



Hampton, Lenzini and Renwick, Inc.
Civil Engineering • Structural Engineering • Environmental Services • Land Surveying
www.hltrengineering.com

September 4, 2020

Attn: Ellen Johnson
City of St. Charles
2 E. Main Street
St. Charles, IL 60174

Re: Munhall Glen Residential Development
St. Charles, IL
Traffic Impact Study

Dear Ms. Johnson:

Per your request we reviewed the revised Traffic Study and response letter submitted by Gewalt Hamilton Associates, Inc. (GHA) on September 2, 2020 for the referenced project. We concur with the findings of the study with one minor comment below.

1. On Exhibit 6B (2027 Total Traffic), show the traffic volume at the open access of the site at South Avenue.

If you have any questions or need additional information please contact HLR at 847-697-6700.

Yours truly,

HAMPTON, LENZINI AND RENWICK, INC.

By: *Callie Allbright*

Callie Allbright, PE, PTOE
Traffic Engineer

Amy McSwane, PE, PTOE
Preliminary/Traffic Engineering Manager

Memorandum

To: Mr. Court Airhart
Airhart Construction

From: Lynn M. Means, P.E., PTOE
Senior Transportation Engineer

Date: July 10, 2020
Updated September 2, 2020

Subject: Munhall Glen Residential Development
Munhall Avenue and Tyler Road
St. Charles, Illinois

625 Forest Edge Drive, Vernon Hills, IL 60061

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Part I. Introduction and Project Context

Gewalt Hamilton Associates, Inc. (GHA) has conducted a Traffic Summary for the proposed Munhall Glen residential development. The site is located on the northwest side of Munhall Avenue, west of Tyler Road, in St. Charles, Illinois. It currently contains a single-family residence and vacant land, accessed via two driveways on Munhall Avenue. As currently proposed, the project includes redeveloping the site to provide 50 age-targeted (not-restricted), single-family homes. Access to the site is proposed via one access on Munhall Avenue. Secondary, emergency access, is also planned via a connection to South Avenue. This also provides an opportunity to permit an open (full access) connection to South Avenue.

The following provides a summary of site traffic characteristics and the analysis conducted, which includes an analysis of the development's impact on the surrounding roadway network. *Exhibits* and *Appendices* referenced are in the Technical Addendum at the end of this document.

Part II. Background Information

Site Location Map and Roadway Inventory

Exhibit 1 provides a site location map. ***Exhibit 2*** depicts traffic operations on the roadways serving the site, including the lane geometry, traffic control (traffic signal and stop control) and posted speed limits. All roadways within the study area are under local, City of St. Charles jurisdiction except Main Street (IL Route 64) is under the jurisdiction of the Illinois Department of Transportation (IDOT). ***Appendix A*** provides a photo inventory of current traffic operations.

Area Land Uses

- The site currently contains a single-family residence with two driveways on Munhall Avenue.
- The site is bound by Tyler Ridge Business Park to the north and east, commercial/industrial uses (including Tanglewood Marine, Bluegrass, CrossFit) to the west and single family residential to the south.

Pedestrian Facilities

A sidewalk is generally provided along both sides of the study area roadways. There are a few areas of disconnect along the east side of 7th Avenue, primarily adjacent to vacant parcels. Pedestrian signals are provided at the Main Street intersections with 7th Avenue and Tyler Road. Crosswalks are also provided on all approaches of these signalized intersections, as well as several of the minor street approaches (see *Exhibit 2*).

Existing Traffic

Exhibit 3 summarizes the existing weekday morning and evening peak hour traffic volumes. Peak period count data along Tyler Road, Madison Avenue, Main Street and 7th Street was obtained from IDOT's Traffic Count Database System from year 2018, as well as along Main Street from year 2019. The IDOT data was supplemented with turning movement count conducted by GHA on Tuesday, August 25, 2020 from 7:00 to 9:00 AM and 4:00 to 6:00 PM at the intersections of Tyler Road at Munhall Avenue and Indiana Avenue at 13th Avenue.

The observed weekday morning and evening peak hours generally occurred from 7:00 to 8:00 AM and 5:00 to 6:00 PM, respectively. The peak hour for each individual intersection / road segment was used in the analysis to provide a conservative analysis scenario.

Exhibit 3 also provides the Annual Average Daily Traffic (AADT) along Main Street (year 2019) and Tyler Road, Madison Avenue and 7th Street (year 2018) obtained from IDOT's website: www.gettingaroundillinois.com. Summaries of the IDOT traffic counts can be found in **Appendix B** and the intersection traffic counts in **Appendix C**.

- Notes:
1. The IDOT traffic volumes presented in Appendix B represent "raw", unadjusted data. These volumes are adjusted based on day of week and month of year factors, resulting in an AADT which is lower than the total.
 2. The Tyler Road and Munhall Avenue intersection volumes were balanced with the IDOT segment volumes to account for abnormal traffic conditions within the study area associated with school and business closures due to COVID-19.
 3. The 2020 Tyler Road and Munhall Avenue intersection volumes were approximately 15 to 25 percent lower than the IDOT roadway segment peak hour volumes. Accordingly, to provide a conservative analysis scenario, the 2020 peak hour volumes at the intersection of Indiana Avenue and 13th Avenue were increased by 25 percent.

Crash Analysis

Crash data was obtained from the IDOT Division of Transportation and Safety for the last five calendar years, 2014 through 2018ⁱ. A summary of the crash data is provided in **Table 1** with the locations mapped on the exhibit contained in **Appendix D**. There were no reported fatalities or crashes within the five-year analysis period that involved a bicyclist or pedestrian.

As shown in Table 1, the intersection of Tyler Road at Madison Avenue and Wallace Avenue has experienced the highest number of crashes within the study area over the five-year analyses period, with an average of approximately 1.5 crashes per year. Approximately 86 percent (6 of 7) of the crashes involved property damage only and approximately 71 percent (5 of 7) were cross-movement/angle type collisions.

ⁱ Complete year 2019, as well as year 2020 crash data was not available from IDOT at the time of this study.

Table 1: Crash Summary (2014 – 2018)

Location	No. of Crashes	Severity ^A					Crash Type ^C						Percent During Wet/Icy Conditions
		PD	PI ^B			F	CM	RE	HO	FO	Ped	Bike	
			A	B	C								
Intersections ^D													
Tyler Rd & Munhall Ave	3	3	-	-	-	-	2	-	-	1	-	-	67%
Tyler Rd & Madison Ave/Wallace Ave	7	6	1	-	-	-	5	2	-	-	-	-	0%
Madison Ave & Independence Ave	3	1	-	1	1	-	1	1	-	1	-	-	0%
Madison Ave & 7th Ave	1	1	-	-	-	-	-	1	-	-	-	-	0%
7th Ave & Indiana Ave	5	5	-	-	-	-	4	-	-	1	-	-	0%
Indiana Ave & 14th Ave	1	1	-	-	-	-	-	-	-	1	-	-	0%
Segments													
Tyler Rd: Munhall Ave and Main St	3	3	-	-	-	-	-	1	-	2	-	-	0%
Madison Ave: Tyler Rd and 7th Ave	3	3	-	-	-	-	1	-	-	2	-	-	0%
7th Ave: Madison Ave and Indiana Ave	4	2	-	2	-	-	1	-	-	3	-	-	25%
Indiana Ave: 7th Ave and 14th Ave	3	3	-	-	-	-	3	-	-	-	-	-	33%
Total (2014-18)	33	28	1	3	1	0	17	5	0	11	0	0	9%

^A PD = property damage only; PI = personal injury; F = fatality.

^B Type A (incapacitating injury); Type B (non-incapacitating injury); Type C (possible injury).

^C CM = cross movement/angle; RE = rear end; HO = head on; FO = fixed object; Ped = pedestrian.

^D Crashes within 200 feet of an intersection.

No-Build Traffic

Exhibit 4 summarizes the 2027 No-Build weekday morning and evening peak hour traffic volumes. Traffic growth in the area is a function of expected land development in the region. Future traffic volume conditions were developed for the year 2027, build-out year of the development plus five years. Based on a review of historical traffic volumes and the Chicago Metropolitan Agency for Planning (CMAP) 2050 projections (see **Appendix E**), traffic volumes within the study area are assumed to experience a compounded growth rate of approximately 0.2 to 1.4 percent per year. However, to provide a conservative analysis scenario, a 0.5 to 1.5 percent per year compounded growth rate was applied (0.5% along 7th Avenue, Indiana Avenue, 13th Avenue and Tyler Road between Main Street and Madison Avenue; 1% along Main Street; and 1.5% along Madison Avenue and Tyler Road between Madison Avenue and Kirk Road).

Part III. Project Traffic Characteristics

Proposed Development

The development consists of redeveloping the site to include 50 age-targeted (not-restricted), single-family homes. Access to the site is proposed via one access on Munhall Avenue. Secondary, emergency access, is also planned via a connection to South Avenue. This also provides an opportunity to permit an open (full access) connection to South Avenue.

Trip Generation and Directional Distribution

Trip generation rates published by the Institute of Transportation Engineers (ITE) in the 10th Edition of the Manual *Trip Generation* were used to determine the anticipated traffic from the proposed residential use (see **Appendix F**). The number of vehicle trips anticipated during the weekday morning peak hour (one hour between 7:00 and 9:00 AM) and weekday evening peak hour (one hour between 4:00 and 6:00 PM), as well as on a weekday daily (24-hour) basis is displayed in **Table 2** and includes all traffic attributed to the proposed residential development (residents, visitors, deliveries, etc.).

Table 2 also presents a comparison between trip generation estimates based on traditional single-family homes and senior housing rates.

Table 2: Estimated Trip Generation

Land Use	Size	ITE Land Use Code	AM Peak Hour ¹			PM Peak Hour ²			Weekday Daily (24-hr)		
			In	Out	Total	In	Out	Total	In	Out	Total
Single Family Homes	50 Units	210	10	30	40	33	19	52	275	275	550
Senior Adult Housing		251	8	16	24	17	11	28	153	153	306
Trip Generation Comparison ³			-2	-14	-16	-16	-8	-24	-122	-122	-244

¹ One hour between 7:00 and 9:00 AM. ² One hour between 4:00 and 6:00 PM.

³ Senior housing (age-restricted) trip generation estimates less traditional (non-restricted), single-family homes.

As shown in Table 2, it is expected that the proposed residential development will generate between 306 and 550 total trips on a typical weekday for senior housing and traditional (non, age-restricted) single family uses, respectively. During the peak hours, the development is expected to generate between 24 and 40 vehicle trips during the weekday AM and between 28 and 52 trips during the weekday PM, again, for senior housing (lower value) and traditional single-family housing (higher value).

- Notes: 1. The existing site formerly contained a single-family residence.
2. The development is anticipated to be age-targeted (not restricted). As shown in Table 2, the trip generation estimates based on senior housing use (ITE LUC 251) are approximately 40 to 45 percent lower during the weekday morning and evening peak hours, respectively, as well as approximately 45 percent lower on a daily basis.
3. **Accordingly, the new trips as presented in Table 2 (highlighted in green and assumed in this study) provides a conservative analysis scenario.**

The anticipated trip distribution of site traffic is summarized in **Table 3**. This was based on current travel patterns, the operational characteristics of the street system and site access.

Table 3: Trip Distribution

Route & Direction	Percent Route To/From Site
North Avenue	
West of 7 th Avenue	20%
East of Tyler Road	35%
Tyler Road	
South of Madison Avenue	25%
7th Avenue	
South of Madison Avenue	20%
Totals =	100%

Site and Total Traffic Assignments

Exhibit 5A illustrates the site traffic assignment for the proposed development's trips, which is based on the traffic characteristics summarized in *Tables 2 and 3* (traffic generation and trip distribution) and assigned to the area roadways, assuming a gated, emergency access at South Avenue. **Exhibit 5B** illustrates the site traffic assignment, assuming an open (full access) connection to South Avenue. The site traffic (*Exhibit 5*) and 2027 No-Build traffic (*Exhibit 4*) were combined to produce the 2027 Total traffic, which is illustrated on **Exhibits 6A and 6B**, with a gated connection to South Avenue and an open connection, respectively.

Traffic Increases

As shown on *Exhibit 5*, the total (including both entering and exiting traffic) weekday AM and PM peak hour between 8 and 17 vehicle trips are expected on the roadways leading beyond the study area, or one additional vehicle every 3 to 7 minutes. **Accordingly, the amount of site-generated traffic is expected to have minimal effects on the operations of the external street network. The gated or open connection to South Avenue has minimal impact on roadway operations.**

Part IV. Traffic Evaluation

Capacity Analysis

Capacity analyses are a standard measurement that identifies how an intersection operates. They are measured in terms of Level of Service (LOS). The concept of LOS is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six Levels of Service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. LOS C is often considered acceptable for design purposes and LOS D is usually considered as providing the lower threshold of acceptable operations. Since the level of service is a function of the traffic flows placed upon it, the facility may operate at a wide range of levels of service, depending on the time of day, day of week or period of year. A description of the operating condition under each level of service, based on the analysis parameters as published in the Transportation Research Board's (TRB) Highway Capacity Manual (HCM), Sixth Edition, is provided in **Table 4**.

Table 4: Level of Service (LOS) Summary

LOS	Description	Delay (sec/veh)	
		Traffic Signal	Stop Sign
A	Describes conditions with little to no delay to motorists.	<10	< 10
B	Represents a desirable level with relatively low delay to motorists.	>10 and < 20	>10 and < 15
C	Describes conditions with average delays to motorists.	>20 and < 35	>15 and < 25
D	Describes operations where the influence of congestion becomes more noticeable. Delays are still within an acceptable range.	>35 and < 55	>25 and < 35
E	Represents operating conditions with high delay values. This level is often considered within urban settings or for minor streets intersecting major arterial roadways to be the limit of acceptable delay.	>55 and < 80	>35 and < 50
F	Is unacceptable to most drivers with high delay values that often occur, when arrival flow rates exceed the capacity of the intersection.	>80	>50

Capacity analyses were performed for four scenarios:

- *Existing Traffic* - Existing traffic,
- *No-Build Traffic* – Future (non-site, year 2027) traffic with background growth (assumed at 0.5 to 1.5 percent compounded per year) and
- *Total Traffic, Gated Access* – Future No-Build traffic volumes (year 2027) plus the addition of site generated traffic, with a gate at South Avenue.
- *Total Traffic, Open Access* – Total Traffic with open site access at South Avenue.

Table 5 summarizes the intersection capacity and queue analysis results. Capacity analysis summary printouts are provided in **Appendix G**.

Table 5: Level-of-Service Summary

Intersection / Timeframe		Roadway Conditions	Movement Group By Approach											
			> = Shared Lane - = Non Critical or not Allowed Movement											
			Eastbound			Westbound			Northbound			Southbound		
1. Tyler Rd at Munhall Ave		TWSC - EB Stops	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak	A.Existing (See Exhibit 3)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	13.3	-	-	-	-	-	8.0	-	-	-	-
			-	5	-	-	-	-	-	-	-	-	-	-
				B (13.3)			-			-			-	
	B. 2027 No-Build (See Exhibit 4)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	13.7	-	-	-	-	-	8.0	-	-	-	-
			-	5	-	-	-	-	-	-	-	-	-	-
				B (13.7)			-			-			-	
	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	13.6	-	-	-	-	-	8.0	-	-	-	-
			-	10	-	-	-	-	-	-	-	-	-	-
				B (13.6)			-			-			-	
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	13.4	-	-	-	-	-	8.0	-	-	-	-
			-	8	-	-	-	-	-	-	-	-	-	-
				B (13.4)			-			-			-	
PM Peak	A.Existing (See Exhibit 3)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	13.7	-	-	-	-	-	8.1	-	-	-	-
			-	5	-	-	-	-	-	-	-	-	-	-
				B (13.7)			-			-			-	
	B. 2027 No-Build (See Exhibit 4)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	14.0	-	-	-	-	-	8.1	-	-	-	-
			-	5	-	-	-	-	-	-	-	-	-	-
				B (14.0)			-			-			-	
	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	14.4	-	-	-	-	-	8.2	-	-	-	-
			-	8	-	-	-	-	-	-	-	-	-	-
				B (14.4)			-			-			-	
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	B	<	-	-	-	>	A	-	-	-	-
			-	14.3	-	-	-	-	-	8.2	-	-	-	-
			-	8	-	-	-	-	-	-	-	-	-	-
				B (14.3)			-			-			-	

Table 5: Level-of-Service Summary (cont.)

Intersection / Timeframe		Roadway Conditions	Movement Group By Approach											
			> = Shared Lane - = Non Critical or not Allowed Movement											
			Eastbound			Westbound			Northbound			Southbound		
2. Indiana Ave at 13th Ave (N Leg)		TWSC - NB Stops	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak	A.Existing (See Exhibit 3)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.2	-
			-	3	-	-	-	-	-	-	-	-	5	-
			-	-	-	-	-	-	-	-	-	-	A (9.2)	-
	B. 2027 No-Build (See Exhibit 4)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	3	-	-	-	-	-	-	-	-	5	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-
	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	3	-	-	-	-	-	-	-	-	5	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	3	-	-	-	-	-	-	-	-	5	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-
PM Peak	A.Existing (See Exhibit 3)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	-	-	-	-	-	-	-	-	-	8	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-
	B. 2027 No-Build (See Exhibit 4)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	-	-	-	-	-	-	-	-	-	8	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-
	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	-	-	-	-	-	-	-	-	-	8	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	-	-	-	-	-	-	-	>	A	<
			-	7.4	-	-	-	-	-	-	-	-	9.3	-
			-	-	-	-	-	-	-	-	-	-	8	-
			-	-	-	-	-	-	-	-	-	-	A (9.3)	-

Table 5: Level-of-Service Summary (cont.)

