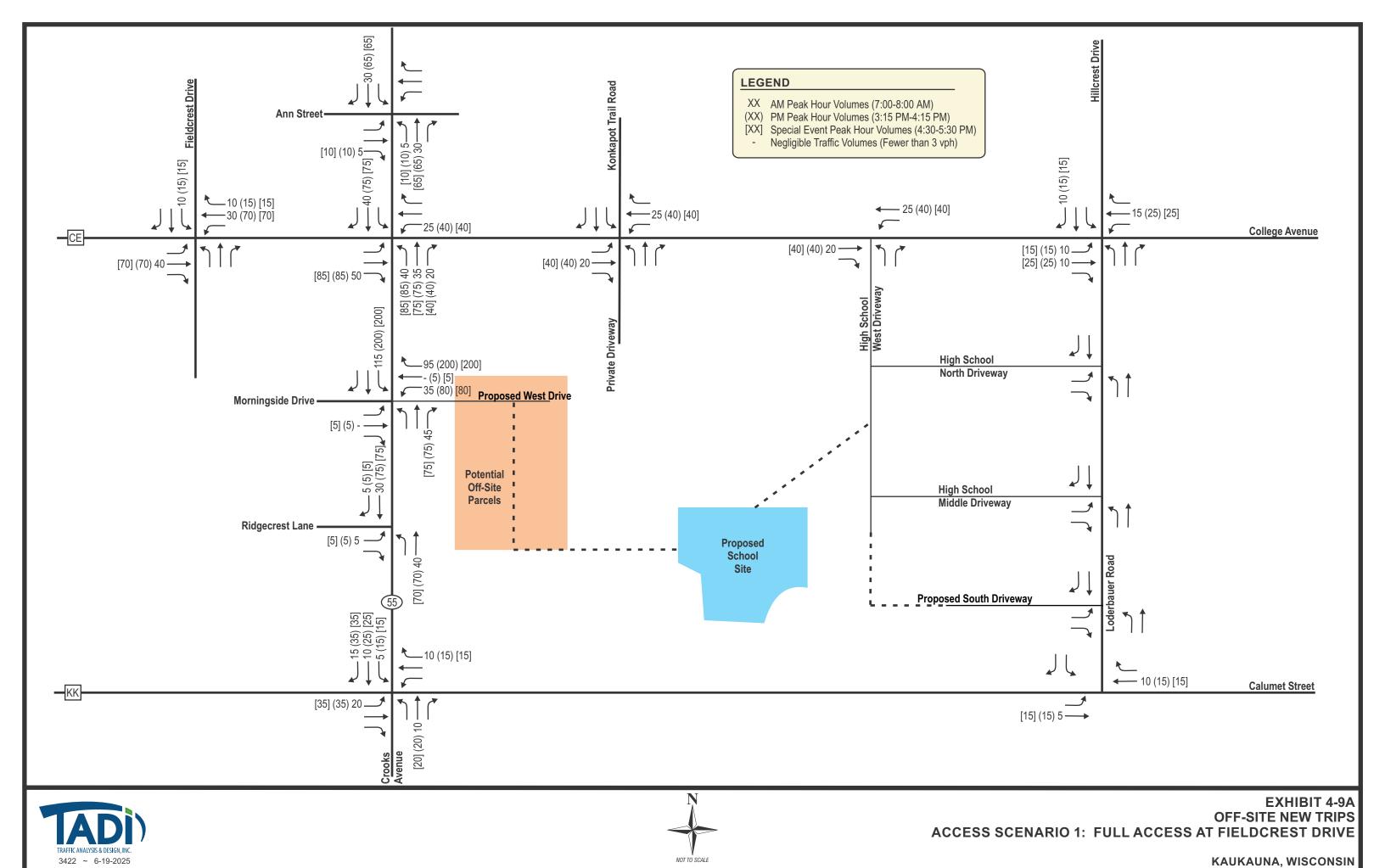
ON-SITE NEW TRIPS ACCESS SCENARIO 1: FULL ACCESS AT FIELDCREST DRIVE

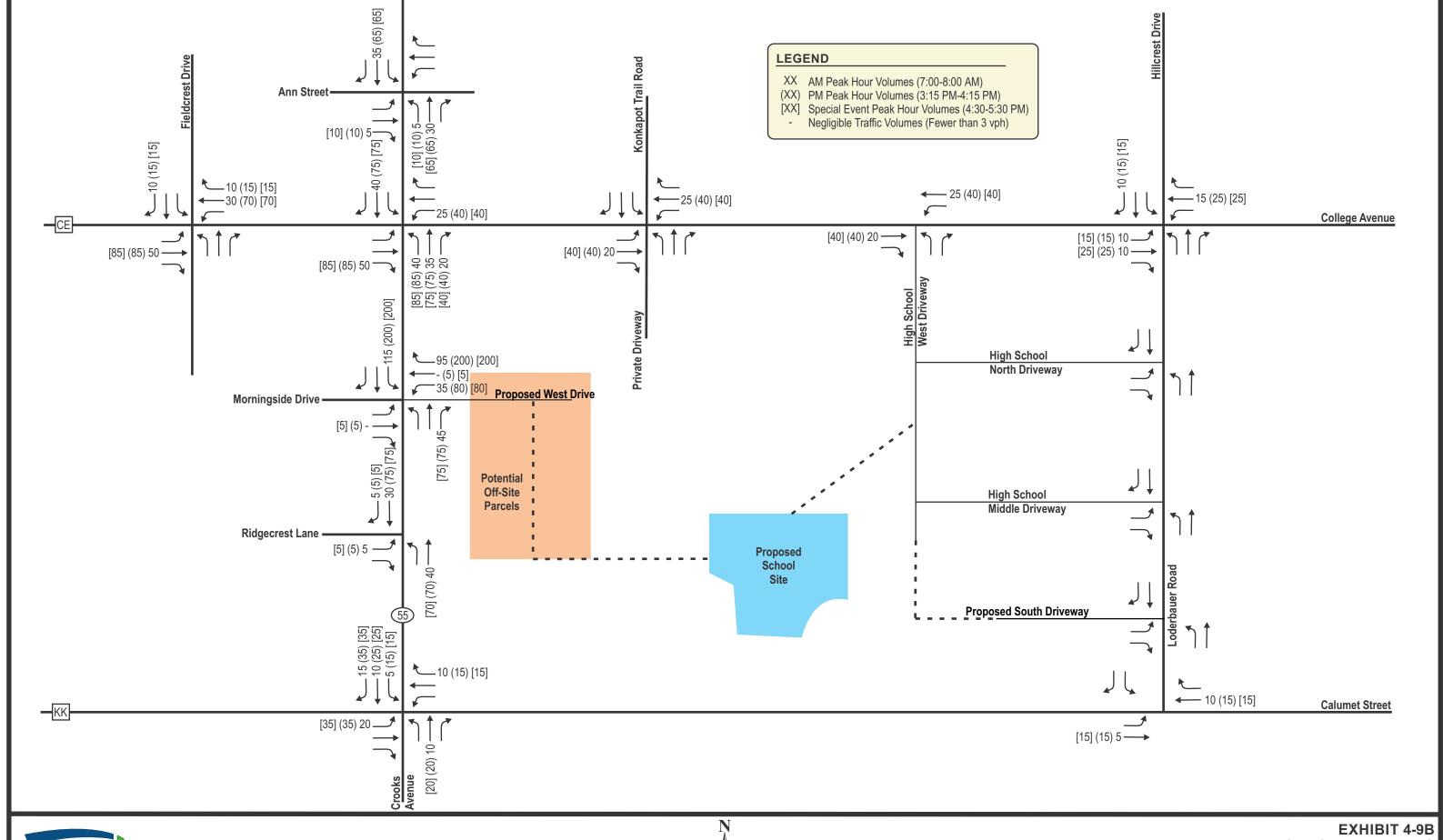






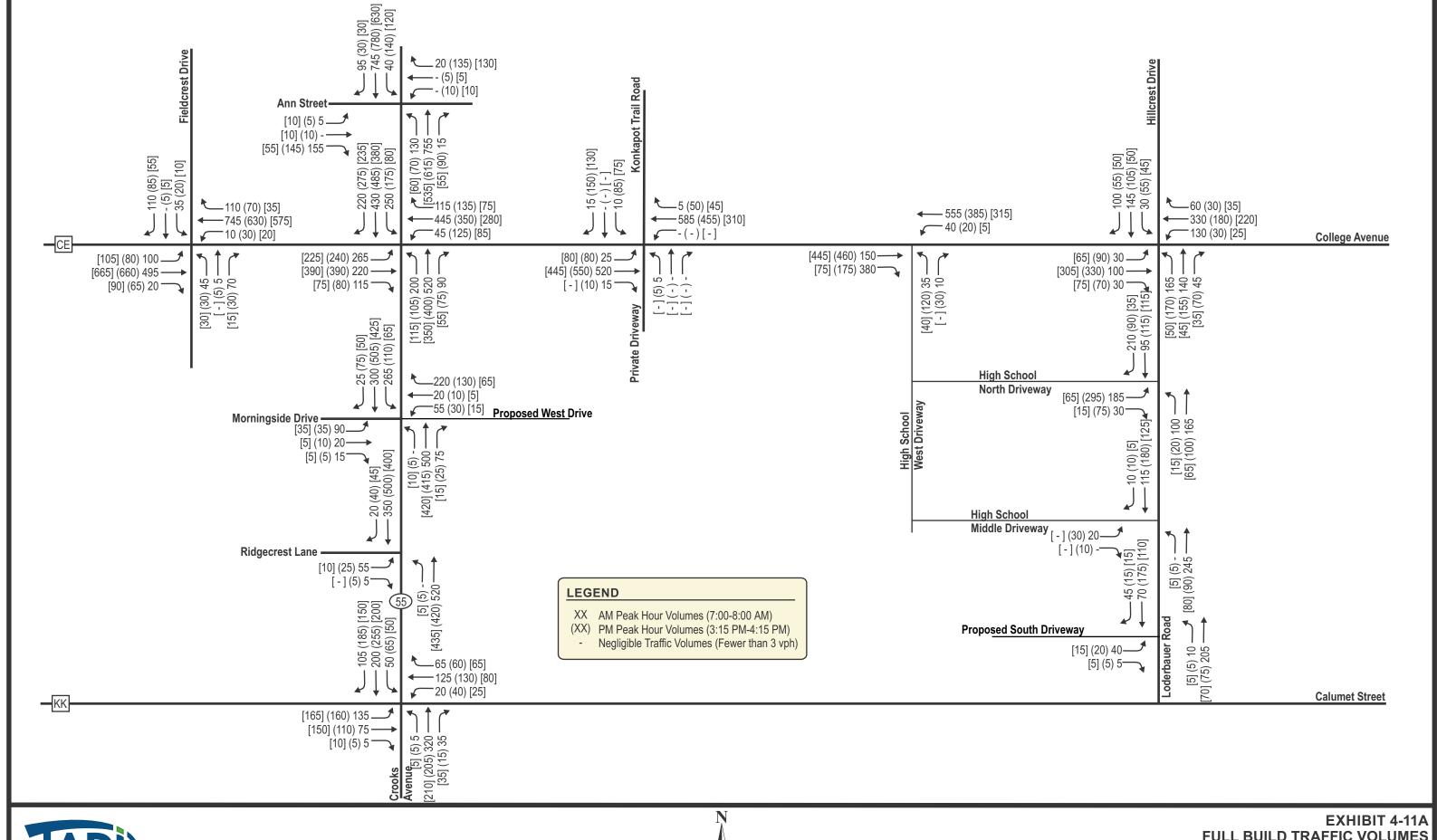
ON-SITE NEW TRIPS
ACCESS SCENARIO 2: LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS AT FIELDCREST DRIVE







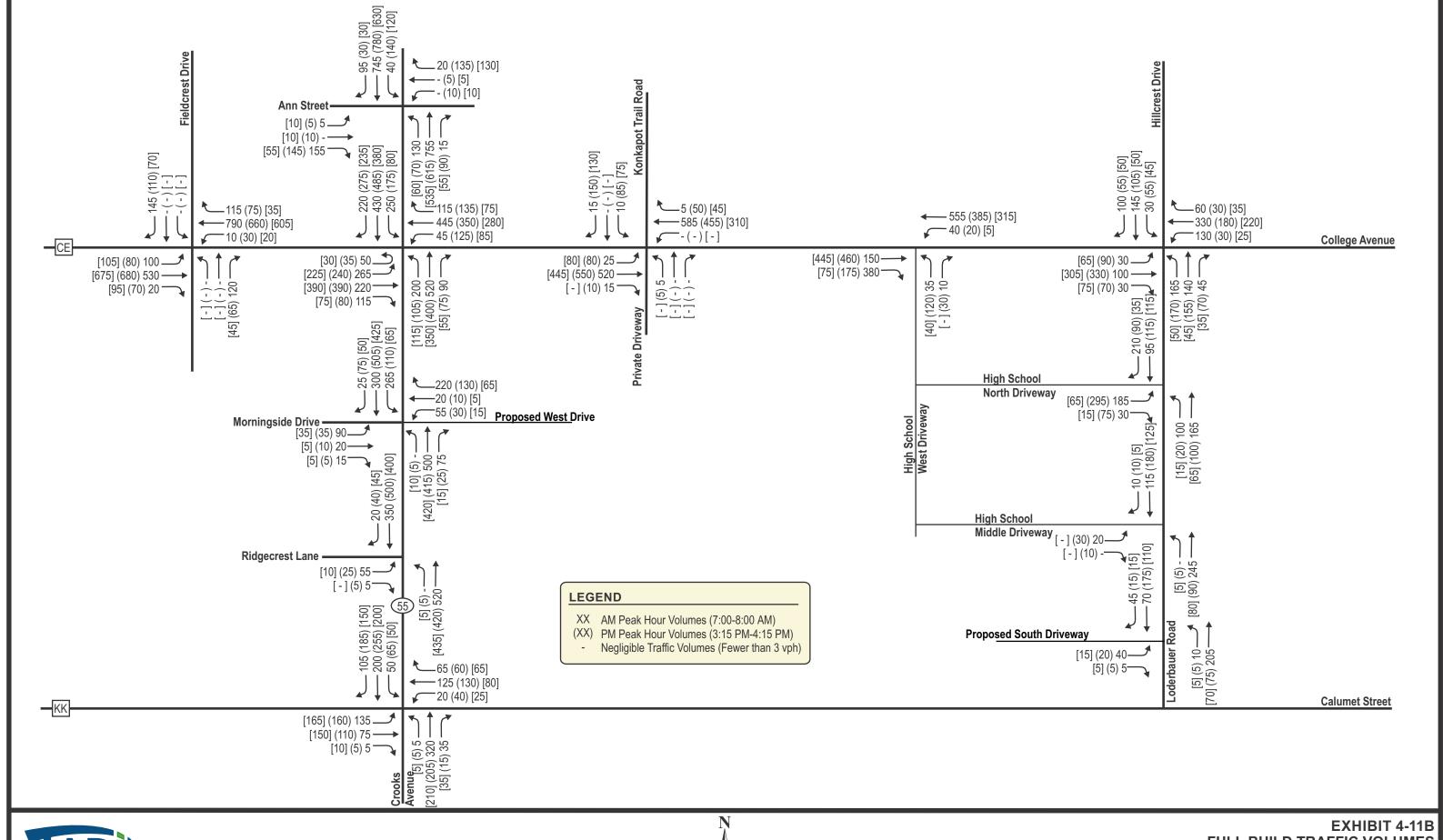








FULL BUILD TRAFFIC VOLUMES ACCESS SCENARIO 1: FULL ACCESS AT FIELDCREST DRIVE







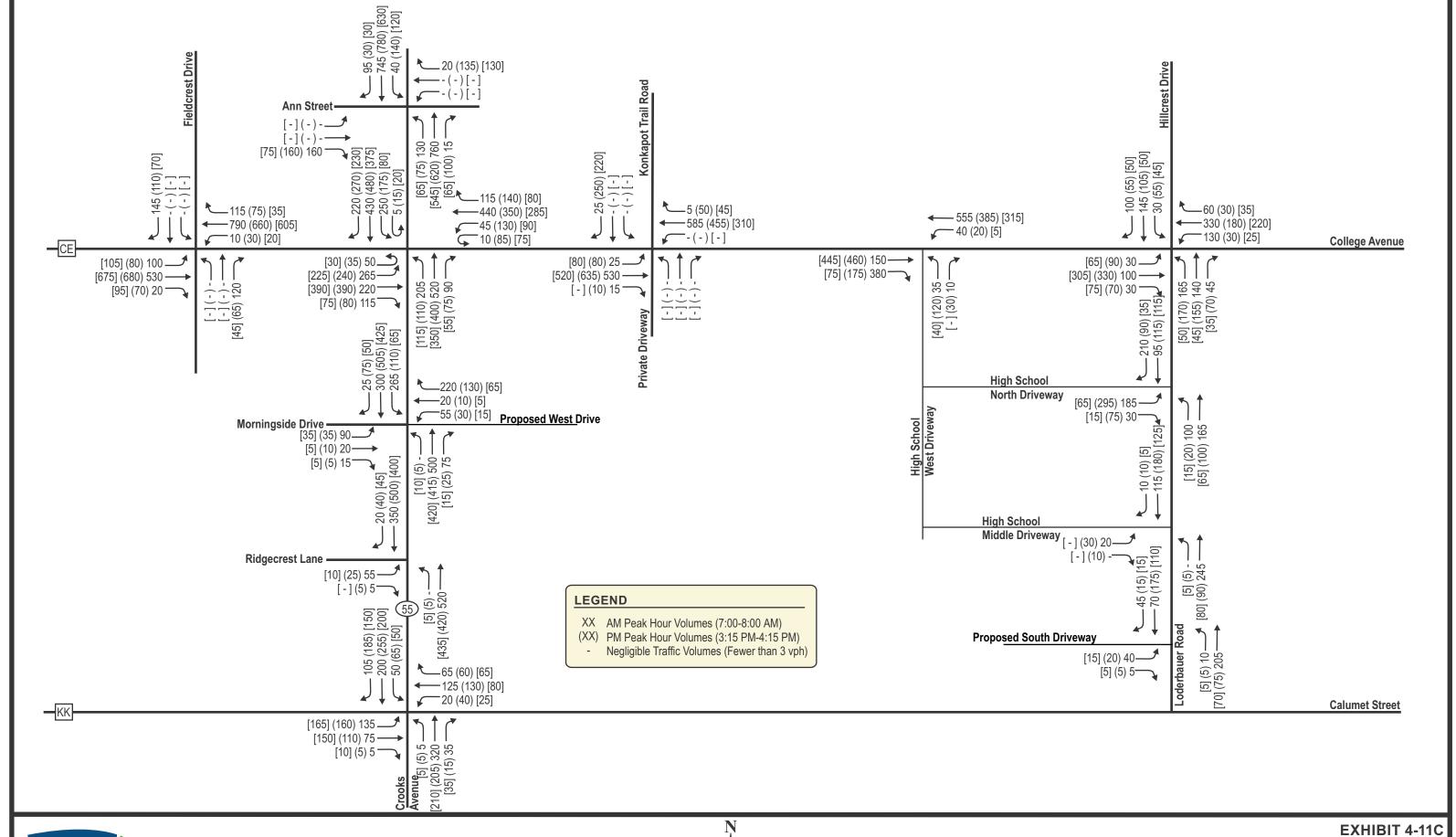




EXHIBIT 4-11C

FULL BUILD TRAFFIC VOLUMES

WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS

AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, FULL ACCESS AT HIGH SCHOOL WEST D/W)

NOT TO SCALE

KAUKAUNA, WISCONSIN

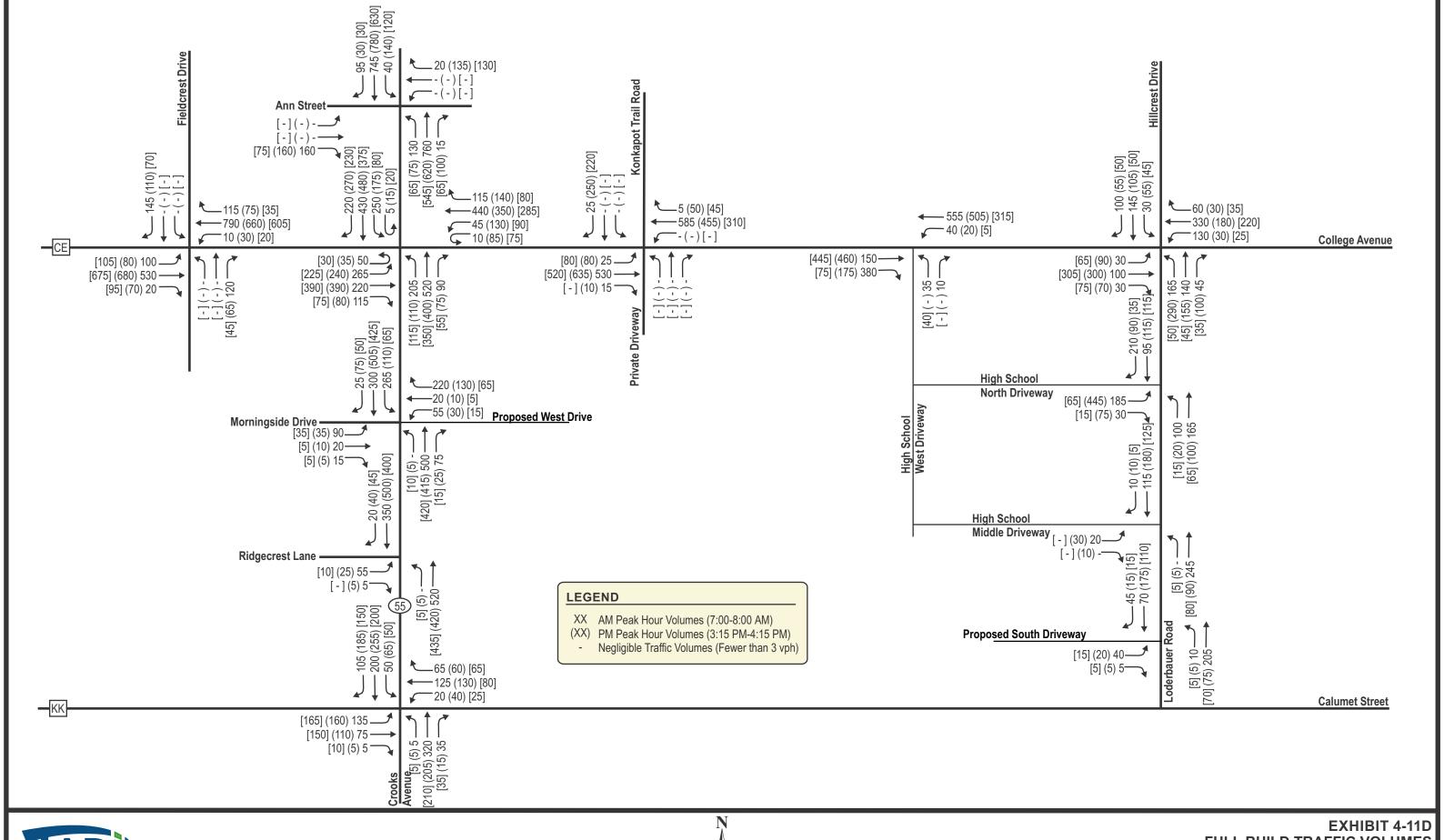
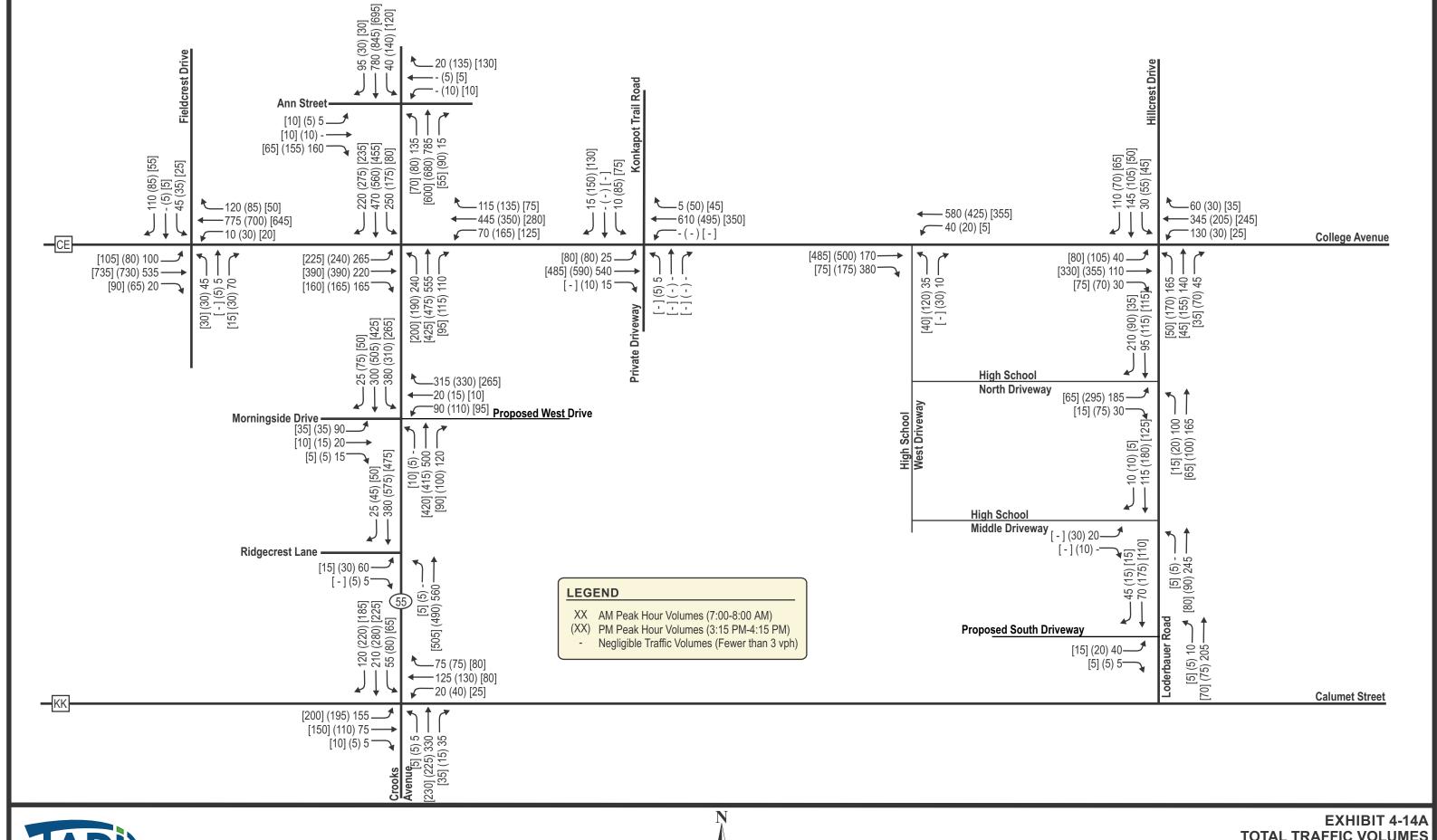




