TIMMONS GROUP

CITY OF HARRISONBURG PUBLIC WORKS

Chicago Avenue & Waterman Drive

Corridor Study

May 2025

Prepared for:

City of Harrisonburg
Department of Public Works

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Corridor Study

Chicago Avenue & Waterman Drive

City of Harrisonburg, Virginia

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1 EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW

At the request of the City of Harrisonburg Department of Public Works, a transportation study was conducted for the Chicago Avenue and Waterman Drive corridors. The study area extends to the Harrisonburg City limit to the west, Dogwood Drive to the east, Westover Park to the south, and Mt Clinton Pike to the north. The intent of the study was to establish existing conditions of vehicular and active transportation movements, perform operational and safety assessments, and ultimately provide recommendations for (1) the overall corridor, (2) the Chicago Avenue and Waterman Drive intersection, and (3) potential alignments for a bicycle and pedestrian connection between the Northend Greenway to the north and the Friendly City Trail to the south.

A list of the tasks associated with the corridor study are included below.

- Collection of 7-day directional traffic volume/class/speed counts at four (4) locations
- Collection of peak-hour turning movement counts at four (4) locations
- Collection of 7-day bicycle/pedestrian counts and observations at seven (7) locations
- Assessment of the existing roadway conditions
- Analysis of the crash history in the study area over five (5) years
- Operational analysis of existing conditions with existing geometry
- Operational analysis of 2034 background conditions with existing geometry and with a roundabout at the Chicago Avenue and Waterman Drive intersection
- Community engagement with City residents to better understand bicycle and pedestrian experiences in the area and to gather feedback on possible improvements to bicycle and pedestrian facilities and the Chicago Avenue/Waterman Drive intersection
- Identification of proposed improvements for the study area, the Chicago Avenue/Waterman Drive intersection, and potential trail alignments between the Northend Greenway and the Friendly City Trail

1.2 PRINCIPAL FINDINGS

Alignment between the Northend Greenway and the Friendly City Trail

Three potential alignments between the Northend Greenway and the Friendly City Trail were developed as part of this study, along with variations of these alignments. Each alignment would provide a significant north-south connection for those biking and walking. Pursuing any of these three alignments would not only provide improved access to the Northend Greenway and the Friendly City Trail, but other primary destinations such as Eastern Mennonite University, City public schools, commercial and retail services, and many nearby residences.

With the approved rezoning and special-use permit applications of the Quarry Heights property, the City may consider tying the alignment through the development, as conditions of approval included the completion of a shared-use path by the developer, from Waterman Drive to the development's frontage on W Market Street.

Chicago Avenue Corridor

The Chicago Avenue corridor should be improved with continuous bicycle-pedestrian facilities from Mt Clinton Pike to Waterman Drive and from Waterman Drive to the shared-use path at the Quarry Heights development. Due to the presence of large concrete utility poles on the NB side of Chicago Avenue, the larger path facility is recommended for the SB portion of Chicago Avenue. The NB side of Chicago Avenue is recommended to be improved with a narrower facility to accommodate the large concrete utility poles that are adjacent to the roadway.

The recommended improvements to Chicago Avenue may be pursued in phases as indicated by the phased planning-level cost estimates in Appendix D.

Chicago Avenue and Waterman Drive Intersection

Two primary recommendations are provided for the Chicago Avenue and Waterman Drive intersection. To address the skewed intersection geometry and the pattern of angle crashes at this location, an offset intersection could be installed; curb extensions would modify both Waterman Drive approaches to meet Chicago Avenue at a perpendicular (90-degree) angle and improve a driver's field-of-vision from Waterman Drive onto Chicago Avenue. Improving the intersection with curb and gutter would also 'harden' the intersection edges and provide a traffic-calming effect. Moreover, the NB bike lane that ends at Rockingham Drive could be extended to Waterman Drive, where marked crossings could be installed at the time of the intersection improvement.

Alternatively, a peanut roundabout could be pursued at the Chicago Avenue and Waterman Drive intersection. Similarly to the offset intersection, a peanut roundabout would address the visibility issues currently present with the skewed approaches. The peanut roundabout would provide traffic calming as well, forcing drivers to slow down as they approach the roundabout. Compared to the offset intersection, the peanut roundabout would have better capacity for future peak-hour projections, however, the offset intersection would still provide adequate service for the future peak hour.

W Market Street Crossing

A new crossing of W Market Street adjacent to Thomas Harrison Middle School is needed, along with a trail connection between the crossing and the Friendly City Trail. At this location, W Market Street is a four-lane divided roadway with a posted speed limit of 35 miles per hour and serves approximately 7,800 vehicles per day. It is recommended that a Rectangular Rapid-Flashing Beacon (RRFB) is installed at this midblock crossing to improve motorist yielding and pedestrian safety.

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Overview

Chicago Avenue & Waterman Drive Corridor Study
City of Harrisonburg, Virginia

Figure 1

2 INTRODUCTION

At the request of the City of Harrisonburg Department of Public Works, a corridor study was performed for the Chicago Avenue and Waterman Drive project area in the City of Harrisonburg, VA. The project area is bounded by Mt Clinton Pike, the Harrisonburg City limit, Westover Park, and Dogwood Drive.

2.1 PROJECT SCOPE

Per the scope of services, the following steps were taken to determine the existing conditions of the roadway segments, to identify where safety and operational improvements may occur, and to assess possible alignments for the Northend Greenway/Friendly City Trail multimodal connector:

- Data Collection – 7-day volume/class/speed tube counts were completed at four (4) locations the week of April 14, 2024. Peak hour (7-9 AM, 11-1 PM, and 4-6 PM) weekday directional turning movement counts performed at four (4) locations. 7-day bicycle and pedestrian counts and observations (5 AM-9 PM) were collected at seven (7) locations.
- Existing Conditions Assessment – Timmons Group evaluated the existing roadway infrastructure to understand the constraints for future improvements.
- Crash Analysis – Using publicly available crash data from VDOT, Timmons Group reviewed and compiled the relevant data within the study area for the period of 2019-2023.
- Operational Analysis – Timmons Group evaluated Chicago Avenue at three (3) intersections and W Market Street at one (1) intersection during the morning (7-9 AM), midday (11-1 PM), and evening (4-6 PM) peak periods under existing conditions (with existing geometry) and 2034 background conditions (with existing geometry and with a roundabout at the Chicago Avenue/Waterman Drive intersection).
    - Background Traffic Growth – Per Virginia Department of Transportation (VDOT) Pathways for Planning Route Analysis Network, the volume on Chicago Avenue and Waterman Drive have experienced a growth rate of approximately 0.5% from 2021-2023. For conservative estimates, an annual growth rate of 2% was applied to analyze future conditions. 2034 traffic volumes were determined using the adjusted existing traffic counts as well as a 2% background growth rate on all existing intersection movements.
- Conceptual Design – Timmons Group prepared four alternatives for corridor improvements, five alternatives for intersection improvements, and three alignments for the Northend Greenway/Friendly City Trail Connector. The alternatives were narrowed down to the final recommendations following community engagement and ongoing discussion with City Staff.
    - Alternative Corridor Improvements
        i. Improving SB Chicago Avenue only with a shared-use path
        ii. Improving SB Chicago Avenue only with a sidewalk
        iii. Improving both sides of Chicago Avenue with a shared-use path and a sidewalk

iv. Improving both sides of Chicago Avenue with a sidewalk and a NB on-road, climbing bike lane

- Alternative Intersection Improvements

  i. Peanut Roundabout

  ii. Mini Roundabout

  iii. Offset Intersection

  iv. Curb Extensions

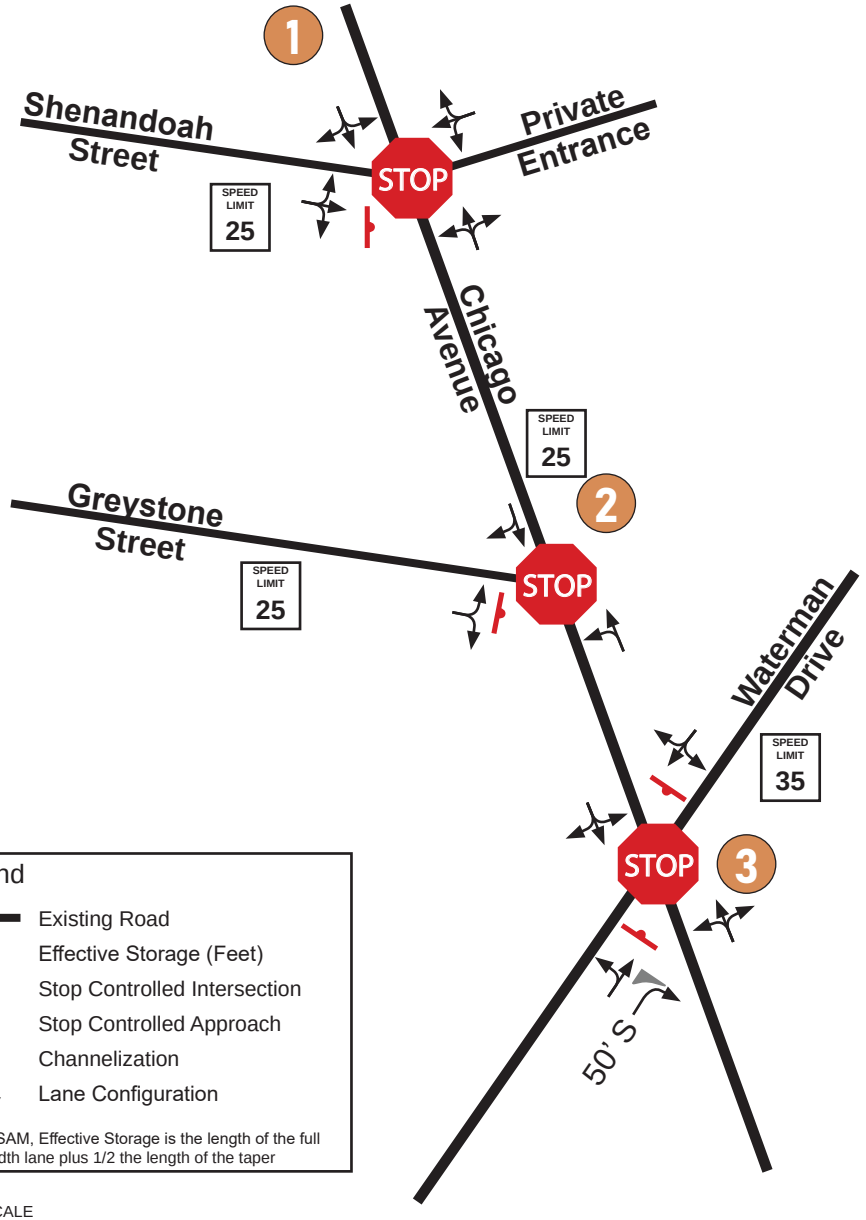
  v. Curb Extensions (Removing the EB Slip Lane)

- Alternative Northend Greenway/Friendly City Trail Connector Alignments

  i. Alignment A – Along College Avenue and through private property

  ii. Alignment B – Along Chicago Avenue and Waterman Drive

  iii. Alignment C – Along Woodleigh Court, Stuart Street, and Dogwood Drive



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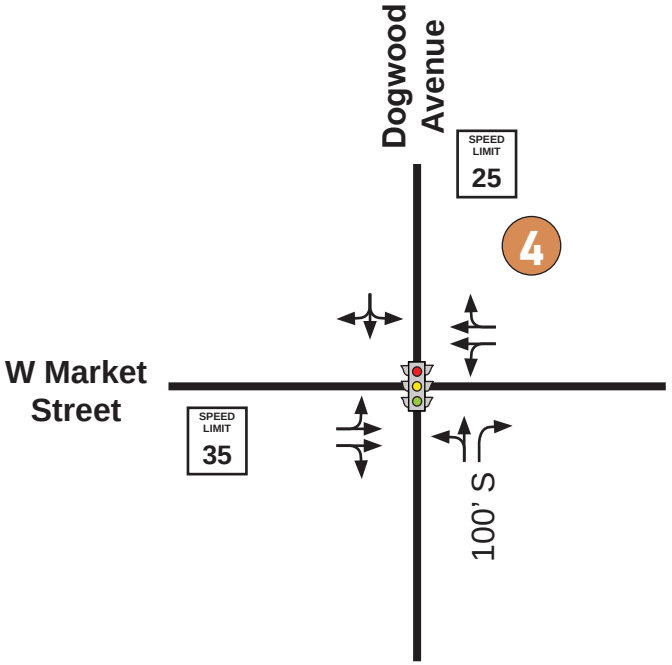
Existing Lane Use and Traffic Control

Chicago Avenue & Waterman Drive Corridor Study

City of Harrisonburg, Virginia

Figure 2



Legend

- Existing Road
- S' Effective Storage (Feet)
- Signalized Intersection
- Channelization
- Lane Configuration

*Per TOSAM, Effective Storage is the length of the full width lane plus 1/2 the length of the taper

NOT TO SCALE

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Existing Lane Use and Traffic Control

Chicago Avenue & Waterman Drive Corridor Study
City of Harrisonburg, Virginia

Figure 3

3 DATA COLLECTION

3.1 7-DAY VOLUME/CLASS/SPEED TUBE COUNTS

Data collection was completed with 7-day tube counts at 4 locations during the week of April 14, 2024. This data collection effort included vehicle classification, direction, speed, and volume, and within the study area:

1. Chicago Avenue – From Mt Clinton Pike to Waterman Drive
2. Waterman Drive – From Chicago Avenue to US Route 33 Market Street
3. Greystone Street – From Chicago Avenue to College Avenue
4. College Avenue – From Shenandoah Street to Mt Clinton Pike

3.2 PEAK-HOUR TURNING-MOVEMENT COUNTS

Data collection was completed with peak-hour (7-9 AM, 11-1 PM, and 4-6 PM) directional turning-movement counts at four (4) locations on Tuesday, April 16, 2024. This data collection effort included vehicle classification, direction, and pedestrian/bicycle counts:

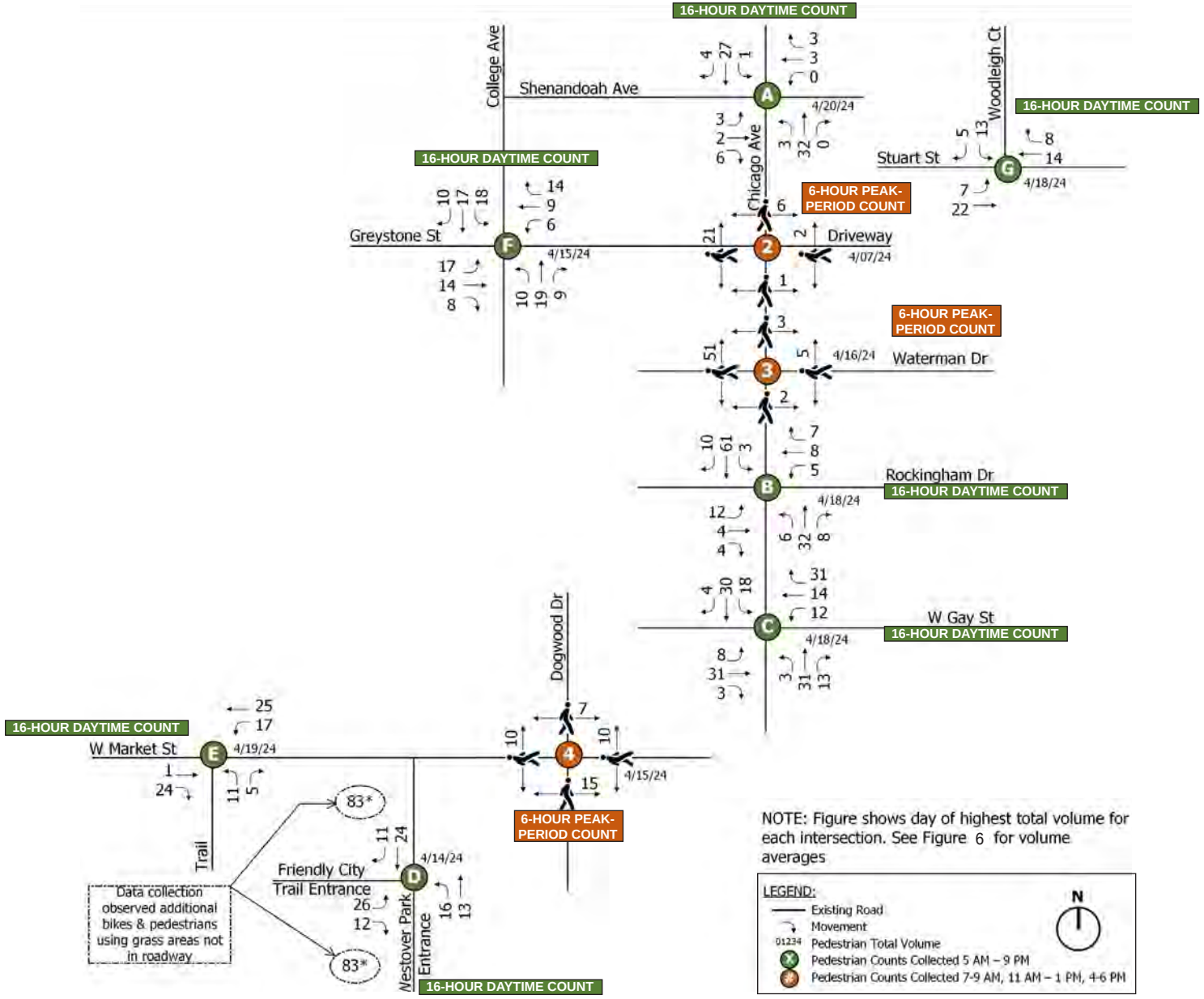
- Chicago Avenue at Greystone Street
- US Route 33 Market Street at Dogwood Drive
- Chicago Avenue at Shenandoah Street
- Chicago Avenue at Waterman Drive

A copy of the collected traffic data is contained in Appendix A.

3.3 7-DAY BICYCLE & PEDESTRIAN COUNTS & OBSERVATIONS

Data collection was completed with 7-day counts and observations (from 5 AM-9 PM) during the week of April 14, 2024. This data collection effort included vehicle classification, direction, and pedestrian/bicycle counts at seven (7) locations:

1. Chicago Avenue at Shenandoah Street
2. Chicago Avenue at Rockingham Drive
3. Chicago Avenue at Gay Street
4. Market Street at the Westover Park Entrance
5. Market Street near Thomas Harrison Middle School
6. Greystone Street at College Avenue
7. Woodleigh Court at Stuart Street



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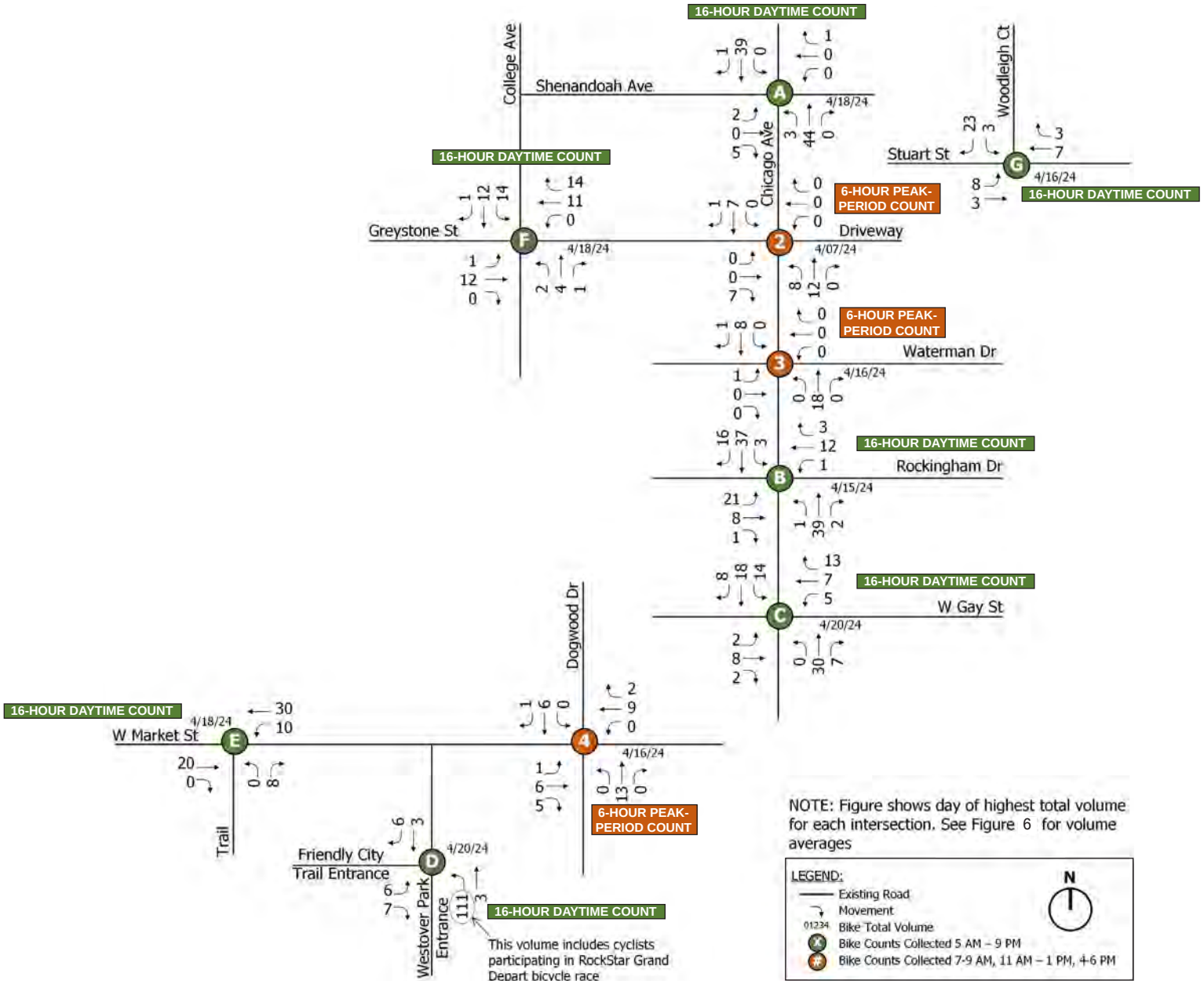
2024 Existing Pedestrian Traffic Volumes (Total)

Chicago Avenue & Waterman Drive Corridor Study

City of Harrisonburg, Virginia

Figure 4



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2024 Existing Bicycle Traffic Volumes (Total)

Chicago Avenue & Waterman Drive Corridor Study

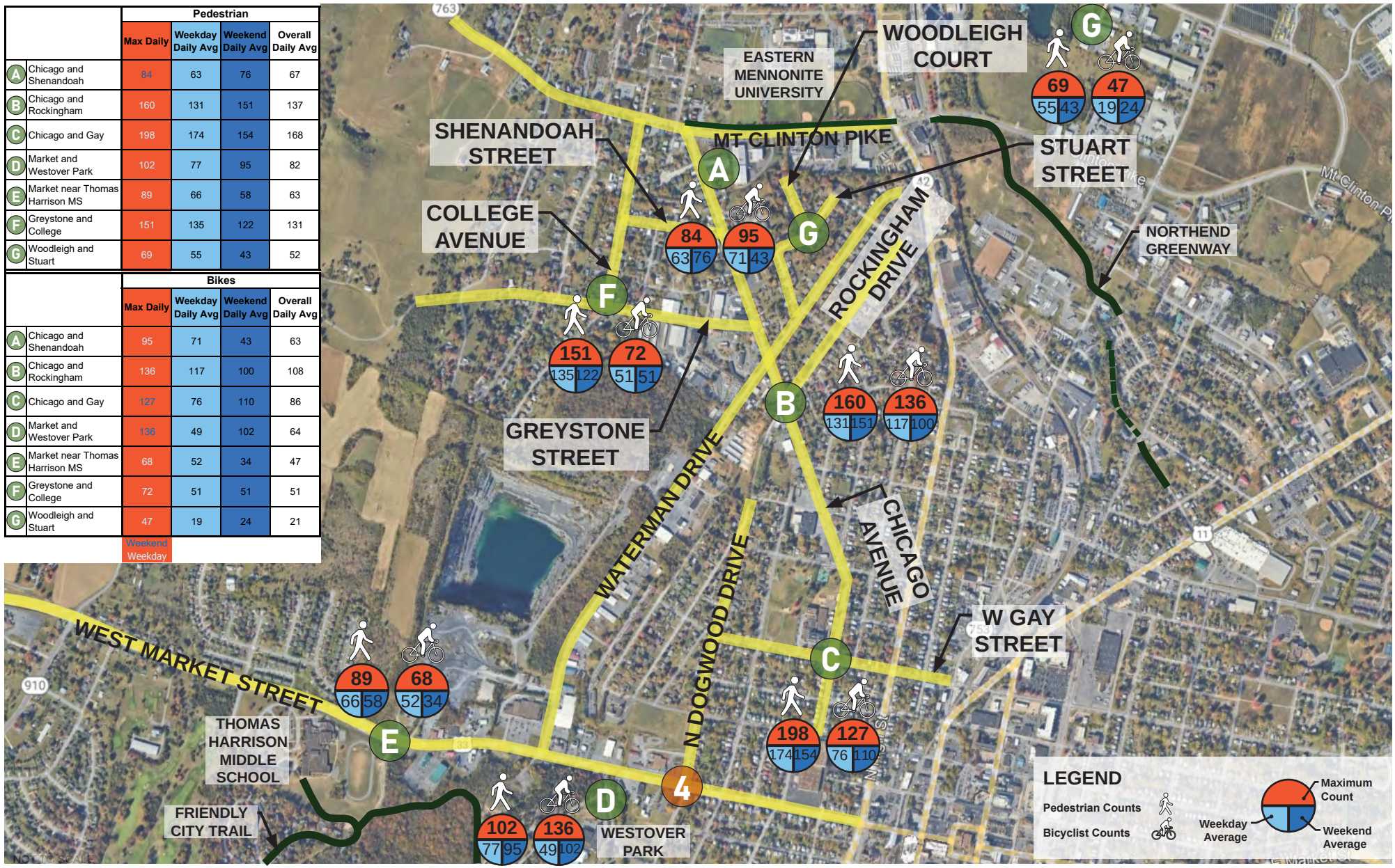
City of Harrisonburg, Virginia

Figure 5

		Pedestrian			
		Max Daily	Weekday Daily Avg	Weekend Daily Avg	Overall Daily Avg
A	Chicago and Shenandoah	84	63	76	67
B	Chicago and Rockingham	160	131	151	137
C	Chicago and Gay	198	174	154	168
D	Market and Westover Park	102	77	95	82
E	Market near Thomas Harrison MS	89	66	58	63
F	Greystone and College	151	135	122	131
G	Woodleigh and Stuart	69	55	43	52

		Bikes			
		Max Daily	Weekday Daily Avg	Weekend Daily Avg	Overall Daily Avg
A	Chicago and Shenandoah	95	71	43	63
B	Chicago and Rockingham	136	117	100	108
C	Chicago and Gay	127	76	110	86
D	Market and Westover Park	136	49	102	64
E	Market near Thomas Harrison MS	68	52	34	47
F	Greystone and College	72	51	51	51
G	Woodleigh and Stuart	47	19	24	21

Weekend
Weekday



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2024 Bike/Pedestrian Traffic Volumes Summary (Total)

Chicago Avenue & Waterman Drive Corridor Study
City of Harrisonburg, Virginia

Figure 6

3.4 SPEED DATA ASSESSMENT

The collected tube count data was assessed to determine whether drivers are speeding in the study area and to what extent they are speeding. Speed data was collected at the following four (4) locations: Chicago Avenue, with a posted speed limit of 25 mph, Waterman Drive, with a posted speed limit of 35 MPH, Greystone Street, with a posted speed limit of 25 mph, and College Avenue, with a posted speed limit of 25 mph. A summary of the vehicle speeds is shown in Table 3-1, Table 3-2, Table 3-3, and Table 3-4.

The *VDOT Road Design Manual* classifies roadways with speeds of 45 MPH or less as low-speed roadways that are typically designed for speeds equal to the posted speed limit.

Table 3-1: Chicago Avenue Speed Data

Chicago Avenue	25 MPH	
Location	Mt. Clinton Pike to Waterman Drive	
Direction	NB	SB
85th Percentile Speed	33	32
95th Percentile Speed	35	35
Average Speed	28.3	28
10 MPH Pace Speed	25-34	25-34
Percent of Vehicles in Pace	72.3%	67.5%
Percent of Vehicles > 25 MPH	78.8%	74.7%

Table 3-2: Waterman Drive Speed Data

Waterman Drive	35 MPH	
Location	W Market Street to Chicago Avenue	
Direction	WB	EB
85th Percentile Speed	41	42
95th Percentile Speed	45	45
Average Speed	36.6	36.8
10 MPH Pace Speed	30-39	30-39
Percent of Vehicles in Pace	66.3%	66.0%
Percent of Vehicles > 35 MPH	62.4%	65.1%

Table 3-3: College Avenue Speed Data

College Avenue	25 MPH	
Location	Mt. Clinton Pike to Shenandoah Street	
Direction	NB	SB
85th Percentile Speed	28	29
95th Percentile Speed	31	32
Average Speed	22.6	22.5
10 MPH Pace Speed	20-29	20-29
Percent of Vehicles in Pace	64.1%	60.6%
Percent of Vehicles > 25 MPH	34.5%	35.5%

Table 3-4: Greystone Street Speed Data

Greystone Street	25 MPH	
Location	College Avenue to Chicago Avenue	
Direction	WB	EB
85th Percentile Speed	33	32
95th Percentile Speed	36	36
Average Speed	26.5	26.1
10 MPH Pace Speed	20-29	20-29
Percent of Vehicles in Pace	57.4%	60.9%
Percent of Vehicles > 25 MPH	62.5%	58.6%

3.5 HEAVY VEHICLE TRAFFIC

The collected tube count data was assessed to determine the proportion of heavy vehicle traffic on Chicago Avenue, Waterman Drive, College Avenue, and Greystone Street. A summary of heavy vehicle traffic is shown in Table 3-5, Table 3-6, Table 3-7, and Table 3-8.

Table 3-5: Chicago Avenue Heavy Vehicle Traffic Data

Chicago Avenue Mt. Clinton Pike to Waterman Drive	Number of HV	% of HV
NB HV Weekday Average	**83**	**4%**
SB HV Weekday Average	**72**	**3%**
NB HV Weekend Average	**14**	**1%**
SB HV Weekend Average	**17**	**1%**

Table 3-6: Waterman Drive Heavy Vehicle Traffic Data

Waterman Drive W Market Street to Chicago Avenue	Number of HV	% of HV
EB HV Weekday Average	**74**	**4%**
WB HV Weekday Average	**77**	**4%**
EB HV Weekend Average	**10**	**1%**
WB HV Weekend Average	**13**	**1%**

Table 3-7: College Avenue Heavy Vehicle Traffic Data

College Avenue Mt. Clinton Pike to Shenadoah Street	Number of HV	% of HV
NB HV Weekday Average	**3**	**1%**
SB HV Weekday Average	**6**	**2%**
NB HV Weekend Average	**1**	**0.3%**
SB HV Weekend Average	**5**	**2%**

Table 3-8: Greystone Street Heavy Vehicle Traffic Data

Greystone Street College Avenue to Chicago Avenue	Number of HV	% of HV
EB HV Weekday Average	**14**	**2%**
WB HV Weekday Average	**4**	**1%**
EB HV Weekend Average	**1**	**0.2%**
WB HV Weekend Average	**0**	**0%**

4 EXISTING DATA REVIEW

Existing conditions and historical count data were assessed to determine suitable alignments for a bicycle and pedestrian connection between the Northend Greenway along Mt. Clinton Pike and the Friendly City Trail at Westover Park to the south.

4.1 CITY OF HARRISONBURG PLANS

With their Comprehensive Plan (2018, amended 2022) and Bicycle & Pedestrian Plan (2017), the City of Harrisonburg has formally incorporated multimodal transportation goals into their City plans.

The Comprehensive Plan seeks to serve all modes of traveling. The Plan acknowledges that although the Downtown area has established pedestrian infrastructure, network improvements to the surrounding area should be pursued to connect new walking and cycling facilities. Chicago Avenue, and the Chicago Avenue & Waterman Drive intersection are specifically identified within the Street Improvement Plan (SIP). The SIP identifies locations with safety, congestion, operational, bicycle-pedestrian, and land use needs. For Chicago Avenue, the SIP describes a need to address safety, congestion mitigation or alternative routes, and bicycle-pedestrian infrastructure; the SIP suggests widening Chicago Avenue to three lanes with sidewalk on one side and a shared-use path on the other side, from Mt Clinton Pike to West Gay Street. For Chicago Avenue & Waterman Drive, the SIP specifies a safety issue, with the recommendation to construct a roundabout.

The Bicycle & Pedestrian Plan provides a focused analysis on and priorities for improving active transportation in the City. The Bicycle & Pedestrian Plan describes that the ability to walk and bike increases quality of life, expands commuting choices and recreational activities, provides a sense of community and place, and encourages independence for both younger and older residents, those with disabilities, and other individuals that do not drive. Furthermore, bicycle tourism is a major economic driver for the Central Shenandoah Valley. Through the Bicycle & Pedestrian Plan, a prioritization methodology was applied, following data collection, community and stakeholder engagement, and connectivity and equity analysis.

Identified priorities for pedestrian segments that may be applicable to this corridor study are as follows (order of priority):

- Chicago Avenue (from Mt Clinton Pike to Rockingham Drive)
- Mt Clinton Pike (from College Avenue to Virginia Avenue) – recently completed
- Hillside Avenue (from Greystone Street to its terminus)
- S Dogwood Drive (from W Market Street to Hidden Creek Lane)
- Waterman Drive (from Chicago Avenue to W Market Street)
- Greystone Street (from Smith Avenue to Chicago Avenue)
- 3rd Street (from Stuart Street to N Dogwood Drive)
- Smith Avenue (from existing sidewalk to Mt Clinton Pike)
- Greystone Street (entire length)
- Shenandoah Street (from College Avenue to Chicago Avenue)
- Stuart Street (from Taliaferro Drive to 3rd Street)

Identified priorities for pedestrian intersections that may be applicable to this corridor study are as follows (order of priority):

- Chicago Avenue & Waterman Drive
- Mt Clinton Pike & College Avenue
- Mt Clinton Pike & Chicago Avenue
- Mt Clinton Pike & Summit Avenue

Identified priorities for bicycle segments that may be applicable to this corridor study are as follows (order of priority):

- Waterman Drive (from Chicago Avenue to W Market Street)
- W Market Street (from West City Limits to Market Street)
- Chicago Avenue (from Mt Clinton Pike to Rockingham Drive)
- Mt Clinton Pike (from West City Limits to Chicago Avenue/Park Road)

Identified priorities for shared-use paths that may be applicable to this corridor study are as follows (order of priority):

- W Market Street (from Dogwood Drive to Westover Park Entrance)
- Trail Connection: Woodleigh Court Terminus (to Mt Clinton Pike)

4.2 Existing Conditions Assessment

The roadway segments in the study area were assessed in the field to understand various design constraints inclusive of existing geometry, speed limits, parking allowances, and presence of bus stops or bicycle accommodations.

Chicago Avenue is a two-lane, undivided facility with a posted speed limit of 25 MPH and is classified as a major collector road, as defined by the 2022 VDOT Approved Functional Classification Map. According to 2022 VDOT ADT, Chicago Avenue has a volume of approximately 4,700 vehicles per day. There is an existing Harrisonburg Department of Public Transportation route through the corridor between Mt. Clinton Pike and Waterman Drive, with three bus stops northbound. Chicago Avenue primarily has a grass ditch section without curb and gutter and on-street parking is prohibited. This roadway primarily serves residential and commercial uses and provides access to Waterman Elementary School and Morrison Park. There are frequent driveway and commercial entrances along both sides of the street. Additionally, there are large utility poles present along the eastern side of Chicago Avenue.

Chicago Avenue has varied, incomplete bicycle and pedestrian facilities through the corridor. There is a short length of a 5' asphalt path, a short length of a 5' concrete sidewalk, and a 10' shared-use path between Greystone Street and Waterman Drive, approximately 280 linear feet, all on the west side. Notably, there is an on-street two-way bike lane with a painted buffer south of the Chicago Avenue/Waterman Drive intersection. There is an existing 10' shared-use path to the west, initially along the north side of Rockingham Drive and continuing along the Rockingham Drive right-of-way or "paper street" to Dogwood Drive and 3rd Street.