Intersection / Timeframe		Roadway Conditions	Movement Group By Approach											
			> = Shared Lane - = Non Critical or not Allowed Movement											
			Eastbound			Westbound			Northbound			Southbound		
3. Indiana Ave at 13th Ave (S Leg)		TWSC - NB Stops	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak	A.Existing (See Exhibit 3)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.3	-	-	9.1	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.1)	-	-	-	-
PM Peak	B. 2027 No-Build (See Exhibit 4)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.3	-	-	9.1	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.1)	-	-	-	-
AM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.3	-	-	9.1	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.1)	-	-	-	-
PM Peak	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.3	-	-	9.2	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.2)	-	-	-	-
AM Peak	A.Existing (See Exhibit 3)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.4	-	-	9.1	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.1)	-	-	-	-
PM Peak	B. 2027 No-Build (See Exhibit 4)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.4	-	-	9.2	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.2)	-	-	-	-
AM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.4	-	-	9.2	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.2)	-	-	-	-
PM Peak	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	-	-	>	A	-	>	A	<	-	-	-
			-	-	-	-	7.4	-	-	9.2	-	-	-	-
			-	-	-	-	-	-	-	3	-	-	-	-
			-	-	-	-	-	-	-	A (9.2)	-	-	-	-

Table 5: Level-of-Service Summary (cont.)

Intersection / Timeframe		Roadway Conditions	Movement Group By Approach											
			> = Shared Lane - = Non Critical or not Allowed Movement											
			Eastbound			Westbound			Northbound			Southbound		
4. Munhall Ave at Site Access		TWSC - EB Stops	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	<	-	-	-	A	-	-	-	-	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	8.7	-	-	-	-	7.3	-	-	-	-	-
PM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	3	-	-	-	-	-	-	-	-	-	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	A (8.7)	-	-	-	-	-	-	-	-	-	-
PM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	<	-	-	-	A	-	-	-	-	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	9	-	-	-	-	7.4	-	-	-	-	-
PM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	3	-	-	-	-	-	-	-	-	-	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	A (9.0)	-	-	-	-	-	-	-	-	-	-
PM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	>	A	<	-	-	-	A	-	-	-	-	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	8.9	-	-	-	-	7.3	-	-	-	-	-
PM Peak	C. 2027 Total - Gated (See Exhibit 6A)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	3	-	-	-	-	-	-	-	-	-	-
	D. 2027 Total - Open (See Exhibit 6B)	<ul style="list-style-type: none"> • LOS • Delay • 95th Queue Length (ft) • Approach LOS (Delay) 	-	A (8.9)	-	-	-	-	-	-	-	-	-	-

As shown in Table 5, under both existing and future conditions (no-build and total, with and without gated access at South Avenue), all movements at the study area intersections operate at desirable Levels of Service (at LOS “B” or better) during both peak hours studied. The 95th percentile queue lengths for exiting movements, as well as left-turn entering movements are not anticipated to exceed one vehicle, which will not impact operations on- or off-site. ***The gated or open connection to South Avenue has minimal impact on intersection operations.***

Part V. Recommendations and Conclusions

Analyses have been conducted to determine the impact from the proposed residential development on the adjacent roadway network. Overall, the development is anticipated to have a minimal effect on the existing traffic operations of the area street network.

In addition, the following recommendations should be considered to facilitate traffic both on and off site:

- The site access driveway should provide one inbound lane and one outbound lane, operating under Stop sign control.
- Secondary, emergency access should be provided via a connection to South Avenue. This access could permit for a future, full (open) access to South Avenue.

Part VI. Technical Addendum

The following *Exhibits* and *Appendices* were previously referenced. They provide technical support for our observations, findings and recommendations discussed in the text.

Exhibits

1. Location Map
2. Existing Operations
3. Existing Traffic
4. 2027 No-Build Traffic
5. Site Traffic
 - a. Gated Access at South Avenue
 - b. Open Access at South Avenue
6. 2027 Total Traffic
 - a. Gated Access at South Avenue
 - b. Open Access at South Avenue

Appendices

- A. Photo Inventory
- B. IDOT Traffic Count Summaries
- C. Intersection Traffic Count Summaries
- D. Crash Summary Map
- E. CMAP Traffic Volume Projections
- F. ITE Trip Generation Excerpts
- G. Capacity Analysis Worksheets

Technical Addendum

Exhibits

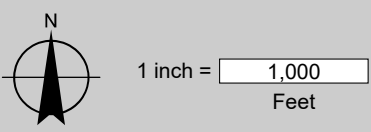
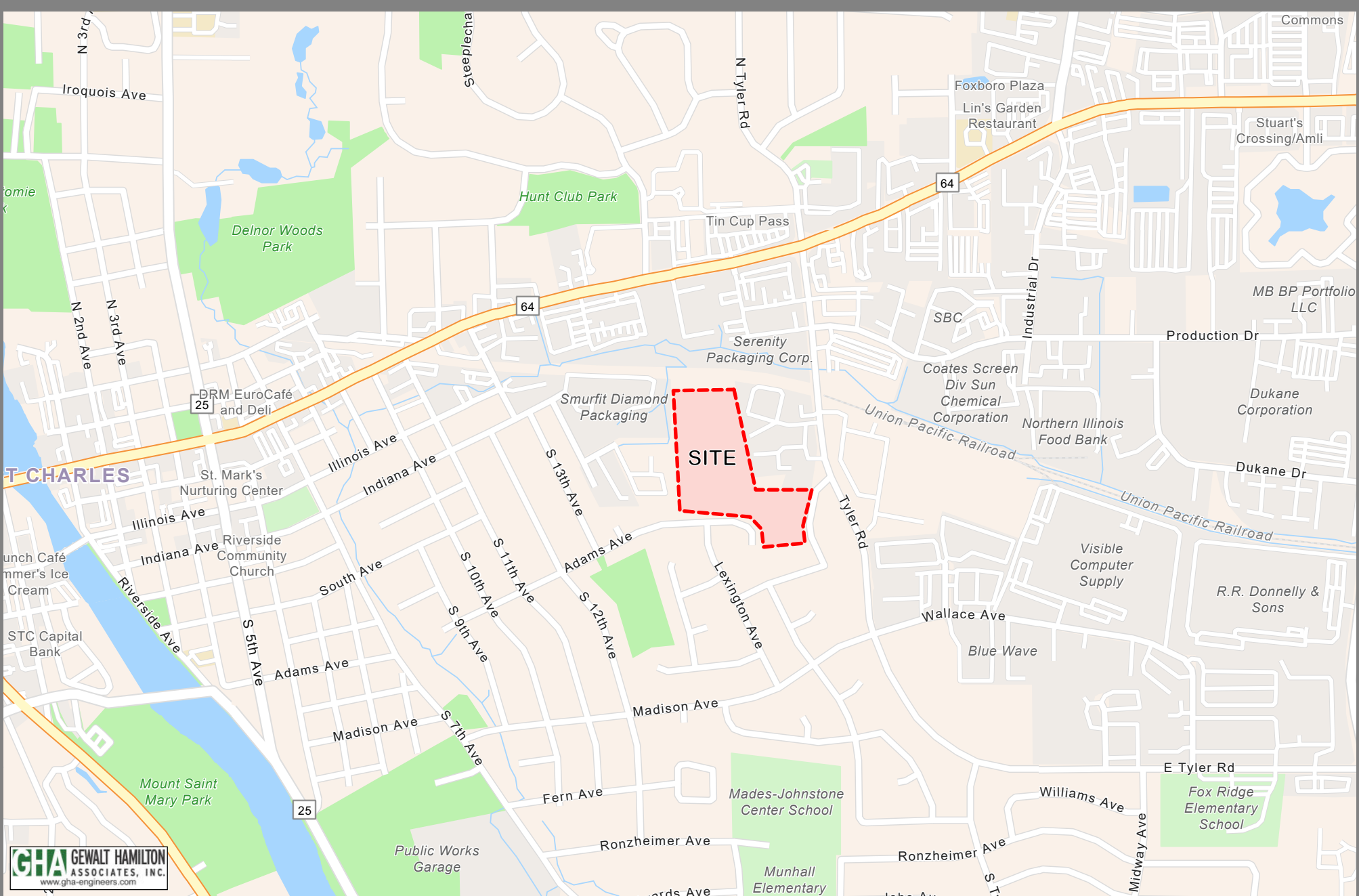
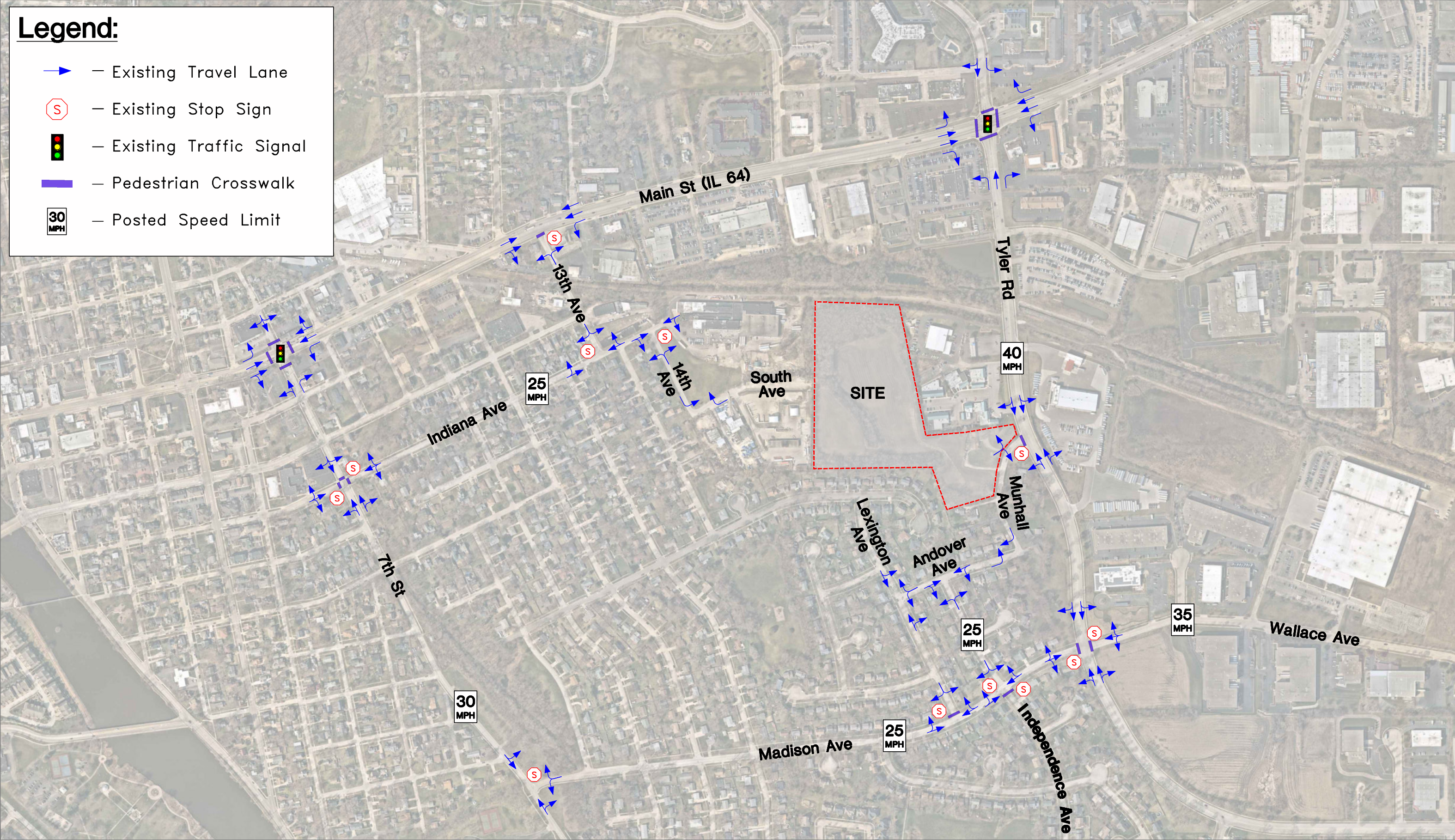


Exhibit 1 - Location Map
Proposed Residential Development
St. Charles, IL

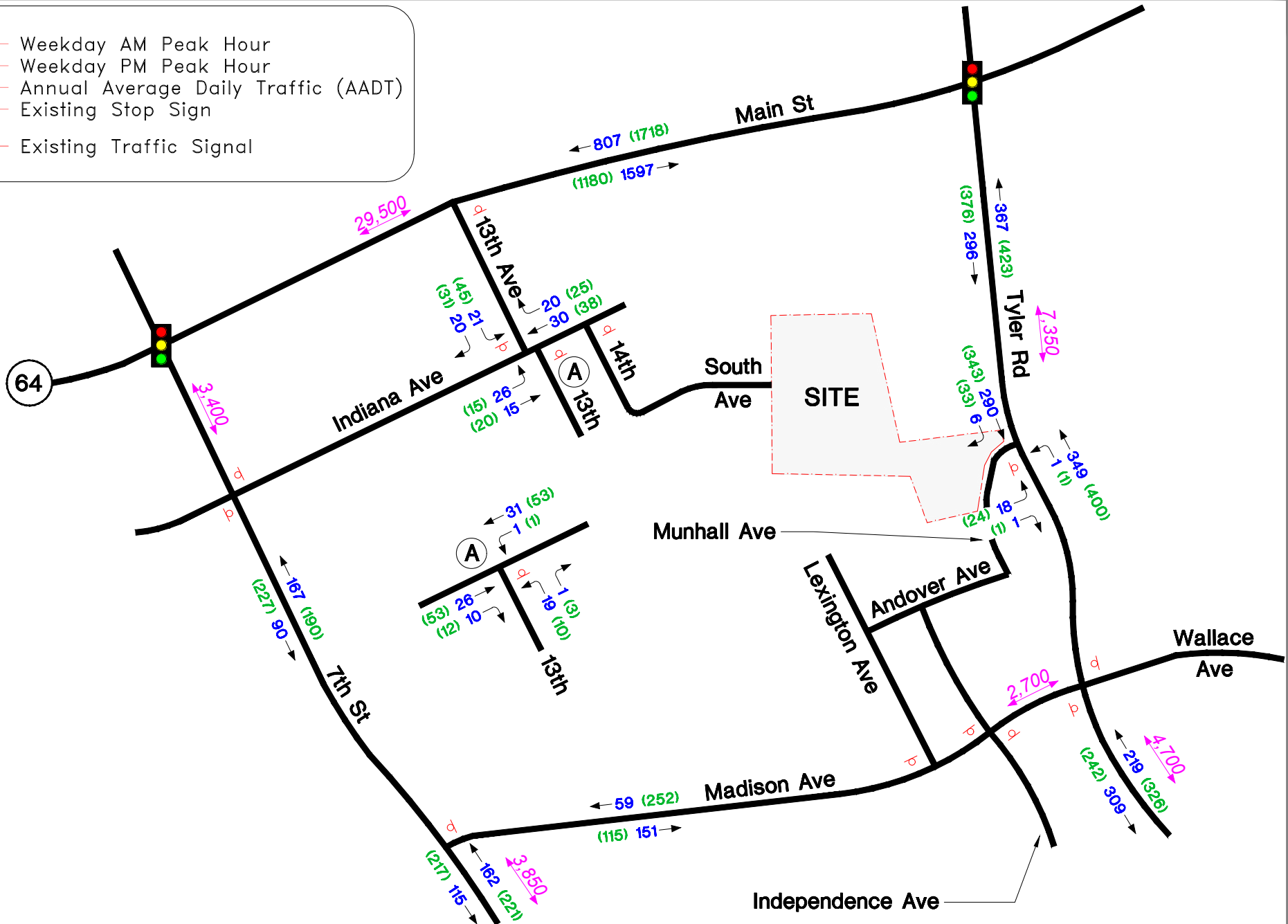
Legend:

- Existing Travel Lane
- Existing Stop Sign
- Existing Traffic Signal
- Pedestrian Crosswalk
- Posted Speed Limit



