TRAFFIC IMPACT ANALYSIS

REPORT FOR:

CONTINENTAL 665 FUND LLC
SUMMIT FIELDS

MEADOWBROOK ROAD & SUMMIT AVENUE
WAUKESHA, WISCONSIN

PREPARED BY:

V3 Companies
7325 Janes Avenue
Woodridge, Illinois 60517

V3 Project No. 211270

June 23, 2022

TRAFFIC IMPACT ANALYSIS

REPORT FOR:

SUMMIT FIELDS DEVELOPMENT

Date Submitted: June 23, 2022

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"I certify that this Traffic Impact Analysis has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering."

_____

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V3 Companies

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CHAPTER 1 – INTRODUCTION AND EXECUTIVE SUMMARY

PART A – PURPOSE OF REPORT AND STUDY OBJECTIVES

V3 Companies has been retained by Continental 665 Fund LLC to conduct a traffic impact analysis for a proposed multifamily residential development with 320 dwelling units and a proposed single-family development of approximately 60 dwelling units located on undeveloped land in the northeast quadrant of the Meadowbrook Road and Summit Avenue intersection in Waukesha, Wisconsin. It is worth noting that the proposed single-family development will be sold and developed by others. The site is bounded by Summit Avenue to the south, residential and retail developments to the west, and residential development to the north and east.

The purpose of this report is to evaluate the potential traffic impacts of the proposed residential development on existing traffic patterns in the area in addition to site circulation. This report includes a description of existing conditions, data collection, capacity analysis, evaluation of data, and conclusions.

PART B – EXECUTIVE SUMMARY

The proposed development consists of a multi-family residential development with 320 dwelling and a proposed single-family development of approximately 60 dwelling units located in the northeast quadrant of the Meadowbrook Road and Summit Avenue intersection in Waukesha, Wisconsin. The site is bounded by Summit Avenue to the south, residential and retail developments to the west, and residential development to the north and east.

The multifamily portion of the proposed development consists of sixteen separate two-story multifamily buildings totaling 320 dwelling units. The dwelling unit sizes vary from studio units up to 3-bedroom units. Residential amenities on site include a club house with a pool, fitness center, and a parcel room. The site includes 595 total surface parking spaces, of which approximately 180 are covered. The single-family development will provide approximately 60 dwelling units. The site plan is included in ***Exhibit 1-1.*** It should be noted that the proposed site plan shows a potential commercial outlot along Summit Avenue, however that development has not been included in this study.

The multifamily portion of the site will be accessed via a proposed full access driveway on Summit Avenue that aligns with the Sports Complex Driveway. A second full access driveway is proposed approximately 1,240 feet east of the Sports Complex Driveway that will provide access to the single-family home development. The single-family home development will also connect to existing residential streets at Windsor Place to the east and Winterberry Drive to the north as these roadways have been planned for connection.

It is anticipated that the multifamily residential development will be constructed in a single phase and the development fully constructed prior to any units being occupied with a completion date in

2024. For the purposes of this study, it is also assumed that the single-family home development will be constructed in one phase and completed in 2024.

Based on the WisDOT methodology, if a site generates less than 500 vehicle trips during a peak hour, the build scenario analysis consists of the projected site trips added to the existing traffic volumes. In this case, the proposed development is anticipated to generate substantially less than 500 peak hour vehicle trips. Additionally, residential land uses are already common in the area, so the generated traffic will be similar in nature to the existing traffic patterns. Therefore, project trips will be added directly to the existing traffic volumes to determine the build scenario traffic volumes.

The study area consists of the following intersections:

- Meadowbrook Road & Summit Avenue (Signalized)
- Summit Avenue & Proposed Driveway aligned with Sports Complex Driveway (stop control on minor approach)
- Summit Avenue & Proposed Driveway (stop control on minor approach)
- Summit Avenue & Maple Way (stop control on minor approach)

Project traffic is estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*, using the land use category for Multi-Family Low-Rise Housing. The *Trip Generation Manual, 10th Edition* assigns trip generation estimates based on a regression equation for each peak period and an independent variable. In this case, dwelling units is the applicable variable for multi-family housing. The am and pm peak hour trip generation equations are selected for weekday, peak hour of adjacent street traffic for one hour from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm. The trip generation table for the proposed residential development is included in ***Exhibit 4-1***.

The distribution of multi-family housing trips is based on the location of schools, employment centers, and commercial/retail areas. The largest portions of trips are distributed to Summit Avenue to the east and Meadowbrook Road to the north, since these areas have the highest development density and most direct access to the regional highway system and the City of Waukesha. The least amount of traffic is distributed to Meadowbrook Road to the south since this area tends to be more rural and less likely to be an origin or destination for trips related to the proposed residential development.

Site related trips are assigned to the proposed site driveway. The site is configured with the Sports Complex Driveway as the primary access point to the multifamily site and the new driveway to the east the primary access point for the single-family home development. The assignment of project traffic volume is illustrated in ***Exhibit 4-2***.

The project trips are added to the existing traffic volumes to obtain the build scenario traffic volumes, which are illustrated in ***Exhibit 4-3***.

Both driveways are proposed to provide a two-lane cross-section, one inbound land and one outbound lane, with no auxiliary turn lanes, which is supported by the findings of a turn lane warrant analysis. Several warranting criteria are defined for left and right turn movements. It is found that no right turn or left turn warrants are met at the intersection of Summit Avenue & Sports Complex Driveway/Proposed Driveway 1 and at Summit Avenue & Proposed Driveway 2.

Due to the speed limit of eastbound Summit Avenue approaching Sports Complex Driveway/ Proposed Driveway 1 of 45 mph, it is not considered a low-speed roadway and the minimum left turn peak hour volume warrant of 20 vehicles per hour does not apply. Therefore, an eastbound left turn lane is not recommended at this location. There are no left turn lanes provided on Summit Avenue at any other intersections or driveways and would be out of character for this corridor for a left turn lane to be installed at this location. Additionally, the delays for the eastbound left turns operate at LOS A with 7.9 seconds per vehicle and 8.4 seconds of delay per vehicle during the weekday am and weekday pm peak hours, respectively.

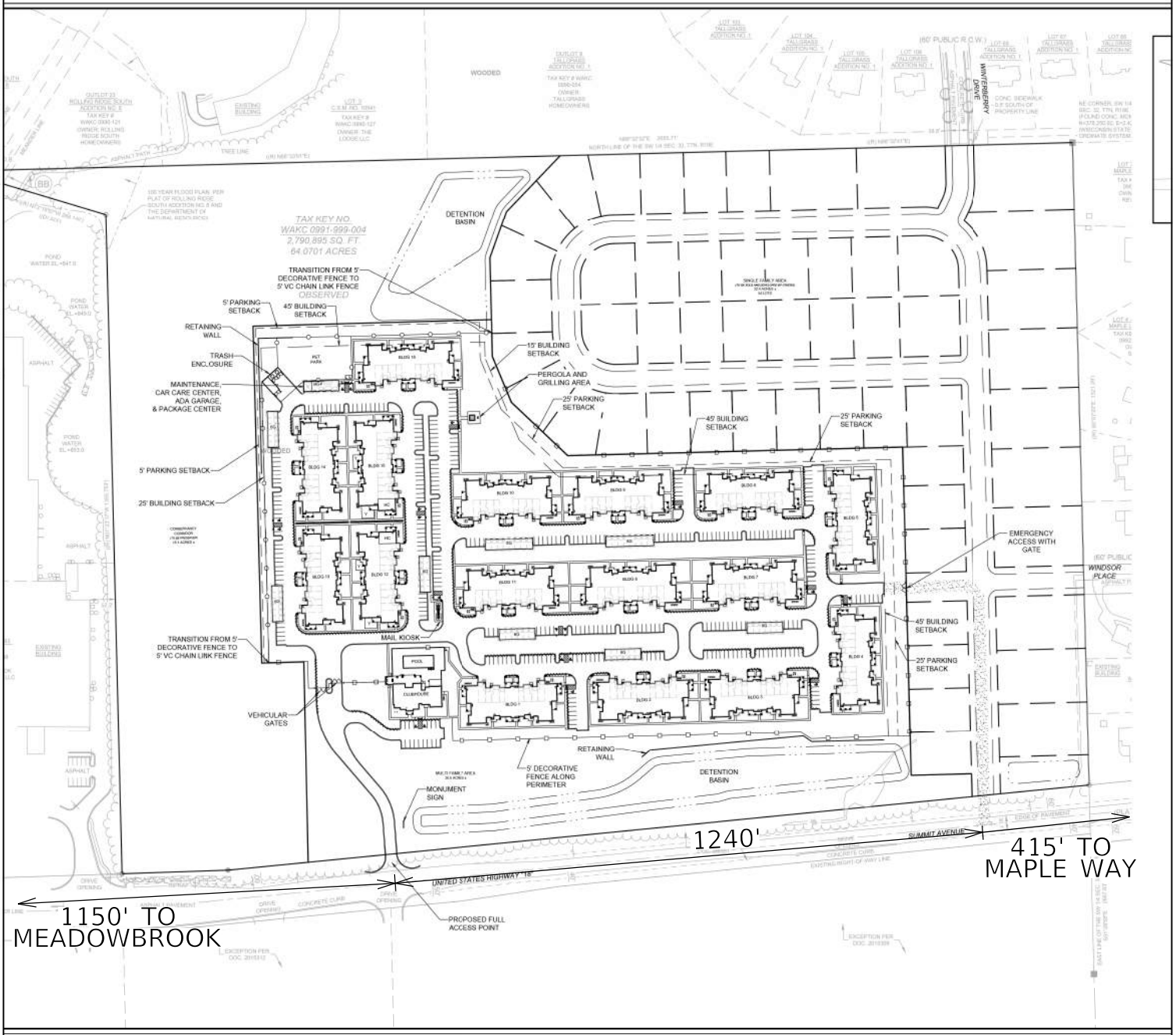
Capacity analysis is performed with HCS7 (Version 7.9), a macrosimulation tool based on methodologies found in the Highway Capacity Manual. Models are created for the weekday am and weekday pm peak hours for the existing and build conditions. In all scenarios, all traffic movements at the study intersections are projected to operate at LOS C or better during both the weekday am and weekday pm peak hours. Analysis results for the existing and build traffic volumes at the study area intersections are summarized in ***Exhibit 3-3*** and ***Exhibit 5-1***, respectively.

The queue storage lengths of the dedicated turn lanes at the intersection of Meadowbrook Road & Summit Avenue are sufficient to accommodate all projected maximum queue lengths. The projected 95th percentile queue lengths at the site driveways are not anticipated to exceed one vehicle during the weekday am and weekday pm peak hours in the build scenario. Projected queue lengths for the existing and build traffic volumes at the study area intersections are summarized in ***Exhibit 5-2*** and ***Exhibit 5-3***, respectively.

Sidewalk currently exists along the north side of Summit Avenue from Meadowbrook Road to the retail driveway and along the south side of Summit Avenue from Meadowbrook Road to Sports Complex Driveway.

Both of the site driveways are proposed with a two-lane cross-section with no dedicated turning lanes on Summit Avenue. Based on the analysis of the build conditions, no mitigation is required at the proposed driveways or the signalized intersection of Meadowbrook Road and Summit Avenue. The recommended lane configuration is illustrated in ***Exhibit 1-2***.

Modifications are for jurisdictional consideration and are not legally binding. The City of Waukesha reserves the right to determine alternative solutions.

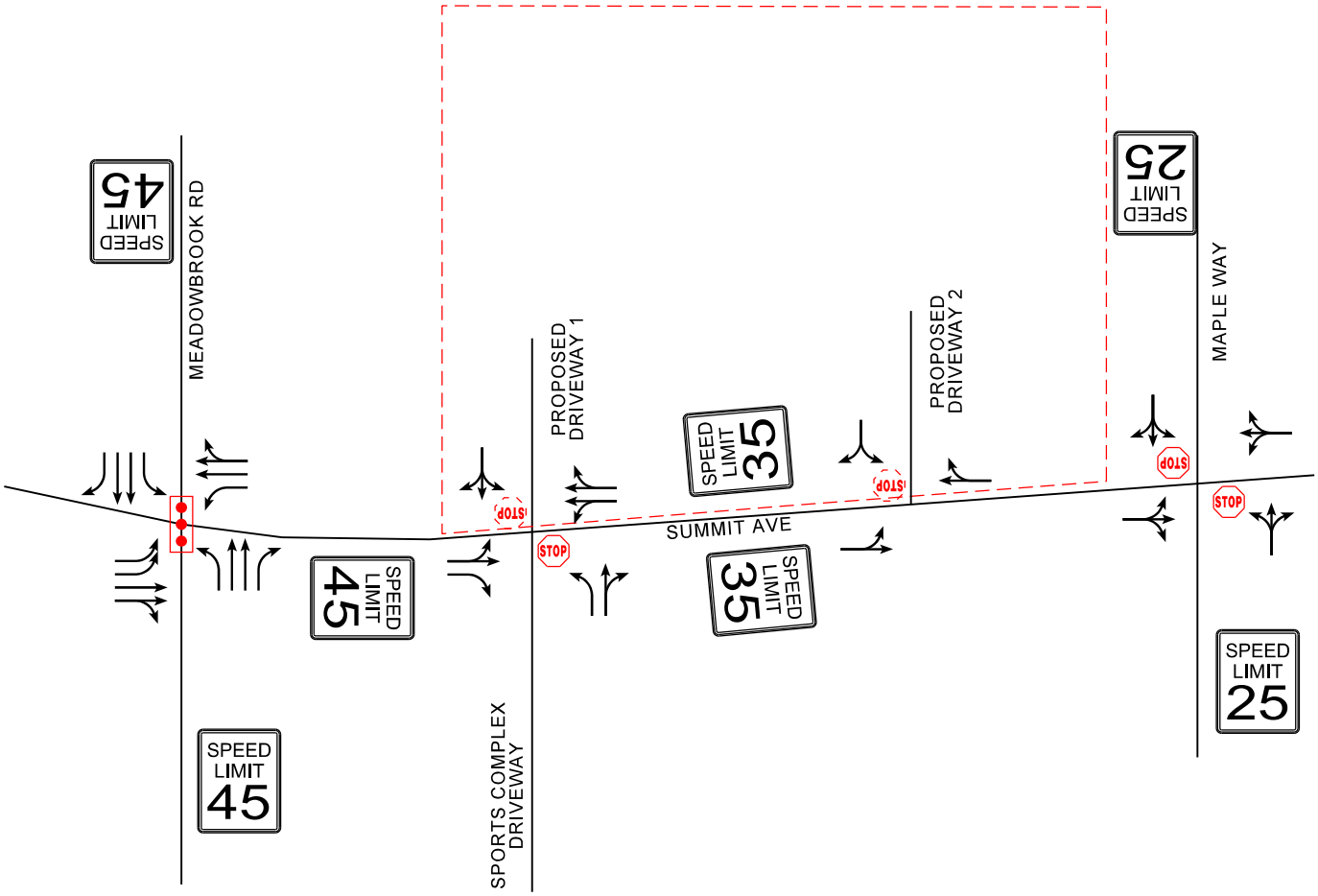


NOT TO SCALE

SUMMIT FIELDS

EXHIBIT 1–1
SITE PLAN

WAUKESHA WISCONSIN



LEGEND

- EXISTING TRAFFIC SIGNAL
- EXISTING STOP SIGN
- PROPOSED STOP SIGN

SUMMIT FIELDS

EXHIBIT 1–2
2022 BUILD TRAFFIC RECOMMENDED IMPROVEMENTS

WAUKESHA WISCONSIN

CHAPTER 2 – PROPOSED DEVELOPMENT

PART A – ON-SITE DEVELOPMENT

A1. Development Description and Site Location

The proposed development consists of a multi-family residential development with 320 dwelling units and a single-family home development with approximately 60 dwelling units located in the northeast quadrant of the Meadowbrook Road and Summit Avenue in Waukesha, Wisconsin. The site is bounded by Summit Avenue to the south, residential and retail developments to the west, and residential development to the north and east. The location of the proposed development is shown on ***Exhibit 2-1***.

A2. Land Use and Intensity

The proposed site is currently an undeveloped parcel of land in the northeast quadrant of Meadowbrook Road and Summit Avenue. The site currently consists of agriculture land, residential neighborhoods to the north and east, retail to the west, and Waukesha Youth Sports Complex to the south.

A3. Site Plan

The conceptual site plan is provided in **Exhibit 2-2.** The development is located on a parcel totaling 63-acres. The finished development will consist of approximately 26.6-acres of multi-family area, 22.4-acres for a future single-family neighborhood, 15.1-acres of conservancy corridor, and the remaining area for detention.

The multifamily portion of the proposed development consists of sixteen separate two-story multifamily buildings totaling 320 dwelling units. The dwelling unit sizes vary from studio units up to 3-bedroom units. Residential amenities on site include a club house with a pool, fitness center, and a parcel room. The site includes 595 total surface parking spaces, of which approximately 180 are covered. The single-family development will provide approximately 60 dwelling units. It should be noted that the proposed site plan shows a potential commercial outlot along Summit Avenue, however that development has not been included in this study.

The multifamily portion of the site will be accessed via a proposed full access driveway on Summit Avenue that aligns with the Sports Complex Driveway. A second full access driveway is proposed approximately 1,240 feet east of the Sports Complex Driveway that will provide access to the single-family home development. The single-family home development will also connect to existing residential streets at Windsor Place to the east and Winterberry Drive to the north as these roadways have been planned for connection.

A4. Development Phasing and Timing

It is anticipated that the multifamily residential development will be constructed in a single phase and the development fully constructed prior to any units being occupied with a completion date in 2024. For the purposes of this study, it is also assumed that the single-family home development will be constructed in one phase and completed in 2024.

PART B – STUDY AREA

B1. Influence Area

Since the proposed development is residential in nature, trips are likely to consist of both local and regional trips to office, retail/service providers, recreational centers, and schools. Trips are likely to be concentrated on the areas north and east of the site since these directions tend to have local trip generators and access to the regional highway system and the City of Waukesha. Fewer trips are anticipated to and from the west and south as these areas are less developed compared to the other directions.

B2. Area of Significant Traffic Impact

The study area for the proposed development includes the following existing intersections:

- Meadowbrook Road & Summit Avenue (Signalized)
- Summit Avenue & Sports Complex Driveway (stop control on minor approach)
- Summit Avenue & Maple Way (stop control on minor approach)

The study area also includes the following proposed access points

- Summit Avenue & Proposed Driveway aligned with Sports Complex Driveway (stop control on minor approach)
- Summit Avenue & Proposed Driveway 2 (stop control on minor approach)

PART C – OFF-SITE LAND USE AND DEVELOPMENT

There are no known off-site land use developments that are likely to impact traffic conditions in the study area.

