

Bull's Head Traffic Impact Study

Bull's Head Urban Renewal Area & Brownfield Opportunity Area
City of Rochester, New York

February 2020

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City of Rochester, New York
Department of Neighborhood and Business
Development

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Bull’s Head Traffic Impact Study

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Executive Summary

This Traffic Impact Study (TIS) was conducted to assess the potential traffic impacts within portions of the Bull's Head Urban Renewal Area (BHURA) and Brownfield Opportunity Area (BHBOA) study areas based on one of several conceptual redevelopment frames developed as part of the Bull's Head Urban Renewal Plan effort. This conceptual redevelopment frame represents the most intensive development compared to the other frames and was chosen as the highest level of potential development for a conventional traffic impact assessment. The objectives of this TIS include:

1. Document existing roadway network
2. Assess the Existing/Future No Build Conditions traffic operations
3. Identify safety deficiencies
4. Develop and assess the Future Build Conditions traffic operations
5. Evaluate the traffic impacts, if any, of the proposed redevelopment concept on the study area transportation network
6. Identify potential mitigation measures needed to address safety and/or capacity issues that arise from the analysis of the proposed redevelopment concept.

Existing Conditions

To establish traffic flow patterns, characteristics, and modes within the study area, intersection turning movement and pedestrian counts were conducted during weekday morning and evening peak periods at the following study intersections:

1. West Avenue/Appleton Street/Ames Street
2. Child Street/Maple Street
3. West Main Street/Chili Avenue/West Avenue/York Street
4. West Main Street/Brown Street/Genesee Street
5. West Main Street/Henion Street
6. West Main Street/Jefferson Avenue

Existing conditions capacity analysis was conducted. Overall, the results of the capacity analysis reflect field observations which noted steady but manageable traffic flow and queues. The traffic signals were generally able to service all arriving traffic during both peak periods with some delay for left turning vehicles at the study intersections. The Results of the existing conditions capacity analysis performed for this study indicate that all project intersections operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods except for the following locations:

- W Main Street & Jefferson Avenue:
 - Northbound LTR movement: LOS E (PM Peak)
- W Main Street & Genesee Street/Brown Street:
 - Southbound LTR movement: LOS E (PM Peak)
 - Eastbound L movement: LOS E (PM Peak)

The Safety Analysis indicated that three of the six study area intersections were identified as having correctable accident patterns:

- W Main Street / Jefferson Avenue: Rear end, overtaking, right angle accidents
- W Main Street / Genesee Street / Brown Street: Rear end, overtaking, left-turn accidents
- W Main Street / West Avenue / Chili Avenue / York Street: Pedestrian & parked vehicle

The accidents at all other study area intersections were random in occurrence with no correctable patterns identified.

Future No Build Conditions

Future No Build Conditions upon which the intensive conceptual redevelopment frame will be added to produce Future Build Conditions within the study area, were established. Volume projections were made for the year 2024. Capacity analysis conducted for the Future No Build Condition (2024) for each of the study intersections projected similar operations to Existing Conditions with minimal degradation in intersection operations.

All study intersections are projected to continue to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the movements at the West Main Street/Jefferson Avenue intersection (NB LTR) and West Main Street/Genesee Street/Brown Street intersection (EB L, SB LTR) which continue to operate at LOS E as noted under Existing Conditions.

Future Build Conditions

The potential number of vehicle trips, trip distribution, and future build operations and capacity within portions of the BHURA and BHBOA study areas were based on one of several conceptual redevelopment frames developed as part of the BHURA Plan effort. As previously indicated, this conceptual redevelopment frame represents the most intensive development frame compared to the other frames and was chosen as the highest level of potential development for a conventional traffic study assessment. The number of vehicle trips estimated for the conceptual redevelopment frame utilized conventional methods for trip generation and distribution.

Trip generation estimates for the conceptual redevelopment frame were produced using the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th edition⁴. Trip generation estimates were calculated for each of the buildings within the conceptual redevelopment frame and then grouped into zones based on the location of the buildings and their access points to the transportation network.

Trip Generation Summary

Zone	Morning Peak Hour			Evening Peak Hour		
	Entering	Exiting	Total	Entering	Exiting	Total
Purple	2	4	6	4	5	9
Red	15	26	40	24	24	48
Yellow	2	6	8	5	3	8
Green	5	6	11	7	9	16
Blue	111	48	159	37	99	136
Total New Trips	135	90	224	77	140	217

The results of the Future Build capacity analysis indicate that all study intersections are projected to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the NB LTR movement at the West Main Street/Jefferson Avenue intersection. This movement is projected to continue to operate at LOS E as noted under Existing and Future No Build Conditions.

The conceptual redevelopment frame's road configuration is projected to generally create acceptable levels of operation, for an urban/city environment, at the study intersections. It should be noted that the NB Left turn lane at the W. Main Street/ Genesee St. intersection is projected to operate near its capacity. During the PM peak, 276 vehicles are projected to make the NB left turn; typically, a 2nd left turn lane is warranted at approximately 300 vehicles. This movement is projected to operate acceptably but minimal increases in traffic in the future (in excess of Future Build conditions) or on non-typical days may generate additional impacts.

The SB approach to the W. Main Street/ Genesee St. intersection is not projected to queue into the roundabout during the morning and evening peak conditions for a typical day. It should be noted that if events such as an accident or unprecedented long term future growth were to occur, traffic from this approach could queue into the roundabout. If this were to occur there are options to mitigate the queuing, including the use of a metering signal on the westbound (Brown Street) approach to the roundabout.

To reduce the likelihood of future traffic increases, the promotion of TDM applications such as increased use of public transportation options and ride sharing are recommended as a general mitigation measure to help reduce traffic congestion within the study network. The project is located in an urban setting with access to multiple modes of transportation. The promotion of TDM applications can further reduce vehicular trips and create trips utilizing different modes of transportation including walking, biking, and transit.

It is noted that the most intensive conceptual redevelopment frame along with conventional trip generation methodology was used to project Future Build Condition traffic volumes and thus represents a “worse-case scenario” for determining potential impacts on the local road network. Due to the unique nature of the conceptual redevelopment frame, including the project’s location within a dense urban environment, the likely inclusion of affordable and senior housing units, and the likely outcome of vehicles utilizing alternative routes within the neighborhood, the number of vehicle trips generated by the redevelopment of the area would likely be less than the estimates, having a positive impact on vehicular operations and capacity. In addition, the City of Rochester in the Rochester 2034 Comprehensive Plan includes numerous recommendations to promote multi-modal transportation options and transportation demand management to reduce single occupancy vehicle trips and vehicle miles traveled. Modifications to the methodology, promotion of alternatives, and less intensive development will result in less traffic overall and thus fewer potential impacts. A Traffic Impact Study will be required for the final design of the study area which accounts for all of these factors. It is recommended that this TIS update the trip generation and determine any specific modifications in support of future design development.

1.0 Introduction

1.1 Purpose and Objectives

The purpose of this Traffic Impact Study (TIS) is to assess the traffic impacts that the conceptual redevelopment frame within portions of the Bull's Head Urban Renewal Area (BHURA) and Brownfield Opportunity Area (BHBOA) study areas may have on the adjacent transportation network. The objectives of this TIS include:

1. Document existing roadway network
2. Assess the Existing/Future No Build Conditions traffic operations
3. Identify safety deficiencies
4. Develop and assess the Future Build Conditions traffic operations
5. Evaluate the traffic impacts, if any, of the conceptual redevelopment frame on the study area transportation network
6. Identify potential mitigation measures needed to address safety and/or capacity issues that arise from the analysis of the conceptual redevelopment frame.

1.2 Background

This project involves the redevelopment of approximately 34 acres of land, the BHURA, in the City of Rochester. The project is being executed in a two phase Urban Renewal Plan (URP). The first URP phase involves removal of blight and preparation of the land for revitalization/redevelopment. A URP covering the second phase will involve adoption of necessary zoning amendments and an urban renewal district. This phase involves the development of conceptual development plans, assessment of their potential environmental impacts and assessment of existing traffic conditions and potential future traffic-related impacts to the transportation network. This study is part of the second URP phase.

1.3 Study Area

The study area for this Traffic Impact Study includes portions of the public right-of-way within the BHURA, as adopted by the City Council in July 2018 and the Bull's Head Brownfield Opportunity Area study area in the City of Rochester, New York (see Figure 1).

The map shows the study area in relation to the area transportation network.

The following signalized intersections are within the study area and were evaluated as part of this Traffic Impact Study (see Figure 1):

1. West Avenue/Appleton Street/Ames Street
2. Child Street/Maple Street
3. West Main Street/Chili Avenue/West Avenue/York Street
4. West Main Street/Brown Street/Genesee Street
5. West Main Street/Henion Street
6. West Main Street/Jefferson Avenue

Figure 1: Bull's Head Traffic Impact Study Area Map



2.0 Existing Conditions Summary & Analysis

2.1 Overview

The existing conditions summary and analysis included a review of information available from the City of Rochester, Monroe County, State of New York, and transportation data collected specifically for this study. Data collection was conducted during the week of January 7th to January 11th and the week of January 14th to January 18th (schools were in session at the time traffic counts were taken). Data collected included:

- Traffic operations and observations (vehicle, pedestrian, transit, and bicycle)
- Documentation of roadway and intersection geometry, pavement markings, speed limits, signing, and traffic control
- Morning peak period (7-9am) and evening peak period (4-6pm) vehicle turning movement traffic counts (TMC) and pedestrian crossing counts at all study area intersections
- Traffic signal timing and phasing data

In addition, information reviewed from the City of Rochester, Monroe County, and State of New York included the following:

- Bicycle markings and facilities
- Transit routes and stops
- Accident data for the most recent three years that were available
- Average Annual Daily Traffic (AADT) volumes
- Roadway functional classifications

2.2 Study Area Roadway Descriptions

W Main Street	W Main Street is an east-west travel route that has two travel lanes approximately 10 feet wide in each direction with widening at the intersections to accommodate turn lanes. Designated on-street parking is present between Brown Street and York Street on the north side of the roadway. It is classified by the New York State Department of Transportation (NYSDOT) as an Urban Minor Arterial roadway. W Main Street is a main transit route for RTS including route numbers 4 (Genesee), 25 (Thurston/MCC), 8 (Chili), and 28 (Genesee Park/Strong).
Jefferson Avenue	Jefferson Avenue is a north-south travel route that has one travel lane approximately 11 feet wide in each direction with widening at the intersections to accommodate turn lanes. Alternate side on-street parking is available north of West Main Street and designated on-street parking is available on both sides of the roadway south of West Main Street. It is classified by the NYSDOT as an Urban Major Collector roadway.
Henion Street	Henion Street is a southbound one-way only travel route that has one travel lane approximately 10 feet wide. On-street parking is allowed on the east side of the roadway. It is classified by the NYSDOT as a Local Roadway.
Genesee Street	Genesee Street is a north-south travel route that has one travel lane approximately 13 feet wide in each direction with widening at the W Main Street intersection to accommodate turn lanes. On-street parking is available on both sides of the roadway for one hour durations. There are “sharrows” on Genesee Street to denote these lanes as shared vehicle/bicycle lanes. It is

classified by the NYSDOT as an Urban Minor Arterial roadway. There are two transit routes that utilize Genesee Street: 4 (Genesee) and 25 (Thurston/MCC).

Brown Street	Brown Street is a northeast-southwest travel route with one travel lane approximately 15 feet wide in each direction. Designated on-street parking is available on both sides of the street. Brown Street is classified by the NYSDOT as an Urban Major Collector roadway. Brown Street becomes a one-way street outside of the study area with traffic moving southwest from Mill Street to Allen Street.
Chili Avenue	Chili Avenue is a northeast-southwest travel route with one travel lane approximately 12 feet wide in each direction. On-street parking is available on the north side of the roadway for one hour durations. It is classified by the NYSDOT as an Urban Minor Arterial roadway. Chili Avenue serves two RTS transit route: 8 (Chili) and 28 (Genesee Park/Strong).
West Avenue	West Avenue is an east-west travel route with one travel lane approximately 12 feet wide in each direction. Bicycle lanes are present on the roadway, one in each direction. Designated on-street parking is also present on the south side of the roadway. Within the study area, West Avenue is classified by the NYSDOT as an Urban Minor Arterial roadway. West Avenue serves one RTS transit route: 28 (Genesee Strong/Park).
York Street	York Street is a north-south travel route that has one travel lane approximately 12 feet wide in each direction. On-street parking is allowed on the east side of the roadway. It is classified by the NYSDOT as a Local Roadway.
Ames Street	Ames Street is a north-south travel route with one travel lane approximately 12 feet wide in each direction. Bicycle lanes are present on the roadway, one in each direction. On-street parking is available on the east side of the roadway. It is classified by the NYSDOT as an Urban Major Collector roadway.
Child Street	Child Street is a north-south travel route that has one travel lane approximately 12 feet wide in each direction. It is classified by the NYSDOT as an Urban Major Collector roadway to the north of Maple Street and as a Local Roadway to the south of Maple Street. On-street parking is allowed on both sides of Child Street.
Maple Street	Maple Street is an east-west travel route that has one travel lane approximately 14 feet wide in each direction. It is classified by the NYSDOT as Urban Major Collector roadway.

The posted speed limit throughout the study area is 30 mph.

2.3 Roadway Functional Classification

Functional classification is the process by which roads, streets, and highways are grouped into classes by the NYSDOT according to the character of service they provide. Individual roads and streets do not serve travel independently but as part of a network of roads through which the traffic moves. Functional classification defines the nature of this movement by defining the part that any particular road or street should play in serving the flow of trips through a highway network, the type of access it provides to adjacent properties and whether the roadway is located in an urban or rural environment (all the roadways in the study area are classified as urban).