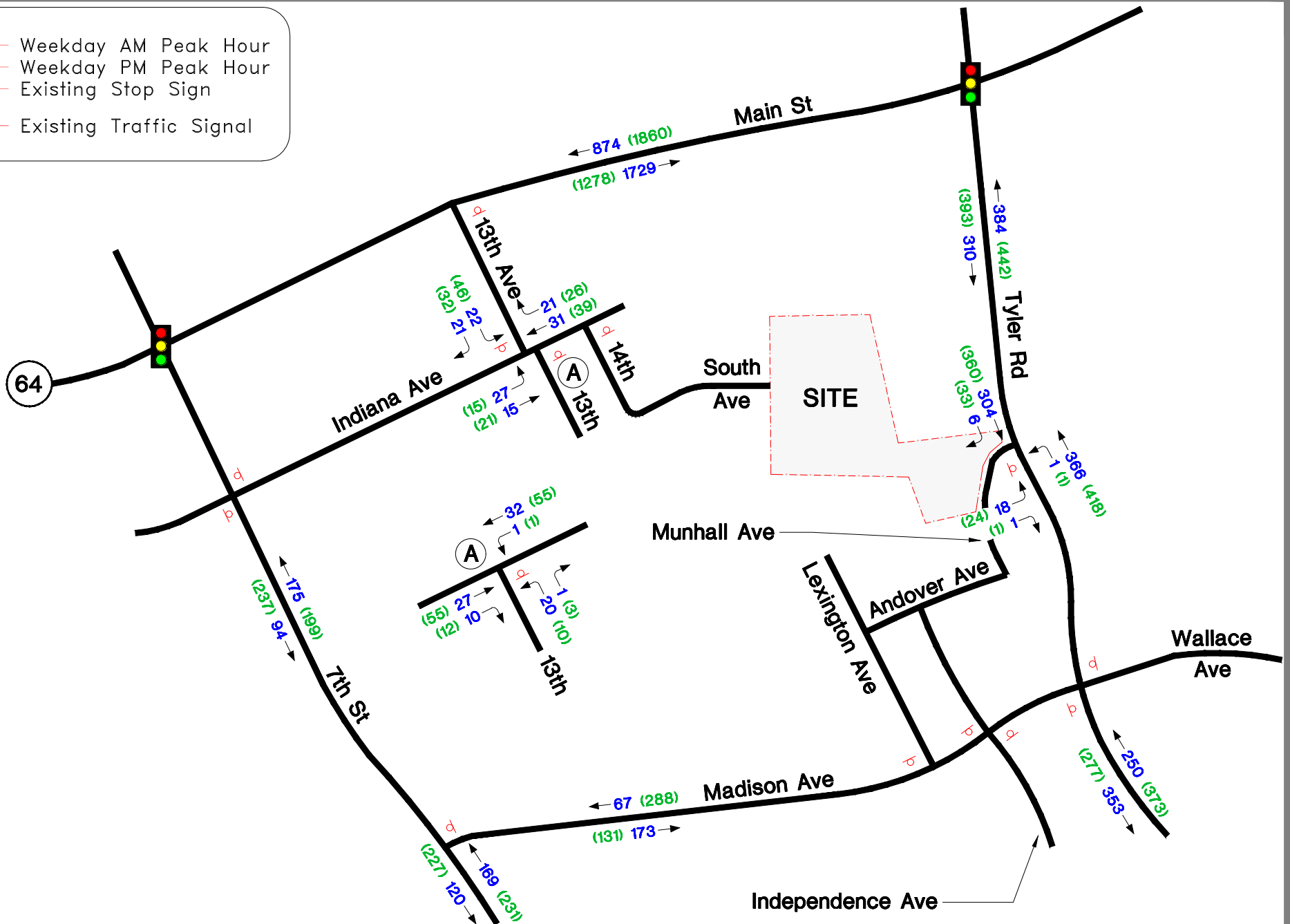
Legend:

- XX — Weekday AM Peak Hour
- (XX) — Weekday PM Peak Hour
- XX — Annual Average Daily Traffic (AADT)
- ⬇ — Existing Stop Sign
- 🚦 — Existing Traffic Signal



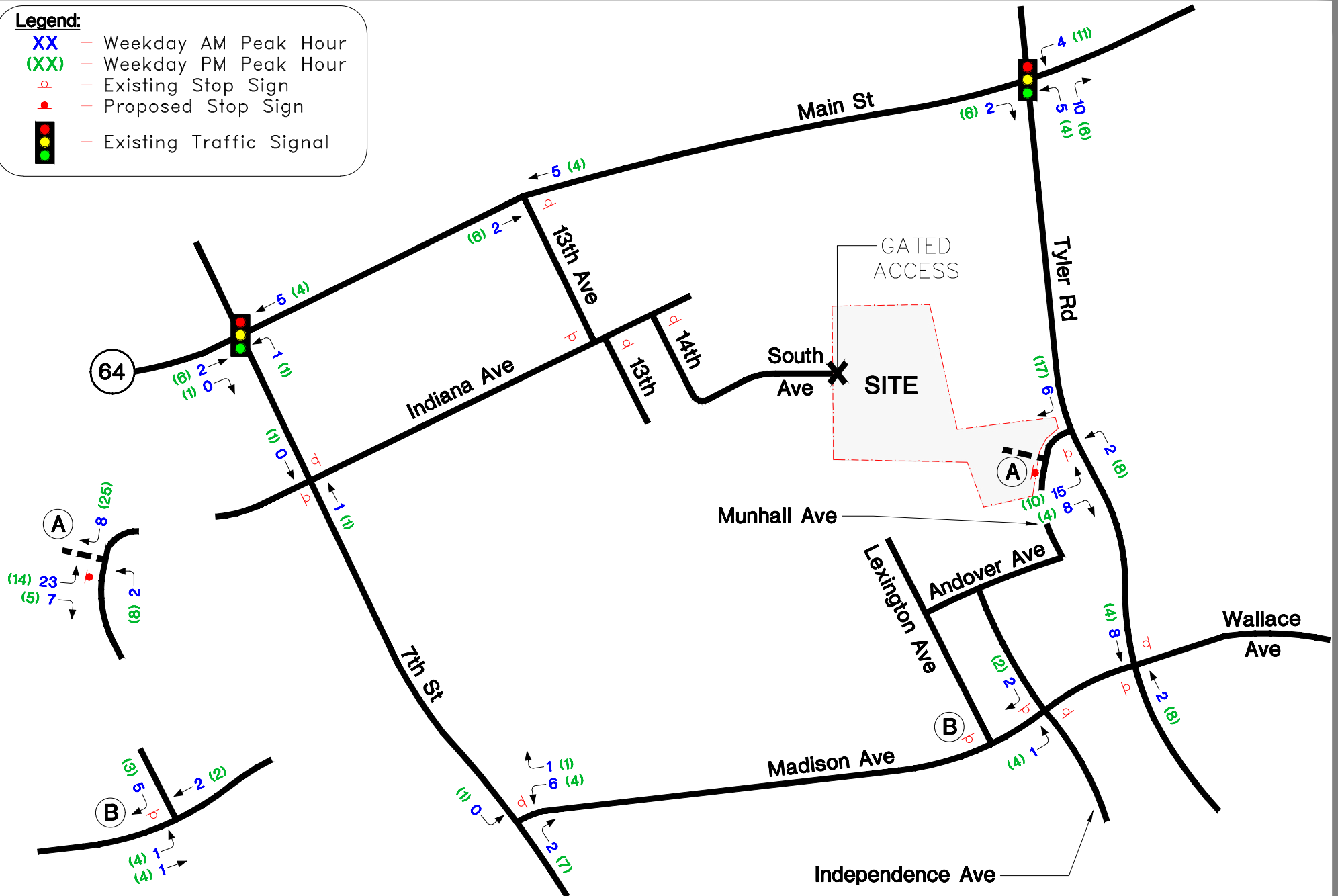
Legend:

- XX — Weekday AM Peak Hour
- (XX) — Weekday PM Peak Hour
- ⬇ — Existing Stop Sign
- 🚦 — Existing Traffic Signal



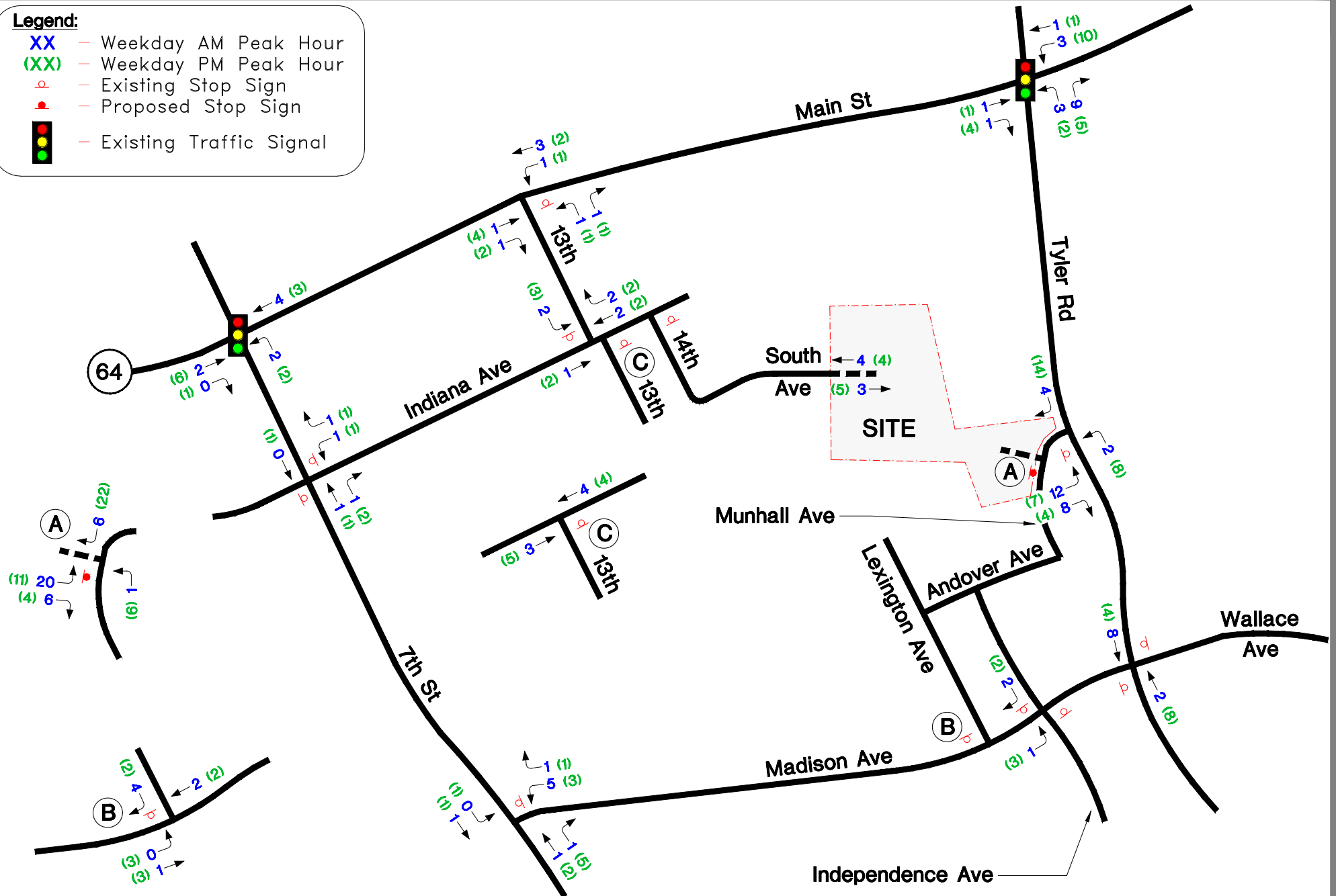
Legend:

- XX — Weekday AM Peak Hour
- (XX) — Weekday PM Peak Hour
- ⬇ — Existing Stop Sign
- ⬇ — Proposed Stop Sign
- 🚦 — Existing Traffic Signal



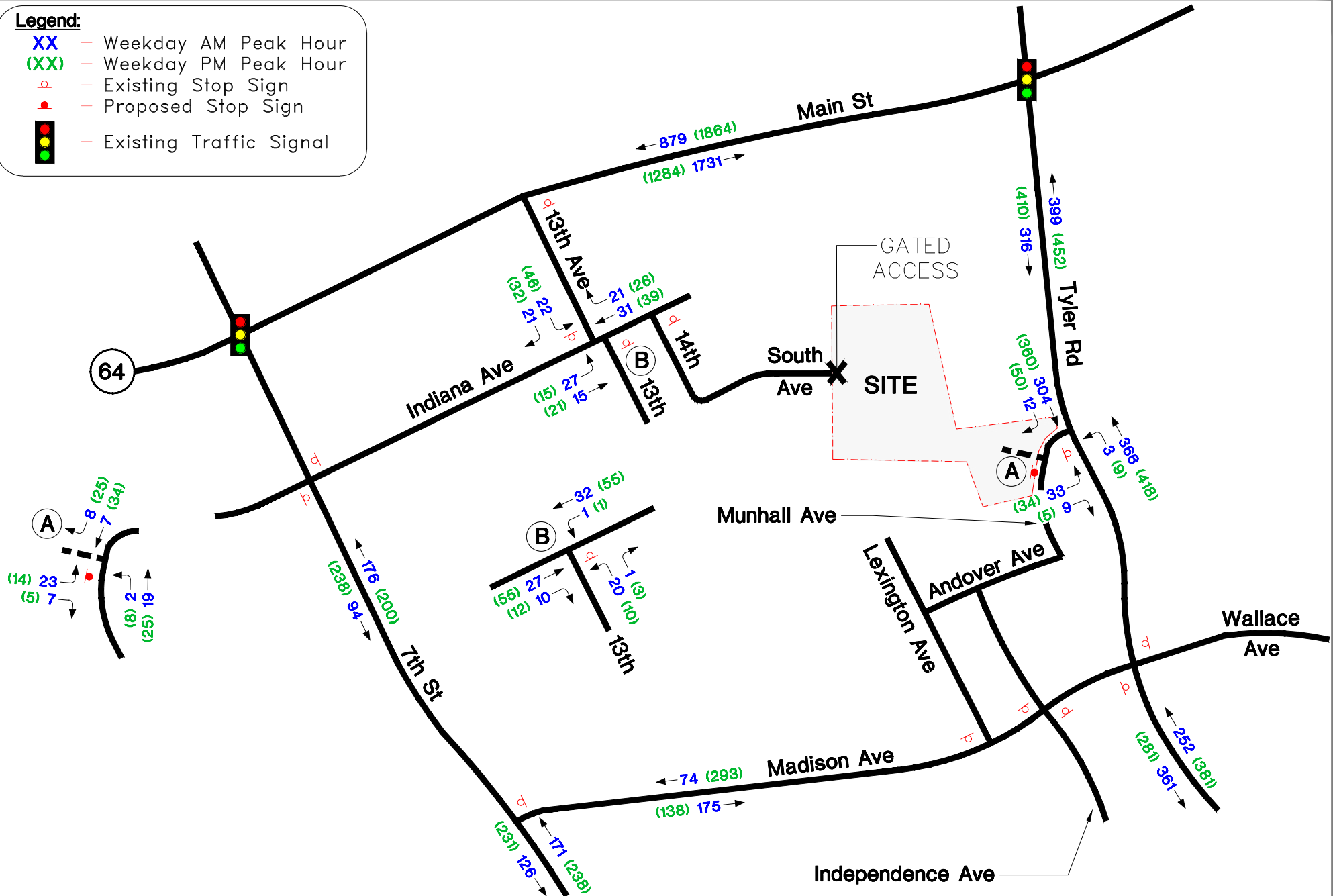
Legend:

- XX — Weekday AM Peak Hour
- (XX) — Weekday PM Peak Hour
- ⬇ — Existing Stop Sign
- ⬇ — Proposed Stop Sign
- 🚦 — Existing Traffic Signal



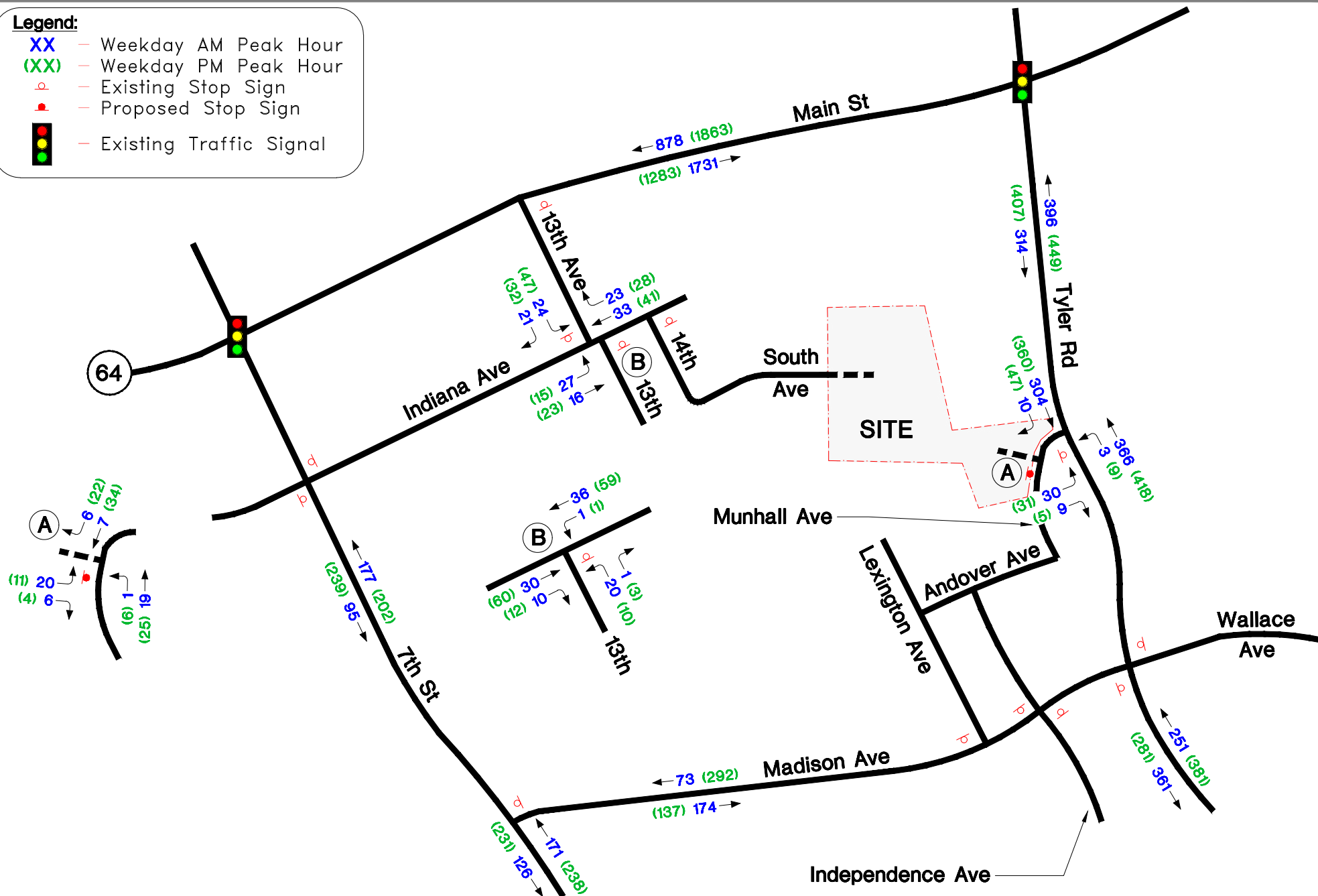
Legend:

