

Intersection Improvements for Chandler and May Streets

Worcester, Massachusetts

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Executive Summary

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by the City of Worcester through the Department of Public Works & Parks (DWP&P) to provide engineering services for the design of roadway and traffic control improvements for an 1,100-foot section of the Chandler Street (Route 122) corridor, including the southern intersection with May Street, the intersection with Claridge Drive, and the northern intersection with May Street. This corridor abuts the Chandler Magnet Elementary School, the May Street Elementary School, and the Worcester State University (WSU) Campus along with associated recreational facilities.

The project proposes to introduce traffic calming measures to moderate the interaction of high traffic volumes and speeds with high volumes of student pedestrians, cyclist, and transit users. There are nine crosswalks, three transit stops, and on-street parking on both sides of the streets to accommodate the student population.

The preferred alternative includes the construction of new modern roundabouts at the northern and southern intersections of Chandler Street and May Street and Complete Streets improvements along the corridor. Work on Chandler Street will include mill and overlay of existing pavement, sidewalk reconstruction, bicycle facilities, installation of median/splitter islands, lighting, and landscaping/hardscaping for a distance of approximately 1,100-feet.

Chandler Street reconstruction will start approximately 250-feet to the north and south of each May Street intersection. Minor work will be performed on May Street and Claridge Drive to tie into the Chandler Street improvements. The construction will include bicycle and pedestrian accommodations, ADA compliant wheelchair ramps, new reflectorized thermoplastic pavement markings, and regulatory and warning signs.

1

Introduction

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by the City of Worcester through the Department of Public Works & Parks (DWP&P) to provide engineering services for the design of roadway and traffic control improvements for Chandler Street. The proposed work includes the construction of two modern roundabouts at the northern and southern intersections of May Street and Chandler Street with the addition of median islands, curbing, and landscaping/hardscaping. The project will also include upgraded pedestrian, transit, and cycling facilities.

This Functional Design Report (FDR) satisfies part of the 25-percent design stage requirements of the Massachusetts Department of Transportation (MassDOT). It contains a summary of traffic volumes, crash data, roadway geometry, traffic signal warrants, and intersection analyses. Recommendations for roadway and traffic control improvements for the study area intersections are based on the analyses findings, field observations, and feedback from the City and Worcester State University (WSU).

The improvement plan also takes into consideration the MassDOT Healthy Transportation Engineering Directive relative to multi-modal accommodations to the extent feasible, while at the same time, balancing impacts to abutters and on-street parking. Figure 1-1 illustrates the project area.



Figure 1-1

Chandler Street
Worcester, MA

Project Description

This project is a result of a study conducted by the City of Worcester, WSU Students, and VHB in 2016. That study identified concerns with traffic volumes, vehicle speeds, the high numbers of students parking and crossing the street, and overall safety of elementary school children. As a consequence, various conceptual designs were presented, including signalization, roundabouts, and channelization alternatives. As a short-term improvement, the City restriped the corridor and added Rectangular Rapid Flashing Beacon (RRFB) pedestrian warning assemblies at three crosswalks, which is the existing conditions today since 2017.

After considering the various alternatives, the project proposes the following improvements:

1. Chandler Street at May Street (North) – Construct a modern, single-lane roundabout with an inscribed diameter of 120 feet.
2. Chandler Street at May Street (South) – Construct a modern, single-lane roundabout with an inscribed diameter of 100 feet.
3. Chandler Street Corridor – Provide sidewalks, bicycle facilities, on-street parking, crosswalks, and transit stops to accommodate the high frequency of pedestrian use.

Per MassDOT standards, a roadway cross-section with the following attributes are proposed:

- 11-foot travel lanes (one each direction),
- 2-foot shoulders next to channelizing and median islands,
- 7- to 8-foot wide on-street parking bays on each side of roadway,
- 6-foot on-street bicycle lane adjacent to on-street parking,
- 2-foot minimum shoulders adjacent to on-street parking without bicycle lanes,
- 5-foot minimum sidewalks, and
- 10- to 15-foot shared use path with 0- to 5- buffer along both sides of roadway from roundabout to roundabout.

As part of the 10-percent Design Submission, VHB prepared a memorandum that included a discussion on parking impacts, comparison to signalized intersections, and preliminary traffic analyses. Some of the findings in this FDR may differ from this memorandum due to continued calibration of the traffic models and further design development. The 10-percent memorandum is included as Appendix H.

Prior Traffic Studies

VHB conducted a Study for the City of Worcester in August of 2016. The study memo is included as Appendix I. The 2016 study area is shown in Figure 1-2: 2016 Study Area. The study was undertaken to address the following issues and concerns:

- Parking – The demand for on- and off-street parking in the area had increased significantly due to the surrounding various educational, institutional and residential uses. Parking within the adjacent residential neighborhoods (by students) was identified as an issue.
- Pedestrian Safety – There were concerns for the safety of the many pedestrians crossing the street due to the traffic volumes and speeds.
- Vehicle Speeds – There were concerns that the wide-open pavement areas encouraged speeding.
- Safety at Intersections – The intersections were identified as having a slightly elevated crash rate when compared to District 3 averages.
- Bicycle Accommodations – There was a lack of lane designations for bicycles. Separated bicycle lanes were painted on either side of the road following the study.

Figure 1-2: 2016 Study Area



In November 2015 a field walk with Worcester DPW&P, WSU Representatives, City Police and concerned residents occurred to discuss issues and concerns. A meeting with the Chandler Magnet School following this field walk also occurred. Following these field walks, and also in November 2015, a public meeting was held at WSU where approximately 35 residents and public officials attended to discuss issues and

opportunities (VHB was also in attendance). Prior to these meetings, WSU students (in collaboration with Worcester DPW&P) conducted a neighborhood survey that resulted in 59 responses. The comments received from the survey and various field walks and meetings are as follows:

- Dissatisfaction with WSU for failing to keep pace with increased demand for parking caused by its students.
- Much greater concern about the safety of the southern May-Chandler intersection than the northern May-Chandler intersection.
- Few issues with the Chandler Street and Claridge Drive intersection.
- Concern about pedestrian crossing safety, especially where parked vehicles impede the line of sight of pedestrians stepping off the curb.
- Complaints about pedestrian behavior and underutilization of crosswalks.
- A majority of people consider traffic a higher priority than parking, although those who favor parking were more vocal.
- No consensus about which time of day has the worst traffic conditions.
- Complete lack of interest in improved bicycle accommodations, even though respondents acknowledge that bike safety could be improved.
- Moderate interest in signaling the Chandler-May intersections.
- More concern with the May Street Elementary School than the Chandler Magnet school, especially with the safety of the younger students attending this school. However, this portion of May Street is outside the Study Area.
- Many expressed satisfaction with the existing configuration and indicated that the behavior/speed of drivers was the main issue. Speed traps were suggested a few times.

The study depended on traffic and pedestrian volumes collected by WSU students and DPW&P and supplemented with MassDOT data. Crash data was also collected from the Worcester Police Department and MassDOT's crash database. An inventory of on-street parking recorded 238 vehicles parked on-street within the study area corridor.

An analysis of the available data resulted in three conceptual improvements:

- Concept 1: Unsignalized intersections at May Street (north and south) at Chandler Street. A raised median with low plantings and narrow trees would be proposed and the intersections would be reconfigured to improve traffic flow and safety.
- Concept 2: Concept 1, but with the intersections of May Street (north and south) at Chandler Street signalized.
- Concept 3: A roundabout would be proposed at each of the May Street (north and south) at Chandler Street intersections. A raised median with low plantings and narrow trees would be proposed where applicable.

As previously noted, in 2017 the City implemented new pavement markings in an attempt to immediately address concerns. These markings closely mimicked Concept 1, however some modifications were made. This is the striping that exists today. The City then decided to proceed with completing a more detailed design and improvement plan that could be pursued as part of the State Transportation Improvement Program (TIP). Traffic signals, roundabouts, and raised median were to be reviewed on a surveyed base plan so the preferred alternative could be determined.

Project Scope

This FDR provides a brief summary and discussion of the needs, benefits, and issues relating to the proposed roadway/traffic control improvements for the study area intersections. The data profile sections provide a quick reference for existing and proposed intersection characteristics such as geometry and roadway operating conditions. A summary of these findings is also provided as a measure of the effectiveness (MOE) of the proposed improvements. Appendix A provides the methodology used to evaluate traffic flow performance. The remaining appendices provide complete supporting information relating to the existing conditions data, signal warrant analyses, and capacity analysis worksheets for the project area intersections.

Analysis Criteria

As stipulated by the MassDOT review process the following design conditions were evaluated for this project:

- 2019 Existing Traffic Volumes with Existing Geometry;
- 2029 Future Traffic Volumes with Existing Geometry;
- 2029 Future Traffic Volumes with Proposed Geometry

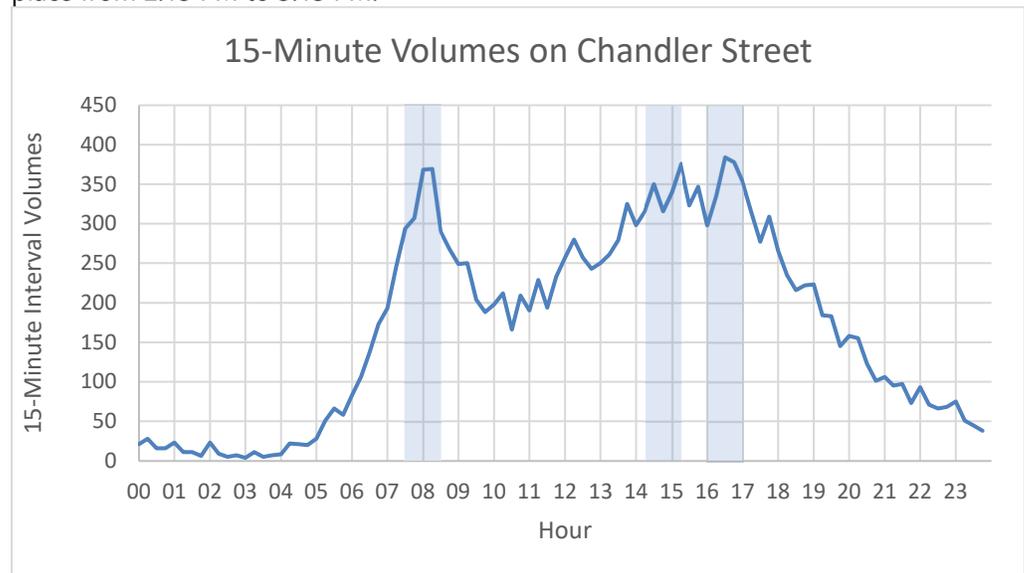
The term "geometry" represents all traffic control measures including physical roadway geometry and traffic signals. A projected 2029 design condition has been used to measure the effectiveness of the proposed improvements based on the project's current 2025 TIP schedule. See the Adjusted Existing Traffic Volumes section on the use of 2019 traffic volumes.

Existing Traffic Volumes

Boston Traffic Data conducted manual turning movement counts (TMCs) in the study area on Tuesday, February 5th and Wednesday, February 6th, 2019 between 7:00 AM and 8:45 AM for the weekday morning peak period and between 12:00 PM and 6:00 PM for the weekday evening peak period at the following locations:

- 1a. Chandler Street at WSU Exit North
- 1b. Chandler Street at Chandler Magnet School.
2. Chandler Street at May Street North
3. Chandler Street at Claridge Drive
4. Chandler Street at May Street South
5. Chandler Street at WSU Exit South

Based on these counts, the study area intersections weekday morning and weekday evening peak hours were determined to be 7:30 AM to 8:30 AM and 4:00 PM to 5:00 PM, respectively. Due to the concurrence of exiting times of the elementary school and university, a third peak hour (termed the “school peak”) was observed to take place from 2:15 PM to 3:15 PM.



This data from an Automatic Traffic Recorder placed on Chandler Street illustrates the three peak hours – morning, school, and evening – with the shaded regions representing the peak hours.

In addition to TMCs, Automatic Traffic Recorder (ATRs) counts were conducted for a continuous 48 hour-period on a typical weekday, Wednesday, January 23rd and Thursday, January 24th, 2019 at the following locations. Unless otherwise noted, all locations recorded data for 48-hours and included volumes, speeds and vehicle-class.

1. Chandler Street north of May Street North;
2. May Street North east of Chandler Street;
3. Chandler Street north of Claridge Drive;
4. Claridge Drive east of Chandler Street (volume only);
5. Chandler Street south of May Street South; and
6. May Street South east of Chandler Street.

Traffic count reports are included in Appendix B.

Seasonal Variations

Traffic data was collected in late January and early February as all of the three adjacent institutions (Worcester State University, May Street Elementary School, and Chandler Magnet School) were in session at this time. Chandler Street is an Urban Principal Arterial and May Street is an Urban Major Collector. Per the MassDOT 2019 Weekday Seasonal and Axle Correction Factors, Chandler Street is within the U3 group where February traffic volumes need to be adjusted up by a factor of 1.03 to an average condition. May Street is within the U4-U7 group and February traffic volumes represent an average condition. Therefore for a conservative analysis, traffic volumes have been seasonally adjusted by 1.03.

Pedestrian and Bicycle Volumes

Bicycle and pedestrian volumes were recorded for the same periods as the peak hour traffic volumes discussed previously. Bicycle and pedestrian activity throughout the project area is very high due to the proximity of the university. Additional review was conducted to review the speed of vehicles at high-activity crosswalks. Chandler Street contains a bike lane on both sides of the street between the travel lanes and the parking lanes.

Adjusted Existing Traffic Volumes

The on-going COVID-19 pandemic caused traffic volumes to plummet in March 2020 and as stay-at-home mandates and travel restrictions have lifted, traffic volumes have slowly rebounded to pre-pandemic levels. Per MassDOT Engineering Directive E-20-005, count data older than 2-years may be used for studies if appropriate adjustments are made. Current trends throughout the Commonwealth indicate 2019 volumes mimic current conditions and therefore no pandemic-related adjustments have been made.

2019 seasonally adjusted traffic volumes are presented in Figure 1-3, 1-4, 1-5 for the weekday morning, school, and evening peak periods, respectively. February pedestrian counts are also shown. Bicycle counts are not presented as volumes were seasonably low, likely due to cooler temperatures in February.

Area Growth/Design Year Volumes

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. Several methods can be used to estimate this growth. A procedure frequently employed is to estimate an annual percentage increase and apply that increase to study area traffic volumes. An alternative procedure is to identify estimated traffic generated by planned new major

developments that would be expected to impact the project study area roadways. For the purpose of this assessment, both methods were utilized.

Historic Traffic Growth

Per MassDOT Yearly Growth Rates information, Urban Principal Arterials increased 0.4 percent from 2018 to 2019 and Urban Collectors decreased by 0.4 percent from 2018 to 2019. Per discussion with Worcester City Planning and Development staff, a 1.0 percent per year growth rate is preferred to accommodate general background growth and future development at the regional Worcester Airport. Therefore a 1.0 percent annual rate increase in traffic would be appropriate to provide a conservative analysis of growth over a ten year period.

Site-specific Growth

No specific development project has been identified that would significantly increase traffic volumes within the project area.

Design Year Traffic Volumes

The 2029 Design Year traffic volumes are presented in Figure 1-6, 1-7, 1-8 for the weekday morning, school, and evening peak periods, respectively.

Traffic Performance Measures

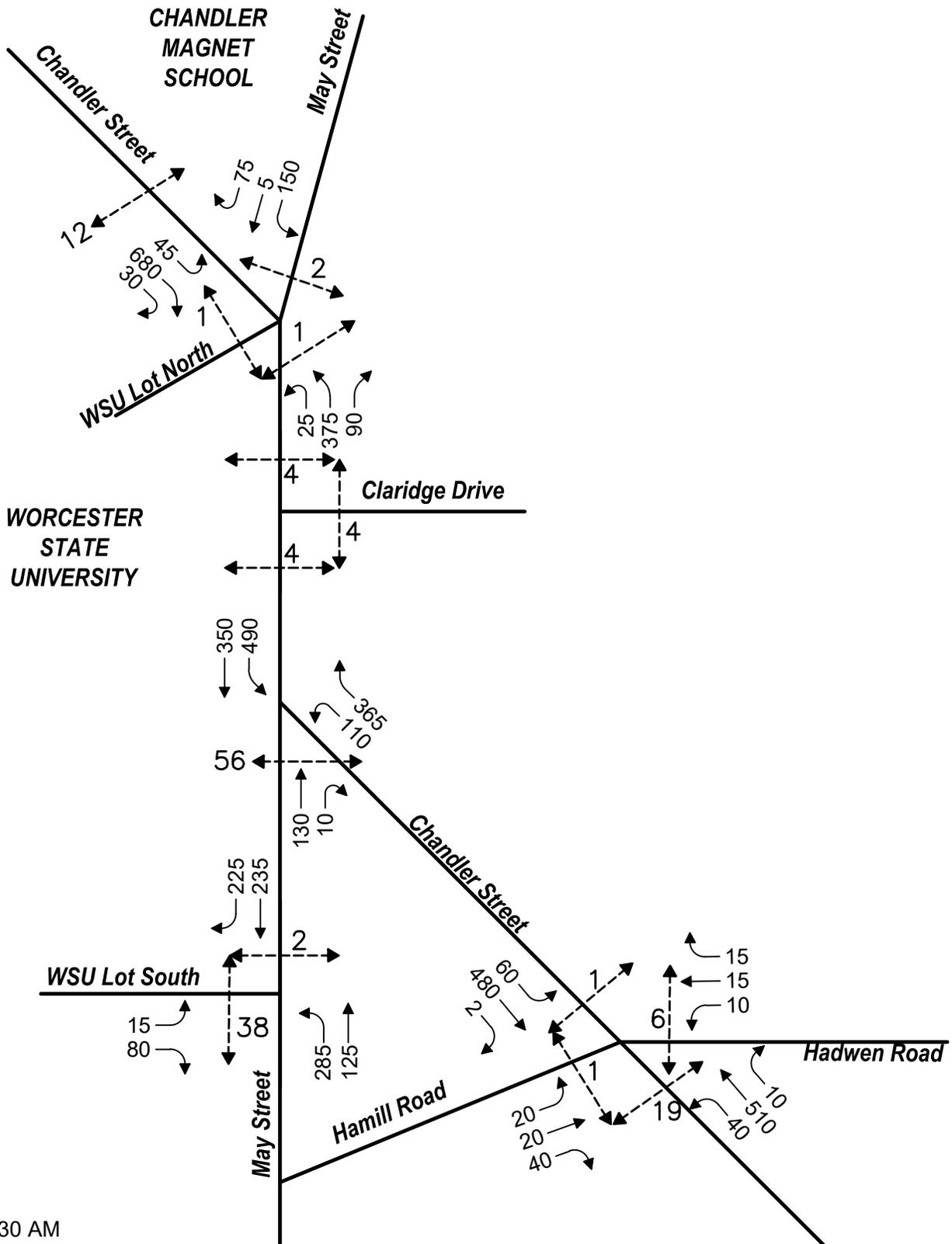
Level-of-service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volumes loading. It is a qualitative measurement of the effect of a number of factors including roadway geometry, speed, travel delay and freedom to maneuver. Level-of-service provides an index to the operational qualities of a roadway segment or an intersection with letter designations ranging from A to F. LOS A represents the best operating condition, and LOS F represents the worst operating condition.