PART D – SITE ACCESSIBILITY

D1. Study Area Roadways

The characteristics of the roadways in the vicinity of the site are presented below.

Meadowbrook Road is a four-lane, north-south roadway that is classified as a major collector under Waukesha County jurisdiction. The posted speed limit is 45 miles per hour. Meadowbrook Road typically consists of a four-lane cross-section with a raised landscaped median except

where it widens at intersections to provide left and right turn lanes. Additionally, the cross-section of Meadowbrook Road consists of a shoulder, a sidewalk on the west side, and a multi-use path on the east side of the roadway. According to WisDOT, the average annual daily traffic (AADT) volumes on Meadowbrook were approximately 11,200 vehicles per day south of Summit Avenue and 15,300 vehicles per day north of Summit Avenue in 2015.

Summit Avenue is an east-west roadway that is classified as a minor arterial that is under Waukesha County jurisdiction. The posted speed limit is 45 miles per hour from Meadowbrook Road to Sports Complex Driveway and 35 miles per hour east of Sports Complex Driveway. Summit Avenue typically consists of a two-lane cross-section except where it widens at Meadowbrook Road to provide additional lanes for left and right turn movements. To the east of Meadowbrook Road, the cross section of Summit Avenue consists of one left-turn lane, one through lane and one shared through/right turn lane while the west side of Summit Avenue consist of two left-turn lanes, one through lane and one shared through/right turn lane. Partial sidewalk is provided at the intersection of Meadowbrook Road and Summit Avenue. According to WisDOT, AADT volumes on Summit Avenue were approximately 7,600 vehicles per day west of Meadowbrook Road and 6,000 vehicles per day east of Meadowbrook Road in 2015.

Sports Complex Driveway is a two-lane, north-south roadway that is classified as a local roadway under City of Waukesha jurisdiction. Sports Complex Driveway is assumed to have a 15-mph speed limit in both directions.

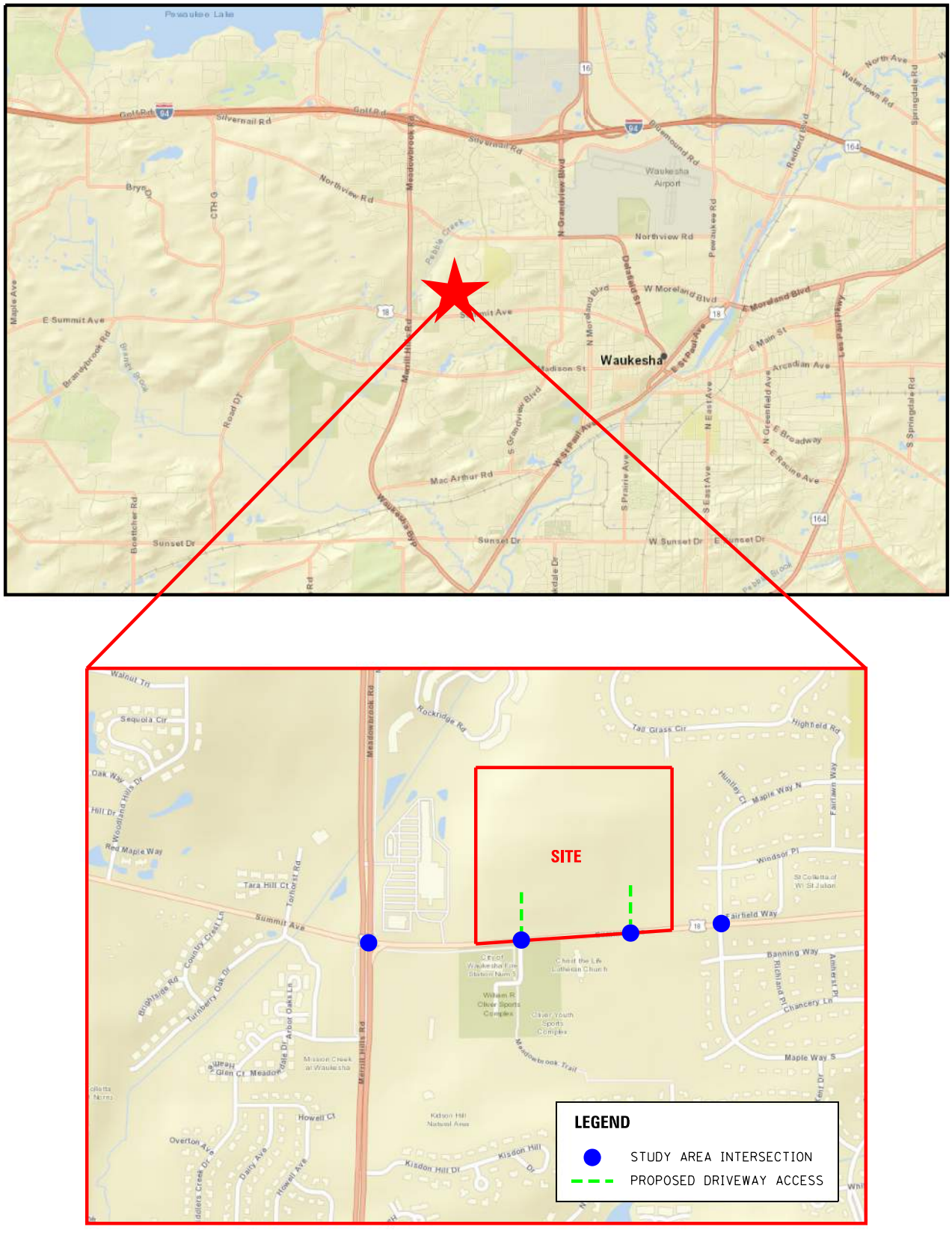
Maple Way is a two-lane, north-south roadway that is classified as a local roadway under City of Waukesha jurisdiction. Maple Way is posted with a 25-mph speed limit in both directions.

D2. Alternative Modes of Transportation

Sidewalks or multi-use paths are present at multiple locations throughout the study area, summarized below:

- Meadowbrook Road – North and south of Summit Avenue
  - Continuous sidewalk on west side of the street
  - Continuous multi-use path on east side of the street.
- Summit Avenue – East of Meadowbrook Road
  - Sidewalk on the north side of the street to retail driveway
  - Sidewalk on the south side of the street to Sports Complex Driveway

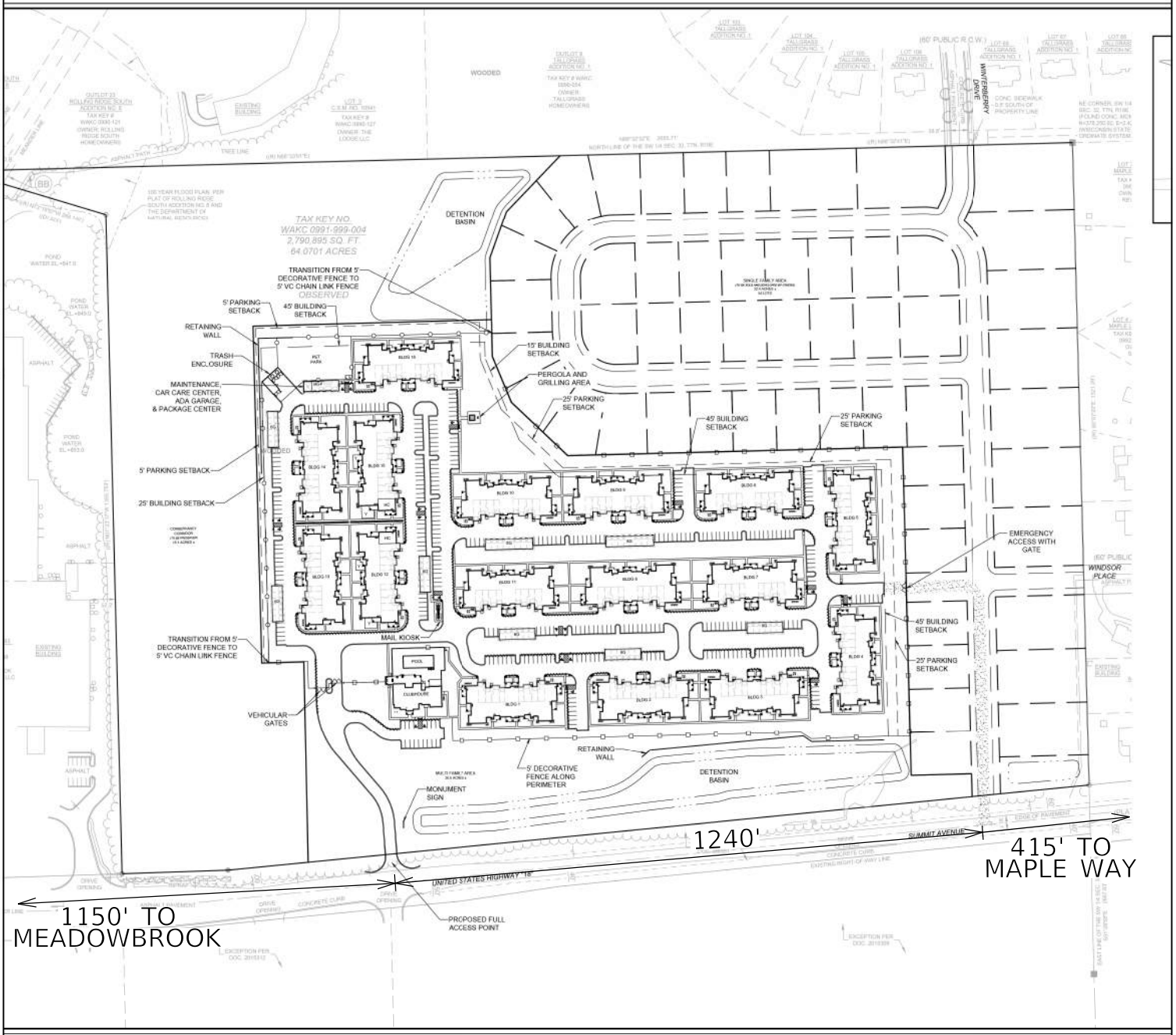
It is also worth noting that a Park and Ride lot is provided at the I-94 interchange on Meadowbrook Road to the north. It is possible that residents at the proposed development will use this lot for commuter traveling. However, no multi-modal adjustment will be made the to the projections since a personal vehicle trip will likely still be needed to travel to the Park and Ride lot.



SUMMIT FIELDS

EXHIBIT 2–1
LOCATION MAP

WAUKESHA WISCONSIN



NOT TO SCALE

SUMMIT FIELDS

EXHIBIT 2–2
SITE PLAN

WAUKESHA WISCONSIN

CHAPTER 3 – ANALYSIS OF EXISTING CONDITIONS

PART A – PHYSICAL CHARACTERISTICS

The existing intersection lane configurations, intersection traffic controls, posted speed limits, and intersection spacing is illustrated in ***Exhibit 3-1.***

PART B – TRAFFIC VOLUMES

To assist in the evaluation of the traffic impact on the roadway system resulting from the proposed development, existing vehicular volumes were collected in the study area.

Existing traffic counts were collected on Tuesday, March 8th, 2022 at the intersections of Meadowbrook Road & Summit Avenue, Summit Avenue & Sports Complex Driveway, and Summit Avenue & Maple Way (west). Peak hour traffic counts were collected from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm. The time periods of the traffic counts were selected to coincide with the typical peak demand hours of minor arterials and major collectors similar to the adjacent roadways and the typical peak generating hours of residential developments. The weekday am and weekday pm peak hours occur between 7:30 am to 8:30 am and 4:00 pm to 5:00 pm, respectively. A summary of the traffic volumes collected in fifteen-minute increments is provided in ***Appendix A.***

It is worth noting that the ongoing COVID-19 pandemic is likely impacting traffic patterns in the area due to school and business restrictions and changes in office employee procedures. Therefore, an adjustment may be needed to account for the potential traffic reductions at the time of the count. This adjustment factor is calculated by comparing the estimated present day AADT volumes to historical AADT volumes. The present day AADT volume is estimated by applying an assumed K-factor to the roadway segment volumes observed in the peak hour traffic counts. The K-Factor represents the portion of total daily traffic that occurs during the peak hour, which typically ranges from 8 percent to 12 percent. In this case, the K-Factor is assumed to be 0.10, which is typical for arterials and collectors on commuter routes.

The estimated present day AADT volumes are compared to historical AADT volumes that are available through the WisDOT database. It is found that the estimated present day AADTs are significantly higher than the historical AADTs. Therefore, a Covid factor has not been applied to the existing traffic counts.

A summary of historical AADT volumes and supporting calculations for the COVID-19 adjustment factor are included as ***Appendix B.*** The existing peak hour volumes for the intersections with the COVID-19 adjustment factor are illustrated in ***Exhibit 3-2***.

PART C – CAPACITY LEVEL OF SERVICE

The operation of a facility is evaluated based on level of service (LOS) calculations obtained by analytical methods defined in the Transportation Research Board's Highway Capacity Manual (HCM), 2010 Edition. The concept of LOS is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

There are six LOS letter designations, from A to F, with LOS A representing the best operating conditions and LOS F the worst.

The LOS of an intersection is based on the average control delay per vehicle. For a signalized intersection, the delay is calculated for each lane group and then aggregated for each approach and for the intersection as a whole. Generally, the LOS is reported for the intersection as a whole. For an unsignalized intersection, the delay is only calculated and reported for each minor movement. An overall intersection LOS is not calculated.

There are different LOS criteria for signalized and unsignalized intersections primarily due to driver perceptions of transportation facilities. The perception is that a signalized intersection is expected to carry higher traffic volumes and experience a greater average delay than an unsignalized intersection. The LOS criteria for signalized and unsignalized intersections are as follows:

Level of Service	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	≤ 10	≤ 10.0
B	> 10.0 and ≤ 20.0	> 10.0 and ≤ 15.0
C	> 20.0 and ≤ 35.0	> 15.0 and ≤ 25.0
D	> 35.0 and ≤ 55.0	> 25.0 and ≤ 35.0
E	> 55.0 and ≤ 80.0	> 35.0 and ≤ 50.0
F	> 80.0	> 50.0

Source: Transportation Research Board, *Highway Capacity Manual 2010*, National Research Council, 2010.

Capacity analysis is performed with HCS7 (Version 7.9), a macrosimulation tool based on methodologies found in the Highway Capacity Manual. Models are created for the weekday am and weekday pm peak hours for the existing conditions. Analysis result for the existing traffic volumes at the study area intersections are summarized in ***Exhibit 3-2***. Supporting HCS analysis worksheets for the existing conditions are provided in ***Appendix C***.

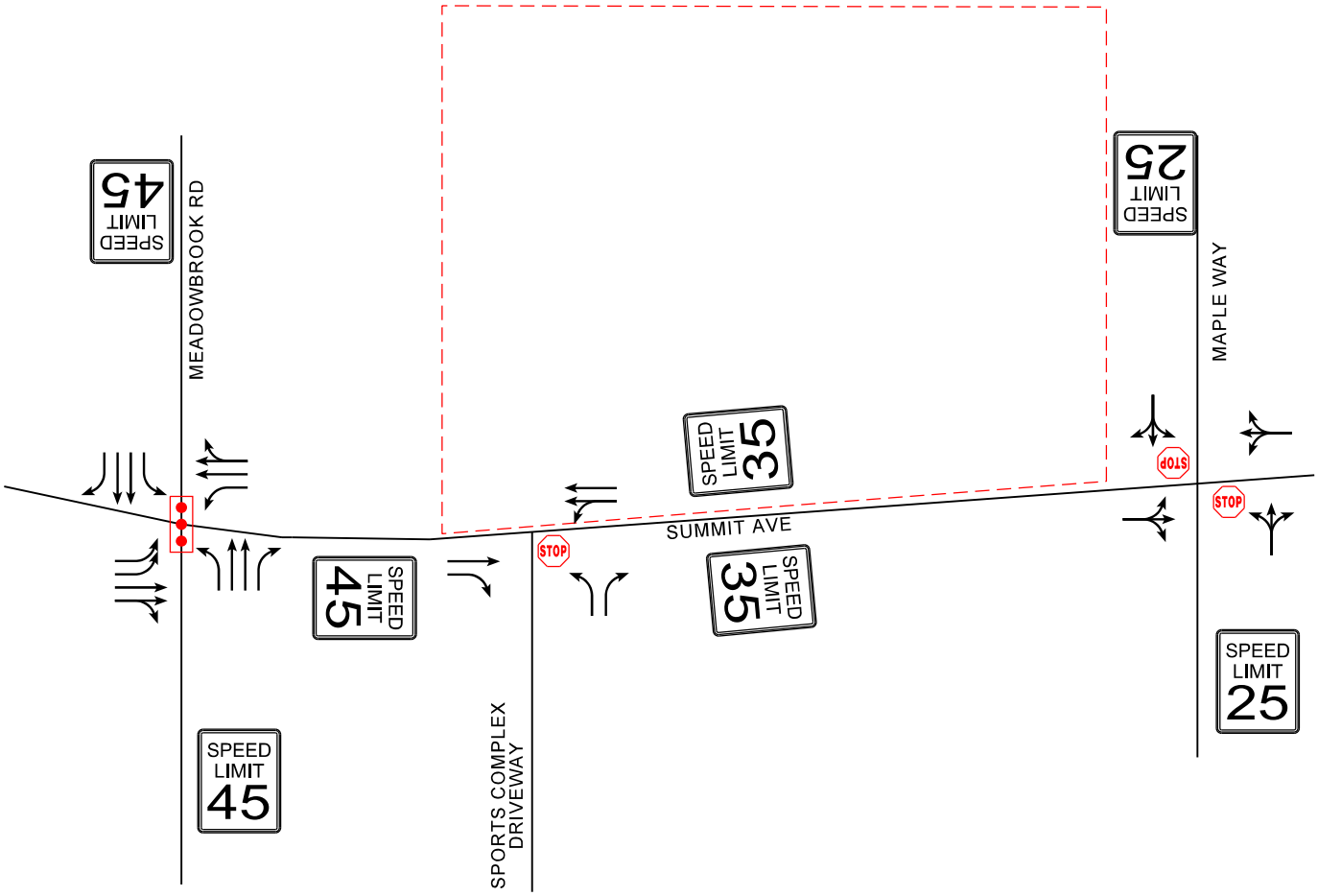
The intersection of Meadowbrook Road and Summit Avenue experiences low delays for the signalized approaches of the intersection. The eastbound and westbound approach in the existing conditions operate at LOS D while the northbound and southbound approach operate at LOS B for both the weekday am and weekday pm time periods. The overall existing intersection level of service is at LOS B and LOS C for the weekday am and weekday pm, respectively. All movements and intersections in the Sports Complex Driveway & Summit Avenue and Maple Way & Summit

Avenue are found to operate at LOS B or better during both the weekday am and weekday pm time periods. There are no observed capacity issues in the existing condition.