- XX — Weekday AM Peak Hour
- (XX) — Weekday PM Peak Hour
- ⬇ — Existing Stop Sign
- ⬆ — Proposed Stop Sign
- 🚦 — Existing Traffic Signal



Legend:

- XX — Weekday AM Peak Hour
- (XX) — Weekday PM Peak Hour
- ⬇ — Existing Stop Sign
- ⬆ — Proposed Stop Sign
- 🚦 — Existing Traffic Signal



Appendices

Appendix A

Photo Inventory



Looking east along Munhall Ave at Tyler Rd



Looking south along Tyler Rd at Munhall Ave



Looking north along Tyler Rd at Munhall Ave



Looking south along Munhall Ave at Site Access



Looking north along Munhall Ave at Site Access



Looking east along Madison Ave at Tyler Rd



Looking south along Tyler Rd at Madison Ave/Wallace Ave



Looking east along Wallace Ave at Tyler Rd



Looking north along Tyler Rd at Madison Ave/Wallace Ave



Looking west along Madison Ave at 7th St



Looking east along South Ave at Site Access



Looking west along South Ave from Site Access

Appendix B

IDOT Traffic Count Summaries

Volume Count Report

LOCATION INFO	
Location ID	045 0011
Type	LINK
Funct'l Class	3
Located On	Main St
From Road	7TH AVE
To Road	Kirk Rd
Direction	2-WAY
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Wed 8/28/2019
End Date	Thu 8/29/2019
Start Time	12:00:00 PM
End Time	12:00:00 PM
Direction	2-WAY
Notes	
Station	IL 64
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	134
1:00-2:00	97
2:00-3:00	84
3:00-4:00	93
4:00-5:00	260
5:00-6:00	688
6:00-7:00	1,557
7:00-8:00	2,404
8:00-9:00	2,259
9:00-10:00	1,768
10:00-11:00	1,742
11:00-12:00	2,048
12:00-13:00	2,281
13:00-14:00	2,137
14:00-15:00	2,256
15:00-16:00	2,428
16:00-17:00	2,744
17:00-18:00	2,898
18:00-19:00	2,348
19:00-20:00	1,657
20:00-21:00	1,411
21:00-22:00	865
22:00-23:00	495
23:00-24:00	277
Total	34,931
AM Peak	07:00-08:00 2,404
PM Peak	17:00-18:00 2,898

Volume Count Report

LOCATION INFO	
Location ID	045 0011_EB
Type	LINK
Funct'l Class	3
Located On	Main St
From Road	7TH AVE
To Road	Kirk Rd
Direction	EB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Wed 8/28/2019
End Date	Thu 8/29/2019
Start Time	12:00:00 PM
End Time	12:00:00 PM
Direction	EB
Notes	
Station	IL 64
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	47
1:00-2:00	39
2:00-3:00	46
3:00-4:00	64
4:00-5:00	175
5:00-6:00	495
6:00-7:00	1,076
7:00-8:00	1,597
8:00-9:00	1,369
9:00-10:00	917
10:00-11:00	947
11:00-12:00	1,047
12:00-13:00	1,144
13:00-14:00	1,036
14:00-15:00	1,057
15:00-16:00	1,082
16:00-17:00	1,106
17:00-18:00	1,180
18:00-19:00	958
19:00-20:00	742
20:00-21:00	673
21:00-22:00	382
22:00-23:00	226
23:00-24:00	121
Total	17,526
AM Peak	07:00-08:00 1,597
PM Peak	17:00-18:00 1,180

Volume Count Report

LOCATION INFO	
Location ID	045 0011_WB
Type	LINK
Funct'l Class	3
Located On	Main St
From Road	7TH AVE
To Road	Kirk Rd
Direction	WB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Wed 8/28/2019
End Date	Thu 8/29/2019
Start Time	12:00:00 PM
End Time	12:00:00 PM
Direction	WB
Notes	
Station	IL 64
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	87
1:00-2:00	58
2:00-3:00	38
3:00-4:00	29
4:00-5:00	85
5:00-6:00	193
6:00-7:00	481
7:00-8:00	807
8:00-9:00	890
9:00-10:00	851
10:00-11:00	795
11:00-12:00	1,001
12:00-13:00	1,137
13:00-14:00	1,101
14:00-15:00	1,199
15:00-16:00	1,346
16:00-17:00	1,638
17:00-18:00	1,718
18:00-19:00	1,390
19:00-20:00	915
20:00-21:00	738
21:00-22:00	483
22:00-23:00	269
23:00-24:00	156
Total	17,405
AM Peak	11:00-12:00 1,001
PM Peak	17:00-18:00 1,718

Volume Count Report

LOCATION INFO	
Location ID	045 3792
Type	LINK
Funct'l Class	5
Located On	Tyler Rd
From Road	Main St
To Road	MADISON AVE
Direction	2-WAY
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	2-WAY
Notes	
Station	TYLER RD
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	45
1:00-2:00	20
2:00-3:00	13
3:00-4:00	15
4:00-5:00	36
5:00-6:00	230
6:00-7:00	407
7:00-8:00	637
8:00-9:00	604
9:00-10:00	473
10:00-11:00	490
11:00-12:00	537
12:00-13:00	605
13:00-14:00	581
14:00-15:00	602
15:00-16:00	615
16:00-17:00	799
17:00-18:00	712
18:00-19:00	532
19:00-20:00	362
20:00-21:00	240
21:00-22:00	199
22:00-23:00	127
23:00-24:00	59
Total	8,940
AM Peak	07:00-08:00 637
PM Peak	16:00-17:00 799

Volume Count Report

LOCATION INFO	
Location ID	045 3792_NB
Type	LINK
Funct'l Class	5
Located On	Tyler Rd
From Road	Main St
To Road	MADISON AVE
Direction	NB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	NB
Notes	
Station	TYLER RD
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	21
1:00-2:00	15
2:00-3:00	7
3:00-4:00	6
4:00-5:00	17
5:00-6:00	113
6:00-7:00	191
7:00-8:00	367
8:00-9:00	316
9:00-10:00	222
10:00-11:00	246
11:00-12:00	261
12:00-13:00	310
13:00-14:00	311
14:00-15:00	292
15:00-16:00	279
16:00-17:00	423
17:00-18:00	364
18:00-19:00	291
19:00-20:00	194
20:00-21:00	133
21:00-22:00	105
22:00-23:00	70
23:00-24:00	34
Total	4,588
AM Peak	07:00-08:00 367
PM Peak	16:00-17:00 423

Volume Count Report

LOCATION INFO	
Location ID	045 3792_SB
Type	LINK
Funct'l Class	5
Located On	Tyler Rd
From Road	Main St
To Road	MADISON AVE
Direction	SB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT



COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	SB
Notes	
Station	TYLER RD
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	24
1:00-2:00	5
2:00-3:00	6
3:00-4:00	9
4:00-5:00	19
5:00-6:00	117
6:00-7:00	216
7:00-8:00	270
8:00-9:00	288
9:00-10:00	251
10:00-11:00	244
11:00-12:00	276
12:00-13:00	295
13:00-14:00	270
14:00-15:00	310
15:00-16:00	336
16:00-17:00	376
17:00-18:00	348
18:00-19:00	241
19:00-20:00	168
20:00-21:00	107
21:00-22:00	94
22:00-23:00	57
23:00-24:00	25
Total	4,352
AM Peak	08:00-09:00 288
PM Peak	16:00-17:00 376

Volume Count Report

LOCATION INFO	
Location ID	045 3793
Type	LINK
Funct'l Class	5
Located On	Tyler Rd
From Road	MADISON AVE
To Road	Kirk Rd
Direction	2-WAY
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT



COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 7/19/2018
End Date	Fri 7/20/2018
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	2-WAY
Notes	
Station	TYLER RD
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
 0:00-1:00	35
1:00-2:00	13
2:00-3:00	8
3:00-4:00	10
4:00-5:00	43
5:00-6:00	167
6:00-7:00	319
7:00-8:00	528
8:00-9:00	491
9:00-10:00	339
10:00-11:00	355
11:00-12:00	316
12:00-13:00	370
13:00-14:00	334
14:00-15:00	397
15:00-16:00	442
16:00-17:00	532
17:00-18:00	568
18:00-19:00	350
19:00-20:00	272
20:00-21:00	221
21:00-22:00	189
22:00-23:00	138
23:00-24:00 	74
Total	6,511
AM Peak	07:00-08:00 528
PM Peak	17:00-18:00 568

Volume Count Report

LOCATION INFO	
Location ID	045 3793_NB
Type	LINK
Funct'l Class	5
Located On	Tyler Rd
From Road	MADISON AVE
To Road	Kirk Rd
Direction	NB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT



COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 7/19/2018
End Date	Fri 7/20/2018
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	NB
Notes	
Station	TYLER RD
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
 0:00-1:00	14
1:00-2:00	9
2:00-3:00	1
3:00-4:00	4
4:00-5:00	10
5:00-6:00	68
6:00-7:00	132
7:00-8:00	219
8:00-9:00	220
9:00-10:00	184
10:00-11:00	187
11:00-12:00	176
12:00-13:00	200
13:00-14:00	188
14:00-15:00	228
15:00-16:00	261
16:00-17:00	327
17:00-18:00	326
18:00-19:00	198
19:00-20:00	157
20:00-21:00	123
21:00-22:00	109
22:00-23:00	86
23:00-24:00 	42
Total	3,469
AM Peak	08:00-09:00 220
PM Peak	16:00-17:00 327

Volume Count Report

LOCATION INFO	
Location ID	045 3793_SB
Type	LINK
Funct'l Class	5
Located On	Tyler Rd
From Road	MADISON AVE
To Road	Kirk Rd
Direction	SB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT



COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 7/19/2018
End Date	Fri 7/20/2018
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	SB
Notes	
Station	TYLER RD
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
 0:00-1:00	21
1:00-2:00	4
2:00-3:00	7
3:00-4:00	6
4:00-5:00	33
5:00-6:00	99
6:00-7:00	187
7:00-8:00	309
8:00-9:00	271
9:00-10:00	155
10:00-11:00	168
11:00-12:00	140
12:00-13:00	170
13:00-14:00	146
14:00-15:00	169
15:00-16:00	181
16:00-17:00	205
17:00-18:00	242
18:00-19:00	152
19:00-20:00	115
20:00-21:00	98
21:00-22:00	80
22:00-23:00	52
23:00-24:00 	32
Total	3,042
AM Peak	07:00-08:00 309
PM Peak	17:00-18:00 242

Volume Count Report

LOCATION INFO	
Location ID	045 3640
Type	LINK
Funct'l Class	5
Located On	MADISON AVE
From Road	7TH AVE
To Road	Tyler Rd
Direction	2-WAY
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT



COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 7/19/2018
End Date	Fri 7/20/2018
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	2-WAY
Notes	
Station	MADISON AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
 0:00-1:00	14
1:00-2:00	10
2:00-3:00	7
3:00-4:00	11
4:00-5:00	17
5:00-6:00	55
6:00-7:00	129
7:00-8:00	207
8:00-9:00	210
9:00-10:00	126
10:00-11:00	150
11:00-12:00	181
12:00-13:00	218
13:00-14:00	160
14:00-15:00	178
15:00-16:00	230
16:00-17:00	275
17:00-18:00	367
18:00-19:00	231
19:00-20:00	138
20:00-21:00	109
21:00-22:00	103
22:00-23:00	69
23:00-24:00 	39
Total	3,234
AM Peak	08:00-09:00 210
PM Peak	17:00-18:00 367

Volume Count Report

LOCATION INFO	
Location ID	045 3640_EB
Type	LINK
Funct'l Class	5
Located On	MADISON AVE
From Road	7TH AVE
To Road	Tyler Rd
Direction	EB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT



COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 7/19/2018
End Date	Fri 7/20/2018
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	EB
Notes	
Station	MADISON AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
 0:00-1:00	5
1:00-2:00	2
2:00-3:00	6
3:00-4:00	5
4:00-5:00	15
5:00-6:00	50
6:00-7:00	101
7:00-8:00	166
8:00-9:00	151
9:00-10:00	78
10:00-11:00	76
11:00-12:00	78
12:00-13:00	100
13:00-14:00	83
14:00-15:00	76
15:00-16:00	68
16:00-17:00	77
17:00-18:00	115
18:00-19:00	100
19:00-20:00	68
20:00-21:00	46
21:00-22:00	40
22:00-23:00	28
23:00-24:00 	7
Total	1,541
AM Peak	07:00-08:00 166
PM Peak	17:00-18:00 115

Volume Count Report

LOCATION INFO	
Location ID	045 3640_WB
Type	LINK
Funct'l Class	5
Located On	MADISON AVE
From Road	7TH AVE
To Road	Tyler Rd
Direction	WB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 7/19/2018
End Date	Fri 7/20/2018
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	WB
Notes	
Station	MADISON AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
 0:00-1:00	9
1:00-2:00	8
2:00-3:00	1
3:00-4:00	6
4:00-5:00	2
5:00-6:00	5
6:00-7:00	28
7:00-8:00	41
8:00-9:00	59
9:00-10:00	48
10:00-11:00	74
11:00-12:00	103
12:00-13:00	118
13:00-14:00	77
14:00-15:00	102
15:00-16:00	162
16:00-17:00	198
17:00-18:00	252
18:00-19:00	131
19:00-20:00	70
20:00-21:00	63
21:00-22:00	63
22:00-23:00	41
23:00-24:00 	32
Total	1,693
AM Peak	11:00-12:00 103
PM Peak	17:00-18:00 252

Volume Count Report

LOCATION INFO	
Location ID	045 3794
Type	LINK
Funct'l Class	5
Located On	7TH AVE
From Road	Main St
To Road	MADISON AVE
Direction	2-WAY
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	2-WAY
Notes	
Station	7TH AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	17
1:00-2:00	11
2:00-3:00	8
3:00-4:00	10
4:00-5:00	14
5:00-6:00	57
6:00-7:00	148
7:00-8:00	257
8:00-9:00	255
9:00-10:00	257
10:00-11:00	279
11:00-12:00	287
12:00-13:00	292
13:00-14:00	286
14:00-15:00	263
15:00-16:00	320
16:00-17:00	395
17:00-18:00	417
18:00-19:00	296
19:00-20:00	194
20:00-21:00	116
21:00-22:00	89
22:00-23:00	62
23:00-24:00	33
Total	4,363
AM Peak	11:00-12:00 287
PM Peak	17:00-18:00 417

Volume Count Report

LOCATION INFO	
Location ID	045 3794_NB
Type	LINK
Funct'l Class	5
Located On	7TH AVE
From Road	Main St
To Road	MADISON AVE
Direction	NB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	NB
Notes	
Station	7TH AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	6
1:00-2:00	3
2:00-3:00	4
3:00-4:00	5
4:00-5:00	9
5:00-6:00	37
6:00-7:00	89
7:00-8:00	167
8:00-9:00	152
9:00-10:00	125
10:00-11:00	146
11:00-12:00	146
12:00-13:00	140
13:00-14:00	126
14:00-15:00	115
15:00-16:00	146
16:00-17:00	162
17:00-18:00	190
18:00-19:00	118
19:00-20:00	71
20:00-21:00	39
21:00-22:00	25
22:00-23:00	24
23:00-24:00	13
Total	2,058
AM Peak	07:00-08:00 167
PM Peak	17:00-18:00 190

Volume Count Report

LOCATION INFO	
Location ID	045 3794_SB
Type	LINK
Funct'l Class	5
Located On	7TH AVE
From Road	Main St
To Road	MADISON AVE
Direction	SB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	SB
Notes	
Station	7TH AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	11
1:00-2:00	8
2:00-3:00	4
3:00-4:00	5
4:00-5:00	5
5:00-6:00	20
6:00-7:00	59
7:00-8:00	90
8:00-9:00	103
9:00-10:00	132
10:00-11:00	133
11:00-12:00	141
12:00-13:00	152
13:00-14:00	160
14:00-15:00	148
15:00-16:00	174
16:00-17:00	233
17:00-18:00	227
18:00-19:00	178
19:00-20:00	123
20:00-21:00	77
21:00-22:00	64
22:00-23:00	38
23:00-24:00	20
Total	2,305
AM Peak	11:00-12:00 141
PM Peak	16:00-17:00 233

Volume Count Report

LOCATION INFO	
Location ID	045 3795
Type	LINK
Funct'l Class	5
Located On	7TH AVE
From Road	MADISON AVE
To Road	State St
Direction	2-WAY
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	2-WAY
Notes	
Station	7TH AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	17
1:00-2:00	12
2:00-3:00	8
3:00-4:00	17
4:00-5:00	15
5:00-6:00	69
6:00-7:00	158
7:00-8:00	269
8:00-9:00	277
9:00-10:00	238
10:00-11:00	266
11:00-12:00	304
12:00-13:00	315
13:00-14:00	311
14:00-15:00	265
15:00-16:00	349
16:00-17:00	438
17:00-18:00	429
18:00-19:00	318
19:00-20:00	208
20:00-21:00	124
21:00-22:00	107
22:00-23:00	65
23:00-24:00	48
Total	4,627
AM Peak	11:00-12:00 304
PM Peak	16:00-17:00 438