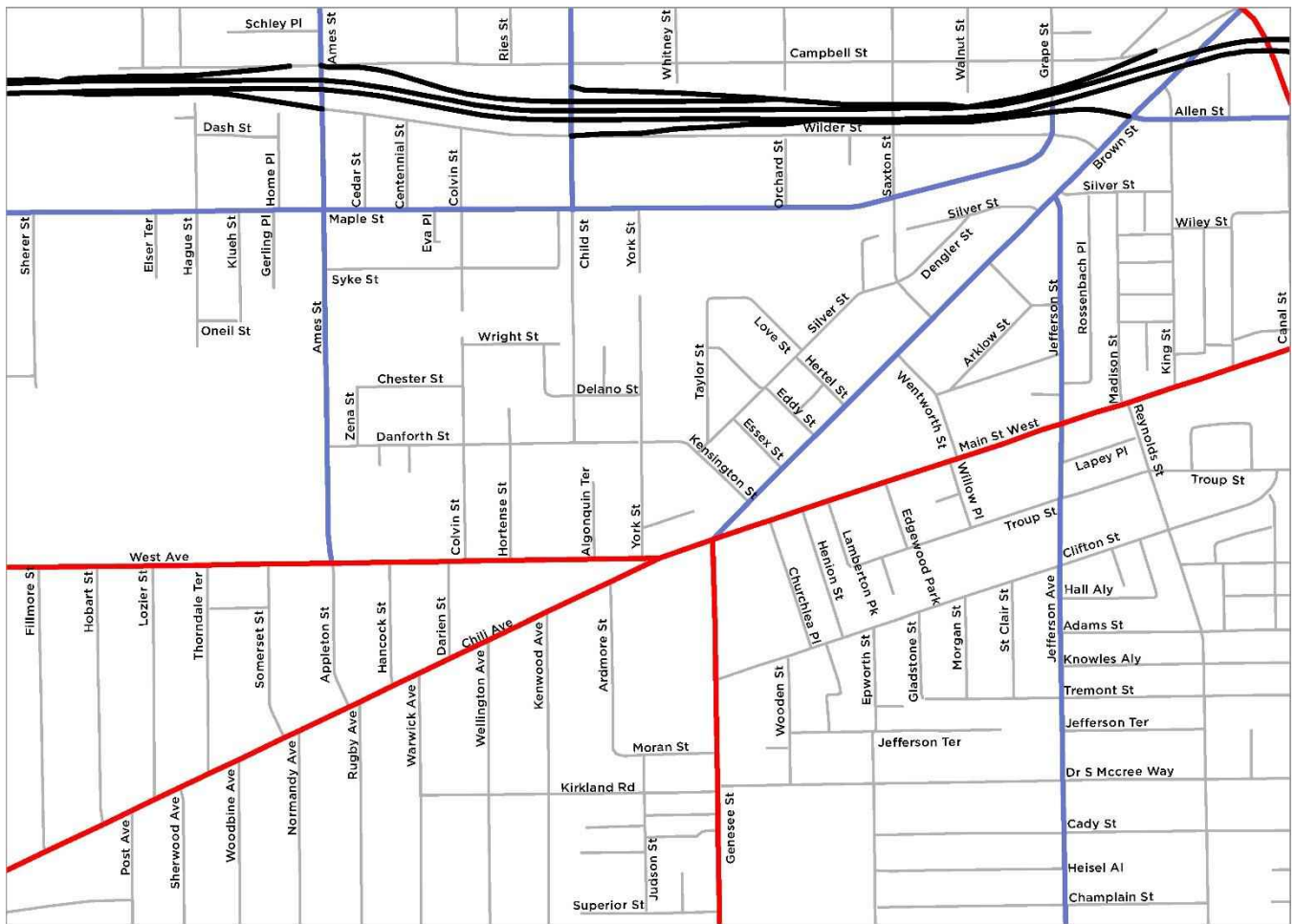
There are four primary functional classes:

- Principal Arterials (class 11)
- Minor Arterials (class 16)
- Collector Roadways (class 17)
- Local Roadways (class 19)

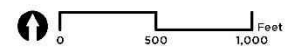
Principal arterials are typically subdivided into interstates, other freeways/expressways, and other principal arterials. Collector streets and roads typically are subdivided into major collectors and minor collectors. By area type, criteria also are provided for differentiation between urban and rural types.

Functional classification of the roadways within the Study Area is shown in Figure 2. West Avenue, Chili Avenue, W Main Street and Genesee Street are classified as Minor Arterials. Ames Street, Maple Street, Brown Street, Jefferson Avenue, and Child Street (north of Maple Street) are classified as Major Collectors. York Street, Child Street (south of Maple Street) and Henion Street are classified as Local Roadways.

Figure 2: Functional Classification



- Principal Arterial Interstate (11)
- Miner Arterial (16)
- Major Collector (17)
- Local (19)



2.4 Roadway Average Annual Daily Traffic (AADT)

Average annual daily traffic volumes represent the average volume of traffic that is present on any given roadway over the course of a day and is available from the New York State Department of Transportation. In order to estimate average daily traffic volumes, raw traffic data is collected by the NYSDOT and then adjusted for the time of the year that the data is collected. Figure 3 summarizes the weekday AADT on study roadway segments. A discussion of historic traffic volumes is presented in Section 3.0 on page 28.

Figure 3: Average Annual Daily Traffic Volumes (AADT)



2.5 Study Area Intersection Descriptions

The following summarizes the vehicle, transit, pedestrian, and bicycle accommodations for the intersections included in the study area. All study intersections are signal controlled with two to four phases of operation. Signal coordination is present at all study intersections except the Child Street/Maple Street intersection. Coordination is operated/maintained by Monroe County.

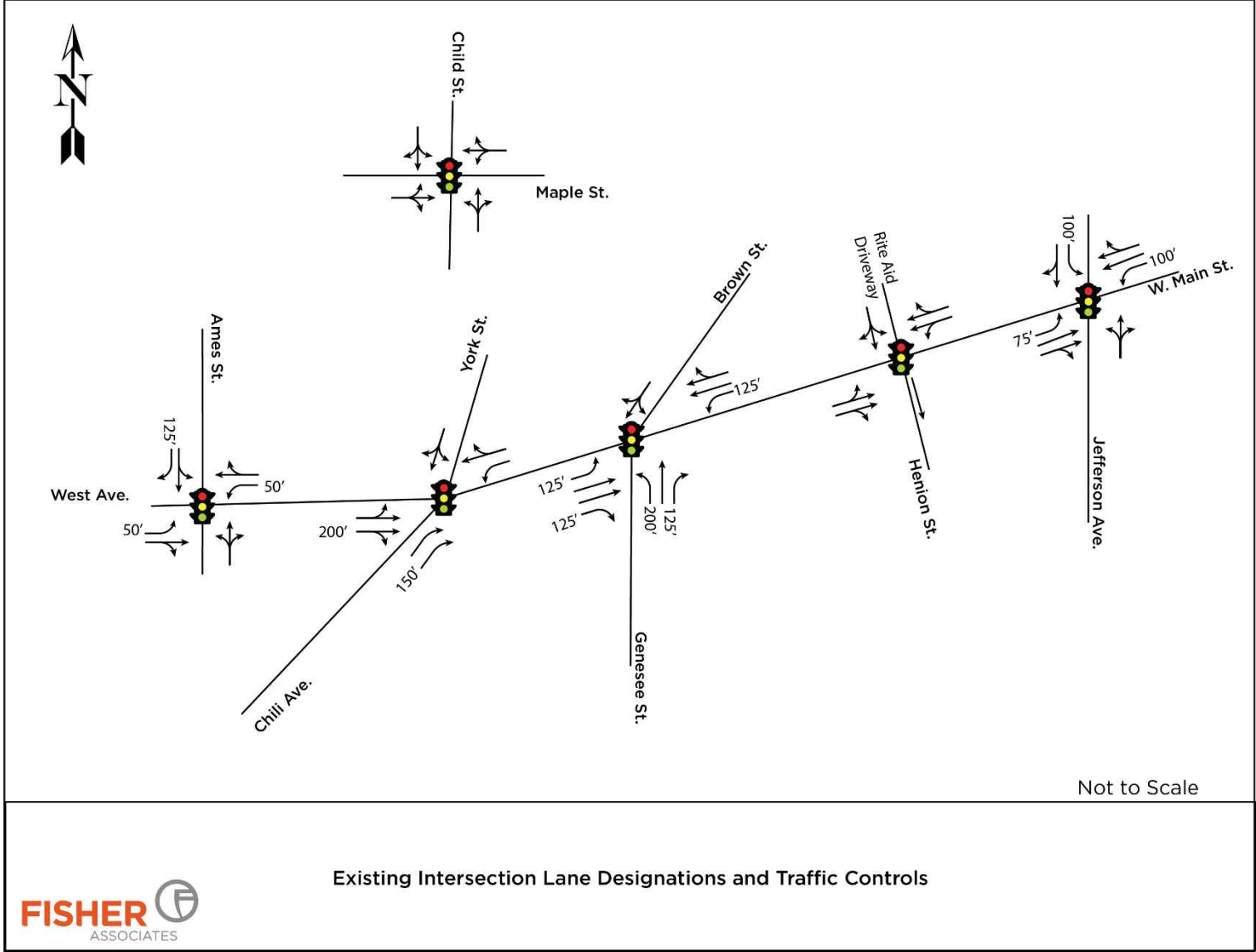
Intersection	Vehicle	Transit	Pedestrian	Bicycle
West Ave/ Appleton St/ Ames St	The West Ave approaches have a single shared through/right turn lane and a 50 foot exclusive left turn lane in each direction. The Ames St southbound approach has a 125 foot exclusive right turn and a shared through/left turn lane. Ames Street northbound is a single lane approach from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on West Ave on the nearside of eastbound traffic. The stop is for Route 28 (Genesee Park/Strong), is an in-lane stop, and does not have seating, a shelter, or any other amenity.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. At most, a pedestrian would need to cross three lanes of vehicular traffic and two lanes of bicycle traffic (approximately 65 feet crossing Ames St). This longer crossing distance is due to the large turning radius at the corner of Ames St and West Ave.	Dedicated bicycle lanes are present on West Ave and Ames St in both directions. Shared lane markings are present on Appleton St in both directions. Although bicycle facilities exist for all approaches to the intersection, the Southbound Ames St approach is the only one with bicycle facilities at the intersection. This approach has a marked bike box.
Child St/ Maple St	All approaches to this intersection are single lane approaches from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on Maple St on the nearside of eastbound traffic and on Child St on the nearside of southbound traffic. Both stops are in-lane and are for Route 9 (Jay/Maple). Neither stop has seating, a shelter, or any other amenity.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. Pedestrian crossing distances are approximately 45-50 feet for each crossing.	There are no bicycle facilities approaching the intersection and there are no facilities within the intersection.
West Ave/ W Main St/ Chili Ave/ York St	The West Ave approach has a shared through/left turn lane and a shared through/right turn lane. The W Main St approach consists of an exclusive left turn lane and a shared through/right turn lane. The Chili Ave approach has two exclusive right turn lanes and the York St approach has a single lane from which all movements are made. The intersection is controlled by a three-phase traffic signal with a protected left turn for W Main St westbound left turns in concert with an overlapping right turn for Chili Ave traffic and an exclusive phase for York St traffic.	RTS stops are set back from the intersection. A stop is posted on West Ave on the nearside of eastbound traffic and on the farside of westbound traffic (near the intersection of West Ave and Algonquin Ter). Both stops are for Route 28 (Genesee Park/Strong), are in-lane, and do not have seating or a shelter. There are two stops on Chili Ave near this intersection, but are associated with the Chili Ave / Ardmore St intersection. Both stops are for Route 28 and 8 (Chili), are nearside, and in-lane.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals across Chili Ave, West Ave, and York Street. Each of the three crosswalks is approximately 40 feet. Considering traffic signal phasing and crosswalk distances, a pedestrian travelling from the St. Mary's Campus to the northeast corner of the intersection (corner of York Street and W Main Street) would take approximately 1 minute. This would require crossing three roadways and approximately 120 feet of pavement.	There are no bicycle facilities for the intersection. The east/west bicycle lanes on West Ave do not have bicycle facilities for this intersection.

Intersection	Vehicle	Transit	Pedestrian	Bicycle
W Main St/ Genesee St/ Brown St	The W Main St eastbound approach consists of 125 foot exclusive left and right turn lanes and two through lanes. The westbound approach of W Main St Genesee Street consists of a 125 foot exclusive left turn lane, a through lane and a shared through/right turn lane. The Genesee St approach consists of exclusive left (200 foot length), through and right (125 foot length) turn lanes. Brown St consists of a single lane approach from which all movements are made. The intersection is controlled by a four-phase traffic signal with protected+permitted left turns for W Main St traffic and a leading phase for Genesee St traffic.	Most RTS stops associated with this intersection are set back from the intersection. A stop is posted on W Main St on the nearside of westbound traffic for Routes 4, 8, 25, and 28 and on the nearside of eastbound traffic for Routes 8 and 28. In addition, a stop is located on Genesee St on the nearside of northbound traffic and farside of southbound traffic both for Routes 4 and 25. All stops are in-lane. The stop located on W Main St on the nearside of eastbound traffic includes an enclosed shelter with seating capacity for 6 people. All other stops for this intersection have no amenities.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. Pedestrian crossing distances are excessive with the western crosswalk measuring approximately 80 feet, eastern 120 feet, northern 105 feet, and southern 70 feet. Given a typical pedestrian walking speed of 3.5 feet per second and current crosswalk countdown timer settings, the eastern 120 foot crosswalk and northern 105 foot crosswalk timers do not provide sufficient time for crossing. In addition, the distances result in an increased likelihood of accidents and reduce pedestrian safety.	There are no dedicated bicycle facilities within the intersection. Bicycle share markings on Genesee Street are located approximately 500 feet south of the intersection.
W Main St/ Henion St	The W Main St approaches consist of a shared through/left turn lane and a shared through/right turn lane in each direction. Henion St is one-way away from the intersection and the Right-Aid Driveway is a single lane from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on W Main St on the nearside of eastbound traffic. This stop is in-lane and for Routes 4, 8, 25, and 28). The stop includes an enclosed shelter with seating capacity for 6 people. The stop also includes a public garbage receptacle.	Pedestrian facilities include continental crosswalk markings across both approaches of W Main Street and across Henion St. No markings are across the driveway into the Rite Aid parking lot. Pedestrian countdown crossing signals are provided at all approaches, including across the Rite Aid driveway. Crosswalk distance across W Main St is 50-55 feet, Henion St 20 feet, and Rite Aid driveway 30 feet.	There are no bicycle facilities approaching the intersection and there are no facilities within the intersection.

Intersection	Vehicle	Transit	Pedestrian	Bicycle
W Main St/ Jefferson Ave	The W Main St eastbound approach has a 75 foot exclusive left turn lane, a through lane and a shared through/right turn lane. The W Main St westbound approach consists of a 100 foot exclusive left turn lane, a through lane and a shared through/right turn lane. Jefferson Ave southbound has a 100 foot exclusive left turn lane and a shared through/right turn lane and the northbound approach has a single lane approach from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on W Main St on the nearside of westbound traffic and the nearside of eastbound traffic. Both stops are in-lane and are for Routes 4, 8, 25, and 28. Neither stop has seating, a shelter, or any other amenity.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. Pedestrian crossing distances range from 45 feet crossing Jefferson Ave and 60 feet crossing W Main Street.	There are no bicycle facilities approaching the intersection and there are no facilities within the intersection.

The existing lane designations, exclusive turn lane lengths and traffic controls at the study area intersections are identified in Figure 4.

Figure 4: Existing Intersection Lane Designations, Turn Lane Lengths & Traffic Controls



xx = Length of turn bay

2.6 Turning Movement Traffic Counts

Turning movement traffic data were collected during the week of January 7th to January 11th and the week of January 14th to January 18th from 7-9 am and 4-6 pm. These time frames encompassed the weekday morning peak and evening peak hours. The morning peak hour occurred from 7:30 – 8:30 am, the evening peak hour occurred from 4:30 – 5:30 pm. Schools were in session at the time traffic counts were taken.

Existing conditions traffic volumes for the morning peak and evening peak hours are depicted in Figure 5 and Figure 6, respectively. The intersection turning movement count data is provided in the Appendix of this study. In general, traffic volumes are between 30% and 45% higher during the PM peak hour. Traffic volumes are highest within the study area on the section of W Main Street between Genesee Street and Chili Avenue, with the next highest volumes between Henion Street and Genesee Street. The lowest volumes are on West Avenue between Chili Avenue and Ames Street. The highest volume intersection is W Main Street/Genesee Street/Brown Street with the W Main Street/Chili Avenue/West Avenue and W Main Street/Jefferson Avenue intersections having the second most amount of traffic.