For unsignalized intersections, the analysis assumes that the traffic on the mainline is not affected by traffic on the side streets. Therefore, level-of-service designations are determined for the critical movements at the intersection, which are typically the turning movements. The methodology for roundabouts is similar to unsignalized intersections but adjusted for yield-control instead of STOP-control. The evaluation criteria used to analyze the study intersections are based on the Highway Capacity Manual¹ and described more fully in Appendix A of this report.



¹ Highway Capacity Manual 6th Edition; Transportation Research Board, Washington, D.C., 2016.

xx → Traffic Volume
 xx ←--- Pedestrian Volume



2019 Weekday Morning
 Peak Hour Traffic Volumes
 Seasonally Adjusted & Rounded

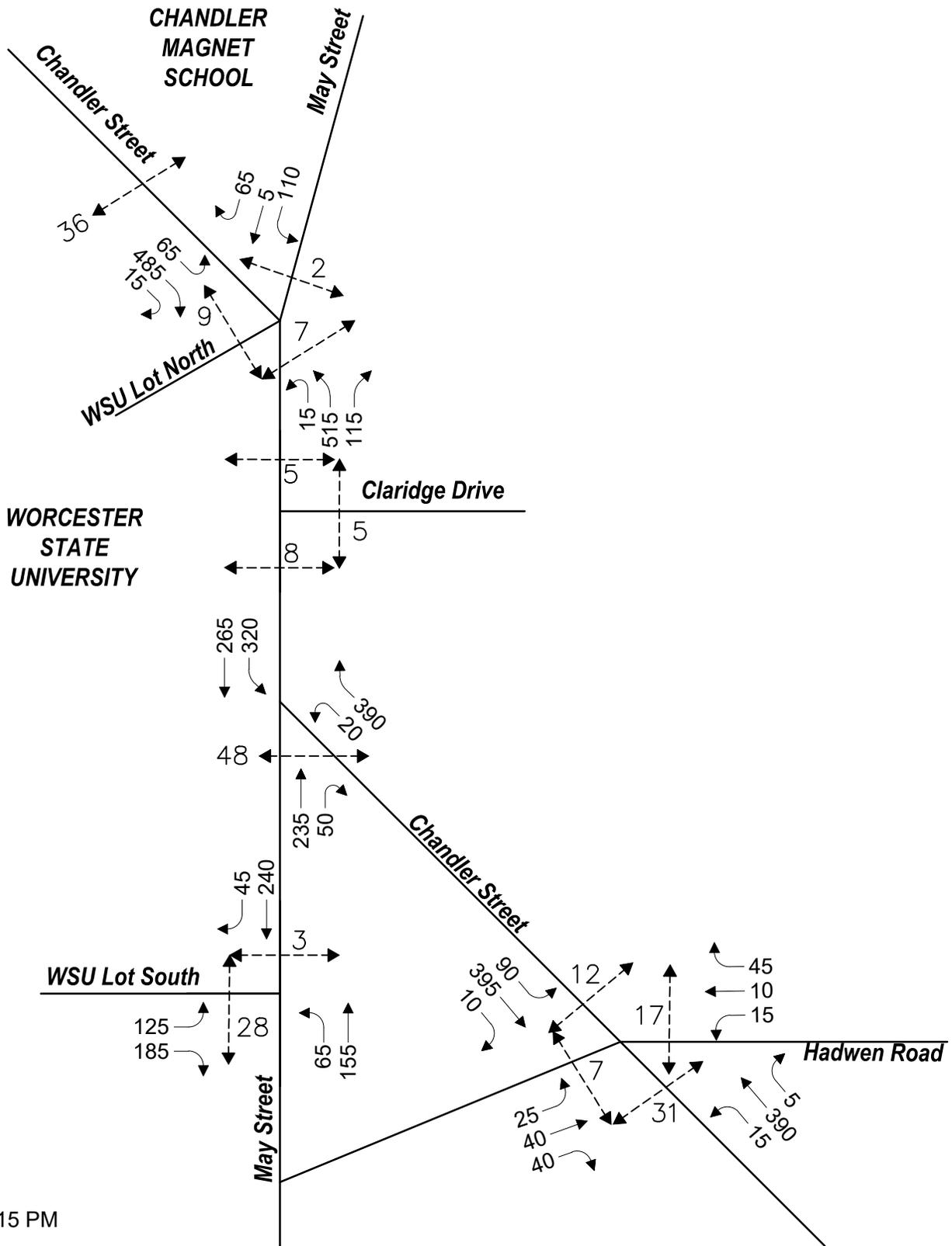
Figure 1-3

Chandler Street
 Worcester, MA



Not to Scale

xx → Traffic Volume
 xx ←--> Pedestrian Volume



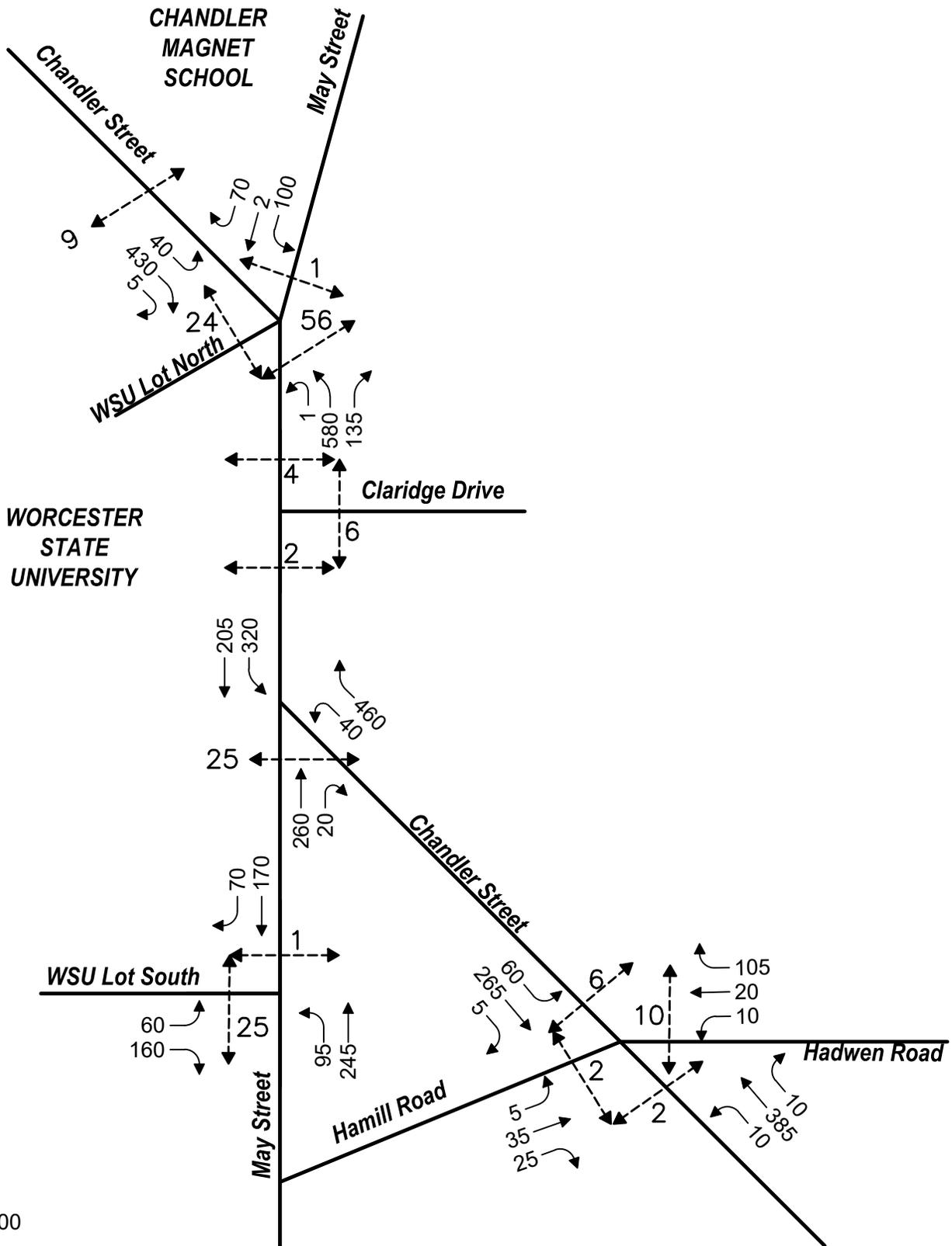
2019 Weekday School
 Peak Hour Traffic Volumes
 Seasonally Adjusted & Rounded