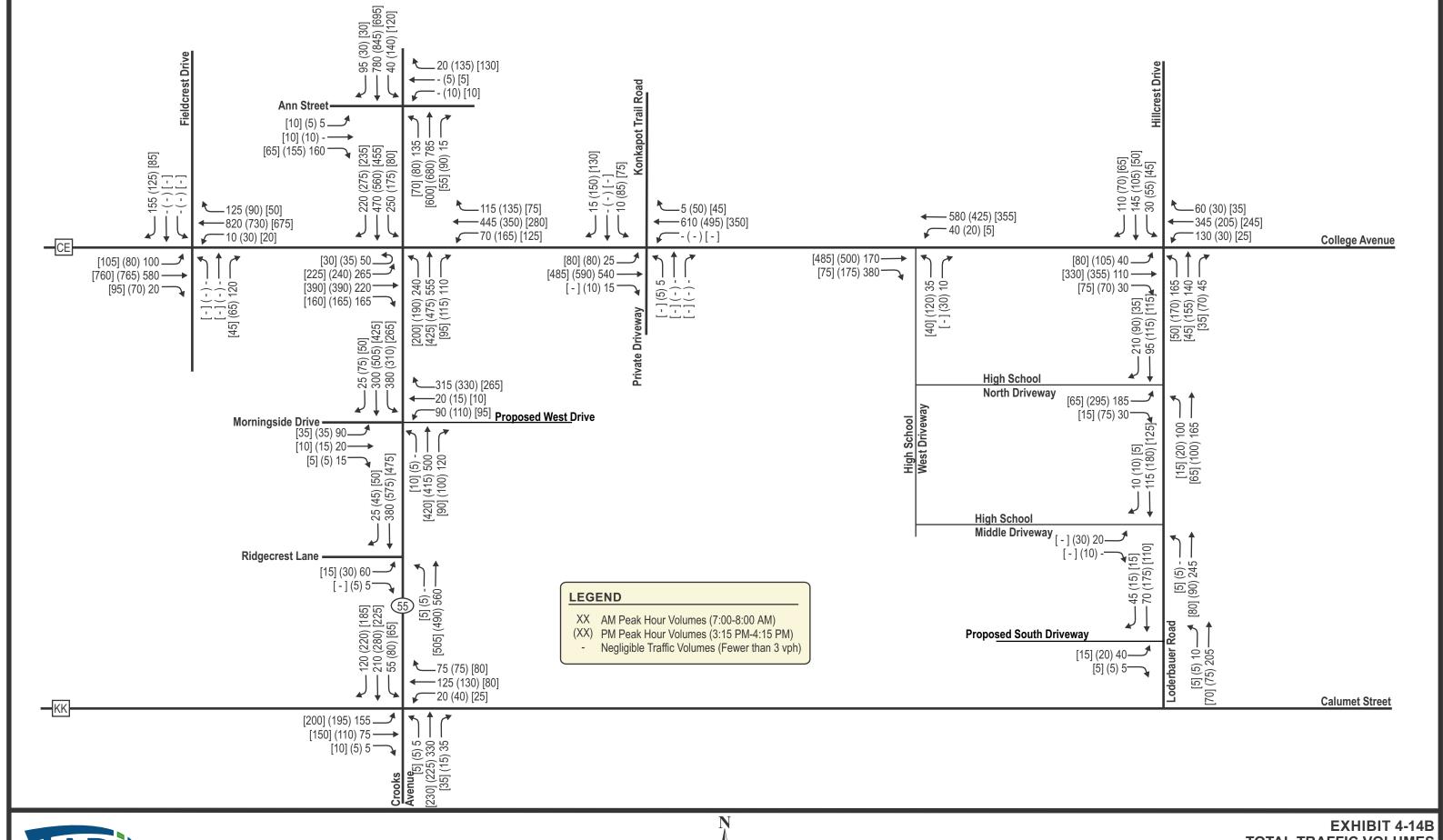
EXHIBIT 4-11D
FULL BUILD TRAFFIC VOLUMES
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, NO EXIT AT HIGH SCHOOL WEST D/W)
KAUKAUNA, WISCONSIN







TOTAL TRAFFIC VOLUMES ACCESS SCENARIO 1: FULL ACCESS AT FIELDCREST DRIVE







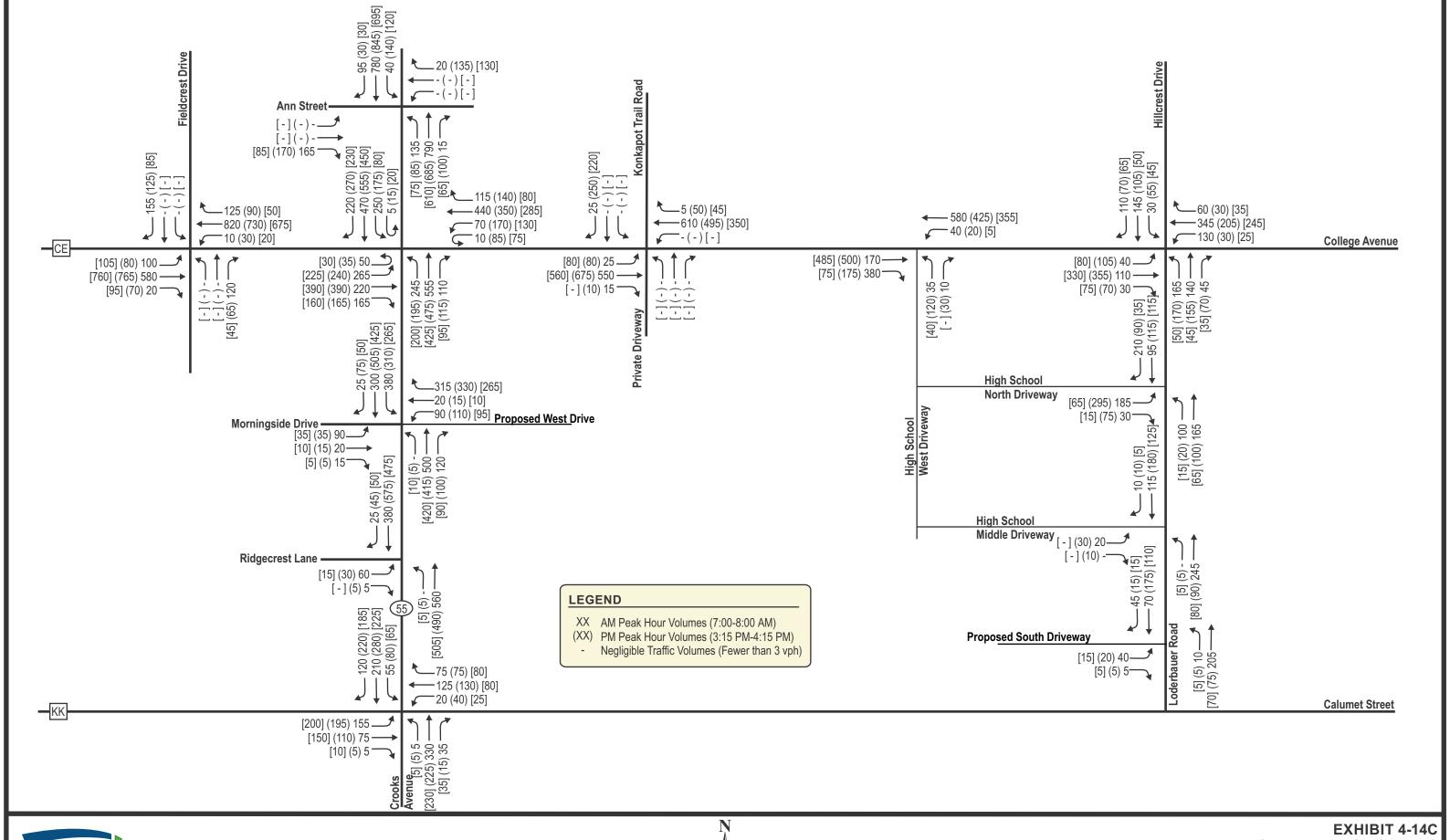




EXHIBIT 4-14C
TOTAL TRAFFIC VOLUMES
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, FULL ACCESS AT HIGH SCHOOL WEST D/W)

KAUKAUNA, WISCONSIN

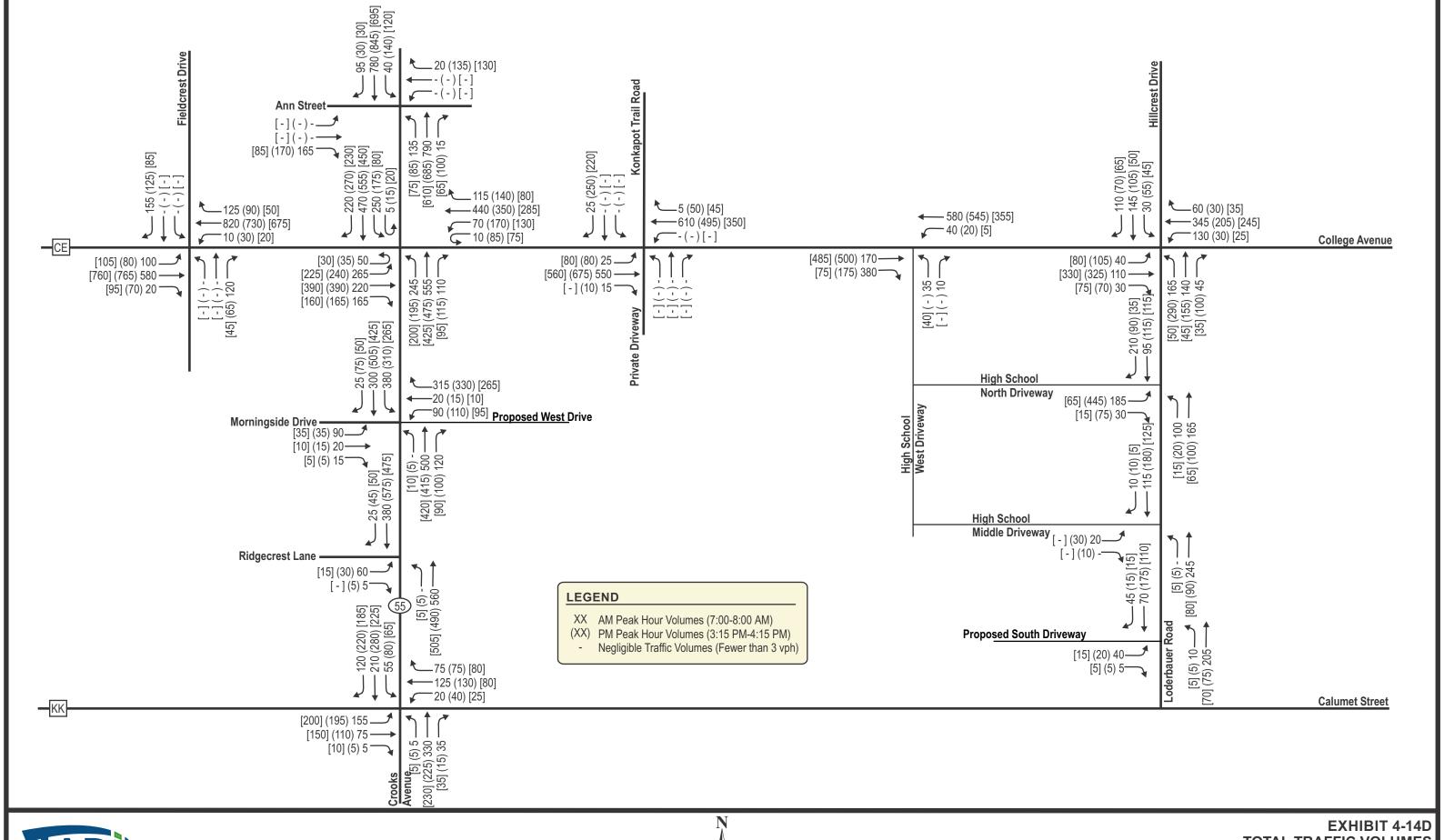




EXHIBIT 4-14D
TOTAL TRAFFIC VOLUMES
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, NO EXIT AT HIGH SCHOOL WEST D/W)
KAUKAUNA, WISCONSIN

CHAPTER V – TRAFFIC AND IMPROVEMENT ANALYSIS

PART A - SITE ACCESS

Two access connections are proposed for the school development site. The main access is proposed as a full access driveway onto a new roadway connection to Crooks Avenue/STH 55 directly across from the existing three-legged, one-way stop sign controlled STH 55 intersection with Morningside Drive. A second driveway is proposed to connect to the high school site located northeast of the proposed middle school site with further existing connections from the high school onto CTH CE/College Avenue and Loderbauer Road. An additional driveway is proposed along Loderbauer Road, immediately south of the high school. Finally, even though not proposed as this time, a future connection via a new north/south connection onto CTH CE to the north and Speedway Lane to the southwest is also planned for at some point in the future.

PART B – CAPACITY LEVEL OF SERVICE ANALYSIS

B1. Full Build Traffic Operating Conditions – No Modifications

Exhibits 5-3A&B show the Full Build traffic peak hour operating conditions at the study area intersections under the two access scenarios as previously described. The Full Build traffic analysis was conducted using existing intersection configurations except with the addition of the new access drives to the site and the access restrictions as previously described for the two respective access options.

As shown in Exhibit 5-3A, under Access Scenario 1 with full access at Fieldcrest Drive, all movements are expected to continue to operate at LOS D or better conditions at the study area intersections under the Full Build traffic volume conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods except the following:

- The eastbound and westbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with Ann Street (node 100) which are expected to continue to operate at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Fieldcrest Drive (node 200) which are expected to continue to operate at LOS E/F during the typical weekday morning peak period.
- The westbound, northbound, and southbound movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E during the typical weekday morning peak period.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Konkapot Trail Road (node 400) which are expected to continue to operate at LOS E/F during the typical weekday morning and afternoon peak periods.
- The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is expected to continue to operate at LOS F during the typical weekday afternoon peak period.
- The eastbound and westbound movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) which are expected to operate at LOS F during the typical weekday morning and afternoon peak periods.

As shown in Exhibit 5-3B, under Access Scenario 2 with Left-in/Right-in/Right-out at Fieldcrest Drive, all movements are expected to continue to operate at LOS D or better conditions at the study area intersections under the Full Build traffic volume conditions during the weekday

morning, weekday afternoon and weekday evening special event peak periods except the following:

- The eastbound and westbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with Ann Street (node 100) which are expected to continue to operate at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.
- The westbound, northbound, and southbound movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E/F during the typical weekday morning peak period.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Konkapot Trail Road (node 400) which are expected to continue to operate at LOS E/F during the typical weekday morning and afternoon peak periods.
- The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is expected to continue to operate at LOS F during the typical weekday afternoon peak period.
- The eastbound and westbound movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) which are expected to operate at LOS F during the typical weekday morning and afternoon and peak periods.

B2. Total Traffic Operating Conditions – No Modifications

Exhibits 5-6A&B show the Total traffic peak hour operating conditions at the study area intersections under the two trip generation assumptions as previously described. The Total traffic analysis was conducted using existing intersection configurations except with the addition of the new access drives to the site and the access restrictions as previously described for the two respective access options.

As shown in Exhibit 5-6A, all movements are expected to continue to operate at LOS D or better conditions at the study area intersections under the Total traffic volume conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods except the following:

- The eastbound and westbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with Ann Street (node 100) which are expected to continue to operate at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Fieldcrest Drive (node 200) which are expected to continue to operate at LOS E/F during the typical weekday morning peak period.
- The westbound, northbound, and southbound movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS F during the typical weekday morning peak period.
- The southbound movement at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which is expected to operate at LOS E during the typical weekday afternoon peak period.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Konkapot Trail Road (node 400) which are expected to continue to operate at LOS E/F during the typical weekday morning and afternoon peak periods.

- The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is expected to continue to operate at LOS F during the typical weekday afternoon peak period.
- The eastbound and westbound movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) which are expected to operate at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.

As shown in Exhibit 5-6B under Access Scenario 2 with Left-in/Right-in/Right-out at Fieldcrest Drive, all movements are expected to continue to operate at LOS D or better conditions at the study area intersections under the Total traffic volume conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods except the following:

- The eastbound and westbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with Ann Street (node 100) which are expected to continue to operate at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.
- The westbound, northbound, and southbound movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS F during the typical weekday morning peak period.
- The eastbound and southbound movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E during the typical weekday afternoon peak period.
- The northbound and southbound through/left-turn movements at the College Avenue/CTH CE intersection with Konkapot Trail Road (node 400) which are expected to continue to operate at LOS E/F during the typical weekday morning and afternoon peak periods.
- The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is expected to continue to operate at LOS F during the typical weekday afternoon peak period.
- The eastbound and westbound movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) which are expected to operate at LOS F during the typical weekday morning, afternoon, and evening special event peak periods.

B3. Existing Traffic Operating Conditions – With Modifications

Modifications to the existing transportation system to accommodate the Existing traffic conditions are recommended at the existing study area intersections. Recommended modifications are summarized in *Chapter VI – Recommendations and Conclusion*.

As shown in Exhibit 5-9, all movements are expected to operate at LOS D or better conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods under the Existing traffic volume conditions with modifications except the northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway which is expected to continue to operate at LOS F during the typical weekday afternoon peak period. Restricting this movement during this time period, with diverted traffic utilizing the signalized intersection at Loderbauer Road, would allow all intersections to operate acceptably under all peak periods.

B4. Full Build Traffic Operating Conditions – With Modifications

Modifications to the existing transportation system to accommodate the Full Build traffic conditions are recommended at the existing study area intersections. Recommended modifications are summarized in *Chapter VI – Recommendations and Conclusion*.

As shown in Exhibit 5-12A, all movements are expected to improve to operate at LOS D or better conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods under the full build traffic volume conditions with modifications except:

- The westbound and northbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E during the typical weekday morning peak period. It is noted that the delays are only slightly higher than acceptable (about 6 seconds), and the reported queueing is expected to be reasonable (all less than 225 feet).
- The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is expected to continue to operate at LOS F during the typical weekday afternoon peak period. Restricting this movement during this time period, with diverted traffic utilizing the signalized intersection at Loderbauer Road, would allow all intersections to operate acceptably under all peak periods.
- The eastbound movements and the westbound through and left-turn movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) which are expected to continue to operate at LOS F during the typical weekday morning and afternoon peak periods and the eastbound movements operating at LOS E during the weekday evening special event peak period.

As shown in Exhibit 5-12B, which includes additional restricted movements at the STH 55/Crooks Ave CTH CE/College Avenue intersection with the High School West Driveway during the typical school afternoon discharge peak hour, all movements are expected to improve to operate at LOS D or better conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods under the full build traffic volume conditions with modifications except:

- The westbound and northbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E during the typical weekday morning peak period. It is noted that the delays are only slightly higher than acceptable (about 6 seconds), and the reported queueing is expected to be reasonable (all less than 225 feet).
- The eastbound movements and the westbound through and left-turn movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) which are expected to continue to operate at LOS F during the typical weekday morning and afternoon peak periods and the eastbound movements operating at LOS E during the weekday evening special event peak period.

B5. Total Traffic Operating Conditions – With Modifications

Modifications to the existing transportation system to accommodate the Total traffic conditions, including traffic signals at the STH 42 intersection with Mill Road and at the 21st Street/Mill Road intersection with Eisner Avenue, are recommended at the existing study area intersections. Recommended modifications are summarized in *Chapter VI – Recommendations and Conclusion*.

As shown in Exhibit 5-15A, all movements are expected to improve to operate at LOS D or better conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods under the full build traffic volume conditions with modifications except:

- The westbound and southbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E during the typical weekday morning peak period. It is noted that the delays are only slightly higher than acceptable (about 5 seconds), and the reported queueing is expected to be reasonable (all less than 200 feet).
- The northbound left-turn movement at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) which is expected to continue to operate at LOS F during the typical weekday afternoon peak period. Restricting this movement during this time period, with diverted traffic utilizing the signalized intersection at Loderbauer Road, would allow all intersections to operate acceptably under all peak periods.

As shown in Exhibit 5-15B, which includes additional restricted movements at the STH 55/Crooks Ave CTH CE/College Avenue intersection with the High School West Driveway during the typical school afternoon discharge peak hour, all movements are expected to improve to operate at LOS D or better conditions during the weekday morning, weekday afternoon and weekday evening special event peak periods under the full build traffic volume conditions with modifications except:

• The westbound and southbound through/left-turn movements at the Crooks Avenue/STH 55 intersection with College Avenue/CTH CE (node 300) which are expected to operate at LOS E during the typical weekday morning peak period. It is noted that the delays are only slightly higher than acceptable (about 5 seconds), and the reported queueing is expected to be reasonable (all less than 200 feet).

PART C – QUEUEING ANALYSIS

To estimate storage length requirements for turn bays at the study area intersections with modifications, a queuing analysis has been conducted. Note that the 95th percentile probable queue lengths were used for the design of turn bay storage at stop sign and traffic signal-controlled intersections. The following is a list of where the results of the queuing analysis can be found.

- Existing Traffic Expected Maximum Queues Exhibit 5-9 & 5-18
- Full Build (Access Scenario 2 Left-in/Right-in/Right-out at Fieldcrest Drive, Full Access at High School West Driveway) Traffic Expected Maximum Queues – Exhibits 5-12A & 5-21A
- Full Build (Access Scenario 2 Left-in/Right-in/Right-out at Fieldcrest Drive, No Exit at High School West Driveway) Traffic Expected Maximum Queues – Exhibits 5-12B & 5-21B
- Total (Access Scenario 2 Left-in/Right-in/Right-out at Fieldcrest Drive, Full Access at High School West Driveway) Traffic Expected Maximum Queues – Exhibits 5-15A & 5-24A
- Total (Access Scenario 2 Left-in/Right-in/Right-out at Fieldcrest Drive, No Exit at High School West Driveway) Traffic Expected Maximum Queues Exhibits 5-15B & 5-24B

PART D - WARRANT ANALYSIS

Warrants should be viewed as guidelines to help decide whether traffic signal controls may be installed. Meeting warrants does not translate to a legal requirement for their installation.