Figure 5: Morning Peak Existing Traffic Volumes

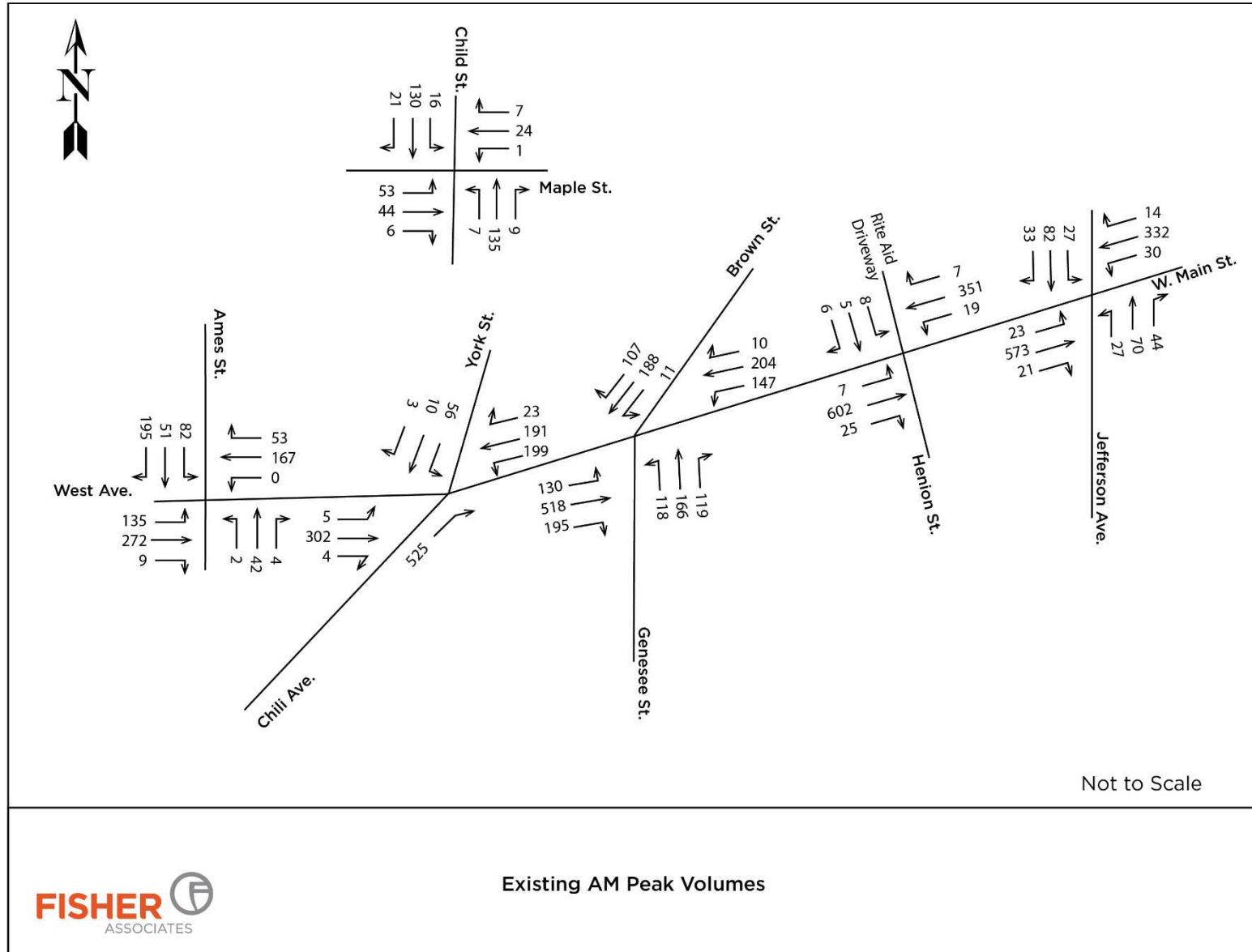
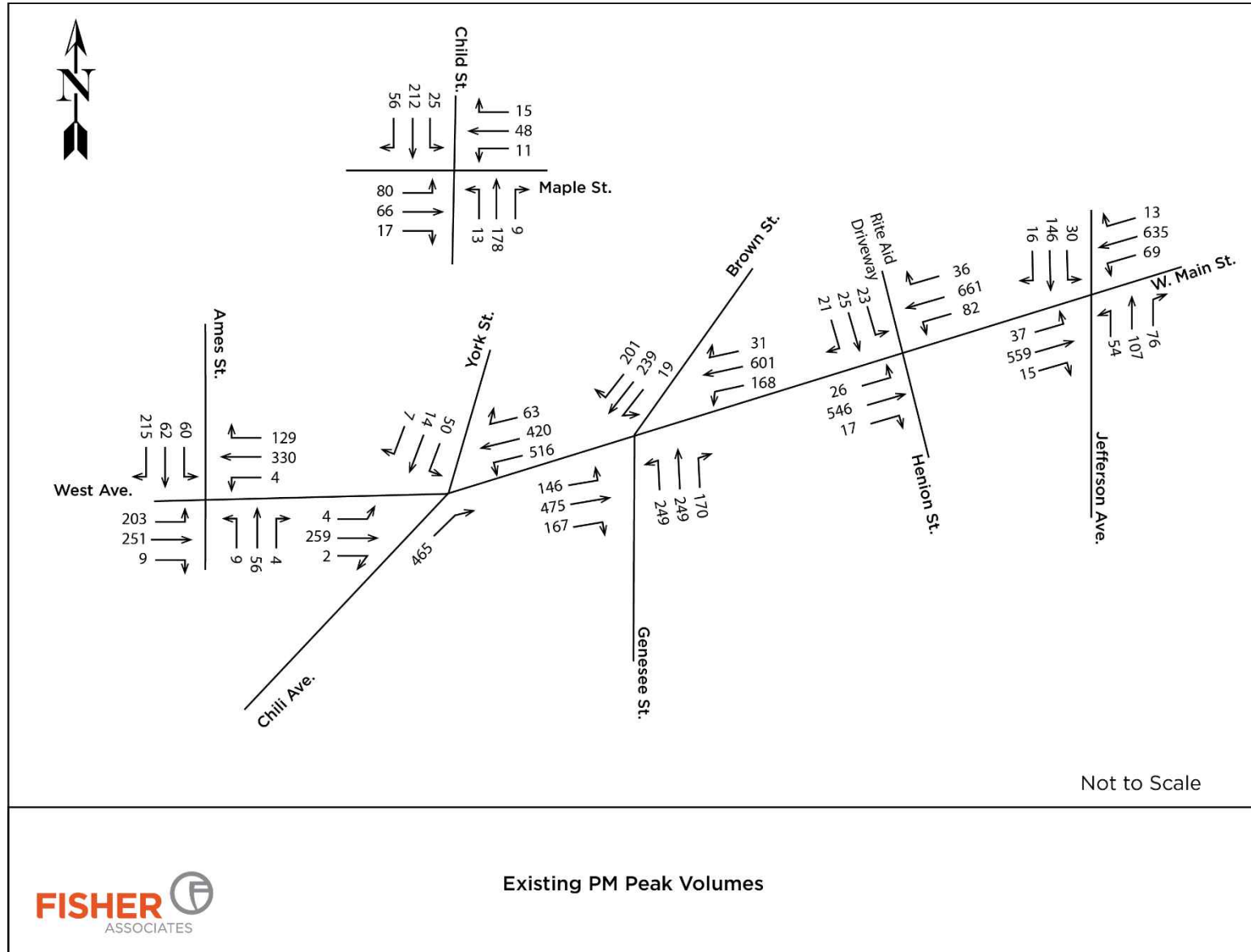


Figure 6: Evening Peak Existing Traffic Volumes



2.7 Pedestrian Counts

During the collection of turning movement traffic data, pedestrian crossing data was also collected during the same timeframe. Table 1 below presents a summary of the pedestrian crossing data. The intersection with the highest number of crossings was at W Main Street and Henion Street with 115 crossings from 4-6pm. Pedestrian activity generators (origins and destinations) near this intersection include the two bus stops serving Routes 4, 8, 25, 28, Rite Aid and associated parking lot, and the Bull's Head Plaza and associated parking lot. Other intersections with a relatively high number of pedestrian crossings include the W Main Street/Jefferson Avenue intersection and the W Main Street/West Avenue/ Chili Avenue/York Street intersection. Both intersections have nearby transit stops and mixed-use buildings. Overall, the greatest pedestrian generators include the St. Mary's Campus, the Bull's Head Plaza, and numerous RTS transit stops.

Table 1: Pedestrian Crossing Data

Intersection	AM Peak Period (7-9am)	PM Peak Period (4-6pm)	Total
Child Street/Maple Street	16	22	38
West Avenue/Ames Street	21	50	71
W Main Street/West Avenue/Chili Avenue/York Street	82	74	156
W Main Street/Genesee Street/Brown Street	31	42	73
W Main Street/Henion Street	63	115	178
W Main Street/Jefferson Avenue	41	86	127
Total	254	389	643

xx=Number of pedestrians crossing at intersection

2.8 Existing Operations and Capacity Analysis

Capacity Analysis Methodology

Intersection vehicle capacity analysis was conducted using Synchro 10¹ software. The program is based on methods presented in the 2010 Highway Capacity Manual² that describes the levels of operation for intersections controlled by signals or regulated by stop signs.

Using an analytical approach, a Level of Service (LOS) is determined for vehicle traffic travelling through an intersection. The Level of Service is defined or quantified in terms of average delay experienced by motorists, which is equated to the letters 'A' to 'F' for signal controlled intersections and to the letters 'a' to 'f' for stop sign controlled intersections. Delay descriptions for each level of service are as follows:

Traffic Signal Controlled Intersections

- A less than 10 seconds
- B 10 to 20 seconds
- C 20 to 35 seconds
- D 35 to 55 seconds
- E 55 to 80 seconds
- F 80 seconds or Greater

Stop Sign Controlled Intersections

- a less than 10 seconds
- b 10 to 15 seconds
- c 15 to 25 seconds
- d 25 to 35 seconds
- e 35 to 50 seconds
- f 50 seconds or Greater

In general, an overall LOS 'D' with intersection turning movement, LOS 'E' for a traffic signal controlled intersection and a LOS 'e' for a stop controlled intersection or roundabout are generally considered to be the thresholds of acceptable operations in an urban environment.

Capacity Analysis Results

This section of the study provides a summary of the results of the existing conditions operation analysis for the study intersections. A summary of Intersection Level of Service is provided in Table 2: Existing Intersection Level of Service on Page 21. In the table, movements have been shaded in red to call out locations approaching or at poor operating conditions. Capacity analysis summary reports for existing conditions are provided in the Appendix of this report.

Overall, the results of the capacity analysis reflect field observations which noted steady but manageable traffic flow and queues. The traffic signals were generally able to service all arriving traffic during both peak periods with some delay for left turning vehicles at the study intersections.

The Results of the existing conditions capacity analysis performed for this study indicate that all project intersections operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods except for the following locations:

W Main Street & Jefferson Avenue:

- Northbound LTR movement: LOS E (PM Peak)
 - Long queues that do not always clear within each cycle were observed in the field.
 - Northbound vehicles were observed running on red due to congestion and insufficient green time.

W Main Street & Genesee Street/Brown Street:

- Southbound LTR movement: LOS E (PM Peak)
 - Long but manageable queues were observed in the field; most queues cleared within each cycle.
- Eastbound L movement: LOS E (PM Peak)
 - No significant queuing was observed in the field.

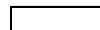
Observations also indicate there were delays and queues caused by bus stops at each intersection excluding the Child Street/Maple Street intersection. Stopped busses created vehicular queues behind them multiple times in an hour, predominantly at the W Main Street/Henion Street intersection. Other intersections were also affected in this way but not as frequently nor as severely.

Table 2: Existing Intersection Level of Service

Study Intersection	Approach	Movement	Morning Peak Hour			Evening Peak Hour		
			Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)
West Main Street & Jefferson Avenue (Signalized)	Eastbound	L	1.0	A	1	4.1	A	14
		T-TR	2.0	A	4	4.4	A	73
	Westbound	L	3.9	A	10	8.5	A	38
		T-TR	3.5	A	30	8.6	A	130
	Northbound	LTR	18.6	B	67	77.8	E	#289
	Southbound	L	17.2	B	23	35.6	D	46
		TR	15.1	B	55	37.3	D	160
	Overall		6.1	A		19.3	B	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	LT-TR	1.1	A	43	1.9	A	m52
	Westbound	LT-TR	2.6	A	75	11.3	B	m291
	Southbound	LTR	30.7	C	25	28.8	C	66
	Overall		2.3	A		8.4	A	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L	21.2	C	116	60.8	E	#154
		T-T	25.4	C	222	37.4	D	218
		R	26.0	C	189	38.1	D	175
	Westbound	L	17.2	B	70	30.5	C	77
		T-TR	21.1	C	44	22.4	C	176
		L	24.8	C	92	42.4	D	#227
	Northbound	T	20.9	C	125	18.6	B	163
		R	20.7	C	95	18.0	B	116
	Southbound	LTR	40.5	D	275	64.6	E	#506
	Overall		25.7	C		36.8	D	
	Eastbound	LT-TR	42.9	D	138	41.2	D	101
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Westbound	L	16.3	B	216	5.9	A	m189
		TR	4.1	A	49	3.5	A	m111
	Northbound	R-R	0.6	A	0	0.4	A	0
	Southbound	LR	45.6	D	81	52.1	D	87
	Overall		16.8	B		10.9	B	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L	6.0	A	56	8.6	A	113
		TR	5.6	A	101	5.3	A	99
	Westbound	L	0.0	A	0	3.8	A	m2
		TR	4.9	A	71	3.8	A	103
	Northbound	LTR	22.8	C	44	40.0	D	76
	Southbound	LT	32.6	C	106	52.3	D	133
		R	7.5	A	42	9.8	A	61
	Overall		10.2	B		12.2	B	
Child Street & Maple Street (Signalized)	Eastbound	LTR	8.6	A	39	11.6	B	70
	Westbound	LTR	6.3	A	12	8.1	A	33
	Northbound	LTR	7.5	A	56	8.0	A	73
	Southbound	LTR	7.5	A	64	9.0	A	108
	Overall		7.6	A		9.3	A	

Note*

- Levels of Service (LOS) were obtained from Synchro 10
- Delay is vehicle delay measured in seconds.
- 95th % = 95th percentile queue length (feet)
- m = Volume for 95th percentile queue is metered by upstream signal.
- # = 95th percentile volume exceeds capacity, queue may be longer.
- LTR = Left/Through/Right turn movement



2.9 Safety Considerations, Accident History and Analysis

An accident analysis was performed for the study area intersections in accordance with the Highway Design Manual chapter 5. Three years of accident history (October 2015 thru September 2018) were reviewed for patterns and safety concerns and summarized for the study area intersections. Accident history data was obtained from MV-104A Police Accident Reports provided by the City of Rochester, New York, Police Department.

The accident analysis summaries produced using HSA³ software are available in the Appendix of the report including Accident Rate Calculations, Accident Summary Sheets, Details of Accident Histories and Collision Diagrams.