Waterman Drive is a two-lane, undivided facility with a posted speed limit of 35 MPH and is classified as a major collector road, as defined by the 2022 VDOT Approved Functional Classification Map. From its intersection with W Market Street to its northern terminus, Waterman Drive serves approximately 3,400 vehicles per day, per 2022 VDOT ADT data. The study area limits are between West Market Street and Chicago Avenue, where on-street parking is not permitted, and the roadway is mostly a grass ditch section without curb and gutter. This segment of Waterman Drive primarily serves a commercial corridor, with businesses largely located on the eastern side of the street. There are several commercial entrances along this eastern side of Waterman with occasional curb and gutter or paved shoulder. There are large utility poles present along the east side of Waterman Drive.

College Avenue is a local, two-lane undivided facility with a posted speed limit of 25 MPH. On-street parking is permitted on both sides of the street. The segment of College Avenue from Mt. Clinton Pike to Shenandoah Street features curb and gutter on both sides and sidewalk and planting buffer on the western side; the sidewalk terminates approximately 60' north of its intersection with Shenandoah Street. Between Shenandoah Street and Greystone Street, the road features a primarily a rural grass ditch section, without sidewalks. College Avenue serves as local access for residents and the street features driveways on both sides of the street.

Greystone Street is a local, two-lane undivided facility with a posted speed limit of 25 MPH. On-street parking is permitted on both sides of the street. From College Avenue to Chicago Avenue, there is some curb and gutter present, but primarily features a rural grass ditch section. There are a mix of residential and commercial uses on Greystone Street; the roadway serves a few residential driveways, several commercial entrances, and access to other local residential streets, such as College Avenue. There are utility poles along the southern side and one short segment of sidewalk along a commercial frontage on the southern side; otherwise, the roadway does not have active transportation facilities.

A summary of the existing conditions on each of the four roadway typical sections is shown in Table 4-1.

Table 4-1: Existing Conditions

Roadway Typical Section	Number of Lanes	Posted Speed Limit (mph)	Minimum Pavement Width (ft)	Gutter Pan Width (ft)	Median
Chicago Avenue Mt. Clinton Pike to Waterman Drive	2	25 mph	26'	No	No
Waterman Drive Chicago Avenue to W Market Street	2	35 mph	28'	No	No
College Avenue Mt. Clinton Pike to Greystone Street	2	25 mph	29'	2'	No
Greystone Street College Avenue to Chicago Avenue	2	25 mph	20'	2', infrequent	No

Roadway Typical Section	Parking	Bus Stops	Sidewalk	Bicycle Accommodations	Approximate ROW
Chicago Avenue Mt. Clinton Pike to Waterman Drive	No	Yes; 3 HDPT Route 5 northbound stops	325 LF of 5' asphalt path (west side) 75 LF of 5' sidewalk (west side) 280 LF of 10' multiuse path (west side)	325 LF of 5' asphalt path (west side) 280 LF of 10' multiuse path (west side)	36' Large utility poles present along east side of Chicago Avenue
Waterman Drive Chicago Avenue to W Market Street	No	No	100 LF of 5' sidewalk (both sides around W Market Street intersection)	No	52' Large utility poles present along south side of Waterman Drive
College Avenue Mt. Clinton Pike to Greystone Street	Yes, both sides	No	Yes (west side), ends 60' north of Shenandoah Street intersection	No	42'
Greystone Street College Avenue to Chicago Avenue	Yes, both sides	No	270 LF of 5' sidewalk (south side)	No; signage present to share road with cyclists	40'

5 CRASH ANALYSIS

A crash analysis was completed using publicly available VDOT crash data for a five-year period from 2019 to 2023. A summary of the crash data for Chicago Avenue, Waterman Drive, and W Market Street is presented herein. Crashes were summarized by collision type, surface conditions, and light condition to analyze suitable paths and accommodations for a bicycle and pedestrian connection.

Figure 7: Chicago Avenue and Waterman Drive Corridor – Crash Heat Map

5.1 CHICAGO AVENUE CRASH ANALYSIS

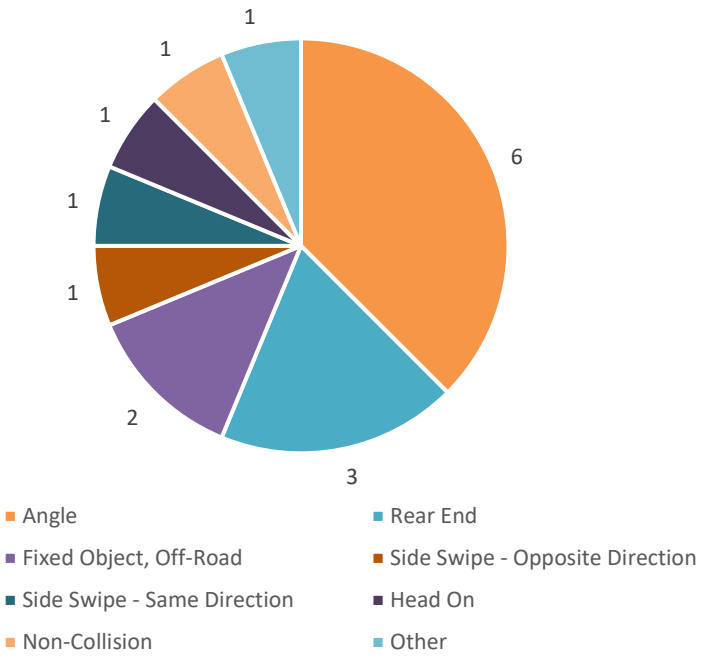
The VDOT crash data set indicates that 16 crashes occurred on Chicago Avenue, from Mt. Clinton Pike to Waterman Drive, during the five-year study period. None of the crashes along Chicago Avenue struck pedestrians or bicyclists, however, bicycle crashes did occur at the Chicago Avenue/Waterman Drive intersection. It appears that there are about four crashes per year on Chicago Avenue, except for in 2022, which had only two crashes.

Angle crashes were the most common crash type during the study period, approximately 38% of all reported crashes. Following the angle crashes, rear end crashes comprised of approximately 19% of all reported crashes.

It should be noted that 12 crashes of the combined 26 crashes on Chicago Avenue and Waterman Drive took place within 250' of the Chicago Avenue/Waterman Drive intersection, including two collisions with bicyclists.

Compared to the statewide percentages, the proportion of angle crashes is similar for other major collector roadways in Virginia, whereas the proportion of rear ends is lower.

Figure 8: Chicago Avenue – Crash Summary by Collision Type



When observing the driving conditions of the reported crashes, approximately 69% of crashes occurred in the daylight and on a dry roadway surface. Four crashes occurred at dark; however, it is noted that there is existing lighting along the roadway. Figures 9 and 10 show the summary of crashes by surface and lighting conditions.

Figure 9: Chicago Avenue – Crash Summary by Roadway Surface Conditions

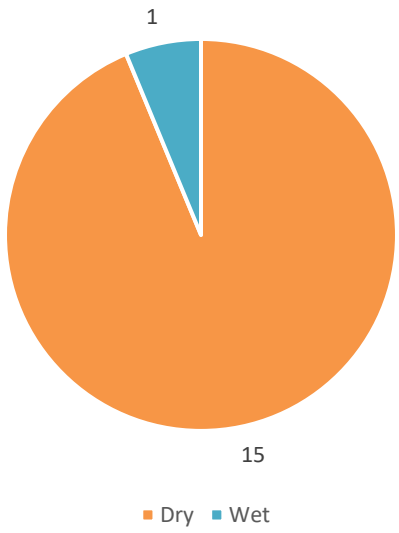
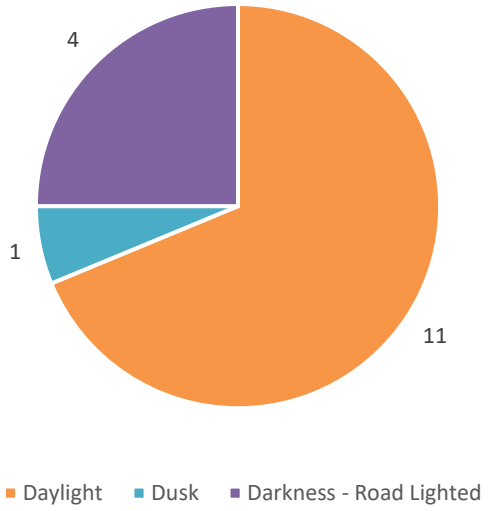


Figure 10: Chicago Avenue – Crash Summary by Light Conditions

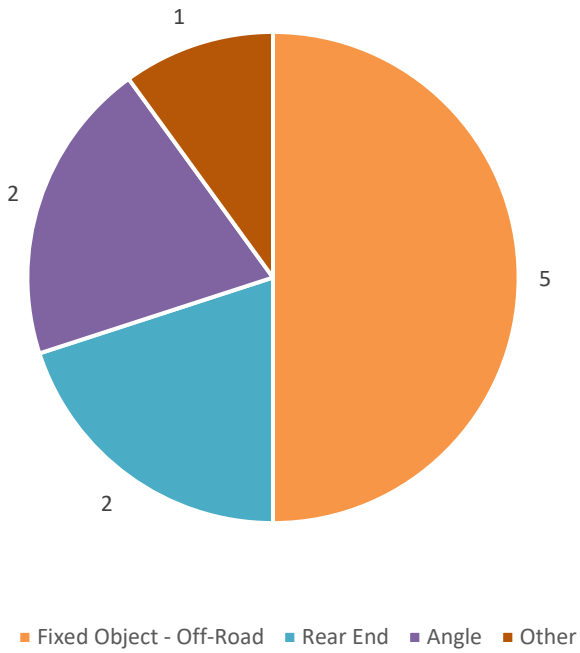


5.2 WATERMAN DRIVE CRASH ANALYSIS

The VDOT crash data set indicates that 10 crashes occurred on Waterman Drive, from Chicago Avenue to W Market Street, during the five-year study period. Again, it should be noted that 12 of the combined 26 crashes on Chicago Avenue and Waterman Drive took place within 250' of the Chicago Avenue/Waterman Drive intersection, including two collisions with bicyclists. The crash reports for these incidents are coded as angle or other; if the two collisions had been coded as a bicyclist crash, these would consist of 20% of all crashes on Waterman Drive.

None of the crashes on Waterman Drive struck pedestrians. Crash rate seems to vary from year-to-year, with no crashes taking place in 2019, two crashes in 2020, two crashes in 2021, four crashes in 2022, and two crashes in 2023. The most common crash type during the study period were fixed object, off-road collisions, consisting of 50% of total crashes. The rate of fixed object – off-road crashes is significantly higher compared to the statewide average for this crash type.

Figure 11: Waterman Drive – Crash Summary by Collision Type



Approximately 60% of crashes occurred in the daylight and on a dry roadway surface, although of those six daylight crashes, only four of these crashes occurred on a dry surface. Of the total ten crashes, 50% of the collisions occurred on a wet surface. Three crashes occurred at dark; however, it is noted that there is existing lighting along the roadway. Figures 12 and 13 show the summary of crashes by surface and lighting conditions.

Figure 12: Waterman Drive – Crash Summary by Roadway Surface Conditions

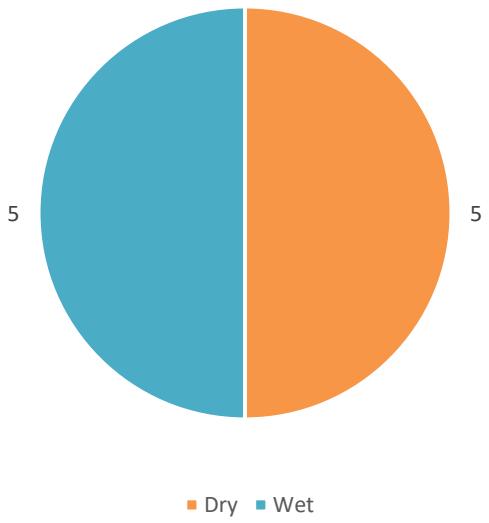
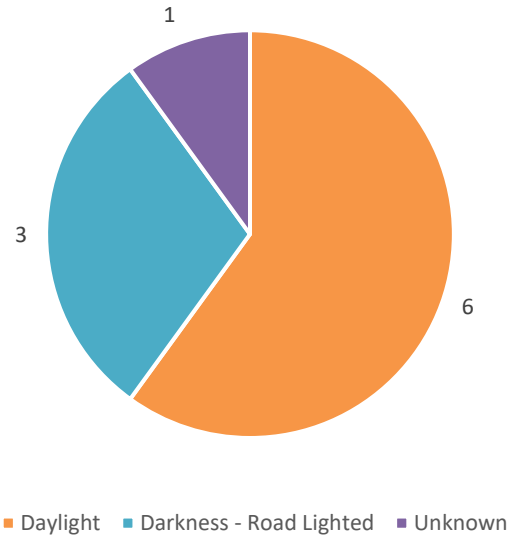


Figure 13: Waterman Drive – Crash Summary by Light Conditions



5.3 W Market Street Crash Analysis

According to the VDOT crash data set, 34 crashes occurred on W Market Street, from Westfield Court (Thomas Harrison Middle School entrance) to Dogwood Drive, during the five-year study period. One of these crashes struck a bicyclist; this crash occurred at the entrance of the Harrisonburg 24/7 Family Fitness Center, with the driver making a left-out onto W Market Street. There were no crashes from 2019-2023 that involved pedestrians along this corridor. Crash rate seems to vary from year-to-year, with five crashes occurring in 2019, seven crashes in 2020, three crashes in 2021, ten crashes in 2022, and nine crashes in 2023. The most common crash type during the study period were angle collisions, comprising approximately 38% of crashes, about 5% more than the statewide average.

Figure 14: W Market Street – Crash Summary by Year

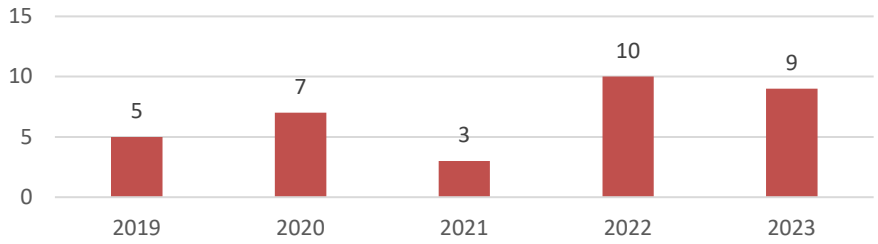
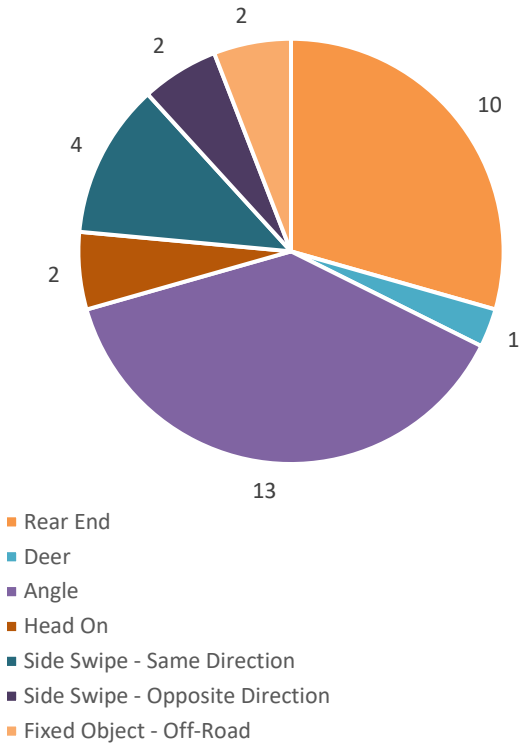


Figure 15: W Market Street – Crash Summary by Collision Type



Most crashes occurred during the day, approximately 79%. Seven of the crashes occurred when it was dark, however, the road is lighted through this segment of W Market Street. Most crashes occurred on dry surfaces (94%).

Figure 16: W Market Street – Crash Summary by Roadway Surface Conditions

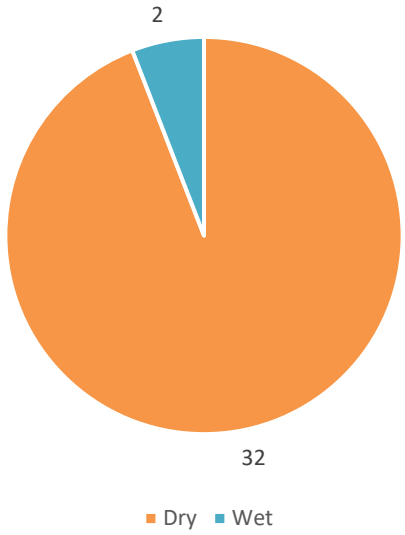
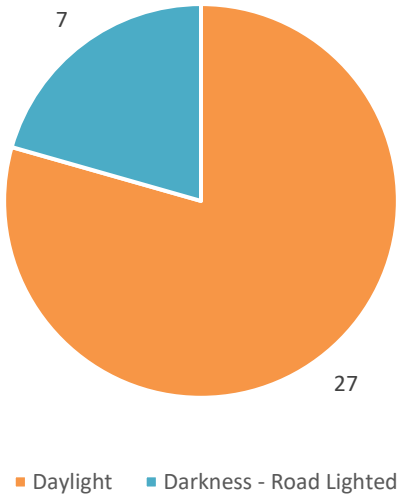


Figure 17: W Market Street – Crash Summary by Light Conditions



6 OPERATIONAL ANALYSIS

The operations within the study-area network were analyzed for 2024 Existing Conditions (with existing geometry) and 2034 Background Conditions. Future traffic volumes were determined using the adjusted existing traffic counts and a 2% background growth rate on all existing intersection movements. Additionally, a roundabout improvement is evaluated at the Chicago Avenue and Waterman Drive intersection. This process allowed for capacity and queuing comparison between the scenarios to determine alignments and accommodations for bicycle and pedestrian movement through the corridor, as well as analyzing roundabout operations at a future time.

At the time of this analysis, the rezoning and special-use permit applications to redevelop the former quarry property, tax parcel 36-T-1, 36-T-5, 37-C-3, 37-C-2, and 37-G-9, are now approved. These parcels are located on the western side of Waterman Drive. At full buildout, the development Quarry Heights could provide a residential density of 6 units per acre, or over 900 units. These units would be a mixture of townhomes and multifamily units. The traffic impact analysis (TIA) accompanying the approved application indicates that utilizing an overall background growth rate of 2% for this operational analysis would generally capture the traffic impacts of the development's full build-out. To be additionally conservative in our estimates, trip generation of specific movements from Quarry Heights' full build-out was incorporated into the analysis of the Chicago Avenue and Waterman Drive intersection, specifically the EB Waterman Drive left and right movements and the SB Chicago Avenue right movement. It should be noted that the midday peak does not incorporate any Quarry Heights' trip generation as this data was not provided with the TIA.

6.1 Operational Analysis Methodologies

Capacity Analyses

Capacity analyses allow traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For signalized and unsignalized intersections, LOS is defined in terms of delay, a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Table 6-1 summarizes the delay associated with each LOS category:

Table 6-1: Level of Service Criteria

Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	≤ 10	A	0 to 10
B	> 10 to ≤ 20	B	> 10 to ≤ 15
C	> 20 to ≤ 35	C	> 15 to ≤ 25
D	> 35 to ≤ 55	D	> 25 to ≤ 35
E	> 55 to ≤ 80	E	> 35 to ≤ 50
F	> 80	F	> 50

Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"

Generally, the standard acceptable minimum for the overall intersection is LOS D, while the standard acceptable minimum for an individual traffic movement is LOS E.

The Chicago Avenue and Waterman Drive corridor was analyzed using both the existing geometry and with proposed intersection improvements. The intersections were analyzed using SYNCHRO based on Highway Capacity Manual 2000 methodologies. Capacity analysis was performed with the following assumptions:

- Level terrain;
- 12-foot lane widths;
- No parking activity or bus stops;
- Existing peak-hour factor as determined by the traffic counts (by intersection) for existing scenario;

- The higher of the existing peak-hour factor as determined by traffic counts or a peak-hour factor of 0.92 for future scenarios;
- Heavy-vehicle percentage as determined by the traffic counts (by movement)

Queuing Analysis

Queuing analysis allows traffic engineers to identify where vehicles queues are not adequately accommodated by existing storage bays and impact adjacent travel lanes.

Queuing analyses were conducted using both the HCM 2000 methodology (as calculated by SYNCHRO) and SimTraffic simulations. The Synchro 95th percentile queue is the maximum back of queue for a particular lane within a lane group considering 95th percentile traffic volumes. The SimTraffic maximum queues are the average maximum queues after 10 runs of 60 minutes each.

Note that it is possible for the 95th percentile queue to be higher than the SimTraffic maximum queue due to the method in which each software calculates its respective value. The 95th percentile queue is based on an HCM formula while the SimTraffic maximum queue varies based on simulation results.

6.2 2024 Existing Conditions Analysis

Table 6-2 summarizes the 2024 existing intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the 2024 existing intersection geometry, signal timings, and peak hour traffic volumes. The corresponding SYNCHRO and SimTraffic reports are included in Appendix E. Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond to the intersection numbers used in the SYNCHRO models.

As indicated in Table 6-2, there are no major existing queueing or operational challenges along the Chicago Avenue and Waterman Drive corridor. The signalized intersection of W Market Street and Dogwood Drive carry the highest overall intersection volumes in comparison with the other study area intersections.

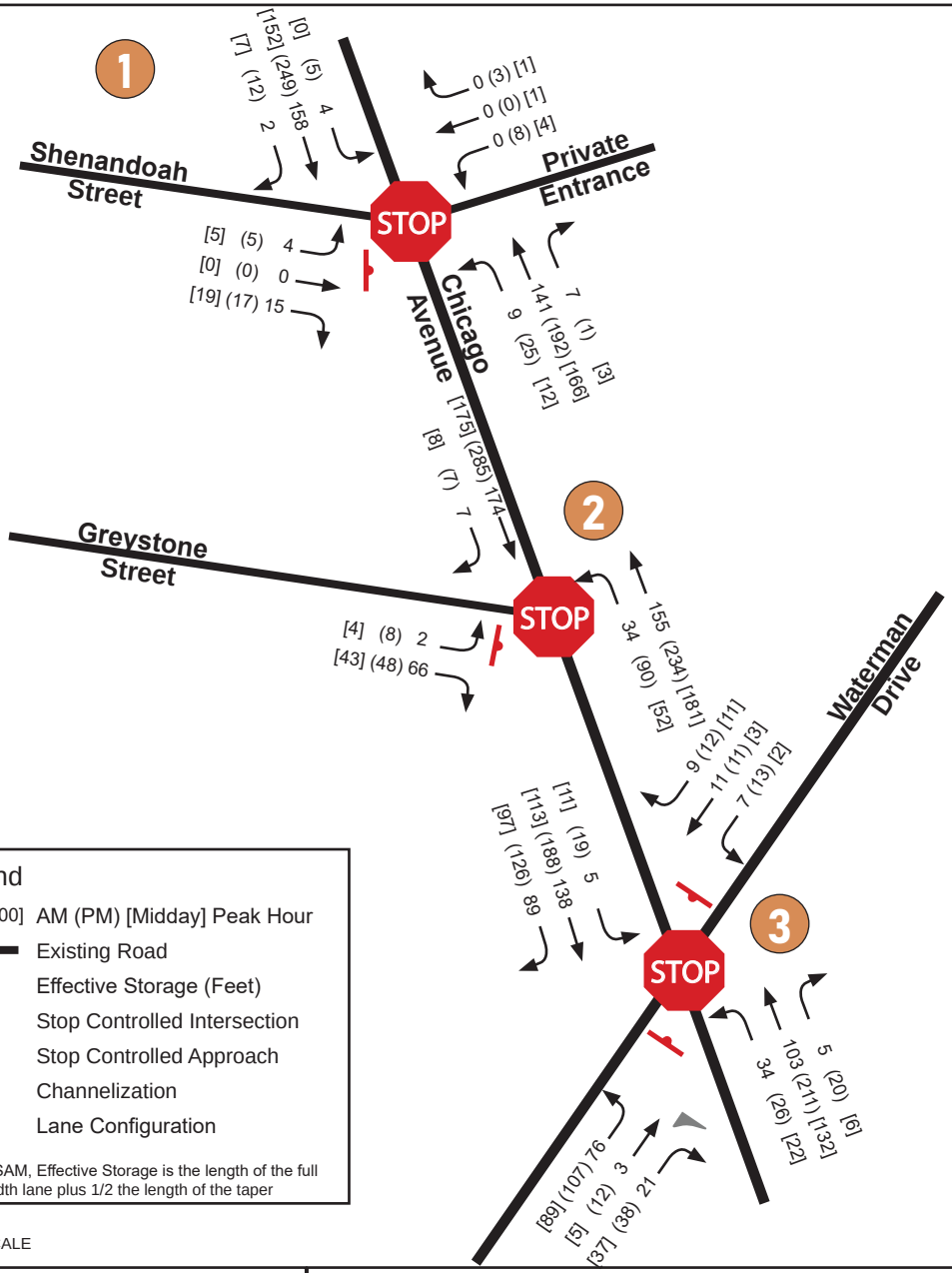
As shown in Table 6-2, the analysis results of 2024 existing conditions indicate:

- At the unsignalized intersections of (1) Chicago Avenue/Shenandoah Street and (2) Chicago Avenue/Greystone Street, all movements operate at a LOS B or better during all peak hours (AM/PM/midday).
- At the unsignalized intersection of (3) Chicago Avenue/Waterman Drive, all movements operate at a LOS C or better during all peak hours.
    - During the midday peak hour, the EB right exceeds the available storage length.
    - Due to the length of the EB right storage (50'), queuing for the EB left/thru movement may prohibit EB right movements during the peak hours.
- At the signalized intersection of (4) W Market Street/Dogwood Drive, the overall intersection operates at a LOS C or better during AM, PM, and midday peak hours.

Table 6-2: LOS, Delay and Queue Length Summary
2024 Existing Conditions

SYNCHRO CAPACITY ANALYSES - Delay, LOS, and Maximum Queue Length Summary
Existing Weekday 2024

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				MIDDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)
1. Chicago Avenue (N-S)	EB Left/Thru/Right		10.1	B	2	45	11.1	B	3	30	10.0	B	3	28
at Shenandoah Street (E-W)	*EB Approach*		*10.1*	*B*	*2*	-	*11.1*	*B*	*3*	-	*10.0*	*B*	3	-
Unsignalized	WB Left/Thru/Right		0.0	A	0	0	13.2	B	2	35	11.9	B	1	35
	WB Approach		*0.0*	*A*	*0*	-	*13.2*	*B*	*2*	-	11.9	B	1	-
	NB Left/Thru/Right		0.5	A	1	26	1.1	A	2	51	0.6	A	1	36
	NB Approach		0.5	-	*1*	-	*1.1*	-	*2*	-	0.6	-	1	-
	SB Left/Thru/Right		0.2	A	0	26	0.2	A	0	16	0.0		0	-
	SB Approach		0.2	-	*0*	-	*0.2*	-	*0*	-	0.0	-	0	-
2. Chicago Avenue (N-S)	EB Left/Thru/Right		9.7	A	7	42	11.5	B	9	48	10.0	B	6	42
at Greystone Street (E-W)	*EB Approach*		9.7	A	7	-	11.5	B	9	-	10.0	B	6	-
Unsignalized	NB Left/Thru/Right		1.6	A	2	53	2.8	A	7	79	2.1	A	4	54
	NB Approach		*1.6*		*2*	-	*2.8*		*7*	-	*2.1*		4	-
	SB Left/Thru/Right		0.0		0	0	0.0		0	2	0.0		0	-
	SB Approach		0.0		0	-	0.0		0	-	0.0		0	-
3. Chicago Avenue (N-S)	EB Left/Thru		12.9	B	15	75	19.8	C	49	121	13.0	B	21	72
at Waterman Drive	EB Right	50	12.9	B	15	43	19.8	C	49	49	13.0	B	21	60
Unsignalized	*EB Approach*		12.9	B	15	-	19.8	C	49	-	13.0	B	21	-
	WB Left/Thru/Right		11.4	B	4	46	14.8	B	8	57	10.1	B	2	31
	WB Approach		11.4	B	4	-	14.8	B	8	-	10.1	B	2	-
	NB Left/Thru/Right		2.1	A	2	49	1.0	A	2	75	1.3	A	2	42
	NB Approach		2.1		2	-	1.0		2	-	1.3		2	-
	SB Left/Thru/Right		0.2	A	0	12	0.6	A	1	40	0.5	A	1	24
	SB Approach		0.2		0	-	0.6		1	-	0.5		1	-
4. W Market Street (E-W)	EB Left/Thru		8.3	A	82	130	10.0	B	62	128	9.3	A	41	113
at Dogwood Drive (N-S)	EB Thru/Right		*8.3*	*A*	*82*	98	*10.0*	*B*	*62*	103	*9.3*	*A*	41	86
Signalized	*EB Approach*		8.3	A	82	-	10.0	B	62	-	9.3	A	41	-
	WB Left/Thru		*7.7*	*A*	*59*	120	*10.7*	*B*	*81*	153	*9.3*	*A*	42	118
	WB Thru/Right		7.7	A	59	58	10.7	B	81	121	9.3	A	42	61
	WB Approach		*7.7*	*A*	*59*	-	*10.7*	*B*	*81*	-	*9.3*	*A*	42	-
	NB Left/Thru		24.3	C	54	91	10.2	B	55	94	9.0	A	32	91
	NB Approach		*23.6*	*C*	*54*	-	*9.8*	*A*	*55*	-	*8.8*	*A*	32	-
	NB Right	100	21.9	C	*0*	46	8.2	A	12	54	8.2	A		45
	SB Left/Thru/Right		27.5	C	25	60	8.4	A	17	61	8.3	A	13	48
	SB Approach		*27.5*	*C*	*25*	-	*8.4*	*A*	*17*	-	*8.3*	*A*	13	-



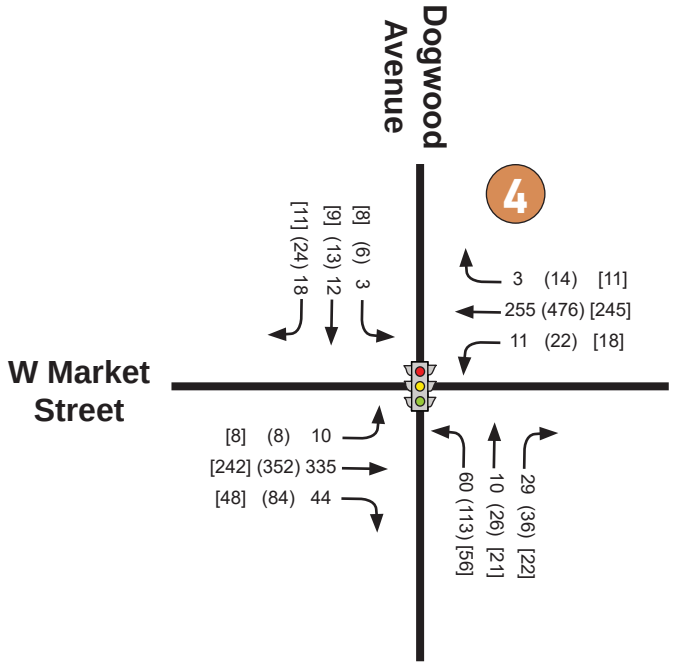
TIMMONS GROUP

2024 Existing Peak Hour Traffic Volumes

Chicago Avenue & Waterman Drive Corridor Study

City of Harrisonburg, Virginia

Figure 18



Legend

00 (00) [00]	AM (PM) [Midday] Peak Hour
	Existing Road
S’	Effective Storage (Feet)
	Signalized Intersection
	Channelization
	Lane Configuration

*Per TOSAM, Effective Storage is the length of the full width lane plus 1/2 the length of the taper

NOT TO SCALE

TIMMONS GROUP

2024 Existing Peak Hour Traffic Volumes

Chicago Avenue & Waterman Drive Corridor Study
City of Harrisonburg, Virginia

Figure 19

6.3 2034 BACKGROUND ANALYSIS

Table 6-3 summarizes the 2034 background conditions intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the 2024 existing intersection geometry, signal timings, and peak hour traffic volumes. The corresponding SYNCHRO and SimTraffic reports are included in Appendix E. Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond to the intersection numbers used in the SYNCHRO models.

Per VDOT Pathways for Planning Route Analysis Network, the volumes on Chicago Avenue and Waterman Drive have experienced a growth rate of approximately 0.5% from 2021-2023. For conservative estimates, an annual growth rate of 2% was applied in the background projects. The 2% annual growth rate was compounded annually for the ten-year period from 2024 to 2034 and applied to all movements at the study intersections. As noted above, to be additionally conservative in our estimates, trip generation of specific movements from Quarry Heights' full build-out was incorporated into the analysis of the Chicago Avenue and Waterman Drive intersection, specifically the EB Waterman Drive left and right movements and the SB Chicago Avenue right movement. It should be noted that the midday peak does not incorporate any Quarry Heights' trip generation as this data was not provided with the TIA.

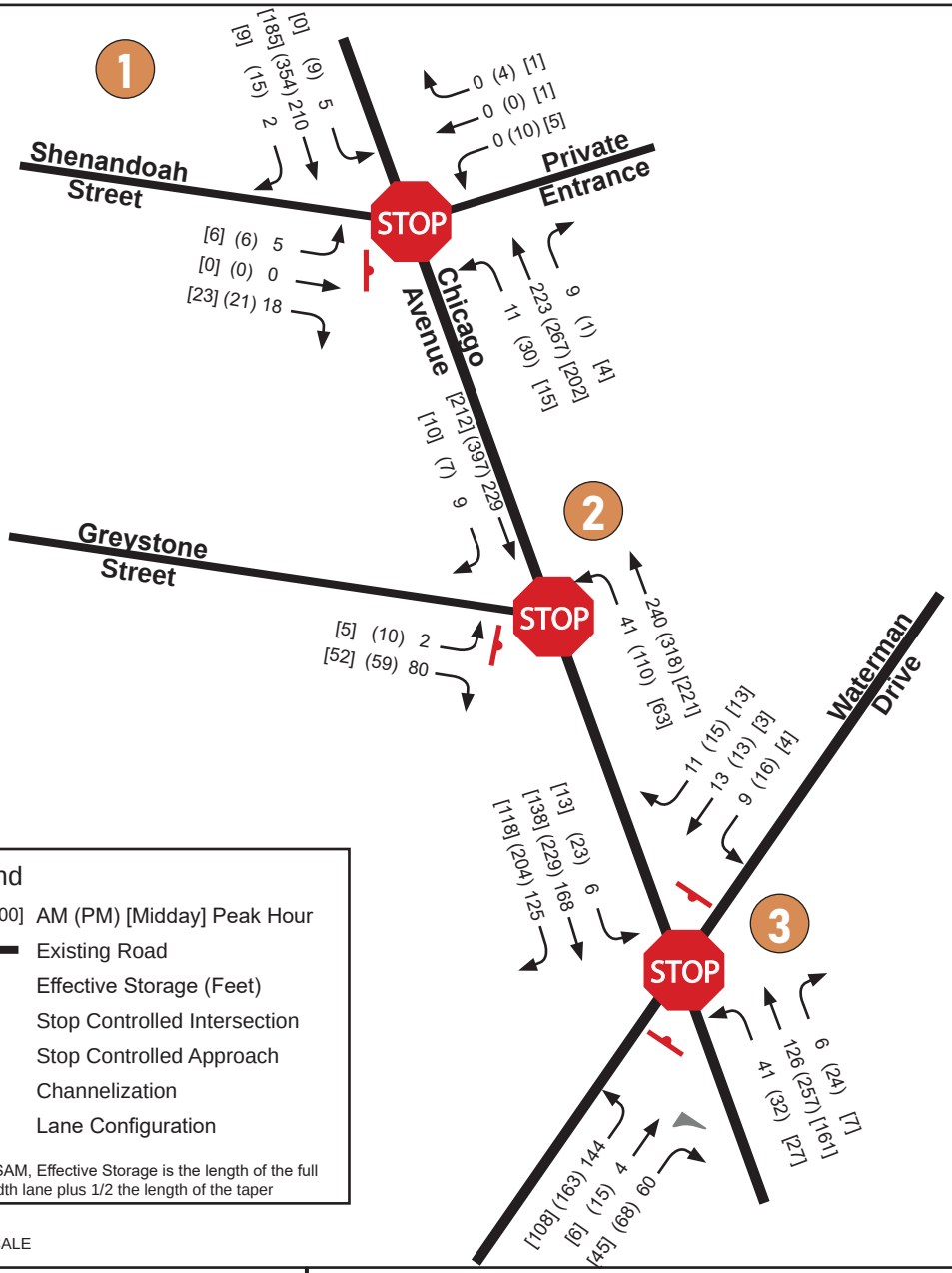
As shown in Table 6-3, the 2034 background traffic is anticipated to continue operating at somewhat similar service operations:

- At the unsignalized intersections of (1) Chicago Avenue/Shenandoah Street and (2) Chicago Avenue/Greystone Street, all movements operate at a LOS B or better during all peak hours (AM/PM/midday).
- At the unsignalized intersection of (3) Chicago Avenue/Waterman Drive, all movements operate at a LOS E or better during all peak hours.
    - During the PM peak hour, the EB left/thru and EB right movements operate at a LOS E.
    - During the midday peak hour, the EB right exceeds the available storage length (50').
    - Due to the length of the EB right storage (50'), queuing for the EB left/thru movement may prohibit EB right movements during the peak hours.
- At the signalized intersection of (4) W Market Street/Dogwood Drive, the overall intersection operates at a LOS C or better during AM, PM, and midday peak hours.