Volume Count Report

LOCATION INFO	
Location ID	045 3795_NB
Type	LINK
Funct'l Class	5
Located On	7TH AVE
From Road	MADISON AVE
To Road	State St
Direction	NB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	NB
Notes	
Station	7TH AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	12
1:00-2:00	7
2:00-3:00	6
3:00-4:00	12
4:00-5:00	7
5:00-6:00	39
6:00-7:00	89
7:00-8:00	146
8:00-9:00	162
9:00-10:00	117
10:00-11:00	123
11:00-12:00	170
12:00-13:00	173
13:00-14:00	168
14:00-15:00	133
15:00-16:00	183
16:00-17:00	221
17:00-18:00	236
18:00-19:00	163
19:00-20:00	105
20:00-21:00	72
21:00-22:00	49
22:00-23:00	35
23:00-24:00	25
Total	2,453
AM Peak	11:00-12:00 170
PM Peak	17:00-18:00 236

Volume Count Report

LOCATION INFO	
Location ID	045 3795_SB
Type	LINK
Funct'l Class	5
Located On	7TH AVE
From Road	MADISON AVE
To Road	State St
Direction	SB
County	Kane
Community	ST CHARLES
MPO ID	
HPMS ID	
Agency	Illinois DOT

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 6/26/2018
End Date	Wed 6/27/2018
Start Time	2:00:00 PM
End Time	2:00:00 PM
Direction	SB
Notes	
Station	7TH AVE
Study	
Speed Limit	
Description	
Sensor Type	
Source	CombineVolumeCountsIncremental
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	5
1:00-2:00	5
2:00-3:00	2
3:00-4:00	5
4:00-5:00	8
5:00-6:00	30
6:00-7:00	69
7:00-8:00	123
8:00-9:00	115
9:00-10:00	121
10:00-11:00	143
11:00-12:00	134
12:00-13:00	142
13:00-14:00	143
14:00-15:00	132
15:00-16:00	166
16:00-17:00	217
17:00-18:00	193
18:00-19:00	155
19:00-20:00	103
20:00-21:00	52
21:00-22:00	58
22:00-23:00	30
23:00-24:00	23
Total	2,174
AM Peak	10:00-11:00 143
PM Peak	16:00-17:00 217

Appendix C

Intersection Traffic Count Summaries

Tyler Rd / Munhall Ave - TMC

Tue Aug 25, 2020

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776044, Location: 41.913573, -88.291841



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Munhall Eastbound					Tyler Northbound					Tyler Southbound					
Time	L	R	U	App	Ped*	L	T	U	App	Ped*	T	R	U	App	Ped*	Int
2020-08-25 7:00AM	7	0	0	7	0	0	48	0	48	0	48	2	0	50	0	105
7:15AM	7	0	0	7	0	0	49	0	49	0	63	3	0	66	0	122
7:30AM	6	0	0	6	0	0	54	0	54	0	62	4	0	66	0	126
7:45AM	1	0	0	1	0	0	84	0	84	0	83	0	0	83	0	168
Hourly Total	21	0	0	21	0	0	235	0	235	0	256	9	0	265	0	521
8:00AM	3	0	0	3	0	0	66	0	66	0	68	1	1	70	0	139
8:15AM	3	0	0	3	0	0	48	0	48	0	77	1	0	78	0	129
8:30AM	3	1	0	4	0	0	54	0	54	0	60	4	0	64	0	122
8:45AM	2	0	0	2	0	0	73	0	73	0	63	1	0	64	0	139
Hourly Total	11	1	0	12	0	0	241	0	241	0	268	7	1	276	0	529
4:00PM	4	0	0	4	0	1	77	0	78	0	91	10	0	101	0	183
4:15PM	2	0	0	2	0	0	61	0	61	0	72	6	0	78	0	141
4:30PM	1	0	0	1	0	1	74	0	75	0	76	10	0	86	0	162
4:45PM	5	0	0	5	0	0	52	0	52	1	87	7	0	94	0	151
Hourly Total	12	0	0	12	0	2	264	0	266	1	326	33	0	359	0	637
5:00PM	4	0	0	4	1	0	73	0	73	0	84	7	0	91	0	168
5:15PM	6	0	0	6	0	0	73	0	73	0	89	8	0	97	0	176
5:30PM	6	0	0	6	0	1	56	0	57	0	79	8	0	87	0	150
5:45PM	6	0	0	6	0	0	59	0	59	0	54	6	0	60	0	125
Hourly Total	22	0	0	22	1	1	261	0	262	0	306	29	0	335	0	619
Total	66	1	0	67	1	3	1001	0	1004	1	1156	78	1	1235	0	2306
% Approach	98.5%	1.5%	0%	-	-	0.3%	99.7%	0%	-	-	93.6%	6.3%	0.1%	-	-	-
% Total	2.9%	0%	0%	2.9%	-	0.1%	43.4%	0%	43.5%	-	50.1%	3.4%	0%	53.6%	-	-
Lights	65	1	0	66	-	3	982	0	985	-	1122	77	1	1200	-	2251
% Lights	98.5%	100%	0%	98.5%	-	100%	98.1%	0%	98.1%	-	97.1%	98.7%	100%	97.2%	-	97.6%
Articulated Trucks	0	0	0	0	-	0	2	0	2	-	6	0	0	6	-	8
% Articulated Trucks	0%	0%	0%	0%	-	0%	0.2%	0%	0.2%	-	0.5%	0%	0%	0.5%	-	0.3%
Buses and Single-Unit Trucks	1	0	0	1	-	0	17	0	17	-	28	1	0	29	-	47
% Buses and Single-Unit Trucks	1.5%	0%	0%	1.5%	-	0%	1.7%	0%	1.7%	-	2.4%	1.3%	0%	2.3%	-	2.0%
Pedestrians	-	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Tyler Rd / Munhall Ave - TMC

Tue Aug 25, 2020

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776044, Location: 41.913573, -88.291841



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Munhall Eastbound						Tyler Northbound						Tyler Southbound						
Time	L	R	U	App	Ped*		L	T	U	App	Ped*		T	R	U	App	Ped*		Int
2020-08-25 7:30AM	6	0	0	6	0		0	54	0	54	0		62	4	0	66	0		126
7:45AM	1	0	0	1	0		0	84	0	84	0		83	0	0	83	0		168
8:00AM	3	0	0	3	0		0	66	0	66	0		68	1	1	70	0		139
8:15AM	3	0	0	3	0		0	48	0	48	0		77	1	0	78	0		129
Total	13	0	0	13	0		0	252	0	252	0		290	6	1	297	0		562
% Approach	100%	0%	0%	-	-		0%	100%	0%	-	-		97.6%	2.0%	0.3%	-	-		-
% Total	2.3%	0%	0%	2.3%	-		0%	44.8%	0%	44.8%	-		51.6%	1.1%	0.2%	52.8%	-		-
PHF	0.542	-	-	0.542	-		-	0.750	-	0.750	-		0.873	0.375	0.250	0.895	-		0.836
Lights	12	0	0	12	-		0	245	0	245	-		280	6	1	287	-		544
% Lights	92.3%	0%	0%	92.3%	-		0%	97.2%	0%	97.2%	-		96.6%	100%	100%	96.6%	-		96.8%
Articulated Trucks	0	0	0	0	-		0	0	0	0	-		3	0	0	3	-		3
% Articulated Trucks	0%	0%	0%	0%	-		0%	0%	0%	0%	-		1.0%	0%	0%	1.0%	-		0.5%
Buses and Single-Unit Trucks	1	0	0	1	-		0	7	0	7	-		7	0	0	7	-		15
% Buses and Single-Unit Trucks	7.7%	0%	0%	7.7%	-		0%	2.8%	0%	2.8%	-		2.4%	0%	0%	2.4%	-		2.7%
Pedestrians	-	-	-	-	0		-	-	-	-	0		-	-	-	-	0		-
% Pedestrians	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Tyler Rd / Munhall Ave - TMC

Tue Aug 25, 2020

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776044, Location: 41.913573, -88.291841



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Munhall Eastbound						Tyler Northbound						Tyler Southbound						
Time	L	R	U	App	Ped*		L	T	U	App	Ped*		T	R	U	App	Ped*		Int
2020-08-25 4:30PM	1	0	0	1	0		1	74	0	75	0		76	10	0	86	0		162
4:45PM	5	0	0	5	0		0	52	0	52	1		87	7	0	94	0		151
5:00PM	4	0	0	4	1		0	73	0	73	0		84	7	0	91	0		168
5:15PM	6	0	0	6	0		0	73	0	73	0		89	8	0	97	0		176
Total	16	0	0	16	1		1	272	0	273	1		336	32	0	368	0		657
% Approach	100%	0%	0%	-	-		0.4%	99.6%	0%	-	-		91.3%	8.7%	0%	-	-		-
% Total	2.4%	0%	0%	2.4%	-		0.2%	41.4%	0%	41.6%	-		51.1%	4.9%	0%	56.0%	-		-
PHF	0.667	-	-	0.667	-		0.250	0.919	-	0.910	-		0.944	0.800	-	0.948	-		0.933
Lights	16	0	0	16	-		1	267	0	268	-		332	32	0	364	-		648
% Lights	100%	0%	0%	100%	-		100%	98.2%	0%	98.2%	-		98.8%	100%	0%	98.9%	-		98.6%
Articulated Trucks	0	0	0	0	-		0	0	0	0	-		0	0	0	0	-		0
% Articulated Trucks	0%	0%	0%	0%	-		0%	0%	0%	0%	-		0%	0%	0%	0%	-		0%
Buses and Single-Unit Trucks	0	0	0	0	-		0	5	0	5	-		4	0	0	4	-		9
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-		0%	1.8%	0%	1.8%	-		1.2%	0%	0%	1.1%	-		1.4%
Pedestrians	-	-	-	-	1		-	-	-	-	1		-	-	-	-	0		
% Pedestrians	-	-	-	-	100%		-	-	-	-	100%		-	-	-	-	-		-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Indiana Ave / 13th Ave (N Leg) - TMC

Tue Aug 25, 2020

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776045, Location: 41.914851, -88.300412



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Indiana Ave Eastbound					Indiana Ave Westbound					13th Ave Southbound					
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	R	U	App	Ped*	Int
2020-08-25 7:00AM	6	4	0	10	0	3	1	0	4	0	5	1	0	6	0	20
7:15AM	4	3	0	7	0	8	2	0	10	0	3	2	0	5	0	22
7:30AM	4	2	0	6	0	7	5	0	12	0	3	5	0	8	0	26
7:45AM	7	3	0	10	0	3	6	0	9	0	6	8	0	14	0	33
Hourly Total	21	12	0	33	0	21	14	0	35	0	17	16	0	33	0	101
8:00AM	5	2	0	7	0	7	2	0	9	0	4	0	0	4	0	20
8:15AM	3	1	0	4	0	1	3	0	4	0	2	0	0	2	0	10
8:30AM	3	3	0	6	0	4	2	0	6	0	2	1	0	3	0	15
8:45AM	0	3	0	3	0	2	3	0	5	0	3	0	0	3	0	11
Hourly Total	11	9	0	20	0	14	10	0	24	0	11	1	0	12	0	56
4:00PM	3	6	0	9	0	6	3	0	9	0	10	6	0	16	0	34
4:15PM	1	2	0	3	0	3	5	0	8	0	6	7	0	13	0	24
4:30PM	2	2	0	4	0	2	5	0	7	0	5	10	0	15	0	26
4:45PM	4	5	0	9	0	9	5	0	14	0	12	4	0	16	0	39
Hourly Total	10	15	0	25	0	20	18	0	38	0	33	27	0	60	0	123
5:00PM	2	4	0	6	0	13	7	0	20	0	7	7	0	14	0	40
5:15PM	4	5	0	9	0	6	3	0	9	0	12	4	0	16	0	34
5:30PM	1	2	0	3	0	3	6	0	9	0	3	5	0	8	0	20
5:45PM	6	5	0	11	0	6	4	0	10	0	6	3	0	9	0	30
Hourly Total	13	16	0	29	0	28	20	0	48	0	28	19	0	47	0	124
Total	55	52	0	107	0	83	62	0	145	0	89	63	0	152	0	404
% Approach	51.4%	48.6%	0%	-	-	57.2%	42.8%	0%	-	-	58.6%	41.4%	0%	-	-	-
% Total	13.6%	12.9%	0%	26.5%	-	20.5%	15.3%	0%	35.9%	-	22.0%	15.6%	0%	37.6%	-	-
Lights	54	48	0	102	-	75	59	0	134	-	87	62	0	149	-	385
% Lights	98.2%	92.3%	0%	95.3%	-	90.4%	95.2%	0%	92.4%	-	97.8%	98.4%	0%	98.0%	-	95.3%
Articulated Trucks	1	1	0	2	-	3	0	0	3	-	0	0	0	0	-	5
% Articulated Trucks	1.8%	1.9%	0%	1.9%	-	3.6%	0%	0%	2.1%	-	0%	0%	0%	0%	-	1.2%
Buses and Single-Unit Trucks	0	3	0	3	-	5	3	0	8	-	2	1	0	3	-	14
% Buses and Single-Unit Trucks	0%	5.8%	0%	2.8%	-	6.0%	4.8%	0%	5.5%	-	2.2%	1.6%	0%	2.0%	-	3.5%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Indiana Ave / 13th Ave (N Leg) - TMC

Tue Aug 25, 2020

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776045, Location: 41.914851, -88.300412



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Indiana Ave Eastbound						Indiana Ave Westbound						13th Ave Southbound						
Time	L	T	U	App	Ped*		T	R	U	App	Ped*		L	R	U	App	Ped*		Int
2020-08-25 7:00AM	6	4	0	10	0		3	1	0	4	0		5	1	0	6	0		20
7:15AM	4	3	0	7	0		8	2	0	10	0		3	2	0	5	0		22
7:30AM	4	2	0	6	0		7	5	0	12	0		3	5	0	8	0		26
7:45AM	7	3	0	10	0		3	6	0	9	0		6	8	0	14	0		33
Total	21	12	0	33	0		21	14	0	35	0		17	16	0	33	0		101
% Approach	63.6%	36.4%	0%	-	-		60.0%	40.0%	0%	-	-		51.5%	48.5%	0%	-	-		-
% Total	20.8%	11.9%	0%	32.7%	-		20.8%	13.9%	0%	34.7%	-		16.8%	15.8%	0%	32.7%	-		-
PHF	0.750	0.750	-	0.825	-		0.656	0.583	-	0.729	-		0.708	0.500	-	0.589	-		0.765
Lights	20	10	0	30	-		17	11	0	28	-		16	15	0	31	-		89
% Lights	95.2%	83.3%	0%	90.9%	-		81.0%	78.6%	0%	80.0%	-		94.1%	93.8%	0%	93.9%	-		88.1%
Articulated Trucks	1	0	0	1	-		1	0	0	1	-		0	0	0	0	-		2
% Articulated Trucks	4.8%	0%	0%	3.0%	-		4.8%	0%	0%	2.9%	-		0%	0%	0%	0%	-		2.0%
Buses and Single-Unit Trucks	0	2	0	2	-		3	3	0	6	-		1	1	0	2	-		10
% Buses and Single-Unit Trucks	0%	16.7%	0%	6.1%	-		14.3%	21.4%	0%	17.1%	-		5.9%	6.3%	0%	6.1%	-		9.9%
Pedestrians	-	-	-	-	0		-	-	-	-	0		-	-	-	-	0		-
% Pedestrians	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Indiana Ave / 13th Ave (N Leg) - TMC

Tue Aug 25, 2020

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776045, Location: 41.914851, -88.300412



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Indiana Ave Eastbound					Indiana Ave Westbound					13th Ave Southbound					
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	R	U	App	Ped*	Int
2020-08-25 4:30PM	2	2	0	4	0	2	5	0	7	0	5	10	0	15	0	26
4:45PM	4	5	0	9	0	9	5	0	14	0	12	4	0	16	0	39
5:00PM	2	4	0	6	0	13	7	0	20	0	7	7	0	14	0	40
5:15PM	4	5	0	9	0	6	3	0	9	0	12	4	0	16	0	34
Total	12	16	0	28	0	30	20	0	50	0	36	25	0	61	0	139
% Approach	42.9%	57.1%	0%	-	-	60.0%	40.0%	0%	-	-	59.0%	41.0%	0%	-	-	-
% Total	8.6%	11.5%	0%	20.1%	-	21.6%	14.4%	0%	36.0%	-	25.9%	18.0%	0%	43.9%	-	-
PHF	0.750	0.800	-	0.778	-	0.577	0.714	-	0.625	-	0.750	0.625	-	0.953	-	0.869
Lights	12	15	0	27	-	30	20	0	50	-	35	25	0	60	-	137
% Lights	100%	93.8%	0%	96.4%	-	100%	100%	0%	100%	-	97.2%	100%	0%	98.4%	-	98.6%
Articulated Trucks	0	1	0	1	-	0	0	0	0	-	0	0	0	0	-	1
% Articulated Trucks	0%	6.3%	0%	3.6%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0.7%
Buses and Single-Unit Trucks	0	0	0	0	-	0	0	0	0	-	1	0	0	1	-	1
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	0%	0%	0%	0%	-	2.8%	0%	0%	1.6%	-	0.7%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Indiana Ave / 13th Ave (S Leg) - TMC

Tue Aug 25, 2020

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776046, Location: 41.914947, -88.30001