PART D. SOURCES OF DATA

The sources of traffic data used in this report are summarized below:

- Turning movement traffic counts – Quality Counts
- Historical AADT – Wisconsin Department of Transportation



LEGEND

- EXISTING TRAFFIC SIGNAL

STOP - EXISTING STOP SIGN

SUMMIT FIELDS

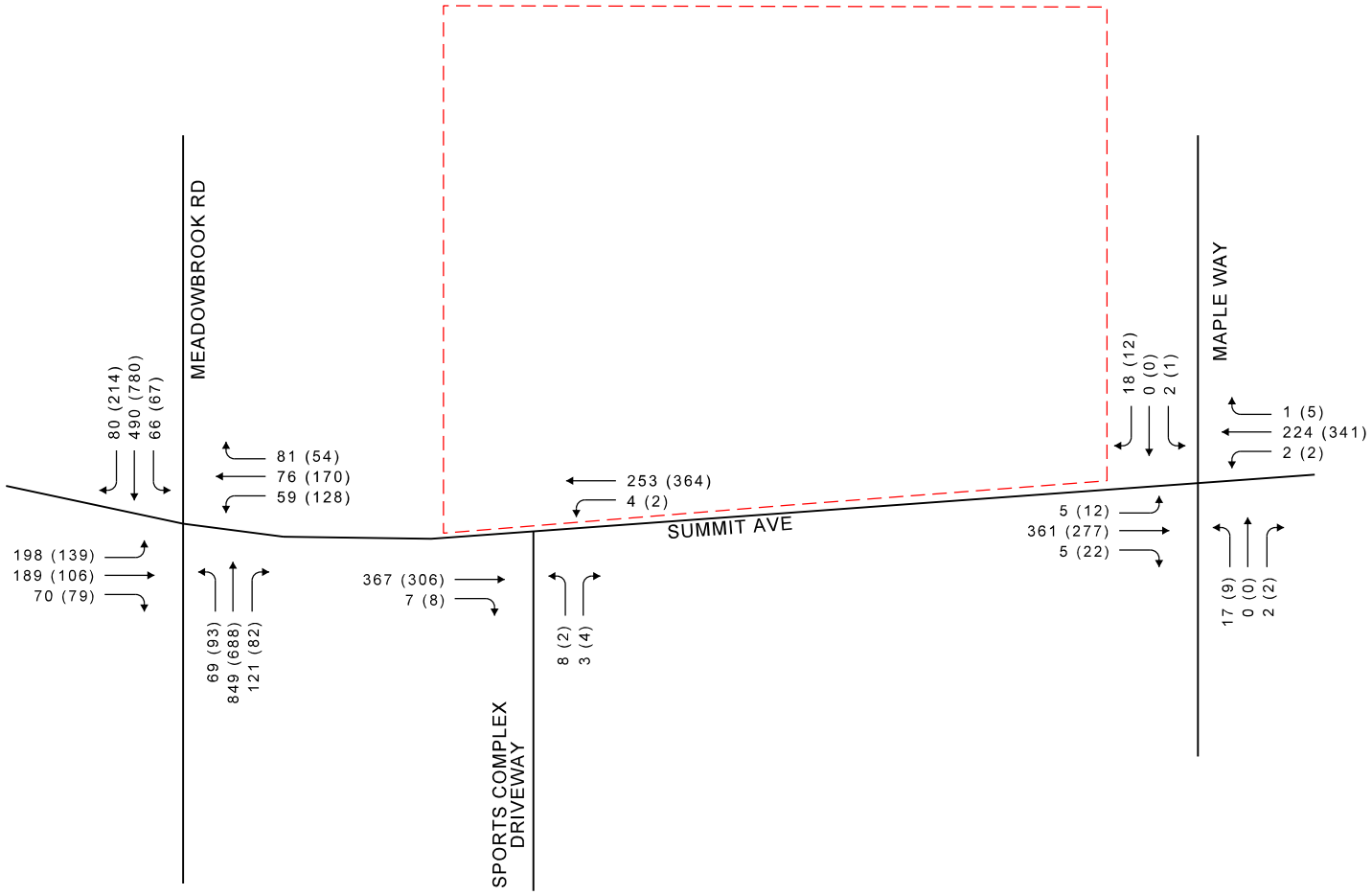
EXHIBIT 3–1
EXISTING TRANSPORTATION DETAIL

WAUKESHA WISCONSIN

LEGEND

- AM PEAK HOUR
(##)- PM PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
PM PEAK HOUR: 4:00 PM - 5:00 PM



SUMMIT FIELDS

EXHIBIT 3–2
EXISTING TRAFFIC VOLUMES

WAUKESHA WISCONSIN

EXISTING PEAK HOUR OPERATING CONDITIONS

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Meadowbrook Rd & Summit Ave				
Eastbound	37.3	D	43.1	D
Westbound	39.6	D	41.4	D
Northbound	12.1	B	13.4	B
Southbound	12.3	B	12.9	B
Intersection	19.6	B	20.7	C
Sports Complex Driveway & Summit Ave				
Westbound Left	8.1	A	7.9	A
Northbound Left	12.5	B	12.6	B
Northbound Right	104.0	B	10.1	B
Maple Way & Summit Ave				
Eastbound Left	7.9	A	8.0	A
Wesbound Left	8.0	A	7.9	A
Northbound Approach	14.6	B	14.9	B
Southbound Approach	10.7	B	10.8	B

CHAPTER 4 – PROJECTED TRAFFIC

PART A. BACKGROUND TRAFFIC FORECASTING

Based on the WisDOT methodology, if a site generates less than 500 vehicle trips during a peak hour, the build scenario analysis consists of the projected site trips added to the existing traffic volumes. In this case, the proposed development is anticipated to generate substantially less than 500 peak hour vehicle trips. Additionally, residential land uses are already common in the area, so the generated traffic will be similar in nature to the existing traffic patterns.

Therefore, project trips will be added directly to the existing traffic volumes to determine the build scenario traffic volumes.

PART B – ON-SITE AND OFF-SITE DEVELOPMENT TRAFFIC FORECASTING

B1. Trip Generation

The proposed residential development consists of a residential complex consisting of 320 dwelling units and approximately 60 dwelling units of single-family homes. Project traffic is estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. The following land use category is used to determine project traffic:

> Single-Family Detached Housing (ITE Land Use Code 210) – Single-family detached housing includes all single-family homes on individual lots. A typical site surveyed is a suburban subdivision.
>
> Multi-Family Low-Rise Housing (ITE Land Use Code 220) – Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors).

The *Trip Generation Manual, 10th Edition* assigns trip generation estimates based on a regression equation for each peak period and an independent variable. In this case, dwelling units is the applicable variable for multi-family housing. The am and pm peak hour trip generation equations are selected for weekday, peak hour of adjacent street traffic for one hour from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm.

For the purposes of this study and to provide a conservative analysis, the trip generation will utilize 340 multifamily dwelling units and 70 single family dwelling units. The trip generation table for the proposed residential development is included in ***Exhibit 4.1***.

B2. Mode Split

All generated trips to and from the site are assumed to be vehicular trips. It is possible that some trips may include walking or bicycling, however, the proportion of non-motorized trips is expected to be small, and is not accounted for in this study.

B3. Trip Distribution

The direction from which traffic approaches and departs a site is a function of numerous variables, including location of residences, location of employment centers, location of commercial/retail centers, available roadway systems, location and number of access points, and level of congestion on adjacent road systems.

The distribution of multifamily housing trips is based on the location of schools, employment centers, and commercial/retail areas. The largest portions of trips are distributed to Meadowbrook Road to the north and Summit Avenue to the east, since these areas have the highest development density and most direct access to the regional highway system and the City of Waukesha. The least amount of traffic is distributed to Meadowbrook Road to the south and Summit Avenue to the west, since these areas tend to be more rural and less likely to be an origin or destination for trips related to the proposed residential development.

The directional distribution of trips to and from the external area is as follows:

- Summit Avenue East of Meadowbrook Road – 60%
- Meadowbrook Road North of Summit Avenue – 30%
- Meadowbrook Road South of Summit Avenue – 10%

B5. Trip Assignment

The site is accessible through two full access driveways on Summit Avenue, one aligned with the Sports Complex Driveway to the south and one approximately 1,240 feet east of that driveway. The overall development is configured with the western driveway that aligns with the Sports Complex Driveway provides access to the multifamily development while the eastern driveway provides access to the single-family homes.

The overall trip assignment of the proposed driveways is as follows:

- Southbound left turn to eastbound on Summit Ave – 60%
- Southbound right turn to westbound on Summit Ave – 40%

The assignment of project traffic volume is illustrated in ***Exhibit 4.2***.

PART C – BUILD TRAFFIC

The project trips are added to the existing traffic volumes to obtain the build scenario traffic volumes, which are illustrated in ***Exhibit 4.3***.

LUC	LAND USE	SIZE		WEEKDAY AM			WEEKDAY PM		
				In	Out	Total	In	Out	Total
220	Multifamily Housing (Low-Rise)	340	Dwelling Unit	35	118	**153**	111	65	**176**
210	Single-Family Detached Housing	70	Dwelling Unit	14	41	**55**	45	27	**72**

NOT TO SCALE

SUMMIT FIELDS

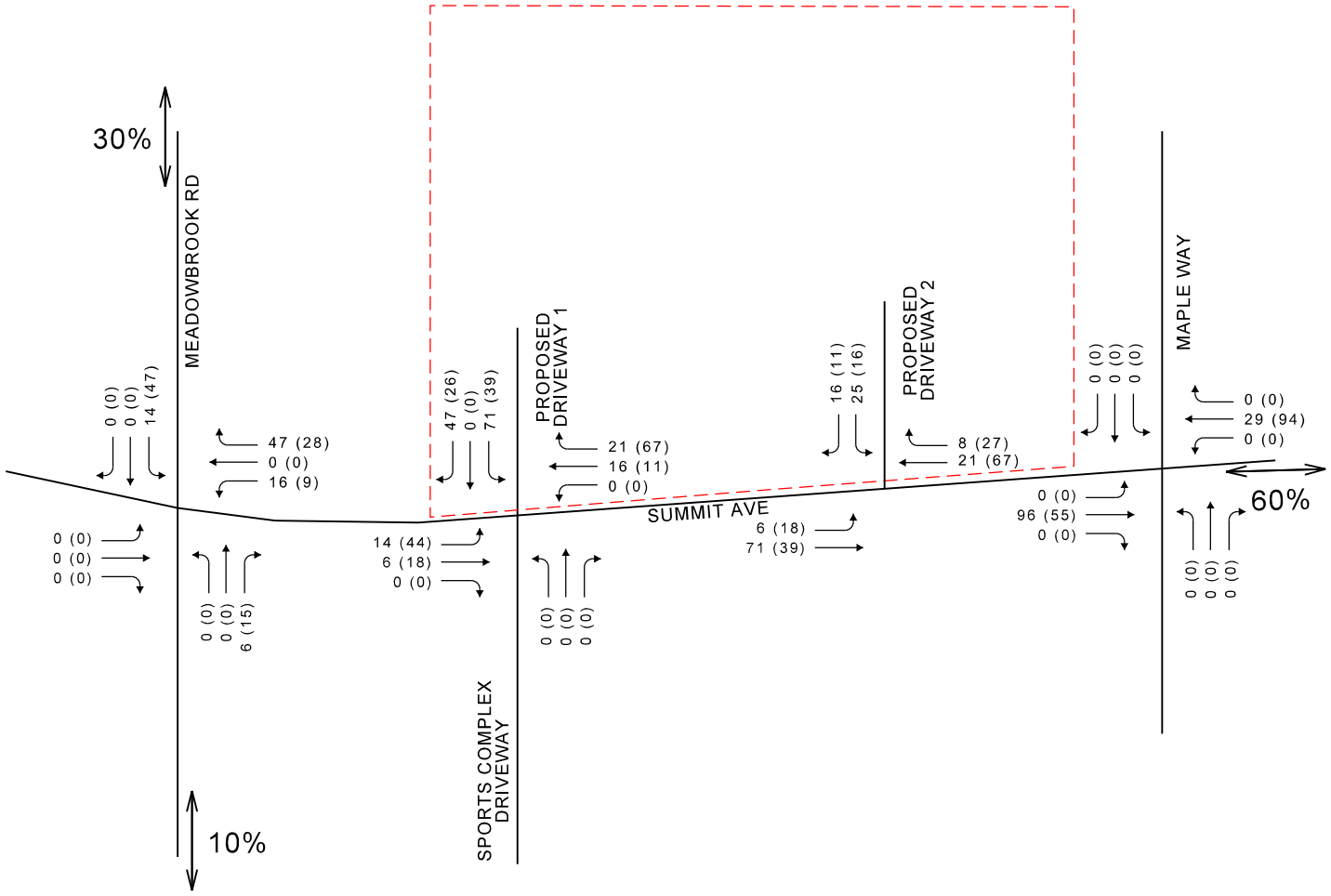
EXHIBIT 4–1
TRIP GENERATION

WAUKESHA WISCONSIN

LEGEND

- AM PEAK HOUR
(##)- PM PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
PM PEAK HOUR: 4:00 PM - 5:00 PM



SUMMIT FIELDS

EXHIBIT 4–2
PROJECT TRAFFIC VOLUME

WAUKESHA WISCONSIN

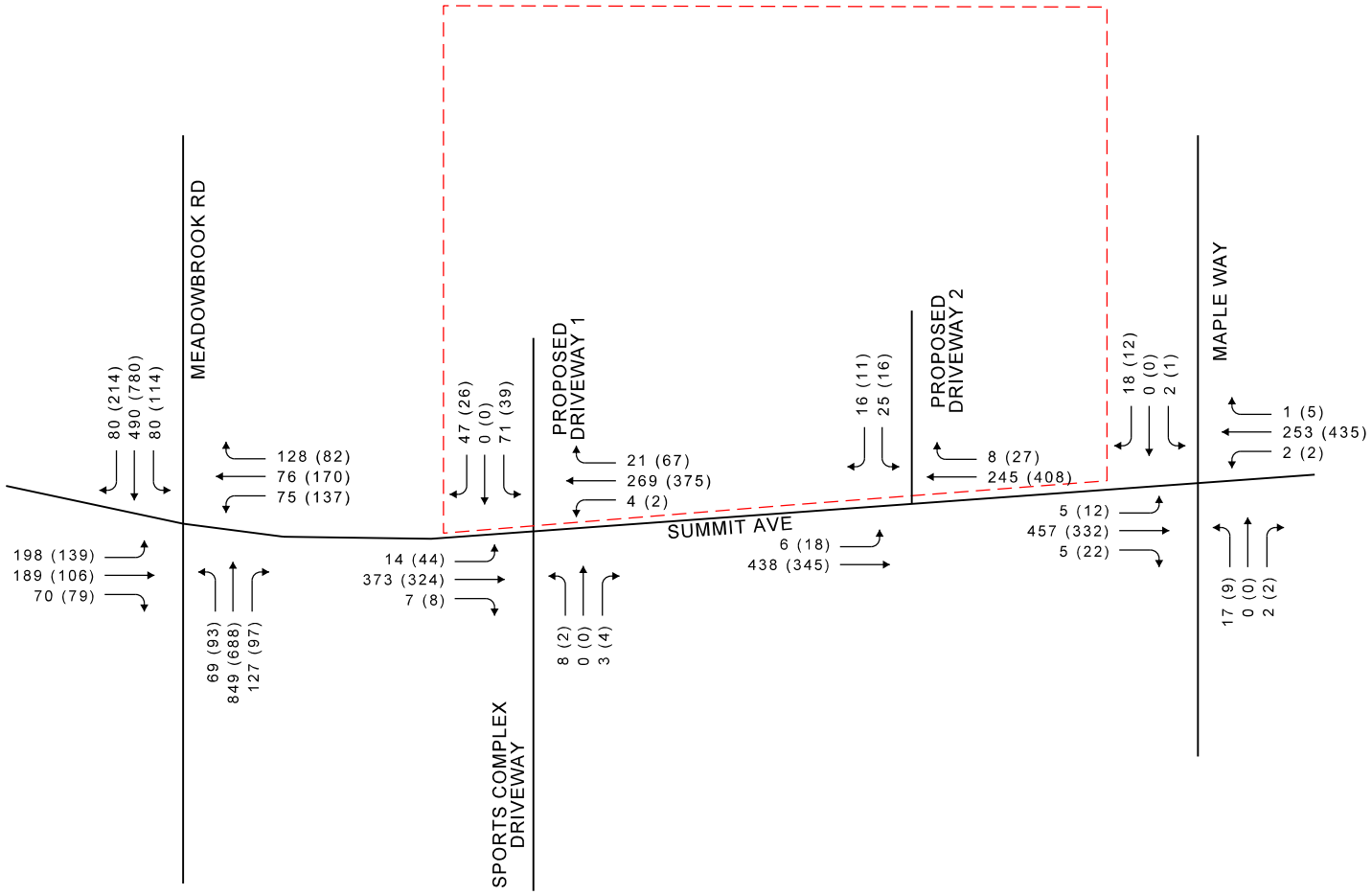
LEGEND

- AM PEAK HOUR
(##)- PM PEAK HOUR

AM PEAK HOUR: 7:30 AM - 8:30 AM
PM PEAK HOUR: 4:00 PM - 5:00 PM

NOTE:

2022 BUILD TRAFFIC VOLUME = EXISTING TRAFFIC VOLUME (EXHIBIT 3-2) + PROJECT TRAFFIC VOLUME (EXHIBIT 4-2)



SUMMIT FIELDS

EXHIBIT 4–3
2022 BUILD TRAFFIC VOLUME

WAUKESHA WISCONSIN

CHAPTER 5 – TRAFFIC AND IMPROVEMENT ANALYSIS

PART A – SITE ACCESS

The proposed site access consists of the multifamily site driveway as a stop-controlled approach to o Summit Avenue aligned with Sports Complex Driveway, and the single-family home driveway as a stop-controlled approach on Summit Avenue between Sports Complex Driveway and Maple Way.

Both driveways are proposed to provide a two-lane cross-section, one inbound land and one outbound lane, with no auxiliary turn lanes, which is supported by the findings of a turn lane warrant analysis. Several warranting criteria are defined for left and right turn movements. It is found that no right turn or left turn warrants are met at the intersection of Summit Avenue & Sports Complex Driveway/Proposed Driveway 1 and at Summit Avenue & Proposed Driveway 2.

Due to the speed limit of eastbound Summit Avenue approaching Sports Complex Driveway/ Proposed Driveway 1 of 45 mph, it is not considered a low-speed roadway and the minimum left turn peak hour volume warrant of 20 vehicles per hour does not apply. Therefore, an eastbound left turn lane is not recommended at this location. There are no left turn lanes provided on Summit Avenue at any other intersections or driveways and would be out of character for this corridor for a left turn lane to be installed at this location. Additionally, the delays for the eastbound left turns operate at LOS A with 7.9 seconds per vehicle and 8.4 seconds of delay per vehicle during the weekday am and weekday pm peak hours, respectively.