Figure 1-4
 Chandler Street
 Worcester, MA



Not to Scale

xx → Traffic Volume
 xx ←--- Pedestrian Volume



2019 Weekday Evening
 Peak Hour Traffic Volumes
 Seasonally Adjusted & Rounded

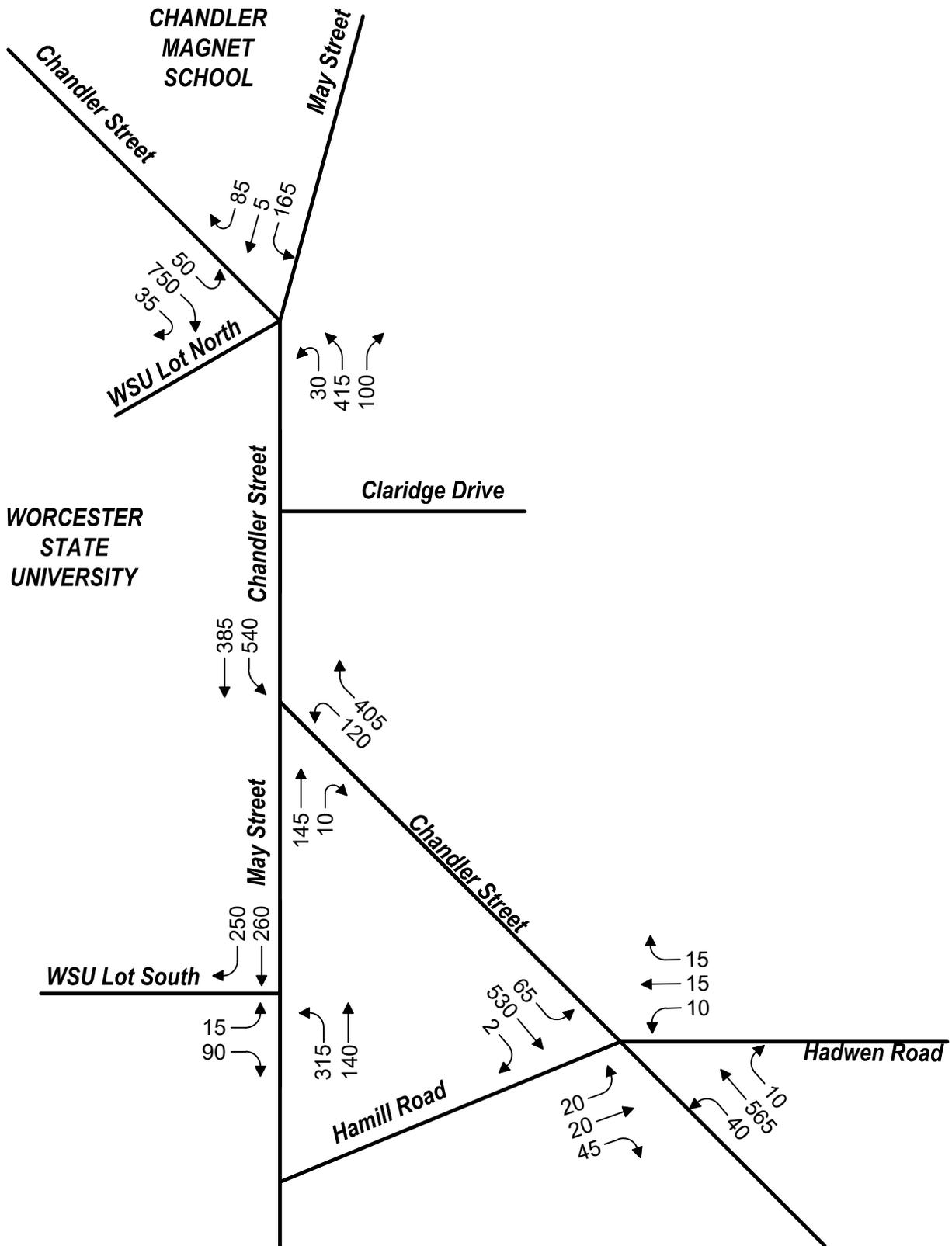
Figure 1-5

Chandler Street
 Worcester, MA



Not to Scale

xx → Traffic Volume



2029 Weekday Morning Peak Hour Traffic Volumes

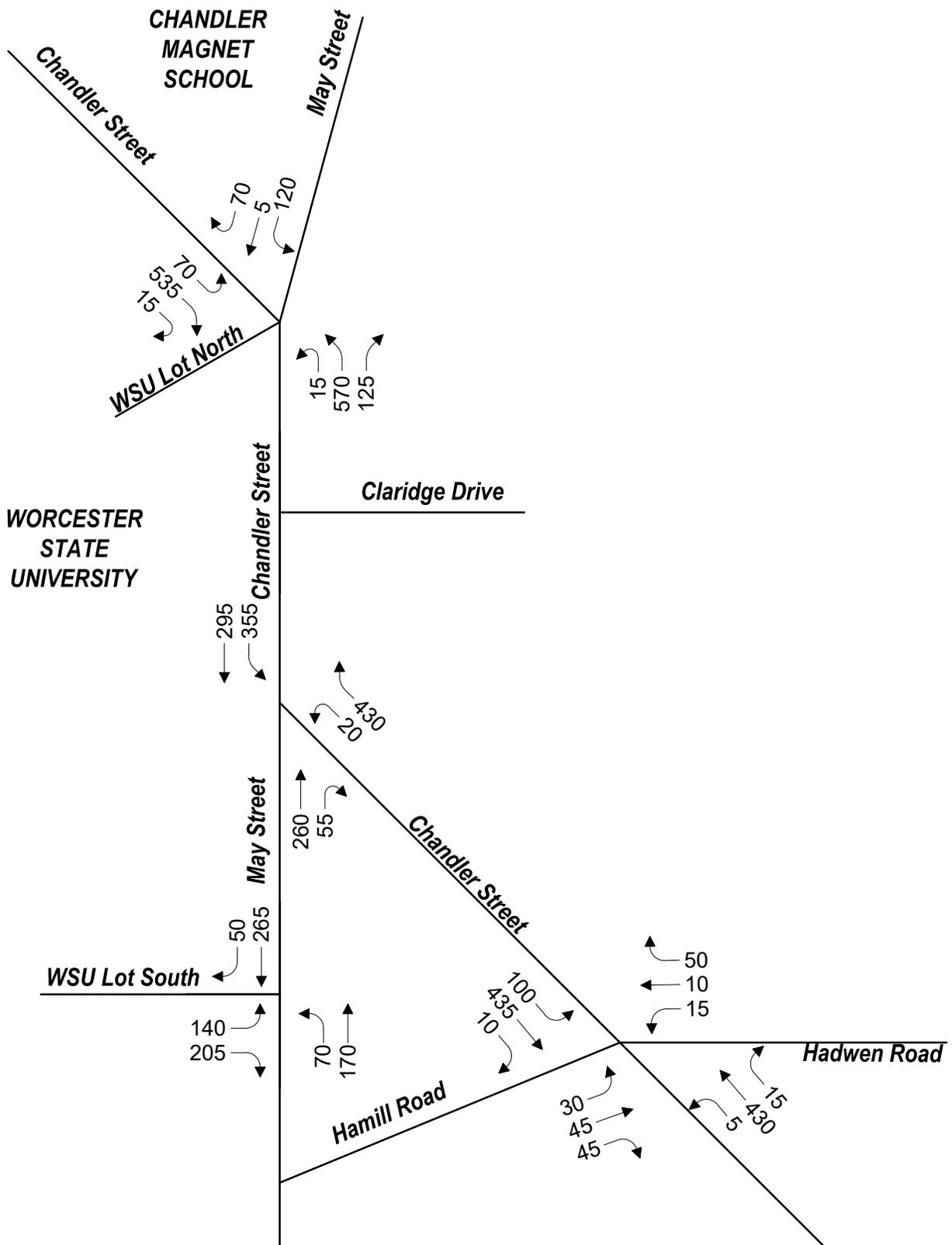
Figure 1-6

Chandler Street
Worcester, MA



Not to Scale

xx → Traffic Volume



2029 Weekday School Peak Hour Traffic Volumes

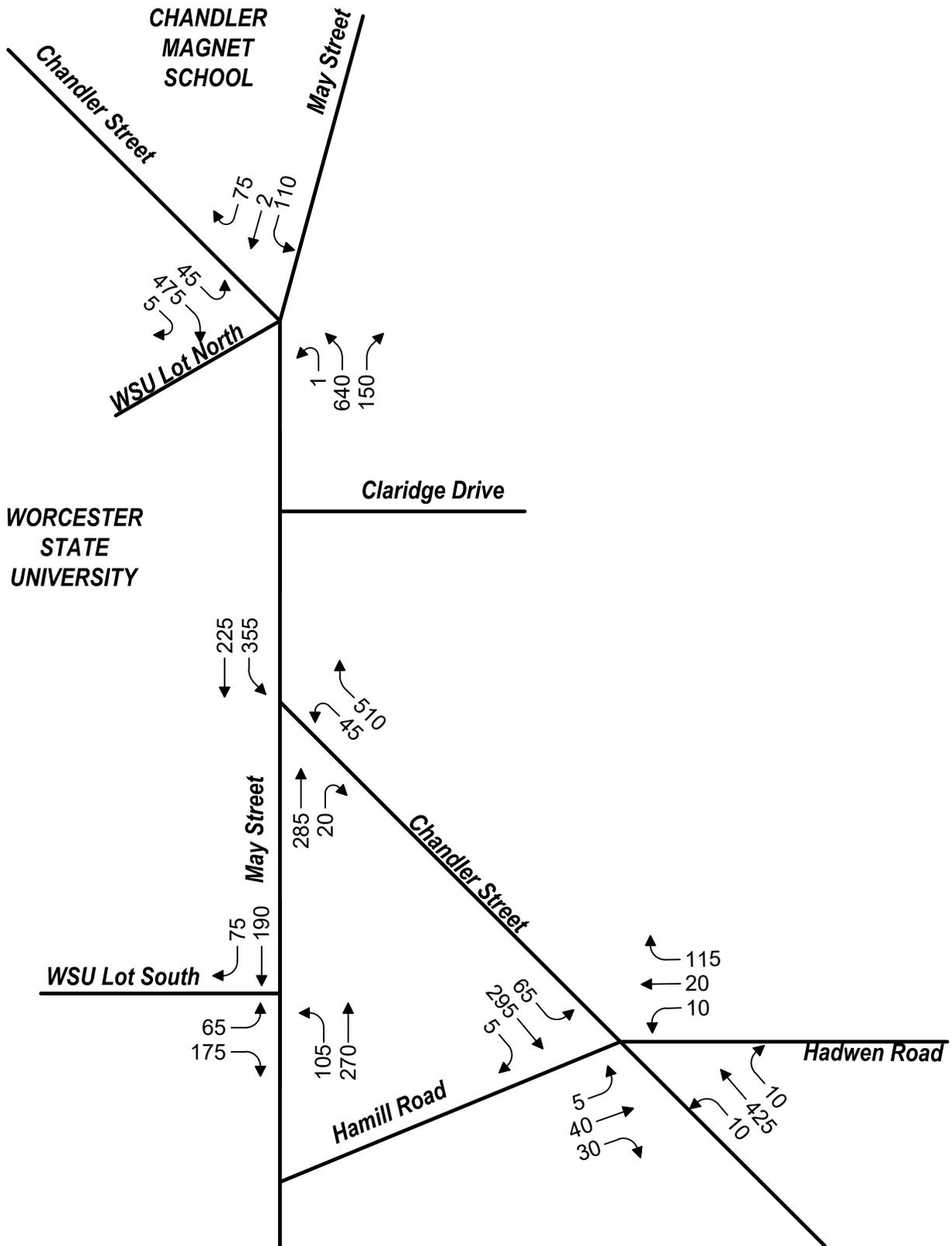
Figure 1-7

Chandler Street Worcester, MA



Not to Scale

xx → Traffic Volume



2029 Weekday Evening Peak Hour Traffic Volumes

Figure 1-8

Chandler Street Worcester, MA



Not to Scale

2

Existing Conditions

The City of Worcester is the second largest city in New England with a population of 181,045 (2010 US Census). It is the Worcester County seat and serves as the major economic, educational, and cultural center for central Massachusetts. Chandler Street (Route 122) is the major northwest-southeast corridor in the western side of the city. Chandler Street is classified as an Urban Principal Arterial under municipal jurisdiction and it is on the NHS system. May Street is classified as a Major Collector under municipal jurisdiction and is not on the NHS system.

Summary of Existing Conditions

Chandler provides an access route to the Worcester Airport, the Tatnuck neighborhood, and as a commuter route between the western suburbs and downtown Worcester. The surrounding land uses include a suburban type residential neighborhood and in the immediate project area includes the May Street Elementary School, the Chandler Magnet Elementary School and Worcester State University (WSU). An aerial is inserted below showing existing conditions, see Figure 2-1 below.

Chandler Street at May Street (Southern Intersection)

The southern intersection is a Y-type intersection with May Street being stop-controlled. Chandler Street southbound traffic splits into two lanes at Claridge Drive, with each lane providing uninterrupted flow through to May Street or Chandler Street. These lanes are not formally channelized and instead are designated through pavement markings .

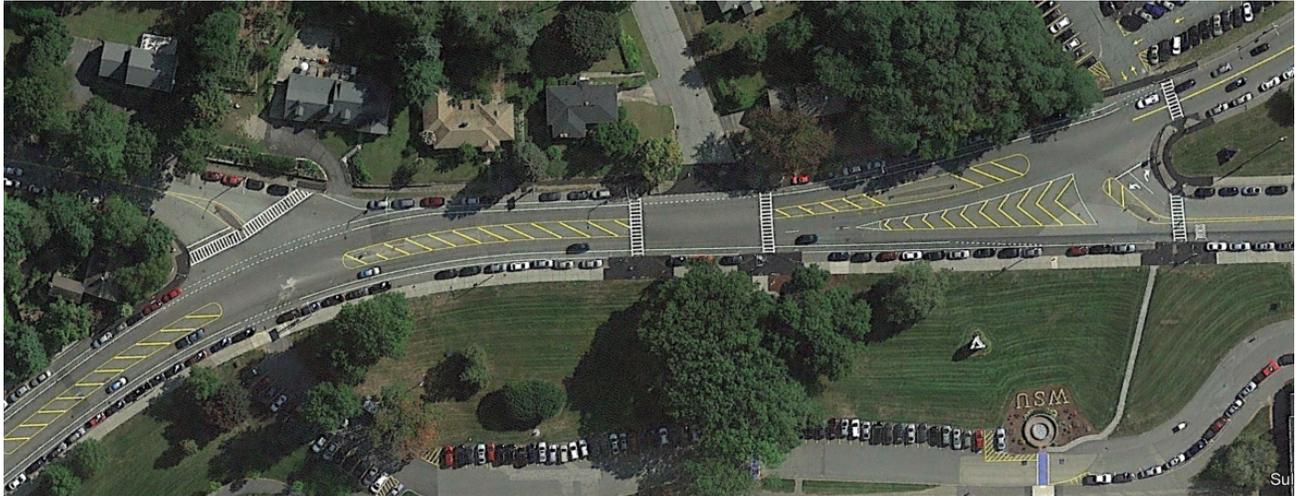
Chandler Street at May Street (Northern Intersection)

The northern intersection of May Street and Chandler Street is also a Y-type intersection with May Street having the stop controlled approach. The May Street throat is nearly 120-foot wide with a marked crosswalk spanning the width. There is also a small splitter island.

Claridge Drive Intersection

The intersection of Claridge Drive is a T-type intersection with Claridge Drive having the stop controlled approach. There is a marked crosswalk across Claridge Drive and two marked crosswalks across Chandler Street on either side.

Figure 2-1: Chandler Street Corridor – Existing Conditions



Note: oriented with north to left

Pedestrian and Bicycle Facilities

In general, the study area is an urbanized neighborhood district with sidewalks and bicycle lanes on both sides of Chandler Street. There are nine crosswalks within the project area connecting both sides of the street. There are RRFBs on Chandler and May Street at the southern intersection. Pedestrian crossing signs (W11-2) are used at the remaining crosswalks. The sidewalks are concrete and of varying width along the project area.

School Facilities

The three school facilities located within the project area create multi-modal traffic patterns based on the dismissal of classes.

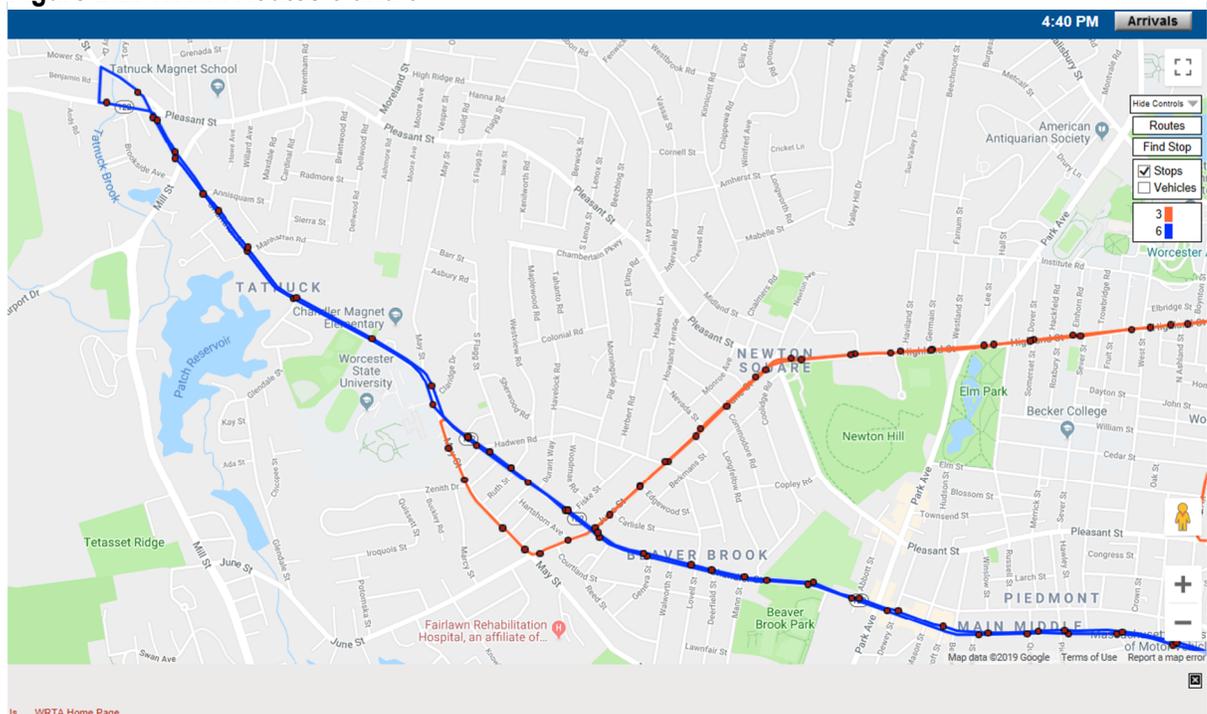
The May Street Elementary school (south of WSU) dismisses students around 2:30 PM, which effectively closes down the southerly segment of May Street from Hamill Road to Chandler Street. During this time through traffic is completely stopped to allow for children to board buses that are stationed on the street. At the same time, many WSU students exit the campus just north of the school, and vehicles exiting the parking lots and garage who desire to travel to the south travel north on May Street and make a right turn onto Chandler Street to avoid the elementary school dismissal.

There is also a satellite parking lot on the easterly side of the May Street (southerly intersection)/ Chandler Street intersection where WSU students cross May Street and Chandler Street via the pedestrian crosswalks.

Transit Facilities

The project area is served by the Worcester Regional Transit Authority (WRTA); Routes 3 and 6. The Route 3 bus does a counter-clock-wise loop from Chandler Street at the southern May Street intersection and back to downtown via June Street as shown in Figure 2-2 below. The Route 6 bus runs on Chandler Street from downtown to Tatnuck Square. Both bus routes have stops within the project area. Route 6 appears to have a heavily used stop opposite Claridge Drive at the WSU campus and a bus shelter is provided at that location.

Figure 2-2: WRTA Routes 3 and 6



Existing Data Profile

Average Daily Traffic (ADT)

Automatic Traffic Recorders (ATRs) were deployed at six locations in the project area to collect vehicle classification, speed, and volumes. These ATRs were placed in the following locations:

1. Chandler Street between May Street (north) and the Magnet School driveway;
2. May Street (north) north of Chandler Street;
3. Chandler Street between Claridge Drive and May Street (north);
4. Claridge Drive north of Chandler Street (volume only);
5. Chandler Street south of May Street (south); and
6. May Street (south) south of Chandler Street.

Turning Movement Counts (TMCs) were also deployed through the study area to collect vehicle, pedestrian, and bicycle turning movements at the following locations:

- 1A. Chandler Street;
- 1B. Chandler Street at the Magnet School driveway;
2. Chandler Street at May Street (north) intersection;
3. Chandler Street at Claridge Drive;
4. Chandler Street at May Street (south) intersection;
5. May Street (south) at driveway to WSU parking garage driveway; and
6. Chandler Street at Hadwen/Hamill Road (outside scope of project).

Existing 2019 Peak hour data from the automatic traffic recorders shown in Table 2-1 are the highest hourly volume occurring before or after noon on a weekday. These peaks do not necessarily correlate with peak hour volumes obtained from turning movement counts which were collected during typical commuter periods.

The ATR count indicates that on a typical weekday, approximately 16,400 vehicles per day (vpd) travel along Chandler Street between the southern and northern sections of May Street. With approximately two-thirds of the traffic travelling in the southbound direction.

Table 2-1: Existing 2019 Traffic Volume Summary

Location	Daily Weekday	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Volume	K-Factor	Dir Dist	Volume	K-Factor	Dir Dist
Chandler Street, north of May Street North	13,497	1,194	8.8%	61% SB	1130	8.4%	58% NB
May Street North, north of Chandler Street	3,954	319	8.1%	66% SB	319	8.1%	51% NB
Chandler Street, north of Claridge Drive	16,388	1,338	8.2%	58% SB	1395	8.5%	62% NB
Chandler Street, south of May Street South	10,127	987	9.7%	52% SB	822	8.1%	61% NB
May Street South, south of Chandler Street	6,740	466	6.9%	72% SB	563	8.4%	53% SB

Source: Based on automatic traffic recorder (ATR) counts conducted in January 2019

a average daily traffic (ADT) volume expressed in vehicles per day

b peak period traffic volumes expressed in vehicles per hour

c percent of daily traffic that occurs during the peak period

d directional distribution of peak period traffic

Note: peak hours do not necessarily coincide with the peak hours of the individual intersection turning movement counts

Speed

Speed limits are regulatorily set on all roadways within project limits to 30 MPH since these are within a thickly settled area. There are no posted speed limit signs within the project area. There are two school zones within the project limits – the May Street Elementary School is posted as a 20 MPH school zone and the Chandler Magnet Elementary School is not posted. The ATR data collected indicates an 85th percentile speeds as follows:

Table 2-2: 85th Percentile Speeds

ATR Location	Location	85 th Percentile Speed (MPH)	
		NB	SB
1	Chandler Street north of May Street (north)	37	35
2	May Street north of Chandler Street	34	32
3	Chandler Street north of Claridge Drive	41	29
4	Claridge Drive	Volume Only	
5	Chandler Street south of May Street (south)	31	33
6	May Street south of Chandler Street (south)	25	37

Southbound traffic appears to speed up significantly as it veers onto May Street south. At ATR location #6, 19-percent of May Street southbound traffic is traveling above 35 MPH throughout the day. This volume and speed of traffic is directly in conflict with significant numbers of pedestrians and the May Street Elementary School Zone.

At the northern section of the project, vehicle speeds for northbound traffic appears to speed up significantly as it passes Claridge Drive. At ATR location #3, 56-percent of northbound traffic is traveling above 35 MPH throughout the day. This traffic is in direct conflict with the heavy pedestrian traffic across Chandler Street at WSU.

Graphic illustrations of the vehicle speeds and volume of pedestrians may be found in the 10-percent design memorandum included as Appendix H.

Special Speed Regulations for Route 122 may be found in Appendix C yet the portion of Route 122 within the project limits is outside the limits of this regulation.

Existing Crash Analysis

The intersection of Chandler Street and May Street (northern location) was identified by MassDOT as an Highway Safety Improvement Program (HSIP) High Crash Cluster for 2015-2017. A HSIP-eligible location is defined as a crash cluster based on crash incidence and severity that ranks within the top 5% of each Regional Planning Agency, which is the CMRPC (Central Massachusetts Regional Planning Commission) for this location.

As required by MassDOT for High Crash Locations, a Road Safety Audit (RSA) was conducted on August 4, 2020 for the entire project area. The RSA may be found at:

<https://gis.massdot.state.ma.us/arcgis/rest/services/Roads/RoadSafetyAudits/MapServer/0/27767/attachments/28518>

Crash Trends

For the RSA, crashes were summarized by type, severity, time-of-day and weather/pavement conditions to in an attempt to identify crash trends and possible contributing factors. A Collision Diagram prepared for the RSA and provided in Appendix D illustrate that nearly half (28 of 63) of crashes are of the rear-end type and approximately half (22 of 63) are angle or left-turn collisions. Contributing factors to these types of crashes present along the corridor include large volume of turning and through traffic volumes, excessive speed on some approaches, inadequate traffic control devices, and lack of gaps in mainline traffic. The expansive pavement at both intersections coupled with lack of turn signal usage may also be causing drivers on STOP-controlled approaches to misjudge movements of the free-flow traffic.