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Indiana Eastbound					Indiana Westbound					13th Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2020-08-25 7:00AM	8	1	0	9	0	0	2	0	2	0	2	0	0	2	0	13
7:15AM	5	1	0	6	0	1	5	0	6	0	5	0	0	5	0	17
7:30AM	4	1	0	5	0	0	10	0	10	0	2	1	0	3	3	18
7:45AM	6	3	0	9	0	0	6	0	6	0	3	0	0	3	0	18
Hourly Total	23	6	0	29	0	1	23	0	24	0	12	1	0	13	3	66
8:00AM	4	2	0	6	0	0	4	0	4	0	5	0	0	5	0	15
8:15AM	2	1	0	3	0	0	1	0	1	0	3	0	0	3	0	7
8:30AM	4	1	0	5	0	0	2	0	2	0	4	0	0	4	0	11
8:45AM	5	1	0	6	0	0	2	0	2	0	3	0	0	3	0	11
Hourly Total	15	5	0	20	0	0	9	0	9	0	15	0	0	15	0	44
4:00PM	12	4	1	17	0	0	7	0	7	0	1	0	0	1	0	25
4:15PM	5	3	0	8	0	0	6	0	6	0	2	0	0	2	0	16
4:30PM	5	2	0	7	0	0	6	0	6	0	1	0	0	1	0	14
4:45PM	15	2	0	17	0	1	12	0	13	0	2	0	0	2	0	32
Hourly Total	37	11	1	49	0	1	31	0	32	0	6	0	0	6	0	87
5:00PM	11	0	0	11	0	0	17	0	17	0	3	0	0	3	0	31
5:15PM	11	6	0	17	0	0	7	0	7	0	2	2	0	4	0	28
5:30PM	2	3	0	5	0	0	5	0	5	0	4	0	0	4	0	14
5:45PM	9	2	0	11	0	0	8	0	8	0	2	0	0	2	0	21
Hourly Total	33	11	0	44	0	0	37	0	37	0	11	2	0	13	0	94
Total	108	33	1	142	0	2	100	0	102	0	44	3	0	47	3	291
% Approach	76.1%	23.2%	0.7%	-	-	2.0%	98.0%	0%	-	-	93.6%	6.4%	0%	-	-	-
% Total	37.1%	11.3%	0.3%	48.8%	-	0.7%	34.4%	0%	35.1%	-	15.1%	1.0%	0%	16.2%	-	-
Lights	103	32	1	136	-	2	93	0	95	-	41	3	0	44	-	275
% Lights	95.4%	97.0%	100%	95.8%	-	100%	93.0%	0%	93.1%	-	93.2%	100%	0%	93.6%	-	94.5%
Articulated Trucks	1	0	0	1	-	0	3	0	3	-	0	0	0	0	-	4
% Articulated Trucks	0.9%	0%	0%	0.7%	-	0%	3.0%	0%	2.9%	-	0%	0%	0%	0%	-	1.4%
Buses and Single-Unit Trucks	4	1	0	5	-	0	4	0	4	-	3	0	0	3	-	12
% Buses and Single-Unit Trucks	3.7%	3.0%	0%	3.5%	-	0%	4.0%	0%	3.9%	-	6.8%	0%	0%	6.4%	-	4.1%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Indiana Ave / 13th Ave (S Leg) - TMC

Tue Aug 25, 2020

AM Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776046, Location: 41.914947, -88.30001



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Indiana Eastbound					Indiana Westbound					13th Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2020-08-25 7:15AM	5	1	0	6	0	1	5	0	6	0	5	0	0	5	0	17
7:30AM	4	1	0	5	0	0	10	0	10	0	2	1	0	3	3	18
7:45AM	6	3	0	9	0	0	6	0	6	0	3	0	0	3	0	18
8:00AM	4	2	0	6	0	0	4	0	4	0	5	0	0	5	0	15
Total	19	7	0	26	0	1	25	0	26	0	15	1	0	16	3	68
% Approach	73.1%	26.9%	0%	-	-	3.8%	96.2%	0%	-	-	93.8%	6.3%	0%	-	-	-
% Total	27.9%	10.3%	0%	38.2%	-	1.5%	36.8%	0%	38.2%	-	22.1%	1.5%	0%	23.5%	-	-
PHF	0.792	0.583	-	0.722	-	0.250	0.625	-	0.650	-	0.750	0.250	-	0.800	-	0.944
Lights	17	6	0	23	-	1	20	0	21	-	12	1	0	13	-	57
% Lights	89.5%	85.7%	0%	88.5%	-	100%	80.0%	0%	80.8%	-	80.0%	100%	0%	81.3%	-	83.8%
Articulated Trucks	0	0	0	0	-	0	2	0	2	-	0	0	0	0	-	2
% Articulated Trucks	0%	0%	0%	0%	-	0%	8.0%	0%	7.7%	-	0%	0%	0%	0%	-	2.9%
Buses and Single-Unit Trucks	2	1	0	3	-	0	3	0	3	-	3	0	0	3	-	9
% Buses and Single-Unit Trucks	10.5%	14.3%	0%	11.5%	-	0%	12.0%	0%	11.5%	-	20.0%	0%	0%	18.8%	-	13.2%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	3	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Indiana Ave / 13th Ave (S Leg) - TMC

Tue Aug 25, 2020

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)

All Movements

ID: 776046, Location: 41.914947, -88.30001



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Indiana Eastbound					Indiana Westbound					13th Northbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	L	R	U	App	Ped*	Int
2020-08-25 4:30PM	5	2	0	7	0	0	6	0	6	0	1	0	0	1	0	14
4:45PM	15	2	0	17	0	1	12	0	13	0	2	0	0	2	0	32
5:00PM	11	0	0	11	0	0	17	0	17	0	3	0	0	3	0	31
5:15PM	11	6	0	17	0	0	7	0	7	0	2	2	0	4	0	28
Total	42	10	0	52	0	1	42	0	43	0	8	2	0	10	0	105
% Approach	80.8%	19.2%	0%	-	-	2.3%	97.7%	0%	-	-	80.0%	20.0%	0%	-	-	-
% Total	40.0%	9.5%	0%	49.5%	-	1.0%	40.0%	0%	41.0%	-	7.6%	1.9%	0%	9.5%	-	-
PHF	0.700	0.417	-	0.765	-	0.250	0.618	-	0.632	-	0.667	0.250	-	0.625	-	0.820
Lights	40	10	0	50	-	1	42	0	43	-	8	2	0	10	-	103
% Lights	95.2%	100%	0%	96.2%	-	100%	100%	0%	100%	-	100%	100%	0%	100%	-	98.1%
Articulated Trucks	1	0	0	1	-	0	0	0	0	-	0	0	0	0	-	1
% Articulated Trucks	2.4%	0%	0%	1.9%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	1.0%
Buses and Single-Unit Trucks	1	0	0	1	-	0	0	0	0	-	0	0	0	0	-	1
% Buses and Single-Unit Trucks	2.4%	0%	0%	1.9%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	1.0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Appendix D

Crash Summary Map



Appendix E

CMAP Traffic Projections



Chicago Metropolitan Agency for Planning

233 South Wacker Drive
Suite 800
Chicago, Illinois 60606

312 454 0400
www.cmap.illinois.gov

June 19, 2020

Lynn M. Means, P.E., PTOE
Senior Transportation Engineer
Gewalt Hamilton Associates
625 Forest Edge Drive
Vernon Hills, IL 60061

Subject: Tyler Road - Madison Avenue - 7th Avenue - Main Street
IDOT

Dear Ms. Mean:

In response to a request made on your behalf and dated June 18, 2020, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volumes	Year 2050 ADT
Main St (IL 64) fr 7th Ave to Kirk Rd	29,500	36,700
Tyler Rd fr Main St to Madison Ave	7,350	8,400
Tyler Rd fr Madison Ave to Kirk Rd	4,700	7,300
Madison Ave from 7th Ave to Tyler Rd	2,700	4,200
7th Ave from Main St to Madison Ave	3,400	3,600
7th Ave from Madison Ave to State St	3,850	4,100

Traffic projections are developed using existing ADT data provided in the request letter and the results from the March 2020 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

Jose Rodriguez, PTP, AICP
Senior Planner, Research & Analysis

cc: Quigley (IDOT)
\\2020_TrafficForecast\St.Charles\ka-13-20\ka-13-20.docx

Appendix F

ITE Trip Generation Excerpts

Single-Family Detached Housing (210)

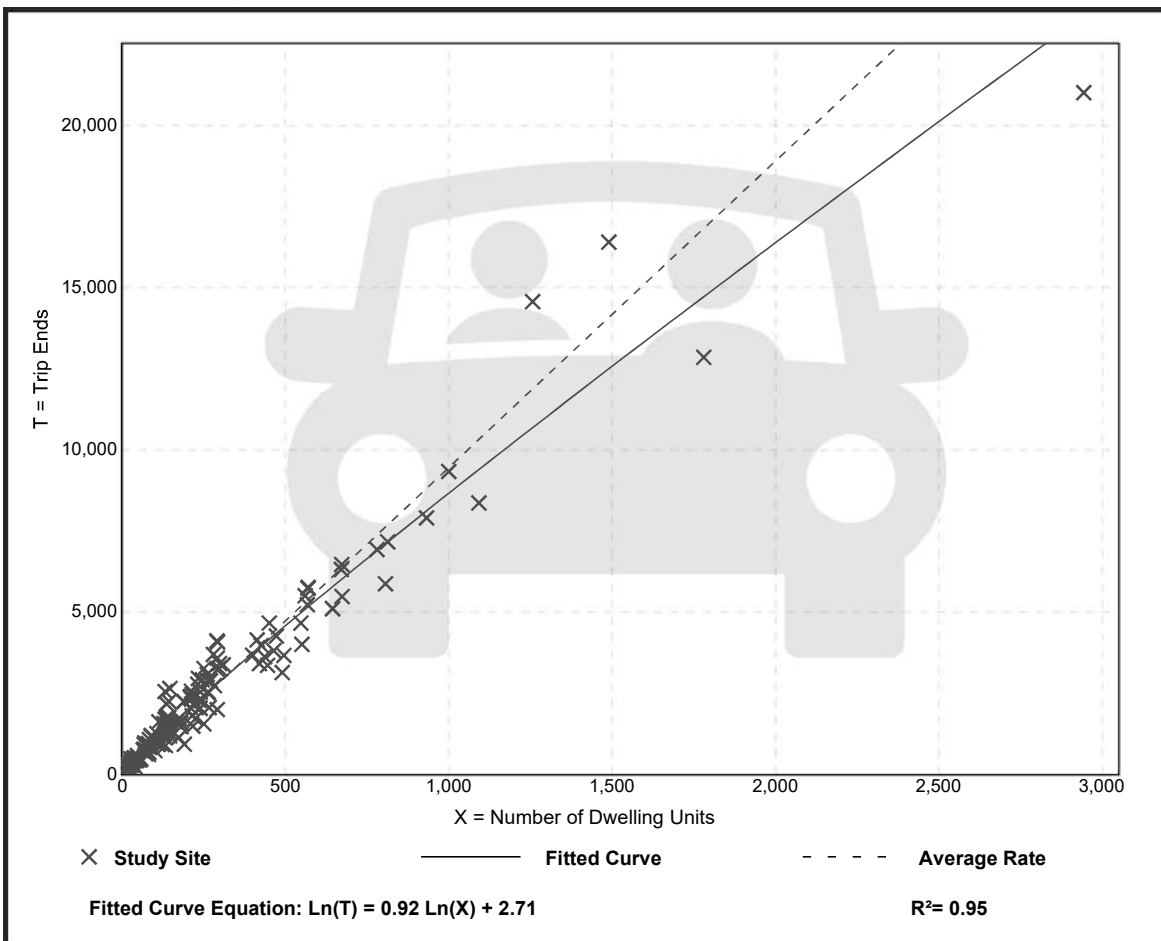
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 173

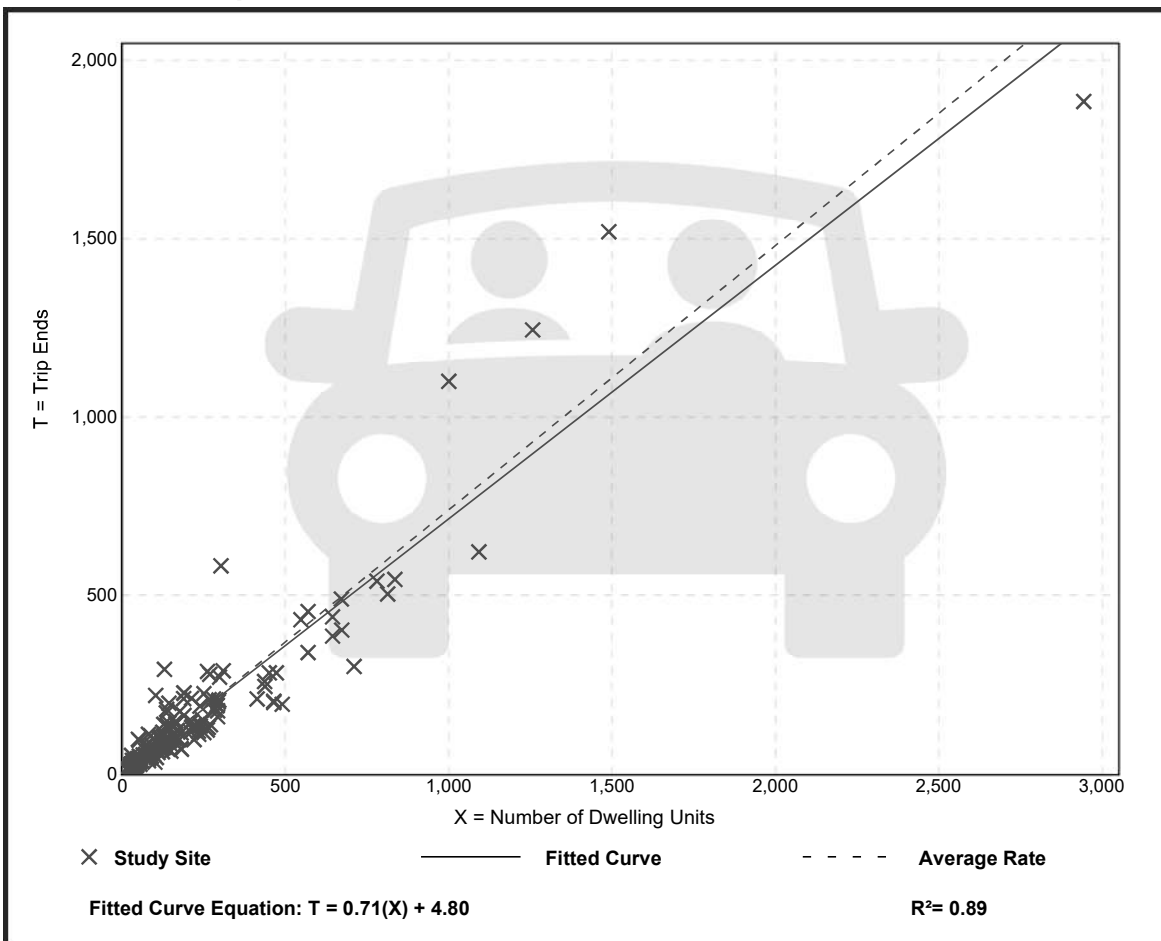
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 190

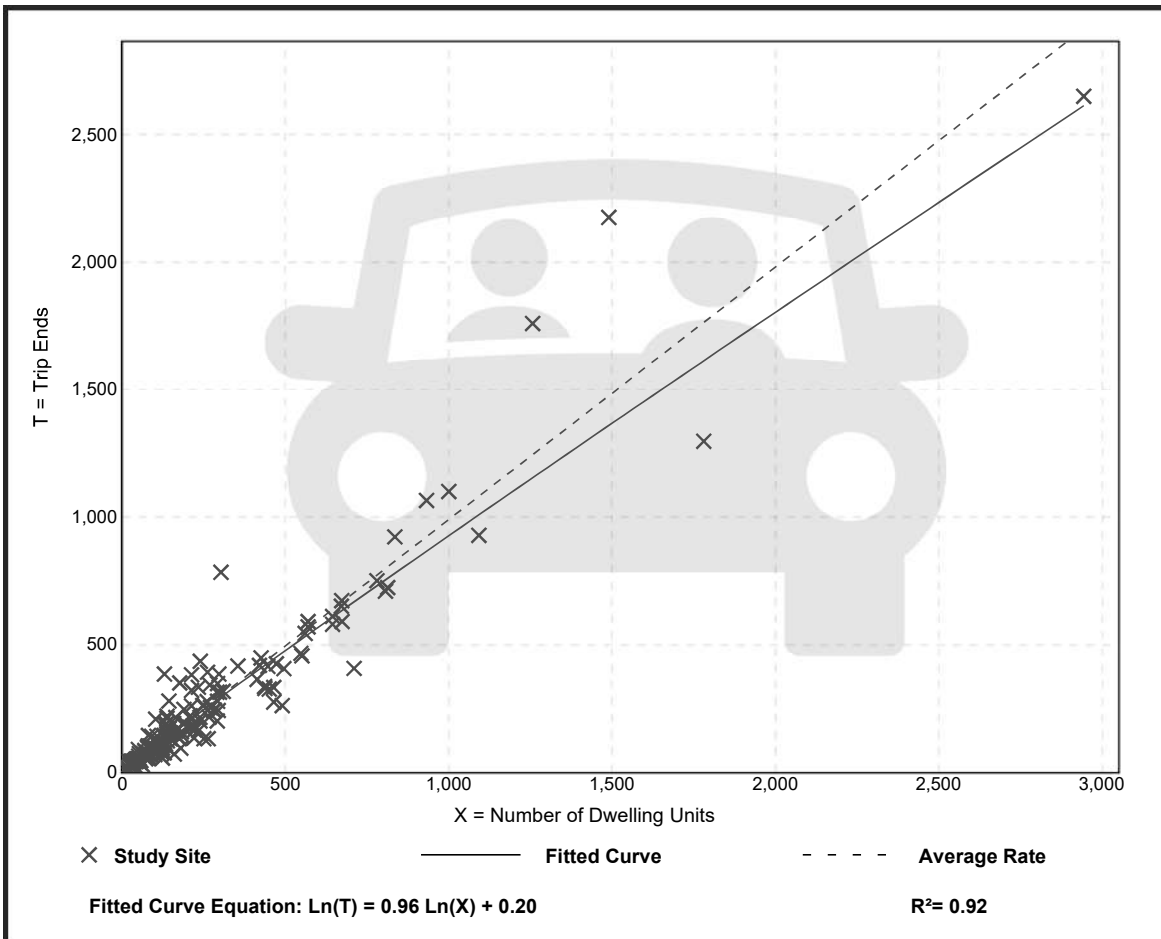
Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Senior Adult Housing - Detached (251)