Table 6-3: LOS, Delay and Queue Length Summary
2034 Background Conditions

SYNCHRO CAPACITY ANALYSES - Delay, LOS, and Maximum Queue Length Summary
Background Weekday 2034

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR				MIDDAY PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length (ft)
1. Chicago Avenue (N-S)	EB Left/Thru/Right		10.5	B	3	48	11.8	B	4	38	10.2	B	3	31
at Shenandoah Street (E-W)	*EB Approach*		*10.5*	*B*	*3*	-	*11.8*	*B*	*4*	-	*10.2*	*B*	3	-
Unsignalized	WB Left/Thru/Right		0.0	A	0	0	14.4	B	3	38	12.2	B	1	31
	WB Approach		*0.0*	*A*	*0*	-	*14.4*	*B*	*3*	-	12.2	B	1	-
	NB Left/Thru/Right		0.5	A	1	36	1.2	A	2	70	0.6	A	1	37
	NB Approach		0.5	-	*1*	-	*1.2*	-	*2*	-	0.6	-	1	-
	SB Left/Thru/Right		0.2	A	0	42	0.2	A	0	33	0.0		0	3
	SB Approach		0.2	-	*0*	-	*0.2*	-	*0*	-	0.0	-	0	-
2. Chicago Avenue (N-S)	EB Left/Thru/Right		10.0	B	9	55	12.6	B	12	51	10.2	B	7	40
at Greystone Street (E-W)	*EB Approach*		10.0	B	9	-	12.6	B	12	-	10.2	B	7	-
Unsignalized	NB Left/Thru/Right		1.6	A	3	61	3.1	A	8	87	2.1	A	4	66
	NB Approach		*1.6*		*3*	-	*3.1*		*8*	-	*2.1*		4	-
	SB Left/Thru/Right		0.0		0	0	0.0		0	6	0.0		0	2
	SB Approach		0.0		0	-	0.0		0	-	0.0		0	-
3. Chicago Avenue (N-S)	EB Left/Thru		16.1	C	43	100	39.4	E	146	169	14.3	B	28	86
at Waterman Drive	EB Right	50	16.1	C	43	44	39.4	E	146	50	14.3	B	28	55
Unsignalized	*EB Approach*		16.1	C	43	-	39.4	E	146	-	14.3	B	28	-
	WB Left/Thru/Right		12.7	B	6	49	17.8	C	12	58	10.7	B	3	37
	WB Approach		12.7	B	6	-	17.8	C	12	-	10.7	B	3	-
	NB Left/Thru/Right		2.2	A	3	63	1.2	A	2	74	1.3	A	2	52
	NB Approach		2.2		3	-	1.2		2	-	1.3		2	-
	SB Left/Thru/Right		0.2	A	0	25	0.6	A	2	64	0.5	A	1	44
	SB Approach		0.2		0	-	0.6		2	-	0.5		1	-
4. W Market Street (E-W)	EB Left/Thru		7.2	A	101	121	10.7	B	78	146	9.6	A	50	123
at Dogwood Drive (N-S)	EB Thru/Right		7.2	A	101	94	10.7	B	78	121	9.6	A	50	94
Signalized	*EB Approach*		*7.2*	*A*	*101*	-	*10.7*	*B*	*78*	-	*9.6*	*A*	50	-
	WB Left/Thru		6.6	A	71	103	11.6	B	102	203	9.7	A	51	137
	WB Thru/Right		6.6	A	71	49	11.6	B	102	161	9.7	A	51	72
	WB Approach		*6.6*	*A*	*71*	-	*11.6*	*B*	*102*	-	*9.7*	*A*	51	-
	NB Left/Thru		21.6	C	60	95	11.0	B	68	118	9.3	A	38	96
	NB Approach		*20.7*	*C*	*60*	-	*10.4*	*B*	*68*	-	*9.0*	*A*	38	-
	NB Right	100	18.4	B	4	51	8.3	A	13	70	8.2	A		50
	SB Left/Thru/Right		24.5	C	29	57	8.5	A	19	60	8.3	A	15	46
	SB Approach		*24.5*	*C*	*29*	-	*8.5*	*A*	*19*	-	*8.3*	*A*	15	-



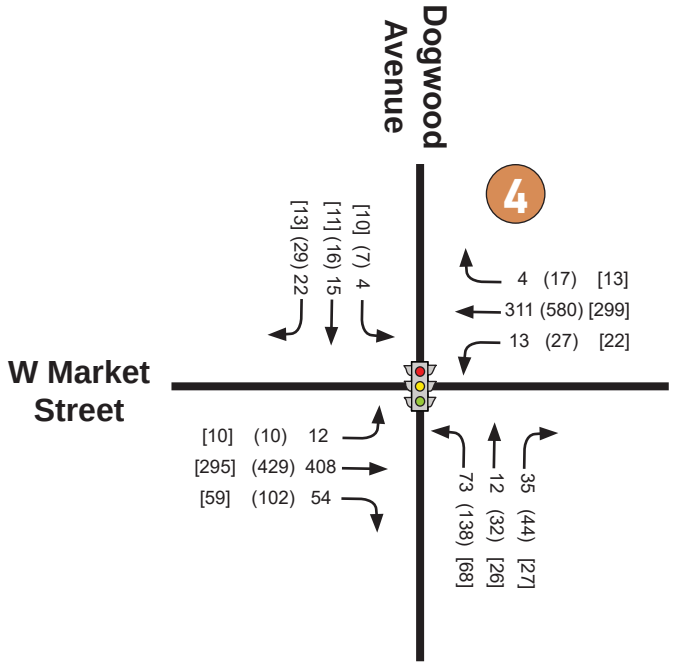
TIMMONS GROUP

2034 Background Peak Hour Traffic Volumes

Chicago Avenue & Waterman Drive Corridor Study

City of Harrisonburg, Virginia

Figure 20



Legend

00 (00) [00]	AM (PM) [Midday] Peak Hour
	Existing Road
S'	Effective Storage (Feet)
	Signalized Intersection
	Channelization
	Lane Configuration

*Per TOSAM, Effective Storage is the length of the full width lane plus 1/2 the length of the taper

NOT TO SCALE

TIMMONS GROUP

2034 Background Peak Hour Traffic Volumes

Chicago Avenue & Waterman Drive Corridor Study
City of Harrisonburg, Virginia

Figure 21

For the Chicago Avenue and Waterman Drive intersection, further analysis was performed, considering that (1) the EB left/thru movements on Waterman Drive are expected to increase; (2) the stacking of the EB left/thru movement on Waterman Drive prohibits the EB right turning movement; and (3) two cyclist crashes have occurred at this intersection in 2022, or 20% of all crashes on Waterman Drive during the crash study period. A roundabout analysis was completed in SIDRA 9 to evaluate roundabout operations at the Chicago Avenue and Waterman Drive intersection.

As shown in Table 6-4, the suboptimal queueing conditions of the EB movements in Table 6-3 is resolved with a proposed roundabout. Moreover, a roundabout would provide a safer condition for all transportation modes, considering the two crashes with bicyclists in 2022.

Table 6-4: LOS, Delay and Queue Length Summary
2034 Background Conditions
Chicago Avenue / Waterman Drive Roundabout

SIDRA CAPACITY ANALYSES - Delay, LOS, and Maximum Queue Length Summary
Background Weekday 2034
Chicago Avenue/Waterman Drive Roundabout

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR			PM PEAK HOUR			MIDDAY PEAK HOUR		
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)
1. Chicago Avenue (N-S) Waterman Drive (E-W) Roundabout	EB Approach		6.4	A	37.3	7.2	A	45.4	4.9	A	19.6
	WB Approach		4.7	A	5.4	5.3	A	8.1	4.0	A	2.2
	NB Approach		5.7	A	29.7	7.6	A	59.2	5.0	A	24.2
	SB Approach		6.4	A	50.9	7.9	A	85.2	4.9	A	32.3
	Overall		5.0	A	50.9	7.6	A	85.2	4.9	A	32.3

7 COMMUNITY ENGAGEMENT

To inform residents about this corridor study and to provide an opportunity to ask questions and encourage discussion about walking and biking in the area, the City hosted a community meeting on October 15, 2024 at the Price Rotary Senior Center. Participants were also asked to complete a paper or online survey about being a cyclist, pedestrian, or both in Harrisonburg; for those unable to attend the meeting, information about the corridor study and survey was posted on the City website and publicized through social media and local news.

61 responses were submitted at the close of survey on November 12, 2024. Of the 61 responses, respondents primarily (1) drive, (2) walk, (3) bike, or (4) ride as a passenger in a vehicle through the City. Few utilize other wheeling (scooter, skateboard, etc.), ride a City bus, or ride a school bus. Notably, 21 respondents bike as their primary mode of transportation and 29 respondents drive as their primary mode of transportation. A majority of the survey responses expressed a desire to walk, bike, drive/ride a passenger car; over a third of the responses expressed that they would like to ride a City bus, indicating a desire for expanded public transportation service.

For those that currently walk, they usually walk with others. For those that currently bike, they sometimes bike with others, sometimes bike with children, and sometimes transport cargo. In both bicycle and pedestrian scenarios, the responses indicate that a separated facility may be needed for adequate accommodations.

Nearly all survey participants that walk or bike do so for recreation and exercise and the majority of respondents walk or bike as part of their commute to school or work. Others noted that they walk or bike to run errands or go shopping, go to a 'third place' destination (such as breweries, restaurants, downtown, or public amenities like libraries), to supervise children to school, to create a sense of place to connect with neighbors, to avoid traffic and parking, and to reduce carbon emissions.

When asked what kind of pedestrian facility is the most comfortable, respondents overwhelmingly chose a separated path with a buffer, shared with people walking and biking (97%). Survey takers also felt comfortable walking on a sidewalk, shared with people walking and biking (79%) and on a separated path without a buffer, shared with people walking and biking (69%). 61% of respondents would feel comfortable walking on a low-traffic residential street, without a sidewalk. Two free responses would prefer bicycles to utilize a separate, protected bike lane if a sidewalk was only provided and one free response noted that while they would be comfortable with any of the options, that they would like to see a speed limit reduction to 25 mph.

When asked what kind of bicycle facility is the most comfortable, respondents similarly selected a separated path with a buffer, shared with people walking and biking (93%). Bicyclists also felt comfortable biking on a low-traffic neighborhood street (75%), or on a connector road in a bike lane (69%). Fewer bicyclists would feel comfortable riding on a separated path without a buffer, shared with people walking or biking (61%) and even fewer felt comfortable riding on a sidewalk with others walking and biking (46%). Only 26% of bicyclists would feel comfortable riding in a shared lane with vehicles. All three free responses noted that they would be comfortable in an on-road bike lane, only if there was a buffer with a physical barrier and separation from vehicles.

Participants noted that they would like to walk or bike along Mt Clinton Pike, Waterman Drive, and Chicago Avenue but currently do not. Many described that the lack of shoulder, existing truck traffic, and speeding vehicles create an unpleasant walking or biking experience. A few responses specifically noted that they would like to bike on Chicago Avenue with their children, however, they currently do

not due to children being “wobbly on bikes and tend[ing] to veer when they look over their shoulders [for oncoming traffic].” A few responses also identified Gift and Thrift, schools, the Eastern Mennonite University campus, Downtown Harrisonburg, and other retail and service businesses as other destinations they hope to walk or bike to in the future.

When asked for their recommendations on other transportation improvements, many responses called for additional traffic calming (such as speed bumps, enforcement, lane narrowing, and lowering speed limits) as they’ve experienced close calls with speeding drivers and ‘rolling stop’ drivers at intersections, violating right-of-way of oncoming bicycle traffic. Several responses supported bike lanes that are physically protected or separated from vehicle traffic. One free response noted that if a west-side improvement on Chicago Avenue is pursued, there needs to be a safe way for NB bicyclists on Chicago Avenue (south of Rockingham Drive) to cross over to the improvement on the west-side of Chicago, north of Waterman Drive.

Participants were additionally asked to review and rank five intersection improvements to the Chicago Avenue and Waterman Drive intersection or if the intersection should remain in its existing condition. Results indicate a strong preference for the peanut roundabout, followed closely by a mini roundabout, or an offset intersection improvement as a third selection.

8 CONCLUSIONS & PROPOSED IMPROVEMENTS

Improvements were proposed based on the analyses performed for the 2024 existing volumes and the 2034 background volumes, community engagement with City residents, and ongoing collaboration with the Department of Public Works.

Alignment between the Northend Greenway and the Friendly City Trail

Three potential alignments between the Northend Greenway along Mount Clinton Pike and the Friendly City Trail in Westover Park were developed as part of this study. These three overall alignments, along with variations, are shown in Figure 22. Alignment A follows Mount Clinton Pike to College Avenue, then proceeds through the Quarry Heights property, and crosses W Market Street at a new crossing and follows the eastern boundary of Thomas Harrison Middle School to the Friendly City Trail at the rear of the school property. Alignment B follows Chicago Avenue to Waterman Drive, crosses W Market Street at the existing signalized intersection at Waterman Drive and through the Westover Park property to the Friendly City Trail. Alignment C connects Mount Clinton Pike to Woodleigh Court and jogs along Stuart Street Waterman Drive, and Chicago Avenue, then follows N Dogwood Drive to the signalized intersection at W Market Street, connecting to the Friendly City Trail through the Westover Park grounds. Proposed variations include utilizing Smith Avenue and Hillside Avenue with Alignment A or Willow Street with Alignment C.

These alignments demonstrate many options for connectivity in this area and can be combined in a variety of ways. Each alignment would provide a significant north-south connection for those biking and walking. Pursuing any or all of these alignments would not only provide improved access to the Northend Greenway and the Friendly City Trail, but other primary destinations such as Eastern Mennonite University, City public schools, commercial and retail services, and many nearby residences.

With the approved rezoning and special-use permit applications of the Quarry Heights property, the City may consider tying the alignment through the development, as conditions of approval included the completion of a shared-use path by the developer, from Waterman Drive to the development's frontage on W Market Street. Furthermore, funding and design of the Chicago Avenue corridor improvements should also be a consideration; if the timing of corridor improvements coincides well with establishing the connection, a variation of Alignment B would likely be appropriate.

Chicago Avenue Corridor

The Chicago Avenue corridor should be improved with continuous bicycle-pedestrian facilities from Mt. Clinton Pike to Waterman Drive, including the existing substandard SB facility between Waterman Drive and Rockingham Drive. Improvements should continue along Waterman Drive and connect to the shared-use path to be included in the Quarry Heights development, with details of that connection to be determined in the future. Due to the presence of large concrete utility poles on the NB side of Chicago Avenue, the larger path facility is recommended for the SB portion of Chicago Avenue. This path will likely be asphalt, intended to serve as an off-road facility for both bicyclists and pedestrians. The path should feature grass buffers along the length, however, the path and buffer width may vary, or the buffer may be omitted in certain locations. This may be due to constraints such as the location of existing buildings.

The NB side of Chicago Avenue is recommended to be improved with a narrower facility to accommodate the large concrete utility poles that are adjacent to the roadway. As relocation of these

poles is not feasible, the facility and buffer width will be adjusted, or the buffer may be omitted, at the time of preliminary engineering and design. While it is currently envisioned as a NB sidewalk to serve pedestrians, the facility material may take shape as asphalt or concrete, to be determined at a future time.

The recommended improvements to Chicago Avenue may be pursued in phases as indicated by the phased planning-level cost estimates in Appendix D.

Chicago Avenue and Waterman Drive Intersection

Two primary recommendations are provided for the Chicago Avenue and Waterman Drive intersection. To address the skewed intersection geometry and the pattern of angle crashes at this location, an offset intersection could be installed; curb extensions would modify both Waterman Drive approaches to meet Chicago Avenue at a perpendicular (90-degree) angle and improve a driver's field-of-vision from Waterman Drive onto Chicago Avenue. Improving the intersection with curb and gutter would also 'harden' the intersection edges and provide a traffic-calming effect. Moreover, the NB bike lane that ends at Rockingham Drive could be extended to Waterman Drive, where marked crossings could be installed at the time of the intersection improvement.

Alternatively, a peanut roundabout could be pursued at the Chicago Avenue and Waterman Drive intersection. Similarly to the offset intersection, a peanut roundabout would address the visibility issues currently present with the skewed approaches. The peanut roundabout would provide traffic calming as well, forcing drivers to slow down as they approach the roundabout. Compared to the offset intersection, the peanut roundabout would have better capacity for future peak-hour projections, however, the offset intersection would still provide adequate service for the future peak hour.

Whether an offset intersection or a peanut roundabout is pursued, it is recommended that the improvement is designed for a WB-40 vehicle. Due to the constraints of existing structures, utilities, and right-of-way, the urban context surrounding the intersection, and the desire for traffic calming while facilitating bike-pedestrian traffic, an improvement that accommodates a WB-40 vehicle would be best suited for the Chicago Avenue and Waterman Drive intersection. For a comprehensive analysis, exhibits and cost estimates for each scenario, accommodating WB-40 or WB-62 design vehicles, are included in Appendix D.

W Market Street Crossing

A new crossing of W Market Street adjacent to Thomas Harrison Middle School is needed, along with a trail connection between the crossing and the Friendly City Trail. To determine the appropriate crossing treatment, two guidelines were used: (1) the Virginia Department of Transportation (VDOT) Traffic Engineering Instructional and Informational Memorandum Pedestrian Crossing Accommodations at Unsignalized Locations (IIM-TE-384.1) and (2) the Federal Highway Administration (FHWA) Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations. W Market Street has an existing AADT of 7,800 and a speed limit of 35 miles per hour, with a four-lane divided roadway cross section. Based on this existing cross section, the guides recommend a Rectangular Rapid-Flashing Beacon (RRFB) and/or roadway reconfiguration , also known as a "road diet" to reduce the travel lanes from two lanes in each direction to one lane in each direction. Though the roadway reconfiguration is feasible based on the recent traffic data, implementation would require changes beyond the limits of the crossing. Thus, a RRFB was selected as the appropriate

countermeasure for the midblock crossing of W Market Street for the concept design and cost estimate.

TIMMONS GROUP

Northend Greenway to Friendly City Trail Alignments

Chicago Avenue & Waterman Drive Corridor Study

City of Harrisonburg, Virginia

Figure 22

9 APPENDIX

APPENDIX A – TRAFFIC COUNTS

Data Collection Group

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File Name : Chicago and Shenandoah
Site Code :
Start Date : 4/16/2024
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Chicago Ave From North					Driveway From East					Chicago Ave From South					Shenandoah St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	37	1	38	0	0	0	0	0	0	5	25	0	30	0	10	0	4	14	82
07:15 AM	0	0	42	2	44	0	0	0	0	0	0	0	22	0	22	0	2	0	7	9	75
07:30 AM	0	0	32	2	34	0	0	0	0	0	0	2	31	0	33	0	0	0	9	9	76
07:45 AM	0	0	38	0	38	0	0	0	0	0	0	2	45	0	47	0	1	0	6	7	92
Total	0	0	149	5	154	0	0	0	0	0	0	9	123	0	132	0	13	0	26	39	325
08:00 AM	0	0	34	0	34	0	0	0	0	0	0	1	33	0	34	0	1	0	4	5	73
08:15 AM	0	1	47	0	48	0	0	0	0	0	0	3	32	1	36	0	2	0	2	4	88
08:30 AM	0	1	39	1	41	0	0	0	0	0	0	2	30	3	35	0	1	0	2	3	79
08:45 AM	0	2	38	1	41	0	0	0	0	0	0	3	46	3	52	0	0	0	7	7	100
Total	0	4	158	2	164	0	0	0	0	0	0	9	141	7	157	0	4	0	15	19	340
11:00 AM	0	1	33	0	34	0	0	0	0	0	0	1	29	2	32	0	1	0	2	3	69
11:15 AM	0	0	35	0	35	0	0	0	0	0	0	5	28	0	33	0	2	0	2	4	72
11:30 AM	0	1	34	0	35	0	0	0	1	1	0	1	32	0	33	0	2	0	0	2	71
11:45 AM	0	2	35	3	40	0	0	0	0	0	0	1	30	0	31	0	1	1	3	5	76
Total	0	4	137	3	144	0	0	0	1	1	0	8	119	2	129	0	6	1	7	14	288
12:00 PM	0	0	58	2	60	0	3	0	0	3	0	3	44	1	48	0	0	0	3	3	114
12:15 PM	0	0	31	2	33	0	0	0	0	0	0	2	37	0	39	0	1	0	6	7	79
12:30 PM	0	0	28	2	30	0	1	0	1	2	0	7	39	0	46	0	1	0	6	7	85
12:45 PM	0	0	35	1	36	0	0	1	0	1	0	0	46	2	48	0	3	0	4	7	92
Total	0	0	152	7	159	0	4	1	1	6	0	12	166	3	181	0	5	0	19	24	370
04:00 PM	0	0	43	5	48	0	2	0	1	3	0	10	66	4	80	0	7	0	3	10	141
04:15 PM	0	0	53	5	58	0	0	0	1	1	0	7	49	0	56	0	4	0	4	8	123
04:30 PM	0	0	60	3	63	0	0	0	0	0	0	9	52	0	61	0	0	0	5	5	129
04:45 PM	0	3	55	1	59	0	1	0	0	1	0	4	28	1	33	0	2	0	4	6	99
Total	0	3	211	14	228	0	3	0	2	5	0	30	195	5	230	0	13	0	16	29	492
05:00 PM	0	1	75	8	84	0	7	0	2	9	0	5	46	0	51	0	3	0	2	5	149
05:15 PM	0	1	59	0	60	0	0	0	1	1	0	7	66	0	73	0	0	0	6	6	140
05:30 PM	0	0	42	0	42	0	2	0	2	4	0	3	48	1	52	0	4	0	6	10	108
05:45 PM	0	0	39	3	42	0	3	0	0	3	0	9	32	1	42	0	3	0	8	11	98
Total	0	2	215	11	228	0	12	0	5	17	0	24	192	2	218	0	10	0	22	32	495
Grand Total	0	13	1022	42	1077	0	19	1	9	29	0	92	936	19	1047	0	51	1	105	157	2310
Apprch %	0	1.2	94.9	3.9		0	65.5	3.4	31		0	8.8	89.4	1.8		0	32.5	0.6	66.9		
Total %	0	0.6	44.2	1.8	46.6	0	0.8	0	0.4	1.3	0	4	40.5	0.8	45.3	0	2.2	0	4.5	6.8	
Passenger Veh	0	13	966	41	1020	0	19	1	9	29	0	88	890	19	997	0	44	1	101	146	2192
% Passenger Veh	0	100	94.5	97.6	94.7	0	100	100	100	100	0	95.7	95.1	100	95.2	0	86.3	100	96.2	93	94.9
Trucks	0	0	56	1	57	0	0	0	0	0	0	4	46	0	50	0	7	0	4	11	118

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% Trucks	0	0	5.5	2.4	5.3	0	0	0	0	0	0	4.3	4.9	0	4.8	0	13.7	0	3.8	7	5.1

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File Name : Chicago and Shenandoah
Site Code :
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	Chicago Ave From North					Driveway From East					Chicago Ave From South					Shenandoah St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	34	0	34	0	0	0	0	0	0	1	33	0	34	0	1	0	4	5	73
08:15 AM	0	1	**47**	0	**48**	0	0	0	0	0	0	**3**	32	1	36	0	**2**	0	2	4	88
08:30 AM	0	1	39	**1**	41	0	0	0	0	0	0	2	30	**3**	35	0	1	0	2	3	79
08:45 AM	0	**2**	38	1	41	0	0	0	0	0	0	3	**46**	3	**52**	0	0	0	**7**	**7**	**100**
Total Volume	0	4	158	2	164	0	0	0	0	0	0	9	141	7	157	0	4	0	15	19	340
% App. Total	0	2.4	96.3	1.2		0	0	0	0		0	5.7	89.8	4.5		0	21.1	0	78.9		
PHF	.000	.500	.840	.500	.854	.000	.000	.000	.000	.000	.000	.750	.766	.583	.755	.000	.500	.000	.536	.679	.850
Passenger Veh	0	4	147	1	152	0	0	0	0	0	0	8	130	7	145	0	2	0	13	15	312
% Passenger Veh	0	100	93.0	50.0	92.7	0	0	0	0	0	0	88.9	92.2	100	92.4	0	50.0	0	86.7	78.9	91.8
Trucks	0	0	11	1	12	0	0	0	0	0	0	1	11	0	12	0	2	0	2	4	28
% Trucks	0	0	7.0	50.0	7.3	0	0	0	0	0	0	11.1	7.8	0	7.6	0	50.0	0	13.3	21.1	8.2

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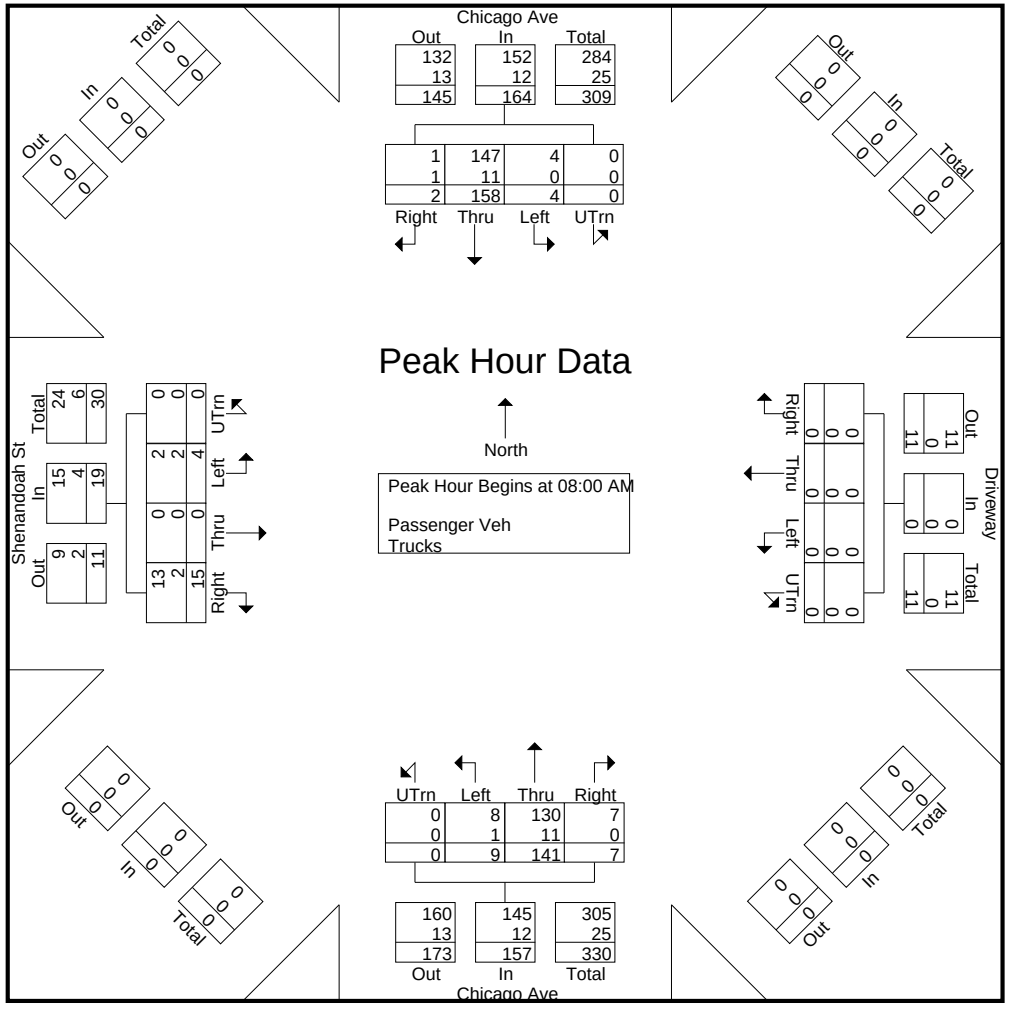
Page No : 4



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File Name : Chicago and Shenandoah
Site Code :
Start Date : 4/16/2024
Page No : 5

	Chicago Ave From North					Driveway From East					Chicago Ave From South					Shenandoah St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	**58**	**2**	**60**	0	**3**	0	0	**3**	0	3	44	1	**48**	0	0	0	3	3	**114**
12:15 PM	0	0	31	2	33	0	0	0	0	0	0	2	37	0	39	0	1	0	**6**	**7**	79
12:30 PM	0	0	28	2	30	0	1	0	**1**	2	0	**7**	39	0	46	0	1	0	6	7	85
12:45 PM	0	0	35	1	36	0	0	**1**	0	1	0	0	**46**	**2**	48	0	**3**	0	4	7	92
Total Volume	0	0	152	7	159	0	4	1	1	6	0	12	166	3	181	0	5	0	19	24	370
% App. Total	0	0	95.6	4.4		0	66.7	16.7	16.7		0	6.6	91.7	1.7		0	20.8	0	79.2		
PHF	.000	.000	.655	.875	.663	.000	.333	.250	.250	.500	.000	.429	.902	.375	.943	.000	.417	.000	.792	.857	.811
Passenger Veh	0	0	142	7	149	0	4	1	1	6	0	12	158	3	173	0	5	0	19	24	352
% Passenger Veh	0	0	93.4	100	93.7	0	100	100	100	100	0	100	95.2	100	95.6	0	100	0	100	100	95.1
Trucks	0	0	10	0	10	0	0	0	0	0	0	0	8	0	8	0	0	0	0	0	18
% Trucks	0	0	6.6	0	6.3	0	0	0	0	0	0	0	4.8	0	4.4	0	0	0	0	0	4.9

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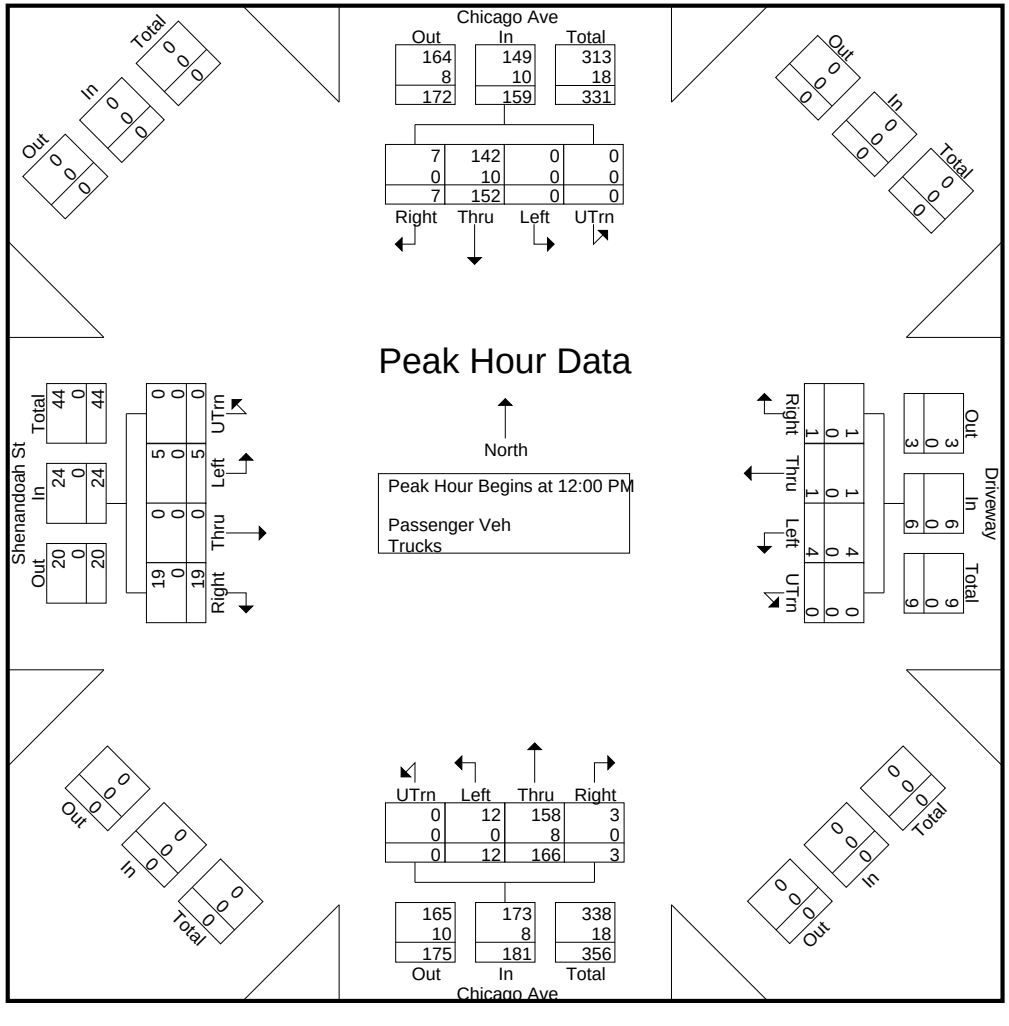

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File Name : Chicago and Shenandoah
Site Code :
Start Date : 4/16/2024

	Chicago Ave From North					Driveway From East					Chicago Ave From South					Shenandoah St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	60	3	63	0	0	0	0	0	0	**9**	52	0	61	0	0	0	5	5	129
04:45 PM	0	**3**	55	1	59	0	1	0	0	1	0	4	28	**1**	33	0	2	0	4	**6**	99
05:00 PM	0	1	**75**	**8**	**84**	0	**7**	0	**2**	**9**	0	5	46	0	51	0	**3**	0	2	5	**149**
05:15 PM	0	1	59	0	60	0	0	0	1	1	0	7	**66**	0	**73**	0	0	0	**6**	6	140
Total Volume	0	5	249	12	266	0	8	0	3	11	0	25	192	1	218	0	5	0	17	22	517
% App. Total	0	1.9	93.6	4.5		0	72.7	0	27.3		0	11.5	88.1	0.5		0	22.7	0	77.3		
PHF	.000	.417	.830	.375	.792	.000	.286	.000	.375	.306	.000	.694	.727	.250	.747	.000	.417	.000	.708	.917	.867
Passenger Veh	0	5	243	12	260	0	8	0	3	11	0	24	185	1	210	0	5	0	16	21	502
% Passenger Veh	0	100	97.6	100	97.7	0	100	0	100	100	0	96.0	96.4	100	96.3	0	100	0	94.1	95.5	97.1
Trucks	0	0	6	0	6	0	0	0	0	0	0	1	7	0	8	0	0	0	1	1	15
% Trucks	0	0	2.4	0	2.3	0	0	0	0	0	0	4.0	3.6	0	3.7	0	0	0	5.9	4.5	2.9