Accident Severity

Table 3 below provides a summary of the severity of the accidents for the study intersections. The study accident history reveals that 99 accidents occurred at the study intersections over the three year period. There were no fatalities, however, 22 out of the 99 (22%) total accidents involved an injury. The study accident history also revealed that 4 out of the 99 (4%) accidents involved a pedestrian and no accidents involved a bicycle. Two pedestrian accidents occurred at the W Main Street/Jefferson Avenue intersection and one pedestrian accident occurred at the W Main Street/West Avenue/Chili Avenue/York Street intersection and at the W Main Street/Genesee Street/Brown Street intersection.

Table 3: Intersection Accident Severity

Intersection	Fatality	Injury	Property Damage Only	Non-Reportable	Total
Main Street/Jefferson Avenue	0	8	29	1	38
Main Street/Henion Street	0	0	0	0	0
Main Street/Genesee Street/Brown Street	0	6	18	2	26
Main Street/West Avenue/Chili Avenue/York Street	0	3	10	2	15
West Avenue/Ames Street	0	3	7	1	11
Child Street/Maple Street	0	2	7	0	9
TOTAL	0	22	71	6	99

Accident Rates

Accident rates were calculated for the study area intersections and compared to the Statewide Average Accident Rates for similar facilities. Table 4 below provides a summary of the accident rates for the study area intersections. Four of the six study area intersections had accident rates over the Statewide Average Rates:

- W Main Street / Jefferson Avenue
- W Main Street / Genesee Street / Brown Street
- West Avenue / Ames Street
- Child Street / Maple Street

Table 4: Intersection Accident Rates

Intersection	Urban Functional Class Statewide Average Rate (Acc/MEV)	Calculated Accident Rate (Acc/MEV)
Main Street/Jefferson Avenue	0.25	1.93
Main Street/Henion Street	0.20	0.00
Main Street/Genesee Street/Brown Street	0.25	0.88
Main Street/West Avenue/Chili Avenue/York Street	0.25	0.08
West Avenue/Ames Street	0.20	0.75
Child Street/Maple Street	0.20	1.13

Acc/MEV – number of accidents/million entering vehicles

Accident Type

The study area intersections were further examined to identify potential accident patterns. Table 5 below summarizes the accident types that occurred at the study area intersections. The table shows that rear-end (30/99), overtaking (21/99), left turn (15/99) and right angle (14/99) accidents were the predominant accident types at the study area intersections.

Table 5: Intersection Accident Type

Intersection	Rear End	Over- take	Right Angle	Left Turn	Right Turn	Fixed Object	Head On	Side swipe	Ped- estrian	Parked Vehicle	Run Off Road	Total
Main Street/Jefferson Avenue	9	9	7	3	0	3	1	1	1	4	0	38
Main Street/Henion Street	0	0	0	0	0	0	0	0	0	0	0	0
Main Street/Genesee Street/Brown Street	8	7	3	5	1	0	0	0	1	0	1	26
Main Street/West Ave/Chili Ave/York St	6	4	0	1	0	0	0	0	2	2	0	15
West Avenue/Ames Street	6	1	1	3	0	0	0	0	0	0	0	11
Child Street/Maple Street	1	0	3	3	0	1	0	0	0	1	0	9
TOTAL	30	21	14	15	1	4	1	1	4	7	1	99

Accident Patterns, Causes, and Mitigation

Four of the six study area intersections were identified as having specific accident patterns:

- W Main Street / Jefferson Avenue
- W Main Street / Genesee Street / Brown Street
- W Main Street / West Avenue / Chili Avenue / York Street
- West Avenue / Ames Street

The accidents at all other study area intersections were random in occurrence with no patterns identified. The following is a breakdown of the accident patterns that were identified.

W Main Street / Jefferson Avenue

Patterns

The W Main Street/Jefferson Avenue intersection accident history revealed that 38 accidents occurred at the intersection. Overall, rear end accidents, overtaking and right angle accidents accounted for approximately 66% (25/38) of the accidents.

The accident history revealed that nine rear-end accidents occurred at the W Main Street/Jefferson Avenue intersection. Of the nine rear-end accidents, three occurred on each the eastbound, westbound and northbound approaches. Following too closely was identified as a contributing factor in five of the rear-end accidents and driver inattention/distraction was identified as a contributing factor in four of the rear end accidents.

Nine overtaking accidents occurred at the intersection of which four occurred on the eastbound approach, three occurred on the westbound approach, one occurred on the northbound approach and one occurred north of the intersection. Failure to yield right-of-way is identified as a contributing factor in three overtaking accidents, improper passing/lane usage were contributing factors in two overtaking accidents and driver inattention/distraction, turning improperly, unsafe lane changing, and oversized vehicle were identified as contributing factors in one overtaking accident.

Seven right angle accidents occurred at the W Main Street/Jefferson Avenue intersection of which four involved a northbound and a westbound vehicle, two involved a northbound and an eastbound vehicle and one involved a southbound and an eastbound vehicle. Disregard of the traffic control was identified as a contributing factor in four of the right angle accidents, unsafe speed was a contributing factor in two right angle accidents and driver inexperience, failure to yield right-of-way and other vehicular issue are each identified as a contributing factor in one accident.

The majority of the accidents discussed above involved vehicles travelling northbound. Examination of the accident diagram indicates a correctable pattern exists for rear-end accidents and right angle accidents on the intersection's northbound approach and for the eastbound/westbound overtaking accidents.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

Probable Causes

The rear-end accidents and right angle accidents on the intersection's northbound approach are likely due to congestion. Capacity analysis indicated a LOS E with notable queues on the northbound approach during the PM peak and that the northbound phase is utilizing all available green time. Observations during the evening peak hours noted vehicle queues on the Jefferson Avenue northbound approach did not always clear the intersection during the northbound/southbound phase. Northbound vehicles were also regularly observed travelling thru the intersection after the traffic signal had turned red which may be a factor contributing to the number of right angle accidents at the intersection.

Additionally, observations noted that on-street parking activity and RTS buses stopping at the intersection along with limited sight distances on the northbound approach contributed to congestion at the intersection and may be factors contributing to parked car, rear-end and overtaking accidents.

The eastbound/westbound overtaking accidents are likely due to the striping on West Main Street. Capacity analysis indicted a LOS A on the eastbound and westbound approaches which indicates excessive capacity. The excessive capacity from two lanes in both the eastbound and westbound direction allows drivers to be aggressive and change lanes frequently.

**Potential
Mitigation
Measures**

Potential mitigation measures for the northbound approach include signal timing adjustments providing additional time for the northbound approach and striping improvements paired with additional parking restrictions on the northbound approach.

A road diet reducing the eastbound and westbound approaches to one lane in each direction with a center turn lane would better channelize traffic flow and potentially reduce overtaking accidents.

W Main Street / Genesee Street / Brown Street

Patterns

The W Main Street/Genesee Street/Brown Street intersection accident history revealed that 26 accidents occurred at the intersection. Overall, rear end accidents, overtaking and left-turn accidents accounted for approximately 77% (20/25) of the accidents.

The accident history revealed that eight rear-end accidents occurred at the W Main Street/Genesee Street/Brown Street intersection of which five occurred on the southbound approach, two occurred on the westbound approach and one occurred on the eastbound approach. Following too closely was identified as a contributing factor in nine of the rear-end accidents, driver inattention was identified as a contributing factor in three of the accidents and driver inexperience, disregard of traffic control, reaction to an uninvolved vehicle and slippery pavement were each identified as contributing factors in one rear-end accident.

Seven overtaking accidents occurred at the intersection of which four occurred on the southbound approach, one occurred eastbound and one occurred on the westbound approach. Review of the accident history details reveals that two of the southbound overtaking accidents involved vehicles moving from on-street parking and one eastbound overtaking accident involves a bus. Failure to yield right-of-way was identified as a contributing factor in three of the overtaking accidents, passing/improper lane usage was identified as a contributing factor in two accidents and driver inattention/distraction, following too closely, outside car distraction, aggressive driving/road rage, oversized vehicle and driverless/runaway vehicle were each identified as contributing factor in an overtaking accident.

Five left turn accidents occurred at W Main Street/Genesee Street/Brown Street of which two involved an eastbound left turn, two involved a southbound left turn, and one involved a westbound left turn. Failure to yield right-of-way was identified as a contributing factor in three of the left turn accidents, turning improperly was a contributing factor in two accidents and driver inattention/distraction and other vehicular issue were both identified as contributing factors in one left turn accident.

One pedestrian accident occurred involving a southbound vehicle hitting two pedestrians crossing Genesee Street outside of a pedestrian crosswalk which was attributed to pedestrian error/confusion.

The majority of the accidents discussed above involved vehicles travelling southbound. Examination of the accident diagram indicates a correctable pattern exists for rear-end accidents, overtaking accidents, and potentially left turn accidents on the intersection's southbound approach.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

Probable Causes

The rear-end accidents, overtaking accidents, and left turn accidents on the intersection's southbound approach are likely due to congestion. Capacity analysis indicated a LOS E with notable queues on the

southbound approach during the PM peak. The queues were also observed in the field. Capacity analysis also indicates that the southbound phase is utilizing all available green time.

Additionally, the on-street parking on the southbound approach extends close to the intersection and adds vehicular interactions that increase the likelihood of overtaking accidents and additional congestion.

**Potential
Mitigation
Measures**

Potential mitigation measures include signal timing adjustments and pushing the on-street parking limits further back from the intersection, traffic calming measures and striping improvements.

W Main Street / West Avenue / Chili Avenue / York Street

Patterns

The W Main Street/West Avenue/Chili Avenue/York Street intersection accident history revealed that 15 accidents occurred at the intersection. Overall, rear-end and right angle accidents accounted for approximately 67% (10/15) of all the intersection accidents. However, these accident types were random in occurrence with no patterns identified. Potential correctable accident patterns involved pedestrian and parked vehicle accidents.

Two pedestrian accidents occurred on the Chili Avenue northeast-bound approach. One of the pedestrian accidents occurred outside of a crosswalk and was attributed to pedestrian error/confusion and failure to yield right-of-way. The other pedestrian accident was attributed to the driver not yielding the right-of-way and occurred within a crosswalk when a pedestrian did not complete crossing the roadway within the pedestrian phase and a vehicle proceeded forward with the green light striking the pedestrian.

Two parked vehicle accidents occurred and were both related to vehicles parked on the north side of W Main Street, east of the W Main Street/West Avenue/Chili Avenue/York Street intersection. One of the accidents was attributed to an oversized vehicle parked on W Main and passing/improper lane use and the other accident was attributed to driver inattention/distraction and parking in a no parking zone.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

Probable Causes

Regarding the pedestrian accidents, review of the pedestrian signal timings on the Chili Avenue approach indicate that there should be sufficient time for pedestrians to cross Chili Avenue safely. Observations noted a number of pedestrians crossing the roadways outside of crosswalks throughout the peak hours which increases the chance of pedestrian accidents. This indicates that the accidents are behavior related and not related to intersection design indicating that there is no correctable pattern.

Regarding the parked vehicle accidents, observations noted delivery trucks parked in the no parking zone in front of the deli on the northeast corner of the intersection resulting in sight distance issues and improper lane usage at the intersection's westbound approach.

Examination of the accident diagram, accident history details and field observations indicate that a correctable problem may exist related to vehicles, particularly heavy vehicles, parked and unloading curbside within the no parking zone on the westbound approach.

**Potential
Mitigation
Measures**

Enforcement of the no parking zone on the westbound approach may reduce congestion, minimize sight distance issues and may result in fewer parked cars, overtaking, left turn and rear-end accidents involving westbound vehicles. In addition, another mitigation option includes a loading/delivery zone utilizing space for on-street parking.

West Avenue / Ames Street

Patterns The West Avenue/Ames Street intersection accident history revealed that 11 accidents occurred at the intersection. Overall, rear end accidents accounted for approximately 55% (6/11) of the accidents.

Examination of the accident diagram revealed that five of the six rear-end accidents involved vehicles on the southbound approach. The contributing factors indicate that following too closely was a contributing factor in four of the accidents, slippery pavement was a contributing factor in three of the accidents and driver inattention along with vehicle issues were contributing factors in one accident.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

Probable Causes Driver behavior and slippery pavement are the probable causes to the rear end accidents.

Potential Mitigation Measures Based on examination of the accident diagrams and review of the accident history details, no correctable accident patterns have been identified at the intersection.

3.0 Future No Build Conditions

This section of the study establishes the base conditions upon which the conceptual redevelopment frame will be added to produce future conditions. Projections were made for 5 years out (2024), assuming full build-out of the conceptual redevelopment frame.

3.1 Background Growth

An annual compounded growth rate of 0.5% per year was applied to account for potential traffic volume growth within the study area. The annual compounded growth rate was determined using historical traffic volume data. Figure 7 and Figure 8 depict the Future No Build traffic volumes for the 2024 conditions morning and evening peak hours, respectively.