Supporting information for the turn lane warrant analysis is provided in ***Appendix D***.

PART B – CAPACITY/LEVEL OF SERVICE ANALYSIS

The build condition traffic volumes are analyzed using the same HCS7 methodology established for the existing condition. Analysis results for the build traffic volumes at the study area intersections are summarized in ***Exhibit 5.1***. Supporting analysis worksheets for the build conditions are provided in ***Appendix E***.

As shown, all traffic movements at the study intersections are projected to operate at LOS C or better during both the weekday am and pm peak hours with the exception of the minor signalized approaches on Meadowbrook Road which operates at LOS D for the weekday pm peak hours.

PART C – QUEUING ANALYSIS

The 95th percentile queue lengths have also been analyzed using the HCS7 models. The relevant minor approach/movement queue lengths for the weekday am and pm peak hours at the study area intersections are illustrated in the following exhibits:

- ***Exhibit 5.2*** – 2022 Existing Traffic Expected Maximum Queues
- ***Exhibit 5.3*** – 2022 Build Traffic Expected Maximum Queues

The queue storage lengths of the dedicated turn lanes at the intersection of Meadowbrook Road & Summit Avenue are sufficient to accommodate all projected maximum queue lengths. The projected 95th percentile queue lengths at the site driveways are not anticipated to exceed one vehicle during the weekday am and pm peak hours in the build scenario.

PART D – MULTIMODAL CONSIDERATIONS

Sidewalk currently exists along the north side of Summit Avenue from Meadowbrook Road to the retail driveway and along the south side of Summit Avenue from Meadowbrook Road to Sports Complex Driveway. An internal sidewalk system is planned within the site.

PART E – SPEED CONSIDERATIONS/SIGHT DISTANCE

A primary feature of highway design is the arrangement of the geometric elements so that there is adequate sight distance for safe and comfortable vehicle operation. Intersection Sight Distance is the distance for which there must be unobstructed sight along both roads of an intersection, and across their included corners that is sufficient to allow the operators of vehicles approaching the intersection or stopped at the intersection, to safely carry out whatever maneuvers may be required to negotiate the intersection.

In this case, the design speed is 40 mph based on the posted speed of 35 miles per hour. The intersection sight distance triangles are illustrated in ***Exhibit 5-4***. It is found that no intersection sight distance issues are anticipated at the proposed driveways.

PART F – TRAFFIC CONTROL NEEDS

The proposed driveway is proposed to be stop-controlled on the minor street approaches. This method of control is typical for driveways of this type, and is found to perform adequately based on the results of the capacity analysis.

BUILD PEAK HOUR OPERATING CONDITIONS

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Meadowbrook Rd & Summit Ave				
Eastbound Approach	34.8	C	43.0	D
Westbound Approach	37.7	D	41.3	D
Northbound Approach	13.9	B	14.9	B
Southbound Approach	14.2	B	14.5	B
Intersection	20.6	C	21.9	C
Summit Ave & Sports Complex Driveway/Proposed Driveway				
Eastbound Left	7.9	A	8.5	A
Westbound Left	8.1	A	8.0	A
Northbound Left	14.6	B	16.2	C
Northbounda Right	10.4	B	10.2	B
Soutbound Approach	17.1	C	20.2	C
Summit Ave & Proposed Driveway 2				
Eastbound Left	7.8	A	8.3	A
Southbound Approach	13.2	B	14.6	B
Maple Way & Summit Ave				
Eastbound Left	8.0	A	8.3	A
Westbound Left	8.3	A	8.0	A
Northbound Approach	16.8	C	17.7	C
Southbound Approach	10.7	B	11.8	B

SUMMIT FIELDS

EXHIBIT 5–1
2022 BUILD TRAFFIC OPERATIONS

WAUKESHA WISCONSIN

QUEUE TABLE - EXISTING TRAFFIC VOLUME

Movement	Weekday AM Peak Hour Queue (ft)	Weekday PM Peak Hour Queue (ft)	Existing Storage Length (ft)	Existing Taper (ft)
Meadowbrook Rd & Summit Ave				
Eastbound Left	91.1	70.0	450	130
Westbound Left	57.0	129.9	360	100
Northbound Left	75.8	108.5	430	95
Northbound Right	43.3	29.9	270	110
Southbound Left	74.4	78.7	290	120
Southbound Right	28.5	92.1	350	100
Summit Ave & Sports Complex Driveway/Proposed Driveway				
Westbound Left	0.0	0.0	-	-
Northbound Left	2.5	0.0	100.0	75
Northbound Right	2.5	0.0	100.0	75
Maple Way & Summit Ave				
Eastbound Left	0.0	0.0	-	-
Westbound Left	0.0	0.0	-	-
Northbound Approach	5.0	2.5	-	-
Southbound Approach	2.5	2.5	-	-

QUEUE TABLE - BUILD TRAFFIC VOLUME

Movement	Weekday AM Peak Hour Queue (ft)	Weekday PM Peak Hour Queue (ft)	Existing Storage Length (ft)	Existing Taper (ft)
Cottage Grove Road & Main Street				
Eastbound Left	87.7	70.0	450	130
Westbound Left	69.5	138.0	360	100
Northbound Left	75.8	108.5	430	95
Northbound Right	52.6	40.9	270	110
Southbound Left	90.0	130.4	290	120
Southbound Right	31.7	93.8	350	100
Summit Ave & Sports Complex Driveway/Proposed Driveway				
Eastbound Left	0.0	2.5	-	-
Westbound Left	0.0	0.0	-	-
Northbound Left	2.5	0.0		
Northbounda Right	0.0	0.0	-	-
Soutbound Approach	30.0	22.5	-	-
Summit Ave & Proposed Driveway 2				
Eastbound Left	0.0	2.5	-	-
Southbound Approach	7.5	5.0	-	-
Maple Way & Summit Ave				
Eastbound Left	0.0	0.0	-	-
Westbound Left	0.0	0.0	-	-
Northbound Approach	5.0	2.5	-	-
Southbound Approach	2.5	2.5	-	-

SCALE: 1" = 400'

SUMMIT FIELDS	**EXHIBIT 5–4** **INTERSECTION SIGHT DISTANCE DRAWINGS** WAUKESHA WISCONSIN	N W V E S

CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS

PART A – CONCLUSIONS

The proposed development consists of a multi-family residential development with 320 dwelling units and a proposed single-family development of approximately 60 dwelling units located in the northeast quadrant of the Meadowbrook Road and Summit Avenue intersection in Waukesha, Wisconsin. The site is bounded by Summit Avenue to the south, residential and retail developments to the west, and residential development to the north and east.

The multifamily portion of the site will be accessed via a proposed full access driveway on Summit Avenue that aligns with the Sports Complex Driveway. A second full access driveway is proposed approximately 1,240 feet east of the Sports Complex Driveway that will provide access to the single-family home development. The single-family home development will also connect to existing residential streets at Windsor Place to the east and Winterberry Drive to the north as these roadways have been planned for connection.

The study area intersections were analyzed using the HCS7 software for the existing and build conditions. It is found that the existing signalized intersection of Meadowbrook Road and Summit Avenue and the proposed site driveways all operate adequately during both the weekday am and weekday pm peak hours in the build scenario.

PART B – RECOMMENDATIONS

Both of the site driveways are proposed with a two-lane cross-section with no dedicated turning lanes on Summit Avenue. Based on the analysis of the build conditions, no mitigation is required at the proposed driveways or the signalized intersection of Meadowbrook Road and Summit Avenue. The recommended lane configuration is illustrated in ***Exhibit 1-2***.

Modifications are for jurisdictional consideration and are not legally binding. The City of Waukesha reserves the right to determine alternative solutions.

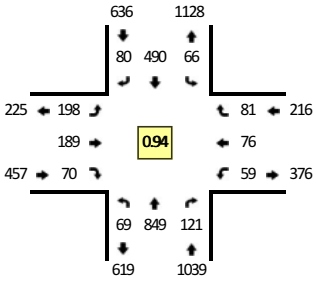
APPENDIX A

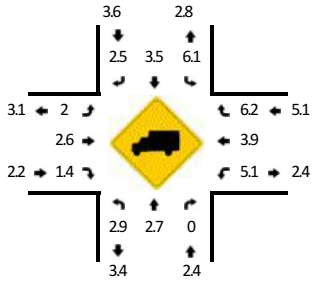
TRAFFIC COUNT DATA

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

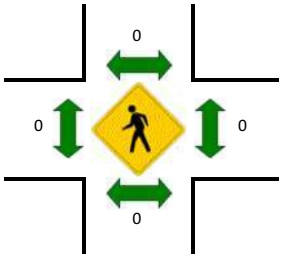
LOCATION: Meadowbrook Road -- Summit Avenue | **QC JOB #:** 15726801
CITY/STATE: Waukesha, WI | **DATE:** Tue, Mar 8 2022

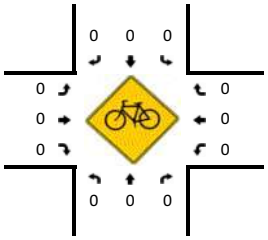
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

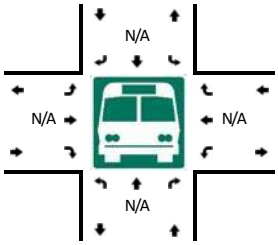


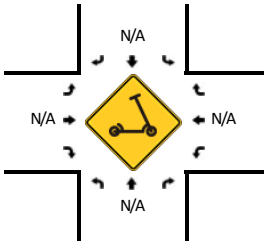


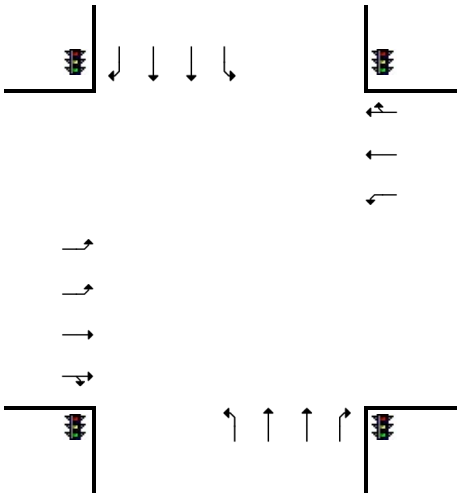
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Meadowbrook Road (Northbound)				Meadowbrook Road (Southbound)				Summit Avenue (Eastbound)				Summit Avenue (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	10	198	10	0	16	101	18	0	51	40	9	0	14	12	19	0	498	
7:15 AM	16	229	20	0	17	142	20	0	49	44	21	0	12	21	17	0	608	
7:30 AM	25	249	21	0	18	121	19	0	49	57	19	0	12	15	21	0	626	
7:45 AM	16	182	44	0	16	133	22	0	38	51	14	0	14	21	21	0	572	2304
8:00 AM	12	189	36	0	15	94	19	0	62	37	16	0	21	19	22	0	542	2348
8:15 AM	10	155	26	0	15	100	24	0	35	33	19	0	18	27	32	0	494	2234
8:30 AM	19	153	19	0	22	102	20	0	38	43	13	0	22	22	23	0	496	2104
8:45 AM	18	125	23	0	10	86	30	0	40	30	10	0	12	14	8	0	406	1938

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	100	996	84	0	72	484	76	0	196	228	76	0	48	60	84	0	2504
Heavy Trucks	0	20	0		0	36	4		4	4	0		0	0	0		68
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/15/2022 3:24 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Meadowbrook Road -- Summit Avenue
CITY/STATE: Waukesha, WI

QC JOB #: 15726802
DATE: Tue, Mar 8 2022

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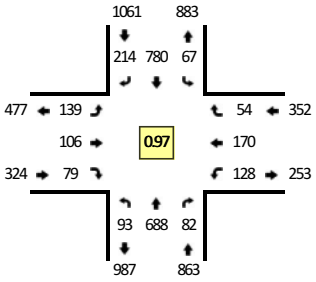
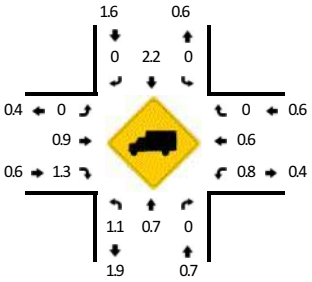
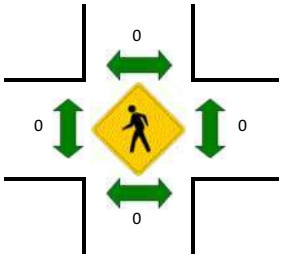
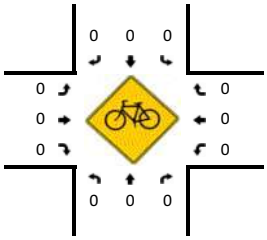
Peak 15-Min: 5:15 PM -- 5:30 PM

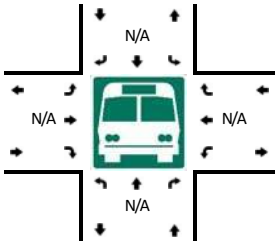


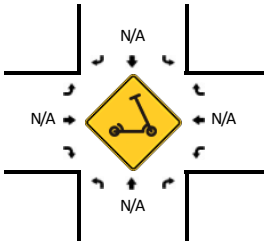


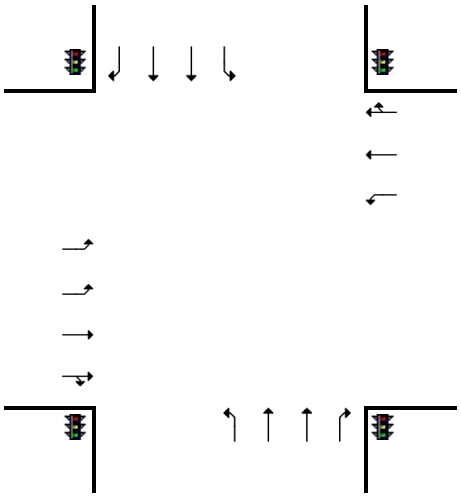
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Meadowbrook Road (Northbound)				Meadowbrook Road (Southbound)				Summit Avenue (Eastbound)				Summit Avenue (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	34	153	28	0	15	183	43	0	41	30	24	0	45	48	14	0	658	
4:15 PM	18	165	29	0	20	192	48	0	27	32	14	0	42	45	12	0	644	
4:30 PM	19	170	30	0	17	200	43	1	35	25	23	0	38	46	13	0	660	
4:45 PM	26	179	19	0	18	178	55	0	31	24	24	0	23	46	10	0	633	2595
5:00 PM	19	167	19	0	9	186	54	0	36	27	18	0	38	47	18	0	638	2575
5:15 PM	29	172	14	0	21	216	62	1	37	30	14	0	29	31	13	0	669	2600
5:30 PM	15	137	21	0	12	194	53	0	32	27	15	0	31	48	19	0	604	2544
5:45 PM	16	117	21	0	16	147	42	0	27	22	8	0	20	29	14	0	479	2390

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	688	56	0	84	864	248	4	148	120	56	0	116	124	52	0	2676
Heavy Trucks	0	0	0		0	16	0		0	0	0		0	4	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/15/2022 3:24 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Sports Complex Driveway -- Summit Avenue
CITY/STATE: Waukesha, WI

QC JOB #: 15726803
DATE: Tue, Mar 8 2022

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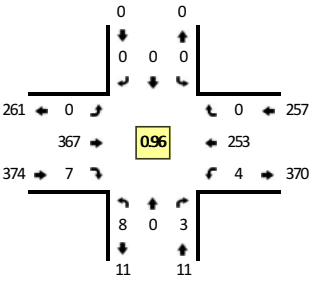
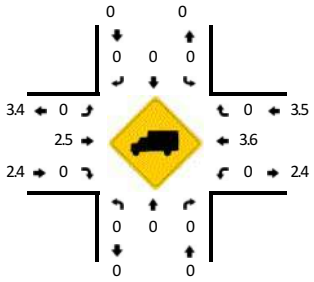
Peak 15-Min: 7:45 AM -- 8:00 AM





Quality Counts
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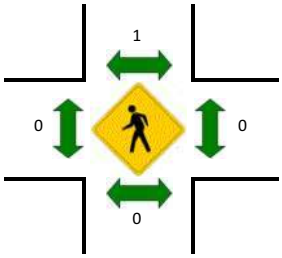

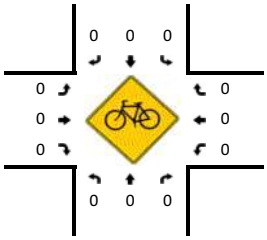

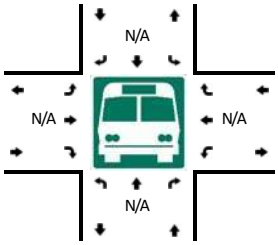

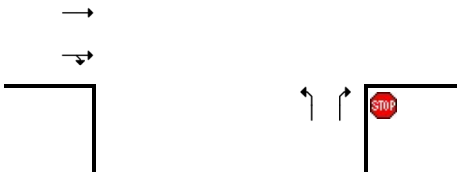

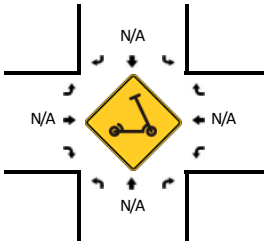

15-Min Count Period Beginning At	Sports Complex Driveway (Northbound)				Sports Complex Driveway (Southbound)				Summit Avenue (Eastbound)				Summit Avenue (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	1	0	0	0	0	0	0	65	1	0	2	44	0	0	113	
7:15 AM	0	0	3	0	0	0	0	0	0	81	6	0	1	44	0	0	135	
7:30 AM	0	0	2	0	0	0	0	0	0	106	1	0	1	54	0	0	164	
7:45 AM	1	0	0	0	0	0	0	0	0	106	1	0	1	58	0	0	167	579
8:00 AM	5	0	0	0	0	0	0	0	0	88	2	0	2	65	0	0	162	628
8:15 AM	2	0	1	0	0	0	0	0	0	67	3	0	0	76	0	0	149	642
8:30 AM	3	0	0	0	0	0	0	0	0	86	2	0	0	67	0	0	158	636
8:45 AM	3	0	0	0	0	0	0	0	0	62	0	0	0	34	0	0	99	568

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	0	0	0	424	4	0	4	232	0	0	668
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	12	0		12
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/15/2022 3:24 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Sports Complex Driveway -- Summit Avenue
CITY/STATE: Waukesha, WI