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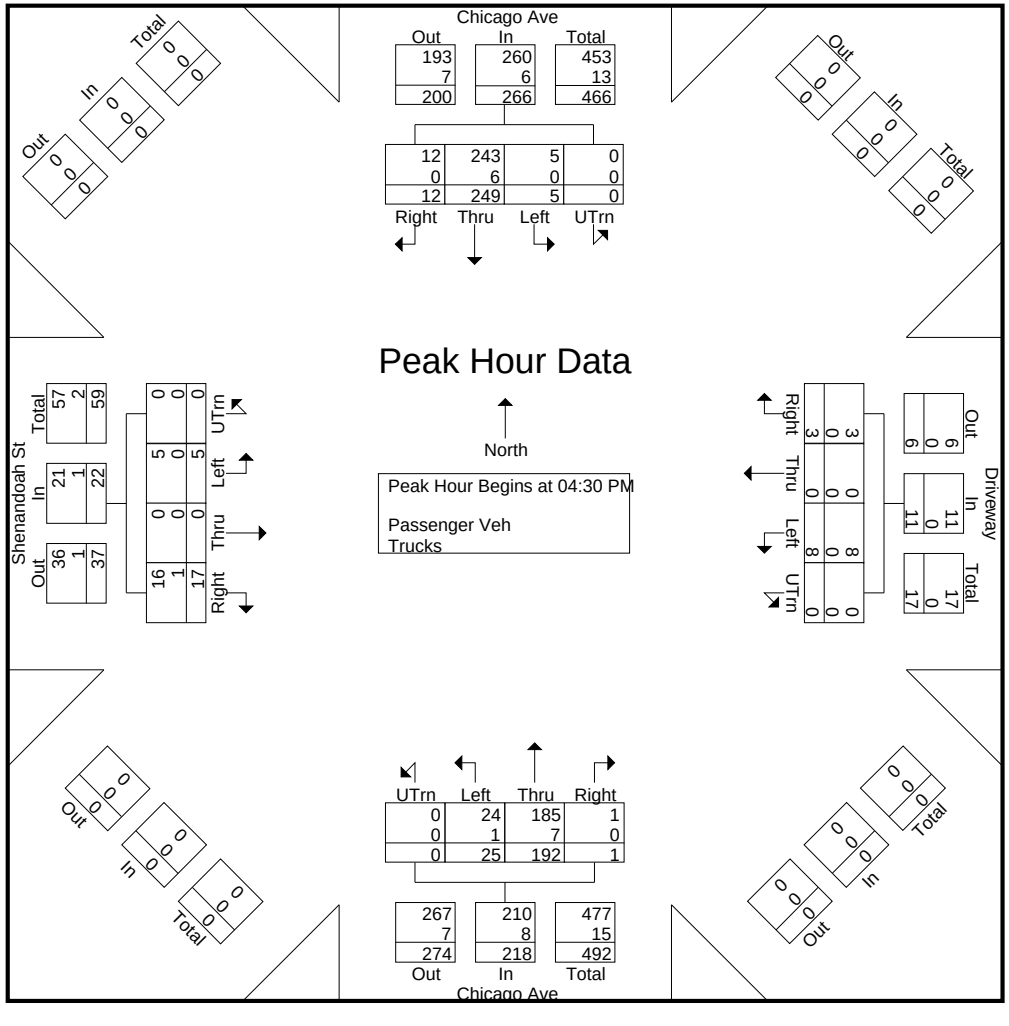

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File Name : Chicago and Shenandoah
Site Code :
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Groups Printed- Bikes - Peds

	Chicago Ave From North						Driveway From East						Chicago Ave From South						Shenandoah St From West								
Start Time	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	2
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	1	0	2	0	4	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	2	1	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
08:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	2	3	5
Total	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	7	1	7	4	11
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	1	2
11:30 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	2
Total	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	4	0	4	4	8
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	3	0	3	1	4
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	1	0	1	2	3
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	2	1	3
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	1	4	0	0	0	0	6	0	7	4	11
04:00 PM	0	0	2	1	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	2	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	1	2
04:45 PM	0	0	1	0	0	1	0	0	0	0	1	0	0	0	2	0	0	2	0	0	0	0	2	0	3	3	6
Total	0	0	3	1	0	4	0	0	0	0	2	0	0	1	3	0	0	4	0	0	0	1	3	1	5	9	14
05:00 PM	0	0	3	0	0	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	4	4
05:15 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	2	3	5
05:30 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	1	0	1	4	5
05:45 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2
Total	0	0	7	0	0	7	0	0	0	0	0	0	0	1	4	0	0	5	0	0	0	0	4	0	4	12	16
Grand Total	0	0	13	1	0	14	0	0	0	0	2	0	0	4	15	0	1	19	0	2	0	2	24	4	27	37	64
Apprch %	0	0	92.9	7.1			0	0	0	0			0	21.1	78.9	0			0	50	0	50					
Total %	0	0	35.1	2.7		37.8	0	0	0	0		0	0	10.8	40.5	0		51.4	0	5.4	0	5.4		10.8	42.2	57.8	
Bikes	0	0	13	1		14	0	0	0	0		0	0	4	15	0		19	0	2	0	2		4	0	0	37
% Bikes	0	0	100	100	0	100	0	0	0	0	0	0	0	100	100	0	0	95	0	100	0	100	0	14.3	0	0	57.8

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File Name : Chicago and Shenandoah
Site Code :
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Groups Printed- Bikes - Peds

	Chicago Ave From North						Driveway From East						Chicago Ave From South						Shenandoah St From West								
	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
Peds	0	0	0	0		0	0	0	0	0		2	0	0	0	0		1	0	0	0	0		24	0	0	27
% Peds	0	0	0	0	0	0	0	0	0	0	100	100	0	0	0	0	100	5	0	0	0	0	100	85.7	0	0	42.2

Data Collection Group

LSmith@DataCollectionGroup.net

File Name : Chicago and Greystone
Site Code :
Start Date : 4/7/2024
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Chicago Ave From North					From East					Chicago Ave From South					Greystone St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	45	2	47	0	1	0	0	1	0	4	30	0	34	0	1	0	9	10	92
07:15 AM	0	0	50	0	50	0	0	0	0	0	0	6	24	0	30	0	1	0	20	21	101
07:30 AM	0	0	37	2	39	0	0	0	0	0	0	12	32	0	44	0	1	0	26	27	110
07:45 AM	0	0	48	1	49	0	0	0	0	0	0	8	39	0	47	0	2	0	17	19	115
Total	0	0	180	5	185	0	1	0	0	1	0	30	125	0	155	0	5	0	72	77	418
08:00 AM	0	0	40	1	41	0	0	0	0	0	0	10	35	0	45	0	0	0	19	19	105
08:15 AM	0	0	46	1	47	0	0	0	0	0	0	9	31	0	40	0	2	0	12	14	101
08:30 AM	0	0	39	4	43	0	0	0	0	0	0	7	32	0	39	0	0	0	17	17	99
08:45 AM	0	0	49	1	50	0	0	0	0	0	0	8	57	0	65	0	0	0	18	18	133
Total	0	0	174	7	181	0	0	0	0	0	0	34	155	0	189	0	2	0	66	68	438
11:00 AM	0	0	32	2	34	0	0	0	0	0	0	4	27	0	31	0	1	0	5	6	71
11:15 AM	0	0	36	0	36	0	0	0	0	0	0	6	34	1	41	0	0	0	5	5	82
11:30 AM	0	0	34	0	34	0	0	0	0	0	0	9	32	0	41	0	1	0	10	11	86
11:45 AM	0	0	41	2	43	0	0	0	0	0	0	13	33	0	46	0	0	0	7	7	96
Total	0	0	143	4	147	0	0	0	0	0	0	32	126	1	159	0	2	0	27	29	335
12:00 PM	0	0	63	1	64	0	0	0	0	0	0	13	51	0	64	0	0	0	10	10	138
12:15 PM	0	0	36	1	37	0	0	0	0	0	0	18	36	0	54	0	1	0	14	15	106
12:30 PM	0	0	30	2	32	0	0	0	0	0	0	9	45	0	54	0	1	0	11	12	98
12:45 PM	0	0	45	4	49	0	0	0	0	0	0	12	49	0	61	0	2	0	8	10	120
Total	0	0	174	8	182	0	0	0	0	0	0	52	181	0	233	0	4	0	43	47	462
04:00 PM	0	0	48	0	48	0	0	0	0	0	0	14	74	1	89	0	3	0	15	18	155
04:15 PM	0	0	58	2	60	0	0	0	0	0	0	15	54	0	69	0	0	0	11	11	140
04:30 PM	0	0	68	2	70	0	0	0	0	0	0	21	65	0	86	0	3	0	10	13	169
04:45 PM	0	0	67	2	69	0	0	0	0	0	0	19	33	0	52	0	1	0	14	15	136
Total	0	0	241	6	247	0	0	0	0	0	0	69	226	1	296	0	7	0	50	57	600
05:00 PM	0	0	83	2	85	0	0	0	0	0	0	29	64	0	93	0	0	0	11	11	189
05:15 PM	0	0	67	1	68	0	0	0	0	0	0	21	72	0	93	0	4	0	13	17	178
05:30 PM	0	0	56	2	58	0	0	0	0	0	0	16	48	0	64	0	4	0	19	23	145
05:45 PM	0	0	48	3	51	0	0	0	0	0	0	14	39	0	53	0	0	0	18	18	122
Total	0	0	254	8	262	0	0	0	0	0	0	80	223	0	303	0	8	0	61	69	634
Grand Total	0	0	1166	38	1204	0	1	0	0	1	0	297	1036	2	1335	0	28	0	319	347	2887
Apprch %	0	0	96.8	3.2		0	100	0	0		0	22.2	77.6	0.1		0	8.1	0	91.9		
Total %	0	0	40.4	1.3	41.7	0	0	0	0	0	0	10.3	35.9	0.1	46.2	0	1	0	11	12	
Passenger Veh	0	0	1105	35	1140	0	1	0	0	1	0	288	983	2	1273	0	26	0	314	340	2754
% Passenger Veh	0	0	94.8	92.1	94.7	0	100	0	0	100	0	97	94.9	100	95.4	0	92.9	0	98.4	98	95.4
Trucks	0	0	61	3	64	0	0	0	0	0	0	9	53	0	62	0	2	0	5	7	133

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% Trucks	0	0	5.2	7.9	5.3	0	0	0	0	0	0	3	5.1	0	4.6	0	7.1	0	1.6	2	4.6

Data Collection Group

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File Name : Chicago and Greystone
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	Chicago Ave From North					From East					Chicago Ave From South					Greystone St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	40	1	41	0	0	0	0	0	0	**10**	35	0	45	0	0	0	**19**	**19**	105
08:15 AM	0	0	46	1	47	0	0	0	0	0	0	9	31	0	40	0	**2**	0	12	14	101
08:30 AM	0	0	39	**4**	43	0	0	0	0	0	0	7	32	0	39	0	0	0	17	17	99
08:45 AM	0	0	**49**	1	**50**	0	0	0	0	0	0	8	**57**	0	**65**	0	0	0	18	18	**133**
Total Volume	0	0	174	7	181	0	0	0	0	0	0	34	155	0	189	0	2	0	66	68	438
% App. Total	0	0	96.1	3.9		0	0	0	0		0	18	82	0		0	2.9	0	97.1		
PHF	.000	.000	.888	.438	.905	.000	.000	.000	.000	.000	.000	.850	.680	.000	.727	.000	.250	.000	.868	.895	.823
Passenger Veh	0	0	161	5	166	0	0	0	0	0	0	31	141	0	172	0	2	0	65	67	405
% Passenger Veh	0	0	92.5	71.4	91.7	0	0	0	0	0	0	91.2	91.0	0	91.0	0	100	0	98.5	98.5	92.5
Trucks	0	0	13	2	15	0	0	0	0	0	0	3	14	0	17	0	0	0	1	1	33
% Trucks	0	0	7.5	28.6	8.3	0	0	0	0	0	0	8.8	9.0	0	9.0	0	0	0	1.5	1.5	7.5

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File Name : Chicago and Greystone
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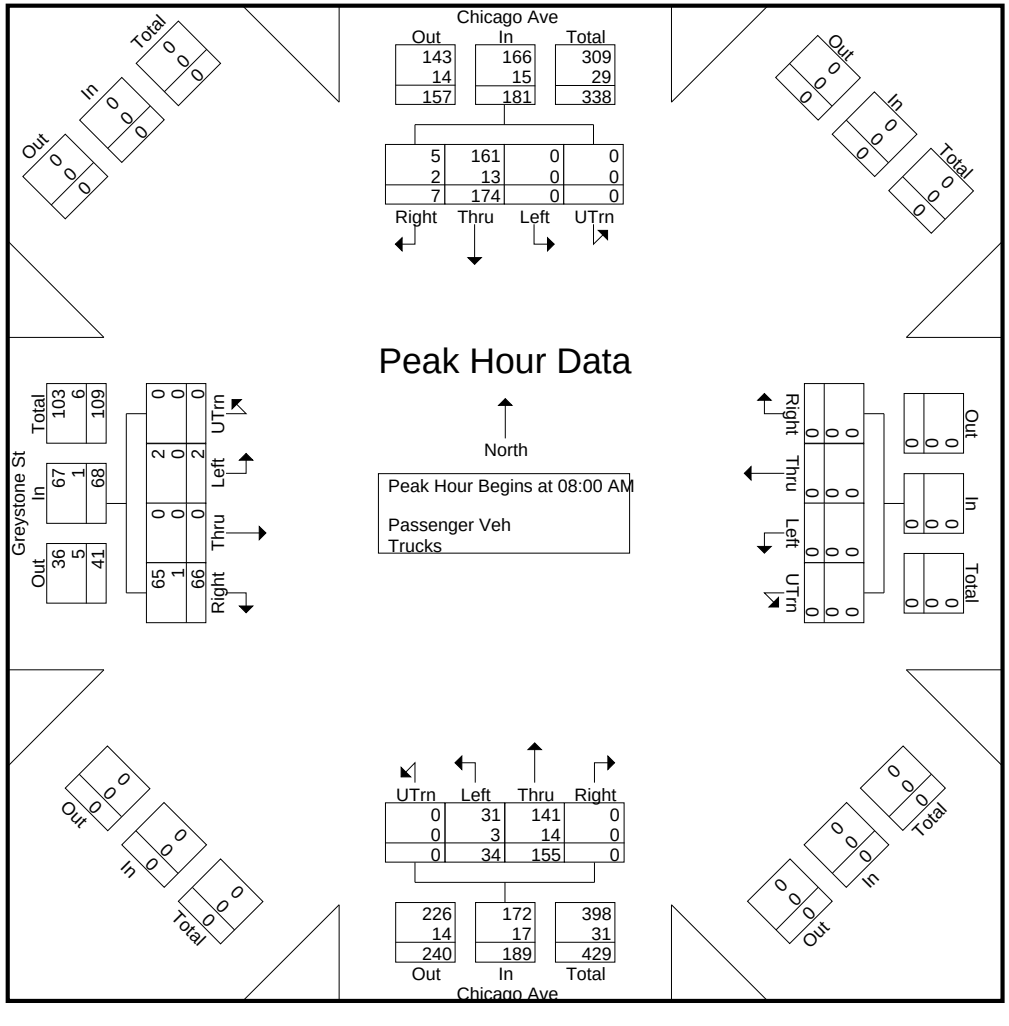

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File Name : Chicago and Greystone
Site Code :
Start Date : 4/7/2024
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	Chicago Ave From North					From East					Chicago Ave From South					Greystone St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	**63**	1	**64**	0	0	0	0	0	0	13	**51**	0	**64**	0	0	0	10	10	**138**
12:15 PM	0	0	36	1	37	0	0	0	0	0	0	**18**	36	0	54	0	1	0	**14**	**15**	106
12:30 PM	0	0	30	2	32	0	0	0	0	0	0	9	45	0	54	0	1	0	11	12	98
12:45 PM	0	0	45	**4**	49	0	0	0	0	0	0	12	49	0	61	0	**2**	0	8	10	120
Total Volume	0	0	174	8	182	0	0	0	0	0	0	52	181	0	233	0	4	0	43	47	462
% App. Total	0	0	95.6	4.4		0	0	0	0		0	22.3	77.7	0		0	8.5	0	91.5		
PHF	.000	.000	.690	.500	.711	.000	.000	.000	.000	.000	.000	.722	.887	.000	.910	.000	.500	.000	.768	.783	.837
Passenger Veh	0	0	165	8	173	0	0	0	0	0	0	51	171	0	222	0	4	0	42	46	441
% Passenger Veh	0	0	94.8	100	95.1	0	0	0	0	0	0	98.1	94.5	0	95.3	0	100	0	97.7	97.9	95.5
Trucks	0	0	9	0	9	0	0	0	0	0	0	1	10	0	11	0	0	0	1	1	21
% Trucks	0	0	5.2	0	4.9	0	0	0	0	0	0	1.9	5.5	0	4.7	0	0	0	2.3	2.1	4.5

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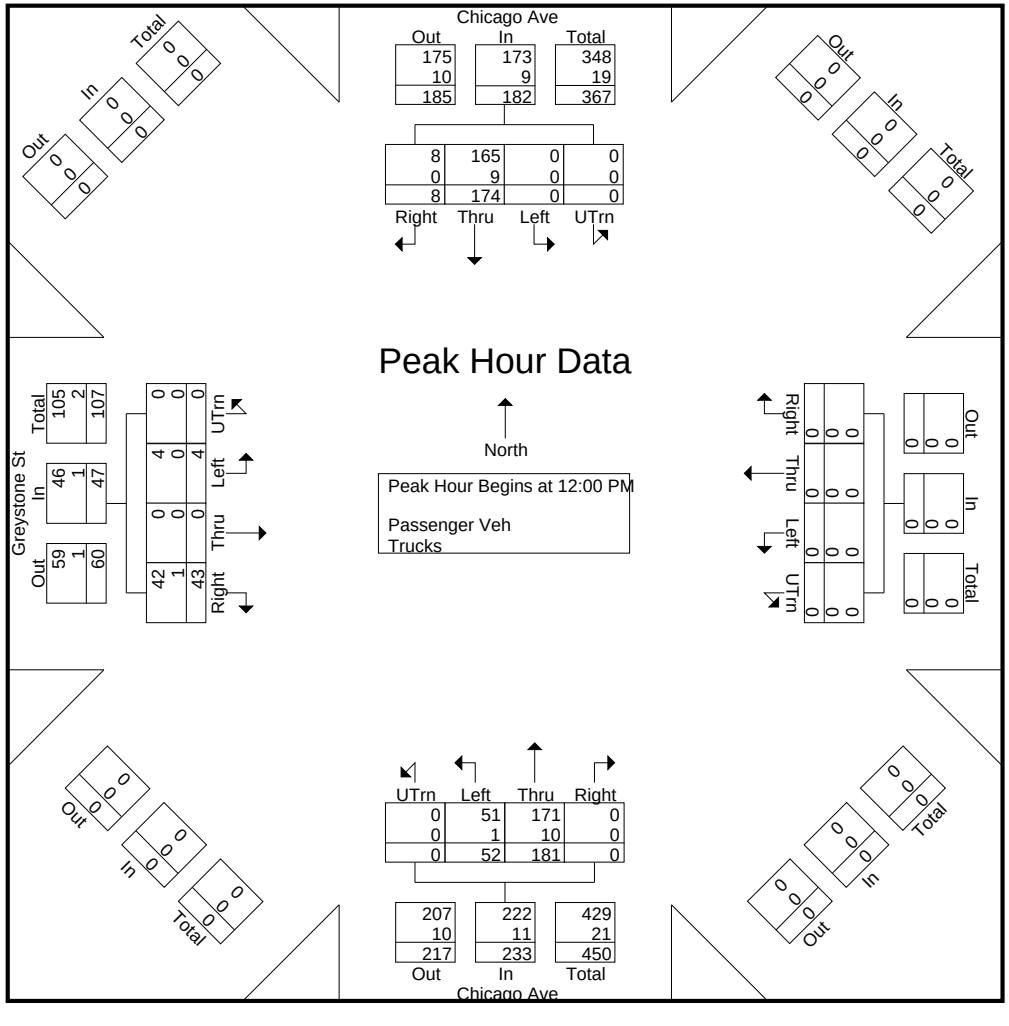

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File Name : Chicago and Greystone
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	Chicago Ave From North					From East					Chicago Ave From South					Greystone St From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	68	**2**	70	0	0	0	0	0	0	21	65	0	86	0	3	0	10	13	169
04:45 PM	0	0	67	2	69	0	0	0	0	0	0	19	33	0	52	0	1	0	**14**	15	136
05:00 PM	0	0	**83**	2	**85**	0	0	0	0	0	0	**29**	64	0	**93**	0	0	0	11	11	**189**
05:15 PM	0	0	67	1	68	0	0	0	0	0	0	21	**72**	0	93	0	**4**	0	13	**17**	178
Total Volume	0	0	285	7	292	0	0	0	0	0	0	90	234	0	324	0	8	0	48	56	672
% App. Total	0	0	97.6	2.4		0	0	0	0		0	27.8	72.2	0		0	14.3	0	85.7		
PHF	.000	.000	.858	.875	.859	.000	.000	.000	.000	.000	.000	.776	.813	.000	.871	.000	.500	.000	.857	.824	.889
Passenger Veh	0	0	276	7	283	0	0	0	0	0	0	90	227	0	317	0	8	0	47	55	655
% Passenger Veh	0	0	96.8	100	96.9	0	0	0	0	0	0	100	97.0	0	97.8	0	100	0	97.9	98.2	97.5
Trucks	0	0	9	0	9	0	0	0	0	0	0	0	7	0	7	0	0	0	1	1	17
% Trucks	0	0	3.2	0	3.1	0	0	0	0	0	0	0	3.0	0	2.2	0	0	0	2.1	1.8	2.5

Data Collection Group

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File Name : Chicago and Greystone
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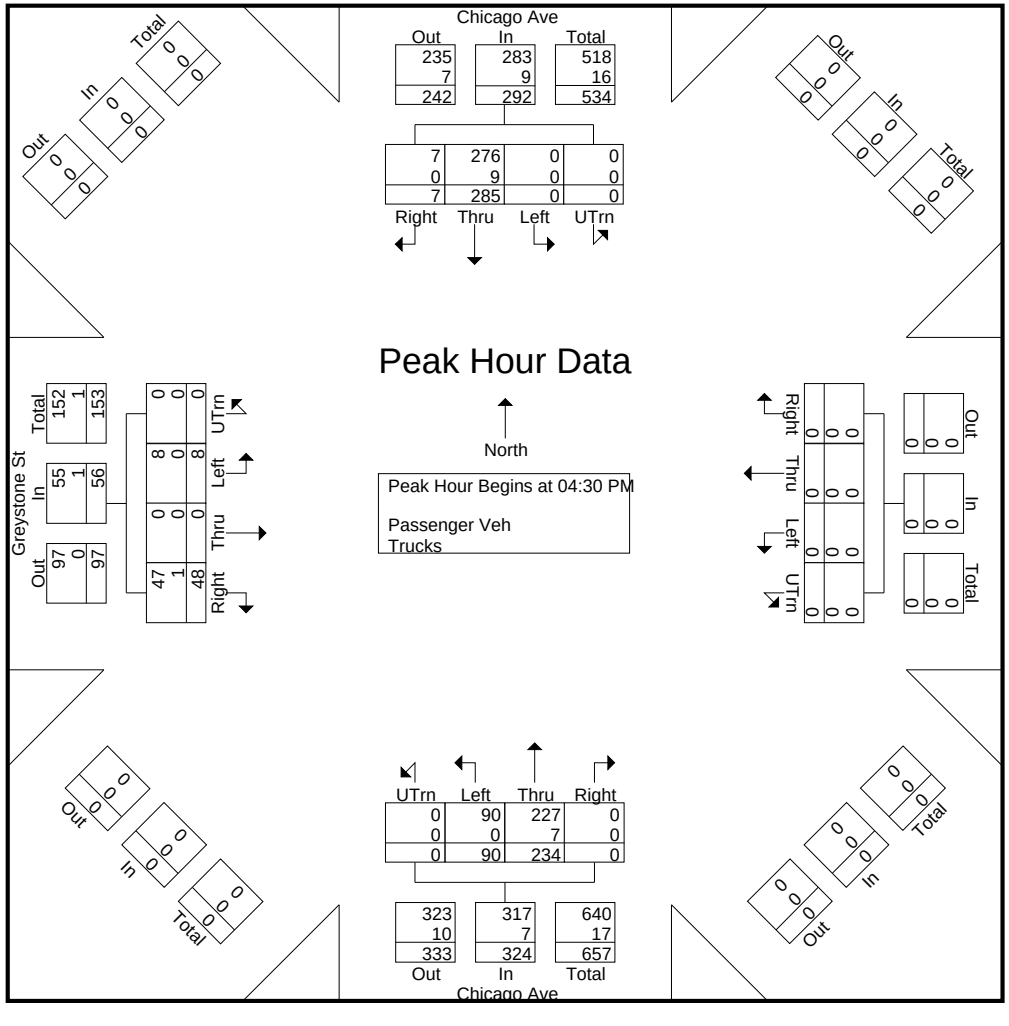

Data Collection Group

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File Name : Chicago and Greystone
Site Code :
Start Date : 4/7/2024
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Groups Printed- Bikes - Peds

	Chicago Ave From North						From East						Chicago Ave From South						Greystone St From West								
Start Time	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
07:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	2
Total	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	1	1	1	1	4	5
08:00 AM	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
08:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	4	0	4
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3	0	3	0	4	4
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	2	2
Total	0	0	0	0	3	0	0	0	0	0	2	0	0	1	2	0	0	3	0	0	0	3	3	3	8	6	14
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1
11:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	2	0	2	2	4
Total	0	0	0	1	0	1	0	0	0	0	0	0	0	2	1	0	0	3	0	0	0	0	6	0	6	4	10
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2	0	0	0	0	2	0	3	2	5
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	3	0	0	0	2	2	2	3	5	8
04:00 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	1	1	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3
04:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	1	2	3
Total	0	0	1	0	1	1	0	0	0	0	0	0	0	2	1	0	0	3	0	0	0	0	5	0	6	4	10
05:00 PM	0	0	3	0	0	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	1	1	5	6
05:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	2	3	5
05:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	2	3
05:45 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2	2	4
Total	0	0	5	0	2	5	0	0	0	0	0	0	0	2	4	0	0	6	0	0	0	1	4	1	6	12	18
Grand Total	0	0	7	1	6	8	0	0	0	0	2	0	0	8	12	0	1	20	0	0	0	7	21	7	30	35	65
Apprch %	0	0	87.5	12.5			0	0	0	0			0	40	60	0			0	0	0	100					
Total %	0	0	20	2.9		22.9	0	0	0	0		0	0	22.9	34.3	0		57.1	0	0	0	20		20	46.2	53.8	
Bikes	0	0	7	1		8	0	0	0	0		0	0	8	12	0		20	0	0	0	7		7	0	0	35
% Bikes	0	0	100	100	0	57.1	0	0	0	0	0	0	0	100	100	0	0	95.2	0	0	0	100	0	25	0	0	53.8

Data Collection Group

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File Name : Chicago and Greystone
Site Code :
Start Date : 4/7/2024
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Groups Printed- Bikes - Peds

	Chicago Ave From North						From East						Chicago Ave From South						Greystone St From West								
	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
Peds	0	0	0	0		6	0	0	0	0		2	0	0	0	0		1	0	0	0	0		21	0	0	30
% Peds	0	0	0	0	100	42.9	0	0	0	0	100	100	0	0	0	0	100	4.8	0	0	0	0	100	75	0	0	46.2

Data Collection Group

LSmith@DataCollectionGroup.net

File Name : Chicago and Waterman
Site Code :
Start Date : 4/16/2024
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Chicago Ave From North					Waterman Dr From East					Chicago Ave From South					Waterman Dr From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	2	26	26	54	0	3	1	4	8	0	4	13	1	18	0	16	1	3	20	100
07:15 AM	0	1	33	37	71	0	1	6	4	11	0	10	8	0	18	0	14	1	6	21	121
07:30 AM	0	0	43	23	66	0	1	2	4	7	0	7	17	0	24	0	27	3	6	36	133
07:45 AM	0	0	38	25	63	0	0	5	4	9	0	3	29	1	33	0	18	0	4	22	127
Total	0	3	140	111	254	0	5	14	16	35	0	24	67	2	93	0	75	5	19	99	481
08:00 AM	0	1	33	21	55	0	2	3	2	7	0	16	24	0	40	0	17	0	6	23	125
08:15 AM	0	2	36	23	61	0	1	3	3	7	0	7	15	0	22	0	23	1	5	29	119
08:30 AM	0	2	33	19	54	0	2	1	3	6	0	5	25	2	32	0	13	1	6	20	112
08:45 AM	0	0	36	26	62	0	2	4	1	7	0	6	39	3	48	0	23	1	4	28	145
Total	0	5	138	89	232	0	7	11	9	27	0	34	103	5	142	0	76	3	21	100	501
11:00 AM	0	1	16	20	37	0	1	1	2	4	0	8	13	2	23	0	17	4	3	24	88
11:15 AM	0	5	20	19	44	0	1	1	4	6	0	7	23	3	33	0	13	3	7	23	106
11:30 AM	0	1	26	14	41	0	1	2	0	3	0	2	24	4	30	0	16	2	7	25	99
11:45 AM	0	1	26	22	49	0	2	0	2	4	0	10	25	1	36	0	20	0	2	22	111
Total	0	8	88	75	171	0	5	4	8	17	0	27	85	10	122	0	66	9	19	94	404
12:00 PM	0	9	29	40	78	0	0	0	2	2	0	6	34	1	41	0	22	1	9	32	153
12:15 PM	0	1	26	20	47	0	1	1	0	2	0	2	33	0	35	0	22	1	7	30	114
12:30 PM	0	1	24	19	44	0	1	2	2	5	0	6	32	3	41	0	23	2	9	34	124
12:45 PM	0	0	34	18	52	0	0	0	7	7	0	8	33	2	43	0	22	1	12	35	137
Total	0	11	113	97	221	0	2	3	11	16	0	22	132	6	160	0	89	5	37	131	528
04:00 PM	0	4	34	22	60	0	0	2	1	3	0	10	52	5	67	0	41	4	8	53	183
04:15 PM	0	4	36	34	74	0	4	0	2	6	0	4	44	4	52	0	24	3	7	34	166
04:30 PM	0	5	44	26	75	0	6	3	3	12	0	8	48	5	61	0	33	2	9	44	192
04:45 PM	0	4	42	29	75	0	2	3	1	6	0	4	40	3	47	0	17	3	10	30	158
Total	0	17	156	111	284	0	12	8	7	27	0	26	184	17	227	0	115	12	34	161	699
05:00 PM	0	7	54	37	98	0	4	2	4	10	0	5	60	8	73	0	26	3	15	44	225
05:15 PM	0	3	48	34	85	0	1	3	4	8	0	9	63	4	76	0	31	4	4	39	208
05:30 PM	0	1	42	33	76	0	1	0	2	3	0	5	38	3	46	0	25	2	11	38	163
05:45 PM	0	3	45	23	71	0	0	0	2	2	0	5	33	2	40	0	21	2	7	30	143
Total	0	14	189	127	330	0	6	5	12	23	0	24	194	17	235	0	103	11	37	151	739
Grand Total	0	58	824	610	1492	0	37	45	63	145	0	157	765	57	979	0	524	45	167	736	3352
Apprch %	0	3.9	55.2	40.9		0	25.5	31	43.4		0	16	78.1	5.8		0	71.2	6.1	22.7		
Total %	0	1.7	24.6	18.2	44.5	0	1.1	1.3	1.9	4.3	0	4.7	22.8	1.7	29.2	0	15.6	1.3	5	22	
Passenger Veh	0	57	796	572	1425	0	36	44	60	140	0	145	739	55	939	0	492	45	163	700	3204
% Passenger Veh	0	98.3	96.6	93.8	95.5	0	97.3	97.8	95.2	96.6	0	92.4	96.6	96.5	95.9	0	93.9	100	97.6	95.1	95.6
Trucks	0	1	28	38	67	0	1	1	3	5	0	12	26	2	40	0	32	0	4	36	148

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% Trucks	0	1.7	3.4	6.2	4.5	0	2.7	2.2	4.8	3.4	0	7.6	3.4	3.5	4.1	0	6.1	0	2.4	4.9	4.4

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File Name : Chicago and Waterman
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	Chicago Ave From North					Waterman Dr From East					Chicago Ave From South					Waterman Dr From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	**1**	33	**37**	**71**	0	1	**6**	**4**	**11**	0	10	8	0	18	0	14	1	**6**	21	121
07:30 AM	0	0	**43**	23	66	0	1	2	4	7	0	7	17	0	24	0	**27**	**3**	6	**36**	**133**
07:45 AM	0	0	38	25	63	0	0	5	4	9	0	3	**29**	**1**	33	0	18	0	4	22	127
08:00 AM	0	1	33	21	55	0	**2**	3	2	7	0	**16**	24	0	**40**	0	17	0	6	23	125
Total Volume	0	2	147	106	255	0	4	16	14	34	0	36	78	1	115	0	76	4	22	102	506
% App. Total	0	0.8	57.6	41.6		0	11.8	47.1	41.2		0	31.3	67.8	0.9		0	74.5	3.9	21.6		
PHF	.000	.500	.855	.716	.898	.000	.500	.667	.875	.773	.000	.563	.672	.250	.719	.000	.704	.333	.917	.708	.951
Passenger Veh	0	2	145	100	247	0	4	15	14	33	0	33	75	1	109	0	71	4	20	95	484
% Passenger Veh	0	100	98.6	94.3	96.9	0	100	93.8	100	97.1	0	91.7	96.2	100	94.8	0	93.4	100	90.9	93.1	95.7
Trucks	0	0	2	6	8	0	0	1	0	1	0	3	3	0	6	0	5	0	2	7	22
% Trucks	0	0	1.4	5.7	3.1	0	0	6.3	0	2.9	0	8.3	3.8	0	5.2	0	6.6	0	9.1	6.9	4.3

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File Name : Chicago and Waterman
Site Code :
Start Date : 4/16/2024
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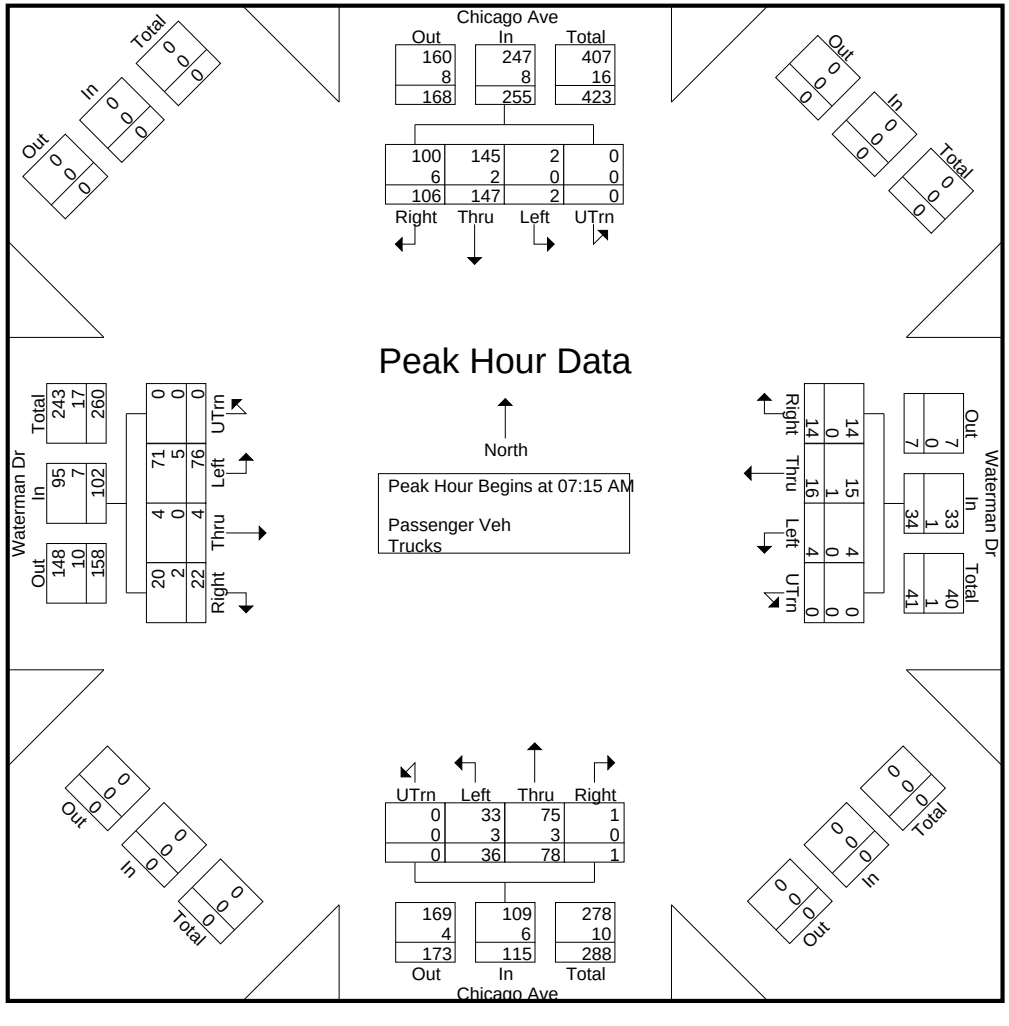