The Potential Safety Enhancement Summary table from the RSA along with the 25 percent design considerations will be discussed in the next Chapter.

Signal Warranting Condition

A traffic signal warrant analysis was conducted for both of the Chandler Street at May Street intersections. The methodology used to determine if traffic signal controls are warranted is based on the criteria set in the Manual on Uniform Traffic Control Devices (MUTCD)². The MUTCD is the established standard for Warrant analyses and defines nine traffic signal warrants. The Warrants consider the roadway geometry, traffic volume entering the intersection, and speeds. Specifically, the traffic projections were evaluated for three volume-based and one crash-based Warrants.

- **Warrant 1 (Eight Hour Vehicular Volume)** – Warrant 1 is based on any eight hours of a day where the traffic entering the intersection reaches a threshold that warrants considering signal control.
- **Warrant 2 (Four Hour Vehicular Volume)** – Warrant 2 is for any four hours of a day.
- **Warrant 3 (Peak Hour)** – Warrant 3 is for the peak hour of any given day.
- **Warrant 7 (Crash Experience)** – Warrant 7 is satisfied when 80% of the volume requirements of Warrant 1 are met and at least 5 crashes of a type correctable through signalization to have occurred over the last 12 months.

Table 2-3 presents the results of the three most commonly utilized warrants analysis completed for the study intersections. The signal warrant worksheets are provided in Appendix E.

Table 2-3: Traffic Signal Warrants Analysis Summary

	Warrant 1 ^a Met	Warrant 2 ^b Met	Warrant 3 ^c Met
Chandler Street at May Street (Southern Intersection)	Yes	Yes	Yes
Chandler Street at May Street (Northern Intersection)	Yes	Yes	Yes

^a Eight-hour volume warrant

^b Four-hour volume warrant

^c Peak hour volume warrant

^d Crash Experience warrant

There are five other warrants that the intersections likely do not meet, they are:

- **Warrant 4 -Pedestrian Volume:** Pedestrian volumes would need to exceed 107 persons per hour for four hours or 133 persons per hour for one hour to meet criteria for this warrant. A cursory review the Turning Movement Counts show that these thresholds are not likely to be met.

² Manual on Uniform Traffic Control Devices; Part 4 – Highway Traffic Signals; U.S. Department of Transportation/Federal Highway Administration; 2009 Edition.

- Warrant 5-School Crossing: A gap study would be required to establish if there are not adequate gaps in the traffic stream to accommodate students and there must be a minimum of twenty (20) students in the highest hour. A cursory review the Turning Movement Counts show that this threshold is not likely to be met.
- Warrant 6 – Coordinated Signal System: The signalized intersection of Chandler Street at Hadwen Road and Hamill Road is approximately 600-feet from the southern Chandler Street/May Street intersection. It is preferable to apply this warrant to intersections spaced 1,000-feet or more apart.
- Warrant 7 – Crash Experience: There would need to be 5 or more crashes within a 12-month period that are correctable by traffic signal control. While high crash locations, there were not 5 or more crashes within the most recent 12-months that could be corrected by signalization.
- Warrant 8 – Roadway Network: This warrant is not applicable to the project area.
- Warrant 9 – Intersection Near a Grade Crossing: There is no active at-grade rail crossing of the project area roadways.

Existing Capacity Analysis Summary

Capacity analyses conducted for the project area intersections current geometry are summarized in the Table 2-4 for 2019 Existing and 2029 Future weekday morning and weekday evening traffic volumes. Vehicle Queue lengths are illustrated in Figure 2-3.

Synchro analysis worksheets may be found in Appendix F.

The resulting analysis reports that significant delays on May Street southbound at the northerly intersection during the morning peak period and May Street northbound at the southerly intersection during the evening peak period. The LOS of both weekday morning and weekday evening is F which shows a need for improvement for these approaches approach. The improvements proposed as part of this project are not only intended to provide significant operational changes, but also to improve roadway conditions for all users.

It should be noted after reviewing the results provided by capacity analysis field observations where repeated to better understand the true vehicle queues and delays during the existing peak hours. The observed existing conditions vary from the Synchro model results because of the unique intersection geometry and the proximity to the signalized intersection of Chandler Street with Hamill Street which is not accounted for in the HCM analysis.

The observed conditions along Chandler were slightly worse than modeled due to pedestrian activity and on-street parking maneuvers. The observed conditions along

both May Street approaches were better than modeled, likely to drivers aggressively taking smaller gaps in traffic. Additional field observations are noted below.

Chandler Street at May Street (Southern Intersection)

The southern intersection of May and Chandler Street is a Y-type intersection with Chandler Street as the major road and May Street as the stop-controlled minor road. Just 500-feet south of this intersection, Chandler Street has a four-way, signalized intersection with Hamill Street that effectually meters the Chandler Street approach to the southern May street intersection.

Observed conditions revealed that when the Hamill Street signal interrupts the free flow of Chandler Street, it forms a significant gap of 25-30 seconds that allows the queue of vehicles from May Street trying to turn left onto Chandler Street to quickly dissipate. May Street exiting traffic tends to treat the stop-control condition as a yield-control condition during these periods of large gaps, as the queued vehicles do not stop at the stop bar for the duration that the gap exists. The Hamill Street signal also forms a tight platoon of vehicles that progress through the intersection quickly. The effect is that the southern May Street intersection functions very efficiently in its current state, with observed queues averaging less than three vehicles and vehicle delays consistently less than 30 seconds. Not only does this have an impact on the southerly May Street intersection, it also impacts the northerly intersection.

Additionally during the school peak, there is a relatively large number of right-turns from May Street (south) to Chandler Street, which is an unusual movement as this right turn functions similar to a U-turn due to the parallel geometry of May Street and Chandler Street. Further field observations have determined that most of the right-turning traffic originates from the WSU lot exit on May Street. It was also found that the May Street Elementary School boards students onto the bus just south of the university parking lot and garage. State law mandates that no vehicle may lawfully pass a bus in either direction while it boards or alights elementary-aged students. This creates a bidirectional queue on either side of the elementary school on May Street for the period from about 2:30 to 2:45 PM each weekday. Vehicles exiting the university parking lot notice the southbound queue and decide to take the right turn on Chandler Street to avoid it.

Chandler Street at May Street (Northern Intersection)

Chandler Street follows a curve around WSU as it passes the Chandler Elementary School and intersects May Street at the inflection point of the curve in an offset-T intersection. May Street opens in a wide mouth with an almond-shaped median as it empties onto Chandler Street. May Street is stop controlled. The approach is wide enough for 3 vehicles however was modelled as an exclusive left-turn and a shared through-right turn. The traffic signal at Hamill Street has less of an impact at this location than at the southern intersection but turning traffic does benefit from gaps

generated between platooned traffic from the traffic signal and vehicles entering the corridor from May Street south of Chandler Street.

Chandler Street at Claridge Drive

Claridge Drive is a low-volume residential road that intersects Chandler Street in between the north and south leg of May Street with a bus stop on the university side of Chandler Street. This intersection has not been analyzed due to the low volume.

Table 2-4: STOP-Controlled Unsignalized Intersection Analysis Summary

<i>AM Peak/ PM Peak</i>	2019 – Weekday Existing Conditions				2029 – Weekday Future Conditions			
	Movement	Delay ¹	LOS ²	95 th Queue ³	Movement	Delay	LOS	95 th Queue
Chandler Street at May Street (North)								
May Street	WB L	244.8/ 37.9	F/ E	288/ 63	WB L	\$497/ 57.3	F/ F	410/ 95
	WB TR	10/8.1	B/A	10/5	WB LT	11.6/9.2	B/A	15/8
Chandler Street	NB LTR	9.4/ 8.2	A/ A	3/ 0	NB LTR	9.8/ 8.4	A/ A	3/ 0
Chandler Street	SB LTR	8.5/ 8.8	A/ A	3/ 3	SB LTR	8.6/ 9	A/ A	5/ 5
	Overall	29.1/ 3.9			Overall	57.7/ 5.5		
Chandler Street at May Street (South)								
May Street	EB L	120.3/ 88	F/ F	165/ 255	EB L	265.2/ \$664.6	F/ F	255/ 673
	EB R	11.8/10.2	B/ B	3/ 3	EB R	12.3/10.4	B/ B	3/ 3
Chandler Street	NB LT	9/ 8	B/ A	13/ 3	NB TL	9.3/ 8.2	A/ A	15/ 5
Chandler Street	SB T	0/ 0	A/ A	0/ 0	SB T	0/ 0	A/ A	0/ 0
	SB R	0/ 0	A/ A	0/ 0	SB R	0/ 0	A/ A	0/ 0
	Overall	13.6/ 22.1			Overall	28.8/127.5		

1 Delay – Control delay per vehicle

2 LOS – Level-of-Service

3 95th–95th percentile queue length estimate, in feet

4 \$ Delay exceeds 300 seconds

5 NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound

6 L = left-turn; T = through; R = right-turn



vhb Vehicle Queues on Existing Geometry
Chandler Street at May Street
Worcester, Massachusetts **Figure 2-3**

3

Proposed Improvements

The northern intersection of Chandler Street at May Street has a high crash history as described in the Road Safety Audit and the southern intersection experiences significant vehicle-pedestrian congestion, especially during school dismissal . To improve the safety and operations at these intersections, modern roundabouts with a raised median between the two locations are proposed As described below and shown on the 25% design plans submitted with this report.

Proposed Improvements

The proposed improvements at this location have been advanced to the 25 percent design level and prepared with this FDR. These geometric improvements are as follows:

- Construction of a 120-foot diameter roundabout at May Street north and Chandler Street.
- Construction of a 100-foot diameter roundabout at May Street south (and realignment of May Street south with Chandler Street).
- Provide a 10-foot minimum shared use path along both sides of Chandler Street from May Street south to May Street north
- Provide sidewalks along May Street north and Chandler Street south
- Provide bicycle lanes from the northern project limits of Chandler Street south to May Street north
- Provide mid-block crossings with neckdowns to shorten pedestrian crossings and construct accessible pedestrian ramps. Crossings are at most 250-feet apart within the project limits.
- Relocation of existing RRFB pedestrian systems to mid-block crossings on Chandler Street and May Street south of the southern intersection where neckdowns are not provided.
- Construction of two bus bays along Chandler Street and May Street South

- Placement of a new bus shelter on Chandler Street in front of WSU
- Delineation of on-street parking spaces, with appropriate accessibility.

Design Vehicle

The proposed roundabouts for the Chandler Street and May Street intersections are designed to accommodate a modified WB-62 tractor-trailer for mainline movements from Chandler Street/Route 122. The default WB-67 was adjusted based on guidance from a webinar from the Transportation Research Board (TRB) titled “Truck Assumptions for Roundabout Design” presented on April 8, 2021. The design vehicle was named WB-62 Extended. The overall vehicle length was maintained at 73.5 but was altered by adjusting the wheelbase from 67 feet to 62.5 feet by shortening the length from the front to the rear axle of the trailer from 45.5 feet to 41 feet, causing the distance from the back of the trailer to the rear axle to change from 4.5 feet to 9 feet. This design vehicle was determined through studies and observations conducted by TRB to represent the most accurate depiction of truck movements through existing roundabouts. Many states and Canada also limit the wheelbase spacing to 41 feet and while Massachusetts does not, several surrounding states do and many companies in the Commonwealth use it as the default setting. Other movements have been designed to accommodate a SU-40 design vehicle. See vehicle turning templates on Figures 3-1 and 3-2.

Operating Speeds

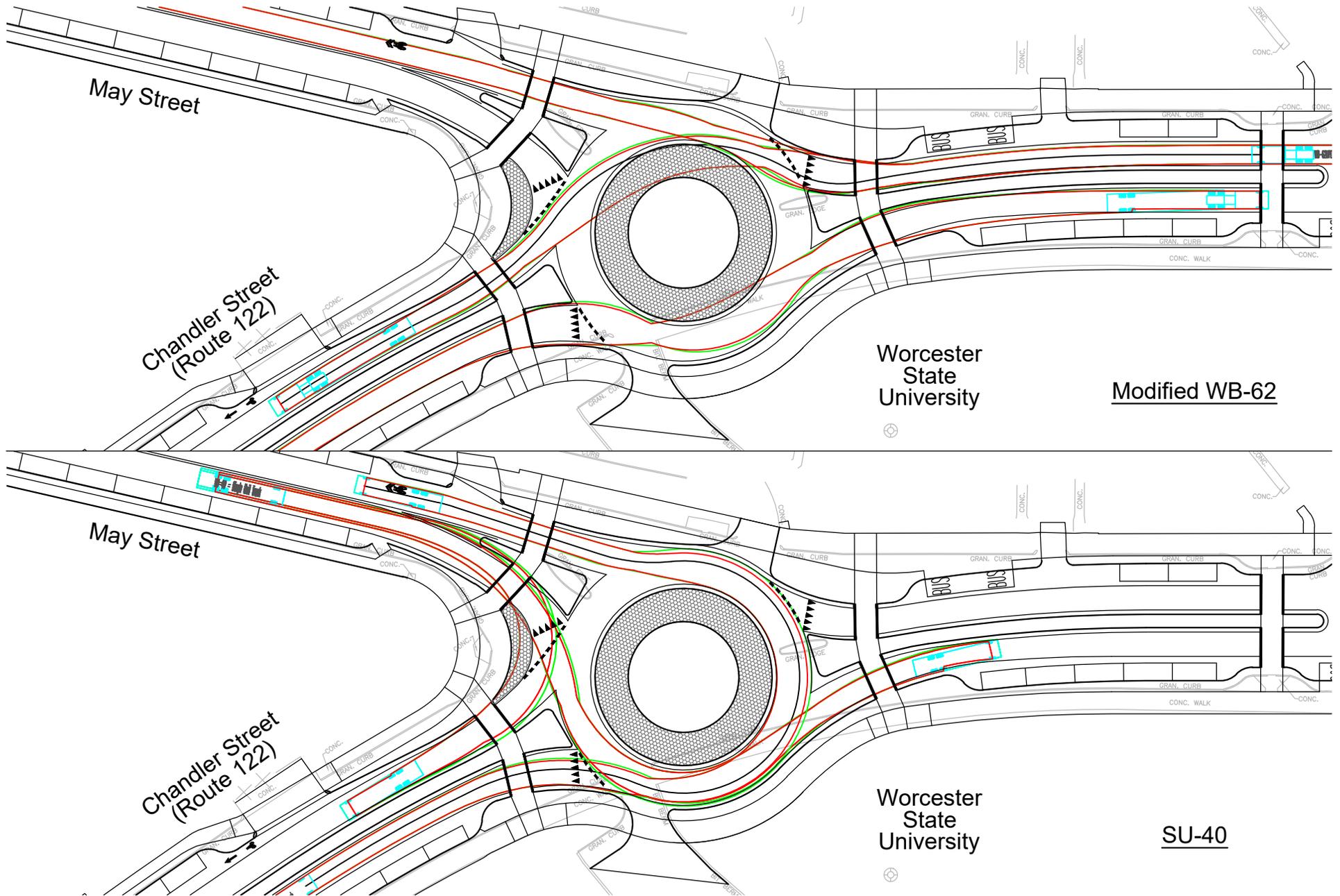
A critical safety feature of roundabouts is to control entering speeds with consistent circulating speeds (no more than 15 mph difference) through well-designed geometrics. The approaches to the Northern Roundabout entry speeds are between the 20 to 25 mph which is under the NCHRP 672³ recommendation for single lane roundabouts. During low-volume periods, May Street North could see speeds of 28 mph if pavement markings and signage are disregarded. The approaches to the Southern Roundabout entry speeds are between 25 and 30 mph. Chandler Street and May Street South could see speeds of 32 mph during low-volume periods if pavement markings and signage are disregarded. Using RRFBs to supplement crosswalks to increase the visibility of pedestrians has been considered but not currently included as part of the design due to lower entering and circulating speeds.

Safety Enhancements

As mentioned in Chapter 2, the Potential Safety Enhancement Summary table from the RSA along with the 25 percent design considerations are presented in Tables 3-1 through 3-4.



³ Transportation Research Board NCHRP Report 672 *Roundabouts: An Informational Guide*, Second Edition. 2010.