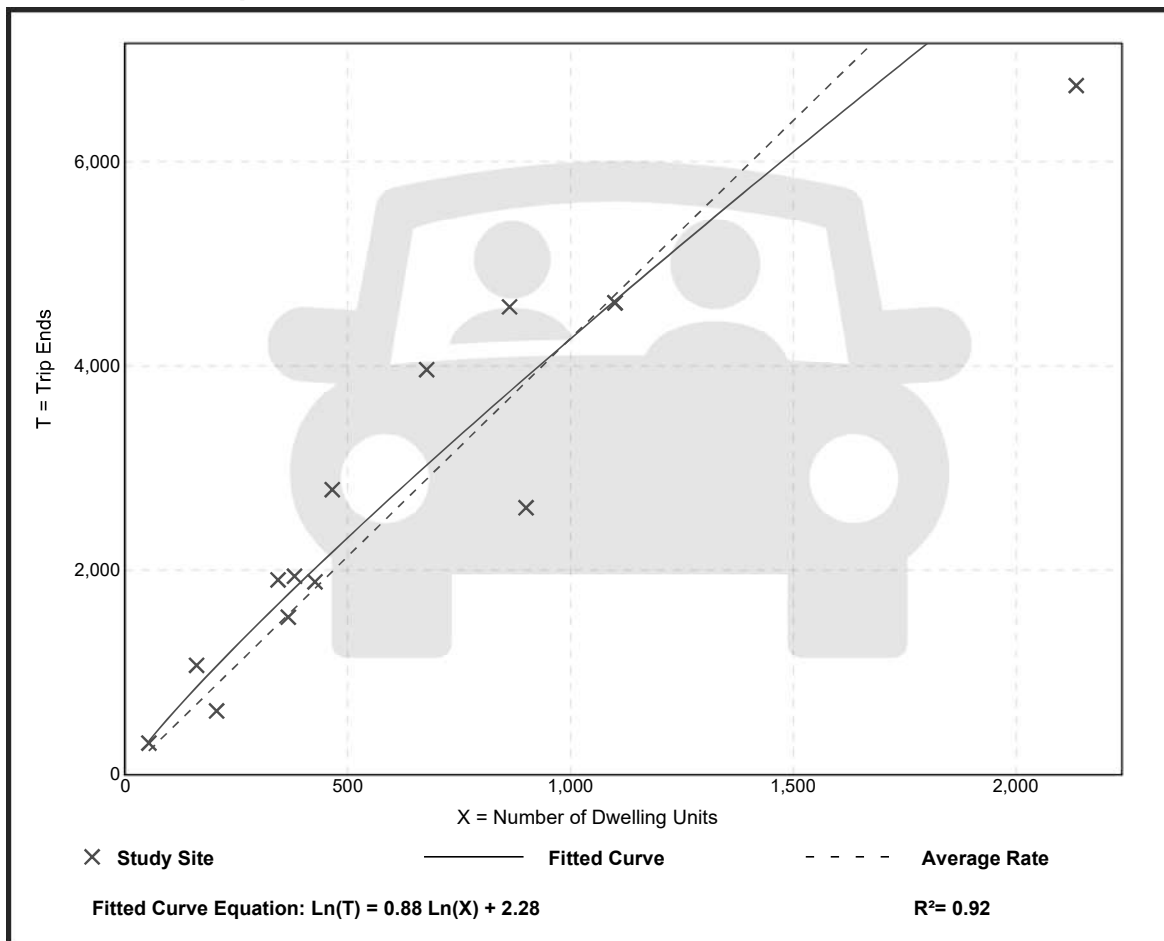
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 14
Avg. Num. of Dwelling Units: 655
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.27	2.90 - 6.66	1.11

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

Senior Adult Housing - Detached (251)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 29

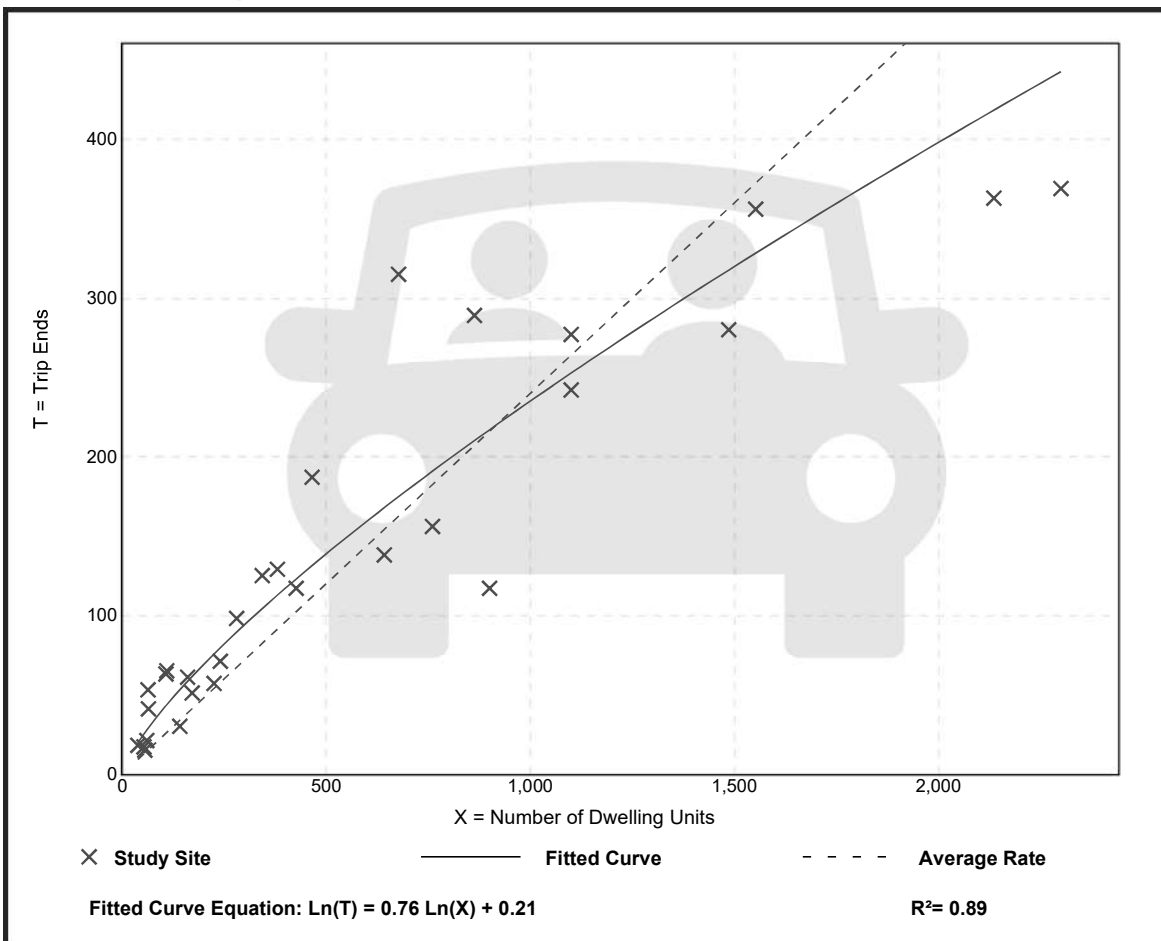
Avg. Num. of Dwelling Units: 583

Directional Distribution: 33% entering, 67% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.24	0.13 - 0.84	0.10

Data Plot and Equation



Senior Adult Housing - Detached (251)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 30

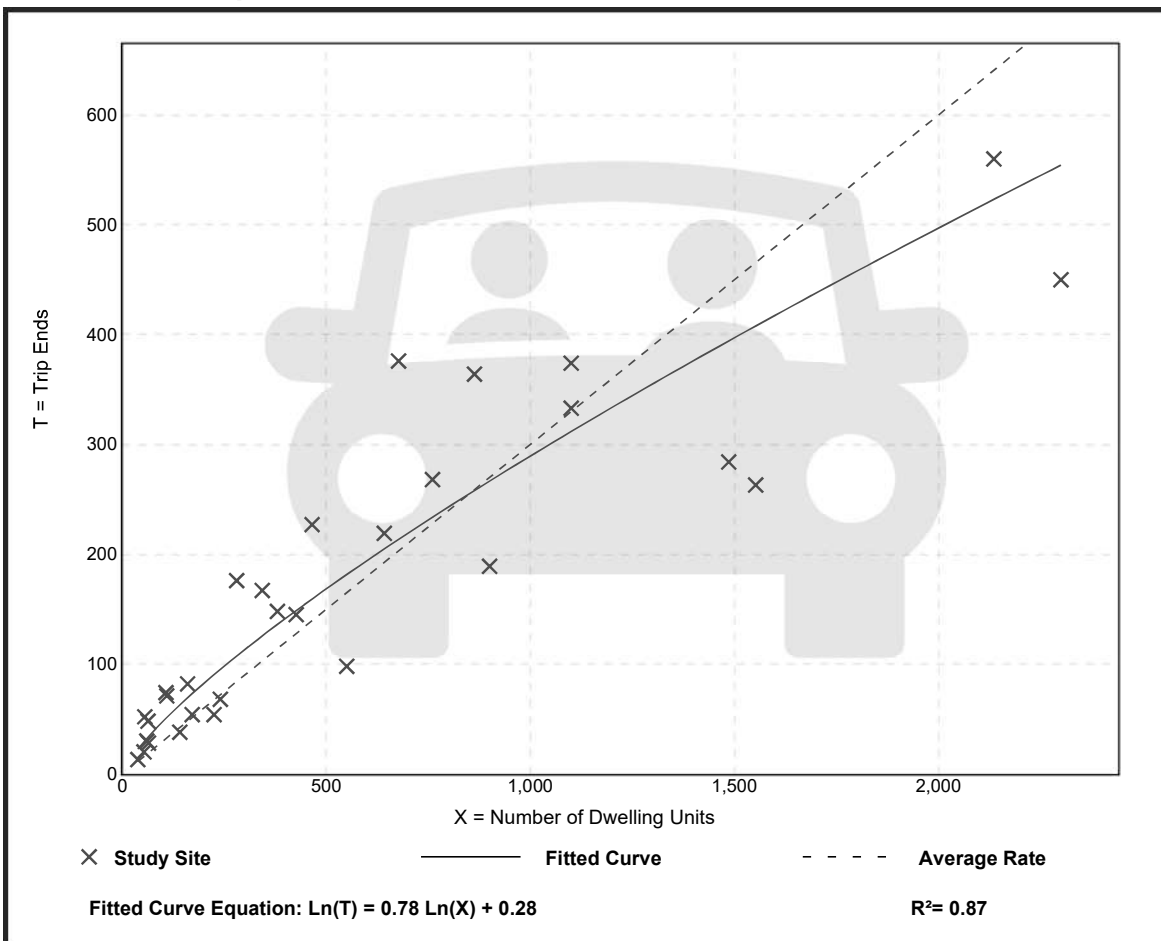
Avg. Num. of Dwelling Units: 582

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.95	0.13

Data Plot and Equation



Appendix G

Capacity Analysis Worksheets

HCS7 Two-Way Stop-Control Report

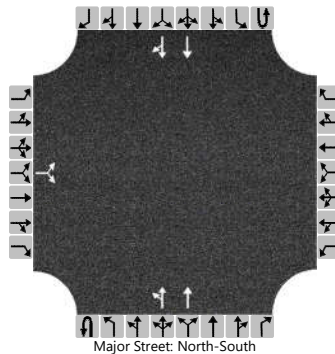
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2020
Time Analyzed	Existing AM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
Peak Hour Factor	0.84
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		18		1						1	349				290	6
Percent Heavy Vehicles (%)		8		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.96		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			23							1						
Capacity, c (veh/h)			456							1218						
v/c Ratio			0.05							0.00						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			13.3							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.3								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

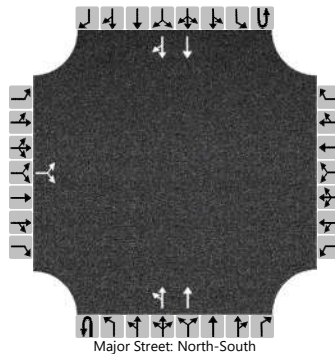
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2020
Time Analyzed	Existing PM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		24		1						1	400				343	33
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			27							1						
Capacity, c (veh/h)			442							1165						
v/c Ratio			0.06							0.00						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			13.7							8.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.7								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

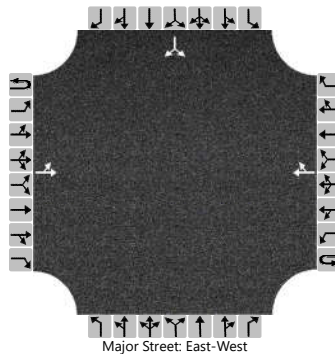
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2020
Time Analyzed	Existing AM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (N. Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Ave (N Leg)
Peak Hour Factor	0.76
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)		26	15				30	20						21		20
Percent Heavy Vehicles (%)		5												6		6
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)		4.15												6.46		6.26
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.25												3.55		3.35

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34													54	
Capacity, c (veh/h)		1517													903	
v/c Ratio		0.02													0.06	
95% Queue Length, Q ₉₅ (veh)		0.1													0.2	
Control Delay (s/veh)		7.4													9.2	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	4.8												9.2			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

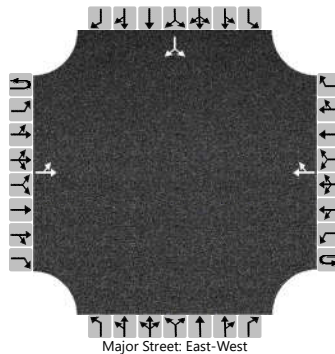
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2020
Time Analyzed	Existing PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (N. Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Ave (N Leg)
Peak Hour Factor	0.87
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)		15	20				38	25						45		31
Percent Heavy Vehicles (%)		0												3		0
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)		4.10												6.43		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.53		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17													87	
Capacity, c (veh/h)		1540													922	
v/c Ratio		0.01													0.09	
95% Queue Length, Q ₉₅ (veh)		0.0													0.3	
Control Delay (s/veh)		7.4													9.3	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	3.2												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

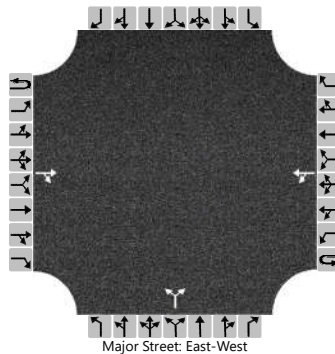
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2020
Time Analyzed	Existing AM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (S Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Stree (S Leg)
Peak Hour Factor	0.94
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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			26	10		1	31			19		1				
Percent Heavy Vehicles (%)						0				20		0				
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)						4.10				6.60		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.68		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						1					21					
Capacity, c (veh/h)						1585					900					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.3					9.1					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.2				9.1							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

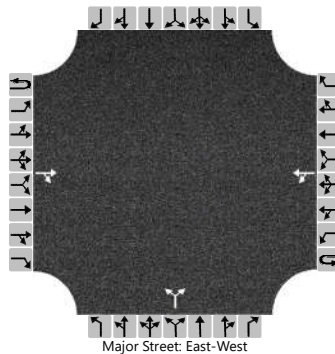
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2020
Time Analyzed	Existing PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (S Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Stree (S Leg)
Peak Hour Factor	0.82
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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			53	12		1	53			10		3				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		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)						1					16					
Capacity, c (veh/h)						1532					886					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.1					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.1				9.1							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

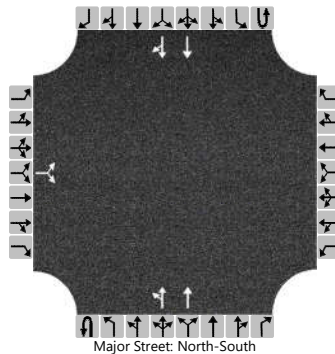
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	NoBuild AM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
Peak Hour Factor	0.84
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		18		1						1	366				304	6
Percent Heavy Vehicles (%)		8		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.96		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			23							1						
Capacity, c (veh/h)			438							1201						
v/c Ratio			0.05							0.00						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			13.7							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.7								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

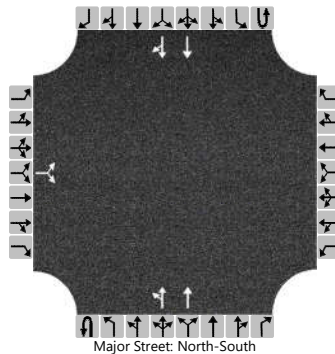
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	NoBuild PM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		24		1						1	418				360	33
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