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File Name : Chicago and Waterman
Site Code :
Start Date : 4/16/2024
Page No : 5

	Chicago Ave From North					Waterman Dr From East					Chicago Ave From South					Waterman Dr From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	**9**	29	**40**	**78**	0	0	0	2	2	0	6	**34**	1	41	0	22	1	9	32	**153**
12:15 PM	0	1	26	20	47	0	**1**	1	0	2	0	2	33	0	35	0	22	1	7	30	114
12:30 PM	0	1	24	19	44	0	1	**2**	2	5	0	6	32	**3**	41	0	**23**	**2**	9	34	124
12:45 PM	0	0	**34**	18	52	0	0	0	**7**	**7**	0	**8**	33	2	**43**	0	22	1	**12**	**35**	137
Total Volume	0	11	113	97	221	0	2	3	11	16	0	22	132	6	160	0	89	5	37	131	528
% App. Total	0	5	51.1	43.9		0	12.5	18.8	68.8		0	13.8	82.5	3.8		0	67.9	3.8	28.2		
PHF	.000	.306	.831	.606	.708	.000	.500	.375	.393	.571	.000	.688	.971	.500	.930	.000	.967	.625	.771	.936	.863
Passenger Veh	0	10	110	91	211	0	2	3	11	16	0	19	128	6	153	0	83	5	35	123	503
% Passenger Veh	0	90.9	97.3	93.8	95.5	0	100	100	100	100	0	86.4	97.0	100	95.6	0	93.3	100	94.6	93.9	95.3
Trucks	0	1	3	6	10	0	0	0	0	0	0	3	4	0	7	0	6	0	2	8	25
% Trucks	0	9.1	2.7	6.2	4.5	0	0	0	0	0	0	13.6	3.0	0	4.4	0	6.7	0	5.4	6.1	4.7

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File Name : Chicago and Waterman
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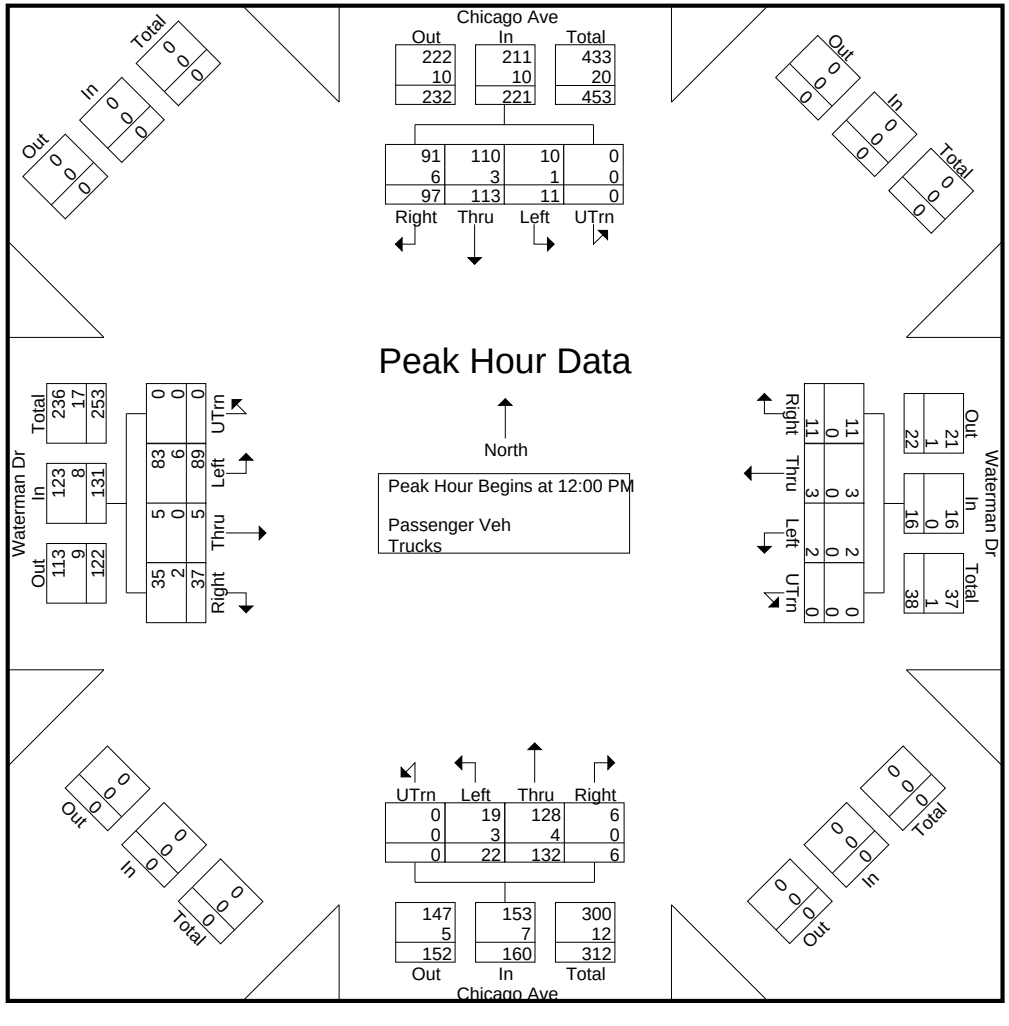

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File Name : Chicago and Waterman
Site Code :
Start Date : 4/16/2024
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	Chicago Ave From North					Waterman Dr From East					Chicago Ave From South					Waterman Dr From West					
Start Time	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	UTrn	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	5	44	26	75	0	**6**	**3**	3	**12**	0	8	48	5	61	0	**33**	2	9	**44**	192
04:45 PM	0	4	42	29	75	0	2	3	1	6	0	4	40	3	47	0	17	3	10	30	158
05:00 PM	0	**7**	**54**	**37**	**98**	0	4	2	**4**	10	0	5	60	**8**	73	0	26	3	**15**	44	**225**
05:15 PM	0	3	48	34	85	0	1	3	4	8	0	**9**	**63**	4	**76**	0	31	**4**	4	39	208
Total Volume	0	19	188	126	333	0	13	11	12	36	0	26	211	20	257	0	107	12	38	157	783
% App. Total	0	5.7	56.5	37.8		0	36.1	30.6	33.3		0	10.1	82.1	7.8		0	68.2	7.6	24.2		
PHF	.000	.679	.870	.851	.849	.000	.542	.917	.750	.750	.000	.722	.837	.625	.845	.000	.811	.750	.633	.892	.870
Passenger Veh	0	19	184	122	325	0	13	11	12	36	0	26	206	20	252	0	103	12	38	153	766
% Passenger Veh	0	100	97.9	96.8	97.6	0	100	100	100	100	0	100	97.6	100	98.1	0	96.3	100	100	97.5	97.8
Trucks	0	0	4	4	8	0	0	0	0	0	0	0	5	0	5	0	4	0	0	4	17
% Trucks	0	0	2.1	3.2	2.4	0	0	0	0	0	0	0	2.4	0	1.9	0	3.7	0	0	2.5	2.2

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File Name : Chicago and Waterman
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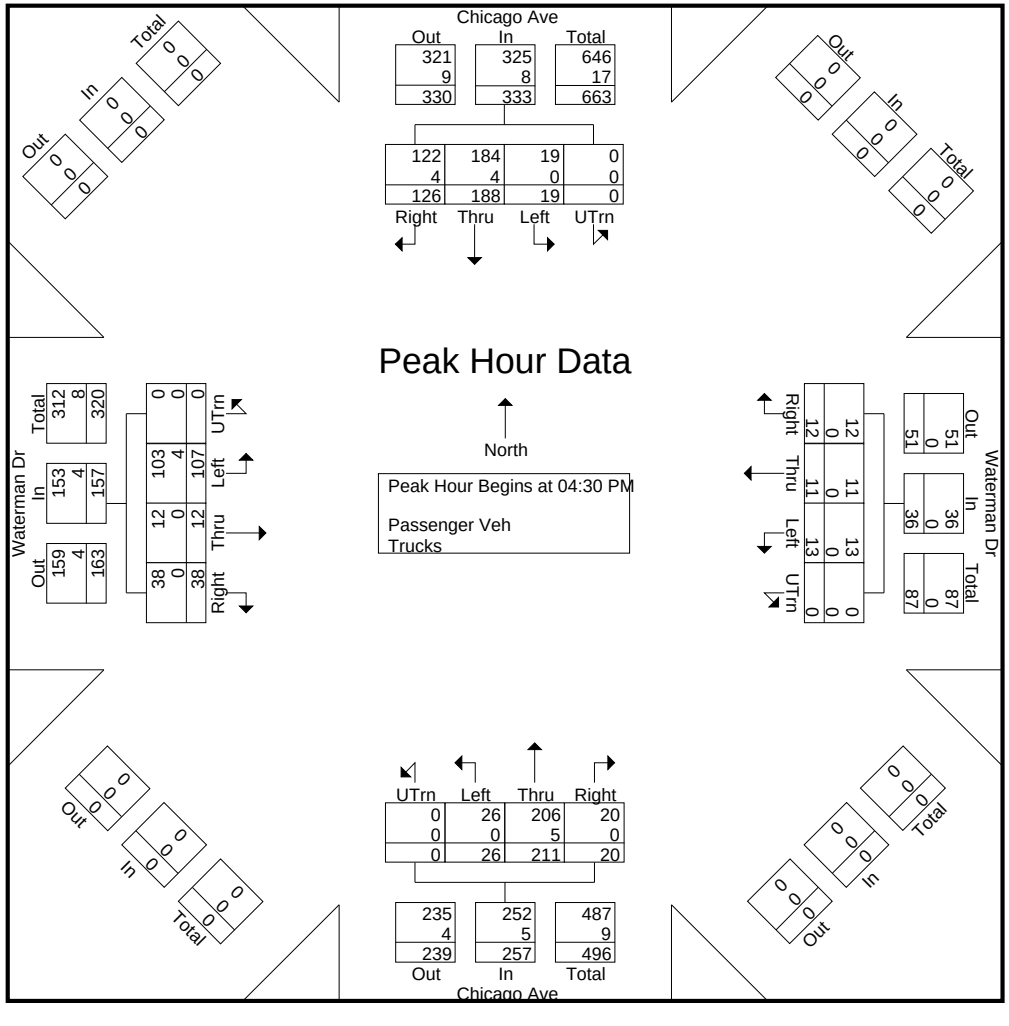

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File Name : Chicago and Waterman
Site Code :
Start Date : 4/16/2024
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Groups Printed- Bikes - Peds

	Chicago Ave From North						Waterman Dr From East						Chicago Ave From South						Waterman Dr From West								
Start Time	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2
07:15 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	2	3
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	3	0	3	1	4
Total	0	0	1	0	1	1	0	0	0	0	1	0	0	0	2	0	0	2	0	0	0	0	6	0	8	3	11
08:00 AM	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4
08:30 AM	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	6	1	7
08:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	0	1	2	0	1	0	0	2	1	3	4	7
Total	0	0	2	1	1	3	0	0	0	0	1	0	0	0	2	0	1	2	0	1	0	0	11	1	14	6	20
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	2	1	3
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	2	2	4
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	9	0	9	3	12
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	2	1	3
12:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2
12:30 PM	0	0	1	0	0	1	0	0	0	0	1	0	0	0	3	0	0	3	0	0	0	0	1	0	2	4	6
12:45 PM	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	3	1	4
Total	0	0	2	0	1	2	0	0	0	0	2	0	0	0	4	0	1	4	0	0	0	0	5	0	9	6	15
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	0	6
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	1	2
04:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	2	0	0	0	0	3	0	4	2	6
Total	0	0	1	0	0	1	0	0	0	0	1	0	0	0	3	0	0	3	0	0	0	0	10	0	11	4	15
05:00 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	2	3	5
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	2	1	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	3	0	3	2	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3
Total	0	0	2	0	0	2	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	10	0	10	6	16
Grand Total	0	0	8	1	3	9	0	0	0	0	5	0	0	0	18	0	2	18	0	1	0	0	51	1	61	28	89
Apprch %	0	0	88.9	11.1			0	0	0	0			0	0	100	0			0	100	0	0					
Total %	0	0	28.6	3.6		32.1	0	0	0	0		0	0	0	64.3	0		64.3	0	3.6	0	0		3.6	68.5	31.5	
Bikes	0	0	8	1		9	0	0	0	0		0	0	0	18	0		18	0	1	0	0		1	0	0	28
% Bikes	0	0	100	100	0	75	0	0	0	0	0	0	0	0	100	0	0	90	0	100	0	0	0	1.9	0	0	31.5

Data Collection Group

LSmith@DataCollectionGroup.net

File Name : Chicago and Waterman
Site Code :
Start Date : 4/16/2024
Page No : 2

Groups Printed- Bikes - Peds

	Chicago Ave From North						Waterman Dr From East						Chicago Ave From South						Waterman Dr From West								
	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	UTrn	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
Peds	0	0	0	0		3	0	0	0	0		5	0	0	0	0		2	0	0	0	0		51	0	0	61
% Peds	0	0	0	0	100	25	0	0	0	0	100	100	0	0	0	0	100	10	0	0	0	0	100	98.1	0	0	68.5

LOCATION Chicago Ave and Rockingham Dr
DATE 4/14/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		2																						
6-7 AM		1																						
7-8 AM					1			1												2				
8-9AM		3	2	3	1			1			1									1				
9-10 AM		2	4	2				3			1			1		2				1				
10-11 AM			4	1		1	1	1			1			2	1	1	1			1				
11-12 PM		4	3				2	3						5						3				
12-1 PM		3	2	2			1	2			1			4		1				4				
1-2 PM		4	1					6	1	1	1				1	3				4				
2-3 PM		2		2			1	4			1			4	3	1	1			1	1			
3-4 PM		5	1	3	1			1		2	1	1		4	2	1	1			2		1		
4-5 PM		3						4	3	2		1	2	3	5	6				7				
5-6 PM		1			1			2	1					3	3	3				2				1
6-7 PM		5	2	1			1	3	1	1				1	2	4				2	1		2	1
7-8 PM	2	2	2	1	3			3		1										2		2		
8-9 PM		3						1		1				1	1		1			2	1	1		
Total	2	40	21	15	7	1	6	35	6	8	7	2	2	28	18	22	4	0	0	34	3	4	2	2
												150												119

269

LOCATION Chicago Ave and Rockingham Dr
DATE 4/15/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1						1																
6-7 AM		3				1		3												1				
7-8 AM		1	1		1	1		1			1			3	2		1						2	
8-9AM		1	5	3			1	2		1				3		1	1			5	1		1	
9-10 AM		4	1	1				2						2		2				2			2	
10-11 AM		3	1					3	1			1		2						3				1
11-12 PM		1	2		1		1	3	1					4	2	2				2				
12-1 PM		4		1	1			4	1	1				8	3	2				3			2	
1-2 PM								2				1		4	2	2	1		1	4		1	2	
2-3 PM	1	3						2	1	1				1	2	1	2	1		1				
3-4 PM	1	3						4					1	2		4	1			1				1
4-5 PM	1	4	1	1	1								2	3	1	3	1			6			1	
5-6 PM		3						2	1	1				1	2	1				6				
6-7 PM	1	3	2			2	1	1	1		1	1		2	1					2	1			
7-8 PM			2											2	1	2	1			2			2	1
8-9 PM		2						1								1				1				
Total	4	36	15	6	4	4	3	31	6	4	2	3	3	37	16	21	8	1	1	39	2	1	12	3
												118												144

262

LOCATION Chicago Ave and Rockingham Dr
DATE 4/16/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1		1	1							1												
6-7 AM		1										4								2				
7-8 AM		1		1			1					1		2	1					3			1	
8-9AM		5	1	3		1		2				1		3						2			2	
9-10 AM		3				3	1	1						1		1				1	1		2	1
10-11 AM		5						1						4	1					1				
11-12 PM		2		1	1			5		1	1	1								3				
12-1 PM	1	1		1	1			3						2		1				4				
1-2 PM		3					1	4	1	2				3				1		5	3			1
2-3 PM		2	1	2				3		1			1	1	1	1								
3-4 PM	2	2					1	1		1	2	1	1	4	1					3				
4-5 PM		5	2					5	1	1		1	1	2	1					2				
5-6 PM		3		1				4						5	4	3			1	4	1			
6-7 PM	1	3		1			1	5						2	2					5				
7-8 PM		2	1	1				2	1	1				2		2				1				
8-9 PM								1								2				1				
Total	4	39	5	12	3	4	5	37	3	7	3	10	3	31	11	10	0	1	1	37	5	0	5	2
												132												106

238

LOCATION Chicago Ave and Rockingham Dr
DATE 4/17/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		2						2																
6-7 AM		2	1					3			1	1												
7-8 AM		3		1	1			3	1					1	3								1	
8-9AM		1	1											3	2	2	1			3			1	
9-10 AM		4		1				2				1		3		3		1					1	3
10-11 AM		1						3						1	1									
11-12 PM		2				1		1								2								
12-1 PM			1	1		1		2					1	5		1				4				1
1-2 PM		2	1					1				1		3	2					2			2	
2-3 PM		3			1			1			2			2	1	1			1	4		1		
3-4 PM	1	2				1	1	5	1	2				1			1		1	2				
4-5 PM		2			1			3					1	2	1	3							1	
5-6 PM	1	5	1	1	1			5			1	1		5	2					6				
6-7 PM		1	2					1						5					1	4				2
7-8 PM		2		1	1	1		2							1	1	1			3			1	
8-9 PM		2						1	1		1			1		1				2				
Total	2	34	7	5	5	4	1	35	3	2	5	4	2	32	13	14	3	1	3	30	0	1	7	6
												107												112

219

LOCATION Chicago Ave and Rockingham Dr
DATE 4/18/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1													1					1				
6-7 AM		1						2				4			1	1				2			1	
7-8 AM		2	2		1				1		1	1		3									1	
8-9AM		10	1	2	2			2						3		1	1			4			1	1
9-10 AM		5		2				1						1						3			2	
10-11 AM		6	2	1		2		3				2		2						1				
11-12 PM	1	5	2	1		1	1	3	1					2				1		3				
12-1 PM		1	1	2							1			3			2			2				
1-2 PM		3						2	1	1	3			3			1			1				
2-3 PM		2						2	1					4		1		2	1	2	1			1
3-4 PM	1	4	1	2				2		1				3					1	4				2
4-5 PM	1	6					1	4	1	1			1	8	2	2	1			9				
5-6 PM		6	1	1			2	2	2	1	2		3	4	2	4				5				
6-7 PM		2			1	1		5	1	1	1			5	1				1	6			1	
7-8 PM		6		1			1	4						1		3				3				
8-9 PM		1					1							1			1			1				
Total	3	61	10	12	4	4	6	32	8	5	8	7	4	43	7	12	6	3	3	47	1	0	6	4	296
												160												136

LOCATION Chicago Ave and Rockingham Dr
DATE 4/19/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1						2																
6-7 AM																								
7-8 AM		1	1	1				2						1	2					2			1	
8-9AM		3	1	2			1	1		1		1		2	1	1				2			2	1
9-10 AM	1	5	2	1	1		1	2			1	1								2				
10-11 AM	1	2			1	1		2						2		1				2				
11-12 PM		5						4				1	1	5		1				2				
12-1 PM		3	1	1				3	1	1	1				1	1								
1-2 PM		4				1								2		2	1			2				
2-3 PM	2	2						2		1		1		1			1			2				
3-4 PM	1	3						1			1			2						2				
4-5 PM		2	1	3	1			5			2			1						4				
5-6 PM		6	2		1			2	1	1			1	5	1	4				4				
6-7 PM			2	1			2	5	1	1	1			4						4	1			
7-8 PM		4		3		1		4	1	1				1						3	1			
8-9 PM		3						2						2						2				
Total	5	44	10	12	4	3	4	37	4	6	6	4	2	28	5	10	2	0	0	33	2	0	3	1
												139												86

225

LOCATION Chicago Ave and Rockingham Dr
DATE 4/20/2024

	PEDESTRIANS												BIKES											
	SB Chicago			EB Rockingham			NB Chicago			WB Rockingham			SB Chicago			EB Rockingham			NB Chicago			WB Rockingham		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1																						
6-7 AM		2						1						1										
7-8 AM		3			1		1	2																
8-9AM		4	2	2	1			2								1				1				
9-10 AM		2	1	2		1		2	1			1		1						1		1		
10-11 AM	2	3	1	3				5			1			2						2				
11-12 PM		7					1	3	1	1		1		4	1	2				3				
12-1 PM		5	2	2	1	1	1	5						1	1					1				
1-2 PM		2	1	2		1								2	1						1			
2-3 PM		4	1					3	2	1	1			6		1				4				
3-4 PM	1	7		1		1		4			1	1		4						5		1		
4-5 PM		3	1	1	1			2	1	1				2	2	3	1			5			2	
5-6 PM		3	2		1			4	1	1				1	1	3				2				
6-7 PM		3						2			2			2	1					1				
7-8 PM		1	2			2		3						2						3				
8-9 PM		1						1	1											1				
Total	3	51	13	13	5	6	3	39	7	4	5	3	0	28	7	10	1	0	0	29	1	2	2	0
												152												80

232

LOCATION Chicago Ave and Gay St
DATE 4/14/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM																								
6-7 AM					1																			
7-8 AM								1			1			1	1		1						1	
8-9AM		1						8			2						1	2		1				2
9-10 AM	1			3	4			2			7						3			3			2	
10-11 AM	2	2			1			2		1				2		1	1			2			1	
11-12 PM				2	3					3	1	1				1	4						1	
12-1 PM		2	1		1			1				2		3									4	
1-2 PM		4									4		2		3								1	
2-3 PM				1							1				2	2	3						1	
3-4 PM		1	2		3	1		1	3	2	1		1		1	1	2	2		2			1	
4-5 PM			8	1	2		2	4			1				1		4	1		3			4	
5-6 PM	3	2	1	6	4			3	1		5				1		4						1	
6-7 PM	1	1	1		1	1		4			2				1		1						2	
7-8 PM	2	8		1				4			3			1									2	1
8-9 PM	1	1	1					4			3						1						3	
	10	22	14	14	20	2	2	34	4	6	31	3	3	7	10	5	25	5	0	11	0	0	24	3
												162												93

255

LOCATION Chicago Ave and Gay St
DATE 4/15/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM					2						3	1		1					1				1	
6-7 AM		2			1	1																	1	
7-8 AM	1				1						1	1						1	1	1			1	
8-9AM		11	4	1	1			8			9			1	2	1	2						2	
9-10 AM	2	5	1		3						2					1	4				2			
10-11 AM	1	1	1	1			1					1				3	1				1			
11-12 PM		1	1	1	1			1									1		2				1	
12-1 PM	1	1	1	2				1			2	1			1		3	2					3	1
1-2 PM	2		1		1						2	1			2		1						2	2
2-3 PM	2																1						1	
3-4 PM			2	4	3			2			1	1											1	
4-5 PM		5		1	1	1		1																
5-6 PM		1			1						1						1						1	
6-7 PM		1		2	2				1		5					2	2			2			4	
7-8 PM	1	3	5		1	3		1							2		1						2	
8-9 PM	2	4		4	4			1		1	1												1	
	12	35	16	16	22	5	1	15	1	1	27	6	0	2	7	7	17	3	4	3	3	0	21	3
												157												70

227

LOCATION Chicago Ave and Gay St
DATE 4/16/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM						1						1												
6-7 AM		1				1											1						2	
7-8 AM	1	1	1				1	2			1	1					1						2	
8-9AM	3	2	9	2	2		1				8	1			2		2	1						
9-10 AM		1	5	1	2		1					3					2	1						
10-11 AM	2							1			2	2				1	2						1	
11-12 PM					1						1						1						1	
12-1 PM	1	1		1	1	1					3	3			2		3						3	
1-2 PM	1	1		1	1			1	1		3	1					3						3	
2-3 PM	2	1	3								3	3					2						2	
3-4 PM	1	4	1	7	3						5	2					1		1				2	
4-5 PM		3	3	2	7						2		1	1	1								3	
5-6 PM	1	2	1	3	3			3	1	1	8			1	1		1			6			2	
6-7 PM		1		2	1	1		3				1		1	4	2	4	1	1				4	1
7-8 PM	1	5	1				1			1	2	1					2		1	1			1	2
8-9 PM		4									1					1								
	13	27	24	19	21	4	4	10	2	2	39	19	1	3	10	4	25	3	3	7	0	0	26	3
												184												85

269

LOCATION Chicago Ave and Gay St
DATE 4/17/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM			1	1							2	1												
6-7 AM			1		1						1													
7-8 AM	1							2				1		2	1			1						
8-9AM			15	1	3		1				8					1	4							
9-10 AM	1		1	2	2		3				3	1					2							
10-11 AM		1	1	2		1		1									1					1		
11-12 PM	1				1			1			2													
12-1 PM	1	2	1					1			2						1						2	
1-2 PM	2		1							2	1	1			1	2	2							1
2-3 PM																								
3-4 PM															1									
4-5 PM		3	5	3	1	1		2			1	1				2	1			2			4	
5-6 PM	4	1	4	1							3	1	3	2	1		4						4	1
6-7 PM				3						3	2	1					2				4		4	
7-8 PM	1	2	3	1				2	2			2					1						1	3
8-9 PM		2	2	2	1	1		5		1			1		1								1	1
	11	11	35	16	9	3	4	14	2	6	25	9	4	4	5	5	18	1	0	2	4	1	16	6
												145												66

211

LOCATION Chicago Ave and Gay St
DATE 4/18/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM												1		4										
6-7 AM		1			4			3			4					1							1	
7-8 AM								1		1		1		1			3	2		1				
8-9AM	2	1	14	1	3	1					7					1	5							
9-10 AM			3	2	5	1	2	1			2	1				1	1						3	1
10-11 AM	1	3		1	3		1	2	1		2	1					2	1		1				
11-12 PM	1			1	2		2				2					1	1				1		1	
12-1 PM		1				1		1		1		1					3						1	
1-2 PM	2						1	2								1	1						2	
2-3 PM											1				2					1			1	
3-4 PM		1	2	7	6			2		1	6	1		1		1	1		1		1		1	
4-5 PM		2	5		1		1	2				1		1	1		3						2	
5-6 PM	4		5		1	1	1	4			4	1	2		3	1	4			1			3	
6-7 PM			1	2	4						1	3	1		3		4						3	
7-8 PM	2	4	1	4	1			6			1		2		2		2			2			2	1
8-9 PM		1						7	2		1	2				1	1						2	
	12	14	31	18	30	4	8	31	3	3	31	13	5	7	11	8	31	3	1	6	2	0	22	2
												198												98

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LOCATION Chicago Ave and Gay St
DATE 4/19/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1									1	1					1						1	
6-7 AM		1															1							
7-8 AM		1						2				1		1			1	1		1				
8-9AM		4	10	3	4	1	2	1			10			1									1	
9-10 AM	4	2	1	1	3		1	1	1		4							1					2	
10-11 AM		3	3		1			1							1		2						1	
11-12 PM					3					1	1	1	1		1	1	4							
12-1 PM						1		1			2													
1-2 PM	1		2	1	1												2							
2-3 PM		2		7							1				1	1	2	1		1			1	
3-4 PM	3		2	12	9		2	4		2	2						2						1	
4-5 PM	1	1	1	2	1		1			3	1	2						1		2				
5-6 PM	2		1		1		2			3	1	1			1		2	1					1	
6-7 PM			4	1				4			1	1		2		5	3							
7-8 PM	1	1	1	2		1		8	1		2				2	1						1	2	
8-9 PM			1	1		2					1												1	
	12	16	26	30	23	5	8	22	2	9	27	7	1	4	6	8	20	5	0	4	0	1	11	0
												187												60

247

LOCATION Chicago Ave and Gay St
DATE 4/20/2024

	PEDESTRIANS												BIKES											
	WB Gay			SB Chicago			EB Gay			NB Chicago			WB Gay			SB Chicago			EB Gay			NB Chicago		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM					1																			
6-7 AM					1						1					1				1				
7-8 AM		4	1	1		3	1				1						1							
8-9AM	1	4		1	1			1						1									1	
9-10 AM			3	3													1							
10-11 AM	1	1	1		1			4			1					1	2						18	
11-12 PM	1	5	1		1	2		2			1	1			1	1	1			3	1			
12-1 PM	1	1	1	1				1			1			1			2						4	
1-2 PM		2	3		4						2			1						2				
2-3 PM	1	5	5	1		1						1				9	14						2	
3-4 PM	2	1	4	4				1			2		4	3	10		4		1				2	1
4-5 PM	1	1	2	1	4				2		1	2			2		2	1	1		1		1	
5-6 PM		1	4	1	1			5			2	2	1	1		2	5			1			1	
6-7 PM	1	1		1	2			3			1	1				1	1			1			1	2
7-8 PM					2	2						2					3	1						4
8-9 PM	1							1			2													
	10	26	25	14	18	8	1	18	2	0	15	9	5	7	13	15	36	2	2	8	2	0	30	7
												146												127

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Data Collection Group

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File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Dogwood Dr From North					Market St From East					Dogwood Dr From South					Market St From West					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	6	5	0	11	3	49	0	0	52	15	2	2	0	19	1	49	8	0	58	140
07:15 AM	1	2	8	0	11	1	79	0	0	80	26	1	2	0	29	3	52	13	0	68	188
07:30 AM	2	1	4	0	7	7	65	1	0	73	18	2	5	0	25	5	117	14	0	136	241
07:45 AM	2	4	8	0	14	2	67	2	0	71	18	1	11	0	30	2	97	21	0	120	235
Total	5	13	25	0	43	13	260	3	0	276	77	6	20	0	103	11	315	56	0	382	804
08:00 AM	2	5	5	0	12	1	93	0	0	94	26	2	7	0	35	1	92	16	0	109	250
08:15 AM	0	3	4	0	7	6	48	0	0	54	11	6	8	0	25	3	107	15	0	125	211
08:30 AM	1	3	6	0	10	2	51	2	0	55	7	0	6	0	13	3	69	8	0	80	158
08:45 AM	0	1	3	0	4	2	63	1	0	66	16	2	8	0	26	3	67	5	0	75	171
Total	3	12	18	0	33	11	255	3	0	269	60	10	29	0	99	10	335	44	0	389	790
11:00 AM	6	2	2	0	10	2	53	2	0	57	9	1	5	0	15	3	56	7	0	66	148
11:15 AM	4	1	3	0	8	3	54	0	0	57	9	3	6	0	18	1	55	7	0	63	146
11:30 AM	1	3	4	0	8	4	53	6	0	63	14	1	3	0	18	3	65	7	0	75	164
11:45 AM	0	2	2	0	4	4	72	1	0	77	3	1	4	0	8	3	51	6	0	60	149
Total	11	8	11	0	30	13	232	9	0	254	35	6	18	0	59	10	227	27	0	264	607
12:00 PM	3	1	2	0	6	4	63	4	0	71	14	8	6	0	28	3	61	13	0	77	182
12:15 PM	1	1	7	0	9	4	48	4	0	56	11	7	5	0	23	1	60	12	0	73	161
12:30 PM	3	4	1	0	8	5	74	1	0	80	15	3	3	0	21	2	66	8	0	76	185
12:45 PM	1	3	1	0	5	5	60	2	0	67	16	3	8	0	27	2	55	15	0	72	171
Total	8	9	11	0	28	18	245	11	0	274	56	21	22	0	99	8	242	48	0	298	699
04:00 PM	1	3	2	0	6	2	105	3	0	110	22	4	3	0	29	3	87	18	0	108	253
04:15 PM	5	5	6	0	16	8	125	3	0	136	33	5	2	0	40	5	87	15	0	107	299
04:30 PM	2	1	9	0	12	9	116	2	0	127	35	6	5	0	46	2	89	27	0	118	303
04:45 PM	0	1	4	0	5	4	114	2	0	120	19	5	7	0	31	2	83	18	0	103	259
Total	8	10	21	0	39	23	460	10	0	493	109	20	17	0	146	12	346	78	0	436	1114
05:00 PM	2	4	5	0	11	5	112	4	0	121	27	10	7	0	44	3	91	23	0	117	293
05:15 PM	2	7	6	0	15	4	134	6	0	144	32	5	17	0	54	1	89	16	0	106	319
05:30 PM	1	2	6	0	9	7	91	1	0	99	23	5	8	0	36	3	87	19	0	109	253
05:45 PM	3	3	1	0	7	4	85	4	0	93	19	4	11	0	34	3	90	17	0	110	244
Total	8	16	18	0	42	20	422	15	0	457	101	24	43	0	168	10	357	75	0	442	1109
Grand Total	43	68	104	0	215	98	1874	51	0	2023	438	87	149	0	674	61	1822	328	0	2211	5123
Apprch %	20	31.6	48.4	0		4.8	92.6	2.5	0		65	12.9	22.1	0		2.8	82.4	14.8	0		
Total %	0.8	1.3	2	0	4.2	1.9	36.6	1	0	39.5	8.5	1.7	2.9	0	13.2	1.2	35.6	6.4	0	43.2	
Passenger Veh	42	68	102	0	212	95	1797	50	0	1942	431	81	146	0	658	53	1741	321	0	2115	4927
% Passenger Veh	97.7	100	98.1	0	98.6	96.9	95.9	98	0	96	98.4	93.1	98	0	97.6	86.9	95.6	97.9	0	95.7	96.2
Trucks	1	0	2	0	3	3	77	1	0	81	7	6	3	0	16	8	81	7	0	96	196

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% Trucks	2.3	0	1.9	0	1.4	3.1	4.1	2	0	4	1.6	6.9	2	0	2.4	13.1	4.4	2.1	0	4.3	3.8

Data Collection Group

LSmith@DataCollectionGroup.net

File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024

	Dogwood Dr From North					Market St From East					Dogwood Dr From South					Market St From West					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**2**	1	4	0	7	**7**	65	1	0	73	18	2	5	0	25	**5**	**117**	14	0	**136**	241
07:45 AM	2	4	**8**	0	**14**	2	67	**2**	0	71	18	1	**11**	0	30	2	97	**21**	0	120	235
08:00 AM	2	**5**	5	0	12	1	**93**	0	0	**94**	**26**	2	7	0	**35**	1	92	16	0	109	**250**
08:15 AM	0	3	4	0	7	6	48	0	0	54	11	**6**	8	0	25	3	107	15	0	125	211
Total Volume	6	13	21	0	40	16	273	3	0	292	73	11	31	0	115	11	413	66	0	490	937
% App. Total	15	32.5	52.5	0		5.5	93.5	1	0		63.5	9.6	27	0		2.2	84.3	13.5	0		
PHF	.750	.650	.656	.000	.714	.571	.734	.375	.000	.777	.702	.458	.705	.000	.821	.550	.882	.786	.000	.901	.937
Passenger Veh	6	13	20	0	39	15	254	3	0	272	72	10	31	0	113	7	385	64	0	456	880
% Passenger Veh	100	100	95.2	0	97.5	93.8	93.0	100	0	93.2	98.6	90.9	100	0	98.3	63.6	93.2	97.0	0	93.1	93.9
Trucks	0	0	1	0	1	1	19	0	0	20	1	1	0	0	2	4	28	2	0	34	57
% Trucks	0	0	4.8	0	2.5	6.3	7.0	0	0	6.8	1.4	9.1	0	0	1.7	36.4	6.8	3.0	0	6.9	6.1