Completed warrant analysis worksheets are included in the appendix of this report. Even though the Peak Hour warrant is a typical warrant considered by many agencies as it is typically used for proposed facilities that have peak discharge characteristics such as schools or factories with high volume shift changes, Warrant 3 (Peak Hour) was not considered for this intersection per WisDOT policy on their highway facilities. Therefore, Warrant 1 (8 Hour) and Warrant 2 (4-Hour) were evaluated for the Build and Total traffic scenarios.

Traffic signal warrants were investigated at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive under Full Build and Total traffic volumes in accordance with the *MUTCD 11th Edition*. Crooks Avenue/STH 55 was analyzed as a major street with two lanes on each approach and Morningside Drive/Proposed West Access Drive was analyzed as a minor street with one lane. Even though the proposed geometry on the north and south approaches on the major street include only one through lane (with additional dedicated left-turn and right-turn taper lanes), per the MUTCD the high-volume southbound left-turn volume (more than half the through volume for several peak periods) indicates that two lanes should be utilized for the major street approach calculations. The posted speed limit is 35-mph along the Crooks Avenue/STH 55 corridor at this location and therefore urban warrant thresholds were utilized.

The warrant analysis was conducted based on the weekday peak hour turning movement counts collected as part of this study at the intersection in mid-February of 2025. Based on the warrant analysis, neither Warrant 1 (8-Hour) nor Warrant 2 (4-Hour) are expected to be met at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive under Full Build traffic conditions. Specifically, only 1 hour of the required 8 hours under Warrant 1 (8-Hour) and only 1 hour of the required 4 hours under Warrant 2 (4-Hour) are expected to be met. It is noted that 0-percent of the minor street right-turn volumes were included in the calculations due to the dedicated right-turn lane proposed on this approach. In addition, even though close to being met under the Total traffic volume condition, Warrant 1 (8-Hour) and Warrant 2 (4-Hour) are also not expected to be met under the Total traffic volume condition. Specifically, only 7 hours of the required 8 hours under Warrant 1 (8-Hour) and only 3 hours of the required 4 hours under Warrant 2 (4-Hour) are met.

Therefore, unless the build out assumptions for the off-site development are more intense than assumed in this study, traffic signal control should not be considered at this intersection under the Build (with proposed school only) traffic volume conditions nor with full build out of both the on-site and off-site developments.

PART E - TRAFFIC CONTROL COMPARISON

Because operational deficiencies are expected to remain at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive under Full Build and Total traffic volumes conditions under the proposed two-way stop control conditions with no geometric modifications other than the new east approach driveway, alternate control conditions were considered.

Under the Build (with proposed school only) traffic volume conditions, two possible modification scenarios were considered: specifically, two-way stop control with additional lanes and roundabout control with single entrance lanes for all approaches.

Under the Total (with on-site and off-site developments) traffic volume conditions, two possible modification scenarios were considered: specifically, two-way stop control with additional lanes and roundabout control with two-lane approaches and circulating lanes for the south approach and single lane approaches and circulating lanes for all other approaches.

Operations and queueing comparison tables have been provided to show the operation at the subject intersection under the two modification scenarios. As shown in Exhibits 5-16A & 5-21B, under two-way stop control the eastbound and westbound movements are expected to operate with higher delays (LOS F) during the weekday morning and afternoon peak periods and LOS E during the special event peak hour for all eastbound movements and the westbound through/left-turn movements at the intersection. However, as with most school sites, higher delays are only expected during about a 20 to 30 minute "surge" during the morning arrival and afternoon dismissal peak periods which can be considered typical for a school location. Even though not warranted, roundabout control was also evaluated. Under roundabout control, all movements are expected to operate at LOS C or better during all three peak periods under Full Build traffic conditions with reasonable queue lengths (all less than 225 feet).

In addition, and as shown in Exhibits 5-16B & 5-24B, under roundabout, all movements are expected to operate at LOS C or better during all three peak periods under Total traffic conditions with reasonable queue lengths (all less than 325 feet). Under two-way stop control, very high delays (LOS F/gridlock conditions) and very long queues are expected for all eastbound movements and the westbound through/left-turn movements at the intersection.

A Phase I Intersection Control Evaluation (ICE) comparing the two modification scenarios has been included in the appendix of this report. Per request from WisDOT, an additional IHSDM evaluation was also completed and is included along with the ICE analysis provided in the appendix of this report.

Based on the ICE analysis, under the Build (with proposed school only) traffic volume conditions, since two-way stop control with additional lanes provides reasonable operations, two-way stop control is recommended for the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive. However, since traffic signal control is not warranted under the Total (with on-site and off-site developments) traffic volume conditions, roundabout control with two-lane approaches and circulating lanes for the south approach and single lane approaches and circulating lanes for all other approaches is the only viable alternative under this build out scenario and is therefore recommended for the intersection if off-site development moves forward. Under the recommended traffic control, all queue lengths are expected to fit within the proposed turn-bay lengths recommended in this study and are not expected to impede on any adjacent intersections.

It is also noted that since development plans for the off-site development area are unknown at this time and the build out assumptions were used for planning purposes only, a future traffic study should be completed in the future as development plans move forward for the off-site area to determine if traffic signals would be warranted thereby allowing traffic signals to be a potential viable option as well.

Exhibit 5-3A Full Build (Scenario 1 - Full Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

		Widi L	- I							emen	t by A	pproa	ch	- 9	I/S
	Peak		Ea	stbou			estbou		_	rthbou			uthbou	und	LOS &
Intersection	Hour	Metric	7	→	И	K	+	K	K	1	7	И	4	K	Delay
		Lanes->		1	1	-	1	1	1	2	1	1	2	2	
Node 100: STH 55/Crooks Avenue		LOS			С	-	F	В	В	*	*	В			
& Ann Street	AM	Delay	24	9.8	18.2	28	3.1	12.5	12.9	*	*	10.8	•	•	
Two-Way Stop Control	Aivi	v/c	0.		-		17	-	-	-	-	-			
97 4S		Queue		0'	55'	_	5'	30'	25'	*	*	25'		•	
		LOS	Y		В		F	В	В	*	*	В		•	
	PM	Delay	20		14.4		9.4	12.1	10.5	*	*	10.4	,		
	1 ' ' '	v/c	0.		-	-	55	-	-	-	-	-		-	
		Queue		5'	30'		5'	25'	25'	*	*	25'		*	
		LOS			В		F	В	Α	*	*	Α			
	PMSE	Delay	_	'.8	11.1	_	2.8	11.3	9.4	*	*	9.4	,	•	
	I MOL	v/c	0.		-		21	-	-	-	-	-		-	
	_	Queue		0'	25'	_	5'	25'	25'	*	*	25'			
		Lanes->	1	2	1	1	2	1	1		1	1		1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*	ı		В			В	
& Fieldcrest Drive	AM	Delay	12.1	*	*	8.9	*	*	50		11.1	_	5.4	13.8	
Two-Way Stop Control	/	w/c	-	*	*	-	*	*	0.4		-		28	-	
		Queue	25'	*	*	25'	*	*		5'	25'		5'	25'	
		LOS	Α	*	*	Α	*	*			В	_		В	
	PM	Delay	9.7	*	*	9.4	*	*	28		10.9	24		11.3	
		Queue	25'	*	*	25'	*	*		5'	25'		5'	25'	
		LOS	Α	*	*	Α	*	*			В			В	
	PMSE		9.5	*	*	9.6	*	*	30		10.9		.4	10.8	
	-	Queue	25'		*	25'	_	*		5'	25'		5'	25'	
	_	Lanes->	- 1		1	_	1	1	1		1	1		1	
Node 300: STH 55/Crooks Avenue	l	LOS			С		E	E			E			E	
& CTH CE/ College Avenue**	AM	Delay		.5	19.4		5.6	43.9	36		39.4		2.8	48.3	
Roundabout Control	\vdash	Queue	11		120'		15'	225'	23		270'	28		335'	
	D.4	LOS	(C	_	3	В			C	(C	
	PM	Delay	19		19.1		1.6	14.5	16		15.8		3.0	19.4	
	_	Queue	11		125'	_	5'	85'		1'	90'	-	35'	160'	
	DIAGE	LOS		3	В		4	A	E		B	1		A	
	PMSE			0.4	10.6		.6	9.4		0.8	10.7		.5	9.7	
	-	Queue	-	0'	65'	_	5'	40'	5	0'	55'	_	5'	60'	-
Nede 400: CT LCE/Cellege Avenue	\vdash	Lanes->			1	-	1	1 *		1 F		1		1	
Node 400: CTH CE/College Avenue		LOS		.8	*		.3	*		72.0				C	
& Konkapot Trail Road	AM	Delay		.0			.s -		_	0.16	-	_	.9 14	15.8	
Two-Way Stop Control		v/c		- 5'	*		- :5'	*	 	25'	-	_	5'	25'	
	-	Queue LOS		<u> </u>	-		<u>A</u>			F			5	C	
	1		_	.2	-	_	.0	-		73.6	-	71		15.5	
	PM	Delay v/c		-	-		-	-	\vdash	0.14		_	70	-	
	1	Queue		5'	-		5'	-		25'		_)5'	40'	
	\vdash	LOS	_	-	-	_	<u>A</u>	-		C			5	B	
	PMSE			.3	-	_	.3	-	\vdash	20.4		23		11.4	
	I WILL	Queue		5'	-		5'	-	_	25'			0'	25'	
	-	Lanes->		1	1	_	1	-	1	-	1	ا	-	20	
Node 500: CTH CE/College Avenue	-	LOS	-	*	*	_	4	1,-1	D		A	-	-		
& High School West D/W	AM	Delay	-	*	*		.6	-	27.9	-	9.6		-		
One-Way Stop Control		Queue	-	*	*		5'	-	25'	-	25'				
		LOS	-	*	*		4	-	F	-	В		-	-	
	L	Delay	-	*	*		.9	-	83.7	-	13.2		-		
	PM	v/c	-	-	-		-	-	0.86	-	-		-		
		Queue		*	*	2	5'	-	160'	-	25'				
		LOS	-	*	*	-	4	-	С	-	В		-	- 6	
	PMSE	Delay	-	*	*	8	.6	-	17.9		11.4		-		
		Queue	-	*	*		5'	-	25'	-	25'		2		
		Lanes->	1	1	1	1		1	1	_	1	1	1	1	4
Nede COO. Ladarhauer Dood CTJ		LOS	В	Α	Α	В		3	В		3	В	С	С	В
Node 600: Loderbauer Road & CTH		Delay	18.2	9.4	8.6	12.2	14	1.7	14.4	12	2.8	19.2	23.2		15.1
CE/College Avenue	AM			70'	25'	95'		75'	105'		20'	40'	135'	65'	
	AM	Queue	30'	70								_			В
CE/College Avenue	AM		30' B	В	A	В		3	В		В	С	C	C	-
CE/College Avenue	AM PM	Queue						3 1.9	B 15.4		B I.5	22.3	23.9	21.1	15.5
CE/College Avenue		Queue	В	В	Α	В	11		_	14					
CE/College Avenue		Queue LOS Delay	B 16.5	B 14.7	A 9.5	B 18.7	11	1.9	15.4	14	1.5	22.3	23.9	21.1	
CE/College Avenue		Queue LOS Delay Queue LOS	B 16.5 70'	B 14.7 220'	9.5 35'	18.7 30'	11	1.9 35'	15.4 105'	14	1.5 10'	22.3 65'	23.9 100'	21.1 40'	15.5

Exhibit 5-3A Full Build (Scenario 1 - Full Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

				Le	evel o	Service (LOS) pe	r Movem	ent by A	Approa	ch	-	I/S
	Peak		Ea	stbou	nd	Westbo	ound	North	bound	So	uthbo	und	LOS
Intersection	Hour	Metric	7	\rightarrow	И	K +	K	K /	7	И	1	K	Dela
Node 700: STH 55/Crooks Avenue		Lanes->		1		1		- 2	2		2		i i
& Morningside Drive/Proposed		LOS		F		F			Ą		В		
West Access Drive	AM	Delay		1495.8	3	742.	2	8	.1	1	11.4	4	1
Two-Way Stop Control		Queue		425'		760)'	2	5'		40'	- i	1
,,		LOS		F		С			Α		Α		
	PM	Delay		57.8		24.2	2	9	.0	+	8.9		1
		Queue		50'		70'			5'	1	25'		1
		LOS		D		C			Ā	+	A		
	PMSE	Delay		30.1		15.3	3		.6	+	8.6		1
	I MICE	Queue		25'		25'			5'	+	25'		1
	_		_	1		-		2	-	+-	1	1	
Node 800: STH 55/Crooks Avenue	-	Lanes->	_	C				A	_	_	_	_	-
		LOS	_			-	_		-	-	-	-	-
& Ridgecrest Lane	AM	Delay		15.7				8.2	-	-	-	-	-
One-Way Stop Control	_	Queue	_	25'		-		25'	-	÷	-	-	_
	l	LOS		С		-		A	-	-	-	-	
	PM	Delay		17.1		-		8.8	-	<u> </u>	-	-	
	\vdash	Queue		25'		-		25'	-	1 -	-	-	_
		LOS		В		-		Α	_	-	-	-	
	PMSE			14.5		-		8.4	-	-	-	-	1
		Queue		25'		-		25'	-	-	-	-	
		Lanes->		1	-	1			1		1		
Node 900: STH 55/Crooks Road		LOS		Α		Α		1	A		Α		
with CTH KK/Calumet Street	AM	Delay		6.0		7.7		8	.0		6.9		1
Roundabout Control		Queue		25'	-	30'		5	0'		45'		1
		LOS		Α		Α			Α		Α		
	PM	Delay		7.4		6.9		7.	.0		8.9		1
		Queue		35'		30'		3	0'	-	75'		1
		LOS		A		A			A	$\overline{}$	A		
	PMSE			7.3		6.1			.4		6.6		1
		Queue		40'		25'			5'	+-	45'		1
	_	Lanes->	2	-	1	-		2	- 	+-	1	1	_
Node 1000: Loderbauer Road &	\vdash	LOS	A	-	A	-		A	+ -	+ -	A	A	А
High School North Access D/W	AM		_			-		9.4	-	_	_		8.7
	Aivi	Delay	9.7 35'	-	8.8 25'				-	<u> </u>	7.2	8.2	0.7
Traffic Signal Control	-	Queue	_	- 2		-		35'	-	+-	_	_	
	D	LOS	В	-	A	-		A	-	+-	A	A	A
	PM	Delay	11.0	-	9.1	-		8.2	-	<u> </u>	8.9	8.0	9.6
		Queue	55'	120	25'	-		25'	-	+-	45'	25'	
		LOS	Α	-	Α	-		Α	-	-	Α	Α	Α
	PMSE	Delay	9.7	- (9.4	1.5		5.7	-	-	6.5	5.5	7.0
		Queue	25'	-	25'	-		25'	-	-	30'	25'	
		Lanes->		1		-		1	-	-	_	1	
Node 1100: Loderbauer Road &	1	LOS		C		-		Α	-	-		*	
High School Middle Access D/W	AM	Delay		15.5		-		7.6	-	-		*	1
One-Way Stop Control		Queue		25'		-		25'		-		*	1
• • • • • • • • • • • • • • • • • • • •		LOS		В		-		Α	-	-		*	
	PM	Delay		13.2		-		8.0	-	-		*	1
		Queue		25'	,			25'	-	1 -		*	1
		LOS		A		-		A	-	1 -		*	
	PMSE			9.6		-		7.6	-	1 -		*	1
		Queue		25'				25'	+-	+÷		*	1
		Lanes->		1		-		1	+-	l :		1	
Node 1200: Loderbauer Bood 9	\vdash								_	+	_	*	-
Node 1200: Loderbauer Road &	^**	LOS	<u> </u>	12.6		-		A 7.6	-	-		*	ł
New South D/W	AM	Delay		12.6		-		7.6	-	+-		*	-
One-Way Stop Control	_	Queue	<u> </u>	25'		-		25'	-	-		-	
	_	LOS		В		-		Α	-	-		*	
	PM	Delay		11.6		-		8.0	-	-		*	
		Queue		25'		-		25'	-	-	_	*	
												*	
	1	LOS		Α		-		Α	-	-			
	PMSE	LOS Delay		A 9.9		-		7.6	-	+ -		*	ł



⁽⁻⁾ indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.

^{**} node 300 dual lane roundabout, left values in table per approach are inside shared lanes and right values are outside shared lanes

Exhibit 5-3B Full Build (Scenario 2 - Left-in/Right-in/Right-out Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

		With E	crouring							emen	t by A	pproa	ch		I/S
	Peak		Ea	stbou			estbou			rthbou			uthbou	und	LOS &
Intersection	Hour	Metric	7	→	И	K	+	K	K	1	7	И	4	K	Delay
		Lanes->		1	1	-	1	1	1	2	1	1	2	2	
Node 100: STH 55/Crooks Avenue		LOS			С		F	В	В	*	*	В	,	*	
& Ann Street	AM	Delay	24	9.8	18.2	28	3.1	12.5	12.9	*	*	10.8	,	*	1
Two-Way Stop Control	AIVI	v/c	0.	37	-	0.	17	10-11	-	-	- 1	-			1
		Queue	3	0'	55'	2	5'	30'	25'	*	*	25'	,	*	1
		LOS			В		F	В	В	*	*	В	,	*	
	PM	Delay	20	7.1	14.4	21	9.4	12.1	10.5	*	*	10.4	,	*	1
	PM	v/c	0.	53	-	0.	55	-	-	-	-	-		-	1
		Queue	4	5'	30'	4	5'	25'	25'	*	*	25'	,	*	
		LOS			В		F	В	Α	*	*	Α	,	*	
	DMCE	Delay	77	.8	11.1	62	2.8	11.3	9.4	*	*	9.4		*	1
	PMSE	w/c	0.	31	-	0.	21	-	-		-	-		-	1
		Queue	3	0'	25'	2	5'	25'	25'	*	*	25'		*	
		Lanes->	1	2	1	1	2	1	-		1	- 1	1	1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	A	*	*	-		В		-	С	
& Fieldcrest Drive	AM	Delay	12.6	*	*	9.1	*	*			12.1	6.5		15.5	1
Two-Way Stop Control		Queue	25'	*	*	25'	*	*	-	-0	25'		- 3	40'	
		LOS	Α	*	*	Α	*	*		-	В		-	В	
	PM	Delay	9.8	*	*	9.5	*	*		-9 - ,	11.4		-	11.8	
		Queue	25'	*	*	25'	*	*	- 1	-	25'	1.5	-	25'	<u></u>
		LOS	Α	*	*	Α	*	*		-	В		-	В	
	PMSE	Delay	9.6	*	*	9.7	*	*		-	11.2		-	11.1	1
		Queue	25'	*	*	25'	*	*			25'			25'	1
		Lanes->		1	1		1	1	1	1	1	1	1	1	
Node 300: STH 55/Crooks Avenue		LOS	(С		F	F	E	E	Е		F	F	
& CTH CE/ College Avenue**	AM	Delay	21	.9	22.1	55	5.9	53.3	45	5.8	49.0	54	1.7	61.3	1
Roundabout Control		Queue	13	30'	145'	24	10'	255'	26	35'	305'	32	25'	380'	1
		LOS	(С	(0	С			С		C	С	
	PM	Delay	20	.4	20.6	15	5.6	15.4	17	.2	16.9	19	9.7	21.3	1
		Queue	12	25'	135'	8	0'	90'	9	0'	95'	14	15'	175'	1
		LOS		3	В		В	Α	Е	3	В		Α	В	
	PMSE	Delay	10	.8	11.1	10	0.0	9.7	11	.3	11.1	9	.9	10.2	1
		Queue	6	5'	70'	4	0'	40'	5	0'	55'	5	5'	65'	1
		Lanes->		1	1		1	1		1		1	1	1	
Node 400: CTH CE/College Avenue		LOS		<u> </u>	*		4	*		F		-	E	С	
& Konkapot Trail Road		Delay	9	.8	*	9	.3	*		72.0		41	1.9	15.8	1
Two-Way Stop Control	AM	v/c			-		_			0.16		0.	14	-	1
		Queue	2	5'	*	2	5'	*		25'		2	5'	25'	
		LOS		1	-	_	4	-		F			F	С	
	l	Delay	9	2	-	9	.0	-		73.6		71	1.1	15.5	1
	PM	v/c		-	-		-	-		0.14		0.	70	-	1
		Queue	2	5'	:	2	5'	-		25'		10	05'	40'	1
		LOS		<u> </u>	-		4	-		С			С	В	
	PMSE		8	.3	-	8	.3	-		20.4		23	3.1	11.4	1
		Queue	2	5'	-	2	5'			25'		3	0'	25'	1
		Lanes->	-	1	1	_	1	-	1	-	1		-		
Node 500: CTH CE/College Avenue		LOS	-	*	*	-	4	12	D	-	Α		-		
& High School West D/W	AM	Delay	-	*	*	9	.6	250	27.9	-:	9.6		-		
One-Way Stop Control		Queue	-	*	*	2	5'	-	25'	-	25'		-	- 1	
		LOS	-	*	*	-	4		F		В		-		
	DNA	Delay	-	*	*	9	.9	-	83.7	-	13.2		-		
	PM	v/c	-	-	-		-	-	0.86	-	-		-	- 8	
		Queue	-	*	*	2	5'	(2)	160'	-2	25'		-		
		LOS	-	*	*	-	Ą	-	С	-	В		2		
	PMSE		-	*	*	8	.6	-	17.9	-	11.4		- 0		
		Queue	-	*	*		5'	-	25'		25'		-		
		Lanes->	1	1	1	1		1	1	- 3	1	1	1	1	·
Node 600: Loderbauer Road & CTH		LOS	В	Α	Α	В		В	В		В	В	С	С	В
CE/College Avenue	AM	Delay	18.2	9.4	8.6	12.2	_	1.7	14.4		2.8	19.2	23.2		15.1
(C.T.)		Queue	30'	70'	25'	95'		75'	105'		20'	40'	135'		
Framic Signal Control		LOS	В	В	Α	В		В	В		В	С	С	С	В
Traffic Signal Control				_				1.9	15.4	14	4.5	22.3	23.9		15.5
Tramic Signal Control	РМ	Delay	16.5	14.7	9.5	18.7	1 1	1.0							
Tranic Signal Control	РМ	Delay Queue	16.5 70'	220'	35'	30'	_	35'	105'	_	40'	65'	100'	40'	
Trame Signal Control	РМ					_	13			14				_	В
Tramic Signal Control	PM PMSE	Queue	70'	220'	35'	30'	13	35'	105'	14	40'	65'	100'	40' B	B 10.7

Exhibit 5-3B Full Build (Scenario 2 - Left-in/Right-in/Right-out Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

									r Move						I/S
	Peak			stbou	nd		stbou			hbou	_		uthbo	und	Los
Intersection	Hour	Metric	7	\rightarrow	И	K	+	K	K	1	7	K	1	K	Dela
Node 700: STH 55/Crooks Avenue		Lanes->		1			1			2			2		
& Morningside Drive/Proposed		LOS		F			F			Α			В		
West Access Drive	AM	Delay		1495.8	3		742.2	9		8.1			11.4	-	1
Two-Way Stop Control		Queue		425'			760'			25'			40'		1
,,		LOS		F			С			Α			Α		
	PM	Delay		57.8			24.2			9.0			8.9		1
		Queue		50'		-	70'	_		25'		-	25'		1
	_	LOS	_	D		_	C	_		A			A		
	PMSE		_	30.1		-	15.3	_	_	8.6		_	8.6		1
	PINISE		_					-			_	_			-
	-	Queue	_	25'		<u> </u>	25'			25'	_	-	25'		-
1 1 11 11 11 11 11		Lanes->		1			-		2		-	-	1	1	-
Node 800: STH 55/Crooks Avenue		LOS		С			-		Α		-	-	-	-	1
Ridgecrest Lane	AM	Delay		15.7			1.7		8.2	2	-	-	-	-	
One-Way Stop Control		Queue		25'			-		25	'	-	-	-	-	1
		LOS		C			-		Α			-	-	-	
	PM	Delay		17.1			-		8.8	3	-	-	-	-	1
		Queue		25'			-		25		-	-	-	-	1
		LOS		В			-	-	A		-	-	-	-	$\overline{}$
	PMSE			14.5			-		8.4	ı	-	-	-	-	1
	I WICE	Queue		25'			-		25		-	-	-	-	1
	_			1			1		25	1	-	-	1	-	-
		Lanes->	_	_	-	_	_	-		_	17.50		_		-
Node 900: STH 55/Crooks Road		LOS		Α			Α			Α			Α		
with CTH KK/Calumet Street	AM	Delay		6.0			7.7			8.0			6.9		1
Roundabout Control		Queue		25'			30'			50'			45'		
		LOS		Α			Α			Α			Α		
	PM	Delay		7.4			6.9			7.0			8.9		1
	I	Queue		35'			30'			30'			75'		1
		LOS		A			Α			Α			Α		
	PMSE			7.3			6.1			7.4			6.6		1
	""	Queue		40'		_	25'	-		35'		_	45'		1
	_		_	-	1		-	-	2	33			1	1	-
lade 1000: Laderbauer Boad 8	_	Lanes->	2	_	_			_			-	-			-
Node 1000: Loderbauer Road &		LOS	Α	-	Α		-	_	A		-	-	A	A	Α
High School North Access D/W	AM	Delay	9.7	- 1	8.8		-		9.4		-	-	7.2	8.2	8.7
Traffic Signal Control		Queue	35'		25'		-		35		-	-	30'	40'	
		LOS	В	-	Α		-		Α			-	Α	Α	Α
	PM	Delay	11.0	- 1	9.1		-		8.2		-	-	8.9	8.0	9.6
		Queue	55'		25'		-		25	'	21	-	45'	25'	
		LOS	Α	-	Α		-		Α		-	-	Α	Α	Α
	PMSE	Delay	9.7	-	9.4		-		5.7	7	-	-	6.5	5.5	7.0
		Queue	25'	-	25'		-		25		-	-	30'	25'	1
		Lanes->	20	1	20		-	-	1		-	-	_	1	-
Node 1100: Loderbauer Road &		LOS		c			-		A		_	_		*	
	A 8.4		-	15.5		<u> </u>	V // V //		7.6		-	-		*	1
High School Middle Access D/W	AM	Delay	<u> </u>			<u> </u>	-	-			-	-		*	-
One-Way Stop Control	\vdash	Queue	—	25'		—	-		25		-	-		*	-
		LOS		В			-		Α		-	-			1
	PM	Delay		13.2			-		8.0		-	-		*	1
		Queue		25'			(2)		25	'		2		*	
		LOS		Α			-		Α		-	-		*	
	PMSE	Delay		9.6			- 1	-	7.6	3	-	-	1 8	*	1
		Queue		25'			-		25	•		-		*	1
		Lanes->		1			-		1		-	-	-	1	
Node 1200: Loderbauer Road &		LOS		В			-		A	_	-	-		*	
New South D/W	AM			12.6		 	-		7.6	3	-			*	1
	AIVI	Delay				_					-	-		*	1
One-Way Stop Control	\vdash	Queue	—	25'			-		25		-	-		*	-
		LOS	_	В			-		Α		-	-			1
	PM	Delay		11.6			-		8.0		-	-		*	1
	1	Queue		25'			-		25	'	-	-		*	
		-											1	*	
		LOS		Α			-		Α		-	-		_	ı
	PMSE			A 9.9	100		-		7.6		-	-		*	1

⁽⁻⁾ indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.



Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.

^{**} node 300 dual lane roundabout, left values in table per approach are inside shared lanes and right values are outside shared lanes

Exhibit 5-6A Total (Scenario 1 - Full Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

		with E	risariy						er Mov	emen	t by A	pproa	ch		I/S
	Peak		Fa	stbou			estbou			rthbou			uthbo	und	LOS &
Intersection	Hour	Metric	71	→	liu V	VV	÷ SLDOL	K	K	1	71	7	<u>utilibo</u>	una L	Delay
mtersection	rioui	Lanes->		1	1		1	1	1	2	1	1		2	Delay
Node 100: STH 55/Crooks Avenue	-	LOS		F	C	_	F	В	В	*	*	В		*	
& Ann Street		Delay		7.0	19.3		8.8	12.8	13.5	*	*	11.0		*	1 1
Two-Way Stop Control	AM	v/c	_	44	-		21	-	-	-	-	-		-	1
The tray crop conner		Queue		0'	60'		5'	25'	30'	*	*	25'		*	1
		LOS		F	С		F	В	В	*	*	В		*	
		Delay		4.0	15.5		5.7	12.7	11.0	*	*	10.8		*	1
	PM	v/c		71	-		83	-	-	-	-	-			1
	l .	Queue		5'	40'		0'	25'	25'	*	*	25'		*	1
		LOS		F	В		F	В	A	*	*	A		*	
		Delay		0.8	11.6		3.4	11.7	9.8	*	*	9.7		*	1
	PMSE	v/c		40	-	_	27	-	-	-	_	-		_	1
		Queue		0'	25'		5'	25'	25'	*	*	25'		*	1
		Lanes->	1	2	1	1	2	1	20	1	1	-	1	1	
Node 200: CTH CE/College Avenue	-	LOS	В	*	*	A	*	*	_	F	В	_	E	В	
& Fieldcrest Drive	1	Delay	12.5	*	*	9.1	*	*	_	7.4	11.4		3.7	14.2	1
Two-Way Stop Control	AM	v/c	12.0	*	*	3.1	*	*	_	49	11.4	_	39	14.2	1
Two-way Stop Control	l .	Queue	25'	*	*	25'	*	*	_	5'	25'	_	!5'	25'	1
	-	LOS	В	*	*	A	*	*		5	В		D	В	
	PM	Delay	10.1	*	*	9.7	*	*		2.6	11.3		3.5	11.7	1
	1	Queue	25'	*	*	25'	*	*		5'	25'		:5'	25'	1 1
		LOS	A	*	*	A	*	*		5	В		D	В	\vdash
	PMSE		9.9	*	*	9.9	*	*	_	1.6	11.2	_	3.1	11.2	1
	I WISE	Queue	25'	*	*	25'	*	*		5'	25'		5'	25'	1 1
	_	Lanes->	_	1	1	_	1	1	-		1	_	1	1	\vdash
Node 300: STH 55/Crooks Avenue	_	LOS		5	D	_	F	F	_	F	F	_	F	F	\vdash
& CTH CE/ College Avenue**	AM	Delay		3.9	27.0		0.9	67.7		3.0	59.4		0.0	78.6	1 1
Roundabout Control	\ \text{\rightarrow}	Queue		55'	170'		30'	300'		15'	370'		35'	450'	1
Roundabout Control	-	LOS	_)	D		C	C	_		D	_	D	E	-
	PM	Delay		2.3	33.0		2.5	22.4	_	1.4	25.1	_	1.7	35.5	1 1
	I F IVI			90'	210'		20'	135'		55'	175'	_	30'	275'	1 1
	_	Queue	_	30 B	_	_	<u> </u>	B		3	B	_	B	_	\vdash
	PMSE	LOS		1.3	B		2.9		_	1.4			2.9	B	1 1
	PIVISE		_	0'	14.7		5'	12.5		5'	14.6		10'	13.2	1 1
	_	Queue	_	1	100'	_	1	60'	<u></u> ⊢°	1	95'	_	1	90'	\vdash
Nede 400: CTH CE/College Avenue	\vdash	Lanes->	_	<u>, </u>	1			1		F		-		1	-
Node 400: CTH CE/College Avenue	1	LOS		0.0	*		.4	*					E	C	1 1
& Konkapot Trail Road	AM	Delay	10	J. U		9	.4		_	81.8			15	16.4	1 1
Two-Way Stop Control		v/c	-	- :5'	*	_	:5'	*						25'	
	\vdash	Queue			-					25'			!5' F	_	\vdash
	l .	LOS	_	.4	-	_	.2	-		92.7	-		5.8	C	1 1
	PM	Delay	_	-	-	_	.2	-	_			_	80	16.6	1 1
		√/c			-			-	<u> </u>	0.18				451	
	<u> </u>	Queue	_	5'	-	_	5'	-				-	25'	45'	\vdash
	DMOE	LOS	_	4	-	_	<u> </u>	-		C		_	D	В	1 1
	PMSE	_		.4	-		.5	-		22.7			3.2	11.9	
	-	Queue	_	5'	-	_	5'	-	_	25'		3	5'	25'	\vdash
N- 4- 500, OT LOF (O-II A	-	Lanes->	-	1	1	_	1	-	1	-	1				\vdash
Node 500: CTH CE/College Avenue	1.0000	LOS	-	*	*		7	-	D	-	A	 			
& High School West D/W	AM	Delay	-	*	*		.7	-	31.0	-	9.6		-		
One-Way Stop Control	—	Queue	-	*	*	-	5'	-	25'	-	25'				\vdash
		LOS	-	*	*	_).1	-	F	-	B	 	-	8	
	PM	Delay	-			_		-	129.1	-	13.9	_	-		
		√/c	-	*	*		-	-	1.01	-	-	_	-		1 1
	_	Queue	-			_	5'	-	200'	-	25'	<u> </u>	-	-	\vdash
	DMOE	LOS	-	*	*		<u>A</u>	-	C	-	В	_	-		
	PMSE		-				.8	-	19.9	-	11.7	<u> </u>	-	-	
	_	Queue	-	*	*	-	5'	-	25'	-	25'	-	-	-	\vdash
N-4-000-1-4-4	<u> </u>	Lanes->	1	1	1	1		1	1	_	1	1	1	1	
Node 600: Loderbauer Road & CTH		LOS	В	Α	Α	В		В	В		В	В	С	С	В
CE/College Avenue	AM	Delay	19.3	9.5	8.6	12.4		1.0	14.9		3.3	19.8	23.9		15.5
Traffic Signal Control		Queue	40'	75'	25'	95'		90'	105'		20'	40'	135'	70'	
		LOS	В	В	Α	В		В	В		В	С	С	С	В
	PM	Delay	17.8	14.7	9.2	19.5	_	2.0	16.8	_	3.3	24.6	26.7	23.8	16.5
	_	Queue	80'	240'	35'	30'		55'	105'		40'	65'	100'	50'	
		LOS	В	В	Α	В		В	В	_	В	В	В	В	В
	PMSE		12.7	10.6	7.6	12.2	_	0.1	10.7	_	0.0	14.7	14.6		11.0
		Queue	40'	140'	25'	25'	12	20'	35'	_ 5	0'	40'	45'	40'	

Exhibit 5-6A
Total (Scenario 1 - Full Access) Traffic Peak Hour Operating Conditions
With Existing Geometrics and Traffic Control

				Le	evelo	f Service ((LOS) pe	r Moveme	ent by A	pproa	ch		I/S
	Peak		Ea	stbou		Westb		Northb		_	uthbo	und	LOS
Intersection	Hour	Metric	71	→	И	K (K 1		И	4	K	Dela
Node 700: STH 55/Crooks Avenue		Lanes->		1		1	_	2		_	2	_	
& Morningside Drive/Proposed	-	LOS		F		F		A		_	В		_
West Access Drive	AM			2191.0)	1060		8.		_	14.1	-	1
	Aivi	Delay	-		,					-			1
Two-Way Stop Control	-	Queue		515'		162		25		_	40'	-	-
	l	LOS		F		F		A			B		-
	PM	Delay		1274.0)	170		9.			10.7	<u></u>	1
	$\overline{}$	Queue		200'		133		25			40'		_
		LOS		F		F		A			В		
	PMSE	Delay		451.0		793	3.0	8.	3		10.2		1
		Queue		145'		92	0'	25	7		35'		1
		Lanes->		1		-		2	T -	-	1	1	
Node 800: STH 55/Crooks Avenue		LOS		С		-		Α	-	-	-	-	
& Ridgecrest Lane	AM	Delay		17.0		-		8.3	-	-	-	-	1
One-Way Stop Control	7	Queue		25'		-		25'	-	-	-	-	1
One-way Stop Control	-	LOS		C		-		A	1 -	-	-	-	_
	PM			20.3				9.1	_	_	-	_	1
	FIVI	Delay		25'		27.0		25'	+-	-	-	-	1
	—	Queue	_			-			-	<u> </u>	-	-	-
		LOS		С		-		A	-	-	-	-	-
	PMSE			16.7		-		8.7	-	-	-	-	1
		Queue		25'				25'	-	-	-	-	
		Lanes->		1	-	1		1	100		1		
Node 900: STH 55/Crooks Road		LOS		A		Α		A			Α		
with CTH KK/Calumet Street	AM	Delay		6.4		8.3	3	8.	5		7.3		1
Roundabout Control		Queue		30'		35	5'	55	1		50'		1
		LOS		Α		Α		A			В		
	PM	Delay		8.4		7.8		7.		_	10.3		1
		Queue	_	45'		35		40		-	95'		1
	-		<u> </u>	A	-	A		A			A		-
	DMOE	LOS	_										-
	PMSE		_	8.4		6.8		8.4		-	7.5		-
	_	Queue	_	55'		25		40	<u>'</u>	├	60'		_
		Lanes->	2	-	1	-	7	2	-	-	1	1	
Node 1000: Loderbauer Road &		LOS	Α	- 7	Α	-	1	Α			Α	Α	Α
High School North Access D/W	AM	Delay	9.7	-	8.8		8	9.4	-	-	7.2	8.2	8.7
Traffic Signal Control		Queue	35'	12	25'	-		35'	-	-	30'	40'	
		LOS	В	-	Α	-		Α	-	-	Α	Α	Α
	PM	Delay	11.0		9.1	-		8.2	-	-	8.9	8.0	9.6
	l	Queue	55'	1 123	25'	-		25'	-	-	45'	25'	1
	$\overline{}$	LOS	Α	-	Α	-		Α	-	-	A	A	Α
	PMSE		9.7	-	9.4	-		5.7	-	-	6.5	5.5	7.0
	"""	Queue	25'	-	25'	-		25'	+ -	-	30'	25'	1 ′·°
	_		25	1	25	_		1	_	-			
Node 1100: Ladort Deed 0	\vdash	Lanes->	_	C					+-	-	_	1	
Node 1100: Loderbauer Road &		LOS				-		A 7.0	-	<u> </u>		*	-
High School Middle Access D/W	AM	Delay		15.5		-		7.6	-	-			1
One-Way Stop Control		Queue	-	25'		-		25'	-	-		*	_
		LOS		В			2	Α	7.0	-		*	1
	PM	Delay		13.2		-	1	8.0	-	-		*	1
		Queue		25'		-		25'	-	-		*	
		LOS		Α		-		Α	- 0	-	1	*	
	PMSE	Delay		9.6		-	3	7.6	-	-		*	1
		Queue		25'		-		25'	+ -	-		*	1
		Lanes->		1		-		1	 -	١.		1	
Node 1200: Loderbauer Road &		LOS	-	В		-		A	+ -	-	_	*	
New South D/W	AM		_	12.6				7.6	_	_		*	1
	AIVI	Delay							-	-		*	1
One-Way Stop Control	—	Queue		25'		-		25'	-	-		*	-
		LOS		В		-		A	-	-			-
	PM	Delay		11.6		-		8.0	-	-		*	1
		Queue		25'		-		25'	-	-		*	
		LOS		Α		-		Α		-		*	
	PMSE	Delay		9.9		-		7.6	-	-		*	1
								25'		_	_	*	1

⁽⁻⁾ indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movemen



Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.

^{**} node 300 dual lane roundabout, left values in table per approach are inside shared lanes and right values are outside shared lanes

Exhibit 5-6B Total (Scenario 2 - Left-in/Right-in/Right-out Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

		Widi L	rourig							emen	t by A	pproa	ch	- 3	I/S
	Peak		Ea	stbou			stbou			rthbou			uthbo	und	LOS &
Intersection	Hour	Metric	71	→	И	K	+	K	K	1	7	K	4	K	Delay
		Lanes->		1	1	1		1	1	2	1	1	- 2	2	
Node 100: STH 55/Crooks Avenue		LOS		F	С			В	В	*	*	В		*	
& Ann Street	AM	Delay	_	7.0	19.3		8.8	12.8	13.5	*	*	11.0	0	*	
Two-Way Stop Control	AW	v/c		44	-	0.		-	-	-	-	-		-	
57 4F		Queue		0'	60'		5'	25'	30'	*	*	25'		*	
		LOS	· ·	F	С			В	В	*	*	В		*	
	PM	Delay		4.0	15.5	40		12.7	11.0	*	*	10.8	-	*	
	1	v/c		71	-	-	83	-	-	-		-		-	
		Queue		5'	40'		0'	25'	25'	*	*	25'		*	
		LOS		F	В			В	Α	*	*	Α		*	
	PMSE	Delay	_	0.8	11.6	_	.4	11.7	9.8	*	*	9.7		*	
	""	√/c		40	-		27	-	-	-	-	-		-	
	_	Queue		0'	25'	_	5'	25'	25'	*	*	25'		*	
		Lanes->	1	2	1	1	2	1	<u> </u>		1	1		1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*	_	-	В	_	-	С	
& Fieldcrest Drive	AM	Delay	13.0	*	*	9.3	*	*	-	_	12.6	_		16.4	
Two-Way Stop Control		w/c	-	*	*	-	*	*	_	-	-	_	-	-	
	_	Queue	25'	*	*	25'	*	*			25'	_	-	45'	
		LOS	В	*	*	A	*	*	_	-	В	_	-	В	
	PM	Delay	10.3	*		9.9	*	*	_	-	11.9	-		12.5	
	_	Queue	25'	*	*	25'	*	*	_	-	25'	_	-	25'	_
	DMCE	LOS	B	*	*	B	*	*	_	-	B	_	-	В	
	PMSE		10.1	*	*	10.1	*	*	_	-	11.7	_	-	11.8	1
	_	Queue	25'			25'				-	25'		-	25'	\vdash
Node 300: STH 55/Crooks Avenue	-	Lanes->		<u>1</u>	1	1		1	1	_	1	1	=	1	
	AM	LOS		.5	D	88		F	68		F 75.0	89		F	
& CTH CE/ College Avenue** Roundabout Control	Alvi	Delay		35'	32.1 205'		15'	83.3 340'	36		75.2 420'	44		98.6 510'	1
Roundabout Control	_	Queue LOS		55	205 E	_	5	C	30		420 D		10	510 E	
	PM	Delay		6.0	37.2		.6	24.0	27		27.7	36		40.7	
	I F IVI	Queue		10'	235'	_	30'	140'	16		190'	25		300'	1 1
	_	LOS	_	2	C	-	3	B	100		C	E		B	\vdash
	PMSE			5.0	15.5	_	.5	13.0	_	5.2	15.4	_	3.6	13.9	1 1
	I WISE	Queue		5'	110'		5'	60'		0'	100'	8		95'	1 1
		Lanes->	_	1	1	<u> </u>		1	۳	1	100	1		1	
Node 400: CTH CE/College Avenue		LOS		3	*	- /		*		F				C	
& Konkapot Trail Road		Delay		0.0	*	_	.4	*		81.8			6.0	16.4	1
Two-Way Stop Control	AM	v/c		-	-			-	-	0.18		_	15	-	1
The tray stop control		Queue	2	5'	*	2	5'	*		25'		_	5'	25'	1
		LOS		4	-		1	12		F				С	
		Delay	9	.4	-	9	.2	-		92.7		95	5.8	16.6	1 1
	PM	v/c		-	-		-	-		0.18		0.	80	-	1 1
		Queue	2	5'		2	5'	-		25'		12	25'	45'	
		LOS		4	-		1	-		С)	В	\Box
	PMSE	Delay	8	.4	-	8	.5	-		22.7		26	6.2	11.9	1 1
		Queue	2	5'	-	2	5'	-		25'		3	5'	25'	
		Lanes->	-	1	1	1	1	-	1	-	1		2		
Node 500: CTH CE/College Avenue		LOS		*	*	/	1	7 -	D		Α		-		
& High School West D/W	AM	Delay	-	*	*	9	.7	-	31.0	-	9.6		-		
One-Way Stop Control		Queue	-	*	*	2	5'	-	25'	-	25'		-		
		LOS	1.50	*	*		3	1,-1	F	-,	В		-	1	
	PM	Delay	-	*	*	10).1	-	129.1	-	13.9		-		1 1
	I F IVI	w/c	-	-	-		-	-	1.01	-	-		-		1 1
		Queue	-	*	*		5'	-	200'	-	25'		-		
		LOS	-	*	*		4	(-)	С	-0	В		=	-	
	PMSE		-	*	*		.8	-	19.9	-	11.7		-		
		Queue	-	*	*	_	5'	-	25'	-	25'		-		
		Lanes->	1	1	1	1		1	1	_	1	1	1	1	
Node 600: Loderbauer Road & CTH	l	LOS	В	Α	Α	В		В	В		3	В	С	С	В
CE/College Avenue	AM	Delay	19.3	9.5	8.6	12.4		1.0	14.9		3.3	19.8	23.9		15.5
Traffic Signal Control	<u> </u>	Queue	40'	75'	25'	95'		90'	105'	-	20'	40'	135'	70'	
		LOS	В	В	A	В		В	В		3	С	C	С	В
	PM	Delay	17.8	14.7	9.2	19.5		2.0	16.8	_	3.3	24.6	26.7	23.8	16.5
	\vdash	Queue	80'	240'	35'	30'		55'	105'		10'	65'	100'	50'	_
	DMCE	LOS	B	B	A 7.6	B		B	B		3	B	B	B	B
	PMSE		12.7	10.6	7.6	12.2		0.1 20'	10.7		0.0	14.7	14.6		11.0
		Queue	40'	140'	25'	25'	14	20	35'	5	U	40'	45'	40'	

Exhibit 5-6B Total (Scenario 2 - Left-in/Right-in/Right-out Access) Traffic Peak Hour Operating Conditions With Existing Geometrics and Traffic Control

						of Service (LOS) pe			_			_			I/S
	Peak			stbou	_		estbou			orthbo	_		uthbo	_	LOS
Intersection	Hour	Metric	7	\rightarrow	K	K	+	K	K	1	7	K	1	K	Dela
Node 700: STH 55/Crooks Avenue		Lanes->		1			1			2			2		
& Morningside Drive/Proposed		LOS		F			F			A		В			
West Access Drive	AM	Delay		2191.0)	_	10609.)		8.1			1		
Two-Way Stop Control		Queue		515'			1620'	-	25'				1		
TWO-Way Stop Control	-	LOS		F			F			A			40' B		
	PM			1274.0	\		1708.0			9.0		-	10.7	6	ł
	FIVI	Delay			,	_				25'					l
		Queue		200'		_	1330'		_				40'		_
		LOS		F			F			Α			В		l
	PMSE	Delay		451.0			793.0			8.6			10.2	<u> </u>	
		Queue		145'			920'			25'			35'		
		Lanes->		1			-			2	-	-	1	1	
Node 800: STH 55/Crooks Avenue		LOS		С			-			A		-	-	-	
& Ridgecrest Lane	AM	Delay		17.0			- A		- 3	8.3	-	-	-	-	1
One-Way Stop Control	7	Queue		25'		-	-			25'	-	-	-	-	ł
One-way Stop Control		LOS		C		-	-			A	-	-	-	_	_
	PM			20.3		_		_		9.1	_	-	_	-	ł
	FIVI	Delay				<u> </u>	-				-	-	-	-	l
	<u> </u>	Queue		25'		<u> </u>	-			25'	-	-	-	-	<u> </u>
		LOS		С			-			Α	-	-	-	-	
	PMSE	Delay		16.7			-			8.7	5	- 0	- 5	-5	
		Queue		25'			-		3	25'	-	-	-	-	
		Lanes->		1			1			1	92		1	•	
Node 900: STH 55/Crooks Road		LOS		A			A			A			A		
with CTH KK/Calumet Street	AM	Delay		6.4			8.3			8.5			7.3		
	Aivi		~	30'		-	35'	_		55'		_	50'		ł
Roundabout Control	\vdash	Queue					-								_
	l	LOS		A			A			A			В		l
	PM	Delay		8.4			7.8			7.9			10.3		l
		Queue	2	45'			35'			40'			95'		
		LOS		Α			Α			Α			Α		
	PMSE	Delay		8.4			6.8			8.4			7.5		1
		Queue		55'			25'			40'			60'		1
	-	Lanes->	2	-	1	-	-			2	Τ.	-	1	1	-
Node 1000: Loderbauer Road &	-	LOS	A	-	A	_	-	_	_	A	-	-	A	A	A
				_					_		_	_	_		
High School North Access D/W	AM	Delay	9.7	-	8.8		-			9.4	-	-	7.2	8.2	8.7
Traffic Signal Control	_	Queue	35'		25'		-			35'	-	-	30'	40'	
		LOS	В	-	Α		-			A	-	-	Α	Α	Α
	PM	Delay	11.0	-	9.1		-		3	8.2	-	-	8.9	8.0	9.6
		Queue	55'	-	25'		-		- 8	25'	-	-	45'	25'	
		LOS	Α	-	Α		-	-		A			Α	Α	Α
	PMSE		9.7	-	9.4		-			5.7	-	-	6.5	5.5	7.0
		Queue	25'	-	25'	-	-	_		25'	-	-	30'	25'	1
	_		25	1	25	-		_	_	1	_	-	_	1	_
Node 1100: Lodort Danid 9	\vdash	Lanes->		_			-		_		-	-		*	
Node 1100: Loderbauer Road &		LOS		C		<u> </u>	-		<u> </u>	A	-	-	_	*	
High School Middle Access D/W	AM	Delay		15.5			-			7.6	-	-			
One-Way Stop Control		Queue		25'			-			25'	-	-		*	
		LOS		В						Α	773	- 6		*	
	PM	Delay		13.2			-		- 8	8.0	-	-		*	
		Queue		25'			-			25'	-	-		*	1
		LOS		A						A	-	-		*	
	PMSE			9.6			-	-		7.6	-	-		*	1
	I WISE		-	25'		_					_			*	1
	_	Queue	-				-		_	25'	-	<u> </u>	_		
	<u> </u>	Lanes->		1		<u> </u>	-		_	1	-	-		1	_
Node 1200: Loderbauer Road &		LOS	2	В			-			A	-	-		*	
New South D/W	AM	Delay		12.6			-			7.6	2	-		*	
One-Way Stop Control		Queue		25'			-			25'	-	-		*	
•		LOS	7	В			-			Α	-	-		*	1
	РМ	Delay	-	11.6			-			8.0	-	-		*	1
	I	Queue		25'			-	-			_	-		*	1
	\vdash			A					25' -		_	_		*	
	DMOE	LOS				_			-	A	-	-			1
	PMSE			9.9			-			7.6	-	-		300	l
		Queue		25'		I	-			25'	1 -		1	*	ı

⁽⁻⁾ indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.



Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.

^{**} node 300 dual lane roundabout, left values in table per approach are inside shared lanes and right values are outside shared lanes

Exhibit 5-9 Existing/Background Traffic Peak Hour Operating Conditions With Modified Geometrics and Traffic Control

		VVIUI IVI	Jumec						er Mov	emen	t by A	nnroa	ch	- 1	I/S
	Peak		Fo	stbou			estbou			rthbou			uthbo	und	LOS &
Intersection	Hour	Metric	71	→	L Z	K	←	K	K	1	7	7	↓	L K	Delay
Intersection	rioui	Lanes->		7	1		1	1	1	2	1	1		2	Delay
Node 100: STH 55/Crooks Avenue	\vdash	LOS	_	_	В	-		В	В	*	*	Á		*	_
& Ann Street	AM		-		14.6	_	_	11.4	10.8	*	*	9.7		*	ı
	Aivi	Delay	_	<u> </u>	25'	-		40'		*	*	25'			
Two-Way Stop Control	-	Queue	_	-		_		_	25'	*	*	_		*	_
	PM	LOS		-	B	_		B	B	*	*	A			
	FIVI	Delay	_	-	13.9	_		11.5	10.0	*	*	9.9		*	
		Queue	_	-	35'	-		25'	25'	*	*	25'		*	
	DMOE	LOS	-	-	В	-		В	A	*	*	A		*	
	PMSE		_	-	11.1	_		11.0	9.2	-	_	9.2		*	ı
	_	Queue	_	-	25'	-		25'	25'	_ *	*	25'			_
		Lanes->	1	2	1	1	2	1	_		1		1	1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*	_	-	В	_	-	В	
& Fieldcrest Drive	AM	Delay	12.1	*	*	8.8	*	*	-	-	11.6		-	14.3	
Two-Way Stop Control		Queue	25'	*	*	25'	*	*		-	25'		-	30'	
	0.0000000	LOS	Α	*	*	Α	*	*		-	В	23	-	В	
	PM	Delay	9.7	*	*	9.4	*	*		-	11.3		-	11.5	
		Queue	25'	*	*	25'	*	*		- 2	25'		-	25'	
		LOS	Α	*	*	Α	*	*		-0	В	12	-	В	
	PMSE		9.5	*	*	9.6	*	*		-	11.2	-	-	11.0	
		Queue	25'	*	*	25'	*	*			25'		-	25'	
		Lanes->	_	1	1		1	1			1	_	1	1	
Node 300: STH 55/Crooks Avenue	\vdash	LOS	_	B	В	_		C	_		С	_	0	C	-
& CTH CE/ College Avenue**	AM	Delay		1.0	_		.6	21.5	_	9.3	19.2		9.3	19.9	ı
Roundabout Control	AW	Queue	_	60'	11.1			135'	_)5'	120'	_	25'	140'	
Roundabout Control	-	Queue 60' 65' 120' 135' LOS C C B B		_	3	B		<u> </u>	C						
	PM			5.0	15.2	_	.5	11.6	_	2.8	12.5	_	1.6	15.4	
	FIVI	Delay		5.0			0'						05'	_	
	-	Queue			95'			65'	50'		55'	-		120'	_
	D	LOS		Α	A		4	A			A		<u> </u>	Α	
	PMSE			.5	9.8		.7	8.6	_	.9	9.7		.7	9.0	
	_	Queue	_	55'	60'	-	5'	35'	_	0'	45'	_	5'	55'	
		Lanes->	_	1	1	_	1	1		-	1		1	1	
Node 400: CTH CE/College Avenue		LOS		A	*		4	*		-0	В		-	С	
& Konkapot Trail Road	AM	Delay		.8	*	_	.3	*		-	11.4		-	16.3	
Two-Way Stop Control		Queue		:5'	*	_	5'	*		-	25'		-	25'	
		LOS		Α	-		4	-	-	- 1	В		-	С	
	PM	Delay		.2	-		.4	-		-	11.5	- 56	-	21.1	
		Queue		:5'	-		5'	-		1	25'		-	95'	
		LOS		A	-		Α	-		- 1	В	- 6	-	В	
	PMSE	Delay	8	.3	-	8	.6	-		20	10.1		-	12.7	ı
		Queue	2	:5'	-	2	5'	-			25'		-	40'	1
		Lanes->	-	1	1		1	-	1	-	1		-		
Node 500: CTH CE/College Avenue		LOS	-	*	*		4	-	D	-	A	-	-		
& High School West D/W	AM	Delay	-	*	*		.4	-	25.0		9.4		_		ı
One-Way Stop Control		Queue	-	*	*	_	5'	-	25'	-	25'		-		ı
One vray Grop Control		LOS	-	*	*		<u> </u>		F	-	B				
		Delay	-	*	*	_	.8	-	70.5	-	13.0				ı
	PM	v/c	-			_	-	-	0.81	-	13.0				ı
			_	*	-	_		-		-	_	-		-	ł
	_	Queue		*	*	-	5'	-	145'	-	25'	-			
	D. 40F	LOS				_	4	-	C	-	В		-		
	PMSE		-	*	*		.6	-	17.9	-	11.4		77.		
	_	Queue	-	*	*	_	5'	-	25'		25'	_	-		
		Lanes->	1	1	1	1	_	1	1	_	1	1	1	1	
Node 600: Loderbauer Road & CTH	1000000	LOS	В	Α	Α	В		В	В		В	В	С	В	В
CE/College Avenue	AM	Delay	17.6	9.4	8.6	11.5		4.6	13.7		1.7	18.5			14.5
Traffic Signal Control		Queue	25'	65'	25'	70'		60'	105'	_	95'	40'	125'	65'	
		LOS	В	В	Α	В		В	В		В	С	С	С	В
	PM	Delay	16.2	14.8	9.5	18.1	11	1.9	14.5	13	3.5	21.7	23.0	20.4	15.1
		Queue	65'	215'	35'	25'	13	30'	105'	12	25'	65'	100'	40'	10 TO
		LOS	В	В	Α	В		A	В	-	A	В	В	В	В
	PMSE		11.7	10.1	7.6	11.4	-	.7	10.6		.8	14.6	14.5	_	10.6
		Queue	35'	130'	25'	25'		10'	30'		10'	40'	40'	30'	1
		_ ~~~~					<u> </u>								

Exhibit 5-9 Existing/Background Traffic Peak Hour Operating Conditions With Modified Geometrics and Traffic Control

	20.00					Service (LOS) pe	er Moveme	nt by A	pproa	ch	<u> </u>	I/S
	Peak		Ea	stbou	nd	Westbound	Northbo	ound	So	uthbo	und	LOS
Intersection	Hour	Metric	7	\rightarrow	И	∠ ← K	「 ↑	7	И	1	K	Dela
		Lanes->		1		-	2	-	-	2	2	
Node 700: STH 55/Crooks Avenue		LOS		С		-	Α	2	-		*	
& Morningside Drive	AM	Delay		19.1		-	8.1	-		-	*	1
One-Way Stop Control		Queue		35'		(3)	25'	-	-		*	1
		LOS		С		-	Α	-	-		*	
	PM	Delay		20.5		-	9.0	-	-	87	*	1
		Queue		25'		10.70	25'	-	-	-	*	1
		LOS		C		-	Α	-	-	2	*	
	PMSE	Delay	,	18.7		-	8.6		-	27	*	1
		Queue		25'		-	25'	-	-	-	*	1
		Lanes->		1		-	2	-	-	1	1	
Node 800: STH 55/Crooks Avenue		LOS		В		-	Α	-	-	-	-	
& Ridgecrest Lane	AM	Delay		13.9		-	8.1	-	-	-	-	1
One-Way Stop Control		Queue		25'		-	25'	1 -	-	-	-	1
		LOS		С		-	Α	-	-	-	-	
	PM	Delay		16.2		-	8.7	-	-	-	-	1
		Queue	-	25'		-	25'	-	-	-	-	1
		LOS		В		-	Α	-	-	-	-	
	PMSE			14.1		-	8.4	T -	-	-	-	1
	100000000000000000000000000000000000000	Queue		25'		-	25'	T -	-	-	-	1
		Lanes->		1		1	1		-	1		
Node 900: STH 55/Crooks Road		LOS		A		A	A		_	A		
with CTH KK/Calumet Street	AM	Delay		5.5		7.0	7.0)		6.2		
Roundabout Control		Queue		25'		30'	40'			35'		1
touridae out Control		LOS		A		A	A			A		
	РМ	Delay		7.0		6.7	6.7	,		8.4		1
		Queue		35'		30'	25			65'		1
		LOS		A		Α	А			Α		
	PMSE			7.1	_	6.0	7.2)		6.4		
		Queue		40'		25'	35			40'		1
		Lanes->	2	-	1	-	2	Τ-	-	1	1	
Node 1000: Loderbauer Road &		LOS	A		A		Ā	1 -	-	A	A	Α
High School North Access D/W	AM	Delay	9.7	-	8.8	-	8.7	-	-	6.8	8.2	8.6
Traffic Signal Control	7	Queue	30'	-	25'	-	30'	+-	-	25'	40'	0.0
Traine Signal Control		LOS	В	-	A	_	A	 -	-	A	A	Α
	РМ	Delay	11.0	-	9.1	-	8.0	-	-	8.5	8.0	9.6
		Queue	45'	-	25'	-	25'	+ -	-	40'	25'	"."
		LOS	A	-	A	_	A	-	-	A	A	Α
	PMSE		9.7	-	9.4	-	5.6	+-	-	6.3	5.5	7.0
	I WISE	Queue	25'	-	25'	-	25'	+-	-	25'	25'	1
	_	Lanes->	25	1	25		1	+-	-		1	
Node 1100: Loderbauer Road &		LOS		В		-	A	+ -	1		*	
High School Middle Access D/W	AM	Delay	_	13.5		-	7.5	+-	-		*	1
•	Aivi			25'		-	25'	-	-		*	1
One-Way Stop Control		Queue	_	25 B		-	A A	_	_		*	
	PM	LOS		12.5		-	8.0	-	-	- 0		1
	PIVI	Delay	-	25'		-	25'	+-	_		*	1
		Queue	-			-		_	-		*	
	DNAGE	LOS		A 0.4		-	A 7.5	-	-			1
	PMSE	,		9.4			7.5	-	-		*	
		Queue		25'		s a freeflow movem	25'	-	-		· / /	L

⁽⁻⁾ indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.

^{**} node 300 dual lane roundabout, left values in table per approach are inside shared lanes and right values are outside shared lanes

Exhibit 5-12A

Full Build (Scenario 2 - Left-in/Right-in/Right-out Access, Full Access at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometrics and Traffic Control

		vvitn ivid	Juniec						er Mov	emen	t by A	pproa	ch		I/S
	Peak		Fa	stbou			estbou			rthbo			uthbo	und	LOS &
Intersection	Hour	Metric	7	→	liu V	L.	+	K	K	1	7	<u>зо</u>	1 T	L K	Delay
mersection	noui	Lanes->			1	_	1	1	1	2	1	1	_	2	Delay
Node 100: STH 55/Crooks Avenue		LOS		-	Ċ		-	В	В	*	*	В		*	
& Ann Street	AM	Delay		-	18.5		-	12.6	12.9	*	*	10.8		*	
Two-Way Stop Control	7	Queue			55'	_		25'	30'	*	*	25'		*	l
The Way Grop Control		LOS			В			В	В	*	*	В		*	
	РМ	Delay			14.8			12.2	10.5	*	*	10.5		*	1
		Queue			35'			25'	25'	*	*	25'		*	1
		LOS		-	В		-	В	A	*	*	A		*	
	PMSE				11.4			11.3	9.4	*	*	9.5		*	1
		Queue		-	25'		-	25'	25'	*	*	25'		*	1
		Lanes->	1	2	1	1	2	1			1		1	1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*		-	В		-	С	
& Fieldcrest Drive	AM	Delay	12.6	*	*	9.1	*	*		-	12.1		-	15.5	1
Two-Way Stop Control		Queue	25'	*	*	25'	*	*		-	25'		-	40'	1
,,		LOS	Α	*	*	Α	*	*		-	В		-	В	
	PM	Delay	9.8	*	*	9.5	*	*		-	11.4		-	11.8	1
		Queue	25'	*	*	25'	*	*		-	25'		-	25'	1
		LOS	Α	*	*	Α	*	*		-	В		-	В	
	PMSE	Delay	9.6	*	*	9.7	*	*		-	11.2		-	11.1	1
		Queue	25'	*	*	25'	*	*		-	25'		-	25'	1
		Lanes->		1	1	2	2	1	2	2	1	1	2	1	
Node 300: STH 55/Crooks Avenue		LOS)	С		E	В	E	E	Α)	С	
& CTH CE/ College Avenue		Delay	26	6.7	24.7	39	9.4	12.8	41	.2	7.1	31	1.4	17.5	1
Roundabout Control	AM	v/c		-	-	0.	78	-	0.	86	-		-	-	1
Tiounda Sout Sound.		Queue	13	35'	130'		15'	30'		10'	25'	10	50'	70'	1
		LOS)	D	(C	Α		2	Α	(C	В	
	PM	Delay	29	9.1	27.5	15	5.9	9.2	21	.3	7.8	16	6.8	10.7	1
		Queue	14	15'	145'	7	5'	25'	7	5'	25'	9	5'	55'	1
		LOS		3	В		3	Α	E	3	Α		A	Α	
	PMSE	Delay	13	3.2	12.6	10).7	6.7	12	2.7	6.0	9	.0	7.9	1
		Queue	8	5'	85'	4	0'	25'	5	0'	25'	3	5'	35'	1
		Lanes->	1	1	1		1	1	_		1		1	1	
Node 400: CTH CE/College Avenue		LOS		Α	*		Α	*			В		-	С	
& Konkapot Trail Road	AM	Delay	9	.8	*	9	.3	*		_	11.4		-	16.3	1
Two-Way Stop Control		Queue	2	5'	*	2	5'	*		_	25'		-	25'	1
		LOS		4	-		4	-		-	В		-	С	
	PM	Delay	9	.2	-	9	.4	-		-	11.5		-	21.1	1
		Queue	2	5'	-	2	5'	-		-	25'		-	95'	1
		LOS		4	-		4	-		-	В		-	В	
	PMSE	Delay	8	.3	-	8	.6	-		-	10.1		-	12.7	1
		Queue	2	5'	-	2	5'	-		-	25'		-	40'	1
		Lanes->	-	1	1		1	-	1	-	1		-		
Node 500: CTH CE/College Avenue		LOS	-	*	*		Α	-	D	-	Α		-		
& High School West D/W	AM	Delay	-	*	*	9	.6	-	27.9	-	9.6		-		1
One-Way Stop Control		Queue	-	*	*	2	5'	-	25'	-	25'		-		1
•		LOS	-	*	*	-	A	-	F	-	В		-		
	D. 4	Delay	-	*	*	9	.9	-	83.7	-	13.2		-		1
	PM	v/c	-	-	-		-	-	0.86	-	-		-		1
		Queue	-	*	*	2	5'	-	160'	-	25'		-		1
		LOS	-	*	*	-	A	-	С	-	В		-		
	PMSE	Delay	-	*	*	8	.6	-	17.9	-	11.4		-		1
		Queue	-	*	*	2	5'	-	25'	-	25'		-		1
		Lanes->	1	1	1	1		1	1		1	1	1	1	
Node 600: Loderbauer Road & CTH		LOS	В	Α	Α	В		В	В		В	В	C	C	В
CE/College Avenue	AM	Delay	18.2	9.4	8.6	12.2		4.7	14.4		2.8	19.2	23.2		15.1
Traffic Signal Control		Queue	30'	70'	25'	95'		75'	105'		20'	40'	135'		
		LOS	В	В	Α	В		В	В		В	С	С	С	В
	PM	Delay	16.5	14.7	9.5	18.7		1.9	15.4	14	4.5	22.3	23.9		15.5
		Queue	70'	220'	35'	30'		35'	105'		40'	65'	100'		1
		LOS	В	В	A	В	_	A	В		A	В	В	В	В
	PMSE	Delay	11.8	10.2		11.8		0.8	10.6		1.9	14.5	14.5		10.7
		Queue	35'	130'	25'	25'		10'	30'		10'	40'	40'	30'	l
		40000						_						- 50	

Exhibit 5-12A

Full Build (Scenario 2 - Left-in/Right-in/Right-out Access, Full Access at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometries and Traffic Control

						and Traffic f Service (L			emen	t by A	pproa	ch		I/S
	Peak		Fa	stbou		Westbou			rthbou			uthbo	und	LOS 8
Intersection		Metric		÷	liu V	vvesibot	K	K	1	7	30 K	<u>uuibo</u>	unu L	Delay
Node 700: STH 55/Crooks Avenue	Hour	Lanes->	7.	1	7	1	1	1	1	1	1	1	1	Delay
& Morningside Drive/Proposed	\vdash	LOS		F		F	C	A	*	*	B	*	*	
West Access Drive				71.6		636.3	_		*	*	11.2	*	*	1
	AM	Delay					19.3	8.1	*	*		-	*	l
Two-Way Stop Control		v/c		0.45		1.95	-	-	*		-	*	*	
		Queue		50'		225'	75'	25'		*	40'			
		LOS		F		F	В	Α	*	*	Α	*	*	1
	PM	Delay		73.9		53.1	12.9	9.0	*	*	8.9	*	*]
	' '''	v/c		0.54		0.38	-	-	*	*	-	*	*	
		Queue		65'		40'	25'	25'	*	*	25'	*	*	1
		LOS		Е		D	В	Α	*	*	Α	*	*	
	D. 405	Delay		38.4		30.9	12.0	8.6	*	*	8.6	*	*	1
	PMSE	v/c		0.32		-	-	-	*	*	-	*	*	1
		Queue		35'		25'	25'	25'	*	*	25'	*	*	i
	+	Lanes->		1		- 20	23	23		-	23	1	1	_
Node 800: STH 55/Crooks Avenue	\vdash			c				_		_	<u> </u>	_	_	
		LOS				-			1	-	-	-	-	ł
& Ridgecrest Lane	AM	Delay		15.7		-			.2	-	-	-	-	ļ
One-Way Stop Control	⊢—	Queue		25'		-			5'	-	-	-	-	—
	1	LOS		С		-			4	-	-	-	-	ı
	PM	Delay		17.1		-			.8	-	-	-	-]
		Queue		25'		-		2	5'	-	-	-	-	
		LOS		С		-		-	4	-	-	-	-	
	PMSE	Delay		16.7		-			.7	-	-	-	-	1
		Queue		25'		_			5'	-		_	-	i
	+			1		1		-	1	_	H	1		
Ned- 000: CTU CC/CI Deed	<u> </u>	Lanes->						├			-			
Node 900: STH 55/Crooks Road		LOS		A		A 7.7			Α_			Α_		Į.
with CTH KK/Calumet Street	AM	Delay		6.0		7.7			8.0			6.9		l
Roundabout Control		Queue		25'		30'			50'			45'		
		LOS		Α		Α			Α			Α		
	PM	Delay		7.4		6.9			7.0			8.9		1
		Queue		35'		30'			30'			75'		1
		LOS		Α		Α			Α			Α		
	PMSE	Delay		7.3		6.1		 	7.4			6.6		i
	1 11102	Queue		40'		25'		 	35'			45'		ł
	+		2	-	1	-		2			_	1	1	_
Nada 1000: Ladashawa Daad 8	<u> </u>	Lanes->			_			_		-	-	_	_	
Node 1000: Loderbauer Road &		LOS	A	-	Α	-			1	-	-	A	A	A
High School North Access D/W	AM	Delay	9.7	-	8.8	-			.4	-	-	7.2	8.2	8.7
Traffic Signal Control		Queue	35'	-	25'	-		_	5'	-	-	30'	40'	
		LOS	В	-	Α	-			4	-	-	Α	Α	Α
	PM	Delay	11.0	-	9.1	-			.2	-	-	8.9	8.0	9.6
		Queue	55'	-	25'	-		2	5'	-	-	45'	25'	
		LOS	Α	-	Α	-		-	1	-	-	Α	Α	Α
	PMSE	Delay	9.7	-	9.4	-		5		-	-	6.5	5.5	7.0
		Queue	25'	_	25'	_			5'	-	-	30'	25'	1
	+	Lanes->	2.0	1	23	_		_	<u> </u>	-	-	_	1	\vdash
Node 1100: Loderbauer Road &	\vdash		_	c				_		_	-		*	\vdash
NOVE LIVO LOGEDBURG ROBO &		LOS				-			4	-	-		*	ł
		Delay		15.5		-			.6	-	-			l
High School Middle Access D/W	AM		1	25'		-		_	5'	-	-		*	<u> </u>
	AM	Queue				-		ı /	4	-	-		*	1
High School Middle Access D/W		LOS		В									*]
High School Middle Access D/W	PM			13.2		-			.0	-	-			I
High School Middle Access D/W		LOS						8	.0 5'	-	-		*	l
High School Middle Access D/W		LOS Delay Queue		13.2		-		8			-		*	
High School Middle Access D/W	PM	LOS Delay Queue LOS		13.2 25' A		-		8 2	5' \	-	-			
High School Middle Access D/W		LOS Delay Queue LOS Delay		13.2 25' A 9.6		- - -		8 2 1 7	5' \ .6	- - -	-		*	
High School Middle Access D/W	PM	LOS Delay Queue LOS Delay Queue		13.2 25' A 9.6 25'		- - - -		8 2 1 7 2	5' A .6 5'	- - -	-		* * *	
High School Middle Access D/W One-Way Stop Control	PM	LOS Delay Queue LOS Delay Queue Lanes->		13.2 25' A 9.6 25' 1				8 2 7 7 2	5' A .6 5'	- - - -	-		*	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road &	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS		13.2 25' A 9.6 25' 1 B				8 2 7 7 2	5' A .6 5'		-		* * *	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road & New South D/W	PM	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay		13.2 25' A 9.6 25' 1 B				8 2 7 2 1 1	5' A .6 5' 1 A	- - - - -	-		* * * 1 *	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road & New South D/W	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay Queue		13.2 25' A 9.6 25' 1 B 12.6 25'				8 2 7 7 2 1 1 7 7	5' A .6 5' 1 A .6	- - - - -	-		* * * 1 * *	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road & New South D/W	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay Queue LOS Delay Queue LOS		13.2 25' A 9.6 25' 1 B 12.6 25' B				8 2 7 7 2 1 1 7 7 7 7 2	5' A .6 5' 1 A .6 5'	- - - - -	- - - - -		* * * * * * * * * * * * *	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road & New South D/W	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay Queue		13.2 25' A 9.6 25' 1 B 12.6 25' B				8 2 7 7 2 1 7 7 2 2 4 8	5' A .66 .5' A .66 .5'	- - - - -	- - - - -		* * * * * * * * * * * * * * * * *	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road & New South D/W	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay Queue LOS Delay Queue LOS		13.2 25' A 9.6 25' 1 B 12.6 25' B				8 2 7 7 2 1 7 7 2 2 4 8	5' A .6 5' 1 A .6 5'				* * * * * * * * * * * * *	
High School Middle Access D/W	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay Queue LOS Delay Queue LOS Delay		13.2 25' A 9.6 25' 1 B 12.6 25' B				8 2 7 7 2 1 7 7 2 2 1 8 8	5' A .66 .5' A .66 .5'				* * * * * * * * * * * * * * * * *	
High School Middle Access D/W One-Way Stop Control Node 1200: Loderbauer Road & New South D/W	PM PMSE	LOS Delay Queue LOS Delay Queue Lanes-> LOS Delay Queue LOS Delay Queue LOS Delay Queue LOS		13.2 25' A 9.6 25' 1 B 12.6 25' B 11.6 25'				8 2 7 7 2 1 1 7 7 2 2 1 8 8 2 1	5' \(\lambda\) .66 5' \(\lambda\) .66 .5' \(\lambda\)				* * * * * * * * * * * * * * * * * * * *	

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.