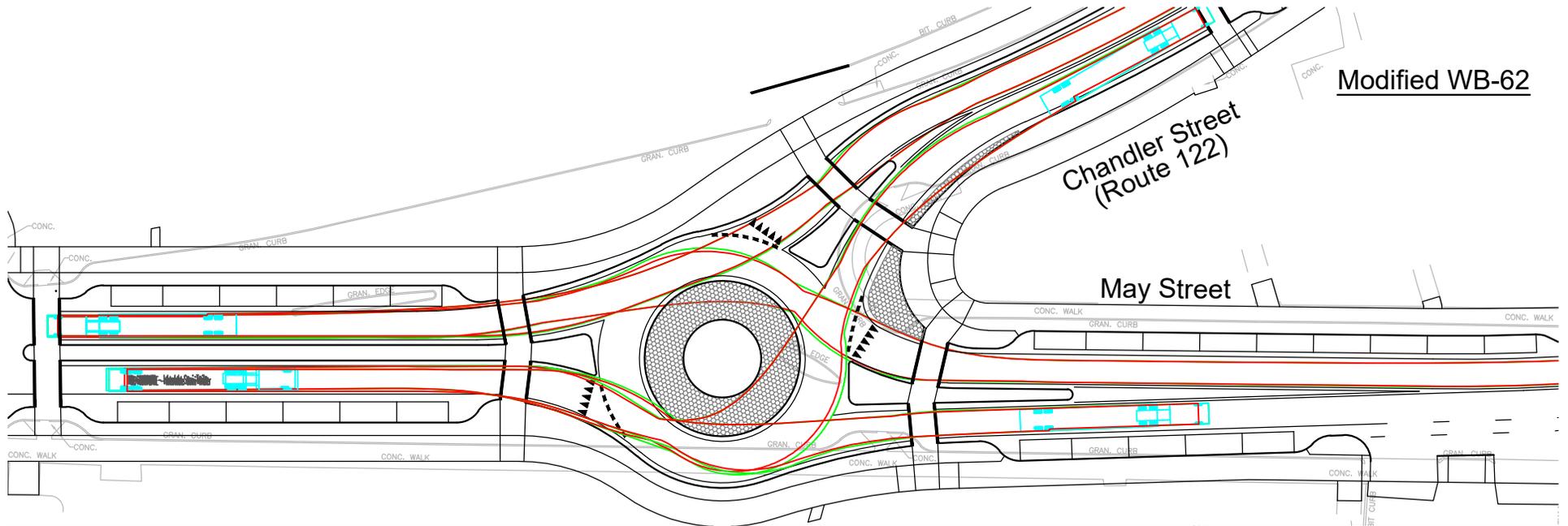


0 30 60 Feet



North Roundabout
Vehicle Turns
Chandler Street
Worcester, MA

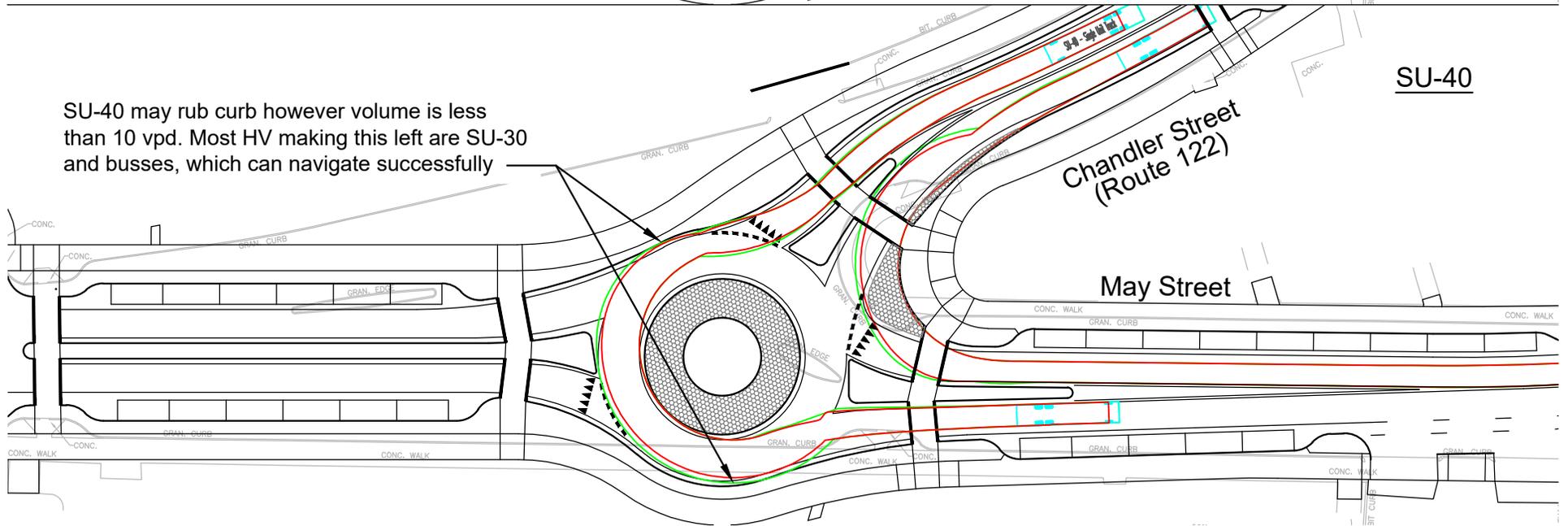
Figure 3-1



Modified WB-62

Chandler Street
(Route 122)

May Street

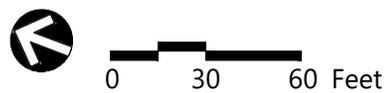


SU-40

SU-40 may rub curb however volume is less than 10 vpd. Most HV making this left are SU-30 and busses, which can navigate successfully

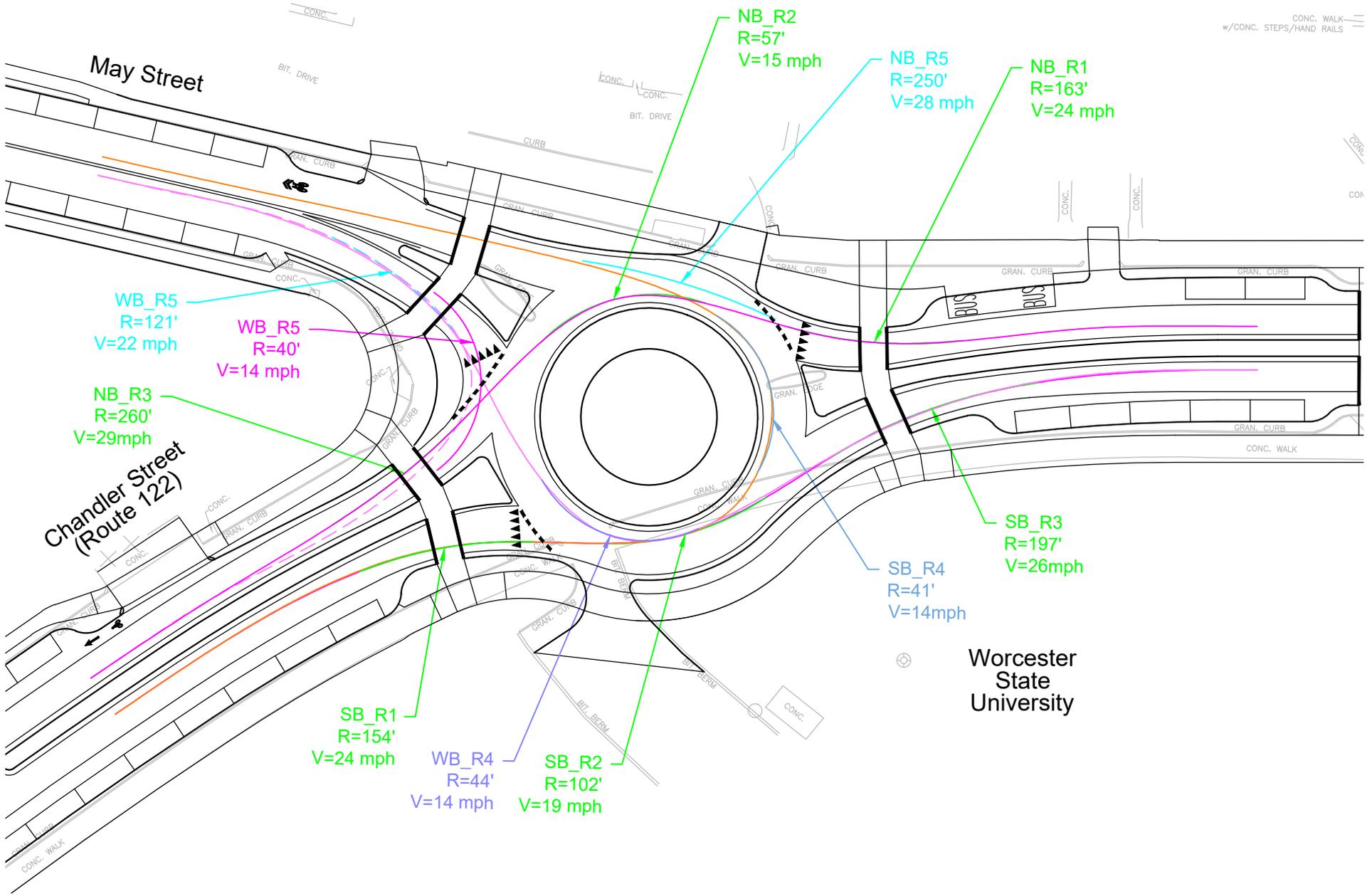
Chandler Street
(Route 122)

May Street



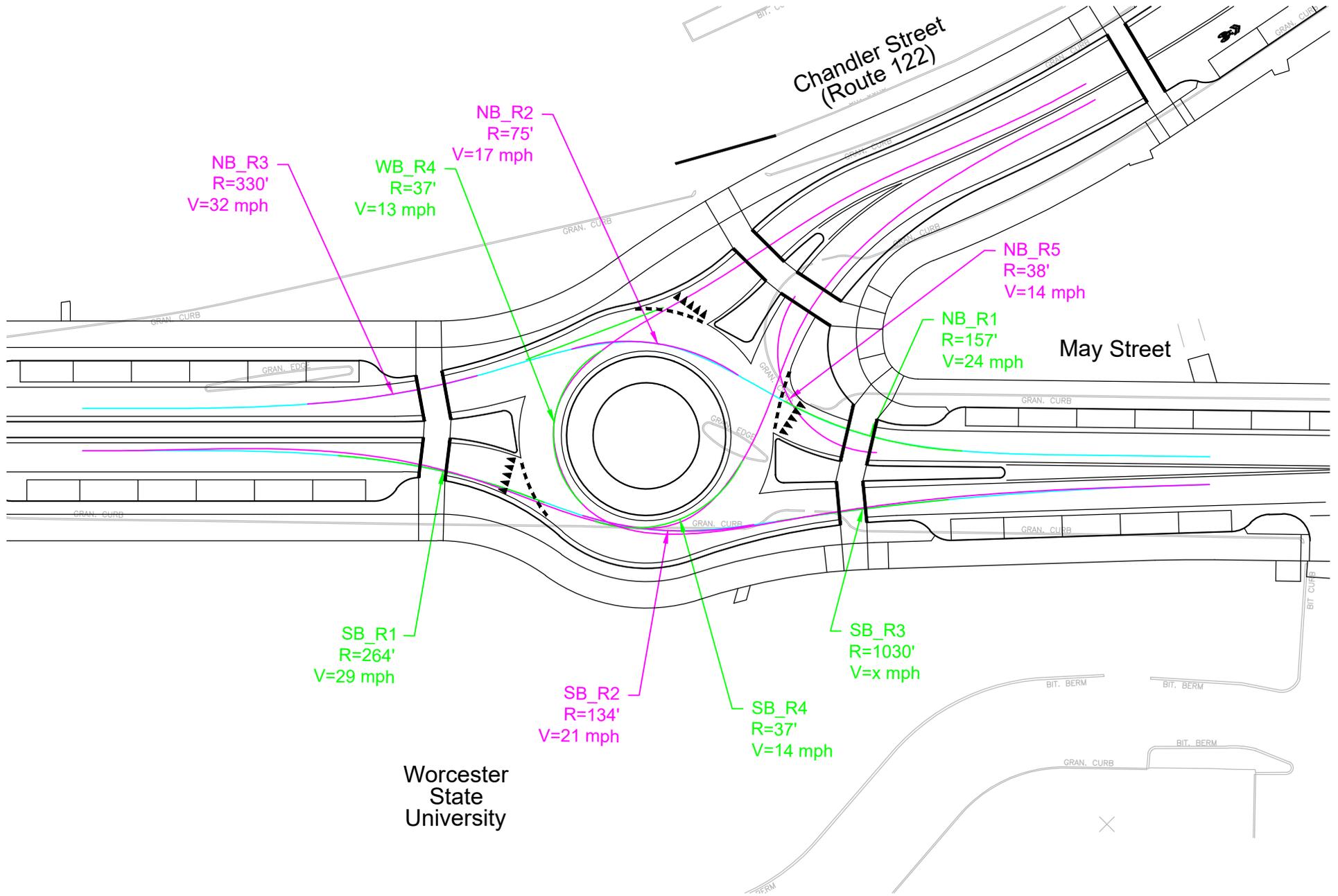
South Roundabout
Vehicle Turns
Chandler Street
Worcester, MA

Figure 3-2



North Roundabout
Fastest Travel Path Check
Chandler Street
Worcester, MA

Figure 3-3



South Roundabout
Fastest Travel Path Check
Chandler Street
Worcester, MA

Figure 3-4

Table 3-1: RSA Table 1: Potential Safety Enhancement Summary – Chandler Street at May Street (north)

Safety Issue	Potential Safety Enhancement	25% Design
Intersection Geometry	Evaluate the need for alternative traffic control at this intersection. Alternatives to be evaluated should include a roundabout and a traffic signal.	Roundabouts are proposed at May Street north and south
	Consider “T”ing up the May Street leg of the intersection to improve the existing sight lines for vehicles exiting May Street.	Roundabout is proposed
	Consider narrowing the May Street opening at the intersection to improve the existing sight lines for vehicles exiting May Street, eliminate confusion on lane usage, and reduce the crossing distance for pedestrians.	Roundabout is proposed
	Consider adding a left turn lane on Chandler Street	Roundabout is proposed
	Provide additional distinctions where parking is currently restricted on Chandler Street, including signage or pavement markings.	Bump-outs, pavement markings, and signage have been added to define on-street parking.
	Better define left, thru and right turning movements from May Street onto Chandler Street with pavement markings.	Roundabout is proposed
	Reduce curb radii at the intersection to promote slower turning speeds and reduce the crossing distance for pedestrians crossing May Street.	Roundabout is proposed
	Evaluate closing the Worcester State University driveway entrance opposite May Street.	The driveway has been incorporated as an egress to the roundabout.
	Evaluate curb extensions at the Worcester State University driveway entrance to preclude blockage by illegally parked vehicles.	This has been incorporated into the roundabout design
	Consider providing crosswalks across Chandler Street to accommodate pedestrian desire lines.	This has been added to the plans. Designer to work with City/MassDOT as project advances on median landscaping elements that could encourage pedestrians to use marked crosswalks.
	If crosswalks are implemented, evaluate the need for RRFB, lighting, enhanced signage, or raised crosswalks	The proposed roundabout shortens pedestrian crossings and slows vehicle travel speeds.
	If crosswalks are implemented, consider a raised pedestrian refuge on Chandler Street.	This is provided at each roundabout
	Consider supplemental bicycle lane markings and additional signage.	Included in plans
	Evaluate ways to shorten the pedestrian crossing distance on May Street, including whether providing a raised pedestrian refuge is feasible.	Neckdowns are proposed
	Provide an ADA-compliant pedestrian path on the north side of May Street.	Added within project limits

<p>If crosswalks are not provided across Chandler Street, evaluate restricting on-street parking on May Street or requiring resident permits.</p>	<p>Crosswalks are proposed across May Street. Resident parking permits would likely need to be petitioned to Worcester Traffic and Parking Committee and is not part of this project.</p>
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Table 3-2: RSA Table 5: Potential Safety Enhancement Summary – Chandler Street at Claridge Drive

Safety Issue	Potential Safety Enhancement	25% Design
Intersection Geometry	Consider making the Chandler Street at Claridge Drive intersection a tabled intersection or adding raised speed tables on Chandler Street.	Signage and pavement markings have been added for crosswalks, as well as bump-outs.
	Evaluate the benefits of pedestrian refuge versus a southbound left turn lane.	Included in the plans North and South of Claridge
	Evaluate the pavement markings and signage for the lane divergence south of the intersection.	Incorporated in the Roundabout Design
	Consider adding mountable aprons adjacent to a raised median or on the corners to visually narrow the roadway width while not impacting emergency response vehicles.	Curb extensions have been included as part of the design
	Consider curb extensions to shorten pedestrian crossing distances across Chandler Street.	This has been included
	Re-evaluate the striped taper on Chandler Street where travel lane splits. Consider new designs that feature a less abrupt lane taper.	Incorporated in the Roundabout Design
Pedestrian & Bicycle Accommodations	Evaluate the need for rapid rectangular flashing beacons (RRFBs).	RRFBs not included at this location at this level of design.
	Provide advanced warning signs to alert drivers to the crosswalk in the southbound direction of Chandler St.	Crosswalk Signage is included in the design.
	Evaluate current lighting conditions at the intersection.	Existing lighting has been relocated closer to the crosswalks in the proposed design.
	Consider additional pedestrian scale lighting.	Existing street lights have been relocated in the proposed design.