Data Collection Group

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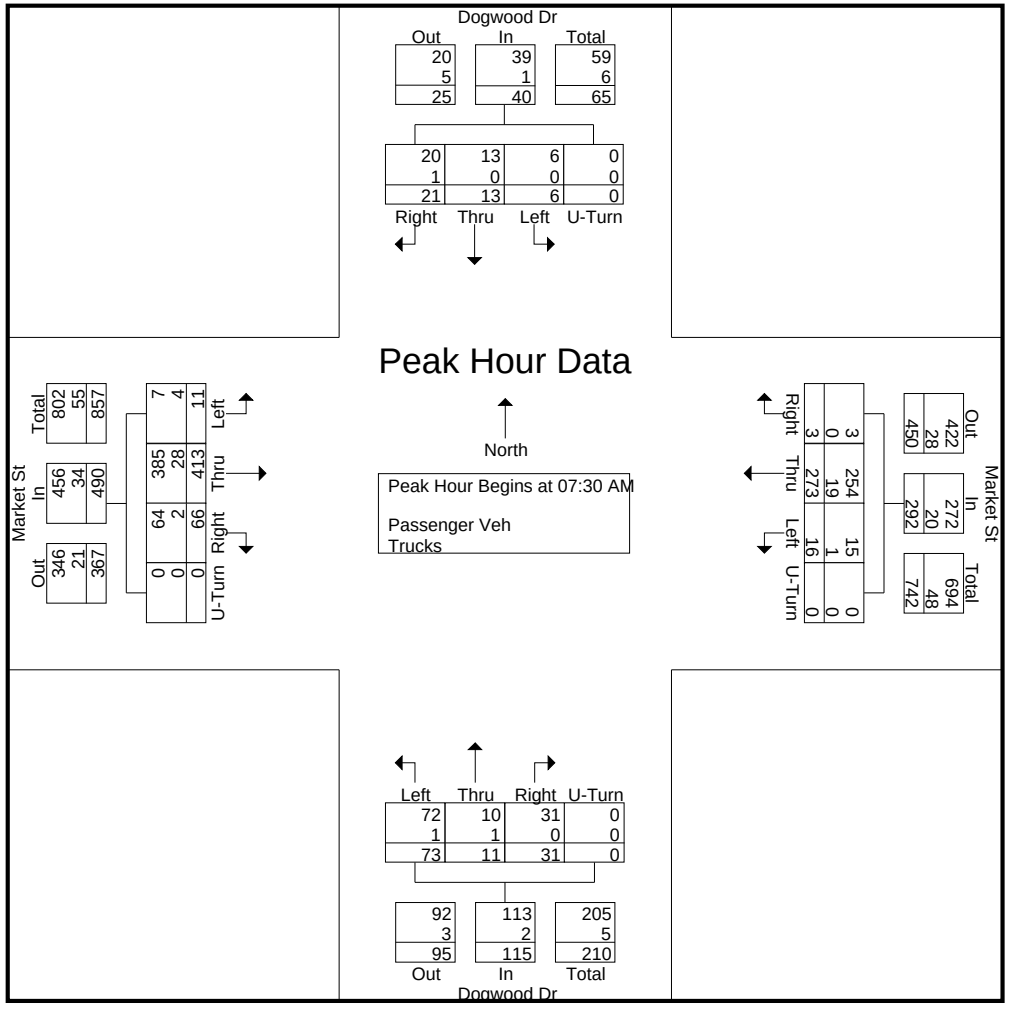
File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024
Page No : 4



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File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024
Page No : 5

	Dogwood Dr From North					Market St From East					Dogwood Dr From South					Market St From West					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	**3**	1	2	0	6	4	63	**4**	0	71	14	**8**	6	0	**28**	**3**	61	13	0	**77**	182
12:15 PM	1	1	**7**	0	**9**	4	48	4	0	56	11	7	5	0	23	1	60	12	0	73	161
12:30 PM	3	**4**	1	0	8	**5**	**74**	1	0	**80**	15	3	3	0	21	2	**66**	8	0	76	**185**
12:45 PM	1	3	1	0	5	5	60	2	0	67	**16**	3	**8**	0	27	2	55	**15**	0	72	171
Total Volume	8	9	11	0	28	18	245	11	0	274	56	21	22	0	99	8	242	48	0	298	699
% App. Total	28.6	32.1	39.3	0		6.6	89.4	4	0		56.6	21.2	22.2	0		2.7	81.2	16.1	0		
PHF	.667	.563	.393	.000	.778	.900	.828	.688	.000	.856	.875	.656	.688	.000	.884	.667	.917	.800	.000	.968	.945
Passenger Veh	8	9	11	0	28	17	229	11	0	257	54	20	22	0	96	8	229	47	0	284	665
% Passenger Veh	100	100	100	0	100	94.4	93.5	100	0	93.8	96.4	95.2	100	0	97.0	100	94.6	97.9	0	95.3	95.1
Trucks	0	0	0	0	0	1	16	0	0	17	2	1	0	0	3	0	13	1	0	14	34
% Trucks	0	0	0	0	0	5.6	6.5	0	0	6.2	3.6	4.8	0	0	3.0	0	5.4	2.1	0	4.7	4.9

Data Collection Group

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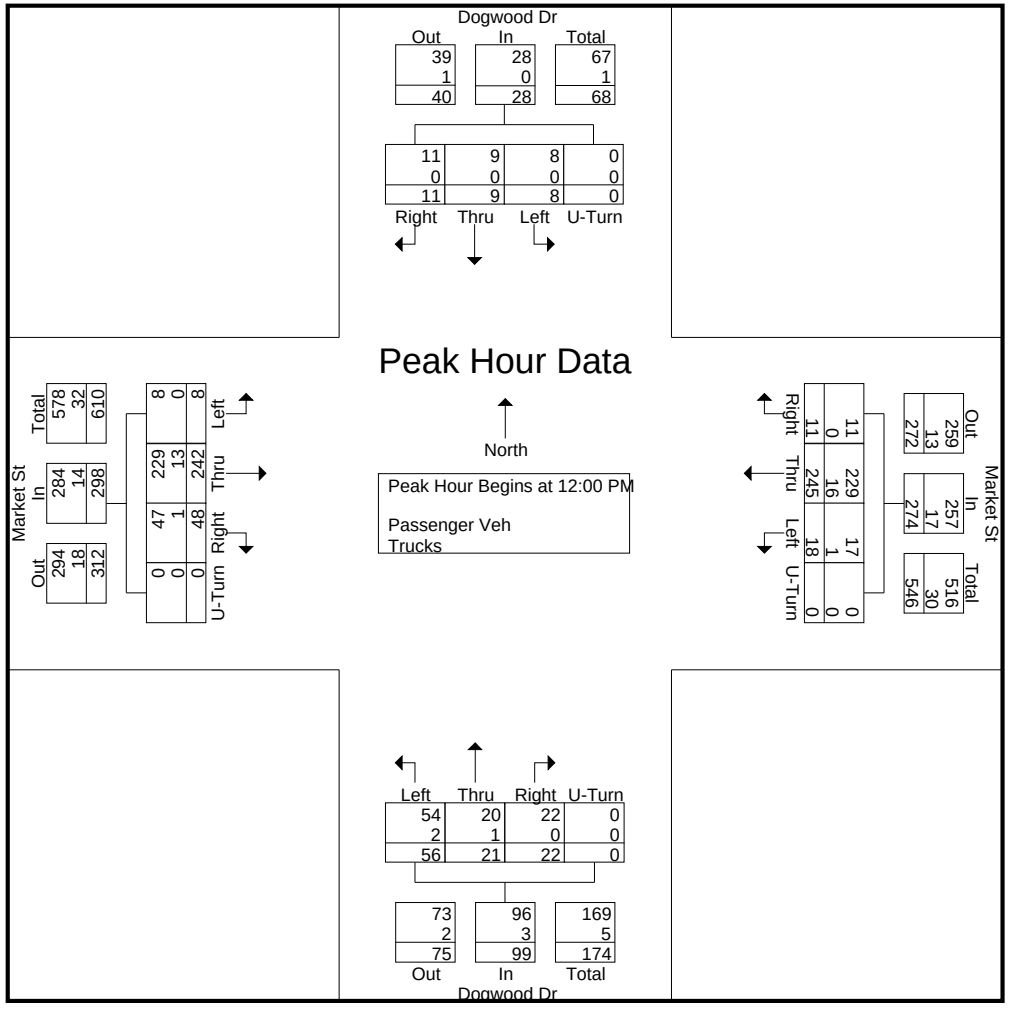
File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024
Page No : 6



Data Collection Group

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File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024

	Dogwood Dr From North					Market St From East					Dogwood Dr From South					Market St From West					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**2**	1	**9**	0	12	**9**	116	2	0	127	**35**	6	5	0	46	2	89	**27**	0	**118**	303
04:45 PM	0	1	4	0	5	4	114	2	0	120	19	5	7	0	31	2	83	18	0	103	259
05:00 PM	2	4	5	0	11	5	112	4	0	121	27	**10**	7	0	44	**3**	**91**	23	0	117	293
05:15 PM	2	**7**	6	0	**15**	4	**134**	**6**	0	**144**	32	5	**17**	0	**54**	1	89	16	0	106	**319**
Total Volume	6	13	24	0	43	22	476	14	0	512	113	26	36	0	175	8	352	84	0	444	1174
% App. Total	14	30.2	55.8	0		4.3	93	2.7	0		64.6	14.9	20.6	0		1.8	79.3	18.9	0		
PHF	.750	.464	.667	.000	.717	.611	.888	.583	.000	.889	.807	.650	.529	.000	.810	.667	.967	.778	.000	.941	.920
Passenger Veh	5	13	23	0	41	22	476	14	0	512	113	25	36	0	174	8	347	84	0	439	1166
% Passenger Veh	83.3	100	95.8	0	95.3	100	100	100	0	100	100	96.2	100	0	99.4	100	98.6	100	0	98.9	99.3
Trucks	1	0	1	0	2	0	0	0	0	0	0	1	0	0	1	0	5	0	0	5	8
% Trucks	16.7	0	4.2	0	4.7	0	0	0	0	0	0	3.8	0	0	0.6	0	1.4	0	0	1.1	0.7

Data Collection Group

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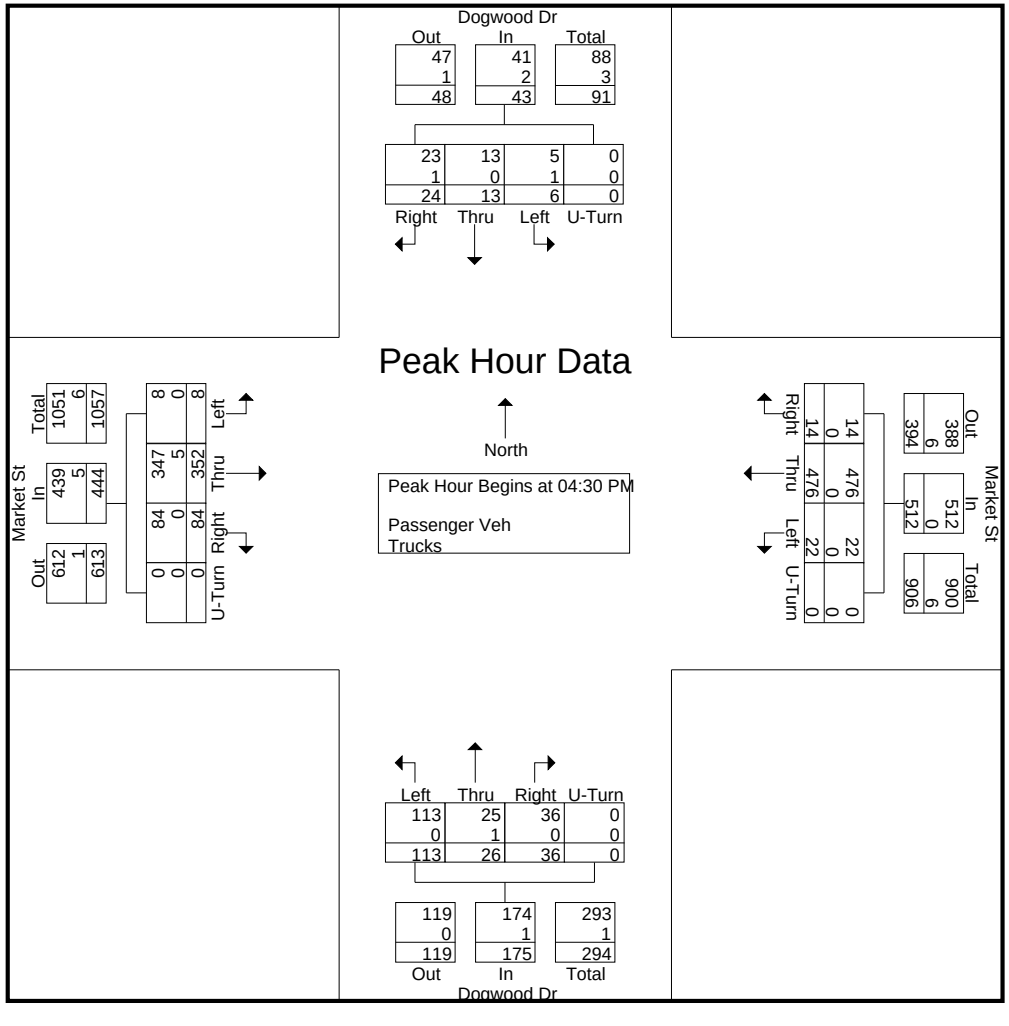
File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024
Page No : 8



Data Collection Group

LSmith@DataCollectionGroup.net

File Name : Market and Dogwood
Site Code :
Start Date : 4/16/2024
Page No : 1

Groups Printed- Bikes - Peds

	Dogwood Dr From North					Market St From East					Dogwood Dr From South					Market St From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
07:15 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
07:45 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	1	1	3
Total	0	0	0	1	1	0	2	0	0	2	0	0	0	0	0	0	1	0	2	3	6
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:30 AM	0	0	0	1	1	0	0	1	2	3	0	0	0	2	2	0	1	0	0	1	7
Total	0	1	0	1	2	0	0	1	2	3	0	0	0	3	3	0	2	0	0	2	10
11:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
11:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	2
11:30 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Total	0	0	0	2	2	0	1	0	1	2	0	0	0	1	1	0	0	1	1	2	7
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	0	3	4
04:00 PM	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	0	0	0	1	1	5
04:15 PM	0	0	0	0	0	0	1	0	3	4	0	0	0	1	1	1	0	0	0	1	6
04:30 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	3
04:45 PM	0	1	0	0	1	0	2	0	1	3	0	0	0	1	1	0	0	0	0	0	5
Total	0	1	0	0	1	0	6	1	5	12	0	0	0	3	3	1	0	0	2	3	19
05:00 PM	0	2	1	1	4	0	0	0	0	0	0	2	0	0	2	0	0	2	0	2	8
05:15 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	2	2	5
05:30 PM	0	1	0	1	2	0	0	0	0	0	0	9	0	7	16	0	0	0	2	2	20
05:45 PM	0	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	2	0	1	3	6
Total	0	4	1	3	8	0	0	0	2	2	0	13	0	7	20	0	2	2	5	9	39
Grand Total	0	6	1	7	14	0	9	2	10	21	0	13	0	15	28	1	6	5	10	22	85
Apprch %	0	42.9	7.1	50		0	42.9	9.5	47.6		0	46.4	0	53.6		4.5	27.3	22.7	45.5		
Total %	0	7.1	1.2	8.2	16.5	0	10.6	2.4	11.8	24.7	0	15.3	0	17.6	32.9	1.2	7.1	5.9	11.8	25.9	
Bikes	0	6	1	0	7	0	9	2	0	11	0	13	0	0	13	1	6	5	0	12	43
% Bikes	0	100	100	0	50	0	100	100	0	52.4	0	100	0	0	46.4	100	100	100	0	54.5	50.6
Peds	0	0	0	7	7	0	0	0	10	10	0	0	0	15	15	0	0	0	10	10	42

Data Collection Group

LSmith@DataCollectionGroup.net

% Peds	0	0	0	100	50	0	0	0	100	47.6	0	0	0	100	53.6	0	0	0	100	45.5	49.4

LOCATION Market St at Westover Park
DATE 4/14/2024
(see graphic for description of Area A and Area B)

	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM																						
6-7 AM										1	1											
7-8 AM	1				1		1			2	1											
8-9AM	1					1	4		1		1											
9-10 AM		2				1	1		3	2	1	1					4					
10-11 AM	1	2			3	1	3		4		1	1	1			1		2				
11-12 PM		1			5	2			2	10	12		1			1		2				
12-1 PM	1				2		2			5	4					1				5		
1-2 PM	7				1					10	14	1				2	1	1		2		
2-3 PM		1			1	2	2			26	24	3				2		1		2		
3-4 PM					2		3			12	13	2	1				2	2		3		
4-5 PM	1	1			5		2			2	2	1	2					2		4		
5-6 PM	1									6	4				1		2	2		4		
6-7 PM	2	3			2	3				1	3	1						1		2		
7-8 PM	1	3			2	1	3		2	2	2	1										
8-9 PM							5			4												
	16	13	0	0	24	11	26	0	12	83	83	11	5	0	1	7	9	13	0	22	0	0	336
									102													68

LOCATION Market St at Westover Park
DATE 4/15/2024
(see graphic for description of Area A and Area B)

	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM					1																	
6-7 AM	1	1								1	1							1				
7-8 AM	2	2			1		1		3			4					1			1		
8-9AM					3					1												
9-10 AM	3								1	4	1									1		
10-11 AM	1					2	1		5	2	1	1										
11-12 PM							2		1	4	3					2						
12-1 PM	2	2							3	4	5		1					1		2		
1-2 PM	1						1			2	4					1				4		
2-3 PM		1								2	4	2				5				2		
3-4 PM	1	2			1				1	2	2							2		1		
4-5 PM	1				4	1	1			5	4	1								1		
5-6 PM		3			1				1	10	10							1				
6-7 PM	5				1	2				1	2											
7-8 PM	4								7	2	6	2					1	1		2		
8-9 PM					1					1	1											
	21	11	0	0	13	5	6	0	22	41	44	10	1	0	0	8	2	6	0	14	0	0
									78													41

204

LOCATION Market St at Westover Park
DATE 4/16/2024
(see graphic for description of Area A and Area B)

	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM																						
6-7 AM	1	2			2	1						1										
7-8 AM	2	1			1	1	1				1						1					
8-9AM	1				2				2	2	1	1										
9-10 AM		1				1	1			2	1						1			1		
10-11 AM							4		1	3	2	1				1		1				
11-12 PM	2						1		3	3	2		1									
12-1 PM		2			1	1	6			14	14											
1-2 PM	1	2			1				1	9	10					1				1		
2-3 PM					2		1			2	2					2	1			1		
3-4 PM		6			1				1	7	8	6				1		1		1		
4-5 PM	1	1				2				4	6	2				1				1		
5-6 PM	2	3			1				2	9	15							3		3		
6-7 PM		2			2		3		1	2	2	4								3		
7-8 PM		4			4		1											1		2		
8-9 PM																		1				
	10	24	0	0	17	6	18	0	11	57	64	15	1	0	0	6	3	7	0	13	0	0
									86													45

252

LOCATION Market St at Westover Park
DATE 4/17/2024
(see graphic for description of Area A and Area B)

	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM																						
6-7 AM	1	2					2															
7-8 AM	2	1			1						2	3				1	3					
8-9AM	3				1	1	2			2	2											
9-10 AM	1				1	1			1	1	1						1					
10-11 AM						1				1	1									1		
11-12 PM					1					2	1	1										
12-1 PM	1	1			1	1	3		4	3	1									2		
1-2 PM		2				1			3	3	5	2				1		1		1		
2-3 PM	1				1					2	9		2			4				3		
3-4 PM	1				1	2	1		2	2	2					3	1			4		
4-5 PM	1				5		1			2	2					2	2			1		
5-6 PM	4	3			1		2		3	4	7	2					1	1				
6-7 PM	1				1	1	1		3	6	8											
7-8 PM	1	2			1	1	4		3							1		3		3		
8-9 PM		2					1		2													
	17	13	0	0	15	9	17	0	21	28	41	8	2	0	0	12	8	5	0	15	0	0
									92													50

211

LOCATION Market St at Westover Park
DATE 4/18/2024
(see graphic for description of Area A and Area B)

	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM		1																				
6-7 AM	3	4				1			1													
7-8 AM		2							1			1					1			2		
8-9AM	2					2			1			1								1		
9-10 AM	1					1	3		3	2	3					1				1		
10-11 AM	2	1					1			1	2		2			2		1				
11-12 PM		2			1				1	2	2	1				1	1			2		
12-1 PM	2						2			5	5					1				1		
1-2 PM	2									8	7						1					
2-3 PM	1				2					2	2					1		1			1	
3-4 PM										8	7	1				2		2				
4-5 PM					1				1	8	7	2								2		
5-6 PM		4				1			3	7	4					1	1	2		1		
6-7 PM						1				3	2	2	1				1			1		
7-8 PM	1	1							2	2	3	1	2							5		
8-9 PM	2	1			2						2									4		
	16	16	0	0	6	6	6	0	13	48	46	9	5	0	0	9	5	6	0	20	1	0
									63													55

212

LOCATION Market St at Westover Park
DATE 4/19/2024
(see graphic for description of Area A and Area B)

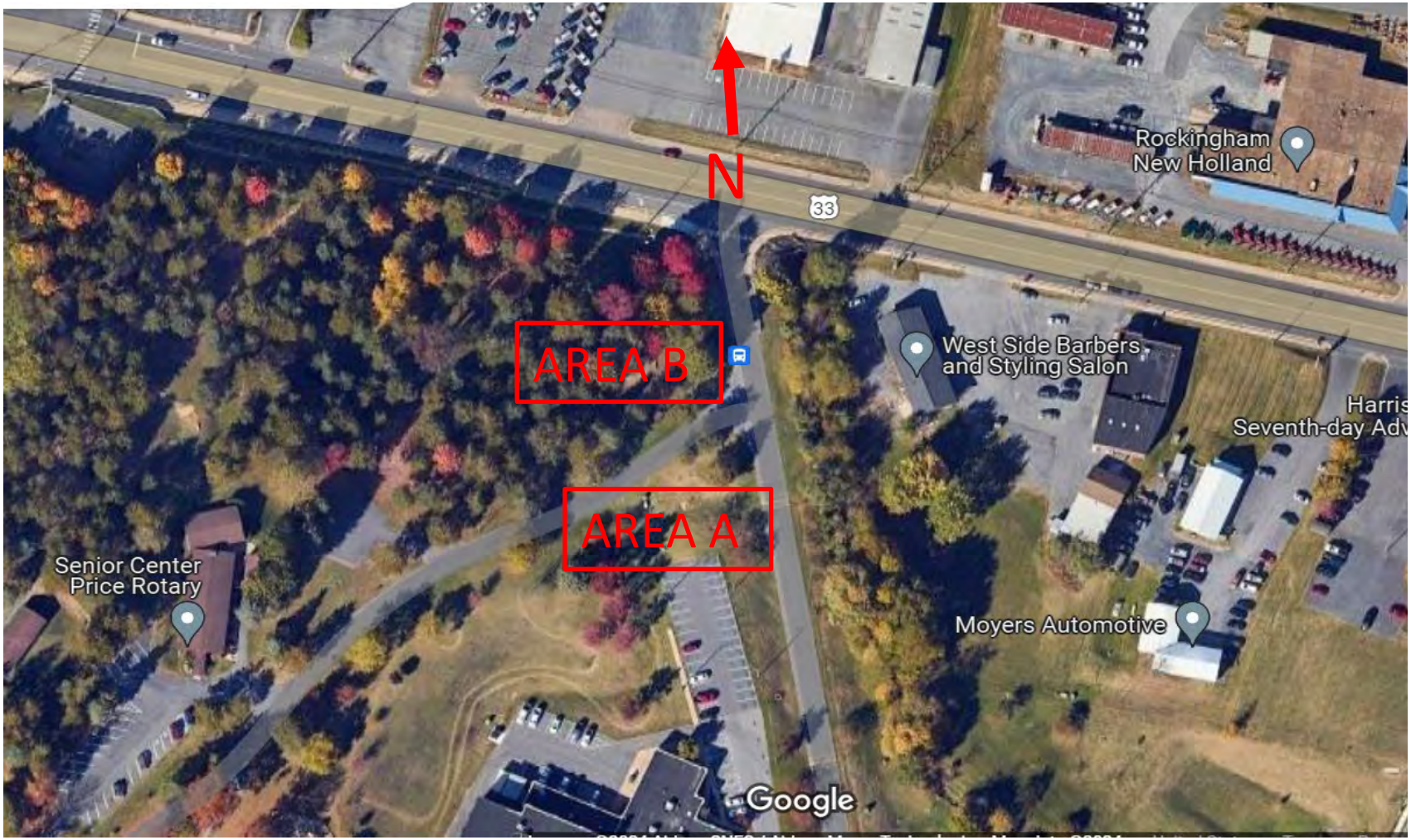
	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM					1																	
6-7 AM	3	1				2	2		1		1	1										
7-8 AM	1	1					1		2		1	5					1					
8-9AM	3	1				1	1					1										
9-10 AM	1	1				1			1		2	1	1									
10-11 AM					2		1		1	2	1	1				2		1		1		
11-12 PM	1	3			1				1	1	2	1								2		
12-1 PM						1				9	10					1						
1-2 PM						1				7	6							1				
2-3 PM									2	1	3					2		2		2		
3-4 PM									2	9	10	1					5	1				
4-5 PM		1			6		3		2	3	3							1		2		
5-6 PM									1	5	5	1	1			1				1		
6-7 PM		3			1	1			1	4	6	3				5						
7-8 PM	2								2	3	3						1	1		2		
8-9 PM							1													2		
	11	11	0	0	11	7	9	0	16	44	53	15	2	0	0	11	7	7	0	12	0	0
									65													54

216

LOCATION Market St at Westover Park
DATE ####
(see graphic for description of Area A and Area B)

	PEDESTRIANS											BIKES										
	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area	NB Park Rd			SB Park Rd			EB Park Rd			Area	Area
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	A	B
5-6 AM		1																				
6-7 AM	2	1					3		2		2		1									
7-8 AM	4				1		1		1			99						1				
8-9AM	3					1	2		2													
9-10 AM					4		1		3	10	15	1										
10-11 AM		1			1		1		2	18	17		1									
11-12 PM	1								1	10	10	1					1			1		
12-1 PM					1				3	2	2	1	1									
1-2 PM		2			3				3	15	14											
2-3 PM					1	1	4			15	11	2										
3-4 PM		2			2					10	12	1				1	3					
4-5 PM	1	1				1	1			2	2	3				1	1	1		5		
5-6 PM	1								2	2	2	2				1		3				
6-7 PM	1	3			3																	
7-8 PM		2			7				2	2	2	1						1		1		
8-9 PM							1			2	2						1					
	13	13	0	0	23	3	14	0	21	88	91	111	3	0	0	3	6	6	0	7	0	0
									87													136

402



There was considerable use of the areas labeled “Area A” and “Area B”.
These bicyclists / peds cut thru the grass areas and did not stay on the roads.

LOCATION Market St near Thomas Harrison Middle School
DATE 4/14/2024

	PEDESTRIANS									BIKES								
	WB Market			EB Market			NB Trail			WB Market			EB Market			NB Trail		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM																		
6-7 AM	1				2													
7-8 AM						1												
8-9AM		4			2		1		1					1				
9-10 AM		3			1	1					1							
10-11 AM		2			3		1		1					2				
11-12 PM		1			3						2			2				
12-1 PM	1	3			1		2		1		3			3				
1-2 PM					1						1			2				
2-3 PM		2			2						5			2				
3-4 PM		4			4			2						3				
4-5 PM	2	4												1				
5-6 PM		1			1						3			2	1	1		
6-7 PM	2				3	1					1			2				
7-8 PM		3			1						1							
8-9 PM	1																	
	7	27	0	0	24	3	4	2	3	0	0	0	0	17	0	0	20	1	1	0	0	0	0	0	109
												70												39	

LOCATION Market St near Thomas Harrison Middle School
DATE 4/15/2024

	PEDESTRIANS									BIKES								
	WB Market			EB Market			NB Trail			WB Market			EB Market			NB Trail		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1			1						1							
6-7 AM		2			1					1	1							
7-8 AM		1			1					7								
8-9AM		3								3				2				
9-10 AM		1			2						1							
10-11 AM		1									1							
11-12 PM	1	1							1		1		1	1				
12-1 PM											2							
1-2 PM		1				1	1							2				
2-3 PM		1			1				2	1	2			7				4
3-4 PM		1			3					1	2			3				3
4-5 PM		1					1		1		1			1				1
5-6 PM														1				
6-7 PM		3			1													
7-8 PM		3			3						1			1				
8-9 PM	1	2			4	1	2							1				
	2	22	0	0	17	2	4	0	4	0	0	0	13	13	0	1	19	0	0	0	8	0	0	0	105
									51															54	

LOCATION Market St near Thomas Harrison Middle School
DATE 4/16/2024

	PEDESTRIANS												BIKES												
	WB Market			EB Market			NB Trail						WB Market			EB Market			NB Trail						
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right				
5-6 AM					1																				
6-7 AM		3			2				1																
7-8 AM	4												7												
8-9AM		1				1							1				2								
9-10 AM		1			3		1							2											
10-11 AM		2			1		1										2								
11-12 PM	1	2			3											1	3								
12-1 PM		2															2								
1-2 PM		1			1	1									1		2								
2-3 PM		1			4		1		5					3			2				3				
3-4 PM	2	5		1	2		1						2				3								
4-5 PM		3			3	1			1				1	1			3								
5-6 PM					2				1								2								
6-7 PM	1	4				1								1					1		3				
7-8 PM		1			2				1												2				
8-9 PM		1			1																				
	8	27	0	1	25	4	4	0	9	0	0	0	11	7	1	1	21	0	1	0	8	0	0	0	128
												78												50	

LOCATION Market St near Thomas Harrison Middle School
DATE 4/17/2024

	PEDESTRIANS									BIKES								
	WB Market			EB Market			NB Trail			WB Market			EB Market			NB Trail		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM											1							
6-7 AM	1	2			1					2								
7-8 AM	1	1			1		1			11				1				
8-9AM										1								
9-10 AM					2									1				
10-11 AM											1			2				
11-12 PM		1			1													
12-1 PM																	1	
1-2 PM							2				1							
2-3 PM					3	2			1			3		1			1	
3-4 PM	1						1		1		2						2	
4-5 PM	1	2			2				1		2						6	
5-6 PM		4			1	1	1		1	1				1				
6-7 PM		1			1									1			1	
7-8 PM		1			1		1							1			1	
8-9 PM	2				1				1					1				
	6	12	0	0	14	3	6	0	5	0	0	0	15	7	3	0	9	0	0	0	12	0	0	0	92
										46														46

LOCATION Market St near Thomas Harrison Middle School
DATE 4/18/2024

	PEDESTRIANS									BIKES								
	WB Market			EB Market			NB Trail			WB Market			EB Market			NB Trail		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		2			2						1							
6-7 AM	3	5			2													
7-8 AM	1									8				1				1
8-9AM	1				1					1				1				
9-10 AM					1	1	1			1	1			1				
10-11 AM		3									3			1				
11-12 PM		3					2		2		5			3				
12-1 PM					1	1					3			1				
1-2 PM							1				3			1				
2-3 PM	1				4				1		3			3				2
3-4 PM		2			1		1		1		1			1				3
4-5 PM	1				1						4			1				2
5-6 PM		4			2	1			1		3			1				
6-7 PM		1				1	1				1			2				
7-8 PM		2		2	1	1								3				
8-9 PM	1										2							
	8	22	0	2	16	5	6	0	5	0	0	0	10	30	0	0	20	0	0	0	8	0	0	0	132
										64													68	

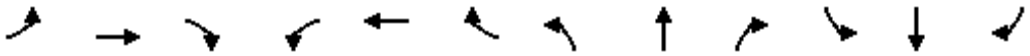
LOCATION Market St near Thomas Harrison Middle School
DATE 4/19/2024

	PEDESTRIANS									BIKES								
	WB Market			EB Market			NB Trail			WB Market			EB Market			NB Trail		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM		1			1					1								
6-7 AM	2	2			1				1	2								
7-8 AM	8	1			1	1				1								
8-9AM	1	1				2	1				1							
9-10 AM		1			2	1	1							1				
10-11 AM		1			3		2				1			2				
11-12 PM					1									2				
12-1 PM						1												
1-2 PM						1	1		1					1				
2-3 PM	1	2			3		2			1	2			2	1			5
3-4 PM		2			1		3							1				
4-5 PM	1	4		1	3				1					1				2
5-6 PM		2			2						3			1		1		2
6-7 PM	3	1			1				1		2			4				
7-8 PM		6			5						2							
8-9 PM	1	1					1		1									
	17	25	0	1	24	6	11	0	5	0	0	0	5	11	0	0	15	1	1	0	9	0	0	0	131
												89												42

LOCATION Market St near Thomas Harrison Middle School
DATE 4/20/2024

	PEDESTRIANS									BIKES								
	WB Market			EB Market			NB Trail			WB Market			EB Market			NB Trail		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
5-6 AM																		
6-7 AM					3													
7-8 AM		2			1	1								1				
8-9AM		2			1													
9-10 AM					1						1			2				
10-11 AM	1										1			1				
11-12 PM		1					1							2				
12-1 PM	1				2						1			1				
1-2 PM	1	3			3						1							
2-3 PM		3			1									2				
3-4 PM		2			1						2							
4-5 PM		2						2			2			3			1	
5-6 PM		2			1					1	1						1	
6-7 PM		1									2							
7-8 PM	1				2		1		1					1				
8-9 PM									1								1	
	4	18	0	0	16	1	2	0	4	0	0	0	1	11	0	0	13	0	0	0	3	0	0	0	73
												45												28

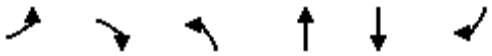
APPENDIX B – CAPACITY ANALYSIS WORKSHEETS FOR EXISTING CONDITIONS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	15	0	0	0	9	141	7	4	158	2
Future Volume (Veh/h)	4	0	15	0	0	0	9	141	7	4	158	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	16	0	0	0	10	153	8	4	172	2
Pedestrians		7									7	
Lane Width (ft)		12.0									12.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	372	369	180	374	366	164	181			161		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	372	369	180	374	366	164	181			161		
tC, single (s)	7.6	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	100	98	100	100	100	99			100		
cM capacity (veh/h)	493	554	830	568	556	880	1333			1430		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	20	0	171	178
Volume Left	4	0	10	4
Volume Right	16	0	8	2
cSH	730	1700	1333	1430
Volume to Capacity	0.03	0.01	0.01	0.00
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	10.1	0.0	0.5	0.2
Lane LOS	B	A	A	A
Approach Delay (s)	10.1	0.0	0.5	0.2
Approach LOS	B	A		

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	66	34	155	174	7
Future Volume (Veh/h)	2	66	34	155	174	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	69	36	163	183	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	422	186	190			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	186	190			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	92	97			
cM capacity (veh/h)	577	856	1343			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	71	199	190
Volume Left	2	36	0
Volume Right	69	0	7
cSH	844	1343	1700
Volume to Capacity	0.08	0.03	0.11
Queue Length 95th (ft)	7	2	0
Control Delay (s)	9.7	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	1.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

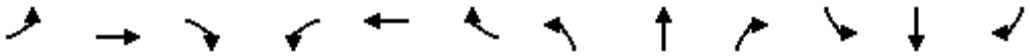
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	34	103	5	5	138	89	76	3	21	7	11	9
Future Volume (Veh/h)	34	103	5	5	138	89	76	3	21	7	11	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	36	110	5	5	147	95	81	3	22	7	12	10
Pedestrians								11				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								3.5				
Percent Blockage								1				
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	253			115			416	402	206	402	448	112
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			115			416	402	206	402	448	112
tC, single (s)	4.2			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	97			100			84	99	97	99	98	99
cM capacity (veh/h)	1259			1487			494	517	831	528	488	922

Direction, Lane #	NB 1	SB 1	NE 1	SW 1
Volume Total	151	247	106	29
Volume Left	36	5	81	7
Volume Right	5	95	22	10
cSH	1259	1487	625	595
Volume to Capacity	0.03	0.00	0.17	0.05
Queue Length 95th (ft)	2	0	15	4
Control Delay (s)	2.1	0.2	12.9	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	2.1	0.2	12.9	11.4
Approach LOS			B	B

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	493	341	89	37	42
v/c Ratio	0.27	0.18	0.31	0.10	0.16
Control Delay	9.1	9.0	23.4	0.6	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	9.0	23.4	0.6	15.6
Queue Length 50th (ft)	29	20	19	0	4
Queue Length 95th (ft)	82	59	54	0	25
Internal Link Dist (ft)	1315	467	445		637
Turn Bay Length (ft)				100	
Base Capacity (vph)	1829	1873	669	693	682
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.18	0.13	0.05	0.06