Exhibit 5-12B

Full Build (Scenario 2 - Left-in/Right-in/Right-out Access, No Exit at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometrics and Traffic Control

		vvitn ivid	Jannec							emen	t hv A	pproa	ch		I/S
	Peak		Fa	stbou			estbou			rthbou			uthbo	und	LOS &
Intersection		Metric	7	→	liu V	∠	÷ €	IIIu K	K NO	1	7	30i	<u>uuibo</u>	unu L	Delay
meraceion	Hour	Lanes->	_		1	_	1	1	1	2	1	1	-	2	Delay
Node 100: STH 55/Crooks Avenue		LOS	-		Ċ	_	-	В	В	*	*	В		*	
& Ann Street	AM	Delay		-	18.5		_	12.6	12.9	*	*	10.8		*	
Two-Way Stop Control	7 (10)	Queue			55'		_	25'	30'	*	*	25'		*	
Two-vvay Stop Control		LOS	-		В		-	В	В	*	*	В		*	
	РМ	Delay			14.8			12.2	10.5	*	*	10.5		*	
		Queue			35'			25'	25'	*	*	25'		*	
		LOS			В		-	В	A	*	*	A		*	
	PMSE	Delav			11.4			11.3	9.4	*	*	9.5		*	
		Queue		-	25'		-	25'	25'	*	*	25'		*	
		Lanes->	1	2	1	1	2	1			1	1	1	1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*	_	-	В		-	С	
& Fieldcrest Drive	AM	Delay	12.6	*	*	9.1	*	*			12.1		-	15.5	
Two-Way Stop Control		Queue	25'	*	*	25'	*	*	-	-	25'		-	40'	
		LOS	Α	*	*	Α	*	*	_		В		-	В	
	PM	Delay	9.8	*	*	9.5	*	*	-	-	11.4		-	11.8	
		Queue	25'	*	*	25'	*	*		-	25'		-	25'	
		LOS	Α	*	*	Α	*	*		-	В		-	В	
	PMSE	Delay	9.6	*	*	9.7	*	*	-	-	11.2		-	11.1	
		Queue	25'	*	*	25'	*	*		-	25'		-	25'	
		Lanes->	•	1	1	- 2	2	1	2	?	1	2	2	1	
Node 300: STH 55/Crooks Avenue		LOS)	С		E	В			Α)	С	
& CTH CE/ College Avenue	AM	Delay	26	5.7	24.7		9.4	12.8		.2	7.1	31	1.4	17.5	
Roundabout Control	7	v/c		-	-		78	-		86	-		-	-	
		Queue		35'	130'	_	15'	30'	21		25'	_	50'	70'	
		LOS)	D		<u> </u>	Α	(Α		<u> </u>	В	
	PM	Delay	29		27.5		5.9	9.2	21		7.8		6.8	10.7	
	<u> </u>	Queue	_	15'	145'		5'	25'		5'	25'	_	5'	55'	
		LOS		3	В		B	Α		3	Α		Α	Α	
	PMSE	Delay		3.2	12.6).7	6.7	12		6.0		.0	7.9	
	—	Queue	_	5'	85'	_	0'	25'	5		25'	_	5'	35'	
	Ь—	Lanes->		1	1		1	1			1	_	1	1	
Node 400: CTH CE/College Avenue		LOS		4	*		<u> </u>	*			В		-	C	
& Konkapot Trail Road	AM	Delay		.8	*		.3	*			11.4		-	16.3	
Two-Way Stop Control	<u> </u>	Queue		5' A			.5' ^				25'	_	-	25'	
	PM	LOS		.2	-		<u>4</u> .4	-		-	B	-	-	C 24.4	
	PIVI	Delay		. <u>z</u> 5'	-		.4 !5'	-			11.5		-	21.1	
	<u> </u>	Queue LOS	-	<u>5</u>	-	_	.э Д	-		-	25'	-		95'	
	PMSE	Delav		.3	-		.6	-			10.1		-	B 12.7	
	FIVIOL	_		.s 5'	-		.6 5'	_			25'	-		40'	
	-	Queue Lanes->		1	1		.5 1	-	1	-	1			40	
Node 500: CTH CE/College Avenue	—	LOS	-	*	*		<u>/</u>	-	D	-	A	_	<u> </u>		
& High School West D/W	AM	Delay	-	*	*		.6	-	27.9	-	9.6	 			
One-Way Stop Control	7 (10)	Queue	-	*	*		5'	-	25'	-	25'	\vdash			
One-way Stop Control		LOS	_	*	*		<u> </u>	-	-	-	-		-		
	РМ	Delay	-	*	*		.8	-	-	-	-		-		
		Queue	-	*	*		5'	-	-	-	-		-		
		LOS	-	*	*		4	-	С	-	В		-		
	PMSE	Delay	-	*	*	8	.6	-	17.9	-	11.4		-		
		Queue	-	*	*		5'	-	25'	-	25'		-		
		Lanes->	1	1	1	1		1	1		1	1	1	1	
Node 600: Loderbauer Road & CTH		LOS	В	Α	Α	В		В	В		В	С	С	С	В
CE/College Avenue	AM	Delay	17.9	9.2	8.5	12.0	14	4.1	15.6		3.9	20.5	24.8	21.6	15.4
Traffic Signal Control		Queue	30'	75'	25'	100'	29	95'	120'	13	35'	45'	155'	75'	
		LOS	С	В	В	С		В	В		В	С	С	С	В
	PM	Delay	22.1	18.5		23.6		5.9	17.9		1.8	28.9	31.5	_	19.1
		Queue	95'	275'	50'	40'	_	85'	205'		85'	80'	135'	55'	
		LOS	В	В	Α	В		A	В		A	В	В	В	В
l	PMSE	Delay	11.8	10.2		11.8		.8	10.6		.9	14.5	14.5		10.7
1		Queue	35'	125'	25'	25'	1 4/	05'	30'	A	5'	40'	45'	30'	

Exhibit 5-12B

Full Build (Scenario 2 - Left-in/Right-in/Right-out Access, No Exit at HS West D/W) Traffic Peak Hour Operating Conditions
With Modified Geometrics and Traffic Control

				Le	evel of	f Service (L(OS) pe	er Mov	emen	t by A	pproa	ch		I/S
	Peak		Fa	stbou		Westbou			rthbou			uthbo	und	LOS
Intersection		Metric	7	→	L V	∠ ←	K	K	1	7	<u>у</u>	<u> </u>	L K	Dela
Node 700: STH 55/Crooks Avenue	Hour	Lanes->	- /-	1		1	1	1	1	1	1	1	1	Dela
& Morningside Drive/Proposed		LOS		F		F	C	_	*	*	В	*	*	_
3				71.6				A	*	*		*	*	l
West Access Drive	AM	Delay				636.3	19.3	8.1	*	*	11.2	*	*	Į.
Two-Way Stop Control		v/c		0.45		1.95	-	-			-			l
		Queue		50'		225'	75'	25'	*	*	40'	*	*	
		LOS		F		F	В	Α	*	*	Α	*	*]
	PM	Delay		73.9		53.1	12.9	9.0	*	*	8.9	*	*	
	I IVI	v/c		0.54		0.38	-	-	*	*	-	*	*	1
		Queue		65'		40'	25'	25'	*	*	25'	*	*	1
		LOS		Е		D	В	Α	*	*	Α	*	*	
		Delay		38.4		30.9	12.0	8.6	*	*	8.6	*	*	i
	PMSE	v/c		0.32		-	-	-	*	*	-	*	*	i
				35'		25'	25'	25'	*	*	25'	*	*	ł
	_	Queue				25	25	_		_	_	_		├─
		Lanes->		1		-		_	2	-	-	1	1	├
Node 800: STH 55/Crooks Avenue		LOS		С		-			4	-	-	-	-	l
& Ridgecrest Lane	AM	Delay		15.7		-			.2	-	-	-	-]
One-Way Stop Control		Queue		25'		-		2	5'	-	-	-	-	
		LOS		С		-		-	4	-	-	-	-	
	PM	Delay		17.1		-		8	.8	-	-	-	-	1
		Queue		25'		_		2	5'	-	-	-	-	i
		LOS		C		_		_	<u> </u>	-		-	-	\vdash
	PMSE			16.7					.7	-	-	-	-	l
	FIVISE											-		l
	-	Queue		25'		-			5'	-	-	<u> </u>	-	├─
		Lanes->		1		1			1			1		
Node 900: STH 55/Crooks Road		LOS		Α		Α			Α			Α]
with CTH KK/Calumet Street	AM	Delay		6.0		7.7			8.0			6.9		
Roundabout Control		Queue		25'		30'			50'			45'		
		LOS		Α		Α			Α			Α		
	PM	Delay		7.4		6.9			7.0			8.9		1
		Queue		35'		30'		l	30'			75'		i
	_	LOS		A		A		\vdash	A		 	A		\vdash
	DMCE							-			-			l
	PMSE			7.3		6.1		ļ	7.4		<u> </u>	6.6		l
		Queue		40'		25'		<u> </u>	35'		_	45'		
		Lanes->	2	-	1	-		_	2	-	-	1	1	
Node 1000: Loderbauer Road &		LOS	В	-	Α	-			4	-	-	Α	Α	Α
High School North Access D/W	AM	Delay	10.6	-	9.7	-		9	.0	-	-	6.9	7.7	8.7
Traffic Signal Control		Queue	35'	-	25'	-		3	5'	-	-	30'	40'	1
		LOS	В	-	Α	-			3	-	-	В	В	В
	PM	Delay	10.8	-	7.6	_		11	1.5	-	-	12.5	11.2	11.0
		Queue	75'		25'	_			0'	-	-	60'	35'	11.0
	\vdash					-		_	_		_		_	
	DMOE	LOS	Α	-	Α				4	-	-	A	Α	A 7.0
	PMSE		9.7	-	9.4	-			.7	-	-	6.5	5.5	7.0
	ـــــ	Queue	25'	-	25'	-		_	5'	-	-	30'	25'	Ь—
		Lanes->		1		-			1	-	-		1	<u> </u>
Node 1100: Loderbauer Road &		LOS		С		1			4	-	-		*	
High School Middle Access D/W	AM	Delay		15.5		-		7	.6	-	-		*	1
One-Way Stop Control	1	Queue		25'		-		2	5'	-	-		*	1
,		LOS		В		-		_	4	-	-		*	
	РМ	Delay		13.2		_			.0	-	٠.		*	1
	I ' '''	Queue		25'		_			5'	-	-		*	ł
	\vdash	LOS	_	A		-		_	4		-		*	\vdash
	DMOE		<u> </u>							-	-		*	1
	PMSE			9.6		-			.6	-	-		*	1
	ـــــ	Queue		25'		-		_	5'	-	-			<u> </u>
		Lanes->		1		-			1	-	-		1	
Node 1200: Loderbauer Road &		LOS		В		-			4	-	-		*	
New South D/W	AM	Delay		12.6		-		7	.6	-	-		*	1
One-Way Stop Control	1	Queue		25'		-			5'	-	-		*	1
s ray stop control		LOS		В		-		_	4	-	-		*	\vdash
	РМ			11.6		_			.0	-	-		*	ł
	PIVI	Delay		25'					.u 5'		-	-	*	1
	<u> </u>	Queue	<u> </u>			-		_		-	-		*	⊢
		LOS		Α		-			4	-	-			1
		D-I	ī	9.9		-		ı 7	.6	-	-	1	*	I
	PMSE	Delay		25'					5'	_		_	*	1

(-) indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.



Exhibit 5-15A

Total (Scenario 2 - Left-in/Right-in/Right-out Access, Full Access at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometrics and Traffic Control

			Level of Service (LOS) per Movement by Approach											I/S	
	Peak		Fs	stbou			estbou			rthbo		_	uthbo	und	LOS &
Intersection	Hour	Metric	7	→	liu V	<u> </u>	÷	K	K	1	7	30ddib0		L L	Delay
mersection	Hour	Lanes->	/-	7	1	-	-	1	1	2	1	1	_	2	Delay
Node 100: STH 55/Crooks Avenue		LOS			C	_	-	В	В	*	*	B		*	
& Ann Street	AM				_			_		*	*			*	
	Alvi	Delay		-	19.7		-	12.8 25'	13.5	*	*	11.0 25'		*	
Two-Way Stop Control		Queue	-	-	65'	⊢—	-	_	30' B	*	*	25 B		*	—
	PM	LOS		-	C		-	B		*	*			*	
	PIVI	Delay		-	16.0		-	12.7	11.0	*	*	10.9		*	
		Queue	_	-	45'	⊢—	-	25'	25'	*	*	25'		*	
		LOS		-	В		-	В	Α			Α		*	
	PMSE	20.00		-	11.9		-	11.8	9.8	*	*	9.8			
		Queue			25'			25'	25'	*	*	25'		*	
		Lanes->	1	2	1	1	2	1		-	1		1	1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*		-	В		-	С	
& Fieldcrest Drive	AM	Delay	13.0	*	*	9.3	*	*		-	12.6		-	16.4	
Two-Way Stop Control		Queue	25'	*	*	25'	*	*		-	25'		-	45'	
		LOS	В	*	*	Α	*	*		-	В		-	В	
	PM	Delay	10.3	*	*	9.9	*	*		-	11.9		-	12.5	
		Queue	25'	*	*	25'	*	*		-	25'		-	25'	
		LOS	В	*	*	В	*	*			В		-	В	
	PMSE		10.1	*	*	10.1	*	*	.		11.7		_	11.8	ı
		Queue	25'	*	*	25'	*	*			25'			25'	i
		Lanes->		2	1	_	3	1		2	1		2	1	
Node 300: STH 55/Crooks Avenue			_	<u>2</u> D	_	_	E	B		<u>2</u>)	D	_	<u>E</u>	E	—
		LOS			В			_			_				
& CTH CE/ College Avenue	AM	Delay	34	1.1	10.1		5.6	13.6		3.3	29.7		5.8	38.5	ı
Roundabout Control		v/c		-	-		75	-		-	-		84	0.84	
		Queue		55'	35'		00'	30'		5'	150'	_	90'	190'	
		LOS)	В		<u> </u>	В			С		D	D	1
	PM	Delay		3.0	11.0	20		10.3		3.2	24.5		1.2	32.7	
		Queue	13	30'	35'	8	0'	25'	10)0'	100'	19	90'	185'	
		LOS		3	Α		3	Α	E	3	В		В	В	
	PMSE	Delay	14	1.5	8.1	12	2.7	7.3	12	2.2	13.2	12	2.8	13.6	ı
		Queue	8	0'	25'	4	5'	25'	6	0'	60'	8	5'	80'	
		Lanes->	-				1	1	-		1	_	1	1	
Node 400: CTH CE/College Avenue		LOS		3	*		4	*			В		-	Ċ	
& Konkapot Trail Road	AM	Delay		0.0	*	_	.5	*	<u> </u>		11.5		-	16.9	
Two-Way Stop Control	7 (14)	Queue		5'	*		5'	*	-		25'	_	_	25'	
TWO-VVAY Stop Control		LOS		<u>A</u>	-		<u></u> A	-	—	-	B	-	-	C	_
	PM			.4			.6	+	-			-		_	
	FIVI	Delay		. 4 5'	-		5'	-	-		11.7			23.8	
		Queue	_		-			-		-	25'		-	105'	—
	D140F	LOS		<u> </u>	-		<u> </u>	-		-	В		-	В	
	PMSE		8.4		-		.7	-		-	10.2			13.4	ı
		Queue	2	5'	-		5'	-		-	25'		-	40'	
		Lanes->	-	1	1	_	1	-	1	-	1		-		
Node 500: CTH CE/College Avenue		LOS	-	*	*		4	-	D	-	Α		-		i
& High School West D/W	AM	Delay	-	*	*		.7	-	31.0	-	9.6		-		ı
One-Way Stop Control		Queue	-	*	*		5'	-	25'	-	25'		-		
		LOS	-	*	*		3	-	F	-	В		-		1
	DM4	Delay	-	*	*	10).1	-	129.1	-	13.9		-		1
	PM	v/c	-	-	-		-	-	1.01	-	-		-		ı
		Queue	-	*	*	2	5'	-	200'	-	25'		-		ı
		LOS	-	*	*	-	Α	-	С	-	В		-		
	PMSE			*	*		.8	-	19.9	-	11.7				1
		Queue	-	*	*		5'	<u> </u>	25'	-	25'				1
	 		1	1	1	1	_	1	1		1	1	1	1	\vdash
Node 600: Lederbauer Dood 9 CTU	\vdash	Lanes->		_	_	_		<u>/</u> В			<u>/</u> В	_	_	_	D
Node 600: Loderbauer Road & CTH	A 8 4	LOS	B	A	A	B			В			B	C	C	В
CE/College Avenue	AM	Delay	19.3	9.5	8.6	12.4		4.0	14.9		3.3	19.8	23.9		15.5
Traffic Signal Control		Queue	40'	75'	25'	95'		90'	105'		20'	40'	135'		
		LOS	В	В	Α	В		В	В		В	С	С	С	В
	PM	Delay	17.8	14.7	9.2	19.5		2.0	16.8		5.3	24.6	26.7		16.5
		Queue	80'	240'	35'	30'		55'	105'		40'	65'	100'	50'	<u> </u>
		LOS	В	В	Α	В		В	В		В	В	В	В	В
	PMSE	Delay	12.7	10.6	7.6	12.2	10	0.1	10.7	10	0.0	14.7	14.6	14.6	11.0
		Queue	40'	140'	25'	25'		20'	35'		0'	40'	45'	40'	
		40000		. 10				_			-		,,,		

Exhibit 5-15A

Total (Scenario 2 - Left-in/Right-in/Right-out Access, Full Access at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometrics and Traffic Control

				Le	evel o	f Service	(LOS) p	er Mo	vemen	t by A	pproa	I/S		
	Peak		Eastbound			West	bound	N	orthbou	ınd	So	outhbound		LOS 8
Intersection	Hour	Metric	7	7 → Y		∠ ← K		K	1	7	И	4	Ľ	Delay
Node 700: STH 55/Crooks Avenue		Lanes->		1			1	-	2			1		\vdash
& Morningside Drive/Proposed		LOS		В			C	_	В			В		С
West Access Drive	AM	Delay		10.3			3.1	+	10.8		 	14.8		15.0
Roundabout Control	/ uvi	Queue	 	25'			70'	+	65'			180'		13.0
Roundabout Control		LOS	 	A			C	+	A		 	C		С
	PM		-	9.0			5.0	_	7.4			23.6		_
	PIVI	Delay												16.7
		Queue		25'			15'	+	35'		<u> </u>	315'		<u> </u>
		LOS		Α			В		Α			В		В
	PMSE	Delay		7.3			2.1		6.6			13.1		10.7
		Queue		25'		8	0'		35'			155'		
		Lanes->		1			-		2	-	-	1	1	
Node 800: STH 55/Crooks Avenue		LOS		C			-		С	-	-	-	-	
& Ridgecrest Lane	AM	Delay		17.0			-	1	18.3	-	-	-	-	l
One-Way Stop Control		Queue		25'			-	1	25'	-	-	-	-	l
		LOS		С			-		Α	-	-	-	-	
	PM	Delay		20.3			-		9.1	-	_	-	-	i
		Queue	 	25'				_	25'	_	-	_	-	l
		LOS	_	C			-	+-	A	_	-	-	-	
	DMCE		 	16.7				+	8.7	-	-			l
	PMSE						-			-	-	-	-	
		Queue		25'			-	_	25'	-	-	-	-	
		Lanes->		1			1		1			1		
Node 900: STH 55/Crooks Road		LOS		Α			A		Α			Α		l
with CTH KK/Calumet Street	AM	Delay		6.4		8	.3		8.5			7.3		l
Roundabout Control		Queue		30'		3	5'		55'			50'		1
		LOS		Α			A		Α			В		
	PM	Delay		8.4		7	.8		7.9			l		
		Queue		45'		3	5'	1	40'			95'		i
		LOS	A				Ā	+	A A			A		
	PMSE	Delay	8.4				.8	+	8.4			7.5		ł
	I WISE	_	55'				5'	+-	40'		60'			ł
	_	Queue	_		-			+			├	_	-	
N I 4000 I I I D I O		Lanes->	2	-	1		-	+	2	-	-	1	1	-
Node 1000: Loderbauer Road &		LOS	Α	-	Α		-	_	Α	-	-	Α	Α	Α
High School North Access D/W	AM	Delay	9.7	-	8.8		-		9.4	-	-	7.2	8.2	8.7
Traffic Signal Control		Queue	35'	-	25'		-		35'	-	-	30'	40'	
		LOS	В	-	Α		-		Α	-	-	Α	Α	Α
	PM	Delay	11.0	-	9.1		-		8.2	-	-	8.9	8.0	9.6
		Queue	55'	-	25'		-		25'	-	-	45'	25'	
		LOS	Α	-	Α		-		Α	-	-	Α	Α	Α
	PMSE	Delay	9.7	-	9.4		-	1	5.7	-	-	6.5	5.5	7.0
		Queue	25'	-	25'		-	1	25'	-	-	30'	25'	
		Lanes->	-20	1	20		_	+	1	-	-		1	
Node 1100: Loderbauer Road &		LOS	\vdash	Ċ			-	+	A	-	-		*	\vdash
High School Middle Access D/W	AM		\vdash	15.5			-	+	7.6	-	-		*	1
	Alvi	Delay	\vdash	25'					25'	-	-		*	1
One-Way Stop Control	—	Queue	\vdash	_			-	+			-	—	*	\vdash
	DA4	LOS	<u> </u>	42.0			-	+	A	-	-		*	
	PM	Delay	<u> </u>	13.2			-		8.0	-	-		*	1
		Queue		25'			-		25'	-	-			
		LOS		Α			-		Α	-	-		*	1
	PMSE	Delay	<u> </u>	9.6			-		7.6	-	-		*	1
	<u> </u>	Queue	L	25'			-		25'	-	-		*	L_
		Lanes->		1			-		1	-	-		1	
Node 1200: Loderbauer Road &		LOS		В			-	1	Α	-	-		*	
New South D/W	AM	Delay		12.6			-	T	7.6	-	-		*	1
One-Way Stop Control	""	Queue	\vdash	25'			-		25'	-	-		*	l
one-way Stop Control		LOS	\vdash	B			-	+	A	-	-		*	\vdash
	DM		\vdash					+					*	1
	PM	Delay	\vdash	11.6			-		8.0	-	-		*	l
	<u> </u>	Queue	Ь—	25'			-	_	25'	-	-			<u> </u>
		LOS	L	Α			-		Α	-	-		*	
	PMSE	Delay	I	9.9			-		7.6	-	-		*	1
	I WICL			25'					25'				*	

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.