QC JOB #: 15726804
DATE: Tue, Mar 8 2022

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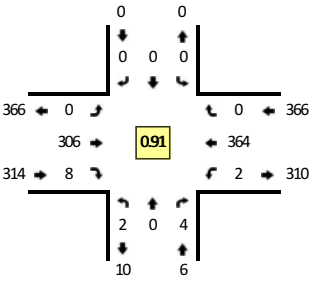
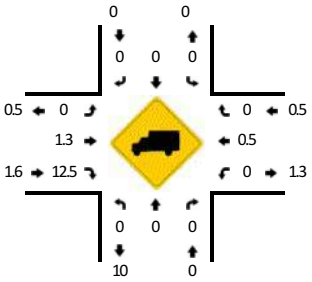
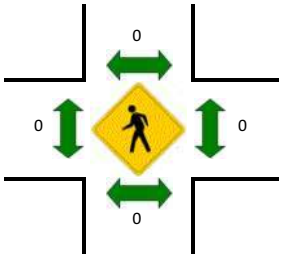
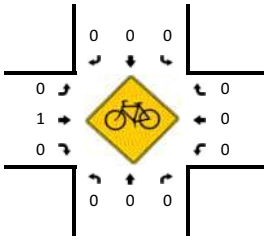
Peak 15-Min: 4:15 PM -- 4:30 PM

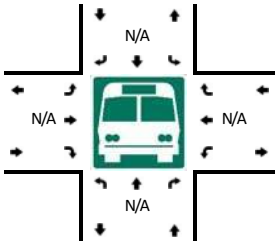


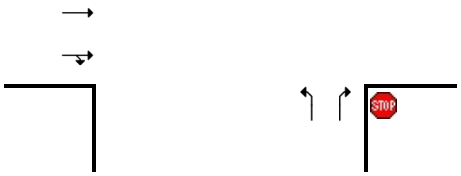


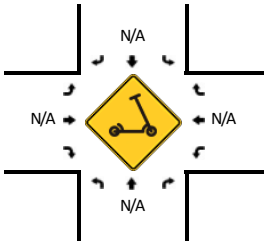
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Sports Complex Driveway (Northbound)				Sports Complex Driveway (Southbound)				Summit Avenue (Eastbound)				Summit Avenue (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	0	0	0	0	0	0	0	68	1	0	1	93	0	0	164	
4:15 PM	0	0	1	0	0	0	0	0	0	89	2	0	1	95	0	0	188	
4:30 PM	0	0	2	0	0	0	0	0	0	80	2	0	0	98	0	0	182	
4:45 PM	1	0	1	0	0	0	0	0	0	69	3	0	0	78	0	0	152	686
5:00 PM	0	0	2	0	0	0	0	0	0	65	1	0	0	87	0	0	155	677
5:15 PM	1	0	0	0	0	0	0	0	0	73	0	0	0	69	0	0	143	632
5:30 PM	0	0	1	0	0	0	0	0	0	63	3	0	0	81	0	0	148	598
5:45 PM	2	0	0	0	0	0	0	0	0	57	0	0	0	57	0	0	116	562

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	4	0	0	0	0	0	0	356	8	0	4	380	0	0	752
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Scooters																	

Comments:

Report generated on 3/15/2022 3:24 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

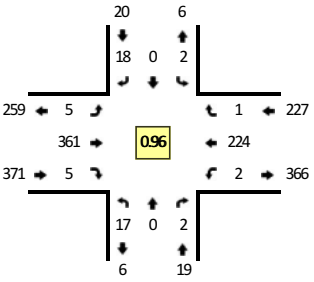
Type of peak hour being reported: Intersection Peak

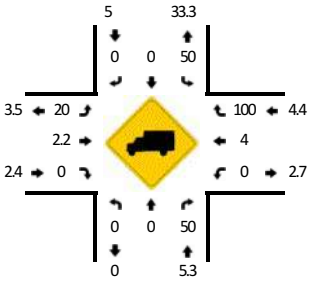
Method for determining peak hour: Total Entering Volume

LOCATION: Maple Way (west) -- Summit Ave
CITY/STATE: Waukesha, WI

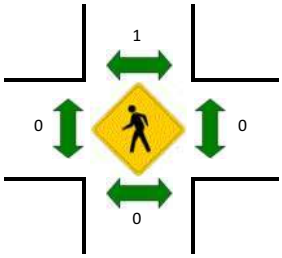
QC JOB #: 15726805
DATE: Tue, Mar 8 2022

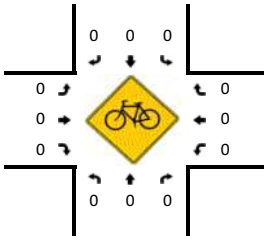
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

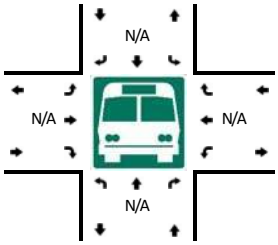


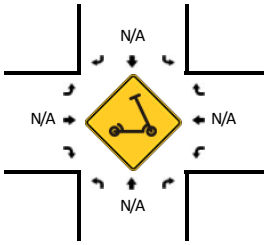


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Maple Way (west) (Northbound)				Maple Way (west) (Southbound)				Summit Ave (Eastbound)				Summit Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	0	0	0	3	0	3	0	1	59	2	0	0	39	0	0	111	
7:15 AM	4	0	0	0	2	1	4	0	1	85	0	0	1	39	1	0	138	
7:30 AM	5	0	1	0	0	0	8	0	1	107	1	0	0	40	0	0	163	
7:45 AM	1	0	0	0	0	0	4	0	2	103	1	0	0	54	1	0	166	578
8:00 AM	4	0	1	0	1	0	3	0	0	88	1	0	1	63	0	0	162	629
8:15 AM	7	0	0	0	1	0	3	0	2	63	2	0	0	67	0	1	146	637
8:30 AM	2	0	1	0	1	0	2	0	0	84	0	0	0	62	0	0	152	626
8:45 AM	0	0	0	0	0	0	1	0	1	62	0	0	0	35	0	0	99	559

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	16	0	8	412	4	0	0	216	4	0	664
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	12	4		16
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/15/2022 3:24 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

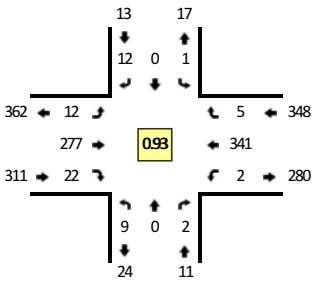
Type of peak hour being reported: Intersection Peak

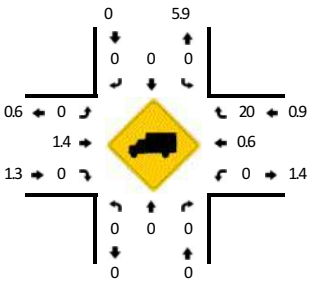
Method for determining peak hour: Total Entering Volume

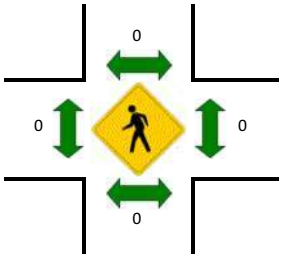
LOCATION: Maple Way (west) -- Summit Ave
CITY/STATE: Waukesha, WI

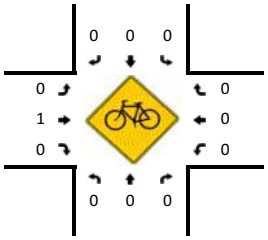
QC JOB #: 15726806
DATE: Tue, Mar 8 2022

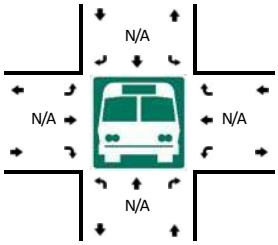
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

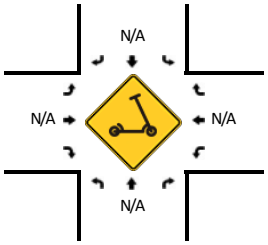












15-Min Count Period Beginning At	Maple Way (west) (Northbound)				Maple Way (west) (Southbound)				Summit Ave (Eastbound)				Summit Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	1	0	0	0	1	0	1	65	4	0	1	92	2	0	169	
4:15 PM	4	0	0	0	1	0	4	0	2	75	6	0	1	89	1	0	183	
4:30 PM	3	0	0	0	0	0	6	0	4	73	7	0	0	86	1	0	180	
4:45 PM	0	0	1	0	0	0	1	0	5	64	5	0	0	74	1	0	151	683
5:00 PM	2	0	0	0	0	0	2	0	4	64	0	0	2	83	0	1	158	672
5:15 PM	0	0	1	0	0	0	2	0	6	66	2	0	1	68	1	0	147	636
5:30 PM	2	1	0	0	0	0	3	0	4	52	5	0	1	71	0	0	139	595
5:45 PM	3	0	0	0	1	1	4	0	4	50	4	0	2	52	0	0	121	565

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	0	0	0	4	0	16	0	8	300	24	0	4	356	4	0	732
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Scooters																	

Comments:

Report generated on 3/15/2022 3:24 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

APPENDIX B

HISTORICAL AADT AND COVID-19 ADJUSTMENT FACTOR

ESTIMATED AADT BASED ON PEAK HOUR COUNTS			
Location	**Two-Way Peak Hour Traffic**	**Assumed K-Factor**	**Estimated ADT**
Meadowbrook Rd North of Summit Ave	1944	0.10	19440
Meadowbrook Rd South of Summit Ave	1850	0.10	18500
Summit Ave West of Meadowbrook Rd	801	0.10	8010

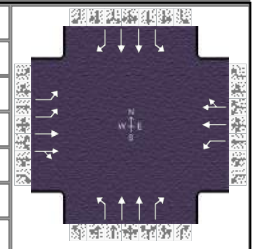
COVID ADJUSTMENT CALCULATION			
Location	**Historic ADT**	**Estimated ADT**	**Calculated Adjustment**
Meadowbrook Rd North of Summit Ave	15300	19440	-21%
Meadowbrook Rd South of Summit Ave	11200	18500	-39%
Summit Ave West of Meadowbrook Rd	7600	8010	-5%

APPENDIX C

CAPACITY ANALYSIS WORKSHEETS
2021 EXISTING

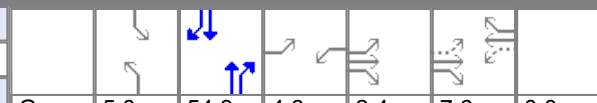
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_AM.xus		
Project Description	2022 Existing				

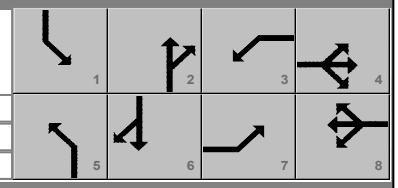


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	59	76	81	69	849	121	66	490	80

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	54.3	4.8	2.4	7.6	0.0						
Yellow	4.0	4.0	4.0	0.0	4.0	0.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						



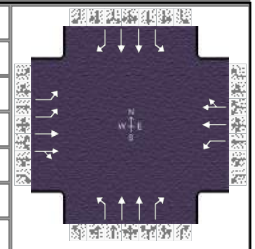
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	59	76	81	69	849	121	66	490	80
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	3		5	4		3	3	0	6	4	2
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	450	0		360	0		430	0	270	290	0	350
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	35	35	35	45	45	45	45	45	45

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	30.0	20.0	30.0	20.0	20.0	20.0	20.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Green (G_{min}), s	6	6	6	6	6	6	6	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		0.0		0.0		0.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

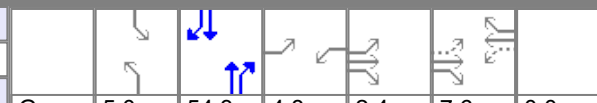
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_AM.xus		
Project Description	2022 Existing				

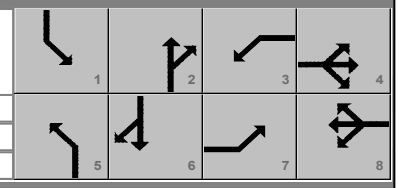


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	59	76	81	69	849	121	66	490	80

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	54.3	4.8	2.4	7.6	0.0
Yellow	4.0	4.0	4.0	0.0	4.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



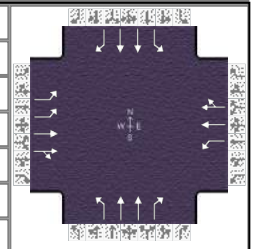
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.1	14.0	8.8	11.6	9.0	58.3	9.0	58.2
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.0	0.0	3.0	0.0
Queue Clearance Time (g_s), s	6.9	8.9	4.9	6.8	5.7		5.6	
Green Extension Time (g_e), s	0.3	0.8	0.1	0.8	0.1	0.0	0.1	0.0
Phase Call Probability	0.99	1.00	0.79	1.00	0.84		0.83	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	211	141	135	63	81	86	73	903	129	70	521	85
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1730	1856	1687	1739	1841	1560	1767	1859	1610	1725	1845	1585
Queue Service Time (g_s), s	4.9	6.6	6.9	2.9	3.8	4.8	3.7	11.5	3.1	3.6	5.9	2.0
Cycle Queue Clearance Time (g_c), s	4.9	6.6	6.9	2.9	3.8	4.8	3.7	11.5	3.1	3.6	5.9	2.0
Green Ratio (*g/C*)	0.17	0.11	0.11	0.14	0.08	0.08	0.06	0.60	0.60	0.06	0.60	0.60
Capacity (*c*), veh/h	511	206	188	185	156	132	99	2243	971	95	2221	954
Volume-to-Capacity Ratio (*X*)	0.413	0.683	0.716	0.340	0.518	0.651	0.741	0.403	0.133	0.738	0.235	0.089
Back of Queue (*Q*), ft/ln (95 th percentile)	91.1	138.2	130.1	57	79.6	84.4	75.8	182.9	43.3	74.4	93.7	28.5
Back of Queue (*Q*), veh/ln (95 th percentile)	3.6	5.4	5.2	2.2	3.1	3.4	3.0	7.1	1.7	2.8	3.6	1.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.20	0.00	0.00	0.16	0.00	0.00	0.18	0.00	0.16	0.26	0.00	0.08
Uniform Delay (d_1), s/veh	33.3	38.5	38.6	35.0	39.4	39.9	41.8	9.4	7.7	41.9	8.3	7.5
Incremental Delay (d_2), s/veh	0.2	1.5	1.9	0.4	1.0	2.0	4.0	0.5	0.3	4.1	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	33.5	40.0	40.5	35.4	40.4	41.9	45.9	9.9	8.0	46.0	8.5	7.7
Level of Service (LOS)	C	D	D	D	D	D	D	A	A	D	A	A
Approach Delay, s/veh / LOS	37.3	D		39.6	D		12.1	B		12.3	B	
Intersection Delay, s/veh / LOS	19.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.46	B	2.24	B	2.39	B
Bicycle LOS Score / LOS	0.89	A	0.68	A	1.40	A	1.05	A

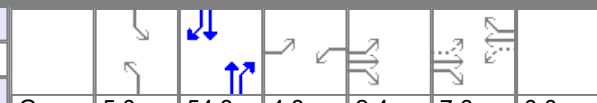
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_AM.xus		
Project Description	2022 Existing				

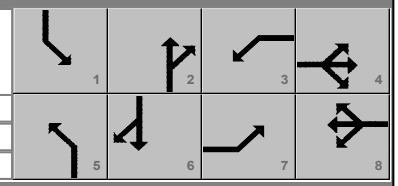


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	59	76	81	69	849	121	66	490	80

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	54.3	4.8	2.4	7.6	0.0
Yellow	4.0	4.0	4.0	0.0	4.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



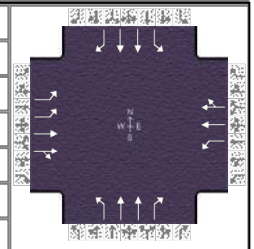
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.984	0.977	1.000	0.961	0.969	1.000	0.977	0.977	1.000	0.953	0.969	0.984
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	1.000	1.000	1.000	0.952	1.000	1.000	0.952	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.909	0.909		0.847	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3459	2609	934	1739	1841	1560	1767	3719	1610	1725	3689	1585
Proportion of Vehicles Arriving on Green (P)	0.08	0.11	0.11	0.05	0.08	0.08	0.06	0.60	0.60	0.06	0.60	0.60
Incremental Delay Factor (k)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.50	0.50	0.04	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Green Ratio (g/C)	0.17	0.11	0.14	0.08	0.06	0.60	0.06	0.60
Permitted Saturation Flow Rate (s_p), veh/h/ln	1218	0	1077	0	0	0	0	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	8.0	0.0	7.6	0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g_u), s	2.8	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s	0.5		0.4					
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln						0		0
Protected Right Effective Green Time (g_R), s						0.0		0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.710	0.000	1.557	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.143	0.000	0.146	0.000	0.079	0.000	0.079
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	222.53	35.54	169.67	37.69	1206.04	7.09	1204.28	7.12
Bicycle F_w / F_v	-3.64	0.40	-3.64	0.19	-3.64	0.91	-3.64	0.56

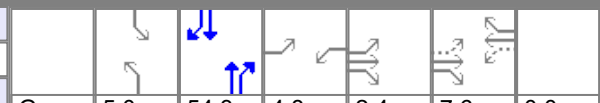
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_AM.xus		
Project Description	2022 Existing				

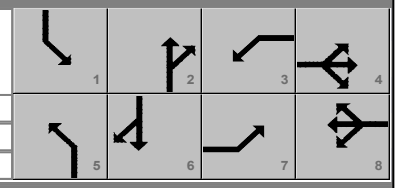


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	59	76	81	69	849	121	66	490	80

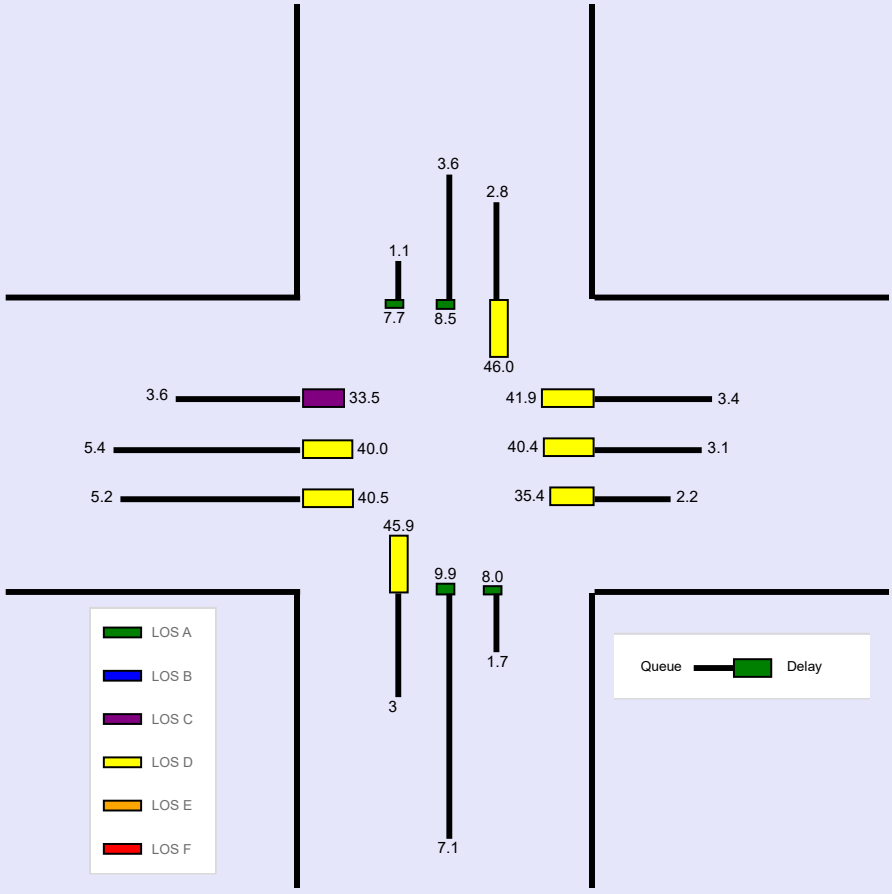
Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	54.3	4.8	2.4	7.6	0.0	
Yellow	4.0	4.0	4.0	0.0	4.0	0.0	
Red	0.0	0.0	0.0	0.0	0.0	0.0	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	91.1	138.2	130.1	57	79.6	84.4	75.8	182.9	43.3	74.4	93.7	28.5
Back of Queue (*Q*), veh/ln (95 th percentile)	3.6	5.4	5.2	2.2	3.1	3.4	3.0	7.1	1.7	2.8	3.6	1.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.20	0.00	0.00	0.16	0.00	0.00	0.18	0.00	0.16	0.26	0.00	0.08
Control Delay (*d*), s/veh	33.5	40.0	40.5	35.4	40.4	41.9	45.9	9.9	8.0	46.0	8.5	7.7
Level of Service (LOS)	C	D	D	D	D	D	D	A	A	D	A	A
Approach Delay, s/veh / LOS	37.3	D		39.6	D		12.1	B		12.3	B	
Intersection Delay, s/veh / LOS	19.6						B					



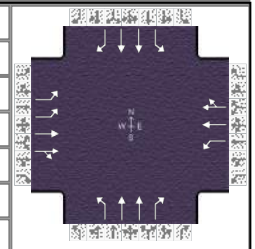
--- Messages ---

No errors or warnings exist.