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	335	44	11	255	3	60	10	29	3	12	18
Future Volume (vph)	10	335	44	11	255	3	60	10	29	3	12	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.7			6.7			5.5	5.5		5.5	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frt		0.98			1.00			1.00	0.85		0.93	
Flt Protected		1.00			1.00			0.96	1.00		1.00	
Satd. Flow (prot)		3249			3390			1752	1615		1751	
Flt Permitted		0.94			0.93			0.96	1.00		1.00	
Satd. Flow (perm)		3067			3157			1752	1615		1751	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	13	424	56	14	323	4	76	13	37	4	15	23
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	32	0	22	0
Lane Group Flow (vph)	0	484	0	0	341	0	0	89	5	0	20	0
Heavy Vehicles (%)	20%	9%	7%	0%	6%	33%	3%	10%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA	Perm	Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6					8			
Actuated Green, G (s)		29.3			29.3			6.9	6.9		2.7	
Effective Green, g (s)		29.3			29.3			6.9	6.9		2.7	
Actuated g/C Ratio		0.52			0.52			0.12	0.12		0.05	
Clearance Time (s)		6.7			6.7			5.5	5.5		5.5	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1587			1634			213	196		83	
v/s Ratio Prot								c0.05			c0.01	
v/s Ratio Perm		c0.16			0.11				0.00			
v/c Ratio		0.31			0.21			0.42	0.02		0.24	
Uniform Delay, d1		7.8			7.4			23.0	21.9		26.0	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.5			0.3			1.3	0.0		1.5	
Delay (s)		8.3			7.7			24.3	21.9		27.5	
Level of Service		A			A			C	C		C	
Approach Delay (s)		8.3			7.7			23.6			27.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	17.7
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: Chicago Avenue & Shenandoah Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	45	26	26
Average Queue (ft)	11	1	2
95th Queue (ft)	33	11	13
Link Distance (ft)		941	249
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Greystone Street & Chicago Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	42	53
Average Queue (ft)	17	8
95th Queue (ft)	34	33
Link Distance (ft)	845	196
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Waterman Drive & Chicago Avenue

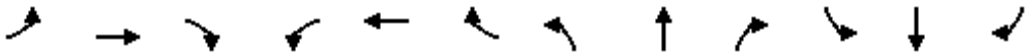
Movement	NB	SB	NE	NE	SW
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	49	12	75	43	46
Average Queue (ft)	7	1	24	17	15
95th Queue (ft)	28	6	55	45	39
Link Distance (ft)	679	196	463		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			1	0	
Queuing Penalty (veh)			0	0	

Intersection: 4: Dogwood Drive & W Market Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	LT	R	LTR
Maximum Queue (ft)	130	98	120	58	91	46	60
Average Queue (ft)	52	24	37	8	38	15	23
95th Queue (ft)	101	66	82	33	73	42	51
Link Distance (ft)			508	508	483		676
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						100	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Zone Summary

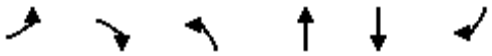
Zone wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	19	4	1	1	12	166	3	0	152	7
Future Volume (Veh/h)	5	0	19	4	1	1	12	166	3	0	152	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	6	0	23	5	1	1	15	205	4	0	188	9
Pedestrians		6										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	437	438	198	452	440	207	203			209		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	437	438	198	452	440	207	203			209		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	97	99	100	100	99			100		
cM capacity (veh/h)	522	507	843	500	506	839	1373			1374		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	7	224	197
Volume Left	6	5	15	0
Volume Right	23	1	4	9
cSH	748	532	1373	1374
Volume to Capacity	0.04	0.01	0.01	0.00
Queue Length 95th (ft)	3	1	1	0
Control Delay (s)	10.0	11.9	0.6	0.0
Lane LOS	B	B	A	
Approach Delay (s)	10.0	11.9	0.6	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	28.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	43	52	181	175	8
Future Volume (Veh/h)	4	43	52	181	175	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	5	51	62	215	208	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	552	213	218			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552	213	218			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	94	95			
cM capacity (veh/h)	475	827	1352			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	56	277	218
Volume Left	5	62	0
Volume Right	51	0	10
cSH	776	1352	1700
Volume to Capacity	0.07	0.05	0.13
Queue Length 95th (ft)	6	4	0
Control Delay (s)	10.0	2.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.0	2.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	22	132	6	11	113	97	89	5	37	2	3	11
Future Volume (Veh/h)	22	132	6	11	113	97	89	5	37	2	3	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	26	153	7	13	131	113	103	6	43	2	3	13
Pedestrians								5				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								3.5				
Percent Blockage								0				
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	249			160			442	430	192	446	484	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	249			160			442	430	192	446	484	156
tC, single (s)	4.2			4.2			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			79	99	95	100	99	99
cM capacity (veh/h)	1244			1378			492	502	837	481	469	894

Direction, Lane #	NB 1	SB 1	NE 1	SW 1
Volume Total	186	257	152	18
Volume Left	26	13	103	2
Volume Right	7	113	43	13
cSH	1244	1378	687	717
Volume to Capacity	0.02	0.01	0.22	0.03
Queue Length 95th (ft)	2	1	21	2
Control Delay (s)	1.3	0.5	13.0	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	1.3	0.5	13.0	10.1
Approach LOS			B	B

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	34.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	310	285	80	23	28
v/c Ratio	0.24	0.23	0.13	0.03	0.04
Control Delay	8.0	9.2	9.3	3.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	9.2	9.3	3.0	6.7
Queue Length 50th (ft)	21	23	12	0	3
Queue Length 95th (ft)	41	42	32	7	13
Internal Link Dist (ft)	1315	467	164		637
Turn Bay Length (ft)				100	
Base Capacity (vph)	1307	1252	601	667	687
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.23	0.13	0.03	0.04

Intersection Summary

Intersection: 1: Chicago Avenue & Shenandoah Street

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	28	35	36
Average Queue (ft)	9	5	3
95th Queue (ft)	24	25	20
Link Distance (ft)		134	941
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Greystone Street & Chicago Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	42	54
Average Queue (ft)	14	11
95th Queue (ft)	30	40
Link Distance (ft)	845	196
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Waterman Drive & Chicago Avenue

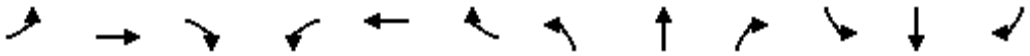
Movement	NB	SB	NE	NE	SW
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	42	24	72	60	31
Average Queue (ft)	5	1	25	26	12
95th Queue (ft)	22	10	55	55	32
Link Distance (ft)	679	196	463		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			1	0	
Queuing Penalty (veh)			0	0	

Intersection: 4: Dogwood Drive & W Market Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	LT	R	LTR
Maximum Queue (ft)	113	86	118	61	91	45	48
Average Queue (ft)	56	30	56	14	32	10	13
95th Queue (ft)	94	66	99	42	69	35	39
Link Distance (ft)			508	508	483		676
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						100	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Zone Summary

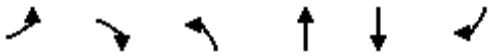
Zone wide Queuing Penalty: 1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	17	8	0	3	25	192	1	5	249	12
Future Volume (Veh/h)	5	0	17	8	0	3	25	192	1	5	249	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	6	0	20	9	0	3	29	221	1	6	286	14
Pedestrians		5										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	592	590	298	604	596	222	305			222		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	592	590	298	604	596	222	305			222		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	97	98	100	100	98			100		
cM capacity (veh/h)	407	409	729	392	406	823	1239			1359		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	26	12	251	306
Volume Left	6	9	29	6
Volume Right	20	3	1	14
cSH	616	451	1239	1359
Volume to Capacity	0.04	0.03	0.02	0.00
Queue Length 95th (ft)	3	2	2	0
Control Delay (s)	11.1	13.2	1.1	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.1	13.2	1.1	0.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	34.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	48	90	234	285	7
Future Volume (Veh/h)	8	48	90	234	285	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	9	54	101	263	320	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	789	324	328			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	789	324	328			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	92	92			
cM capacity (veh/h)	333	717	1243			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	63	364	328
Volume Left	9	101	0
Volume Right	54	0	8
cSH	616	1243	1700
Volume to Capacity	0.10	0.08	0.19
Queue Length 95th (ft)	9	7	0
Control Delay (s)	11.5	2.8	0.0
Lane LOS	B	A	
Approach Delay (s)	11.5	2.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

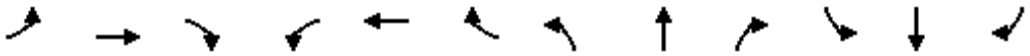
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	26	211	20	19	188	126	107	12	38	13	11	12
Future Volume (Veh/h)	26	211	20	19	188	126	107	12	38	13	11	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	30	243	23	22	216	145	123	14	44	15	13	14
Pedestrians								7				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								3.5				
Percent Blockage								1				
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	368			266			674	666	296	676	726	254
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	368			266			674	666	296	676	726	254
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			63	96	94	95	96	98
cM capacity (veh/h)	1194			1310			333	365	744	326	336	789

Direction, Lane #	NB 1	SB 1	NE 1	SW 1
Volume Total	296	383	181	42
Volume Left	30	22	123	15
Volume Right	23	145	44	14
cSH	1194	1310	445	410
Volume to Capacity	0.03	0.02	0.41	0.10
Queue Length 95th (ft)	2	1	49	8
Control Delay (s)	1.0	0.6	19.8	14.8
Lane LOS	A	A	C	B
Approach Delay (s)	1.0	0.6	19.8	14.8
Approach LOS			C	B

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	483	556	151	39	47
v/c Ratio	0.36	0.42	0.27	0.06	0.07
Control Delay	8.8	10.8	10.7	3.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	10.8	10.7	3.9	5.7
Queue Length 50th (ft)	35	50	25	0	3
Queue Length 95th (ft)	62	81	55	12	17
Internal Link Dist (ft)	1315	467	164		637
Turn Bay Length (ft)				100	
Base Capacity (vph)	1358	1334	568	669	663
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.42	0.27	0.06	0.07

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	352	84	22	476	14	113	26	36	6	13	24
Future Volume (vph)	8	352	84	22	476	14	113	26	36	6	13	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5	4.5		4.5	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frt		0.97			1.00			1.00	0.85		0.93	
Flt Protected		1.00			1.00			0.96	1.00		0.99	
Satd. Flow (prot)		3477			3588			1812	1615		1666	
Flt Permitted		0.94			0.93			0.75	1.00		0.96	
Satd. Flow (perm)		3285			3326			1420	1615		1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	383	91	24	517	15	123	28	39	7	14	26
RTOR Reduction (vph)	0	44	0	0	4	0	0	0	23	0	16	0
Lane Group Flow (vph)	0	439	0	0	552	0	0	151	16	0	31	0
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	4%	0%	17%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		18.0			18.0			18.0	18.0		18.0	
Effective Green, g (s)		18.0			18.0			18.0	18.0		18.0	
Actuated g/C Ratio		0.40			0.40			0.40	0.40		0.40	
Clearance Time (s)		4.5			4.5			4.5	4.5		4.5	
Lane Grp Cap (vph)		1314			1330			568	646		647	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.17			c0.11	0.01		0.02	
v/c Ratio		0.33			0.41			0.27	0.02		0.05	
Uniform Delay, d1		9.3			9.7			9.1	8.2		8.3	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.7			1.0			1.1	0.1		0.1	
Delay (s)		10.0			10.7			10.2	8.2		8.4	
Level of Service		B			B			B	A		A	
Approach Delay (s)		10.0			10.7			9.8			8.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Chicago Avenue & Shenandoah Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	30	35	51	16
Average Queue (ft)	9	11	7	1
95th Queue (ft)	25	35	33	9
Link Distance (ft)		134	941	249
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Greystone Street & Chicago Avenue

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	48	79	2
Average Queue (ft)	16	26	0
95th Queue (ft)	35	66	2
Link Distance (ft)	845	196	941
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Waterman Drive & Chicago Avenue

Movement	NB	SB	NE	NE	SW
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	75	40	121	49	57
Average Queue (ft)	9	4	38	27	19
95th Queue (ft)	42	20	84	54	44
Link Distance (ft)	679	196	463		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			5	0	
Queuing Penalty (veh)			2	1	

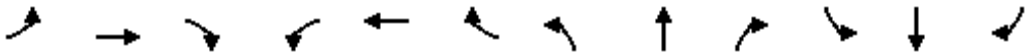
Intersection: 4: Dogwood Drive & W Market Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	LT	R	LTR
Maximum Queue (ft)	128	103	153	121	94	54	61
Average Queue (ft)	68	41	82	31	42	15	18
95th Queue (ft)	109	80	132	78	79	43	48
Link Distance (ft)			508	508	483		676
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						100	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Zone Summary

Zone wide Queuing Penalty: 3

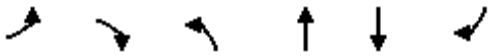
APPENDIX C – CAPACITY ANALYSIS FOR 2034 BACKGROUND CONDITIONS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	18	0	0	0	11	172	9	5	193	2
Future Volume (Veh/h)	5	0	18	0	0	0	11	172	9	5	193	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	20	0	0	0	12	187	10	5	210	2
Pedestrians		7									7	
Lane Width (ft)		12.0									12.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		1									1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	451	449	218	457	445	199	219			197		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451	449	218	457	445	199	219			197		
tC, single (s)	7.6	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	4.0	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	100	97	100	100	100	99			100		
cM capacity (veh/h)	433	498	790	497	501	841	1290			1388		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	0	209	217
Volume Left	5	0	12	5
Volume Right	20	0	10	2
cSH	678	1700	1290	1388
Volume to Capacity	0.04	0.00	0.01	0.00
Queue Length 95th (ft)	3	0	1	0
Control Delay (s)	10.5	0.0	0.5	0.2
Lane LOS	B	A	A	A
Approach Delay (s)	10.5	0.0	0.5	0.2
Approach LOS	B	A		

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	24.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	80	41	189	212	9
Future Volume (Veh/h)	2	80	41	189	212	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	84	43	199	223	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	512	228	232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	512	228	232			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	100	90	97			
cM capacity (veh/h)	508	812	1295			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	86	242	232
Volume Left	2	43	0
Volume Right	84	0	9
cSH	801	1295	1700
Volume to Capacity	0.11	0.03	0.14
Queue Length 95th (ft)	9	3	0
Control Delay (s)	10.0	1.6	0.0
Lane LOS	B	A	
Approach Delay (s)	10.0	1.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	41	126	6	6	168	125	144	4	60	9	13	11
Future Volume (Veh/h)	41	126	6	6	168	125	144	4	60	9	13	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	44	134	6	6	179	133	153	4	64	10	14	12
Pedestrians								11				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								3.5				
Percent Blockage								1				
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	323			140			512	496	256	516	560	137
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323			140			512	496	256	516	560	137
tC, single (s)	4.2			4.1			7.2	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	96			100			63	99	92	98	97	99
cM capacity (veh/h)	1186			1456			419	453	779	414	417	893

Direction, Lane #	NB 1	SB 1	NE 1	SW 1
Volume Total	184	318	221	36
Volume Left	44	6	153	10
Volume Right	6	133	64	12
cSH	1186	1456	591	506
Volume to Capacity	0.04	0.00	0.37	0.07
Queue Length 95th (ft)	3	0	43	6
Control Delay (s)	2.2	0.2	16.1	12.7
Lane LOS	A	A	C	B
Approach Delay (s)	2.2	0.2	16.1	12.7
Approach LOS			C	B

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	515	356	92	38	44
v/c Ratio	0.28	0.19	0.36	0.10	0.19
Control Delay	8.8	8.6	21.6	1.1	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	8.6	21.6	1.1	14.1
Queue Length 50th (ft)	23	15	16	0	3
Queue Length 95th (ft)	101	71	60	4	29
Internal Link Dist (ft)	1315	467	164		637
Turn Bay Length (ft)				100	
Base Capacity (vph)	1828	1879	542	717	524
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.19	0.17	0.05	0.08

Intersection Summary

Intersection: 1: Chicago Avenue & Shenandoah Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	55	40	30
Average Queue (ft)	13	3	2
95th Queue (ft)	39	20	15
Link Distance (ft)		941	249
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Greystone Street & Chicago Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	57	84
Average Queue (ft)	20	14
95th Queue (ft)	40	50
Link Distance (ft)	845	196
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Waterman Drive & Chicago Avenue

Movement	NB	SB	NE	NE	SW
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	77	30	128	50	54
Average Queue (ft)	12	2	48	32	19
95th Queue (ft)	46	15	102	56	45
Link Distance (ft)	274	196	462		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			7	1	
Queuing Penalty (veh)			4	1	

Intersection: 4: Dogwood Drive & W Market Street

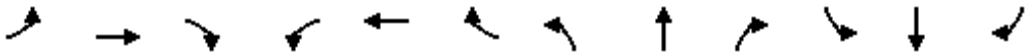
Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	LT	R	LTR
Maximum Queue (ft)	130	90	116	54	90	53	54
Average Queue (ft)	56	28	41	8	36	20	25
95th Queue (ft)	106	70	85	33	72	48	53
Link Distance (ft)			507	507	204		676
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						100	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Intersection: 6: Chicago Avenue & Mount Clinton Pike

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 7: College Avenue & Shenandoah Street

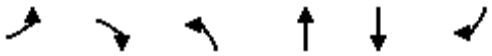
Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	23	5	1	1	15	202	4	0	185	9
Future Volume (Veh/h)	6	0	23	5	1	1	15	202	4	0	185	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	25	5	1	1	16	220	4	0	201	10
Pedestrians		6										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	468	468	212	485	471	222	217			224		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	468	468	212	485	471	222	217			224		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	97	99	100	100	99			100		
cM capacity (veh/h)	498	487	828	474	485	823	1357			1357		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	32	7	240	211
Volume Left	7	5	16	0
Volume Right	25	1	4	10
cSH	723	507	1357	1357
Volume to Capacity	0.04	0.01	0.01	0.00
Queue Length 95th (ft)	3	1	1	0
Control Delay (s)	10.2	12.2	0.6	0.0
Lane LOS	B	B	A	
Approach Delay (s)	10.2	12.2	0.6	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	33.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	52	63	221	212	10
Future Volume (Veh/h)	5	52	63	221	212	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	57	68	240	230	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	612	236	241			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612	236	241			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	93	95			
cM capacity (veh/h)	436	804	1326			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	308	241
Volume Left	5	68	0
Volume Right	57	0	11
cSH	752	1326	1700
Volume to Capacity	0.08	0.05	0.14
Queue Length 95th (ft)	7	4	0
Control Delay (s)	10.2	2.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.2	2.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

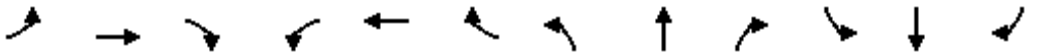
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	27	161	7	13	138	118	108	6	45	4	3	13
Future Volume (Veh/h)	27	161	7	13	138	118	108	6	45	4	3	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	175	8	14	150	128	117	7	49	4	3	14
Pedestrians								5				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								3.5				
Percent Blockage								0				
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	283			183			500	488	219	507	548	179
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	283			183			500	488	219	507	548	179
tC, single (s)	4.2			4.2			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			74	98	94	99	99	98
cM capacity (veh/h)	1208			1351			448	464	809	432	429	869

Direction, Lane #	NB 1	SB 1	NE 1	SW 1
Volume Total	212	292	173	21
Volume Left	29	14	117	4
Volume Right	8	128	49	14
cSH	1208	1351	626	649
Volume to Capacity	0.02	0.01	0.28	0.03
Queue Length 95th (ft)	2	1	28	3
Control Delay (s)	1.3	0.5	14.3	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	1.3	0.5	14.3	10.7
Approach LOS			B	B

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	378	348	98	28	35
v/c Ratio	0.29	0.28	0.17	0.04	0.05
Control Delay	8.4	9.6	9.7	3.5	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	9.6	9.7	3.5	6.6
Queue Length 50th (ft)	27	28	15	0	3
Queue Length 95th (ft)	50	51	38	9	15
Internal Link Dist (ft)	1315	467	164		637
Turn Bay Length (ft)				100	
Base Capacity (vph)	1309	1244	591	667	684
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.28	0.17	0.04	0.05

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	295	59	22	299	13	68	26	27	10	11	13
Future Volume (vph)	10	295	59	22	299	13	68	26	27	10	11	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5	4.5		4.5	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frt		0.98			0.99			1.00	0.85		0.95	
Flt Protected		1.00			1.00			0.97	1.00		0.99	
Satd. Flow (prot)		3370			3353			1758	1615		1772	
Flt Permitted		0.94			0.92			0.81	1.00		0.94	
Satd. Flow (perm)		3186			3094			1477	1615		1690	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	307	61	23	311	14	71	27	28	10	11	14
RTOR Reduction (vph)	0	35	0	0	7	0	0	0	17	0	8	0
Lane Group Flow (vph)	0	343	0	0	341	0	0	98	11	0	27	0
Heavy Vehicles (%)	0%	5%	2%	6%	7%	0%	4%	5%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		18.0			18.0			18.0	18.0		18.0	
Effective Green, g (s)		18.0			18.0			18.0	18.0		18.0	
Actuated g/C Ratio		0.40			0.40			0.40	0.40		0.40	
Clearance Time (s)		4.5			4.5			4.5	4.5		4.5	
Lane Grp Cap (vph)		1274			1237			590	646		676	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.11			c0.07	0.01		0.02	
v/c Ratio		0.27			0.28			0.17	0.02		0.04	
Uniform Delay, d1		9.1			9.1			8.7	8.2		8.2	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.5			0.6			0.6	0.0		0.1	
Delay (s)		9.6			9.7			9.3	8.2		8.3	
Level of Service		A			A			A	A		A	
Approach Delay (s)		9.6			9.7			9.0			8.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Chicago Avenue & Shenandoah Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	31	31	37	3
Average Queue (ft)	11	6	4	0
95th Queue (ft)	26	26	21	3
Link Distance (ft)		134	941	249
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Greystone Street & Chicago Avenue

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	40	66	2
Average Queue (ft)	16	14	0
95th Queue (ft)	31	47	2
Link Distance (ft)	845	196	941
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Waterman Drive & Chicago Avenue

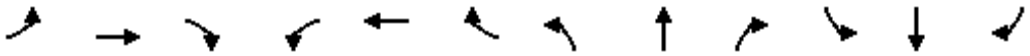
Movement	NB	SB	NE	NE	SW
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	52	44	86	55	37
Average Queue (ft)	7	2	32	31	13
95th Queue (ft)	32	18	69	55	34
Link Distance (ft)	274	196	462		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			3	1	
Queuing Penalty (veh)			1	1	

Intersection: 4: Dogwood Drive & W Market Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	LT	R	LTR
Maximum Queue (ft)	123	94	137	72	96	50	46
Average Queue (ft)	63	32	64	17	37	12	16
95th Queue (ft)	106	69	111	47	75	41	42
Link Distance (ft)			507	507	204		676
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						100	
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Zone Summary

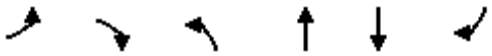
Zone wide Queuing Penalty: 2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	21	10	0	4	30	234	1	6	304	15
Future Volume (Veh/h)	6	0	21	10	0	4	30	234	1	6	304	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	23	11	0	4	33	254	1	7	330	16
Pedestrians		5										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	682	678	343	696	686	254	351			255		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	682	678	343	696	686	254	351			255		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	97	97	100	99	97			99		
cM capacity (veh/h)	353	363	687	337	359	789	1191			1322		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	30	15	288	353
Volume Left	7	11	33	7
Volume Right	23	4	1	16
cSH	563	398	1191	1322
Volume to Capacity	0.05	0.04	0.03	0.01
Queue Length 95th (ft)	4	3	2	0
Control Delay (s)	11.8	14.4	1.2	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.8	14.4	1.2	0.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	39.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	59	110	285	347	7
Future Volume (Veh/h)	10	59	110	285	347	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	64	120	310	377	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	931	381	385			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	931	381	385			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	90	90			
cM capacity (veh/h)	268	666	1185			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	75	430	385
Volume Left	11	120	0
Volume Right	64	0	8
cSH	547	1185	1700
Volume to Capacity	0.14	0.10	0.23
Queue Length 95th (ft)	12	8	0
Control Delay (s)	12.6	3.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.6	3.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	32	257	24	23	229	204	163	15	68	16	13	15
Future Volume (Veh/h)	32	257	24	23	229	204	163	15	68	16	13	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	279	26	25	249	222	177	16	74	17	14	16
Pedestrians								7				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								3.5				
Percent Blockage								1				
Right turn flare (veh)									2			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	478			305			802	792	367	817	890	292
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478			305			802	792	367	817	890	292
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			34	95	89	93	95	98
cM capacity (veh/h)	1088			1267			268	305	678	243	268	752

Direction, Lane #	NB 1	SB 1	NE 1	SW 1
Volume Total	340	496	267	47
Volume Left	35	25	177	17
Volume Right	26	222	74	16
cSH	1088	1267	358	328
Volume to Capacity	0.03	0.02	0.75	0.14
Queue Length 95th (ft)	2	2	146	12
Control Delay (s)	1.2	0.6	39.4	17.8
Lane LOS	A	A	E	C
Approach Delay (s)	1.2	0.6	39.4	17.8
Approach LOS			E	C

Intersection Summary				
Average Delay	10.5			
Intersection Capacity Utilization	53.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	588	677	185	48	57
v/c Ratio	0.43	0.51	0.33	0.07	0.09
Control Delay	9.7	11.8	11.5	3.7	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	11.8	11.5	3.7	5.6
Queue Length 50th (ft)	46	64	31	0	4
Queue Length 95th (ft)	78	102	68	13	19
Internal Link Dist (ft)	1315	467	164		637
Turn Bay Length (ft)				100	
Base Capacity (vph)	1353	1323	554	674	665
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.43	0.51	0.33	0.07	0.09

Intersection Summary

Intersection: 1: Chicago Avenue & Shenandoah Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	35	36	65	26
Average Queue (ft)	11	13	11	1
95th Queue (ft)	28	37	43	10
Link Distance (ft)		134	941	249
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Greystone Street & Chicago Avenue

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	53	85	2
Average Queue (ft)	17	33	0
95th Queue (ft)	37	73	2
Link Distance (ft)	845	196	941
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Waterman Drive & Chicago Avenue

Movement	NB	SB	NE	NE	SW
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	83	77	261	50	64
Average Queue (ft)	14	9	90	36	25
95th Queue (ft)	51	41	202	64	53
Link Distance (ft)	274	196	462		396
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			26	2	
Queuing Penalty (veh)			18	3	

Intersection: 4: Dogwood Drive & W Market Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	TR	LT	TR	LT	R	LTR
Maximum Queue (ft)	155	124	195	158	124	78	63
Average Queue (ft)	78	48	99	43	52	21	22
95th Queue (ft)	126	90	162	105	95	55	54
Link Distance (ft)			507	507	204		676
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						100	
Storage Blk Time (%)					1	0	
Queuing Penalty (veh)					0	0	

Intersection: 6: Chicago Avenue & Mount Clinton Pike

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 7: College Avenue & Shenandoah Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

MOVEMENT SUMMARY

Site: 101 [2034 Background AM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Chicago Avenue														
3	L2	41	9.0	45	9.0	0.199	5.9	LOS A	1.1	29.7	0.43	0.28	0.43	22.9
8	T1	126	5.0	137	5.0	0.199	5.7	LOS A	1.1	29.7	0.43	0.28	0.43	23.0
18	R2	6	20.0	7	20.0	0.199	6.3	LOS A	1.1	29.7	0.43	0.28	0.43	22.6
Approach		173	6.5	188	6.5	0.199	5.7	LOS A	1.1	29.7	0.43	0.28	0.43	22.9
East: Waterman Drive														
1	L2	9	0.0	10	0.0	0.043	4.5	LOS A	0.2	5.4	0.50	0.34	0.50	23.1
6	T1	13	0.0	14	0.0	0.043	4.5	LOS A	0.2	5.4	0.50	0.34	0.50	23.1
16	R2	11	11.0	12	11.0	0.043	5.1	LOS A	0.2	5.4	0.50	0.34	0.50	22.8
Approach		33	3.7	36	3.7	0.043	4.7	LOS A	0.2	5.4	0.50	0.34	0.50	23.0
North: Chicago Avenue														
7	L2	6	0.0	7	0.0	0.305	6.1	LOS A	1.9	50.9	0.30	0.14	0.30	22.9
4	T1	168	6.0	183	6.0	0.305	6.3	LOS A	1.9	50.9	0.30	0.14	0.30	22.9
14	R2	125	8.0	136	8.0	0.305	6.4	LOS A	1.9	50.9	0.30	0.14	0.30	22.6
Approach		299	6.7	325	6.7	0.305	6.4	LOS A	1.9	50.9	0.30	0.14	0.30	22.8
West: Waterman Drive														
5	L2	144	11.0	157	11.0	0.246	6.6	LOS A	1.4	37.3	0.46	0.32	0.46	22.4
2	T1	4	0.0	4	0.0	0.246	6.1	LOS A	1.4	37.3	0.46	0.32	0.46	22.5
12	R2	60	0.0	65	0.0	0.246	6.1	LOS A	1.4	37.3	0.46	0.32	0.46	22.2
Approach		208	7.6	226	7.6	0.246	6.4	LOS A	1.4	37.3	0.46	0.32	0.46	22.4
All Vehicles		713	6.8	775	6.8	0.305	6.2	LOS A	1.9	50.9	0.39	0.24	0.39	22.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2034 Background PM Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Chicago Avenue														
3	L2	32	0.0	35	0.0	0.355	7.5	LOS A	2.3	59.2	0.53	0.38	0.53	22.6
8	T1	257	2.0	279	2.0	0.355	7.6	LOS A	2.3	59.2	0.53	0.38	0.53	22.6
18	R2	24	0.0	26	0.0	0.355	7.5	LOS A	2.3	59.2	0.53	0.38	0.53	22.3
Approach		313	1.6	340	1.6	0.355	7.6	LOS A	2.3	59.2	0.53	0.38	0.53	22.6
East: Waterman Drive														
1	L2	16	0.0	17	0.0	0.062	5.3	LOS A	0.3	8.1	0.59	0.44	0.59	22.9
6	T1	13	0.0	14	0.0	0.062	5.3	LOS A	0.3	8.1	0.59	0.44	0.59	22.9
16	R2	15	0.0	16	0.0	0.062	5.3	LOS A	0.3	8.1	0.59	0.44	0.59	22.6
Approach		44	0.0	48	0.0	0.062	5.3	LOS A	0.3	8.1	0.59	0.44	0.59	22.8
North: Chicago Avenue														
7	L2	23	0.0	25	0.0	0.441	7.8	LOS A	3.3	85.2	0.33	0.16	0.33	22.5
4	T1	229	2.0	249	2.0	0.441	7.9	LOS A	3.3	85.2	0.33	0.16	0.33	22.5
14	R2	204	3.0	222	3.0	0.441	7.9	LOS A	3.3	85.2	0.33	0.16	0.33	22.2
Approach		456	2.3	496	2.3	0.441	7.9	LOS A	3.3	85.2	0.33	0.16	0.33	22.4
West: Waterman Drive														
5	L2	163	4.0	177	4.0	0.299	7.3	LOS A	1.8	45.4	0.55	0.42	0.55	22.3
2	T1	15	0.0	16	0.0	0.299	7.1	LOS A	1.8	45.4	0.55	0.42	0.55	22.3
12	R2	68	0.0	74	0.0	0.299	7.1	LOS A	1.8	45.4	0.55	0.42	0.55	22.0
Approach		246	2.7	267	2.7	0.299	7.2	LOS A	1.8	45.4	0.55	0.42	0.55	22.2
All Vehicles		1059	2.1	1151	2.1	0.441	7.6	LOS A	3.3	85.2	0.45	0.30	0.45	22.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX D – PROPOSED IMPROVEMENTS AND COST ESTIMATES: CHICAGO AVENUE CORRIDOR EXHIBITS, CHICAGO AVENUE AND WATERMAN DRIVE INTERSECTION EXHIBITS, PLANNING LEVEL COST ESTIMATES

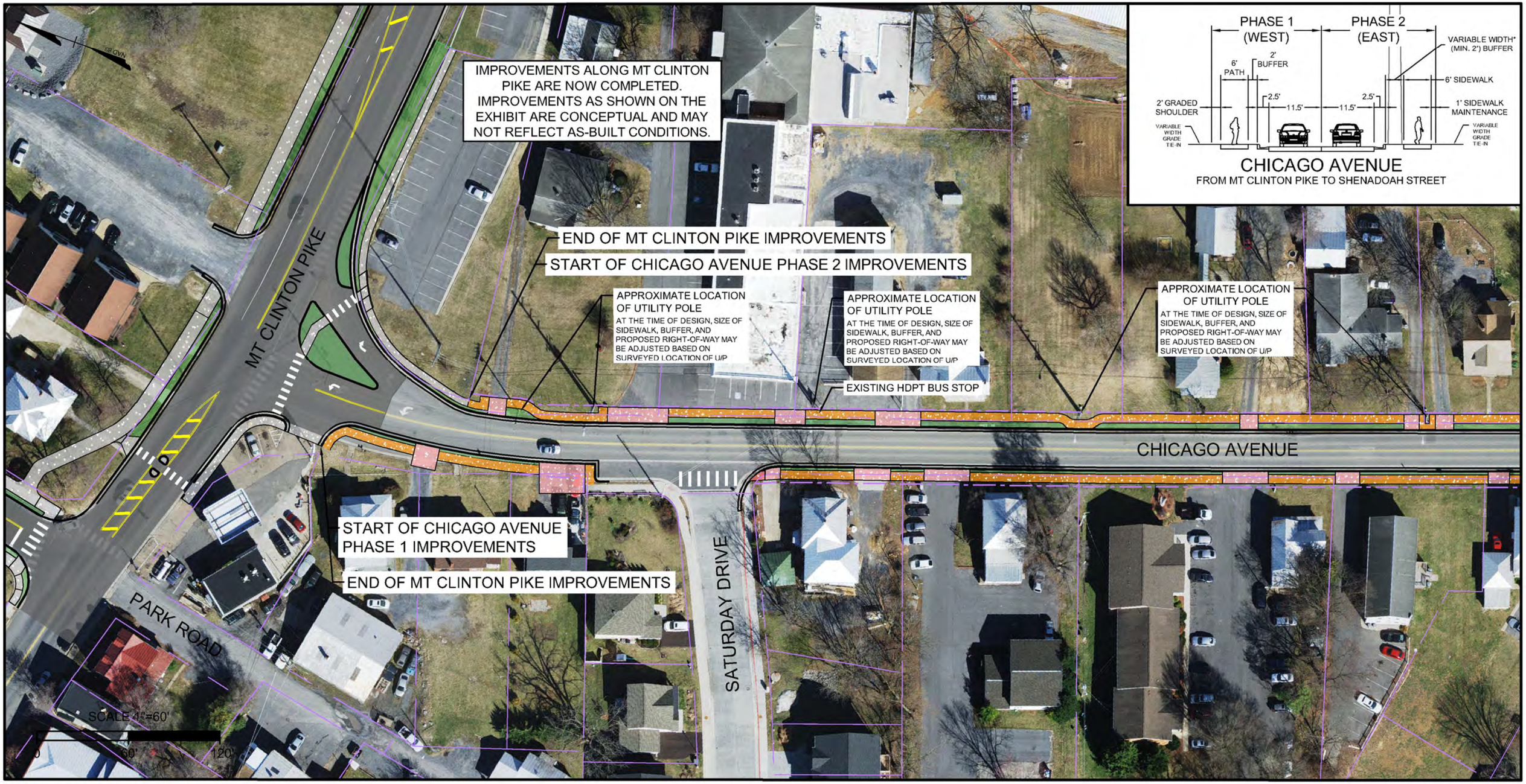


FIGURE F-1
CHICAGO AVENUE CORRIDOR IMPROVEMENTS

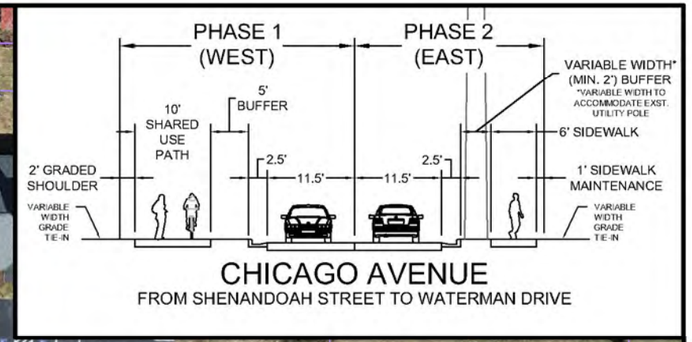
TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED DRIVEWAY APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED RIGHT-OF-WAY

NOTE: THESE EXHIBITS ARE CONCEPTUAL IN NATURE AND FOR FEASIBILITY PURPOSES ONLY. AT THE TIME OF FUTURE DESIGN, ELEMENTS, INCLUDING BUT NOT LIMITED TO ENTRANCE LOCATION AND DESIGN, RIGHT-OF-WAY, AND EASEMENTS, WILL INVOLVE COORDINATION WITH ADJACENT PROPERTY OWNERS.