Exhibit 5-15B

Total (Scenario 2 - Left-in/Right-in/Right-out Access, No Exit at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometrics and Traffic Control

		With Modified Geometrics and Traffic Control Level of Service (LOS) per Movement by Approach												I/C	
	l	Lev Eastbound						Northbound Southbound						I/S	
Intersection	Peak Hour	Motrio					estbou					_	ithpo		LOS & Delay
intersection	nour	Metric Lanes->	7	→	1	Ľ	+	1	1	2	1	ע 1		∟∠ 2	Delay
Node 100: STH 55/Crooks Avenue		LOS	-		C	_	-	B	B	*	*	В		*	
& Ann Street	AM	Delay			19.7		-	12.8	13.5	*	*	11.0		*	1
Two-Way Stop Control	7 (10)	Queue		_	65'		_	25'	30'	*	*	25'		*	
Two Vvay Grop Control		LOS	-		C			В	В	*	*	В		*	
	PM	Delay		-	16.0		-	12.7	11.0	*	*	10.9		*	1
		Queue		-	45'		-	25'	25'	*	*	25'		*	1
		LOS		-	В		-	В	Α	*	*	Α		*	
	PMSE	Delay		-	11.9		-	11.8	9.8	*	*	9.8		*	1
		Queue		-	25'		-	25'	25'	*	*	25'		*	
		Lanes->	1	2	1	1	2	1			1	1		1	
Node 200: CTH CE/College Avenue		LOS	В	*	*	Α	*	*		-	В			С	
& Fieldcrest Drive	AM	Delay	13.0	*	*	9.3	*	*		-	12.6			16.4	
Two-Way Stop Control		Queue	25'	*	*	25'	*	*		-	25'			45'	
		LOS	В	*	*	Α	*	*			В			В	
	PM	Delay	10.3	*	*	9.9	*	*		-	11.9			12.5	
		Queue	25'	*	*	25'	*	*	-		25'			25'	
	DMOE	LOS	B	*	*	В	*	*			В			В	
	PMSE	Delay	10.1	*	*	10.1	*	*			11.7	<u> </u>		11.8	
		Queue	25'			25'				2	25'	2		25'	
Node 300: STH 55/Crooks Avenue		Lanes->	_	2	1	_	3	1 B	_	<u>'</u>)	1	E		1	
& CTH CE/ College Avenue		LOS		.1	B 10.1		6.6	13.6		1.3	D 29.7	36		38.5	
Roundabout Control	AM	Delay v/c		-	10.1		75	13.0		-	29.1	0.0		0.84	
Roundabout Control		Queue		55'	35'		00'	30'		5'	150'	19		190'	
		LOS)	В		-	В		;	C	<u> </u>		D	
	РМ	Delay		3.0	11.0).1	10.3		.2	24.5	31		32.7	
		Queue		30'	35'		0'	25'		00'	100'	19		185'	
		LOS		3	A	_	3	A		3	В	E		В	
	PMSE	Delay		.5	8.1		2.7	7.3		.2	13.2	12		13.6	1
		Queue	8	0'	25'	4	5'	25'	6	0'	60'	8	5'	80'	1
		Lanes->	1	1	1		1	1			1	1		1	
Node 400: CTH CE/College Avenue		LOS		3	*		4	*		-	В			С	
& Konkapot Trail Road	AM	Delay	10	0.0	*	9	.5	*		-	11.5			16.9	1
Two-Way Stop Control		Queue	2	5'	*	2	5'	*		-	25'			25'	
		LOS		4	-		4	-		-	В			С	
	PM	Delay		.4	-		.6	-		-	11.7			23.8	
		Queue	_	5'	-	_	5'	-			25'	<u> </u>		105'	
		LOS		<u> </u>	-		<u> </u>	-			В			В	
	PMSE	Delay		.4	-		.7	-		-	10.2			13.4	
		Queue	2	5'	-	_	5'	-			25'	<u> </u>		40'	
Nede FOO: CTH CE/C-II A	<u> </u>	Lanes->	-	1 *	1 *		1	-	1	-	1	-	-		
Node 500: CTH CE/College Avenue & High School West D/W	AM	LOS	-	*	*	_	<u>4</u> .7	-	D 31.0	-	9.6	-			l
	AIVI	Delay	-	*	*		. <i>1</i> 5'	-	25'	-	25'		-		l
One-Way Stop Control		LOS	-	*	*		3	-	-	-	-	\vdash	-		
	PM	Delay	-	*	*).0	-	-	-	-				
		Queue	-	*	*		5'	-	-	-	-		-		
		LOS	-	*	*	_	4	-	С	-	В		-		
	PMSE		-	*	*		.8	-	19.9	-	11.7		-		
		Queue	-	*	*		5'	-	25'	-	25'		-		
		Lanes->	1	1	1	1		1	1		1	1	1	1	
Node 600: Loderbauer Road & CTH		LOS	В	Α	Α	В		В	В		В	С	С	С	В
CE/College Avenue	AM	Delay	18.9	9.3	8.5	12.2		1.3	16.3	14	1.6	21.2	25.7	22.7	15.9
Traffic Signal Control		Queue	40'	80'	25'	100'		10'	125'	14	10'	45'	160'		
		LOS	С	В	В	С		В	С		В	С	D	С	С
	PM	Delay	25.0	19.2	_	25.5		5.6	20.7		7.2	32.9	35.8	_	21.1
		Queue	110'	300'	45'	40'		05'	210'		30'	85'	135'	60'	
	D1 100	LOS	В	В	Α	В		A	В		В	В	В	В	В
	PMSE		12.4	_	_	12.0		.8	11.3		0.6	15.3	15.3	_	10.9
		Queue	40'	140'	25'	25'	12	20'	35'	5	0'	40'	45'	40'	

Exhibit 5-15B

Total (Scenario 2 - Left-in/Right-in/Right-out Access, No Exit at HS West D/W) Traffic Peak Hour Operating Conditions

With Modified Geometrics and Traffic Control

						s and Traffi f Service (l			emen	t by A	рргоа	I/S		
	Peak		Eastbound			Westbo			rthbo		So	LOS 8		
Intersection		Metric	7	→	N V	∠ ←	K	K	1	7	N K	<u> </u>	L K	Delay
Node 700: STH 55/Crooks Avenue		Lanes->		1	_	1		_	2		_	1	_	
& Morningside Drive/Proposed		LOS		В		Ċ			В			В		С
West Access Drive	AM	Delay	_	10.3		23.1	1		10.8			14.8		15.0
Roundabout Control	7 44	Queue	-	25'		170		-	65'		-	180'		13.0
Roundabout Control		LOS	_	A		C		_	A		_	C		С
	РМ	Delay	-	9.0		15.0	1	 	7.4		 	23.6		16.7
	FIVI	_		25'		115			35'			315'		10.7
	<u> </u>	Queue		A		B		-	A		-	В		_
	DMCE	LOS	_			_	4	-			-			B
	PMSE			7.3		12.1			6.6			13.1		10.7
		Queue		25'		80'		<u> </u>	35'			155'		
		Lanes->		1		-			2	-	-	1	1	
Node 800: STH 55/Crooks Avenue	1	LOS		С		-			C	-	-	-	-	1
& Ridgecrest Lane	AM	Delay		17.0		-			3.3	-	-	-	-	l
One-Way Stop Control		Queue		25'		-		2	25'	-	-	-	-	
		LOS		С		-		-	A	-	-	-	-	
	PM	Delay		20.3		-		9	.1	-	-	-	-	1
	1	Queue		25'		-		2	25'	-	-	-	-	1
		LOS		С		-			Д	-	-	-	-	
	PMSE			16.7		-			.7	١.	-	<u> </u>	-	1
		Queue		25'		-			25'	-	-	-		l
	 	Lanes->	_	1		1		_	1			1		
Node 900: STH 55/Crooks Road	—	LOS	 	A		A		 	Ä		 	Á		
with CTH KK/Calumet Street	AM		-	6.4		8.3		\vdash	8.5		\vdash	7.3		ł
	Aivi	Delay	-	30'		35'		-	55'		-	50'		l
Roundabout Control	<u> </u>	Queue	_											
	L	LOS		Α_		A 7.0			A			B		1
	PM	Delay		8.4		7.8			7.9			10.3		l
		Queue		45'		35'			40'			95'		
	1	LOS		Α		Α			Α			Α		l
	PMSE	Delay		8.4		6.8			8.4			7.5		1
		Queue		55'		25'			40'			60'		
		Lanes->	2	-	1	-		- 2	2	-	-	1	1	
Node 1000: Loderbauer Road &		LOS	В	-	Α	-			A	-	-	Α	Α	Α
High School North Access D/W	AM	Delay	10.6	-	9.7	-		9	.0	-	-	6.9	7.7	8.7
Traffic Signal Control		Queue	35'	-	25'	-			5'	-	-	30'	40'	· · · ·
Traine Signal Control		LOS	В	-	A	-			B	-	-	В	В	В
	РМ	Delay	10.8	_	7.6	_			1.5	١.	-	12.5	11.2	11.0
	1	Queue	75'	_	25'	_			10'	-	-	60'	35'	11.0
	—	LOS	A	-	A	-		_	A	-	-	A	A	Α
	PMSE				9.4	-			.7	_	_	_		
	PIVISE	Delay	9.7	-		<u> </u>				-	-	6.5	5.5	7.0
		Queue	25'	-	25'	-		_	25'	-	-	30'	25'	
	<u> </u>	Lanes->		1		-			1	-	-		7 *	
Node 1100: Loderbauer Road &		LOS		С		-			Α	-	-			
High School Middle Access D/W	AM	Delay		15.5		-			.6	-	-		*	1
One-Way Stop Control		Queue		25'		-		2	5'	-	-		*	
	1	LOS		В		-			A	-	-		*	l
	PM	Delay		13.2		-		8	.0	-	-		*	l
	1	Queue		25'		-		2	25'	-	-		*	l
		LOS		Α		-			A	-	-		*	
	PMSE			9.6		-			.6	-	-		*	1
	1	Queue	 	25'		-			25'	-			*	l
	+			1		-		_	1	_	-		1	
	\vdash	Lanes->	\vdash	B						-	-		*	\vdash
Jodo 1200: Lodorbours- Daniel P	AM	LOS				-		_	A	-	-		*	l
	43.13/1	Delay		12.6		-			.6	-	-		*	l
New South D/W	Aivi			25'		-		_	25'	-	-			
New South D/W	AIVI	Queue	_									1	*	I
New South D/W		LOS		В		-			Α	-	-			
New South D/W	PM			B 11.6		-			A .0	-	-		*	
New South D/W		LOS		В				8		+	-		*	
Node 1200: Loderbauer Road & New South D/W One-Way Stop Control		LOS Delay Queue		B 11.6		-		8	.0	-	-			
New South D/W		LOS Delay Queue LOS		B 11.6 25'		-		8 2	.0 !5'	-	-		*	

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.



Exhibit 5-16A
STH 55/Crooks Avenue & Morningside Drive/Proposed West Access Drive
Full Build Traffic Peak Hour Operating Conditions Comparison Table

			Level of Service (LOS) per Movement by Approach												I/S
	Peak		East	tbound		We	estbou	ınd	No	rthbou	ınd	Soi	LOS &		
Intersection	Hour	Metric	7	→	ĸ	٧	+	K	K	1	7	ĸ	+	Ľ	Delay
Node 700: STH 55/Crooks Avenue		Lanes->		1			1		1						
& Morningside Drive/Proposed		LOS		Α		B 13.1				С			В		
West Access Drive	AM	Delay		8.2						22.2		10.2			14.9
Roundabout Control		Queue		25'			75'			215'			105'		
		LOS		Α			Α			Α			В		Α
	PM	Delay		6.3			6.9			8.3			10.4		9.1
		Queue		25'			25'			65'			115'		
		LOS		Α			Α			Α			Α		
	PMSE	Delay		5.2		5.6		7.3			7.4			7.1	
		Queue		25'			25'			55'			65'		
Node 700: STH 55/Crooks Avenue		Lanes->				1	1	1	1	1	1	1	1	1	
& Morningside Drive/Proposed		LOS		F				С	Α	*	*	В	-	-	
West Access Drive	AM	Delay		71.6			6.3	19.3	8.1	*	*	11.2	-	-	1
Two-Way Stop Control	/ uvi	v/c		0.45			95	-	-	*	*	-	-	-]
		Queue		50'		22		75'	25'	*	*	40'	-	-	
		LOS		F				В	Α	*	*	Α	-	-]
	РМ	Delay		73.9		53		12.9	9.0	*	*	8.9	-	-]
	1 101	v/c	_	0.54			38	-	-	*	*	-	-	-]
		Queue		65'		_	0'	25'	25'	*	*	25'	-	-	
		LOS		E		D		В	Α	A *	*	Α	-	-	
	PMSE	Delay		38.4		30	1.9	12.0	8.6	*	*	8.6	-	-]
	INIOL	v/c		0.32			-	-	-	-	-	-	-	-]
		Queue		35'		2	5'	25'	25'	*	*	25'	-	-	

(-) indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.

Exhibit 5-16B

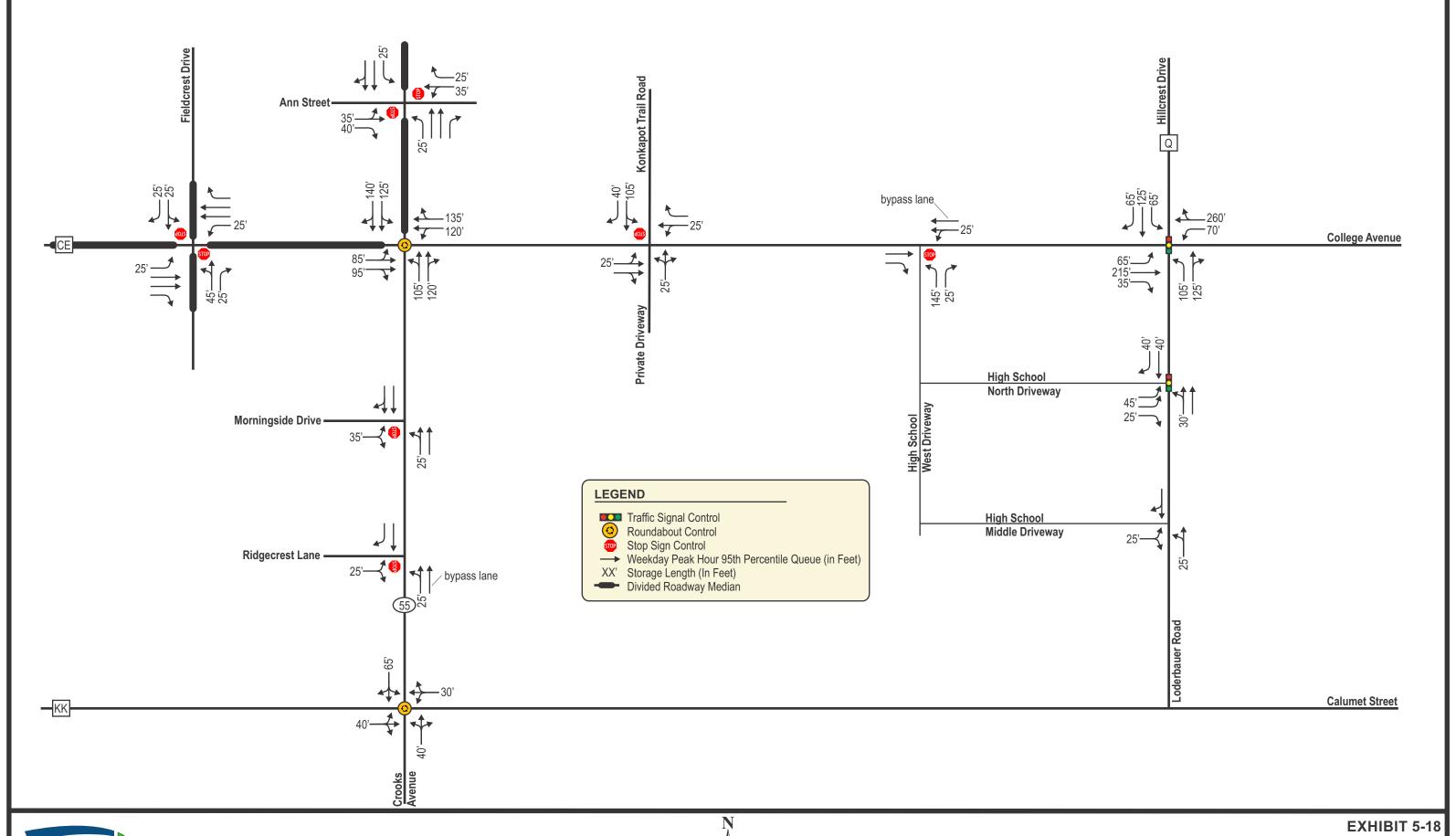
Total (Scenario 2 - Left-in/Right-in/Right-out Access) Traffic Peak Hour Operating Conditions

Total Traffic Peak Hour Operating Conditions Comparison Table

			Level of Service (LOS) per Movement by Approach												I/S
	Peak		Ea	astbou	ınd	N	/estbou	ınd	No	rthbou	ınd	Sou	uthbou	ınd	LOS &
Intersection	Hour	Metric	7	→	ĸ	Ľ	+	K	K	1	7	Ŋ	4	Ľ	Delay
Node 700: STH 55/Crooks Avenue		Lanes->		1			1			2			1		
& Morningside Drive/Proposed		LOS		В			С			В			В		С
West Access Drive	AM	Delay		10.3			23.1			10.8			14.8		15.0
Roundabout Control		Queue		25'			170'			65'			180'		
		LOS		Α			С			Α			С		С
	PM	Delay		9.0			15.0			7.4			23.6		16.7
		Queue		25'			115'			35'			315' B		
		LOS PMSE Delay		Α			В			Α			В		
	PMSE			7.3			12.1		6.6			13.1 155'			10.7
		Queue		25'			80'			35'					
Node 700: STH 55/Crooks Avenue		Lanes->		1			1	1	1	1	1	1	1	1	
& Morningside Drive/Proposed		LOS		F			F	D	Α	*	*	В	-	-	
West Access Drive	AM	Delay	14844.0				05.0	29.1	8.1	*	*	13.8	-	-	
Two-Way Stop Control	7 (14)	v/c		30.67	'	_	2.55	-	-	*	*	-	-	-	
		Queue		515'		4	40'	150'	25'	*	*	80'	-	-	
		LOS		F			F	С	Α	*	*	В	-	-	1
	РМ	Delay		1465.0	0		97.0	20.1	9.0	*	*	10.6	-	-	1
	PIVI	v/c		3.31			.02	-	-	*	*	-	-	-	1
		Queue		205'		4	10'	105'	25'	* *		40'	-	-	
		LOS		F			F	С	Α	*	*	В	-	-	
	PMSE	Delay		620.0			46.0	17.5	8.6	*	*	10.2	-	-	
	INISE	v/c		1.74		2	.27	-	-	-	-	-	-	-	
		Queue		160'			3'	75'	25'	*	*	35'	-	-	

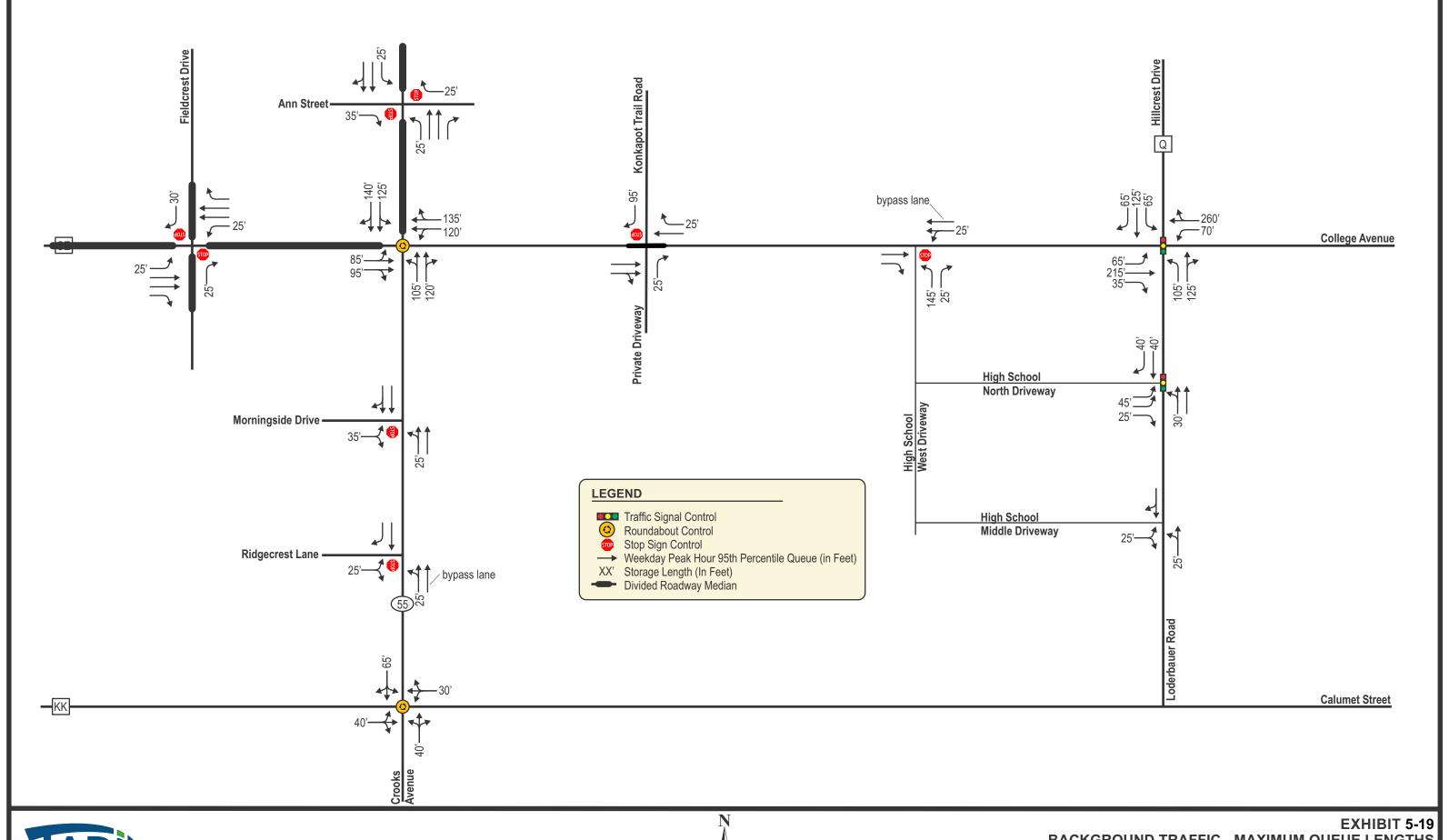
(-) indicates a movement that is prohibited or does not exist; (*) indicates a freeflow movement.

Delay is reported in seconds. Queue is the maximum of the 50th & 95th percentile queue, measured in feet.