Table 3-3: RSA Table 6: Potential Safety Enhancement Summary – Chandler St at May St (south)

Safety Issue	Potential Safety Enhancement	25% Design
Intersection Geometry	Evaluate traffic signal and roundabout options for a new intersection design.	Roundabouts are proposed.
	Improve sight lines by reducing the skew of the intersection.	Included, a roundabout is proposed
	Consider a raised median or curbing to better define entrance to May Street.	Included
	Consider adjusting westerly curb line to define Chandler Street as the primary through movement and reduce curb radii of May Street to better define entrance of May Street.	Included
	Evaluate closing May Street between Hamill Road and Chandler Street. Improvements to Hamill Street and the Chandler Street at Hamill Street intersection would need to be considered in conjunction with this measure.	NA – outside project limits
	Evaluate realignment of May Street and Chandler Street to a “T” intersection.	This intersection is now proposed to be a roundabout
	Evaluate WRTA and school bus route options in order to potentially restrict left-turns from Chandler Street to May Street.	WRTA Route 3 makes a Left Turn from Chandler to May
	Evaluate the efficacy of a raised median or stamped concrete median to discourage travel over the painted median.	The proposed design includes a raised median
Lighting	Conduct an existing lighting evaluation and address any lighting deficiencies in particular pedestrian scale lighting.	Existing street lighting has been relocated closer to crosswalks
	Evaluate additional lighting for the crosswalks.	Existing street lighting has been relocated closer to crosswalks
Pedestrian & Bicycle Accommodations	Evaluate the need for buffered bicycle lanes or a separated shared use path on Chandler Street.	Included where feasible
	Evaluate converting the painted median into a planted raised median on Chandler Street.	Included
	Provide educational programs for students and drivers on the usage of RRFBs.	NA – not part of project

Table 3-4: RSA Table 10: Potential Safety Enhancement Summary – Corridor-Wide Study Area

Safety Issue	Potential Safety Enhancement	25% Design
Roadway Geometry	Evaluate traffic calming measures such as street trees, gateway treatments, identification of corridor as a University area, among others.	Included
	Consider plans for a long-term road diet project.	Included
Pavement Markings and On-Street Parking	Provide additional no parking signage or pavement markings near driveway entrances and side streets to discourage illegal parking.	Included
	Evaluate restricting parking in more locations along Chandler Street to ensure adequate sight distance is provided.	Parking has been defined and signed within the project limits.
	Conduct a comprehensive parking study to evaluate parking supply and demand and standardize parking designation.	NA
Pedestrian & Bicycle Accommodations	Provide a continuous ADA-compliant sidewalk along Chandler Street.	Updated
	Provide additional advance pedestrian warning.	Advanced signage not added to minimize sign clutter. Other traffic calming measures and increased pedestrian visibility implemented.
	Consider the use of video detection for pedestrians instead of push button actuation.	Accessible PED Push Buttons have been provided
	Enhance lighting along the corridor and consider pedestrian scale lighting at crosswalk locations.	Existing street lighting has been relocated closer to crosswalks
	Consider the benefits of curb extensions or a median refuge at crosswalks.	Added at roundabouts and midblock
	Consider a shared use path to provide separation between bicyclists and vehicles and minimize conflicts with on-street parking. Evaluate the impacts of a shared use path at the limits where transitioning to on-street bicycle accommodations.	Added
	Evaluate protected bicycle lanes.	Reviewed

Alternative Designs

Traffic signals and roundabouts were considered for both of the Chandler Street at May Street intersections. The City of Worcester preferred roundabouts even though preliminary traffic signal analysis indicated good operations.

The analysis of the existing intersections results in long vehicle-delays for the left-turning vehicles from May Street north and south with a level-of-service F. The intersections meet 8-hour signalization warrants and appears to improve in functionality in reduced queuing and delays when analyzed as a signalized intersection, but the large amount of pedestrian traffic coupled with the City's preference for exclusive pedestrian phases cause the signalized model to report delays roughly equivalent to the unimproved existing condition. This led to the selection of dual roundabouts as the preferred improvement alternative.

The signalized intersection assessment is included in the 10-percent design memorandum attached to this FDR in Appendix H.

Benefits

The proposed geometric and traffic control modifications provide the following benefits:

- The intersections are projected to operate at an overall LOS A, B, or C depending on the location and peak hour. The biggest improvement when compared to existing conditions is the side street traffic queues for both May Street north and south, which will significantly improve as a result of the construction of a roundabout.
- Provide accessible accommodations to allow pedestrians and cyclists to cross the street.
- Provides off-street shared use paths.
- Enhances on-street parking.
- Enhances transit stops.
- Provides improved access to WSU.
- Reduces vehicle speeds with the use of raised medians and roundabouts.

Environmental

There are no direct environmental impacts associated with the work within the project area and no work will be done within the 100' buffer zone.

Right-of-Way

Several permanent easements will be required along the City right of way throughout the project area to accommodate the proposed realignments. There will be four permanent easements, two of which will be on one property totaling around 5,930 square feet. A third easement will be about 1,050 square feet. A fourth easement will be about 70 square feet. There will be 15 temporary easements required to construct these improvements and will affect 12 abutters. Access to two WSU parking lots and four homes will be modified. One utility easement will be required to relocate a hydrant and a street lighting pole. No alterations to MassDOT layout are required.

Proposed Capacity Analysis Summary

Capacity analyses for the 2029 Future volumes with proposed roundabouts were conducted for the project area intersections and are summarized in Table 3-5. Queues are anticipated to increase on the Chandler Street approaches when compared to the existing conditions; however, the improvements will significantly improve side street traffic operations and queueing on May Street north and south. While the analysis indicates Chandler Street southbound during the morning peak period could experience a lengthy queue approaching the northerly intersection, the driver delay is within reasonable expectations considering the surrounding educational facilities. The analysis also does not take into consideration that Worcester drivers tend to be more aggressive and are getting more familiar with roundabouts as more get constructed within the region.

Queues are graphically shown in Figure 3-5.

Table 3-5: Roundabout Analysis Summary

<i>AM Peak/ PM Peak</i>	2029 – Weekday Future Conditions			
	Movement	Delay¹	LOS²	95th Queue³
Chandler Street at May Street (North)				
May Street	WB LTR	8.3/9.2	A/ A	41/33
Chandler Street	NB LTR	6.3/ 8.3	A/ A	69/ 128
Chandler Street	SB LTR	23.6/ 6.6	C/ A	696/ 68
	Overall	15.5/ 7.8	C/A	
Chandler Street at May Street (South)				
May Street	EB LR	7.4/ 7.9	A/ A	25/47
Chandler Street	NB LT	7.8/10.6	A/ B	78/125
Chandler Street	SB TR	12.0/ 5.7	B/ A	194/ 66
	Overall	10.2/ 8.0	B/A	

1 Delay – Control delay per vehicle; 2 LOS – Level-of-Service; 3 95th–95th percentile queue length estimate, in feet

NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound

2 L = left-turn; T = through; R = right-turn



Design Designation Data

Tables 3-6 summarizes the average daily roadway usage characteristics in the vicinity of the project. These characteristics are:

- Average Daily Traffic (ADT), the total volume of motor vehicle traffic using the roadway on any given day for both existing and design years, expressed in vehicles per day (vpd). Design year is projected 10 years;
- Peaking Factor (K), the percentage of daily traffic that occurs during the peak hour travel period;
- Directional Distribution (D), the highest percentage of traffic in a single direction during the peak hour;
- Truck Volume (T), the percentage of heavy vehicles during the peak hour travel period and per-day average;
- Design Hourly Volume (DHV), the bi-directional peak hour volume for the design year, expressed in vehicles per hour (vph); and
- Directional Design Hourly Volume (DDHV), the highest direction volume during the design year peak hour, expressed in vph.

Table 3-6: Design Data

Chandler Street north of Claridge Street	
Speed Limit:	30 mph
Design Speed:	35 mph
ADT (2019):	16,055vpd
ADT (2029):	17,735 vpd
K:	9% (PM)
D:	61.6% NB
T (Peak Hour):	3.0%
T (Average Day):	3.8%
DHV:	1,595 vph
DDHV:	985 vph

The Design Data worksheets may be found in Appendix G.

Traffic Management Strategy

As stated previously in this FDR, this project consists of constructing modern roundabouts at two locations, pavement mill and overlay, full depth widening, sidewalk construction, and the associated utility, pavement marking and signage work. Pedestrian bypass set-ups, temporary lane shifts and closures, and work at the existing intersections and along the corridor will be required.

The Traffic Management Plan (TMP) and associated Temporary Traffic Control Plans (TTCPs) for this project has been developed with a primary goal of preventing unnecessary delays to the motoring public. For the purposes of this Project, regular working hours are expected to be 7:00 AM to 3:00 PM. Any work that is to occur during peak traffic hours (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM) will be coordinated in advance with MassDOT. Work that impacts existing travel lanes is expected to be restricted to off-peak traffic hours. Nighttime work shall require prior approval from MassDOT and the City of Worcester. Finally, the project is expected to be constructed over two construction seasons and work will not occur on Saturdays, Sundays or holidays, or on the day before or the day after a long weekend which involves a holiday without prior approval by MassDOT.

The traffic management plan developed and analyzed for this project addresses the major aspects of construction. The following provides more details on the traffic management plan for the project.

Existing Conditions

The Study Area consists of the portion of Chandler Street bounded by the northerly edge of the WSU Campus and extending to either side of the northern intersection of Chandler Street at May Street and the southern intersection of Chandler Street at May Street. Chandler Street and May Street converge between these two intersections. It is noted that Chandler Street is an Urban Principal Arterial and is on the National Highway System network, while May Street north and south is an Urban Collector roadway. Sidewalks exist on both sides of the roadway, as well as bicycle lanes.

Pedestrian Accommodations

As described previously, there is continuous sidewalk through the project area. When the existing sidewalk needs to be reconstructed, pedestrian connectivity will be maintained through the use of the pedestrian bypass illustrated on the Temporary Traffic Control Plans included in the 25-percent design plans. The contractor will be required to maintain a pedestrian route and temporary wheelchair ramps from the existing sidewalk to the roadway. The pedestrians will be separated from the travel

lanes by reflectorized drums and a pedestrian channelization device. On-street parking may need to be closed to accommodate pedestrian shifts.

Bicycle Accommodations

There are bicycle lanes in both directions along Chandler Street from north of May Street, near Chandler Magnet Elementary school to the southerly intersection of Chandler Street and May Street. The contractor should maintain a bike lane adjacent to travel lanes to the greatest extent possible. There may be some construction activities that require the closure of the bike lanes, requiring cyclists to mix with motor vehicles.

Abutter Access

The work being performed is in an area with adjacent residential and institutional uses. The Contractor will need to provide access to all properties at all times. The Contractor is required to provide proper and ready means of ingress and egress, both day and night, for the project duration. If the access needs to be restricted for a short period of time, the Contractor shall coordinate with the property owner to determine an acceptable time to perform the work.

Lane Shifts, Closures and Work at Intersections

The following describes the temporary traffic control details that may be used during construction. These plans are depicted on the Temporary Traffic Control Plans included in the 25-percent design plans. Where construction activity impacts the adjacent roadways, lane closure details shall be used to facilitate the construction activity. All lane closures are expected to be restricted to off peak hours.

Typical Two-way Street Lane Shift: The two-way street lane shift detail shall be used in instances where work needs to be completed at the roadway edge such as sidewalk construction.

Typical Two-way Street Lane Closure Alternating Traffic: The two-way street lane shift detail shall be used in instances where work needs to be completed at the roadway edge and sufficient space is not sufficient for the Typical Two-way Street Lane Shift such as utility construction.

Shoulder/Parking Lane Work with Minor Encroachment: This detail shall be used in instances where the shoulder/ parking lane work is needed but the main traveled way can still be maintained as two-way.

Typical Two-Way Street Center Area: This detail shall be used in instances where work in the center of the roadway is needed and two-way traffic can be maintained along the outside edges of the work zone.

Bicycle Lane Work with Minor Encroachment: This detail is similar to the Shoulder/Parking Lane Work detail noted above and when working within the bicycle lane.

Typical Local Road Closure: The Typical Local Road Closure details shall be used in instances where work needs a full local road to be closed off. This could also be applied to a WSU driveway.

Typical Local Road Closure With Local Access: The Typical Local Road Closure With Local Access details shall be used in instances where work needs a full local road to be closed off while local access is maintained.

One Lane Bi-Directional Traffic at Intersections – Far Side and Near Side

The Right Lane Closure at T-Intersection W/Side Street Lane Shift at intersections detail shall be used to support work at the corners of intersections for items such as sidewalk construction.

As shown in Table 3-7 and Figure 3-6, during the morning and evening peak hours, volumes on Chandler Street exceed the lane capacity for alternating traffic and should not be used during these times.

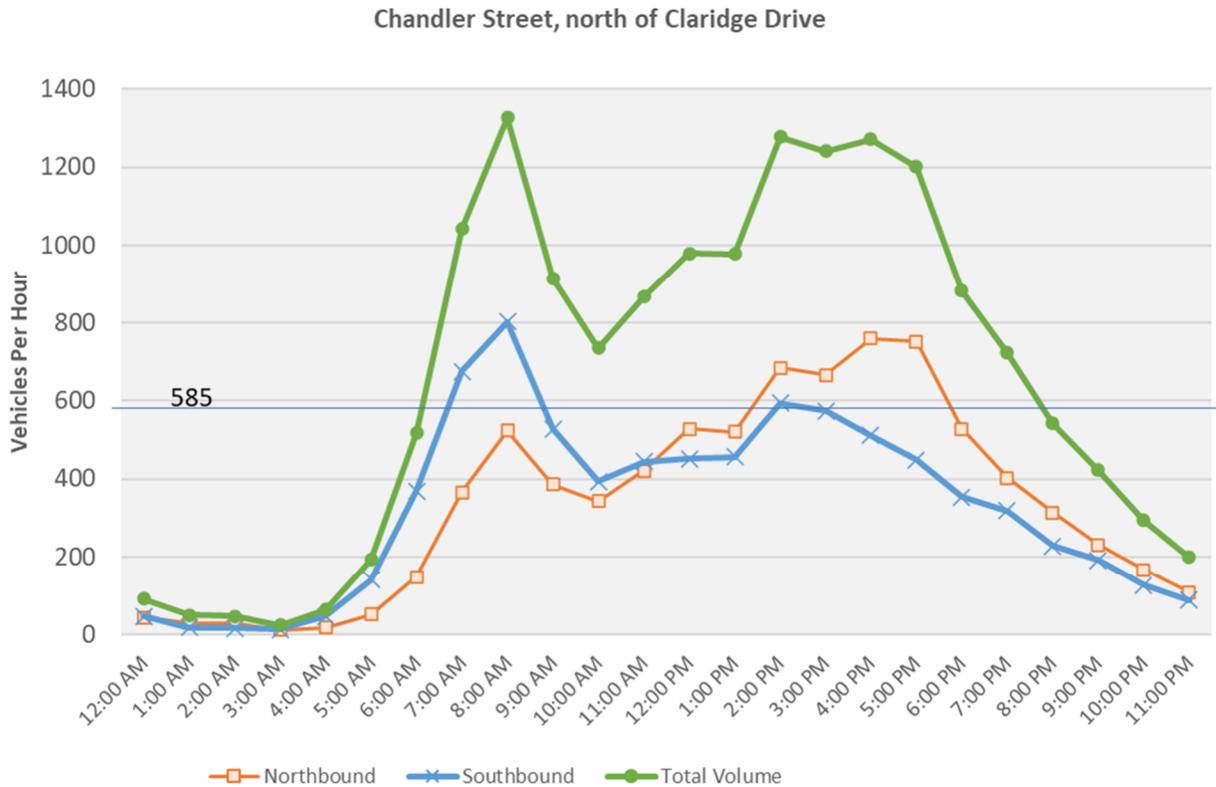
Table 3-7: Work Zone Capacities

Location	Hourly Traffic Range ¹			Commuter Hours		Temporary Traffic Control Plan ²					
						Lane Shift			Two Way Street Lane Closure Alternating Traffic		
	Low	High	Average	AM Peak	PM Peak	Lanes ³	Ideal Average Lane Capacity ⁴	Meets MassDOT ⁵	Lanes	Ideal Average Lane Capacity	Meets MassDOT
Chandler Street											
Northbound	366	760	563	524	760	1 to 1	1340	Yes	Alternating	585	No
Southbound	394	803	599	803	512	1 to 1	1340	Yes	Alternating	585	No

Source: Hourly traffic volumes were obtained from Automatic Traffic Recorder (ATR) Counts conducted in January 2019. Data was collected by Boston Traffic Data for VHB.

- 1 Volumes expressed in vehicles per hour and report low, high and average hourly traffic volumes between the hours of 7:00 AM and 7:00 PM.
- 2 Temporary Traffic Control Plans are depicted on the Temporary Traffic Control Plans included in the 25% design plans.
- 3 Indicates the cross sectional change for the corridor; i.e. 2 to 1 indicates that 2 travel lanes will be reduced to 1 travel lane during construction
- 4 Ideal Average Lane Capacity values obtained from FIGURE Gen-1, GENERAL GUIDELINES, Standard Details and Drawings for the Development of Traffic Management Plans, prepared by MassDOT/MassHighway.
- 5 Indicates whether this section of the corridor will meet the MassDOT guidelines for Average Lane Capacity in a work zone.

Figure 3-6: Weekday Traffic Volume Fluctuations



Suggested Roundabout Construction Sequencing

Reconstructing signalized or traditional unsignalized intersections is typically a more straightforward construction staging process than a roundabout. Contractors develop their own means and methods for construction, however, it is good practice to provide suggested staging for roundabouts due to the complexity of constructing and maintaining traffic. The following summarized how the roundabouts could be constructed but does not negate or exclude the use of the typical details described above. Supporting sequencing details are provided in the 25-percent design plans.

May Street at Chandler Street : STA 102+00 to STA 109+00

The contractor shall maintain pedestrian access along westerly sidewalk of Chandler Street. Bicycles to share the road during construction, parking within the work areas will be eliminated during construction.

1. Remove existing raised and painted islands within Chandler Street and May Street.
2. Shift Chandler Street traffic to the west. Widen easterly corners of intersection. Install curb and pavement to binder and portions of splitter island curb.

- 2A. Shift Chandler street traffic to the east. Install curb and pavement binder opposite the May Street leg on the westerly side of Chandler Street and within the frontage of WSU.
3. Implement roundabout pattern using drums. Shift northbound and southbound traffic to new roundabout traffic pattern. Install westerly curb. Maintain pedestrian access and/or detour pedestrians to easterly ADA-compliant sidewalk.
4. Construct center island and truck apron.
5. Construct splitter islands. Maintain one pedestrian crossing of Chandler Street at all times.
6. Perform final paving and pavement marking installation.

May Street at Chandler Street : STA 110+00 to STA 116+00

The contractor shall maintain pedestrian access along easterly sidewalk of Chandler Street. Bicycles to share the road during construction, parking within the work areas will be eliminated during construction.