CHICAGO AVENUE
FROM SHENANDOAH STREET TO WATERMAN DRIVE

APPROXIMATE LOCATION OF UTILITY POLE
AT THE TIME OF DESIGN, SIZE OF SIDEWALK, BUFFER, AND PROPOSED RIGHT-OF-WAY MAY BE ADJUSTED BASED ON SURVEYED LOCATION OF U/P

EXISTING HDPT BUS STOP

APPROXIMATE LOCATION OF UTILITY POLE
AT THE TIME OF DESIGN, SIZE OF SIDEWALK, BUFFER, AND PROPOSED RIGHT-OF-WAY MAY BE ADJUSTED BASED ON SURVEYED LOCATION OF U/P

APPROXIMATE LOCATION OF UTILITY POLE
AT THE TIME OF DESIGN, SIZE OF SIDEWALK, BUFFER, AND PROPOSED RIGHT-OF-WAY MAY BE ADJUSTED BASED ON SURVEYED LOCATION OF U/P

RELOCATE PARKING SPACES
AT THE TIME OF DESIGN, IMPACTED PARKING MAY BE ADJUSTED BASED ON SURVEY DATA AND FINALIZED ENTRANCE DESIGN. THE SHOWN IMPROVEMENTS ARE CONCEPTUAL AND FOR FEASIBILITY PURPOSES ONLY.

CHICAGO AVENUE

SHENANDOAH STREET

SCALE 1"=60'
0 60' 120'

FIGURE F-2
CHICAGO AVENUE CORRIDOR IMPROVEMENTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED DRIVEWAY APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED RIGHT-OF-WAY

NOTE: THESE EXHIBITS ARE CONCEPTUAL IN NATURE AND FOR FEASIBILITY PURPOSES ONLY. AT THE TIME OF FUTURE DESIGN, ELEMENTS, INCLUDING BUT NOT LIMITED TO ENTRANCE LOCATION AND DESIGN, RIGHT-OF-WAY, AND EASEMENTS, WILL INVOLVE COORDINATION WITH ADJACENT PROPERTY OWNERS.

FIGURE F-3
CHICAGO AVENUE CORRIDOR IMPROVEMENTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED DRIVEWAY APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED RIGHT-OF-WAY

NOTE: THESE EXHIBITS ARE CONCEPTUAL IN NATURE AND FOR FEASIBILITY PURPOSES ONLY. AT THE TIME OF FUTURE DESIGN, ELEMENTS, INCLUDING BUT NOT LIMITED TO ENTRANCE LOCATION AND DESIGN, RIGHT-OF-WAY, AND EASEMENTS, WILL INVOLVE COORDINATION WITH ADJACENT PROPERTY OWNERS.

FIGURE F-4
WATERMAN DRIVE CORRIDOR IMPROVEMENTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG
PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED DRIVEWAY APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED RIGHT-OF-WAY

NOTE: THESE EXHIBITS ARE CONCEPTUAL IN NATURE AND FOR FEASIBILITY PURPOSES ONLY. AT THE TIME OF FUTURE DESIGN, ELEMENTS, INCLUDING BUT NOT LIMITED TO ENTRANCE LOCATION AND DESIGN, RIGHT-OF-WAY, AND EASEMENTS, WILL INVOLVE COORDINATION WITH ADJACENT PROPERTY OWNERS.

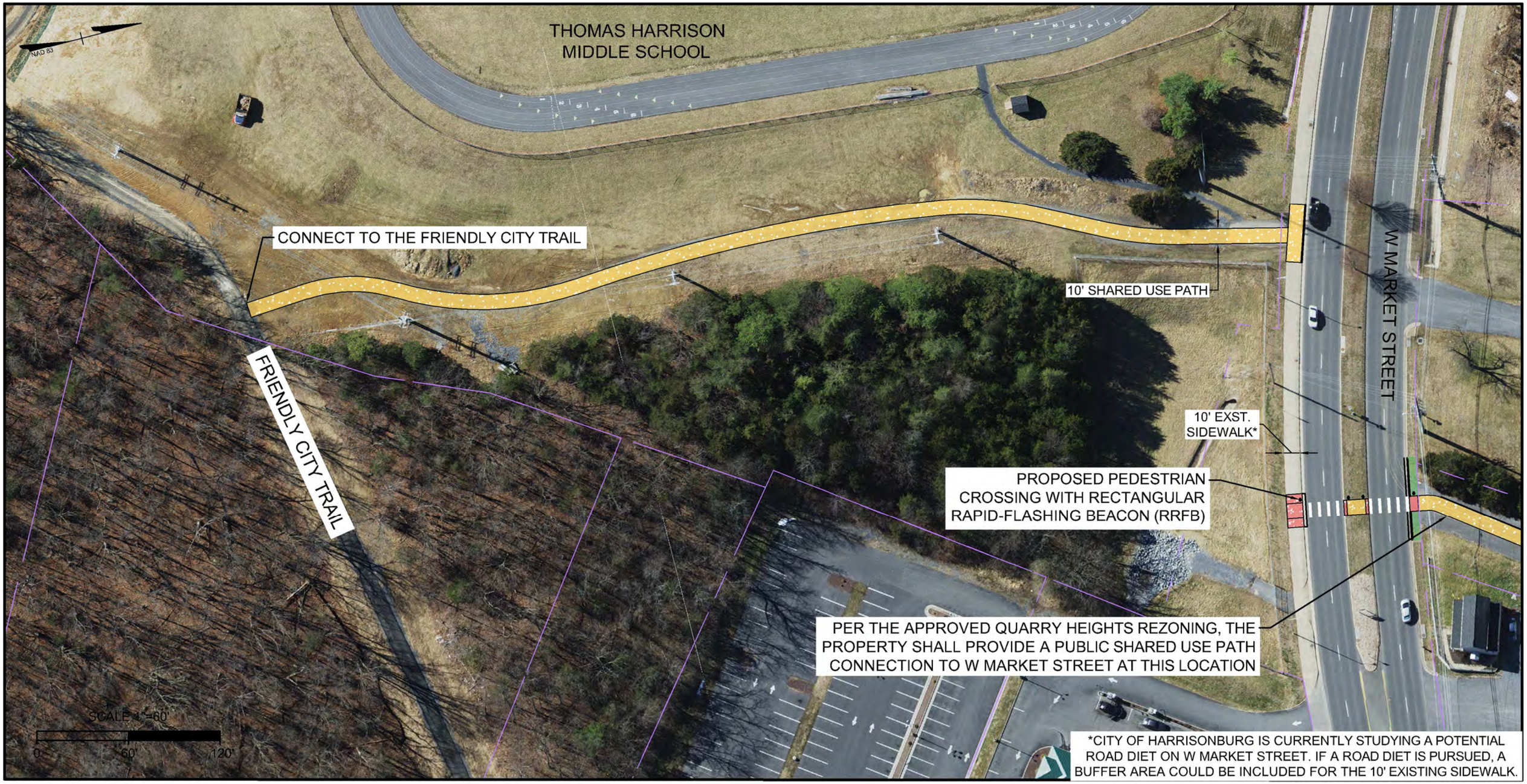


FIGURE F-5
W MARKET STREET CROSSING & FRIENDLY CITY TRAIL CONNECTION

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED DRIVEWAY APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED RIGHT-OF-WAY

NOTE: THESE EXHIBITS ARE CONCEPTUAL IN NATURE AND FOR FEASIBILITY PURPOSES ONLY. AT THE TIME OF FUTURE DESIGN, ELEMENTS, INCLUDING BUT NOT LIMITED TO ENTRANCE LOCATION AND DESIGN, RIGHT-OF-WAY, AND EASEMENTS, WILL INVOLVE COORDINATION WITH ADJACENT PROPERTY OWNERS.

FIGURE F-6
OFFSET INTERSECTION CONCEPTUAL PLAN (WB-40)

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED ROW

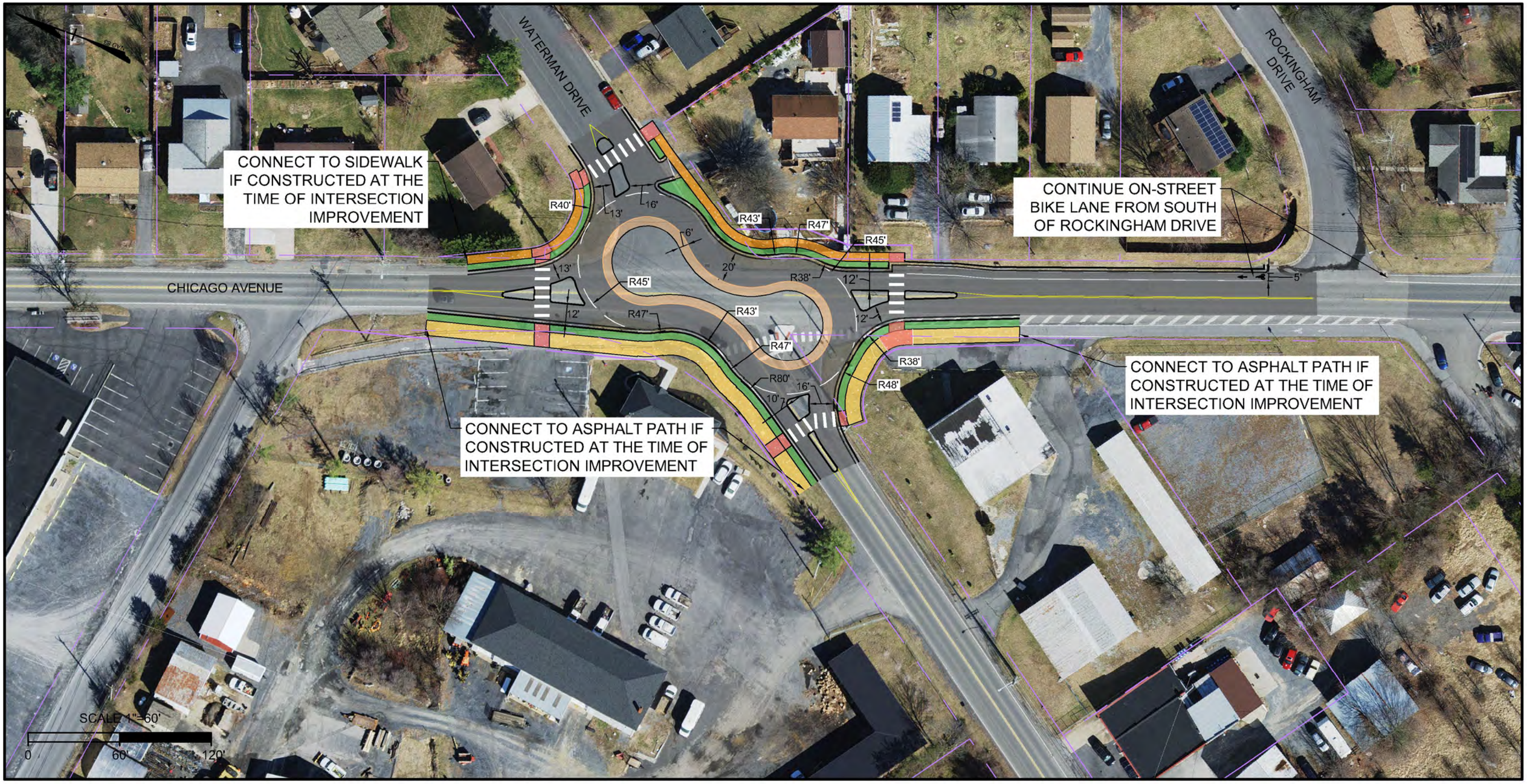


FIGURE F-7
PEANUT ROUNDABOUT CONCEPTUAL PLAN (WB-40)

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED TRUCK APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED ROW

FIGURE F-8
OFFSET INTERSECTION CONCEPTUAL PLAN (WB-62)

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED ROW

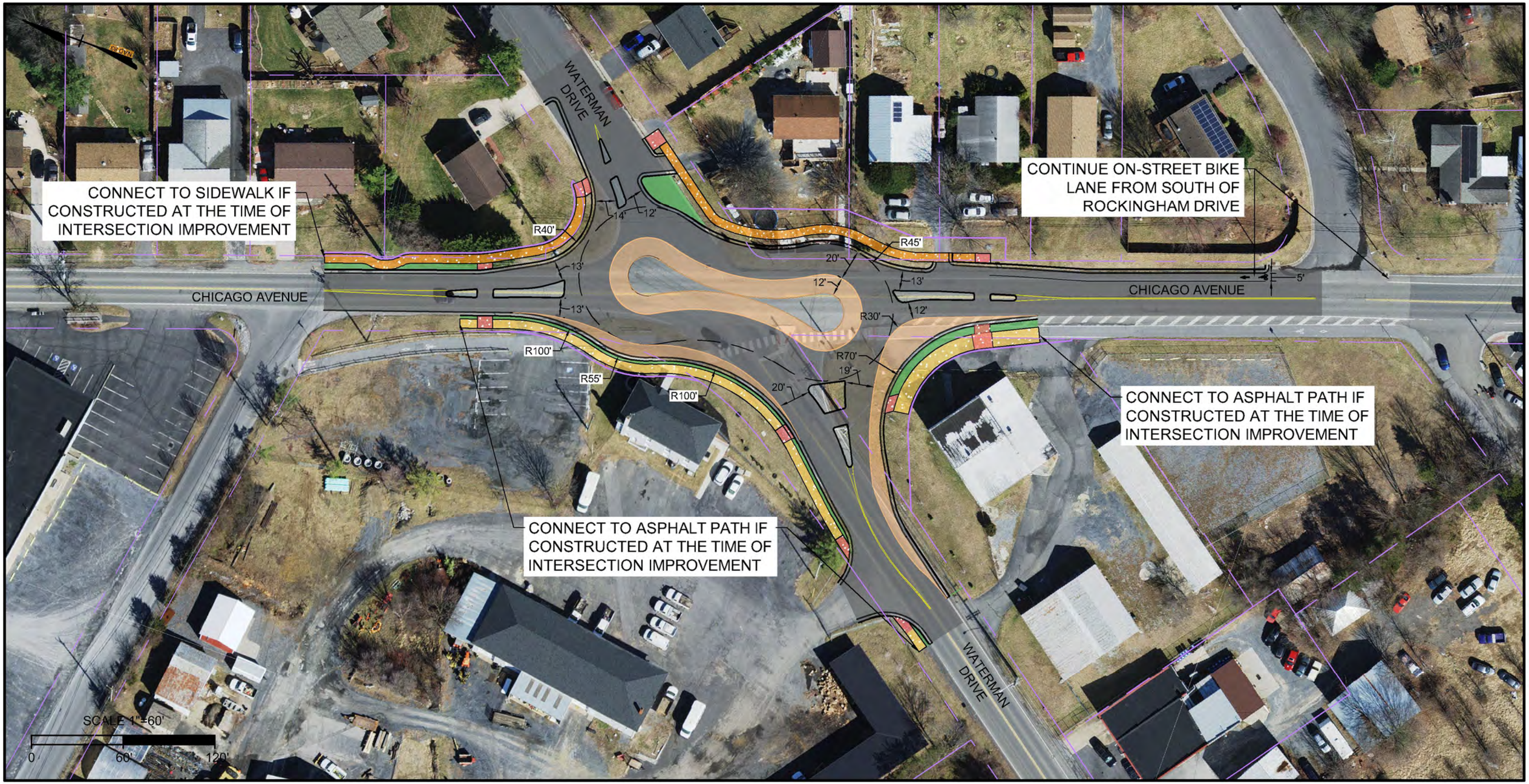


FIGURE F-9
PEANUT ROUNDABOUT CONCEPTUAL PLAN (WB-62)

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

CITY OF HARRISONBURG PUBLIC WORKS

LEGEND

- PROPOSED ASPHALT PATH
- PROPOSED CONCRETE SIDEWALK
- PROPOSED ADA PEDESTRIAN CURB RAMP
- PROPOSED TRUCK APRON
- PROPOSED GRASS/LANDSCAPE AREA
- PROPOSED CURB & GUTTER
- EXISTING PARCELS (GIS)
- PROPOSED ROW

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg

Chicago Avenue & Waterman Drive Corridor

Preliminary Planning Cost Estimate - March 2025

City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

Chicago Avenue SB (Mt Clinton Pike to Shenandoah Street)

SUMMARY OF BUDGET PHASES		C&G + 6' Facility
Preliminary Engineering (PE)	$	202,000.00
Right of Way (RW)	$	558,000.00
Construction (CN)	$	915,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,675,000.00

Chicago Avenue SB (Shenandoah Street to Greystone Street)

SUMMARY OF BUDGET PHASES		C&G + 10' Facility
Preliminary Engineering (PE)	$	222,000.00
Right of Way (RW)	$	1,253,000.00
Construction (CN)	$	1,005,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	2,480,000.00

Chicago Avenue SB (Greystone Street to Rockingham Drive)

SUMMARY OF BUDGET PHASES		C&G + 10' Facility
Preliminary Engineering (PE)	$	137,000.00
Right of Way (RW)	$	333,000.00
Construction (CN)	$	618,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,088,000.00

Waterman Drive (Chicago Avenue to Quarry Heights Property)

SUMMARY OF BUDGET PHASES		C&G + 10' Facility
Preliminary Engineering (PE)	$	182,000.00
Right of Way (RW)	$	410,000.00
Construction (CN)	$	825,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,417,000.00

W Market Street Crossing (Quarry Heights Property towards Thomas Harrison Middle School)

SUMMARY OF BUDGET PHASES		Signalized Crossing + 10' Facility
Preliminary Engineering (PE)	$	80,000.00
Right of Way (RW)	$	126,000.00
Construction (CN)	$	479,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	685,000.00

Trail Connection to Friendly City Trail (from W Market Street)

SUMMARY OF BUDGET PHASES		10' Facility
Preliminary Engineering (PE)	$	168,000.00
Right of Way (RW)	$	210,000.00
Construction (CN)	$	759,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,137,000.00

Chicago Avenue NB (Mt Clinton Pike to Shenandoah Street)		
SUMMARY OF BUDGET PHASES		**C&G + 6' Facility**
Preliminary Engineering (PE)	$	196,000.00
Right of Way (RW)	$	638,000.00
Construction (CN)	$	888,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,722,000.00

Chicago Avenue NB (Shenandoah Street to Waterman Drive)		
SUMMARY OF BUDGET PHASES		**C&G + 6' Facility**
Preliminary Engineering (PE)	$	268,000.00
Right of Way (RW)	$	1,052,000.00
Construction (CN)	$	1,211,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	2,531,000.00

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue & Waterman Drive Intersection
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

Chicago Avenue & Waterman Drive - Peanut Roundabout (WB-40)		
SUMMARY OF BUDGET PHASES		
Preliminary Engineering (PE)	$	602,000.00
Right of Way (RW)	$	1,245,000.00
Construction (CN)	$	2,732,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	4,579,000.00

Chicago Avenue & Waterman Drive - Peanut Roundabout (WB-62)		
SUMMARY OF BUDGET PHASES		
Preliminary Engineering (PE)	$	904,000.00
Right of Way (RW)	$	1,934,000.00
Construction (CN)	$	4,103,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	6,941,000.00

Chicago Avenue & Waterman Drive -Offset Intersection (WB-40)		
SUMMARY OF BUDGET PHASES		
Preliminary Engineering (PE)	$	273,000.00
Right of Way (RW)	$	413,000.00
Construction (CN)	$	1,238,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,924,000.00

Chicago Avenue & Waterman Drive -Offset Intersection (WB-62)		
SUMMARY OF BUDGET PHASES		
Preliminary Engineering (PE)	$	275,000.00
Right of Way (RW)	$	435,000.00
Construction (CN)	$	1,248,000.00
TOTAL RECOMMENDED PROJECT BUDGET	$	1,958,000.00

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue Corridor Phase 1 (SB)
Mt Clinton Pike to Shenandoah Street
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification			
				C&G + Shared-Use Path + Sidewalk
CONSTRUCTION BID COSTS				
Grading & Earthwork			$	93,000.00
Roadway Improvements			$	168,000.00
Stormwater & Hydraulics	50%		$	131,000.00
Miscellaneous Construction	20%		$	79,000.00
		Subtotal A =	**$**	**471,000.00**
OTHER BID COSTS FOR CONSTRUCTION				
Mobilization for Subtotal A (Calc from VDOT formula)			$	41,000.00
Construction Surveying	1.5%		$	8,000.00
Materials Testing	2%		$	10,000.00
Construction Engineering & Inspection	15%		$	80,000.00
Contingency for CN (Construction + Other)	50%		$	305,000.00
		Subtotal B =	**$**	**444,000.00**
		TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**915,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)				
Survey, Design Services, & Permitting	20%		$	183,000.00
Environmental Coordination	0%		$	-
Contingency for PE	10%		$	19,000.00
		Subtotal C =	**$**	**202,000.00**
		GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**1,117,000.00**
RIGHT OF WAY & UTILITY COSTS				
Utility Coordination & Relocation	15%		$	168,000.00
Right of Way - Administrative Costs			$	80,000.00
Right of Way - Acquisition Costs			$	124,000.00
Contingency for Right of Way/Utility	50%		$	186,000.00
		ROW Subtotal =	**$**	**558,000.00**
SUMMARY OF BUDGET PHASES				
Preliminary Engineering (PE)			**$**	**202,000.00**
Right of Way (RW)			**$**	**558,000.00**
Construction (CN)			**$**	**915,000.00**
TOTAL RECOMMENDED PROJECT BUDGET			**$**	**1,675,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg

Chicago Avenue Corridor Phase 2 (NB)

Mt Clinton Pike to Shenandoah Street

Preliminary Planning Cost Estimate - March 2025

City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT))		
	Facility Classification		
			C&G + Sidewalk
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	98,000.00
Roadway Improvements		$	168,000.00
Stormwater & Hydraulics	50%	$	133,000.00
Miscellaneous Construction	20%	$	80,000.00
	Subtotal A =	**$**	**479,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	41,000.00
Construction Surveying	1.5%	$	8,000.00
Materials Testing	2%	$	10,000.00
Construction Engineering & Inspection	10%	$	54,000.00
Contingency for CN (Construction + Other)	50%	$	296,000.00
	Subtotal B =	**$**	**409,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**888,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	178,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	18,000.00
	Subtotal C =	**$**	**196,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**1,084,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	163,000.00
Right of Way - Administrative Costs		$	100,000.00
Right of Way - Acquisition Costs		$	162,000.00
Contingency for Right of Way/Utility	50%	$	213,000.00
	ROW Subtotal =	**$**	**638,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**196,000.00**
Right of Way (RW)		**$**	**638,000.00**
Construction (CN)		**$**	**888,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**1,722,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue Corridor Phase 1 (SB)
Shenandoah Street to Greystone Street
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification		C&G + Shared-Use Path
CONSTRUCTION BID COSTS			
Grading & Earthwork			$ 103,000.00
Roadway Improvements			$ 185,000.00
Stormwater & Hydraulics	50%		$ 144,000.00
Miscellaneous Construction	20%		$ 87,000.00
		Subtotal A =	**$ 519,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)			$ 44,000.00
Construction Surveying	1.5%		$ 8,000.00
Materials Testing	2%		$ 11,000.00
Construction Engineering & Inspection	15%		$ 88,000.00
Contingency for CN (Construction + Other)	50%		$ 335,000.00
		Subtotal B =	**$ 486,000.00**
		TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$ 1,005,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%		$ 201,000.00
Environmental Coordination	0%		$ -
Contingency for PE	10%		$ 21,000.00
		Subtotal C =	**$ 222,000.00**
		GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$ 1,227,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%		$ 185,000.00
Right of Way - Administrative Costs			$ 90,000.00
Right of Way - Acquisition Costs			$ 560,000.00
Contingency for Right of Way/Utility	50%		$ 418,000.00
		ROW Subtotal =	**$ 1,253,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)			**$ 222,000.00**
Right of Way (RW)			**$ 1,253,000.00**
Construction (CN)			**$ 1,005,000.00**
TOTAL RECOMMENDED PROJECT BUDGET			**$ 2,480,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue Corridor Phase 2 (NB)
Shenandoah Street to Waterman Drive
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT))		
	Facility Classification		
			C&G + Sidewalk
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	134,000.00
Roadway Improvements		$	229,000.00
Stormwater & Hydraulics	50%	$	182,000.00
Miscellaneous Construction	20%	$	109,000.00
	Subtotal A =	**$**	**654,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	55,000.00
Construction Surveying	1.5%	$	10,000.00
Materials Testing	2%	$	14,000.00
Construction Engineering & Inspection	10%	$	74,000.00
Contingency for CN (Construction + Other)	50%	$	404,000.00
	Subtotal B =	**$**	**557,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**1,211,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	243,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	25,000.00
	Subtotal C =	**$**	**268,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**1,479,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	222,000.00
Right of Way - Administrative Costs		$	110,000.00
Right of Way - Acquisition Costs		$	369,000.00
Contingency for Right of Way/Utility	50%	$	351,000.00
	ROW Subtotal =	**$**	**1,052,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**268,000.00**
Right of Way (RW)		**$**	**1,052,000.00**
Construction (CN)		**$**	**1,211,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**2,531,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue Corridor Phase 1 (SB)
Greystone Street to Rockingham Drive
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification			
				C&G + Shared-Use Path
CONSTRUCTION BID COSTS				
Grading & Earthwork			$	25,000.00
Roadway Improvements			$	151,000.00
Stormwater & Hydraulics	50%		$	88,000.00
Miscellaneous Construction	20%		$	53,000.00
		Subtotal A =	**$**	**317,000.00**
OTHER BID COSTS FOR CONSTRUCTION				
Mobilization for Subtotal A (Calc from VDOT formula)			$	29,000.00
Construction Surveying	1.5%		$	5,000.00
Materials Testing	2%		$	7,000.00
Construction Engineering & Inspection	15%		$	54,000.00
Contingency for CN (Construction + Other)	50%		$	206,000.00
		Subtotal B =	**$**	**301,000.00**
		TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**618,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)				
Survey, Design Services, & Permitting	20%		$	124,000.00
Environmental Coordination	0%		$	-
Contingency for PE	10%		$	13,000.00
		Subtotal C =	**$**	**137,000.00**
		GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**755,000.00**
RIGHT OF WAY & UTILITY COSTS				
Utility Coordination & Relocation	15%		$	114,000.00
Right of Way - Administrative Costs			$	30,000.00
Right of Way - Acquisition Costs			$	78,000.00
Contingency for Right of Way/Utility	50%		$	111,000.00
		ROW Subtotal =	**$**	**333,000.00**
SUMMARY OF BUDGET PHASES				
Preliminary Engineering (PE)			**$**	**137,000.00**
Right of Way (RW)			**$**	**333,000.00**
Construction (CN)			**$**	**618,000.00**
TOTAL RECOMMENDED PROJECT BUDGET			**$**	**1,088,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Waterman Drive Corridor
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification		C&G + Shared-Use Path
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	88,000.00
Roadway Improvements		$	148,000.00
Stormwater & Hydraulics	50%	$	118,000.00
Miscellaneous Construction	20%	$	71,000.00
	Subtotal A =	**$**	**425,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	37,000.00
Construction Surveying	1.5%	$	7,000.00
Materials Testing	2%	$	9,000.00
Construction Engineering & Inspection	15%	$	72,000.00
Contingency for CN (Construction + Other)	50%	$	275,000.00
	Subtotal B =	**$**	**400,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**825,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	165,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	17,000.00
	Subtotal C =	**$**	**182,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**1,007,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	152,000.00
Right of Way - Administrative Costs		$	30,000.00
Right of Way - Acquisition Costs		$	91,000.00
Contingency for Right of Way/Utility	50%	$	137,000.00
	ROW Subtotal =	**$**	**410,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**182,000.00**
Right of Way (RW)		**$**	**410,000.00**
Construction (CN)		**$**	**825,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**1,417,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
W Market Street Crossing & Quarry Heights Connection
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification			
				Signalized Ped Crossing + Shared Use Path
CONSTRUCTION BID COSTS				
Grading & Earthwork			$	16,000.00
Roadway Improvements			$	153,000.00
Stormwater & Hydraulics	20%		$	34,000.00
Miscellaneous Construction	20%		$	41,000.00
		Subtotal A =	**$**	**244,000.00**
OTHER BID COSTS FOR CONSTRUCTION				
Mobilization for Subtotal A (Calc from VDOT formula)			$	24,000.00
Construction Surveying	1.5%		$	4,000.00
Materials Testing	2%		$	5,000.00
Construction Engineering & Inspection	15%		$	42,000.00
Contingency for CN (Construction + Other)	50%		$	160,000.00
		Subtotal B =	**$**	**235,000.00**
		TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**479,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)				
Survey, Design Services, & Permitting	15%		$	72,000.00
Environmental Coordination	0%		$	-
Contingency for PE	10%		$	8,000.00
		Subtotal C =	**$**	**80,000.00**
		GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**559,000.00**
RIGHT OF WAY & UTILITY COSTS				
Utility Coordination & Relocation	15%		$	84,000.00
Right of Way - Administrative Costs				
Right of Way - Acquisition Costs				
Contingency for Right of Way/Utility	50%		$	42,000.00
		ROW Subtotal =	**$**	**126,000.00**
SUMMARY OF BUDGET PHASES				
Preliminary Engineering (PE)			**$**	**80,000.00**
Right of Way (RW)			**$**	**126,000.00**
Construction (CN)			**$**	**479,000.00**
TOTAL RECOMMENDED PROJECT BUDGET			**$**	**685,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Friendly City Trail Connection
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification			
				Shared Use Path
CONSTRUCTION BID COSTS				
Grading & Earthwork			$	78,000.00
Roadway Improvements			$	59,000.00
Stormwater & Hydraulics	50%		$	69,000.00
Miscellaneous Construction	50%		$	103,000.00
		Subtotal A =	**$**	**309,000.00**
OTHER BID COSTS FOR CONSTRUCTION				
Mobilization for Subtotal A (Calc from VDOT formula)			$	29,000.00
Construction Surveying	1.5%		$	5,000.00
Materials Testing	2%		$	7,000.00
Construction Engineering & Inspection	15%		$	53,000.00
Contingency for CN (Construction + Other)	50%		$	356,000.00
		Subtotal B =	**$**	**450,000.00**
		TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**759,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)				
Survey, Design Services, & Permitting	20%		$	152,000.00
Environmental Coordination	0%		$	-
Contingency for PE	10%		$	16,000.00
		Subtotal C =	**$**	**168,000.00**
		GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**927,000.00**
RIGHT OF WAY & UTILITY COSTS				
Utility Coordination & Relocation	15%		$	140,000.00
Right of Way - Administrative Costs				
Right of Way - Acquisition Costs				
Contingency for Right of Way/Utility	50%		$	70,000.00
		ROW Subtotal =	**$**	**210,000.00**
SUMMARY OF BUDGET PHASES				
Preliminary Engineering (PE)			**$**	**168,000.00**
Right of Way (RW)			**$**	**210,000.00**
Construction (CN)			**$**	**759,000.00**
TOTAL RECOMMENDED PROJECT BUDGET			**$**	**1,137,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue/Waterman Drive
Peanut Roundabout (WB-40)
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

(Input Length of Roadway, (FT)) Facility Classification			Peanut Roundabout Designed for WB-40
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	83,000.00
Roadway Improvements		$	564,000.00
Stormwater & Hydraulics	70%	$	453,000.00
Miscellaneous Construction	30%	$	330,000.00
	Subtotal A =	**$**	**1,430,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	102,000.00
Construction Surveying	1.5%	$	22,000.00
Materials Testing	2%	$	29,000.00
Construction Engineering & Inspection	15%	$	238,000.00
Contingency for CN (Construction + Other)	50%	$	911,000.00
	Subtotal B =	**$**	**1,302,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**2,732,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	547,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	55,000.00
	Subtotal C =	**$**	**602,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**3,334,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	501,000.00
Right of Way - Administrative Costs		$	70,000.00
Right of Way - Acquisition Costs		$	259,000.00
Contingency for Right of Way/Utility	50%	$	415,000.00
	ROW Subtotal =	**$**	**1,245,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**602,000.00**
Right of Way (RW)		**$**	**1,245,000.00**
Construction (CN)		**$**	**2,732,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**4,579,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue/Waterman Drive
Peanut Roundabout (WB-62)
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification		Peanut Roundabout Designed for WB-62
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	93,000.00
Roadway Improvements		$	885,000.00
Stormwater & Hydraulics	70%	$	685,000.00
Miscellaneous Construction	30%	$	499,000.00
	Subtotal A =	**$**	**2,162,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	139,000.00
Construction Surveying	1.5%	$	33,000.00
Materials Testing	2%	$	44,000.00
Construction Engineering & Inspection	15%	$	357,000.00
Contingency for CN (Construction + Other)	50%	$	1,368,000.00
	Subtotal B =	**$**	**1,941,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**4,103,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	821,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	83,000.00
	Subtotal C =	**$**	**904,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**5,007,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	752,000.00
Right of Way - Administrative Costs		$	70,000.00
Right of Way - Acquisition Costs		$	467,000.00
Contingency for Right of Way/Utility	50%	$	645,000.00
	ROW Subtotal =	**$**	**1,934,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**904,000.00**
Right of Way (RW)		**$**	**1,934,000.00**
Construction (CN)		**$**	**4,103,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**6,941,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue/Waterman Drive
Offset Intersection (WB-40)
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification		Offset Intersection Designed for WB-40
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	47,000.00
Roadway Improvements		$	230,000.00
Stormwater & Hydraulics	70%	$	194,000.00
Miscellaneous Construction	30%	$	142,000.00
	Subtotal A =	**$**	**613,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	51,000.00
Construction Surveying	1.5%	$	10,000.00
Materials Testing	2%	$	13,000.00
Construction Engineering & Inspection	20%	$	138,000.00
Contingency for CN (Construction + Other)	50%	$	413,000.00
	Subtotal B =	**$**	**625,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**1,238,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	248,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	25,000.00
	Subtotal C =	**$**	**273,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**1,511,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	227,000.00
Right of Way - Administrative Costs		$	20,000.00
Right of Way - Acquisition Costs		$	28,000.00
Contingency for Right of Way/Utility	50%	$	138,000.00
	ROW Subtotal =	**$**	**413,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**273,000.00**
Right of Way (RW)		**$**	**413,000.00**
Construction (CN)		**$**	**1,238,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**1,924,000.00**

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

City of Harrisonburg
Chicago Avenue/Waterman Drive
Offset Intersection (WB-62)
Preliminary Planning Cost Estimate - March 2025
City of Harrisonburg, Virginia

CITY OF HARRISONBURG PUBLIC WORKS

	(Input Length of Roadway, (FT)) Facility Classification		Offset Intersection Designed for WB-62
CONSTRUCTION BID COSTS			
Grading & Earthwork		$	47,000.00
Roadway Improvements		$	232,000.00
Stormwater & Hydraulics	70%	$	196,000.00
Miscellaneous Construction	30%	$	143,000.00
	Subtotal A =	**$**	**618,000.00**
OTHER BID COSTS FOR CONSTRUCTION			
Mobilization for Subtotal A (Calc from VDOT formula)		$	52,000.00
Construction Surveying	1.5%	$	10,000.00
Materials Testing	2%	$	13,000.00
Construction Engineering & Inspection	20%	$	139,000.00
Contingency for CN (Construction + Other)	50%	$	416,000.00
	Subtotal B =	**$**	**630,000.00**
	TOTAL ROADWAY CONSTRUCTION ITEMS (A + B):	**$**	**1,248,000.00**
PRELIMINARY ENGINEERING (DESIGN & ADMINISTRATIVE COSTS)			
Survey, Design Services, & Permitting	20%	$	250,000.00
Environmental Coordination	0%	$	-
Contingency for PE	10%	$	25,000.00
	Subtotal C =	**$**	**275,000.00**
	GRAND TOTAL ROADWAY ITEMS (A+B+C):	**$**	**1,523,000.00**
RIGHT OF WAY & UTILITY COSTS			
Utility Coordination & Relocation	15%	$	229,000.00
Right of Way - Administrative Costs		$	20,000.00
Right of Way - Acquisition Costs		$	41,000.00
Contingency for Right of Way/Utility	50%	$	145,000.00
	ROW Subtotal =	**$**	**435,000.00**
SUMMARY OF BUDGET PHASES			
Preliminary Engineering (PE)		**$**	**275,000.00**
Right of Way (RW)		**$**	**435,000.00**
Construction (CN)		**$**	**1,248,000.00**
TOTAL RECOMMENDED PROJECT BUDGET		**$**	**1,958,000.00**