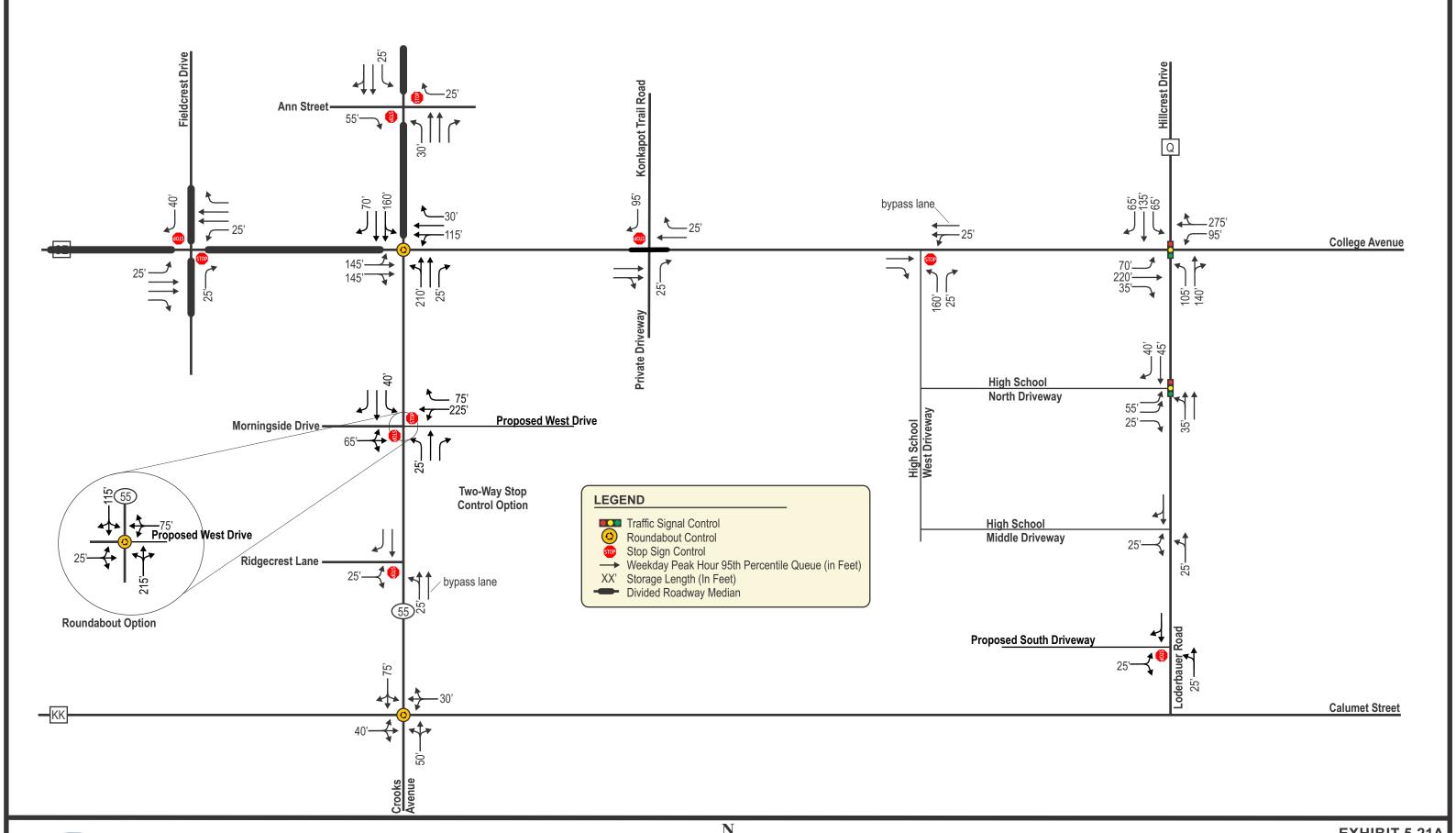






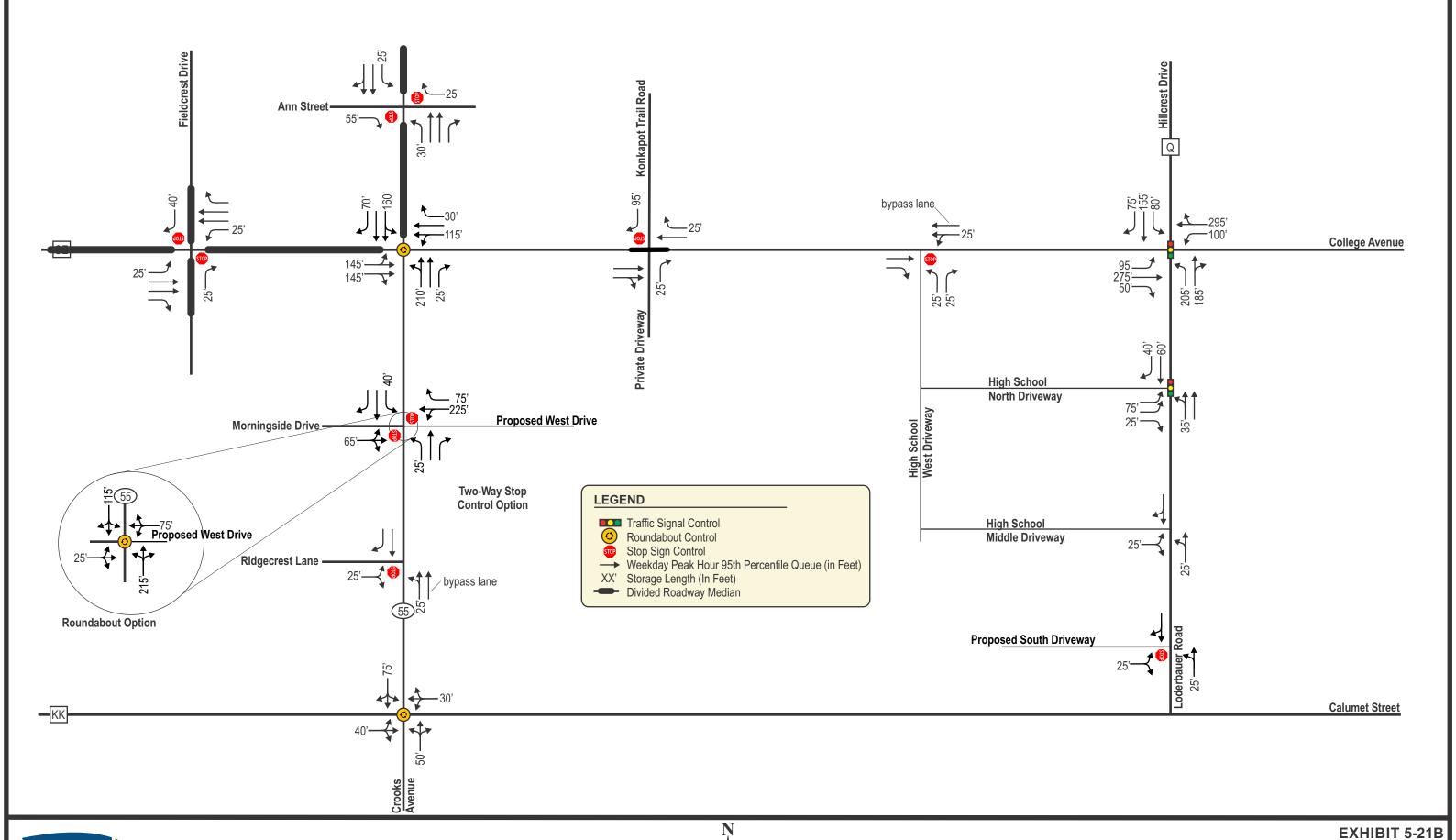






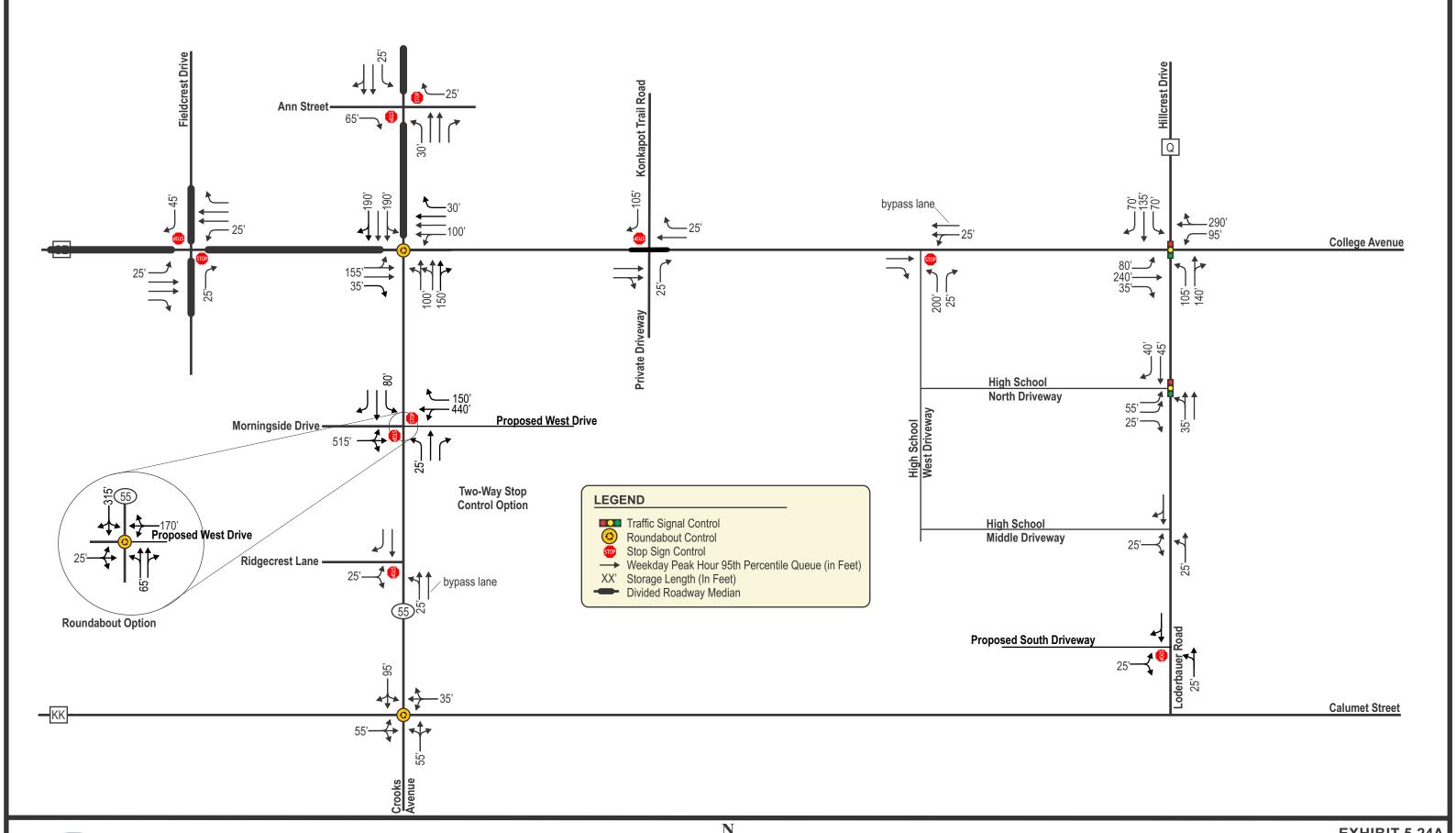


FULL BUILD TRAFFIC - MAXIMUM QUEUE LENGTHS
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, FULL ACCESS AT HIGH SCHOOL WEST D/W)
KAUKAUNA, WISCONSIN



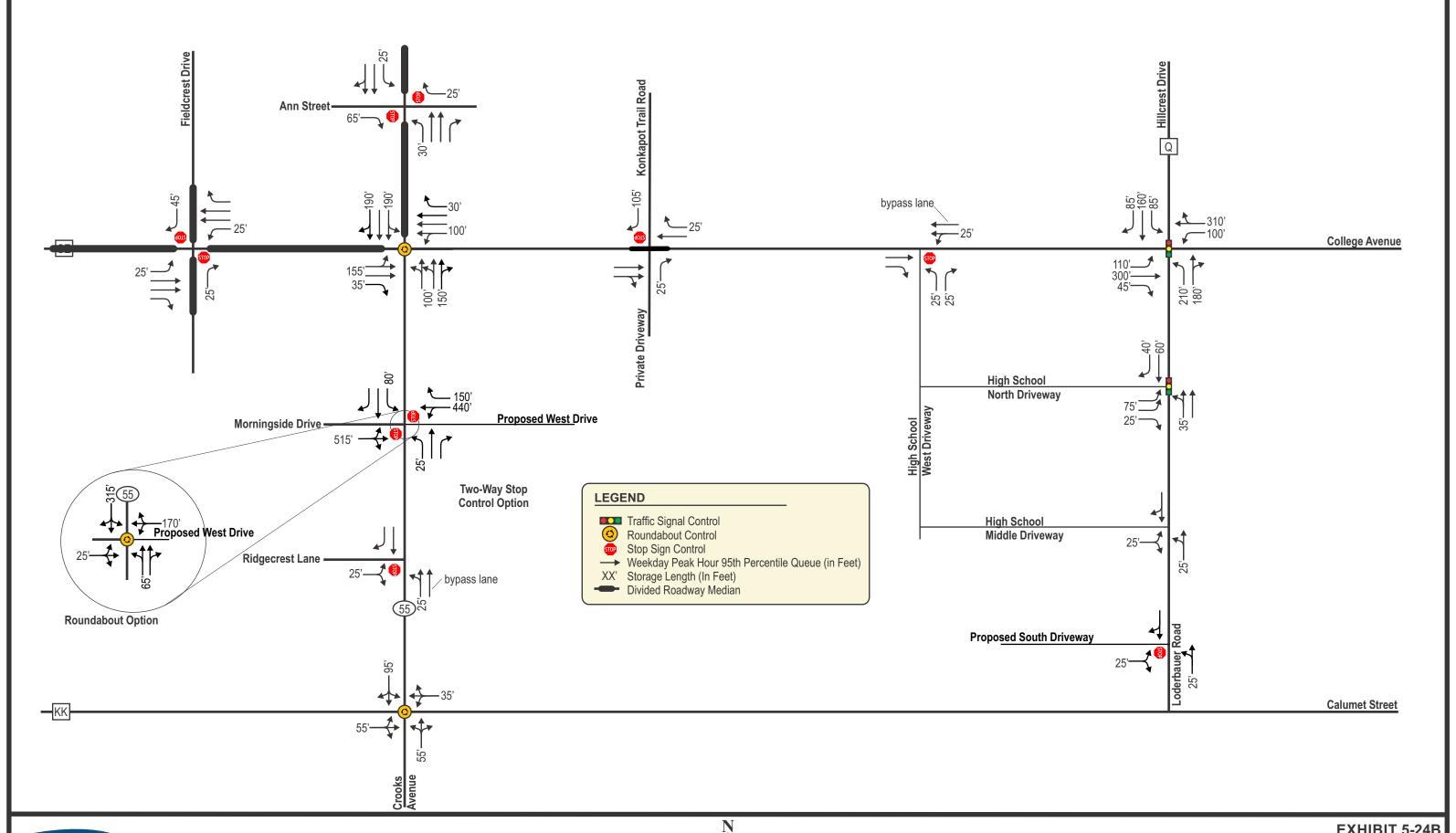


FULL BUILD TRAFFIC - MAXIMUM QUEUE LENGTHS
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, NO EXIT AT HIGH SCHOOL WEST D/W)
KAUKAUNA, WISCONSIN





TOTAL TRAFFIC - MAXIMUM QUEUE LENGTHS
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, FULL ACCESS AT HIGH SCHOOL WEST D/W)
KAUKAUNA, WISCONSIN





TOTAL TRAFFIC - MAXIMUM QUEUE LENGTHS
WITH MODIFICATIONS (LEFT-IN/RIGHT-IN/RIGHT-OUT ACCESS
AT FIELDCREST DRIVE, ANN STREET & KONKAPOT TRAIL, NO EXIT AT HIGH SCHOOL WEST D/W)
KAUKAUNA, WISCONSIN

CHAPTER VI – RECOMMENDATIONS AND CONCLUSION

PART A – RECOMMENDATIONS

The study area intersections were analyzed based on the procedures set forth in the *Highway Capacity Manual* (HCM) 7th *Edition*. Intersection operation is defined by "level of service." Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A,' to very poor, represented by LOS 'F.' For the purpose of this study, LOS D or better was used to define acceptable peak hour operating conditions.

Modifications to address traffic impacts are shown in Exhibit 1-3 for the following traffic volume scenarios:

- ""Background Traffic" These modifications are expected to be necessary to accommodate the Existing/Background traffic volumes.
- "Full Build Traffic" These modifications are expected to be necessary to accommodate the Full Build traffic volumes which includes full build out of the proposed Middle School but does not include the identified off-site development areas.
- "Total Traffic" These modifications are expected to be necessary to accommodate the Total traffic volumes which includes full build out of the proposed Middle School as well as the identified off-site development areas.

The analysis was conducted using existing intersection geometrics and traffic control and the existing traffic signal timings. The following modifications, as shown in Exhibit 1-3, are recommended to accommodate the Existing/Background, Full Build, and Total traffic volumes, respectively. *Modifications are for jurisdictional consideration and are not legally binding.* WisDOT, Outagamie County and the City of Kaukauna reserve the right to determine alternative solutions.

Node 100: STH 55/Crooks Avenue with Ann Street

- Background Traffic:
 - o Reconstruct the median to restrict through and left-turn exiting movements from the east and west approaches, thereby allowing left-in/right-in/right-out access at this intersection. The restricted movements would either divert to other intersections or make a right-turn movement and then traverse the adjacent roundabout to continue to their ultimate destination.
 - o Maintain stop control on the east and west approaches.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 200: CTH CE/College Avenue with Fieldcrest Drive

- Background Traffic:
 - o Reconstruct the median to restrict through and left-turn exiting movements from the north and south approaches, thereby allowing left-in/right-in/right-out access at this intersection. The restricted movements would either divert to other intersections or make a right-turn movement and then traverse the adjacent roundabout to continue to their ultimate destination.

- o Maintain stop control on the north and south approaches.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 300: STH 55/Crooks Avenue with CTH CE/College Avenue

- Background Traffic: No modifications.
- Full Build Traffic.
 - Consider roundabout modification to provide a right-turn bypass lane on the north, south and east approaches.
- Total Traffic:
 - O Depending on the build out plans for the off-site development area, consider reconstructing the roundabout to provide a multi-lane roundabout with three lane approaches on the north and south approaches, a two-lane approach with a bypass lane on the west approach and a three-lane approach with a bypass lane on the east approach. A future traffic study should be completed for this intersection as development plans move forward in the future to determine the optimal modifications for this intersection.

<u>Node 400: CTH CE/College Avenue with Konkapot Trail Road/Forefront Dermatology</u> <u>Access Driveway</u>

- Background Traffic:
 - Oconstruct a raised median through the limits of the intersection to allow only right-in/right-out access at this intersection. The restricted movements would either divert to other intersections or make a right-turn movement and then traverse the adjacent intersection to continue to their ultimate destination.
 - o Maintain stop control on the north and south approaches.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 500: CTH CE/College Avenue with High School West Driveway

- Background Traffic:
 - Consider restricting all exiting northbound movements at this intersection during the weekday afternoon peak period (see discussion below).
 Diverted traffic would be expected to utilize the signalized intersections at Loderbauer Road.
- Full Build Traffic: No additional modifications.
- *Total Traffic:* No additional modifications.

Node 600: Loderbauer Road with CTH CE/College Avenue

- *Background Traffic:* No modifications.
- Full Build Traffic:

- o Consider updating traffic signal timings to provide optimized operations.
- Total Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.

Node 700: STH 55/Crooks Avenue with Morningside Drive/Proposed West Access Drive

- Background Traffic: No modifications.
- Full Build Traffic. Two modification options are recommended for consideration (see discussion below):
 - Option 1 Two-way stop control.
 - No modifications recommended on the west approach.
 - Provide a shared through /left-turn lane and a dedicated right-turn lane on the east approach.
 - Provide a dedicated left-turn lane, a through lane and right-turn taper on the north and south approaches (two lanes plus taper on each approach).
 - Depending on the location of the pedestrian tunnel under STH 55, consider providing pedestrian crosswalk pavement markings along all approaches of the intersection.
 - Option 2 Construct a single lane roundabout with single entrance lanes on all approaches.
- *Total Traffic:* Two modification options are recommended for consideration (see discussion below):
 - Option 1 Two-way stop control.
 - No modifications recommended on the west approach.
 - Provide a shared through /left-turn lane and a dedicated right-turn lane on the east approach.
 - Provide a dedicated left-turn lane, a through lane and right-turn taper on the north and south approaches (two lanes plus taper on each approach).
 - Depending on the location of the pedestrian tunnel under STH 55, consider providing pedestrian crosswalk pavement markings along all approaches of the intersection
 - Option 2 Modify roundabout to provide an additional northbound lane (two lanes) on the south approach with two northbound lanes through the roundabout. All other approaches to remain as single lane approaches.
 - Even though not needed from an operations perspective, consideration could be given to providing two southbound lanes through the roundabout to match the existing two southbound lanes along STH 55 to the north.

Node 800: STH 55/Crooks Avenue with Ridgecrest Lane

- Background Traffic: No modifications.
- Full Build Traffic: No modifications.
- *Total Traffic:* No modifications.

Node 900: STH 55/Crooks Avenue with CTH KK/Calumet Street

- Background Traffic: No modifications.
- Full Build Traffic: No modifications.
- *Total Traffic:* No modifications.

Node 1000: Loderbauer Road with High School North Driveway

- Background Traffic: No modifications.
- Full Build Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.
- Total Traffic:
 - o Consider updating traffic signal timings to provide optimized operations.

Node 1100: Loderbauer Road with High School Middle Driveway

- Background Traffic: No modifications.
- Full Build Traffic: No modifications.
- *Total Traffic:* No modifications.

Node 1200: Loderbauer Road with Proposed South Access Driveway

- Background Traffic: No modifications.
- Full Build Traffic:
 - Construct a full access driveway with stop sign control on the west approach.
- *Total Traffic:* No additional modifications.

Higher delays (LOS F) are expected for several movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) even with the recommended geometry listed above under two-way stop control and under Full Build traffic volume conditions. Specifically, higher delays (LOS F) are expected during the weekday morning and afternoon peak periods and LOS E during the special event peak hour for all eastbound movements and the westbound through/left-turn movements at the intersection. However, as with most school sites, higher delays are only expected during about a 20 to 30 minute "surge" during the morning arrival and afternoon dismissal peak periods which can be considered typical for a school location. In addition, to alleviate some of the higher delays and queueing expected for the westbound through and left turn movements exiting the school during the typical weekday, exploration of an internal site connection to Speedway Lane to the south is expected to provide for another access alternative for vehicles to/from the south of the proposed school.

In addition, very high delays (LOS F/gridlock conditions) and very long queues are expected for several movements at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700), under Total traffic volume conditions, even with the recommended geometry listed above under two-way stop control. To provide for safe overall operations as well as realistic queue lengths under the off-site build-out assumptions, a higher level of traffic control should be considered under Total traffic volume conditions as future development moves forward.

A traffic signal warrant analysis was completed for the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive (node 700) under Full Build and Total traffic volume conditions. Based on the warrant analysis, neither Warrant 1 (8-Hour) nor Warrant 2 (4-Hour) are expected to be met at the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive under Full Build traffic conditions. Specifically, only 1 hour of the required 8 hours under Warrant 1 (8-Hour) and only 1 hour of the required 4 hours under Warrant 2 (4-Hour) are expected to be met. In addition, even though close to being met under the Total traffic volume condition, Warrant 1 (8-Hour) and Warrant 2 (4-Hour) are also not expected to be met under the Total traffic volume condition. Specifically, only 7 hours of the required 8 hours under Warrant 1 (8-Hour) and only 3 hours of the required 4 hours under Warrant 2 (4-Hour) are met. Therefore, unless the build out assumptions for the off-site development are more intense than assumed in this study, traffic signal control should not be considered at this intersection under the Build (with proposed school only) traffic volume conditions nor with Total (with proposed school plus off-site) traffic volume conditions.

Per the WisDOT Facilities Development Manual (FDM), if an intersection warrants traffic signal control, a modern roundabout should also be evaluated. As stated above, traffic signals are not expected to be warranted, even under the Total traffic volume conditions which includes full build out of both the on-site and off-site assumptions used in this study. However, since higher delays are expected under the Total traffic volume condition under two-way stop control, and to provide for acceptable delays and queues and overall safe operations, roundabout control was also considered at the proposed intersection under Total traffic volume conditions. Based on the ICE analysis, roundabout control provides the only viable option under the Total traffic conditions to provide for acceptable delays with reasonable queuing and is therefore recommended for the Crooks Avenue/STH 55 intersection with Morningside Drive/Proposed West Access Drive. Under the Build (with proposed school only) traffic volume conditions, two-way stop control with lane modifications is recommended at the intersection.

Higher delays (LOS E/F) are expected for several movements at the STH 55/Crooks Avenue intersection with CTH CE/College Avenue (node 300) under the current dual lane roundabout controlled intersection under Full Build and Total traffic volume conditions. The recommended bypass lane additions under the Full Build traffic volume conditions and the recommended reconstruction to a 3-lane roundabout with bypass lanes under the Total traffic volume conditions are expected to provide acceptable operation for most movements; however, higher delays (LOS E) are still expected for some movements during the typical weekday morning peak period noting that the delays are only slightly higher that acceptable (about 6 seconds) and the reported queueing is expected to be reasonable (all less than 225 feet). Without the bypass lanes recommended under the Full Build traffic conditions, higher delays (about 60 seconds) are expected for several movements during the weekday morning peak school peak hour with maximum queues of about 400 feet (16 vehicles) or less. As with many schools, the morning peak period "surge" last about 20 to 30 minutes. However, acceptable delays are expected during all other hours of the typical weekday, including the typical school afternoon school discharge and weekday evening commuter peak hours. Since development plans for the off-site

development area are unknown at this time and the build out assumptions were used for planning purposes only and with this study showing the need for a three lane roundabout at the STH 55/Crooks Avenue intersection with CTH CE/College Avenue, which is not typically acceptable by WisDOT, a future traffic study should be completed in the future as development plans move forward for the off-site area.

Higher delays (LOS F) are also expected at the College Avenue/CTH CE intersection with the High School West Driveway (node 500) under Existing, Full Build and Total traffic conditions during the typical weekday afternoon peak period. Since the higher delays are only currently being experienced during the typical weekday afternoon peak and are expected to increase during this evening peak period, restricting these movements during this weekday afternoon peak period, with diverted traffic utilizing the signalized intersection at Loderbauer Road, would allow this and all adjacent study area intersections to operate acceptably under all peak periods. Restrictions could include signage, gating and/or the use of temporary cones placed daily by school staff to restrict exiting traffic during the weekday afternoon discharge peak period. A separate analysis was completed for this scenario (with restricted/diverted traffic) that shows that the existing traffic signals at the College Avenue/CTH CE intersection with Loderbauer Road and the existing traffic signals at the

Loderbauer Road intersection with the High School North Driveway are expected to operate acceptably with acceptable delays and queueing during the typical weekday afternoon peak period even with the diverted traffic from the High School West Driveway.

Even though the existing traffic signal timings at the College Avenue/CTH CE intersection with Loderbauer Road and the existing traffic signals at the Loderbauer Road intersection with the High School North Driveway are expected to provide acceptable operations and queueing under both Full Build and Total traffic volume conditions, optimized traffic signal timings and offsets were implemented as part of the analysis as provided in the outputs provided in the appendix of this report.

PART B - CONCLUSION

To accommodate the full build out of the proposed middle school, recommended modifications are expected to be necessary to the transportation network. Except as noted, all movements at the study area intersections are expected to operate safely and efficiently with the modifications identified in this TIA with the proposed middle school site and identified off-site development areas. Since development plans for the off-site development area are unknown at this time and the build-out assumptions were used for planning purposes only, a future traffic study should be completed in the future as development plans move forward for the off-site area.