--- Comments ---

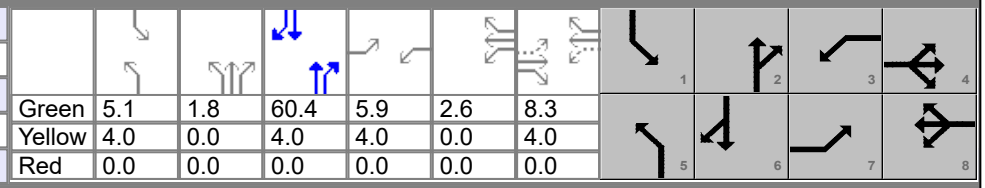
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_PM.xus		
Project Description	2022 Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	128	170	54	93	688	82	67	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.1	1.8	60.4	5.9	2.6	8.3						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						

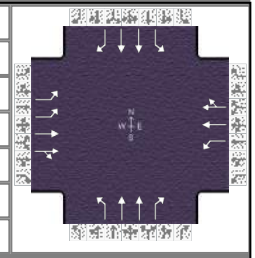
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	128	170	54	93	688	82	67	780	214
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	0	1		1	1		1	1	0	0	2	0
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	450	0		360	0		430	0	270	290	0	350
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	35	35	35	45	45	45	45	45	45

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	30.0	20.0	30.0	20.0	30.0	20.0	30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Green (G_{min}), s	6	6	6	6	6	6	6	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		0.0		0.0		0.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_PM.xus		
Project Description	2022 Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	128	170	54	93	688	82	67	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	5.1	1.8	60.4	5.9	2.6	8.3	5	6	7	8
Yellow	4.0	0.0	4.0	4.0	0.0	4.0				
Red	0.0	0.0	0.0	0.0	0.0	0.0				

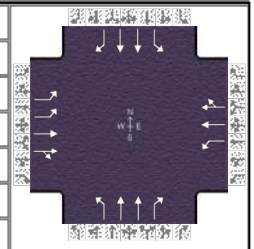
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	9.9	12.3	12.5	14.9	10.9	66.1	9.1	64.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.0	0.0	3.0	0.0
Queue Clearance Time (g_s), s	5.6	7.5	8.6	8.2	7.3		5.8	
Green Extension Time (g_e), s	0.2	0.8	0.1	0.8	0.1	0.0	0.1	0.0
Phase Call Probability	0.98	1.00	0.97	1.00	0.93		0.85	
Max Out Probability	0.00	0.00	0.01	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	143	98	93	132	118	113	96	709	85	69	804	221
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1885	1628	1795	1885	1732	1795	1889	1610	1810	1874	1610
Queue Service Time (g_s), s	3.6	5.0	5.5	6.6	5.9	6.2	5.3	8.8	2.1	3.8	10.8	6.3
Cycle Queue Clearance Time (g_c), s	3.6	5.0	5.5	6.6	5.9	6.2	5.3	8.8	2.1	3.8	10.8	6.3
Green Ratio (*g/C*)	0.14	0.08	0.08	0.17	0.11	0.11	0.07	0.62	0.62	0.05	0.60	0.60
Capacity (*c*), veh/h	412	157	135	257	205	188	124	2347	1000	93	2263	972
Volume-to-Capacity Ratio (*X*)	0.347	0.625	0.686	0.513	0.574	0.602	0.776	0.302	0.085	0.746	0.355	0.227
Back of Queue (*Q*), ft/ln (95 th percentile)	70	107.8	102.8	129.9	125.5	120.9	108.5	142.5	29.9	78.7	180.9	92.1
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	4.3	4.1	5.2	5.0	4.8	4.3	5.7	1.2	3.1	7.1	3.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00	0.00	0.36	0.00	0.00	0.25	0.00	0.11	0.27	0.00	0.26
Uniform Delay (d_1), s/veh	38.5	44.3	44.6	37.1	42.4	42.5	45.8	8.8	7.6	46.8	10.0	9.1
Incremental Delay (d_2), s/veh	0.2	1.5	2.3	0.6	0.9	1.2	3.9	0.3	0.2	4.4	0.4	0.5
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	38.7	45.9	46.9	37.7	43.3	43.7	49.7	9.2	7.7	51.2	10.4	9.6
Level of Service (LOS)	D	D	D	D	D	D	D	A	A	D	B	A
Approach Delay, s/veh / LOS	43.1	D		41.4	D		13.4	B		12.9	B	
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.46	B	2.46	B	2.24	B	2.39	B
Bicycle LOS Score / LOS	0.76	A	0.79	A	1.22	A	1.39	A

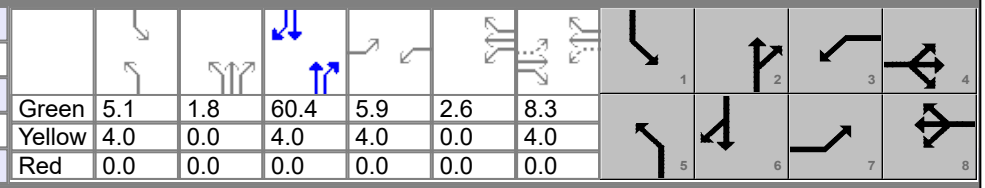
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_PM.xus		
Project Description	2022 Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	128	170	54	93	688	82	67	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.1	1.8	60.4	5.9	2.6	8.3						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						

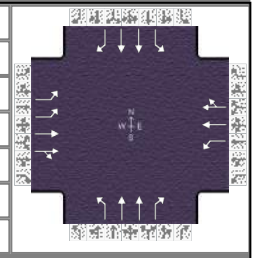
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	1.000	0.992	1.000	0.992	0.992	1.000	0.992	0.992	1.000	1.000	0.984	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	1.000	1.000	1.000	0.952	1.000	1.000	0.952	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.864	0.864		0.919	0.919		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3514	2084	1429	1795	2767	851	1795	3778	1610	1810	3749	1610
Proportion of Vehicles Arriving on Green (P)	0.06	0.08	0.08	0.08	0.11	0.11	0.07	0.62	0.62	0.05	0.60	0.60
Incremental Delay Factor (k)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.50	0.50	0.04	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Green Ratio (g/C)	0.14	0.08	0.17	0.11	0.07	0.62	0.05	0.60
Permitted Saturation Flow Rate (s_p), veh/h/ln	1168	0	1202	0	0	0	0	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	8.3	0.0	8.9	0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g_u), s	2.6	0.0	2.8	0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s	0.4		0.8					
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln						0		0
Protected Right Effective Green Time (g_R), s						0.0		0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.710	0.000	1.557	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.150	0.000	0.148	0.000	0.079	0.000	0.083
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	166.14	42.04	217.43	39.72	1242.42	7.17	1207.14	7.86
Bicycle F_w / F_v	-3.64	0.28	-3.64	0.30	-3.64	0.73	-3.64	0.90

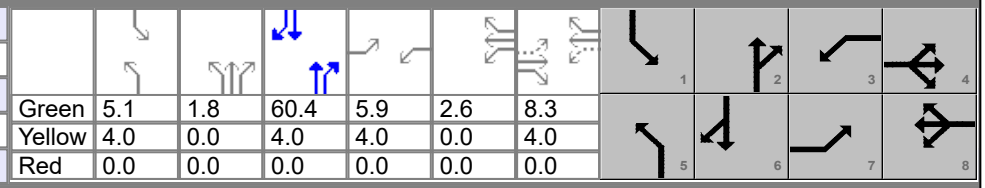
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 Existing_PM.xus		
Project Description	2022 Existing				



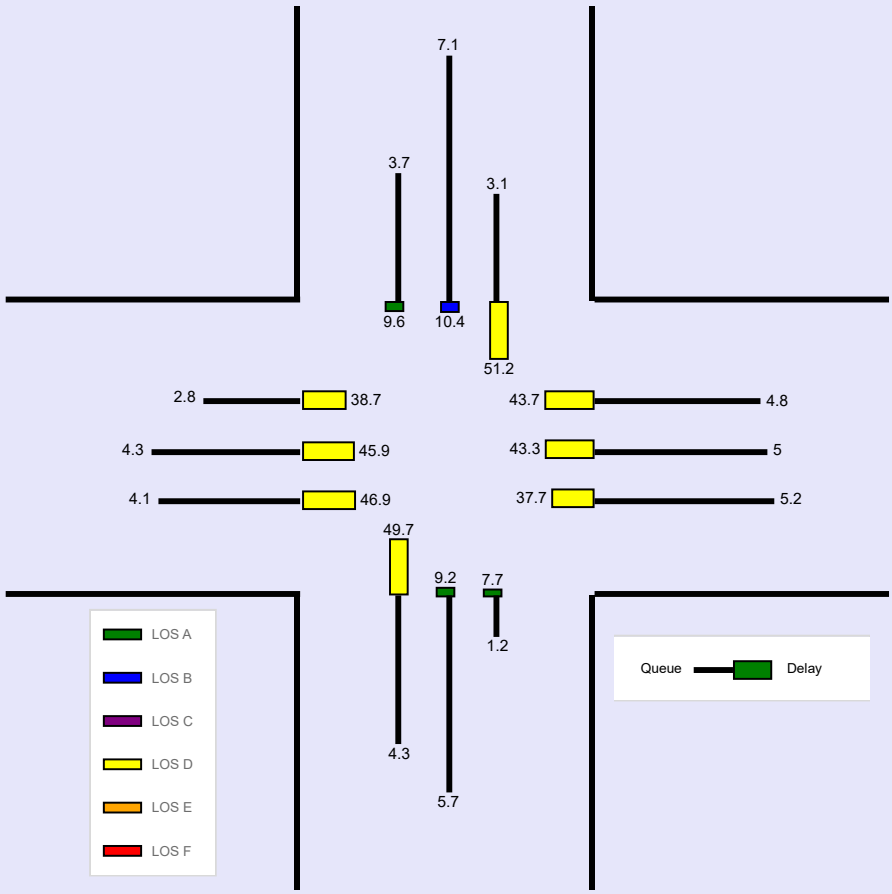
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	128	170	54	93	688	82	67	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.1	1.8		60.4	5.9	2.6	8.3					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	0.0	0.0		0.0	0.0	0.0	0.0					

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	70	107.8	102.8	129.9	125.5	120.9	108.5	142.5	29.9	78.7	180.9	92.1
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	4.3	4.1	5.2	5.0	4.8	4.3	5.7	1.2	3.1	7.1	3.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00	0.00	0.36	0.00	0.00	0.25	0.00	0.11	0.27	0.00	0.26
Control Delay (*d*), s/veh	38.7	45.9	46.9	37.7	43.3	43.7	49.7	9.2	7.7	51.2	10.4	9.6
Level of Service (LOS)	D	D	D	D	D	D	D	A	A	D	B	A
Approach Delay, s/veh / LOS	43.1	D		41.4	D		13.4	B		12.9	B	
Intersection Delay, s/veh / LOS	20.7						C					



--- Messages ---

No errors or warnings exist.

--- Comments ---

HCS7 Two-Way Stop-Control Report

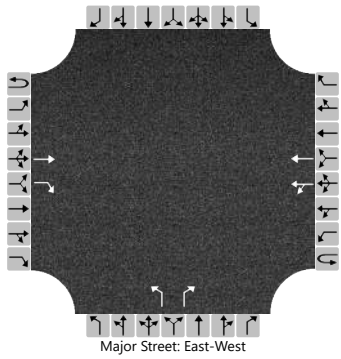
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	2022 Existing

Site Information

Intersection	Sports Complex & Summit
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Sports Complex Driveway
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	0	2	0		1	0	1		0	0	0
Configuration			T	R		LT	T			L		R				
Volume (veh/h)			367	7		4	253			8		3				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			No							No						
Median Type | Storage				Undivided												

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.5		6.2				
Critical Headway (sec)						4.10				6.80		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4				8		3				
Capacity, c (veh/h)						1180				487		669				
v/c Ratio						0.00				0.02		0.00				
95% Queue Length, Q_{95} (veh)						0.0				0.1		0.0				
Control Delay (s/veh)						8.1				12.5		10.4				
Level of Service (LOS)						A				B		B				
Approach Delay (s/veh)						0.1				11.9						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

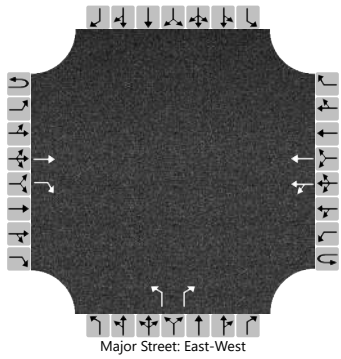
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	2022 Existing

Site Information

Intersection	Sports Complex & Summit
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Sports Complex Driveway
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	0	2	0		1	0	1		0	0	0
Configuration			T	R		LT	T			L		R				
Volume (veh/h)			306	8		2	364			2		4				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			No							No						
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.5		6.2				
Critical Headway (sec)						4.10				6.80		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						2				2		4				
Capacity, c (veh/h)						1225				475		710				
v/c Ratio						0.00				0.00		0.01				
95% Queue Length, Q_{95} (veh)						0.0				0.0		0.0				
Control Delay (s/veh)						7.9				12.6		10.1				
Level of Service (LOS)						A				B		B				
Approach Delay (s/veh)						0.1				10.9						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

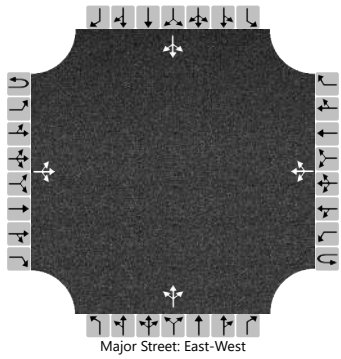
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	2022 Existing

Site Information

Intersection	Maple Way & Summit
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Maple Way
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	361	5		2	224	1		17	0	2		2	0	18
Percent Heavy Vehicles (%)		20				0				0	0	50		0	0	50
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.30				4.10				7.10	6.50	6.70		7.10	6.50	6.70
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.38				2.20				3.50	4.00	3.75		3.50	4.00	3.75

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				2					20				21	
Capacity, c (veh/h)		1234				1188					394				650	
v/c Ratio		0.00				0.00					0.05				0.03	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.1	
Control Delay (s/veh)		7.9				8.0					14.6				10.7	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)		0.1				0.1				14.6				10.7		
Approach LOS										B				B		

HCS7 Two-Way Stop-Control Report

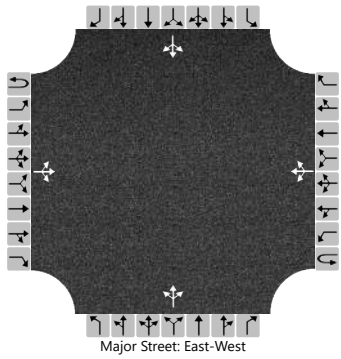
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	2022 Existing

Site Information

Intersection	Maple Way & Summit
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Maple Way
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		12	277	22		2	341	5		9	0	2		1	0	12
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		13				2					12				14	
Capacity, c (veh/h)		1198				1250					374				634	
v/c Ratio		0.01				0.00					0.03				0.02	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.1	
Control Delay (s/veh)		8.0				7.9					14.9				10.8	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	0.4				0.1				14.9				10.8			
Approach LOS									B				B			

APPENDIX D

TURN LANE WARRANT ANALYSIS

RIGHT TURN LANE WARRANTS				
Criteria	Warrant	Criteria Met?		Reason
		Summit Avenue & Sports Complex Driveway / Proposed Driveway	Summit Avenue & Proposed Driveway	
Intersections in Rural and Developing Areas				
1	Intersections meeting the criteria in FDM 11-25 Attachment 1.1	N/A	N/A	Not a rural area
Two-Way Stop-Controlled Intersections on Urban Low Speed and Tranitional Roads				
1	Check with traffic operations on the need for right turn lanes. Accommodate transit, pedestrian and bicyclist roadway users	No	No	Traffic operations for the major road to minor road right turns are acceptable without right-turn lanes
2	At any intersection where the right-turning volume is greater than 150 vph and where there is greater than 300 vplph on the mainline	No	No	Turning volumes are less than 150 vph
3	Intersections meeting the warrants of FDM 11-25 Figure 10.1	No	No	Major road volume is not enough
Signalized Intersections				
1	Consider providing exclusive right turn lanes for all approaches at a signalized intersection.	N/A	N/A	Not a signalized intersection