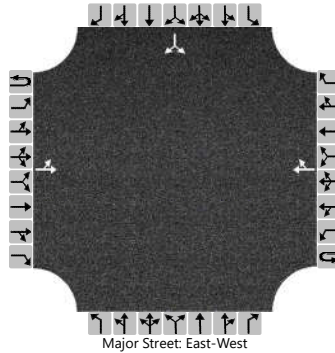
Flow Rate, v (veh/h)			27							1						
Capacity, c (veh/h)			425							1147						
v/c Ratio			0.06							0.00						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			14.0							8.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	14.0								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	LMM	Intersection	Indiana/13th (N. Leg)
Agency/Co.	GHA	Jurisdiction	Local
Date Performed	9/2/2020	East/West Street	Indiana Ave
Analysis Year	2027	North/South Street	13th Ave (N Leg)
Time Analyzed	NoBuild AM	Peak Hour Factor	0.76
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	5718.900		

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)		27	15				31	21						22		21
Percent Heavy Vehicles (%)		5												6		6
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)		4.15												6.46		6.26
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.25												3.55		3.35

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		36													57	
Capacity, c (veh/h)		1514													898	
v/c Ratio		0.02													0.06	
95% Queue Length, Q ₉₅ (veh)		0.1													0.2	
Control Delay (s/veh)		7.4													9.3	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	4.8												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

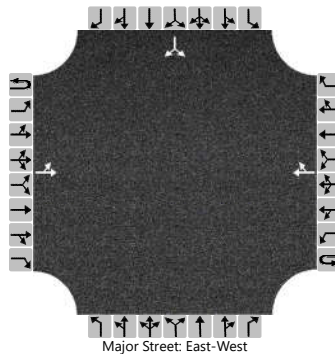
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	NoBuild PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (N. Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Ave (N Leg)
Peak Hour Factor	0.87
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)		15	21				39	26						46		32
Percent Heavy Vehicles (%)		0												3		0
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)		4.10												6.43		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.53		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17													90	
Capacity, c (veh/h)		1537													920	
v/c Ratio		0.01													0.10	
95% Queue Length, Q ₉₅ (veh)		0.0													0.3	
Control Delay (s/veh)		7.4													9.3	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	3.1												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

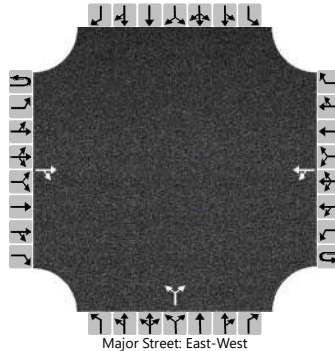
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	NoBuild AM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (S Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Stree (S Leg)
Peak Hour Factor	0.94
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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			27	10		1	32			20		1				
Percent Heavy Vehicles (%)						0				20		0				
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)						4.10				6.60		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.68		3.30				

Delay, Queue Length, and Level of Service

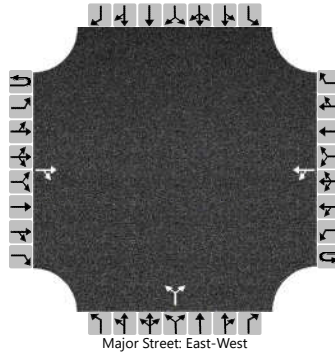
Flow Rate, v (veh/h)						1					22					
Capacity, c (veh/h)						1584					897					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.3					9.1					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.2				9.1							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information

Analyst	LMM	Intersection	Indiana/13th (S Leg)
Agency/Co.	GHA	Jurisdiction	Local
Date Performed	9/2/2020	East/West Street	Indiana Ave
Analysis Year	2027	North/South Street	13th Stree (S Leg)
Time Analyzed	NoBuild PM	Peak Hour Factor	0.82
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	5718.900		

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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			55	12		1	55			10		3				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		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)						1					16					
Capacity, c (veh/h)						1528					881					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.2					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.1				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

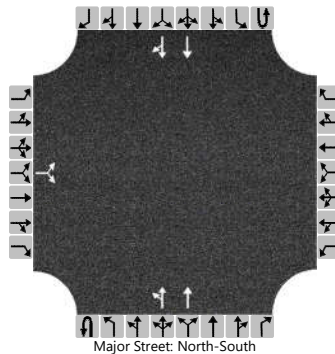
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Gate) AM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
Peak Hour Factor	0.84
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		33		9						3	366				304	12
Percent Heavy Vehicles (%)		8		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.96		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			50							4						
Capacity, c (veh/h)			470							1193						
v/c Ratio			0.11							0.00						
95% Queue Length, Q ₉₅ (veh)			0.4							0.0						
Control Delay (s/veh)			13.6							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.6								0.1							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

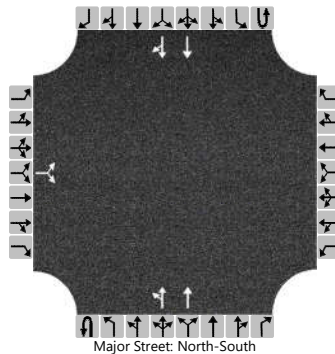
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Gate) PM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		34		5						9	418				360	50
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

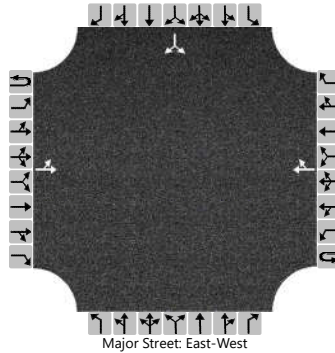
Flow Rate, v (veh/h)			42							10						
Capacity, c (veh/h)			424							1130						
v/c Ratio			0.10							0.01						
95% Queue Length, Q ₉₅ (veh)			0.3							0.0						
Control Delay (s/veh)			14.4							8.2						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	14.4								0.2							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	LMM	Intersection	Indiana/13th (N. Leg)
Agency/Co.	GHA	Jurisdiction	Local
Date Performed	9/2/2020	East/West Street	Indiana Ave
Analysis Year	2027	North/South Street	13th Ave (N Leg)
Time Analyzed	Total (Gate) AM	Peak Hour Factor	0.76
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	5718.900		

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)		27	15				31	21						22		21
Percent Heavy Vehicles (%)		5												6		6
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)		4.15												6.46		6.26
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.25												3.55		3.35

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		36													57	
Capacity, c (veh/h)		1514													898	
v/c Ratio		0.02													0.06	
95% Queue Length, Q ₉₅ (veh)		0.1													0.2	
Control Delay (s/veh)		7.4													9.3	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	4.8												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

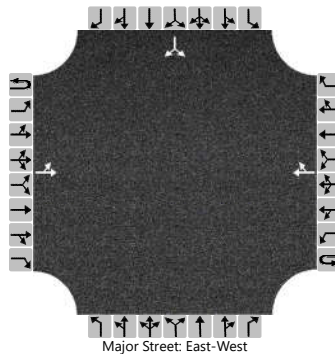
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Gate) PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (N. Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Ave (N Leg)
Peak Hour Factor	0.87
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)		15	21				39	26						46		32
Percent Heavy Vehicles (%)		0												3		0
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)		4.10												6.43		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.53		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17													90	
Capacity, c (veh/h)		1537													920	
v/c Ratio		0.01													0.10	
95% Queue Length, Q ₉₅ (veh)		0.0													0.3	
Control Delay (s/veh)		7.4													9.3	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	3.1												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

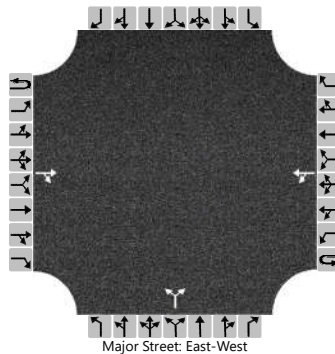
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Gate) AM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (S Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Stree (S Leg)
Peak Hour Factor	0.94
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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			27	10		1	32			20		1				
Percent Heavy Vehicles (%)						0				20		0				
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)						4.10				6.60		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.68		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						1					22					
Capacity, c (veh/h)						1584					897					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.3					9.1					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.2				9.1							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

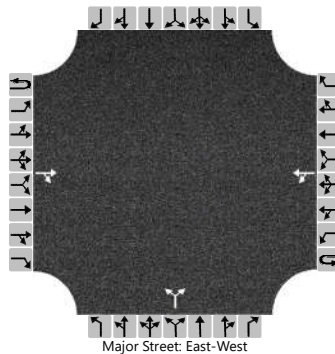
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Gate) PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (S Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Stree (S Leg)
Peak Hour Factor	0.82
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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			55	12		1	55			10		3				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		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)						1					16					
Capacity, c (veh/h)						1528					881					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.2					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.1				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

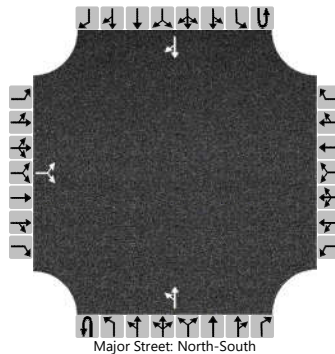
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Gated) AM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave/Site
Jurisdiction	Local
East/West Street	Site
North/South Street	Munhall Ave
Peak Hour Factor	0.90
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		23		7						2	19				7	8
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

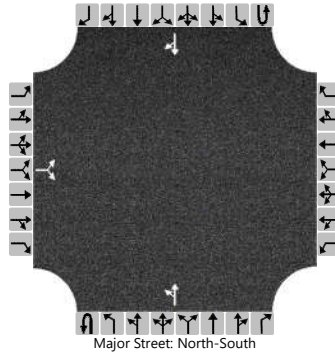
Flow Rate, v (veh/h)			33							2						
Capacity, c (veh/h)			994							1601						
v/c Ratio			0.03							0.00						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			8.7							7.3						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)	8.7								0.7							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	LMM	Intersection	Munhall Ave/Site
Agency/Co.	GHA	Jurisdiction	Local
Date Performed	9/2/2020	East/West Street	Site
Analysis Year	2027	North/South Street	Munhall Ave
Time Analyzed	Total (Gated) PM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	5718.900		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		14		5						8	25				34	25
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			21							9						
Capacity, c (veh/h)			925							1536						
v/c Ratio			0.02							0.01						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			9.0							7.4						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)	9.0								1.8							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

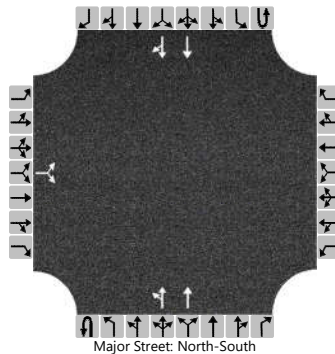
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Open) AM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave / Tyler Rd
Jurisdiction	Local
East/West Street	Munhall Ave
North/South Street	Tyler Rd
Peak Hour Factor	0.84
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		30		9						3	366				304	10
Percent Heavy Vehicles (%)		8		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.96		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.58		3.30						2.20						

Delay, Queue Length, and Level of Service

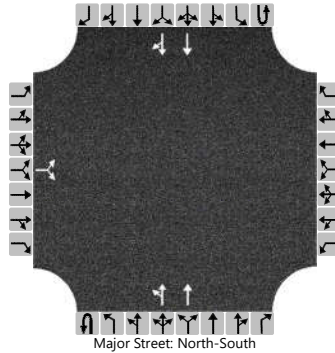
Flow Rate, v (veh/h)			46							4						
Capacity, c (veh/h)			475							1196						
v/c Ratio			0.10							0.00						
95% Queue Length, Q ₉₅ (veh)			0.3							0.0						
Control Delay (s/veh)			13.4							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	13.4								0.1							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	LMM	Intersection	Munhall Ave / Tyler Rd
Agency/Co.	GHA	Jurisdiction	Local
Date Performed	9/2/2020	East/West Street	Munhall Ave
Analysis Year	2027	North/South Street	Tyler Rd
Time Analyzed	Total (Open) PM	Peak Hour Factor	0.93
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	5718.900		

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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	2	0	0	0	2	0
Configuration			LR							LT	T				T	TR
Volume (veh/h)		31		5						9	418				360	47
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5		6.9						4.1						
Critical Headway (sec)		6.80		6.90						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			39							10						
Capacity, c (veh/h)			428							1133						
v/c Ratio			0.09							0.01						
95% Queue Length, Q ₉₅ (veh)			0.3							0.0						
Control Delay (s/veh)			14.3							8.2						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)	14.3								0.2							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

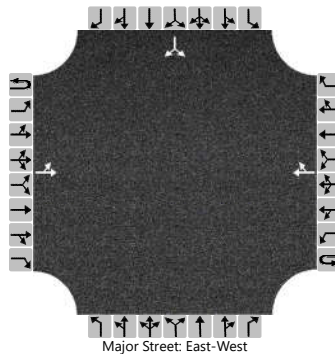
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Open) AM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (N. Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Ave (N Leg)
Peak Hour Factor	0.76
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)		27	16				33	23						24		21
Percent Heavy Vehicles (%)		5												6		6
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)		4.15												6.46		6.26
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.25												3.55		3.35

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		36													59	
Capacity, c (veh/h)		1507													889	
v/c Ratio		0.02													0.07	
95% Queue Length, Q ₉₅ (veh)		0.1													0.2	
Control Delay (s/veh)		7.4													9.3	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	4.7												9.3			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

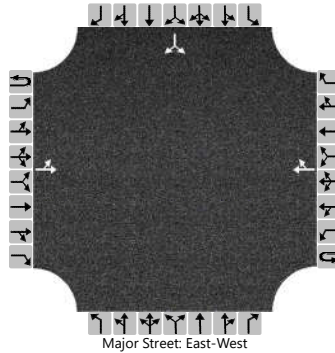
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Open) PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (N. Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Ave (N Leg)
Peak Hour Factor	0.87
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)		15	23				41	28						47		32
Percent Heavy Vehicles (%)		0												3		0
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)		4.10												6.43		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.53		3.30

Delay, Queue Length, and Level of Service

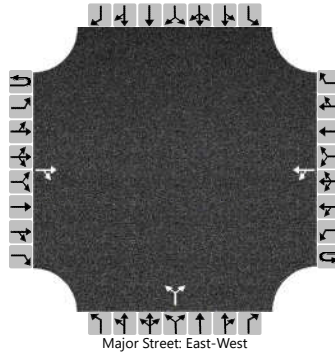
Flow Rate, v (veh/h)		17													91	
Capacity, c (veh/h)		1532													913	
v/c Ratio		0.01													0.10	
95% Queue Length, Q ₉₅ (veh)		0.0													0.3	
Control Delay (s/veh)		7.4													9.4	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	3.0												9.4			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

General Information

Analyst	LMM	Intersection	Indiana/13th (S Leg)
Agency/Co.	GHA	Jurisdiction	Local
Date Performed	9/2/2020	East/West Street	Indiana Ave
Analysis Year	2027	North/South Street	13th Stree (S Leg)
Time Analyzed	Total (Open) AM	Peak Hour Factor	0.94
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	5718.900		

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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			30	10		1	36			20		1				
Percent Heavy Vehicles (%)						0				20		0				
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)						4.10				6.60		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.68		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						1					22					
Capacity, c (veh/h)						1579					888					
v/c Ratio						0.00					0.03					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.3					9.2					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.2				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

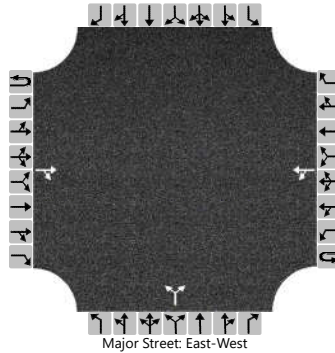
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Open) PM
Intersection Orientation	East-West
Project Description	5718.900

Site Information

Intersection	Indiana/13th (S Leg)
Jurisdiction	Local
East/West Street	Indiana Ave
North/South Street	13th Stree (S Leg)
Peak Hour Factor	0.82
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	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			60	12		1	59			10		3				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		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)						1					16					
Capacity, c (veh/h)						1521					870					
v/c Ratio						0.00					0.02					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.4					9.2					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.1				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

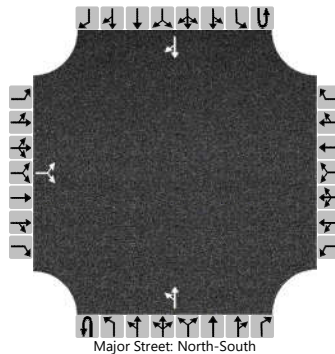
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Open) AM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave/Site
Jurisdiction	Local
East/West Street	Site
North/South Street	Munhall Ave
Peak Hour Factor	0.90
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		20		6						1	19				7	6
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			29							1						
Capacity, c (veh/h)			998							1604						
v/c Ratio			0.03							0.00						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			8.7							7.2						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)	8.7								0.4							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

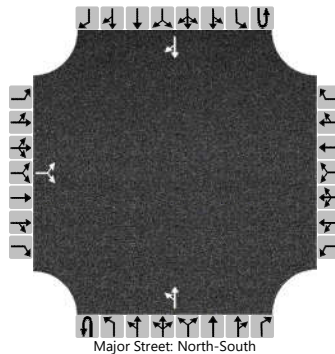
General Information

Analyst	LMM
Agency/Co.	GHA
Date Performed	9/2/2020
Analysis Year	2027
Time Analyzed	Total (Open) PM
Intersection Orientation	North-South
Project Description	5718.900

Site Information

Intersection	Munhall Ave/Site
Jurisdiction	Local
East/West Street	Site
North/South Street	Munhall Ave
Peak Hour Factor	0.90
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		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		11		4						6	25				34	22
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			17							7						
Capacity, c (veh/h)			933							1541						
v/c Ratio			0.02							0.00						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			8.9							7.3						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)	8.9								1.4							
Approach LOS	A															