1. Remove existing raised and painted islands within Chandler Street.
2. Shift Chandler Street traffic to the east. Widen westerly corners of May Street intersection. Install curb and pavement to binder and portions of splitter island curb.
3. Implement roundabout pattern using drums. Shift northbound and southbound traffic to roundabout traffic pattern. Install easterly curb. Maintain pedestrian access and/or detour pedestrians to westerly ADA-compliant sidewalk.
4. Construct center island and truck apron.
5. Construct splitter islands. Maintain one pedestrian crossing of Chandler Street at all times.
6. Perform final paving and pavement marking installation.

Public Outreach

Portable changeable message signs (PCMS) will be provide on Chandler Street and May Street approaching the project area 14 days prior to the start of construction and for 14 days after the start of construction to inform the general public of the construction work.

Appendix A – Level of Service Analysis

Signalized and unsignalized intersections are analyzed differently in the HCM2010, which does not specifically identify roundabout procedures. HCM 6th Edition is the first edition to identify roundabout procedures.

Signalized Intersection Procedures

In the HCM approach, capacity at intersections is defined for lane groups rather than for approaches or the intersection as a whole. A lane group may be a single movement, a group of movements, or an entire approach and is defined by the geometry of the intersection and the distribution of movements over the various lanes. Capacity of a lane group is calculated as the maximum rate of flow that may pass through the intersection under prevailing traffic, roadway, and signalization conditions. The rate of flow is generally measured or projected for a 15-minute period and capacity is stated in vehicles per hour. Capacity analysis of intersections involves the computation of volume-to-capacity (v/c) ratio for each lane group, from which an overall intersection v/c ratio may be derived.

Generally, when two opposing flows are moving during a signal phase, one of the lane groups will require more green time than another to process all of its volume. This would be defined as the “critical” lane group for the subject signal phase. The concept of a critical v/c ratio is used to evaluate the intersection as a whole, considering only the critical lane groups or those with the greatest demand for green time within each signal phase. This procedure assumes that green time has been appropriately allocated. Thus, it is possible to have an overall intersection v/c of less than 1.00 (under capacity), but still have individual movements be over saturated within the signal cycle if the green time has not been appropriately allocated to the various approaches.

The other major concept in signalized intersection analysis is level of service, which is an index used to grade intersection operations. Level of service is defined in terms of delay and ranges from LOS A (free-flow conditions) to LOS F (long delays). Delay represents a measure of driver discomfort and frustration, fuel consumption, and lost time. Specifically, level of service delay criteria is stated in terms of average stopped delay per vehicle for a 15-minute analysis period. The criteria are represented in Table A-1.

Table A-1 Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay (sec/veh)
A	< 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	>80

Source: Highway Capacity Manual 6th Edition, Transportation Research Board, Washington, DC, 2016.

Delay is a complex measure that depends upon a number of variables such as quality of signal progression, cycle length, allocation of green time, and v/c ratio. Of all the factors cited, v/c ratios have the least effect on delay. Thus, for any given v/c ratio, a range of delay values (and, therefore, level of service) may result. Conversely, for a given level of service, the v/c ratio may lie anywhere within a broad range.

The base saturation flow rate used in the signalized intersection analysis model varies from 1,800 to 1,900 passenger cars per hour of green per lane (pcphgpl). this value is adjusted for prevailing traffic conditions such as lane width, left turns, right turns, heavy vehicles, grades, parking, area type, bus blockage, and left-turn blockage.

Unsignalized STOP-controlled Intersection Procedures

Level of service for unsignalized intersections is based on the assumption that major street traffic is not affected by minor street movements (i.e., minor street traffic must wait for a gap in major street traffic). The capacity of the intersection to accommodate minor street movements is based on the amount of traffic on the major street and the configuration of the intersection. LOS is based on the average total delay, defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. Table A-2 presents the criteria.

Table A-2 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Delay Range (sec/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: Highway Capacity Manual 6th Edition, Transportation Research Board, Washington, DC, 2016

Roundabout Procedures

LOS criteria for motorized vehicles in roundabouts are given in Table A-3. As the table notes, LOS F is assigned if the volume-to-capacity ratio of a lane exceeds 1.0 regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

The thresholds in Table A-3 are based on the judgement of the Transportation Research Board Committee on Highway Capacity and Quality of Service. Roundabouts share the same basic control delay formulation with unsignalized intersections, adjusting for the effect of Yield Control. However, at the time of publication of the Highway Capacity Manual 6th Edition, no research was available on traveler perception of quality of service at roundabouts. In the absence of such research, the service measure and thresholds have been made consistent with those for other unsignalized intersections, primarily on the basis of the similar control delay formulations.

Table A-3 Level-of-Service Criteria for Roundabouts

Level of Service	Delay Range (sec/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: Highway Capacity Manual 6th Edition, Transportation Research Board, Washington, DC, 2016

Appendix B

Traffic Volume Data

- Turning Movement Counts
- Automatic Traffic Recorder Data

Turning Movement Counts

Volume Report

Job 307_059_VHB_ATR 1
Area Worcester, MA
Location Chandler Street, north of May Street (north)

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Wednesday, January 23, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	20	7	13	1200	225	115	110
0015	29	8	21	1215	215	102	113
0030	13	8	5	1230	196	91	105
0045	13	75	8	1245	184	82	390
0100	22	12	10	1300	195	97	98
0115	9	5	4	1315	195	93	102
0130	9	6	3	1330	221	111	110
0145	4	44	3	1345	261	872	118
0200	20	13	7	1400	237	117	120
0215	8	5	3	1415	246	123	123
0230	5	3	2	1430	281	153	128
0245	6	39	2	1445	270	1034	139
0300	3	3	0	1500	270	134	136
0315	8	3	5	1515	313	148	165
0330	5	1	4	1530	263	147	116
0345	8	24	3	1545	278	1124	141
0400	8	6	2	1600	249	146	103
0415	18	3	15	1615	258	147	111
0430	19	3	16	1630	306	171	135
0445	16	61	5	1645	317	1130	189
0500	21	4	17	1700	283	178	105
0515	39	7	32	1715	260	158	102
0530	52	9	43	1730	230	132	98
0545	52	164	15	1745	253	1026	156
0600	70	27	43	1800	220	138	82
0615	96	27	69	1815	176	105	71
0630	129	26	103	1830	156	90	66
0645	152	447	39	1845	176	728	81
0700	162	44	118	1900	176	71	105
0715	206	65	141	1915	138	64	74
0730	274	96	178	1930	143	74	69
0745	280	922	109	1945	122	579	70
0800	326	131	195	2000	132	72	60
0815	314	126	188	2015	122	70	52
0830	255	83	172	2030	106	52	54
0845	231	1126	76	2045	79	439	43
0900	220	79	141	2100	86	40	46
0915	211	85	126	2115	77	40	37
0930	187	88	99	2130	77	41	36
0945	172	790	74	2145	51	291	26
1000	167	54	113	2200	74	35	39
1015	182	90	92	2215	57	32	25
1030	140	54	86	2230	54	27	27
1045	169	658	74	2245	53	238	25
1100	168	79	89	2300	60	35	25
1115	194	93	101	2315	36	14	22
1130	156	71	85	2330	38	19	19
1145	188	706	89	2345	26	160	10
Total	13497	6383	7114				

Volume Report

Job 307_059_VHB_ATR 1
Area Worcester, MA
Location Chandler Street, north of May Street (north)

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Thursday, January 24, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	25	9	16	1200	170	96	74
0015	38	15	23	1215	183	81	102
0030	14	6	8	1230	208	110	98
0045	15	7	8	1245	265	124	141
0100	11	6	5	1300	197	92	105
0115	7	6	1	1315	162	71	91
0130	14	12	2	1330	187	100	87
0145	9	4	5	1345	193	86	107
0200	20	12	8	1400	214	103	111
0215	11	6	5	1415	330	152	178
0230	10	6	4	1430	332	132	200
0245	6	4	2	1445	267	147	120
0300	8	3	5	1500	238	125	113
0315	4	1	3	1515	248	114	134
0330	5	3	2	1530	219	113	106
0345	6	3	3	1545	262	137	125
0400	5	1	4	1600	267	153	114
0415	17	3	14	1615	254	135	119
0430	14	3	11	1630	232	136	96
0445	15	3	12	1645	256	150	106
0500	21	3	18	1700	240	148	92
0515	40	9	31	1715	245	157	88
0530	42	8	34	1730	270	166	104
0545	56	17	39	1745	229	149	80
0600	76	28	48	1800	211	120	91
0615	122	36	86	1815	152	85	67
0630	132	25	107	1830	155	92	63
0645	162	38	124	1845	176	91	85
0700	169	36	133	1900	183	92	91
0715	218	67	151	1915	142	76	66
0730	250	81	169	1930	146	82	64
0745	287	111	176	1945	128	55	73
0800	364	149	215	2000	109	49	60
0815	373	167	206	2015	126	67	59
0830	284	102	182	2030	110	62	48
0845	201	63	138	2045	123	56	67
0900	181	72	109	2100	96	55	41
0915	180	63	117	2115	106	57	49
0930	209	85	124	2130	92	40	52
0945	257	110	147	2145	113	49	64
1000	160	62	98	2200	77	46	31
1015	127	66	61	2215	58	32	26
1030	149	70	79	2230	67	33	34
1045	177	77	100	2245	49	22	27
1100	189	78	111	2300	44	20	24
1115	253	116	137	2315	34	18	16
1130	177	74	103	2330	37	18	19
1145	175	81	94	2345	42	21	21
Total	13529	6322	7207				

Volume Report

Job 307_059_VHB_ATR 2
Area Worcester, MA
Location May Street (north), northeast of Chandler Street

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
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 www.BostonTrafficData.com

Wednesday, January 23, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	5	2	3	1200	65	35	30
0015	2	2	0	1215	67	35	32
0030	5	5	0	1230	64	40	24
0045	2	1	1	1245	63	29	34
0100	3	1	2	1300	58	33	25
0115	2	1	1	1315	70	44	26
0130	1	1	0	1330	57	30	27
0145	2	1	1	1345	91	49	42
0200	2	2	0	1400	88	51	37
0215	0	0	0	1415	95	61	34
0230	2	2	0	1430	102	48	54
0245	1	1	0	1445	88	43	45
0300	1	1	0	1500	80	41	39
0315	2	1	1	1515	69	43	26
0330	0	0	0	1530	80	35	45
0345	0	0	0	1545	94	48	46
0400	2	0	2	1600	86	42	44
0415	4	1	3	1615	70	37	33
0430	4	2	2	1630	93	46	47
0445	3	2	1	1645	70	39	31
0500	4	1	3	1700	80	44	36
0515	11	4	7	1715	90	50	40
0530	13	4	9	1730	83	40	43
0545	5	2	3	1745	80	43	37
0600	14	6	8	1800	67	33	34
0615	13	4	9	1815	59	28	31
0630	20	7	13	1830	60	38	22
0645	38	19	19	1845	58	36	22
0700	46	17	29	1900	66	44	22
0715	61	19	42	1915	43	32	11
0730	70	25	45	1930	42	28	14
0745	70	18	52	1945	35	21	14
0800	95	40	55	2000	32	20	12
0815	84	27	57	2015	42	28	14
0830	63	32	31	2030	36	25	11
0845	49	17	32	2045	27	17	10
0900	59	19	40	2100	33	19	14
0915	55	18	37	2115	22	12	10
0930	40	21	19	2130	20	12	8
0945	52	24	28	2145	19	12	7
1000	44	18	26	2200	21	16	5
1015	49	23	26	2215	11	6	5
1030	39	17	22	2230	11	6	5
1045	52	33	19	2245	18	13	5
1100	48	24	24	2300	16	10	6
1115	68	34	34	2315	8	3	5
1130	49	31	18	2330	7	5	2
1145	54	28	26	2345	10	8	2
Total	3954	2036	1918				

Volume Report

Job 307_059_VHB_ATR 2
Area Worcester, MA
Location May Street (north), northeast of Chandler Street

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
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 www.BostonTrafficData.com

Thursday, January 24, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	7	5	2	1200	43	24	19
0015	6	4	2	1215	54	33	21
0030	5	5	0	1230	55	25	30
0045	2	2	0	1245	67	36	31
0100	3	2	1	1300	60	29	31
0115	3	1	2	1315	45	28	17
0130	3	1	2	1330	42	21	21
0145	3	2	1	1345	54	38	16
0200	1	1	0	1400	98	53	45
0215	0	0	0	1415	125	79	46
0230	0	0	0	1430	98	55	43
0245	2	1	1	1445	88	51	37
0300	1	0	1	1500	69	33	36
0315	0	0	0	1515	33	22	11
0330	0	0	0	1530	0	0	0
0345	0	0	0	1545	0	0	0
0400	2	0	2	1600	0	0	0
0415	4	1	3	1615	0	0	0
0430	1	0	1	1630	0	0	0
0445	3	3	0	1645	0	0	0
0500	3	0	3	1700	0	0	0
0515	11	5	6	1715	3	2	1
0530	9	2	7	1730	0	0	0
0545	10	4	6	1745	0	0	0
0600	13	8	5	1800	0	0	0
0615	16	5	11	1815	0	0	0
0630	31	13	18	1830	0	0	0
0645	46	16	30	1845	0	0	0
0700	43	15	28	1900	0	0	0
0715	64	21	43	1915	0	0	0
0730	82	24	58	1930	0	0	0
0745	88	32	56	1945	0	0	0
0800	101	37	64	2000	0	0	0
0815	97	25	72	2015	2	1	1
0830	65	22	43	2030	0	0	0
0845	58	23	35	2045	0	0	0
0900	41	12	29	2100	0	0	0
0915	37	16	21	2115	0	0	0
0930	58	29	29	2130	0	0	0
0945	70	33	37	2145	0	0	0
1000	29	13	16	2200	0	0	0
1015	34	20	14	2215	0	0	0
1030	46	19	27	2230	0	0	0
1045	47	25	22	2245	0	0	0
1100	70	37	33	2300	0	0	0
1115	75	40	35	2315	0	0	0
1130	49	26	23	2330	0	0	0
1145	46	27	19	2345	0	0	0
Total	2321	1107	1214				

Volume Report

Job 307_059_VHB_ATR 3
Area Worcester, MA
Location Chandler Street, north of Claridge Drive

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Wednesday, January 23, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	21	8	13	1200	257	136	121
0015	28	9	19	1215	280	166	114
0030	16	12	4	1230	257	145	112
0045	16	10	6	1245	243	126	117
0100	23	12	11	1300	250	141	109
0115	11	6	5	1315	261	155	106
0130	11	8	3	1330	279	158	121
0145	6	4	2	1345	325	166	159
0200	23	16	7	1400	298	171	127
0215	9	6	3	1415	316	186	130
0230	5	4	1	1430	350	200	150
0245	7	3	4	1445	316	173	143
0300	4	4	0	1500	340	193	147
0315	11	5	6	1515	376	202	174
0330	5	1	4	1530	323	191	132
0345	7	3	4	1545	347	188	159
0400	8	5	3	1600	298	183	115
0415	22	5	17	1615	335	211	124
0430	21	5	16	1630	384	227	157
0445	20	7	13	1645	378	238	140
0500	28	8	20	1700	353	226	127
0515	51	14	37	1715	314	201	113
0530	66	16	50	1730	277	168	109
0545	58	20	38	1745	309	200	109
0600	83	34	49	1800	266	167	99
0615	106	34	72	1815	235	145	90
0630	137	28	109	1830	216	136	80
0645	173	57	116	1845	222	119	103
0700	193	64	129	1900	223	115	108
0715	246	84	162	1915	184	108	76
0730	294	109	185	1930	183	109	74
0745	307	126	181	1945	145	90	55
0800	368	170	198	2000	158	95	63
0815	369	153	216	2015	155	101	54
0830	290	110	180	2030	123	71	52
0845	268	96	172	2045	101	62	39
0900	249	90	159	2100	106	57	49
0915	250	106	144	2115	95	54	41
0930	204	100	104	2130	97	56	41
0945	188	83	105	2145	73	39	34
1000	198	73	125	2200	93	53	40
1015	212	109	103	2215	71	42	29
1030	166	70	96	2230	66	36	30
1045	209	107	102	2245	68	39	29
1100	190	91	99	2300	75	46	29
1115	229	122	107	2315	51	24	27
1130	194	97	97	2330	45	26	19
1145	233	117	116	2345	38	20	18
Total	16388	8582	7806				

Volume Report

Job 307_059_VHB_ATR 3
Area Worcester, MA
Location Chandler Street, north of Claridge Drive

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Thursday, January 24, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	32	15	17	1200	192	114	78
0015	39	16	23	1215	198	99	99
0030	17	10	7	1230	234	126	108
0045	15	8	7	1245	298	144	154
0100	14	8	6	1300	224	102	122
0115	8	6	2	1315	184	94	90
0130	16	13	3	1330	212	114	98
0145	11	5	6	1345	220	112	108
0200	20	13	7	1400	261	131	130
0215	12	6	6	1415	366	192	174
0230	11	7	4	1430	343	142	201
0245	7	5	2	1445	307	174	133
0300	8	3	5	1500	283	152	131
0315	3	1	2	1515	271	128	143
0330	6	4	2	1530	254	129	125
0345	6	3	3	1545	289	150	139
0400	8	2	6	1600	302	164	138
0415	21	4	17	1615	283	153	130
0430	15	3	12	1630	276	174	102
0445	15	5	10	1645	287	169	118
0500	25	4	21	1700	291	178	113
0515	48	13	35	1715	288	184	104
0530	48	9	39	1730	306	181	125
0545	62	20	42	1745	265	168	97
0600	82	34	48	1800	238	144	94
0615	130	38	92	1815	196	120	76
0630	147	30	117	1830	189	110	79
0645	178	42	136	1845	202	116	86
0700	208	57	151	1900	210	115	95
0715	253	82	171	1915	174	98	76
0730	284	94	190	1930	173	105	68
0745	299	116	183	1945	153	67	86
0800	385	155	230	2000	126	59	67
0815	420	175	245	2015	138	82	56
0830	321	113	208	2030	134	79	55
0845	232	76	156	2045	151	80	71
0900	214	86	128	2100	120	75	45
0915	202	73	129	2115	123	67	56
0930	237	105	132	2130	107	53	54
0945	285	130	155	2145	124	61	63
1000	172	72	100	2200	92	55	37
1015	143	79	64	2215	58	34	24
1030	174	83	91	2230	72	40	32
1045	198	92	106	2245	67	35	32
1100	220	102	118	2300	49	23	26
1115	267	126	141	2315	41	23	18
1130	207	94	113	2330	47	26	21
1145	193	95	98	2345	51	30	21
Total	15387	7503	7884				