LEFT TURN LANE WARRANTS				
Criteria	Warrant	Criteria Met?		Reason
		Summit Avenue & Sports Complex Driveway / Proposed Driveway	Summit Avenue & Proposed Driveway	
1	All median openings on rural divided highways and on urban and transitional high-speed divided highways	N/A	N/A	Not a high-speed divided highway
2	Median openings on urban low-speed roadways unless left-turn PHV<20 vph or sideroad/driveway AADT<400 vpd	No	No	Speed limit greater than 40 mph on Summit west of Sports Complex Drivweway, so not a low-speed roadway.
3	All intersections on a 2-lane community bypass	No	No	Not a community bypass road
4	Intersections meeting the warrants of FDM 11-25 Table 5.1	No	No	Does not meet minimum criteria speed
5	To replace TWLTLs at non-signalized intersections/driveways where the left turn volume exceeds 100 vph	N/A	N/A	No TWLTL present

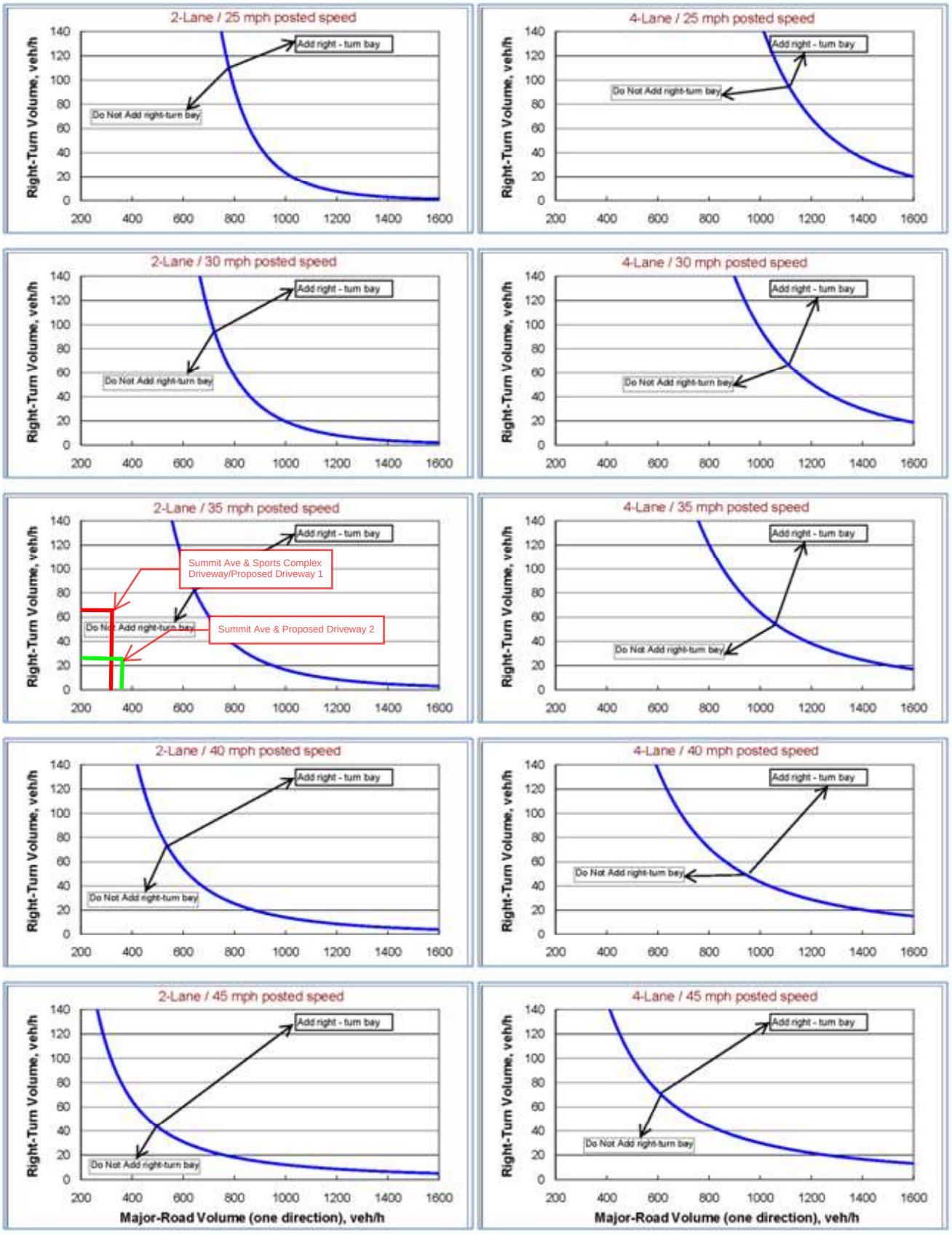


***Figure 10.1** Guidelines for a Major-road Right-turn Bay at Urban Two-way Stop-controlled Intersections*[81]

10.3.1 Corner Curb Radius

Central Business District (CBD) streets are typically undivided and often operate as one-way roadways. A lower

***Table 5.1** Operational Warrants for Left-Turn Lanes at Intersections on Two-Lane Highways* [59]

Opposing Volume (veh/hr)	Advancing volume to warrant a left-turn lane (veh/hr) with 5 percent left turns	with 10 percent left turns	with 20 percent left turns	with 30 percent left turns
		40-mph Operating Speed		
800	330	240	180	160
600	410	305	225	200
400	510	380	275	245
200	640	470	350	305
100	720	515	390	340
		50-mph Operating Speed		
800	280	210	165	135
600	350	260	195	170
400	430	320	240	210
200	550	400	300	270
100	615	445	335	295
		60-mph Operating Speed		
800	230	170	125	115
600	290	210	160	140
400	365	270	200	175
200	450	330	250	215
100	505	370	275	240

AM

PM

396

253 (AM)/ 364 (PM)

14/367=3.8% (AM) / 44/306=14.4% (PM)

Existing Through volume = 306 < Advancing Volume = 396

5.3 Design Criteria

See FDM 11-25-2.1 for guidance on Intersection *Design Vehicles* and Intersection *Check Vehicles* (including *OSOW Vehicles)*.

The assumed speed of a vehicle making a minimum radius left turn is 10-15 mph.[60]

Develop Intersection designs, including the location and shape of the median nose and median opening, by using design vehicle turning templates and an appropriate control radius. Design the intersection so that the Design Vehicle(s) for the turning movement(s) stays in lane (see Table 2.1). Larger vehicles may encroach on other lanes as shown in Figure 2.2 and Table 2.1.

Design movements to allow vehicles to turn with a smooth continuous radius. Simultaneous opposing left turns must be able to complete their turns with a clearance between them as they pass each other of typically 10 feet / 3 feet minimum for opposing single left turn lanes (see FDM 11-25-5.4.3.1 for guidance on multiple left turn

[59] (*1) A Policy on Geometric Design of Highways and Streets 2004*, 5th edition. AASHTO, 2004., p. 685, Exh. 9-75, "Guide for Left Turning Lanes on Two-Lane Highways"

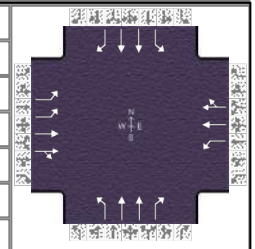
[60] (*1) A Policy on Geometric Design of Highways and Streets 2004*, 5th edition. AASHTO, 2004., chapter 9, p.690

APPENDIX E

CAPACITY ANALYSIS WORKSHEETS
2021 BUILD

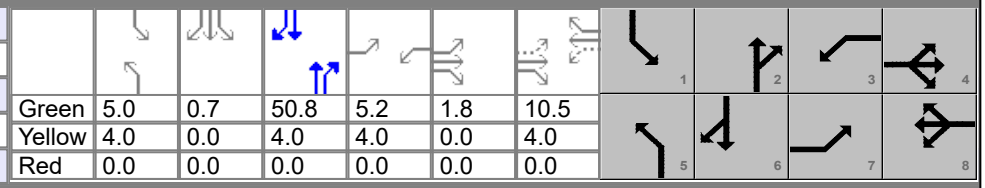
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_AM.xus		
Project Description	Existing + Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	75	76	128	69	849	127	80	490	80

Signal Information					EB			WB			NB			SB		
Cycle, s	90.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	5.0	0.7		50.8	5.2	1.8	10.5					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		0.0	0.0	0.0	0.0					



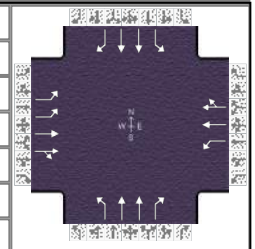
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	75	76	128	69	849	127	80	490	80
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	3		5	4		3	3	0	6	4	2
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	450	0		360	0		430	0	270	290	0	350
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	35	35	35	45	45	45	45	45	45

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	30.0	20.0	30.0	20.0	20.0	20.0	20.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Green (G_{min}), s	6	6	6	6	6	6	6	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		0.0		0.0		0.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

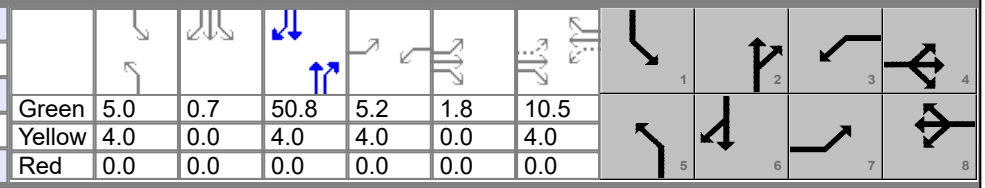
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_AM.xus		
Project Description	Existing + Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	75	76	128	69	849	127	80	490	80

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	0.7	50.8	5.2	1.8	10.5						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						

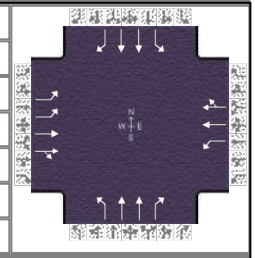
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.0	16.3	9.2	14.5	9.0	54.8	9.7	55.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.0	0.0	3.0	0.0
Queue Clearance Time (g_s), s	6.7	8.7	5.6	9.6	5.7		6.4	
Green Extension Time (g_e), s	0.3	0.9	0.1	0.9	0.1	0.0	0.1	0.0
Phase Call Probability	0.99	1.00	0.86	1.00	0.84		0.88	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	211	141	135	80	81	136	73	903	135	85	521	85
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1730	1856	1687	1739	1841	1560	1767	1859	1610	1725	1845	1585
Queue Service Time (g_s), s	4.7	6.4	6.7	3.6	3.7	7.6	3.7	12.6	3.6	4.4	6.3	2.2
Cycle Queue Clearance Time (g_c), s	4.7	6.4	6.7	3.6	3.7	7.6	3.7	12.6	3.6	4.4	6.3	2.2
Green Ratio (*g/C*)	0.19	0.14	0.14	0.17	0.12	0.12	0.06	0.56	0.56	0.06	0.57	0.57
Capacity (*c*), veh/h	504	254	231	223	215	183	99	2098	908	110	2109	906
Volume-to-Capacity Ratio (*X*)	0.418	0.555	0.582	0.357	0.375	0.746	0.741	0.431	0.149	0.775	0.247	0.094
Back of Queue (*Q*), ft/ln (95 th percentile)	87.7	132.1	123.9	69.5	75.6	132.5	75.8	207.1	52.6	90	104.3	31.7
Back of Queue (*Q*), veh/ln (95 th percentile)	3.5	5.2	5.0	2.7	2.9	5.3	3.0	8.1	2.1	3.4	4.0	1.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.19	0.00	0.00	0.19	0.00	0.00	0.18	0.00	0.19	0.31	0.00	0.09
Uniform Delay (d_1), s/veh	31.4	36.3	36.4	32.4	36.7	38.4	41.8	11.3	9.3	41.5	9.6	8.7
Incremental Delay (d_2), s/veh	0.2	0.7	0.9	0.4	0.4	2.3	4.0	0.6	0.3	4.4	0.3	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	31.6	37.0	37.3	32.8	37.1	40.7	45.9	11.9	9.7	45.9	9.9	8.9
Level of Service (LOS)	C	D	D	C	D	D	D	B	A	D	A	A
Approach Delay, s/veh / LOS	34.8	C		37.6	D		13.9	B		14.2	B	
Intersection Delay, s/veh / LOS	20.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.45	B	2.24	B	2.39	B
Bicycle LOS Score / LOS	0.89	A	0.73	A	1.40	A	1.06	A

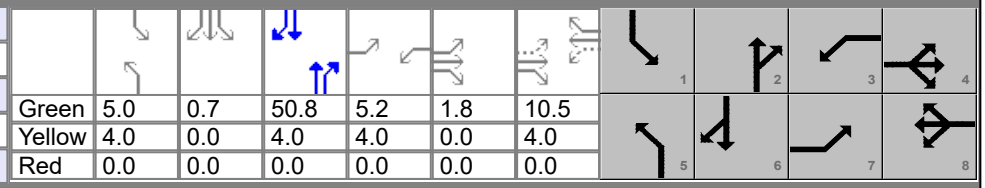
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_AM.xus		
Project Description	Existing + Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	75	76	128	69	849	127	80	490	80

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	0.7	50.8	5.2	1.8	10.5						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						

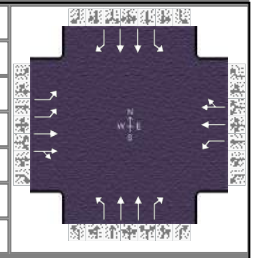
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.984	0.977	1.000	0.961	0.969	1.000	0.977	0.977	1.000	0.953	0.969	0.984
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	1.000	1.000	1.000	0.952	1.000	1.000	0.952	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.909	0.909		0.847	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3459	2609	934	1739	1841	1560	1767	3719	1610	1725	3689	1585
Proportion of Vehicles Arriving on Green (P)	0.08	0.14	0.14	0.06	0.12	0.12	0.06	0.56	0.56	0.06	0.57	0.57
Incremental Delay Factor (k)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.50	0.50	0.04	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Green Ratio (g/C)	0.19	0.14	0.17	0.12	0.06	0.56	0.06	0.57
Permitted Saturation Flow Rate (s_p), veh/h/ln	1164	0	1077	0	0	0	0	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	10.5	0.0	10.5	0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g_u), s	2.9	0.0	3.6	0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s	0.8		0.6					
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln						0		0
Protected Right Effective Green Time (g_R), s						0.0		0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.710	0.000	1.557	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.141	0.000	0.143	0.000	0.086	0.000	0.085
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	273.90	33.52	233.99	35.09	1128.08	8.55	1143.29	8.26
Bicycle F_w / F_v	-3.64	0.40	-3.64	0.24	-3.64	0.92	-3.64	0.57

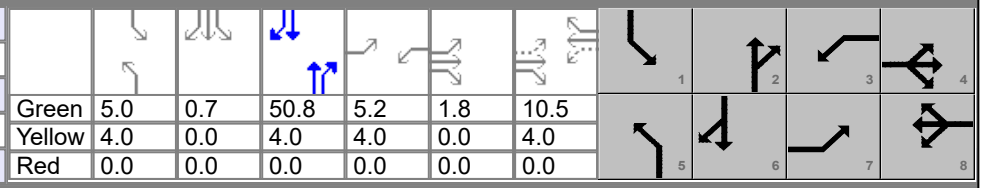
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	AM Peak Hour	PHF	0.94
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_AM.xus		
Project Description	Existing + Project				



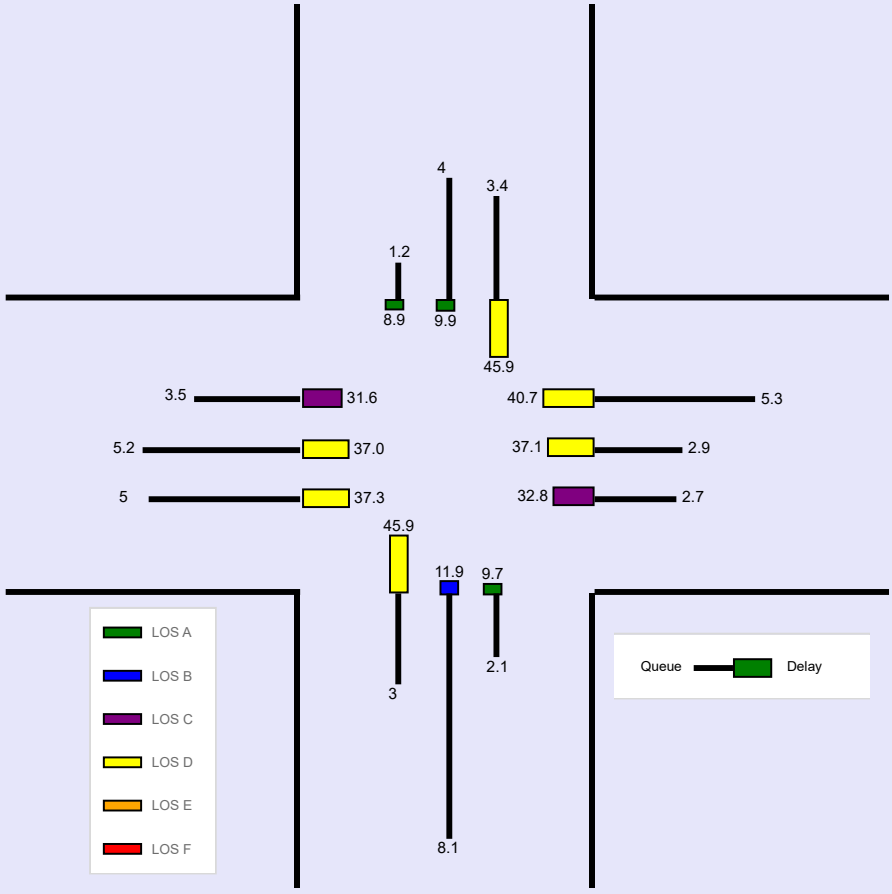
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	198	189	70	75	76	128	69	849	127	80	490	80

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	5.0	0.7	50.8	5.2	1.8	10.5						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	87.7	132.1	123.9	69.5	75.6	132.5	75.8	207.1	52.6	90	104.3	31.7
Back of Queue (*Q*), veh/ln (95 th percentile)	3.5	5.2	5.0	2.7	2.9	5.3	3.0	8.1	2.1	3.4	4.0	1.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.19	0.00	0.00	0.19	0.00	0.00	0.18	0.00	0.19	0.31	0.00	0.09
Control Delay (*d*), s/veh	31.6	37.0	37.3	32.8	37.1	40.7	45.9	11.9	9.7	45.9	9.9	8.9
Level of Service (LOS)	C	D	D	C	D	D	D	B	A	D	A	A
Approach Delay, s/veh / LOS	34.8	C		37.6	D		13.9	B		14.2	B	
Intersection Delay, s/veh / LOS	20.6						C					



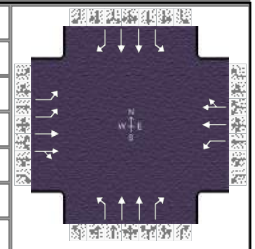
--- Messages ---

No errors or warnings exist.