Figure 7: Morning Peak Traffic Volumes - Future No-Build 2024

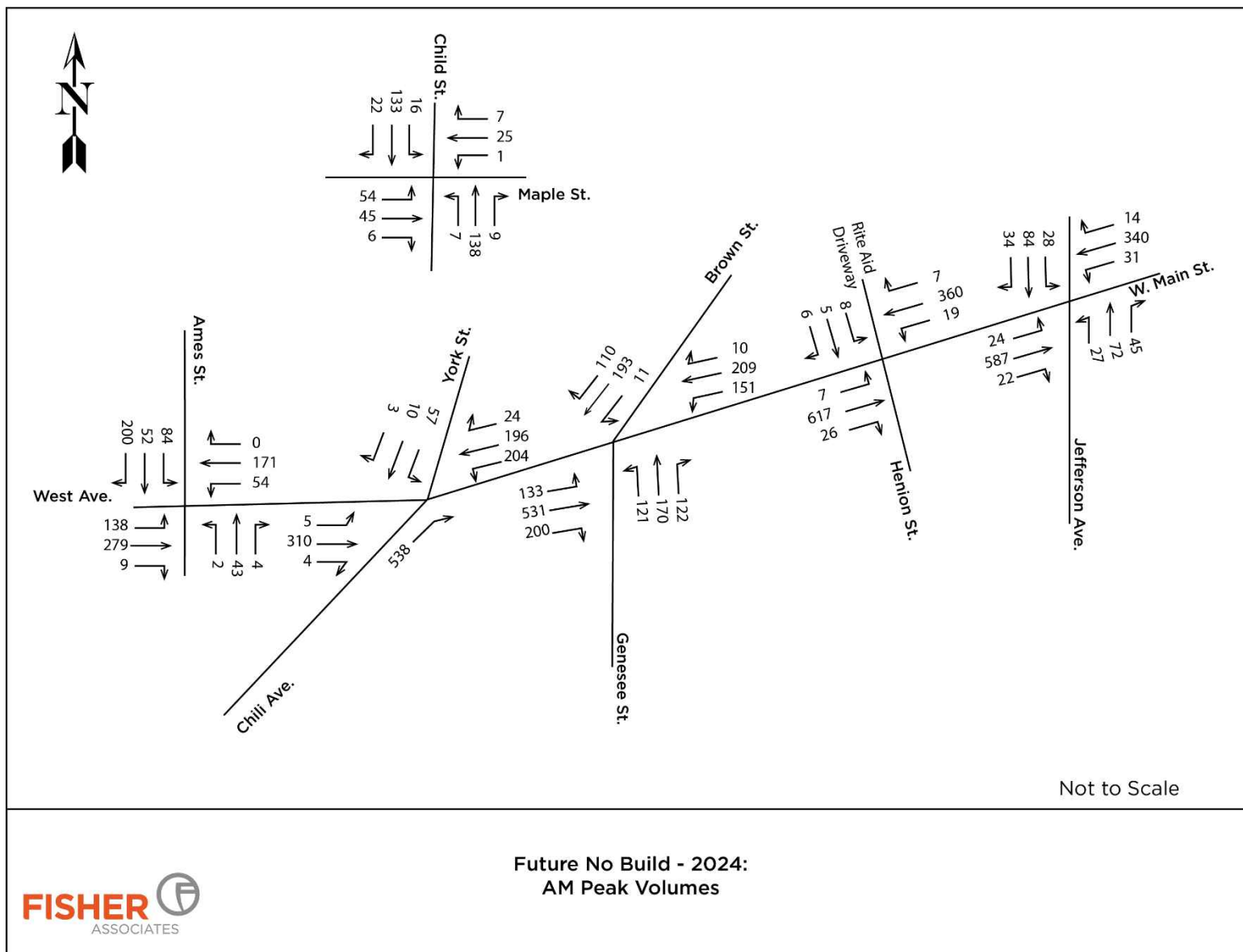
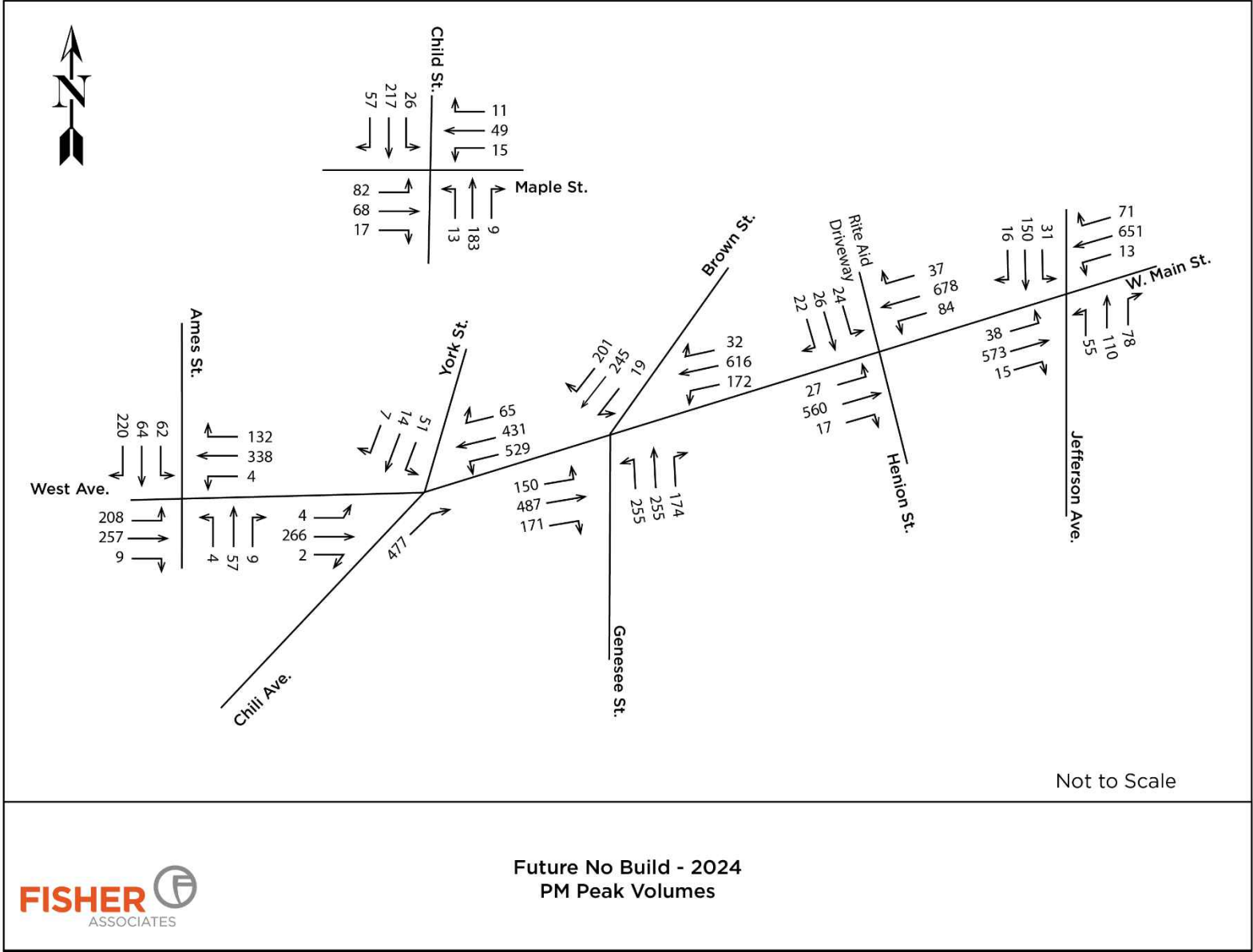


Figure 8: Evening Peak Traffic Volumes - Future No-Build 2024



3.2 Future No Build Operations & Capacity Analysis

This section of the report provides Future No Build Conditions operational assessment for the study area intersections.

No Build Conditions capacity analysis results for the morning peak and evening peak hours are summarized in Table 6 on page 32. Also included in Table 6 are the results of the Existing Conditions analysis. Capacity analysis summary reports for Future No Build Conditions are provided in the Appendix of this report.

Capacity analysis conducted for the Future No Build Condition (2024) for each of the study intersections projected similar operations to Existing Conditions with minimal degradation in intersection operations. The degradation is highlighted in the tables summarizing Intersection Level of Service.

All study intersections are projected to continue to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the movements at the West Main Street/Jefferson Avenue intersection (NB LTR) and West Main Street/Genesee Street/Brown Street intersection (EB L, SB LTR) which continue to operate at LOS E as noted under Existing Conditions.

Potential options to improve operations for the northbound approach to the West Main Street/Jefferson Avenue intersection include signal timing adjustments providing additional time for the northbound approach and striping improvements paired with additional parking restrictions on the northbound approach.

Potential options to improve operations for the W Main Street/Genesee Street/Brown Street intersection include signal timing adjustments and pushing the southbound on-street parking limits further back from the intersection along with striping improvements.

Table 6: Existing and Future No-Build Level of Service

Study Intersection	Approach	Movement	Morning Peak Hour						Evening Peak Hour					
			Existing Conditions 2019			Future No Build 2024			Existing Conditions 2019			Future No Build 2024		
			Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)
West Main Street & Jefferson Avenue (Signalized)	Eastbound	L	1.0	A	1	1.0	A	1	4.1	A	14	4.2	A	15
		T-TR	2.0	A	4	1.9	A	4	4.4	A	73	4.5	A	74
	Westbound	L	3.9	A	10	3.9	A	10	8.5	A	38	8.8	A	39
		T-TR	3.5	A	30	3.5	A	31	8.6	A	130	8.9	A	134
	Northbound	LTR	18.6	B	67	19.0	B	69	77.8	E	#289	78.9	E	#301
	Southbound	L	17.2	B	23	17.3	B	24	35.6	D	46	35.5	D	46
		TR	15.1	B	55	15.2	B	56	37.3	D	160	37.1	D	165
	Overall		6.1	A		6.2	A		19.3	B		19.6	B	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	LT-TR	1.1	A	43	1.1	A	43	1.9	A	m52	1.9	A	m53
	Westbound	LT-TR	2.6	A	75	2.6	A	77	11.3	B	m291	11.5	B	m301
	Southbound	LTR	30.7	C	25	30.7	C	25	28.8	C	66	29.2	C	68
		Overall		2.3	A		2.3	A		8.4	A		8.5	A
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L	21.2	C	116	21.3	C	115	60.8	E	#154	66.8	E	#169
		T-T	25.4	C	222	25.7	C	224	37.4	D	218	38.5	D	224
		R	26.0	C	189	26.3	C	190	38.1	D	175	38.6	D	180
	Westbound	L	17.2	B	70	18.0	B	71	30.5	C	77	32.9	C	82
		T-TR	21.1	C	44	21.2	C	44	22.4	C	176	23.3	C	178
	Northbound	L	24.8	C	92	25.7	C	96	42.4	D	#227	44.9	D	#239
		T	20.9	C	125	21.0	C	128	18.6	B	163	18.6	B	167
	Southbound	R	20.7	C	95	20.8	C	98	18.0	B	116	18.0	B	119
		LTR	40.5	D	275	40.9	D	284	64.6	E	#506	66.5	E	#522
	Overall		25.7	C		26.1	C		36.8	D		38.2	D	
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR	42.9	D	138	42.6	D	141	41.2	D	101	41.2	D	101
	Westbound	L	16.3	B	216	16.6	B	220	5.9	A	m189	6.1	A	m193
		TR	4.1	A	49	4.2	A	52	3.5	A	m111	3.6	A	m114
	Northbound	R-R	0.6	A	0	0.8	A	4	0.4	A	0	0.4	A	0
	Southbound	LR	45.6	D	81	45.7	D	81	52.1	D	87	52.1	D	88
	Overall		16.8	B		16.9	B		10.9	B		10.9	B	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L	6.0	A	56	6.2	A	59	8.6	A	113	9.1	A	120
		TR	5.6	A	101	5.8	A	106	5.3	A	99	5.4	A	103
	Westbound	L	0.0	A	0	0.0	A	0	3.8	A	m2	4.0	A	m2
		TR	4.9	A	71	5.1	A	74	3.8	A	103	4.1	A	110
	Northbound	LTR	22.8	C	44	22.5	C	44	40.0	D	76	39.6	D	76
	Southbound	LT	32.6	C	106	32.5	C	108	52.3	D	133	52.3	D	136
		R	7.5	A	42	7.4	A	42	9.8	A	61	9.6	A	62
		Overall		10.2	B		10.2	A		12.2	B		12.4	B
Child Street & Maple Street (Signalized)	Eastbound	LTR	8.6	A	39	8.6	A	40	11.6	B	70	11.8	B	73
	Westbound	LTR	6.3	A	12	6.3	A	12	8.1	A	33	8.2	A	34
	Northbound	LTR	7.5	A	56	7.5	A	57	8.0	A	73	8.0	A	74
	Southbound	LTR	7.5	A	64	7.6	A	65	9.0	A	108	9.1	A	110
		Overall		7.6	A		7.7	A		9.3	A		9.4	A

Note*

- Levels of Service (LOS) were obtained from Synchro 10
- Delay is vehicle delay measured in seconds.
- 95th % = 95th percentile queue length (feet)
- m = Volume for 95th percentile queue is metered by upstream signal.
- # = 95th percentile volume exceeds capacity, queue may be longer.
- LTR = Left/Through/Right turn movement

= Acceptable Operations

= LOS E or F, and/or Significant Queues

4.0 Future Build Conditions

This section of the report documents the potential number of vehicle trips, trip distribution, and future build operations and capacity within portions of the BHURA and BHBOA study areas based on one of several conceptual redevelopment frames included in the BHURA Plan. This conceptual redevelopment frame represents the most intensive development frame compared to the other frames and was chosen as the highest level of potential development for a conventional traffic study assessment. The number of vehicle trips estimated for the conceptual redevelopment frame utilized conventional methods for trip generation and distribution. Due to the unique nature of the conceptual redevelopment frame, including the project's location within a dense urban environment, the likely inclusion of affordable and senior housing units, and the likely outcome of vehicles utilizing alternative paths within the neighborhood, the number of vehicle trips generated by redevelopment of the area would likely be less than the estimates, having a positive impact on vehicular operations and capacity. In addition, the City of Rochester in the Rochester 2034 Comprehensive Plan includes numerous recommendations to promote multi-modal transportation options and transportation demand management to reduce single occupancy vehicle trips and vehicle miles traveled. To that end, Section 5.0 on page 47 includes recommendations to conduct a more detailed traffic impact study in support of future design development which can account for these factors.

4.1 Description of Conceptual Redevelopment Frame

The BHURA comprises approximately 34 acres and is located in Rochester, New York, centered at the convergence of West Main Street, Genesee Street, and Brown Street, West Avenue, and Chili Avenue and is bounded by West Avenue, Colvin Street, Danforth Street, Silver Street, Essex Street, Brown Street, West Main Street, Churchlea Place, Clifton Street, and Genesee Street. The goals and objectives of the BHURA Plan correspond to a phased approach to eliminate blighting conditions in the URA. Based on the identified greatest need and opportunity, the first phase of urban renewal actions are concentrated in the eastern portion of the URA and is referenced as the "Land Assembly Target Area." The conceptual redevelopment frames focus on this Land Assembly Target Area. The conceptual redevelopment frame is shown in Figure 9 on page 34.

As described above, the most intensive conceptual redevelopment frame was chosen as the highest level of potential development for a conventional traffic study assessment. The frame conservatively estimates a total of 125,500 SF of commercial space, 304 residential units (assuming 2-bedroom units at 1,200 SF of rentable area per unit), and the conceptual Rochester Police Department building. It is noted that due to some adjustments to the initial conceptual development frame, including the retention of existing buildings at the corner of West Main and York Streets and Genesee and Clifton Streets, total commercial and residential square footage for the frame shown in Figure 9 on page 34 is estimated to be approximately 10% less than the square footage/units described above, further reducing trips in the study area. To provide a conservative analysis the more intensive initial frame was utilized. The initial frame is included with the trip generation calculations in the Appendix of the report. Based on the transportation system modifications and improvements within the conceptual redevelopment frame, traffic within the adjacent roadway network needs to be re-routed to accommodate the elimination of York Street access at the W. Main Street/West Avenue/Chili Avenue intersection along with the implementation of the Brown Street roundabout. The results of the re-routed traffic are reflected in Figure 10 and Figure 11 which depict the 2024 traffic volumes for the scenario without Trips from Redevelopment for the morning and evening peak periods, respectively.

Figure 9: Conceptual Redevelopment Frame

Building Height
4-stories
3-stories
2-stories
Existing Building

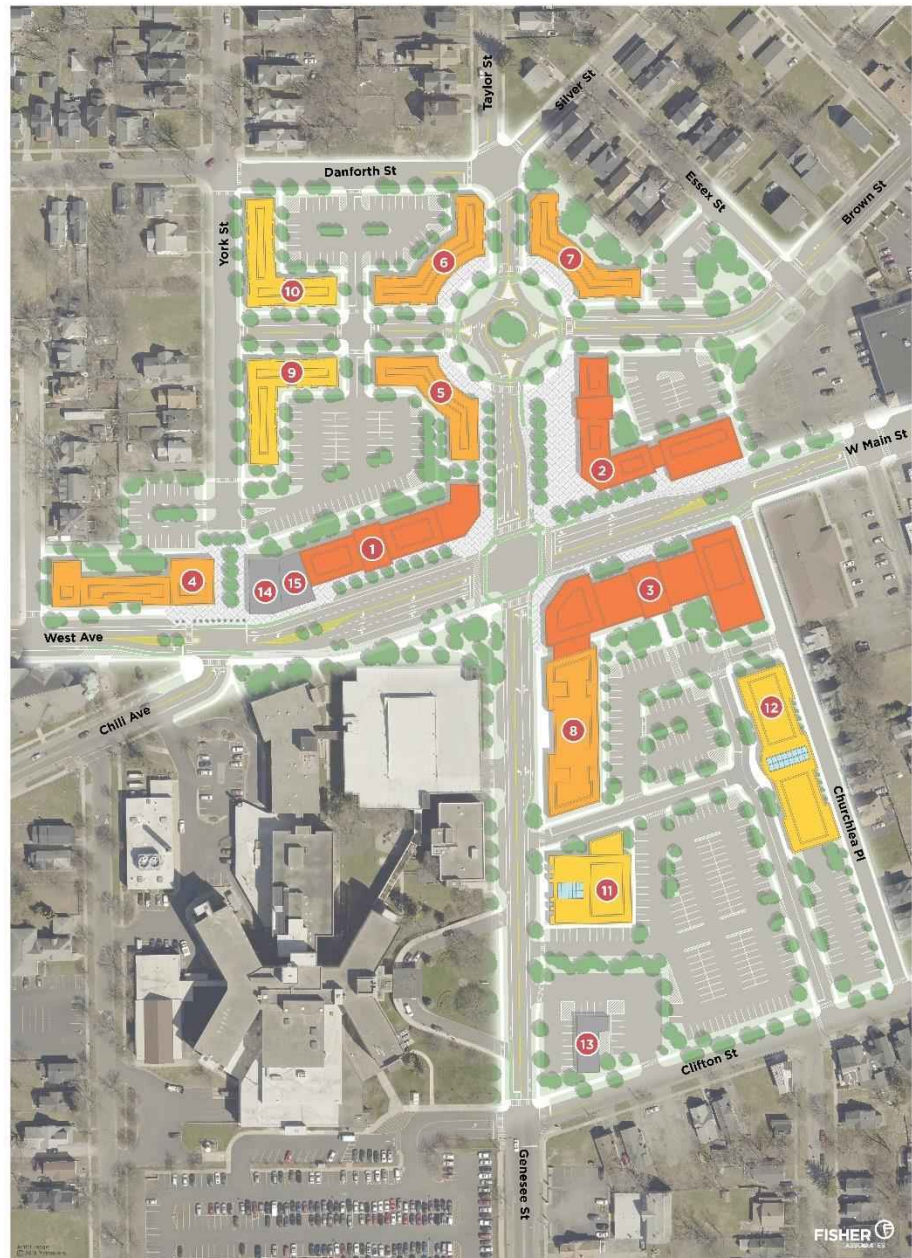
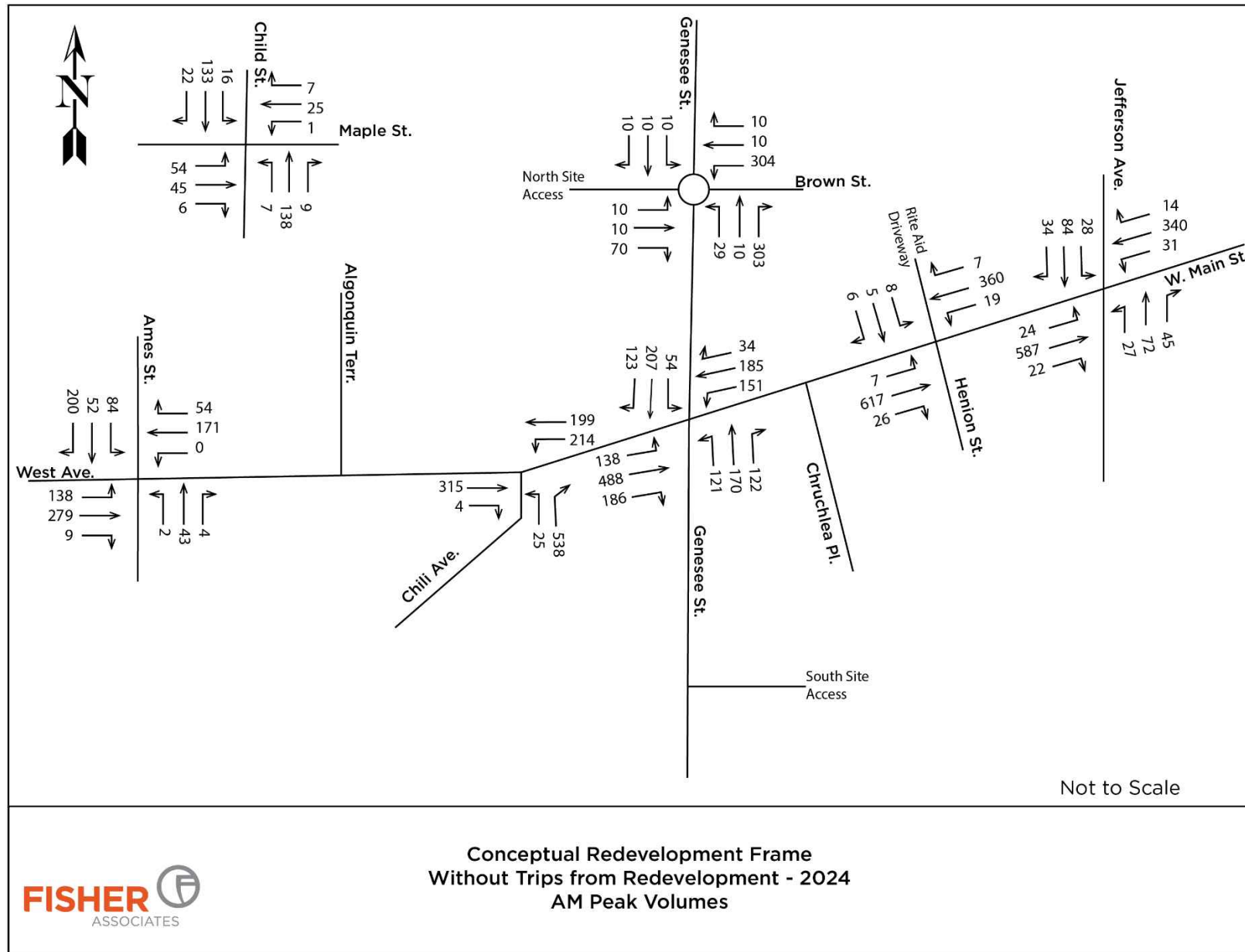


Figure 10: Morning Peak Traffic Volumes – Conceptual Redevelopment Frame without Trips from Redevelopment 2024



Conceptual Redevelopment Frame
Without Trips from Redevelopment - 2024
PM Peak Volumes

Not to Scale

4.2 Trip Generation

Trip generation estimates for the conceptual redevelopment frame were produced using the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th edition⁴. Trip generation estimates were calculated for each of the buildings within the conceptual redevelopment frame and then grouped into zones based on the location of the buildings and their access points to the transportation network. These zones are listed below in Table 7 below and depicted in Figure 12: Trip Distribution on page 3939.

Table 7: Trip Generation Zones

Zone	Description
Purple Zone	Parcel located on northeast corner of West Avenue/Algonquin Terrace intersection
Red Zone	Parcel located on the west side of the conceptual Brown Street roundabout
Yellow Zone	Parcel located on northeast corner of the conceptual Brown Street roundabout
Green Zone	Parcel located on southeast corner of the conceptual Brown Street roundabout
Blue Zone	Parcel located on the southeast corner of the W. Main Street/Brown Street/Genesee Street intersection

The trip generation estimates for each building were based on the trip generation characteristics for the following ITE Land Use Codes:

- Land Use Code 220 – Multifamily Housing (Low-Rise)
- Land Use Code 221 – Multifamily Housing (Mid-Rise)
- Land Use Code 231 – Mid-Rise Residential with 1st-Floor Commercial
- Land Use Code 710 – General Office Building

There is no ITE Land Use Code that directly correlates to the conceptual Police Station, therefore, a custom rate was utilized. The custom rate is based on ITE Land Use Code 730 – Government Office Building. The trips generated using this rate are in-line with the number of projected employees at the conceptual Police Station and the assumption that they will all arrive during the morning peak hour and leave at various hours during the evening.

All trip generation rates are based on Dense Multi-Use Urban Site data. This data is from dense multi-use urban settings and reflects the more multi-modal nature of trips in these locations compared to general urban/suburban locations.

Internal trips between different land uses within the conceptual redevelopment are anticipated due to the mixed-use nature of the conceptual development frame. However, utilizing the conventional methodologies from ITE resulted in minimal trip credits. The Mid-Rise Residential with 1st-Floor Commercial Land Use (Land Use Code 231) already accounts for internal trips between residential and commercial spaces within those multi-use buildings. Additional internal trip credits were calculated for each of the five zones using the methodology in the ITE Trip Generation Handbook, 3rd Edition and NCHRP Internal Trip Capture Rates. To keep the trip credits conservative, the trips generated from individual buildings within a zone were utilized in the calculations versus taking credits for the total trips generated for each zone. It should also be noted that higher trip generators such as the conceptual Police Station are not anticipated to generate internal trips. Finally, internal trip methodology does not account for trips within the same land use such as retail to retail. Due to the low number of trips generated for each building within the zones and the other factors discussed above it was determined that no additional internal trips are projected beyond those accounted for in the Mid-Rise Residential with 1st-

Floor Commercial Land Use. Trip generation calculations are included in the Appendix of the report. A summary of Trip Generation data for the morning and evening peaks is presented Table 68.

Table 8: Trip Generation Summary – New Trips

Zone	Morning Peak Hour			Evening Peak Hour		
	Entering	Exiting	Total	Entering	Exiting	Total
Purple	2	4	6	4	5	9
Red	15	26	40	24	24	48
Yellow	2	6	8	5	3	8
Green	5	6	11	7	9	16
Blue	111	48	159	37	99	136
Total New Trips	135	90	224	77	140	217

4.3 Trip Distribution

The estimated trip generation was distributed onto the adjacent roadway network utilizing the conceptual access points from the conceptual redevelopment frame. This trip distribution was based on the following:

- Existing travel patterns
- Population centers
- Proximity to expressways and other main roadways
- Site layout of the conceptual redevelopment frame

Trip distribution in the form of entering and exiting percentages are depicted in Figure 12. In addition to the trips within the conceptual redevelopment frame it is anticipated that new trips shall access I-490 via Danforth Street and Child Street. These trips/distributions are depicted in the stand-alone Child St/Maple St intersection in the upper left corner of the figures.

Figure 13 and Figure 14 depict the new trips for the morning and evening peak hours, respectively. The new trips generated by the redevelopment project were added to the Future No Build Conditions traffic volumes to produce Future Build Conditions traffic volumes. The trip generation/distribution methodology does not account for the removal of trips associated with the existing land uses within the study area. Several currently occupied businesses will be eliminated/replaced by new development. The exact land uses are not known but do not appear to be major trip generators. Therefore, actual Future Build Conditions traffic volumes are likely lower than projected and the Future Build Conditions traffic volumes used in this study will be conservative. The Future Build Conditions traffic volumes are depicted in Figure 15 and Figure 16 for the morning peak and evening peak hours, respectively.