--- Comments ---

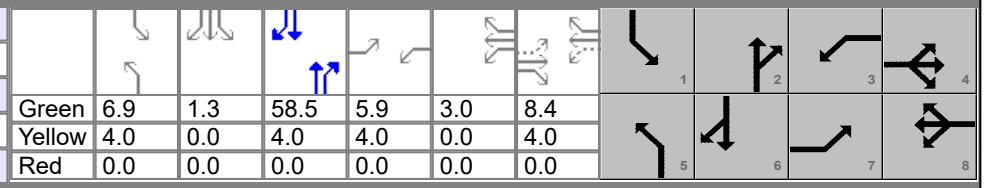
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_PM.xus		
Project Description	Existing + Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	137	170	82	93	688	97	114	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.9	1.3		58.5	5.9	3.0	8.4					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	0.0	0.0		0.0	0.0	0.0	0.0					

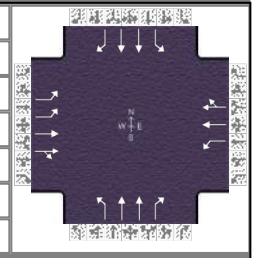
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	137	170	82	93	688	97	114	780	214
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	0	1		1	1		1	1	0	0	2	0
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	450	0		360	0		430	0	270	290	0	350
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	35	35	35	45	45	45	45	45	45

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	30.0	20.0	30.0	20.0	30.0	20.0	30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Green (G_{min}), s	6	6	6	6	6	6	6	6
Start-Up Lost Time (*l*t), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		0.0		0.0		0.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_PM.xus		
Project Description	Existing + Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	137	170	82	93	688	97	114	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.9	1.3	58.5	5.9	3.0	8.4	1	2	3	4		
Yellow	4.0	0.0	4.0	4.0	0.0	4.0	5	6	7	8		
Red	0.0	0.0	0.0	0.0	0.0	0.0						

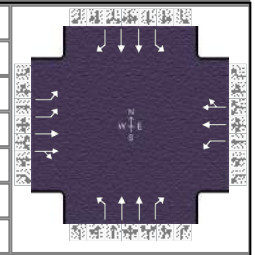
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	9.9	12.4	12.9	15.4	10.9	62.5	12.2	63.8
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.0	0.0	3.0	0.0
Queue Clearance Time (g_s), s	5.6	7.5	9.0	9.2	7.3		8.4	
Green Extension Time (g_e), s	0.2	0.8	0.1	0.8	0.1	0.0	0.2	0.0
Phase Call Probability	0.98	1.00	0.98	1.00	0.93		0.96	
Max Out Probability	0.00	0.00	0.01	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	143	98	93	141	133	126	96	709	100	118	804	221
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1885	1628	1795	1885	1683	1795	1889	1610	1810	1874	1610
Queue Service Time (g_s), s	3.6	5.0	5.5	7.0	6.7	7.2	5.3	9.6	2.7	6.4	11.0	6.4
Cycle Queue Clearance Time (g_c), s	3.6	5.0	5.5	7.0	6.7	7.2	5.3	9.6	2.7	6.4	11.0	6.4
Green Ratio (*g/C*)	0.14	0.08	0.08	0.18	0.11	0.11	0.07	0.58	0.58	0.08	0.60	0.60
Capacity (*c*), veh/h	401	158	136	266	215	192	124	2210	942	149	2243	963
Volume-to-Capacity Ratio (*X*)	0.357	0.621	0.681	0.531	0.621	0.659	0.776	0.321	0.106	0.789	0.359	0.229
Back of Queue (*Q*), ft/ln (95 th percentile)	70	107.7	102.7	138	143.2	135.7	108.5	163.1	40.9	130.4	184.1	93.8
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	4.3	4.1	5.5	5.7	5.4	4.3	6.5	1.6	5.2	7.2	3.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.15	0.45	0.00	0.27
Uniform Delay (d_1), s/veh	38.5	44.3	44.5	36.5	42.2	42.4	45.8	10.6	9.2	45.0	10.3	9.3
Incremental Delay (d_2), s/veh	0.2	1.5	2.2	0.6	1.1	1.4	3.9	0.4	0.2	3.5	0.4	0.6
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	38.7	45.8	46.7	37.1	43.3	43.9	49.7	11.0	9.4	48.5	10.7	9.9
Level of Service (LOS)	D	D	D	D	D	D	D	B	A	D	B	A
Approach Delay, s/veh / LOS	43.0	D		41.3	D		14.9	B		14.5	B	
Intersection Delay, s/veh / LOS	21.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.46	B	2.46	B	2.24	B	2.39	B
Bicycle LOS Score / LOS	0.76	A	0.82	A	1.23	A	1.43	A

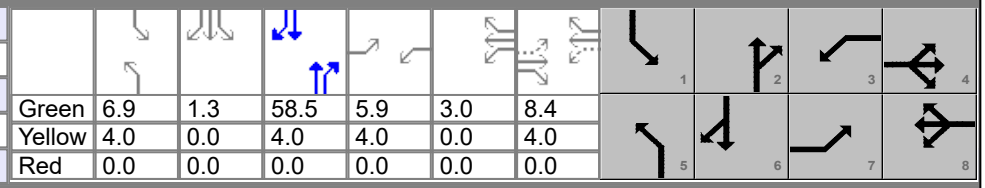
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_PM.xus		
Project Description	Existing + Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	137	170	82	93	688	97	114	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	6.9	1.3		58.5	5.9	3.0	8.4					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	0.0	0.0		0.0	0.0	0.0	0.0					

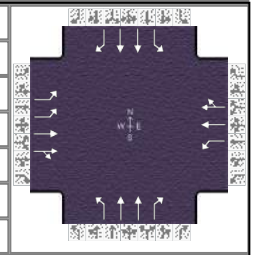
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	1.000	0.992	1.000	0.992	0.992	1.000	0.992	0.992	1.000	1.000	0.984	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	1.000	1.000	1.000	0.952	1.000	1.000	0.952	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.864	0.864		0.893	0.893		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3514	2084	1429	1795	2442	1126	1795	3778	1610	1810	3749	1610
Proportion of Vehicles Arriving on Green (P)	0.06	0.08	0.08	0.09	0.11	0.11	0.07	0.58	0.58	0.08	0.60	0.60
Incremental Delay Factor (k)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.50	0.50	0.04	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Green Ratio (g/C)	0.14	0.08	0.18	0.11	0.07	0.58	0.08	0.60
Permitted Saturation Flow Rate (s_p), veh/h/ln	1137	0	1202	0	0	0	0	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	8.4	0.0	9.4	0.0	0.0	0.0	0.0	0.0
Permitted Service Time (g_u), s	2.2	0.0	2.8	0.0	0.0	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s	0.4		0.9					
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln						0		0
Protected Right Effective Green Time (g_R), s						0.0		0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.710	0.000	1.557	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.150	0.000	0.147	0.000	0.086	0.000	0.084
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	167.36	41.98	227.95	39.25	1169.68	8.62	1196.63	8.07
Bicycle F_w / F_v	-3.64	0.28	-3.64	0.33	-3.64	0.75	-3.64	0.94

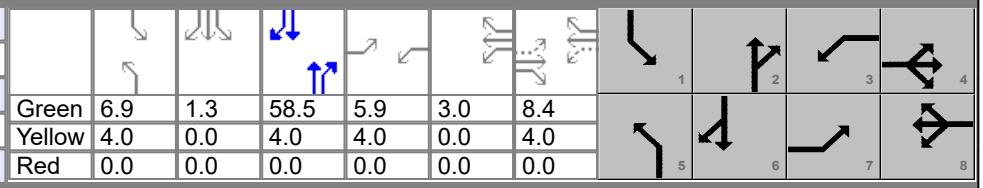
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	V3 Companies			Duration, h	0.250
Analyst	MFM	Analysis Date	Mar 18, 2022	Area Type	Other
Jurisdiction	Waukesha County	Time Period	PM Peak Hour	PHF	0.97
Urban Street	Meadowbrook Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Meadowbrook Rd & Su…	File Name	1 FwP_PM.xus		
Project Description	Existing + Project				



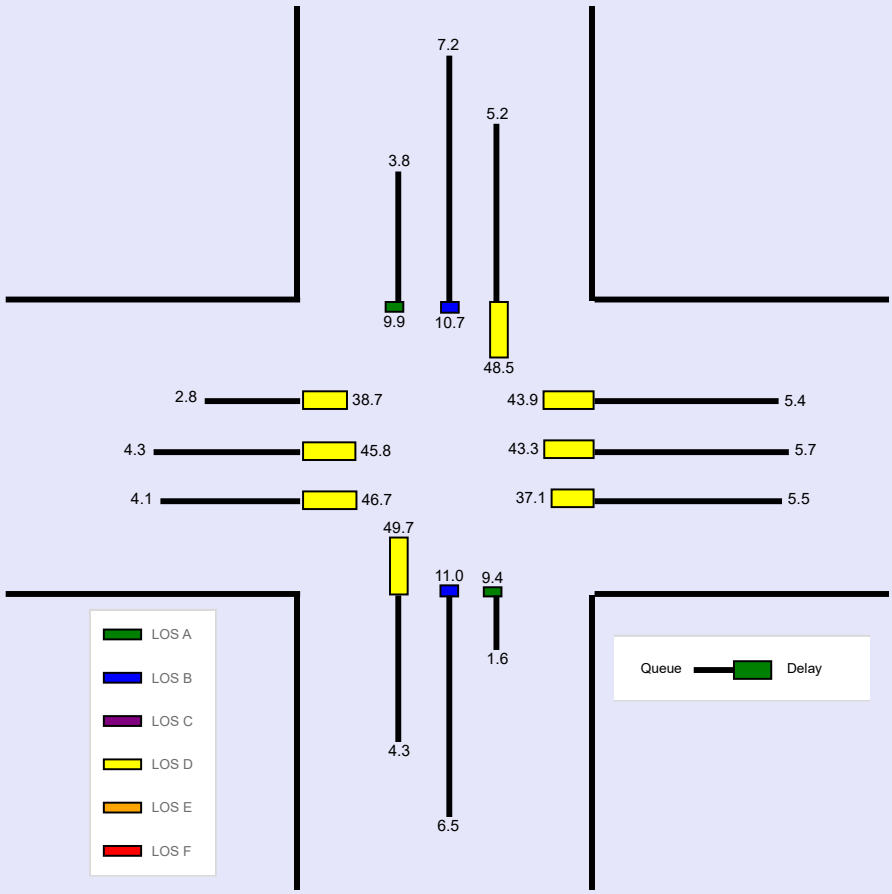
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	139	106	79	137	170	82	93	688	97	114	780	214

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.9	1.3	58.5	5.9	3.0	8.4						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	70	107.7	102.7	138	143.2	135.7	108.5	163.1	40.9	130.4	184.1	93.8
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	4.3	4.1	5.5	5.7	5.4	4.3	6.5	1.6	5.2	7.2	3.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.15	0.45	0.00	0.27
Control Delay (*d*), s/veh	38.7	45.8	46.7	37.1	43.3	43.9	49.7	11.0	9.4	48.5	10.7	9.9
Level of Service (LOS)	D	D	D	D	D	D	D	B	A	D	B	A
Approach Delay, s/veh / LOS	43.0	D		41.3	D		14.9	B		14.5	B	
Intersection Delay, s/veh / LOS	21.9						C					



--- Messages ---

No errors or warnings exist.

--- Comments ---

HCS7 Two-Way Stop-Control Report

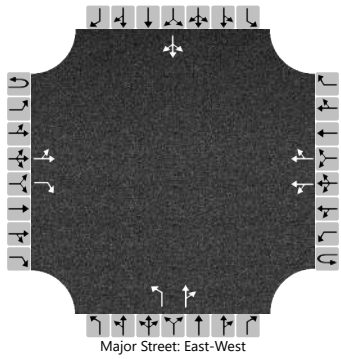
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Exisitng + Project

Site Information

Intersection	Summit & Sports Complex
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Sports Complex Driveway
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	0	2	0		1	1	0		0	1	0
Configuration		LT		R		LT		TR		L		TR			LTR	
Volume (veh/h)		14	373	7		4	269	21		8	0	3		71	0	47
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.2		7.5	6.5	6.9
Critical Headway (sec)		4.10				4.10				7.50	6.50	6.20		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		15				4				8		3			123	
Capacity, c (veh/h)		1270				1174				383		664			419	
v/c Ratio		0.01				0.00				0.02		0.00			0.29	
95% Queue Length, Q_{95} (veh)		0.0				0.0				0.1		0.0			1.2	
Control Delay (s/veh)		7.9				8.1				14.6		10.4			17.1	
Level of Service (LOS)		A				A				B		B			C	
Approach Delay (s/veh)		0.4				0.1				13.5				17.1		
Approach LOS										B				C		

HCS7 Two-Way Stop-Control Report

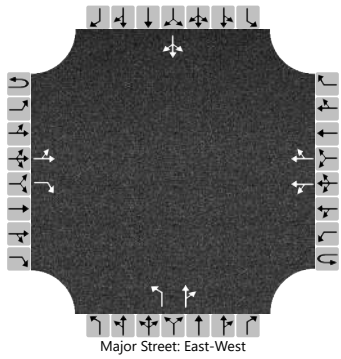
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Existing + Project

Site Information

Intersection	Summit & Sports Complex
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Sports Complex Driveway
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	0	2	0		1	1	0		0	1	0
Configuration		LT		R		LT		TR		L		TR			LTR	
Volume (veh/h)		44	324	8		2	375	67		2	0	4		39	0	26
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.2		7.5	6.5	6.9
Critical Headway (sec)		4.10				4.10				7.50	6.50	6.20		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		48				2				2		4			71	
Capacity, c (veh/h)		1088				1205				323		693			308	
v/c Ratio		0.04				0.00				0.01		0.01			0.23	
95% Queue Length, Q_{95} (veh)		0.1				0.0				0.0		0.0			0.9	
Control Delay (s/veh)		8.5				8.0				16.2		10.2			20.2	
Level of Service (LOS)		A				A				C		B			C	
Approach Delay (s/veh)		1.4				0.0				12.2				20.2		
Approach LOS										B				C		

HCS7 Two-Way Stop-Control Report

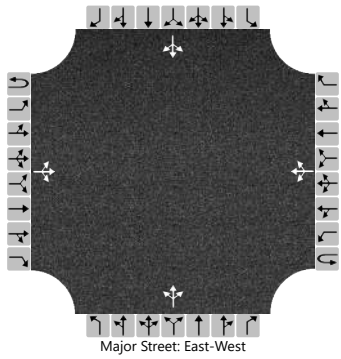
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Existing + Project

Site Information

Intersection	Maple Way & Summit
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Maple Way
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	457	5		2	253	1		17	0	2		2	0	18
Percent Heavy Vehicles (%)		20				0				0	0	50		50	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.30				4.10				7.10	6.50	6.70		7.60	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.38				2.20				3.50	4.00	3.75		3.95	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				2					20				21	
Capacity, c (veh/h)		1202				1092					325				655	
v/c Ratio		0.00				0.00					0.06				0.03	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.1	
Control Delay (s/veh)		8.0				8.3					16.8				10.7	
Level of Service (LOS)		A				A					C				B	
Approach Delay (s/veh)		0.1				0.1				16.8				10.7		
Approach LOS										C				B		

HCS7 Two-Way Stop-Control Report

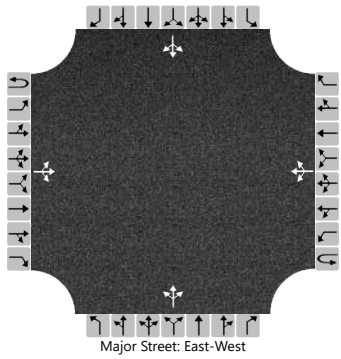
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Existing + Project

Site Information

Intersection	Maple Way & Summit
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Maple Way
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		12	332	22		2	435	5		9	0	2		1	0	12
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		13				2					12				14	
Capacity, c (veh/h)		1099				1189					295				546	
v/c Ratio		0.01				0.00					0.04				0.03	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.1	
Control Delay (s/veh)		8.3				8.0					17.7				11.8	
Level of Service (LOS)		A				A					C				B	
Approach Delay (s/veh)		0.4				0.1				17.7				11.8		
Approach LOS										C				B		

HCS7 Two-Way Stop-Control Report

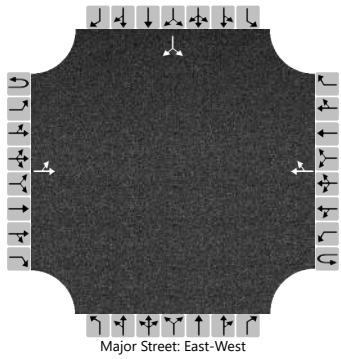
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Existing + Project

Site Information

Intersection	Summit & PR Driveway 2
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Proposed Driveway 2
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		6	438				245	8						25		16
Percent Heavy Vehicles (%)		3												0		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.40		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6													43	
Capacity, c (veh/h)		1292													481	
v/c Ratio		0.00													0.09	
95% Queue Length, Q_{95} (veh)		0.0													0.3	
Control Delay (s/veh)		7.8													13.2	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)	0.2												13.2			
Approach LOS													B			

HCS7 Two-Way Stop-Control Report

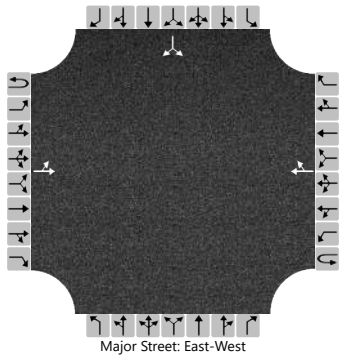
General Information

Analyst	MFM
Agency/Co.	V3 Companies
Date Performed	3/18/2022
Analysis Year	2022
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Existing + Project

Site Information

Intersection	Summit & PR Driveway 2
Jurisdiction	Waukesha County
East/West Street	Summit Ave
North/South Street	Proposed Driveway 2
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		18	345				408	27						16		11
Percent Heavy Vehicles (%)		3												0		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.40		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		19													28	
Capacity, c (veh/h)		1098													405	
v/c Ratio		0.02													0.07	
95% Queue Length, Q_{95} (veh)		0.1													0.2	
Control Delay (s/veh)		8.3													14.6	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)		0.6												14.6		
Approach LOS														B		