Figure 12: Trip Distribution

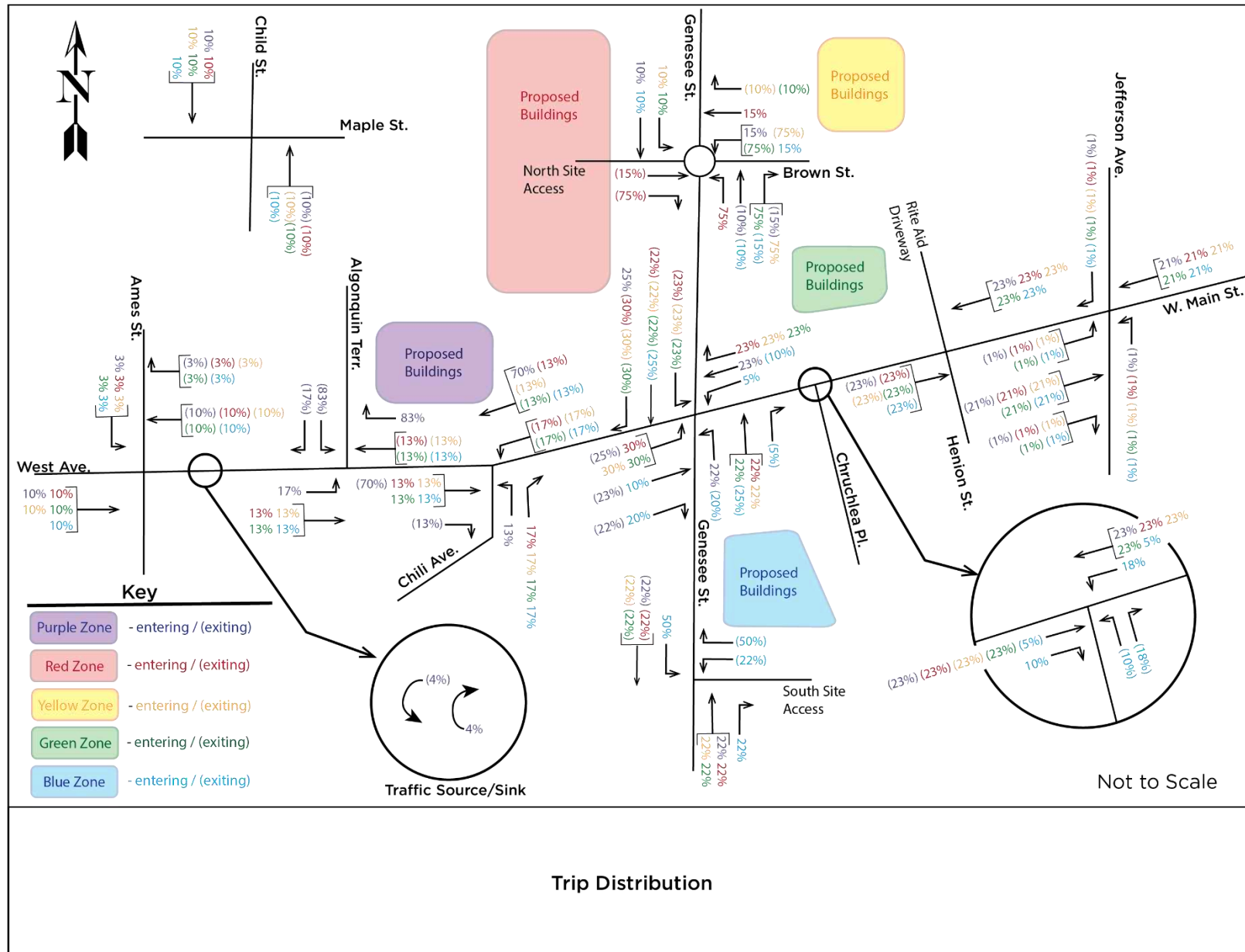


Figure 13: New Trips – Morning Peak

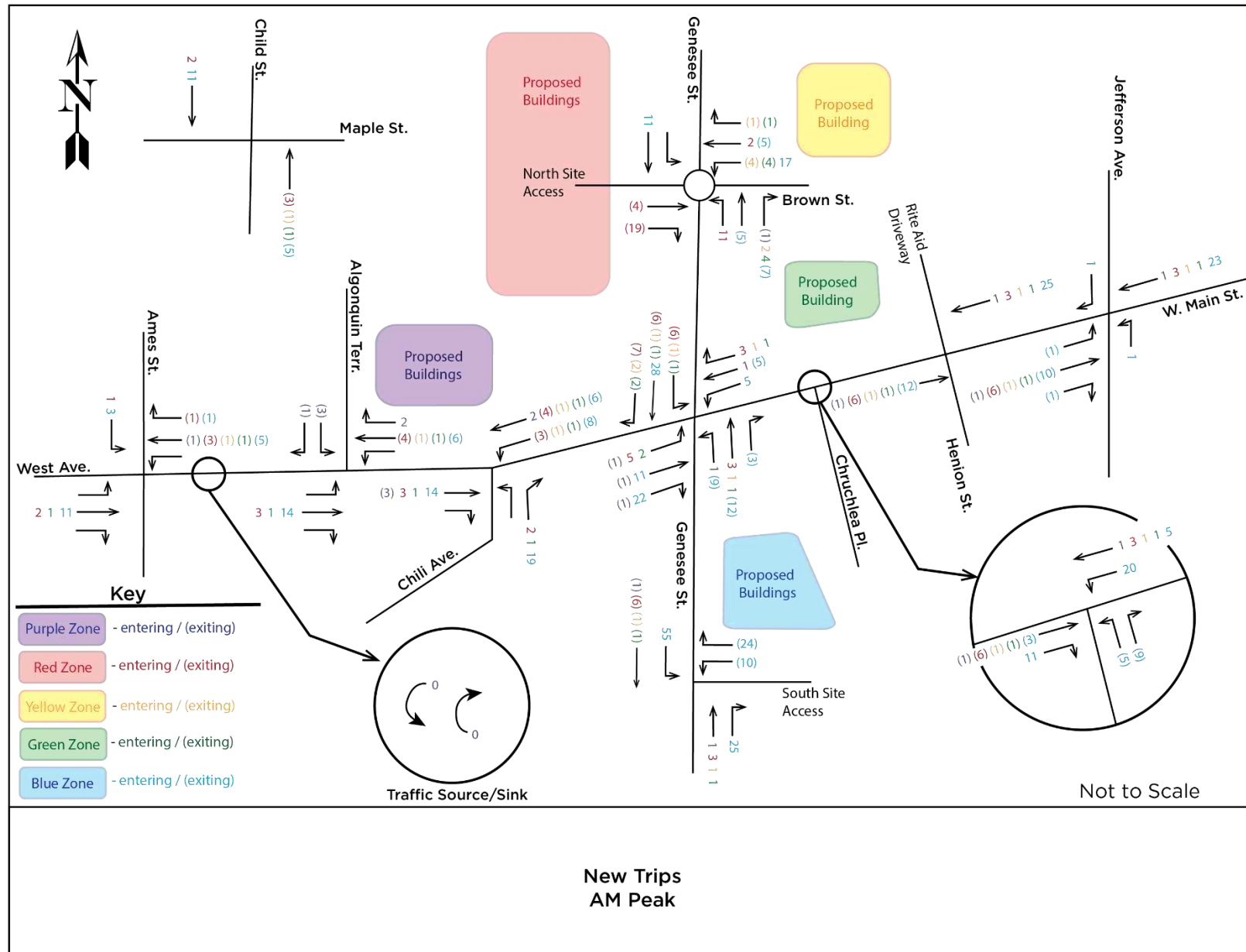


Figure 14: New Trips – Evening Peak

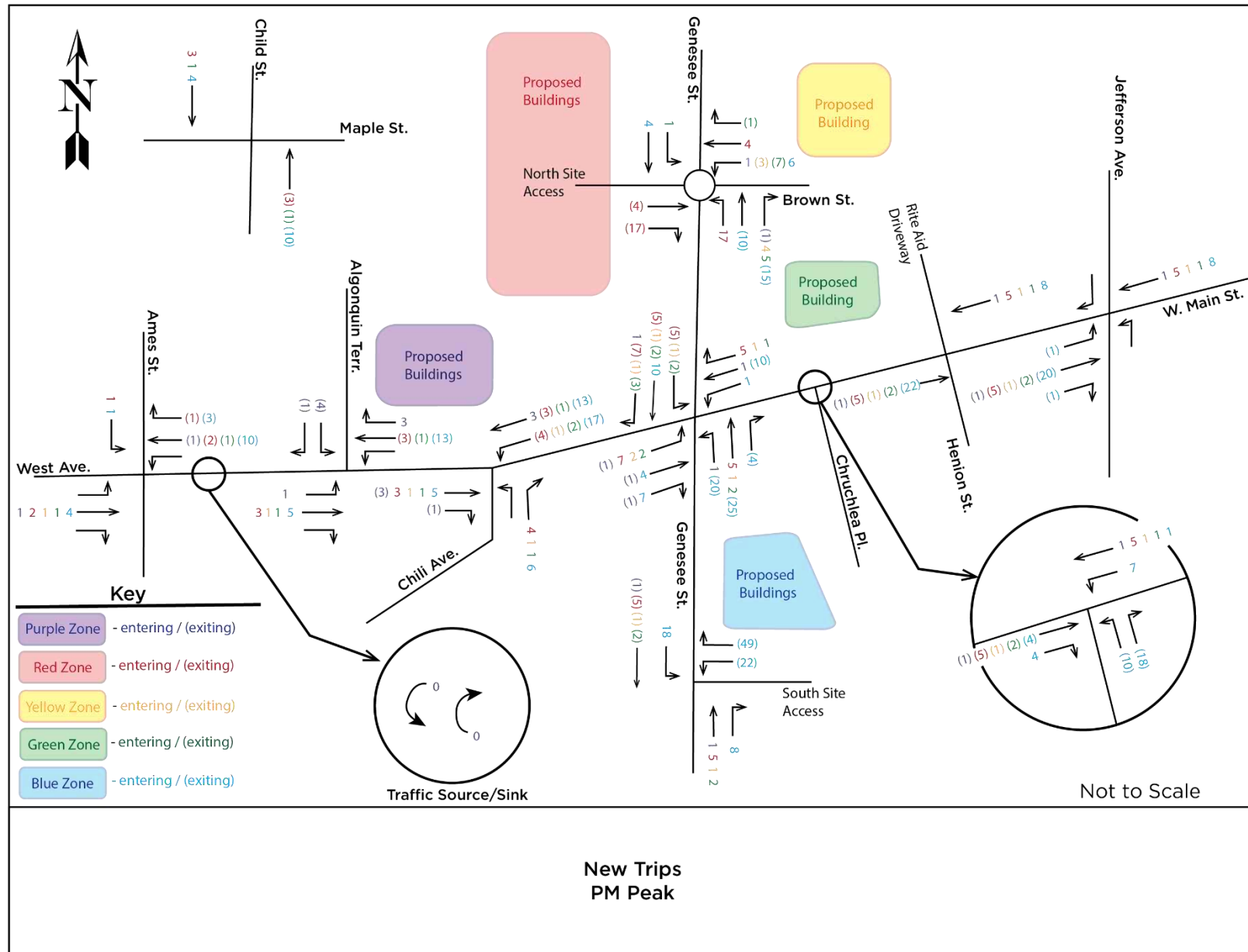


Figure 15: Morning Peak Traffic Volumes - Future Build 2024

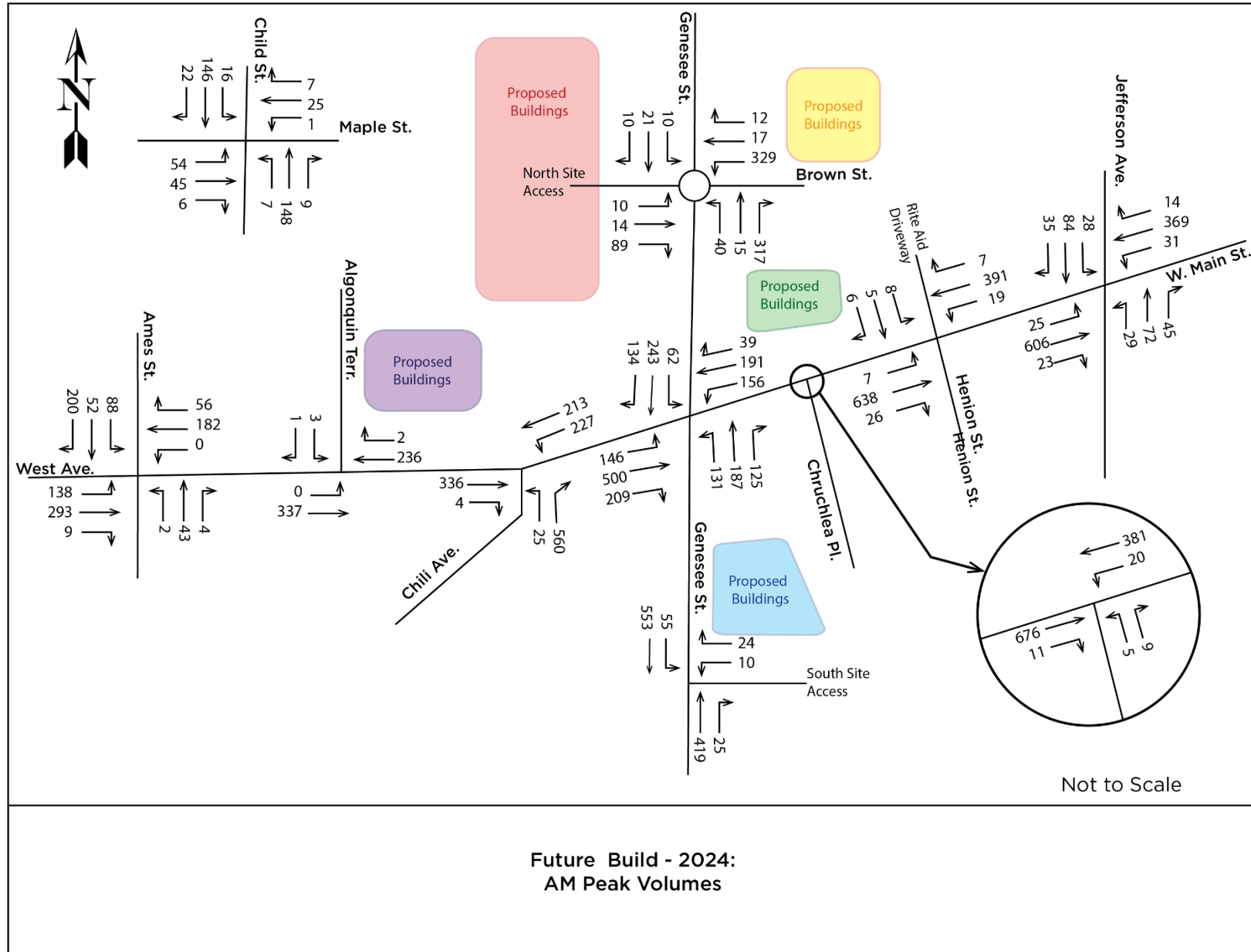
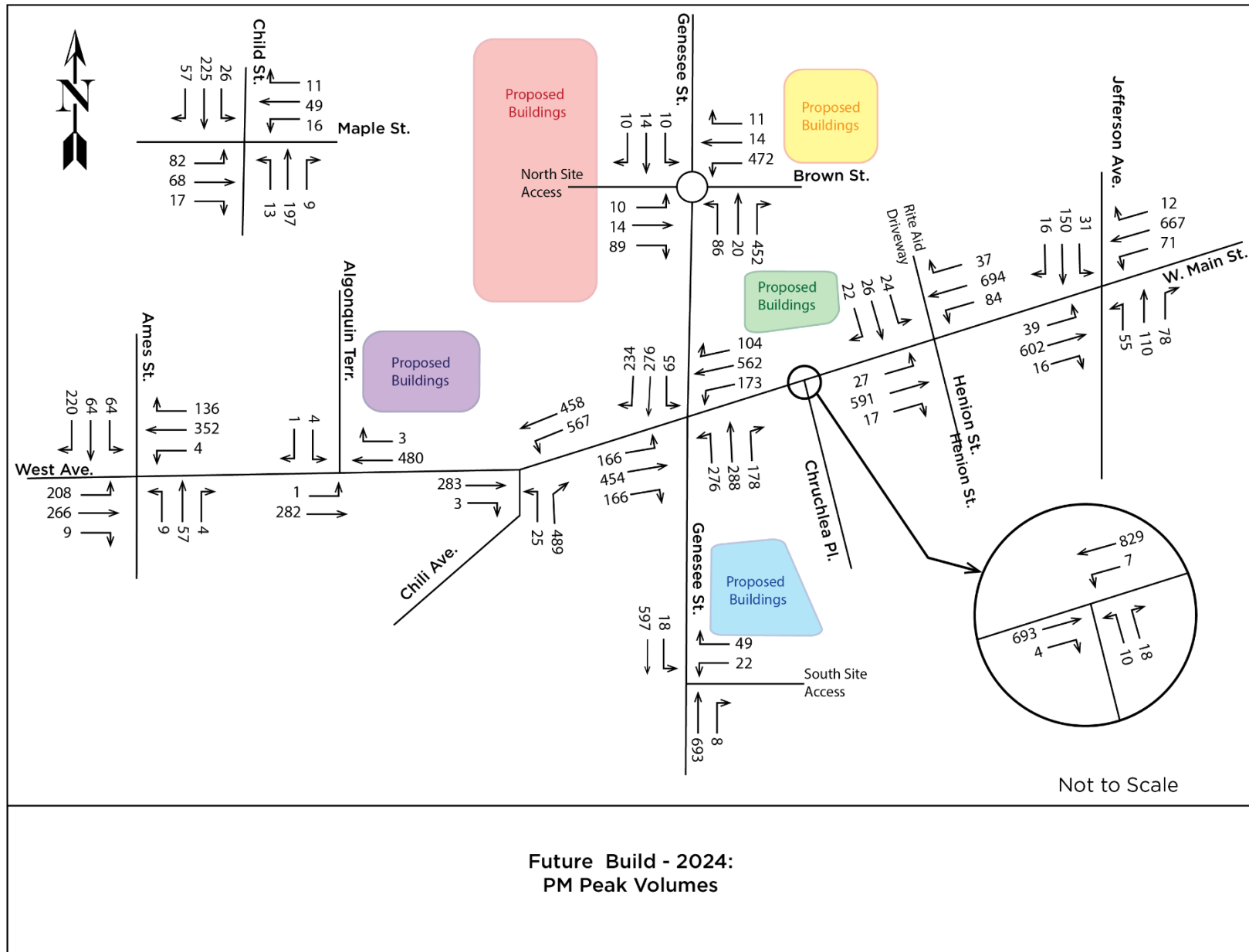


Figure 16: Evening Peak Traffic Volumes - Future Build 2024



4.4 Future Build Operations & Capacity Analysis

This section of the report provides the results of the capacity analysis of the conceptual redevelopment frame for the BHURA. Intersection capacity analysis for the signalized and unsignalized intersections was conducted using Synchro as described in Section 2.8. Intersection capacity analysis for the conceptual roundabout was conducted using Sidra Intersection 8⁵ and is based on methods presented in the Highway Capacity Manual 6th Edition² that describe the levels of operation for intersections controlled by roundabouts. Additionally, Simtraffic simulations were utilized to supplement the results Synchro and Sidra analyses to qualitatively determine the impacts of the projected queuing.

Future Build Conditions capacity analysis results for the morning peak and evening peak hours are summarized in Table 9 and Table 10, respectively (pages 45 & 46). Also included in Table 9 and Table 10 are the results of the Existing Conditions and Future No Build Conditions analyses. Capacity analysis summary reports for Future Build Conditions are provided in the Appendix of this report.

The conceptual redevelopment scenario is projected to generally create acceptable levels of operation, for an urban/city environment, at the study intersections. All study intersections are projected to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the NB LTR movement at the West Main Street/Jefferson Avenue intersection. This movement is projected to continue to operate at LOS E as noted under Existing and Future No Build Conditions.

It should be noted that the NB Left turn lane at the W. Main Street/ Genesee St. intersection is projected to operate near its capacity. During the PM peak, 276 vehicles are projected to make the NB left turn; typically, a 2nd left turn lane is warranted at approximately 300 vehicles. This movement is projected to operate acceptably but minimal increases in traffic in the future (in excess of Future Build conditions) or on non-typical days may generate additional impacts.

The SB approach to the W. Main Street/ Genesee St. intersection is not projected to queue into the roundabout during the morning and evening peak conditions for a typical day. It should be noted that if events such as an accident or unprecedented long term future growth were to occur, traffic from this approach could queue into the roundabout. If this were to occur there are options to mitigate the queuing, including the use of a metering signal on the westbound (Brown Street) approach to the roundabout.

To reduce the likelihood of future traffic increases, the promotion of TDM applications such as increased use of public transportation options and ride sharing are recommended as a general mitigation measure to help reduce traffic congestion within the study network. The project is located in an urban setting with access to multiple modes of transportation. The promotion of TDM applications can further reduce vehicular trips and create trips utilizing different modes of transportation including walking, biking, and transit.

Table 9: Level of Service Summary – Morning Peak

Study Intersection	Approach	Movement	Existing Conditions 2019			Future No Build 2024			Future Build 2024		
			Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)
West Main Street & Jefferson Avenue (Signalized)	Eastbound	L (L)	1.0	A	1	1.0	A	1	0.9	A	m1
		T-TR (T-TR)	2.0	A	4	1.9	A	4	1.5	A	3
	Westbound	L (L)	3.9	A	10	3.9	A	10	3.9	A	10
		T-TR (T-TR)	3.5	A	30	3.5	A	31	3.6	A	34
	Northbound	LTR (LTR)	18.6	B	67	19.0	B	69	19.2	B	70
	Southbound	L (L)	17.2	B	23	17.3	B	24	17.3	B	24
		TR (TR)	15.1	B	55	15.2	B	56	15.2	B	56
Overall		6.1	A		6.2	A		5.9	A		
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	(L)	-	-	-	-	-	-	2.0	A	m1
		LT-TR (TR)	1.1	A	43	1.1	A	43	4.1	A	185
	Westbound	(L)	-	-	-	-	-	-	3.4	A	m9
		LT-TR (TR)	2.6	A	75	2.6	A	77	3.7	A	179
	Southbound	LTR (LTR)	30.7	C	25	30.7	C	25	30.7	C	25
Overall		2.3	A		2.3	A		4.5	A		
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L (L)	21.2	C	116	21.3	C	115	12.8	B	m86
		T-T (T-TR)	25.4	C	222	25.7	C	224	25.7	C	289
		R (-)	26.0	C	189	26.3	C	190	-	-	-
	Westbound	L (L)	17.2	B	70	18.0	B	71	23.5	C	#83
		T-TR (T-TR)	21.1	C	44	21.2	C	44	20.0	C	80
	Northbound	L (L)	24.8	C	92	25.7	C	96	31.0	C	100
		T (TR)	20.9	C	125	21.0	C	128	34.9	C	251
		R (-)	20.7	C	95	20.8	C	98	-	-	-
	Southbound	LTR (L)	40.5	D	275	40.9	D	284	41.2	D	75
		- (T)	-	-	-	-	-	-	51.7	D	230
		- (R)	-	-	-	-	-	-	26.0	C	111
Overall		25.7	C		26.1	C		29.1	C		
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR (TR)	42.9	D	138	42.6	D	141	53.0	D	287
	Westbound	L (L)	16.3	B	216	16.6	B	220	8.6	A	116
		TR (T)	4.1	A	49	4.2	A	52	1.4	A	57
	Northbound	(L)	-	-	-	-	-	-	41.7	D	39
		R-R (R)	0.6	A	0	0.8	A	4	14.9	B	317
	Southbound	LR (-)	45.6	D	81	45.7	D	81	-	-	-
Overall		16.8	B		16.9	B		22.7	C		
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L (L)	6.0	A	56	6.2	A	59	6.5	A	60
		TR (TR)	5.6	A	101	5.8	A	106	6.0	A	113
	Westbound	L (L)	0.0	A	0	0.0	A	0	0.0	A	0
		TR (TR)	4.9	A	71	5.1	A	74	5.4	A	81
	Northbound	LTR (LTR)	22.8	C	44	22.5	C	44	22.2	C	43
	Southbound	LT (LT)	32.6	C	106	32.5	C	108	32.5	C	110
		R (R)	7.5	A	42	7.4	A	42	7.3	A	42
Overall		10.2	B		10.2	B		10.3	B		
Child Street & Maple Street (Signalized)	Eastbound	LTR (LTR)	8.6	A	39	8.6	A	40	8.7	A	40
	Westbound	LTR (LTR)	6.3	A	12	6.3	A	12	6.4	A	12
	Northbound	LTR (LTR)	7.5	A	56	7.5	A	57	7.6	A	60
	Southbound	LTR (LTR)	7.5	A	64	7.6	A	65	7.7	A	70
Overall		7.6	A		7.7	A		7.7	A		
West Main Street & Churchlea Place (Unsignalized)	Westbound	- (L)	-	-	-	-	-	-	9.4	a	3
	Northbound	- (LR)	-	-	-	-	-	-	16.5	c	3
Genesee Street & Proposed Access (Unsignalized)	Westbound	- (LR)	-	-	-	-	-	-	16.3	c	10
	Southbound	- (L)	-	-	-	-	-	-	8.6	a	5
Proposed Brown Street Roundabout	Eastbound	- (LTR)	-	-	-	-	-	-	5.3	a	15
	Westbound	- (LTR)	-	-	-	-	-	-	5.8	a	45
	Northbound	- (LTR)	-	-	-	-	-	-	5.6	a	46
	Southbound	- (LTR)	-	-	-	-	-	-	4.6	a	5
	Overall								5.6	a	

Note*

- Levels of Service (LOS) were obtained from Synchro 10 & Sidra 8
- Delay is vehicle delay measured in seconds.
- 95th % = 95th percentile queue length (feet)
- m = Volume for 95th percentile queue is metered by upstream signal.
- # = 95th percentile volume exceeds capacity, queue may be longer.
- Scenarios: L (LT) [LTR] = Existing & No Build Conditions (Future Build Conditions)

= Acceptable Operations

= LOS E or F, and/or Significant Queues

Table 10: Level of Service Summary – Evening Peak

Study Intersection	Approach	Movement	Existing Conditions 2019			Future No Build 2024			Future Build 2024		
			Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)	Delay (Sec)	LOS	95 th % Queue (ft)
West Main Street & Jefferson Avenue (Signalized)	Eastbound	L (L)	4.1	A	14	4.2	A	15	8.0	A	24
		T-TR (T-TR)	4.4	A	73	4.5	A	74	6.7	A	117
	Westbound	L (L)	8.5	A	38	8.8	A	39	9.0	A	40
		T-TR (T-TR)	8.6	A	130	8.9	A	134	9.0	A	138
	Northbound	LTR (LTR)	77.8	E	#289	78.9	E	#301	78.9	E	#301
		L (L)	35.6	D	46	35.5	D	46	35.5	D	46
	Southbound	TR (TR)	37.3	D	160	37.1	D	165	37.1	D	165
Overall			19.3	B		19.6	B		20.1	C	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	(L)	-	-	-	-	-	-	3.5	A	m7
		LT-TR (TR)	1.9	A	m52	1.9	A	m53	5.1	A	179
	Westbound	(L)	-	-	-	-	-	-	2.1	A	m11
		LT-TR (TR)	11.3	B	m291	11.5	B	m301	6.6	A	m474
	Southbound	LTR (LTR)	28.8	C	66	29.2	C	68	29.3	C	68
	Overall		8.4	A		8.5	A		6.8	A	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L (L)	60.8	E	#154	66.8	E	#169	24.4	C	m#140
		T-T (T-TR)	37.4	D	218	38.5	D	224	38.1	D	296
		R (-)	38.1	D	175	38.6	D	180	-	-	-
	Westbound	L (L)	30.5	C	77	32.9	C	82	24.3	C	#124
		T-TR (T-TR)	22.4	C	176	23.3	C	178	29.5	C	#287
		L (L)	42.4	D	#227	44.9	D	#239	54.7	D	#240
	Northbound	T (TR)	18.6	B	163	18.6	B	167	36.6	D	355
		R (-)	18.0	B	116	18.0	B	119	-	-	-
		LTR (L)	64.6	E	#506	66.5	E	#522	42.0	D	78
	Southbound	- (T)	-	-	-	-	-	-	50.5	D	251
		- (R)	-	-	-	-	-	-	26.3	C	178
	Overall		36.8	D		38.2	D		36.0	D	
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR (TR)	41.2	D	101	41.2	D	101	51.8	D	#190
	Westbound	L (L)	5.9	A	m189	6.1	A	m193	8.3	A	m173
		TR (T)	3.5	A	m111	3.6	A	m114	3.2	A	m95
	Northbound	(L)	-	-	-	-	-	-	41.9	D	39
		R-R (R)	0.4	A	0	0.4	A	0	7.4	A	181
	Southbound	LR (-)	52.1	D	87	52.1	D	88	-	-	-
	Overall		10.9	B		10.9	B		13.9	B	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L (L)	8.6	A	113	9.1	A	120	9.6	A	124
		TR (TR)	5.3	A	99	5.4	A	103	5.6	A	108
	Westbound	L (L)	3.8	A	m2	4.0	A	m2	4.0	A	m2
		TR (TR)	3.8	A	103	4.1	A	110	5.5	A	122
	Northbound	LTR (LTR)	40.0	D	76	39.6	D	76	39.3	D	76
		LT (LT)	52.3	D	133	52.3	D	136	52.2	D	137
	Southbound	R (R)	9.8	A	61	9.6	A	62	9.5	A	61
Overall			12.2	B		12.4	B		12.9	B	
Child Street & Maple Street (Signalized)	Eastbound	LTR (LTR)	11.6	B	70	11.8	B	73	12.2	B	76
	Westbound	LTR (LTR)	8.1	A	33	8.2	A	34	8.5	A	36
	Northbound	LTR (LTR)	8.0	A	73	8.0	A	74	8.1	A	80
	Southbound	LTR (LTR)	9.0	A	108	9.1	A	110	9.2	A	115
	Overall		9.3	A		9.4	A		9.5	A	
West Main Street & Churchlea Place (Unsignalized)	Westbound	- (L)	-	-	-	-	-	-	9.3	a	0
	Northbound	- (LR)	-	-	-	-	-	-	26.5	d	13
Genesee Street & Proposed Access (Unsignalized)	Westbound	- (LR)	-	-	-	-	-	-	26.3	d	33
	Southbound	- (L)	-	-	-	-	-	-	9.4	a	3
Proposed Brown Street Roundabout	Eastbound	- (LTR)	-	-	-	-	-	-	6.4	a	17
	Westbound	- (LTR)	-	-	-	-	-	-	8.0	a	77
	Northbound	- (LTR)	-	-	-	-	-	-	7.6	a	87
	Southbound	- (LTR)	-	-	-	-	-	-	5.7	a	5
	Overall								7.6	a	

Note*

- Levels of Service (LOS) were obtained from Synchro 10 & Sidra 8
 - Delay is vehicle delay measured in seconds.
 - 95th % = 95th percentile queue length (feet)
 - m = Volume for 95th percentile queue is metered by upstream signal.
 - # = 95th percentile volume exceeds capacity, queue may be longer.
- Scenarios: L (LT) = Existing & No Build Conditions (Future Build Conditions)

= Acceptable Operations

= LOS E or F, and/or Significant Queues

5.0 Conclusion, Recommendations, and Next Steps

This Traffic Impact Study (TIS) was conducted to assess the potential traffic impacts within portions of the Bull's Head Urban Renewal Area (BHURA) and Brownfield Opportunity Area (BHBOA) study areas based on one of several conceptual redevelopment frames developed as part of the Bull's Head Urban Renewal Plan. This conceptual redevelopment frame represents the most intensive development compared to the other frames and was chosen as the highest level of potential development for a conventional traffic impact assessment. The results of Future Build capacity analysis indicate that all study intersections are projected to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the NB LTR movement at the West Main Street/Jefferson Avenue intersection. This movement is projected to continue to operate at LOS E as noted under Existing and Future No Build Conditions.

The conceptual redevelopment frame's road configuration is projected to generally create acceptable levels of operation, for an urban/city environment, at the study intersections. It should be noted that the NB Left turn lane at the W. Main Street/ Genesee St. intersection is projected to operate near its capacity. During the PM peak, 276 vehicles are projected to make the NB left turn; typically, a 2nd left turn lane is warranted at approximately 300 vehicles. This movement is projected to operate acceptably but minimal increases in traffic in the future (in excess of Future Build conditions) or on non-typical days may generate additional impacts.

The SB approach to the W. Main Street/ Genesee St. intersection is not projected to queue into the roundabout during the morning and evening peak conditions for a typical day. It should be noted that if events such as an accident or unprecedented long term future growth were to occur, traffic from this approach could queue into the roundabout. If this were to occur there are options to mitigate the queuing, including the use of a metering signal on the westbound (Brown Street) approach to the roundabout.

To reduce the likelihood of future traffic increases, the promotion of TDM applications such as increased use of public transportation options and ride sharing are recommended as a general mitigation measure to help reduce traffic congestion within the study network. The project is located in an urban setting with access to multiple modes of transportation. The promotion of TDM applications can further reduce vehicular trips and create trips utilizing different modes of transportation including walking, biking, and transit.

It is noted that the most intensive conceptual redevelopment frame along with conventional trip generation methodology was used to project Future Build Condition traffic volumes and thus represents a "worse-case scenario" for determining potential impacts on the local road network. Due to the unique nature of the conceptual redevelopment frame, including the projects location within a dense urban environment, the likely inclusion of affordable and senior housing units, and the likely outcome of vehicles utilizing alternative paths within the neighborhood, the number of vehicle trips generated by the redevelopment of the area would likely be less than the estimates which would have a positive impact on vehicular operations and capacity. In addition, the City of Rochester in the Rochester 2034 Comprehensive Plan includes numerous recommendations to promote multi-modal transportation options and transportation demand management to reduce single occupancy vehicle trips and vehicle miles traveled. Modifications to the methodology, promotion of alternatives, and less intensive development will result in less traffic overall and thus fewer potential impacts. A Traffic Impact Study will be required for the final design of the study area which accounts for all of these factors. It is recommended that this TIS update the trip generation and determine any specific modifications in support of future design development.

6.0 References

1. Synchro 10 Software.
2. Transportation Research Board. Highway Capacity Manual, 6th Edition Washington, DC, 2016.
3. Highway Safety Analysis Software, Version 3.0 published by the X32 Group, Inc.
4. Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10th Edition.
5. Akcelik & Associates Pty Ltd, Sidra Intersection 8 Software