Volume Report

Job 307_059_VHB_ATR 4
Area Worcester, MA
Location Claridge Drive, northeast of Chandler Street

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Wednesday, January 23, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	0	0	0	1200	0	0	0
0015	0	0	0	1215	2	1	1
0030	0	0	0	1230	2	2	0
0045	0	0	0	1245	0	0	0
0100	1	1	0	1300	2	1	1
0115	0	0	0	1315	7	3	4
0130	0	0	0	1330	3	3	0
0145	0	0	0	1345	0	0	0
0200	0	0	0	1400	0	0	0
0215	0	0	0	1415	4	2	2
0230	0	0	0	1430	5	4	1
0245	0	0	0	1445	0	0	0
0300	0	0	0	1500	3	0	3
0315	0	0	0	1515	0	0	0
0330	0	0	0	1530	2	1	1
0345	0	0	0	1545	4	1	3
0400	0	0	0	1600	1	1	0
0415	0	0	0	1615	0	0	0
0430	1	0	1	1630	1	0	1
0445	0	0	0	1645	6	3	3
0500	1	0	1	1700	4	2	2
0515	0	0	0	1715	1	1	0
0530	1	0	1	1730	2	1	1
0545	0	0	0	1745	1	0	1
0600	0	0	0	1800	3	1	2
0615	2	1	1	1815	2	1	1
0630	0	0	0	1830	6	4	2
0645	2	1	1	1845	1	1	0
0700	0	0	0	1900	0	0	0
0715	0	0	0	1915	2	0	2
0730	2	1	1	1930	0	0	0
0745	3	1	2	1945	1	1	0
0800	1	0	1	2000	3	1	2
0815	2	2	0	2015	2	2	0
0830	1	0	1	2030	1	0	1
0845	3	0	3	2045	0	0	0
0900	0	0	0	2100	2	2	0
0915	3	2	1	2115	2	2	0
0930	1	1	0	2130	1	0	1
0945	0	0	0	2145	2	2	0
1000	2	1	1	2200	0	0	0
1015	0	0	0	2215	1	1	0
1030	5	2	3	2230	1	1	0
1045	4	2	2	2245	2	1	1
1100	1	1	0	2300	1	0	1
1115	1	0	1	2315	1	0	1
1130	2	0	2	2330	0	0	0
1145	2	1	1	2345	2	1	1
Total	127	64	63				

Volume Report

Job 307_059_VHB_ATR 4
Area Worcester, MA
Location Claridge Drive, northeast of Chandler Street

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Thursday, January 24, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	0	0	0	1200	2	1	1
0015	0	0	0	1215	2	2	0
0030	0	0	0	1230	2	2	0
0045	0	0	0	1245	1	1	0
0100	0	0	0	1300	1	1	0
0115	1	1	0	1315	1	1	0
0130	0	0	0	1330	5	2	3
0145	0	0	0	1345	1	0	1
0200	0	0	0	1400	2	1	1
0215	0	0	0	1415	6	3	3
0230	0	0	0	1430	8	5	3
0245	1	1	0	1445	2	2	0
0300	0	0	0	1500	2	1	1
0315	0	0	0	1515	4	2	2
0330	0	0	0	1530	1	1	0
0345	0	0	0	1545	5	1	4
0400	0	0	0	1600	4	3	1
0415	0	0	0	1615	2	1	1
0430	1	0	1	1630	0	0	0
0445	0	0	0	1645	4	2	2
0500	0	0	0	1700	1	1	0
0515	1	0	1	1715	2	1	1
0530	0	0	0	1730	5	2	3
0545	1	0	1	1745	3	1	2
0600	1	0	1	1800	2	1	1
0615	2	1	1	1815	3	2	1
0630	2	2	0	1830	2	1	1
0645	2	0	2	1845	1	1	0
0700	1	1	0	1900	2	1	1
0715	0	0	0	1915	0	0	0
0730	1	0	1	1930	1	1	0
0745	3	0	3	1945	3	2	1
0800	1	0	1	2000	1	0	1
0815	2	0	2	2015	1	0	1
0830	3	2	1	2030	1	1	0
0845	0	0	0	2045	3	3	0
0900	2	1	1	2100	1	1	0
0915	1	1	0	2115	5	2	3
0930	3	2	1	2130	0	0	0
0945	2	2	0	2145	0	0	0
1000	2	0	2	2200	1	1	0
1015	0	0	0	2215	1	0	1
1030	2	2	0	2230	1	0	1
1045	3	2	1	2245	1	0	1
1100	3	2	1	2300	0	0	0
1115	1	1	0	2315	0	0	0
1130	1	0	1	2330	0	0	0
1145	1	1	0	2345	0	0	0
Total	140	76	64				

Volume Report

Job 307_059_VHB_ATR 5
Area Worcester, MA
Location Chandler Street, southeast of May Street (south)

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Wednesday, January 23, 2019

Time	Total	NB	SB	Time	Total	NB	SB			
0000	12	3	9	1200	154	86	68			
0015	16	7	9	1215	177	100	77			
0030	13	8	5	1230	144	75	69			
0045	12	53	9	1245	131	606	59	320	72	286
0100	9	6	3	1300	149	84	65			
0115	5	3	2	1315	141	70	71			
0130	10	7	3	1330	98	78	20			
0145	5	29	3	1345	144	532	80	312	64	220
0200	17	10	7	1400	178	107	71			
0215	6	4	2	1415	169	103	66			
0230	3	2	1	1430	229	110	119			
0245	5	31	2	1445	179	755	95	415	84	340
0300	4	4	0	1500	201	106	95			
0315	6	2	4	1515	172	98	74			
0330	3	0	3	1530	193	115	78			
0345	7	20	3	1545	194	760	111	430	83	330
0400	7	4	3	1600	179	111	68			
0415	15	3	12	1615	186	118	68			
0430	19	3	16	1630	217	124	93			
0445	14	55	5	1645	240	822	150	503	90	319
0500	16	4	12	1700	209	145	64			
0515	40	10	30	1715	174	115	59			
0530	47	9	38	1730	180	108	72			
0545	51	154	18	1745	203	766	134	502	69	264
0600	55	22	33	1800	167	97	70			
0615	77	24	53	1815	133	83	50			
0630	104	19	85	1830	126	76	50			
0645	117	353	30	1845	136	562	65	321	71	241
0700	125	40	85	1900	128	54	74			
0715	161	60	101	1915	106	55	51			
0730	208	86	122	1930	101	62	39			
0745	222	716	107	1945	88	423	55	226	33	197
0800	272	140	132	2000	103	53	50			
0815	285	138	147	2015	86	52	34			
0830	211	83	128	2030	78	43	35			
0845	178	946	78	2045	62	329	40	188	22	141
0900	172	96	76	2100	65	38	27			
0915	186	98	88	2115	59	32	27			
0930	131	60	71	2130	62	35	27			
0945	122	611	55	2145	46	232	25	130	21	102
1000	137	57	80	2200	53	30	23			
1015	140	72	68	2215	46	27	19			
1030	106	48	58	2230	39	26	13			
1045	136	519	68	2245	40	178	22	105	18	73
1100	120	61	59	2300	43	27	16			
1115	149	76	73	2315	34	14	20			
1130	130	53	77	2330	29	20	9			
1145	147	546	83	2345	23	129	11	72	12	57
Total	10127	5307	4820							

Volume Report

Job 307_059_VHB_ATR 5
Area Worcester, MA
Location Chandler Street, southeast of May Street (south)

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Thursday, January 24, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	27	13	14	1200	131	82	49
0015	17	11	6	1215	150	77	73
0030	15	8	7	1230	151	95	56
0045	11	5	6	1245	201	93	108
0100	8	5	3	1300	165	82	83
0115	6	4	2	1315	133	68	65
0130	10	8	2	1330	126	70	56
0145	9	6	3	1345	145	75	70
0200	13	7	6	1400	175	97	78
0215	8	4	4	1415	270	137	133
0230	8	4	4	1430	287	131	156
0245	5	3	2	1445	199	104	95
0300	5	1	4	1500	179	97	82
0315	0	0	0	1515	195	100	95
0330	5	4	1	1530	156	73	83
0345	6	3	3	1545	173	88	85
0400	5	2	3	1600	192	113	79
0415	16	2	14	1615	188	100	88
0430	14	3	11	1630	175	118	57
0445	7	2	5	1645	206	134	72
0500	20	3	17	1700	175	111	64
0515	37	10	27	1715	176	115	61
0530	35	7	28	1730	208	135	73
0545	50	15	35	1745	166	115	51
0600	55	19	36	1800	157	101	56
0615	107	34	73	1815	133	83	50
0630	107	19	88	1830	130	72	58
0645	111	28	83	1845	135	80	55
0700	135	35	100	1900	146	77	69
0715	162	58	104	1915	106	66	40
0730	211	86	125	1930	107	66	41
0745	208	100	108	1945	83	38	45
0800	295	170	125	2000	79	39	40
0815	347	203	144	2015	99	57	42
0830	253	116	137	2030	97	57	40
0845	126	48	78	2045	89	48	41
0900	150	72	78	2100	62	42	20
0915	131	52	79	2115	87	52	35
0930	152	77	75	2130	73	44	29
0945	181	90	91	2145	80	44	36
1000	136	61	75	2200	65	39	26
1015	93	54	39	2215	44	29	15
1030	123	70	53	2230	56	35	21
1045	135	65	70	2245	37	22	15
1100	136	68	68	2300	32	20	12
1115	181	83	98	2315	31	18	13
1130	122	53	69	2330	31	15	16
1145	123	67	56	2345	33	19	14
Total	10431	5431	5000				

Location May Street (south), southwest of Chandler Street

TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Wednesday, January 23, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	8	3	5	1200	131	59	72
0015	14	3	11	1215	133	64	69
0030	6	5	1	1230	109	52	57
0045	7	2	5	1245	100	41	59
0100	13	6	7	1300	98	49	49
0115	8	4	4	1315	104	60	44
0130	5	3	2	1330	105	46	59
0145	5	3	2	1345	149	66	83
0200	5	5	0	1400	125	51	74
0215	2	1	1	1415	139	77	62
0230	2	2	0	1430	124	75	49
0245	2	1	1	1445	131	60	71
0300	0	0	0	1500	144	72	72
0315	5	3	2	1515	163	71	92
0330	2	1	1	1530	133	59	74
0345	1	0	1	1545	153	70	83
0400	1	1	0	1600	151	65	86
0415	6	2	4	1615	125	59	66
0430	2	0	2	1630	159	79	80
0445	7	3	4	1645	128	60	68
0500	10	2	8	1700	129	63	66
0515	14	4	10	1715	131	71	60
0530	17	6	11	1730	104	54	50
0545	12	1	11	1745	125	63	62
0600	32	13	19	1800	119	69	50
0615	22	3	19	1815	102	54	48
0630	37	10	27	1830	83	47	36
0645	57	23	34	1845	87	46	41
0700	70	25	45	1900	96	51	45
0715	98	28	70	1915	70	38	32
0730	99	28	71	1930	82	42	40
0745	128	38	90	1945	59	30	29
0800	136	34	102	2000	71	42	29
0815	103	32	71	2015	77	48	29
0830	116	41	75	2030	52	28	24
0845	119	34	85	2045	47	22	25
0900	115	32	83	2100	58	23	35
0915	91	27	64	2115	47	24	23
0930	104	54	50	2130	34	18	16
0945	83	34	49	2145	38	20	18
1000	81	25	56	2200	39	19	20
1015	103	51	52	2215	24	12	12
1030	92	36	56	2230	33	13	20
1045	85	40	45	2245	36	20	16
1100	88	33	55	2300	39	21	18
1115	112	62	50	2315	11	3	8
1130	91	49	42	2330	19	6	13
1145	91	38	53	2345	17	8	9
Total	6740	3041	3699				

Volume Report

Job 307_059_VHB_ATR 6
Area Worcester, MA
Location May Street (south), southwest of Chandler Street

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Thursday, January 24, 2019

Time	Total	NB	SB	Time	Total	NB	SB
0000	8	4	4	1200	74	36	38
0015	28	8	20	1215	95	45	50
0030	10	6	4	1230	125	60	65
0045	3	3	0	1245	155	74	81
0100	10	5	5	1300	108	47	61
0115	6	5	1	1315	75	40	35
0130	6	4	2	1330	111	55	56
0145	4	0	4	1345	94	43	51
0200	10	7	3	1400	126	57	69
0215	4	2	2	1415	147	73	74
0230	2	2	0	1430	120	53	67
0245	2	2	0	1445	147	81	66
0300	3	2	1	1500	115	61	54
0315	3	1	2	1515	107	47	60
0330	1	0	1	1530	136	73	63
0345	0	0	0	1545	130	66	64
0400	3	0	3	1600	151	69	82
0415	5	2	3	1615	108	61	47
0430	3	1	2	1630	129	68	61
0445	7	2	5	1645	112	47	65
0500	4	0	4	1700	145	81	64
0515	15	4	11	1715	119	67	52
0530	16	4	12	1730	117	56	61
0545	17	7	10	1745	122	60	62
0600	32	16	16	1800	124	68	56
0615	29	7	22	1815	80	44	36
0630	52	14	38	1830	76	45	31
0645	76	21	55	1845	81	41	40
0700	73	21	52	1900	79	44	35
0715	110	31	79	1915	84	40	44
0730	110	29	81	1930	73	42	31
0745	125	31	94	1945	69	29	40
0800	146	36	110	2000	61	24	37
0815	110	28	82	2015	58	30	28
0830	126	41	85	2030	61	34	27
0845	112	35	77	2045	70	36	34
0900	92	28	64	2100	58	30	28
0915	93	34	59	2115	59	27	32
0930	122	47	75	2130	52	17	35
0945	142	64	78	2145	67	30	37
1000	84	36	48	2200	40	20	20
1015	73	36	37	2215	33	14	19
1030	86	30	56	2230	33	13	20
1045	98	49	49	2245	35	14	21
1100	114	53	61	2300	26	8	18
1115	142	69	73	2315	16	8	8
1130	101	43	58	2330	14	8	6
1145	92	40	52	2345	21	11	10
Total	6748	3007	3741				

Speed Report

Job 307_059_VHB_ATR 1
 Area Worcester, MA
 Location Chandler Street, north of May Street (north)
 Dir Northbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	31	0	0	0	1	2	4	9	11	3	1	0	0	0	0	0	0
0100	26	0	0	0	1	1	2	7	11	2	2	0	0	0	0	0	0
0200	23	0	0	0	0	0	1	8	10	4	0	0	0	0	0	0	0
0300	10	0	0	0	0	0	0	0	6	2	2	0	0	0	0	0	0
0400	17	0	0	0	1	1	0	5	4	6	0	0	0	0	0	0	0
0500	35	0	0	0	0	1	4	9	8	12	1	0	0	0	0	0	0
0600	119	0	0	1	4	3	10	39	48	11	3	0	0	0	0	0	0
0700	314	0	0	0	6	39	82	117	63	7	0	0	0	0	0	0	0
0800	416	0	13	5	16	77	108	126	53	14	4	0	0	0	0	0	0
0900	326	0	0	0	5	16	58	129	99	16	3	0	0	0	0	0	0
1000	272	0	0	0	0	18	44	124	75	9	2	0	0	0	0	0	0
1100	332	0	0	0	2	11	53	133	107	21	5	0	0	0	0	0	0
1200	390	0	0	0	1	25	87	166	101	10	0	0	0	0	0	0	0
1300	419	0	0	2	6	31	103	193	73	11	0	0	0	0	0	0	0
1400	532	0	1	21	34	79	132	182	71	11	1	0	0	0	0	0	0
1500	570	0	0	1	7	56	119	246	123	16	2	0	0	0	0	0	0
1600	653	0	2	0	8	57	159	314	105	8	0	0	0	0	0	0	0
1700	624	0	0	0	7	39	133	323	109	13	0	0	0	0	0	0	0
1800	414	0	0	0	4	16	53	218	106	16	1	0	0	0	0	0	0
1900	279	0	0	0	4	15	32	133	79	15	0	1	0	0	0	0	0
2000	237	0	0	0	2	7	26	87	93	19	3	0	0	0	0	0	0
2100	147	0	0	0	1	7	23	39	61	16	0	0	0	0	0	0	0
2200	119	0	0	0	0	3	4	54	37	19	1	1	0	0	0	0	0
2300	78	0	0	0	0	0	5	23	30	18	2	0	0	0	0	0	0
Total	6383	0	16	30	110	504	1242	2684	1483	279	33	2	0	0	0	0	0

100.00% 0.00% 0.25% 0.47% 1.72% 7.90% 19.46% 42.05% 23.23% 4.37% 0.52% 0.03% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 54.2 mph, Minimum = 6.5 mph, Mean = 32.0 mph
 85% Speed = 36.91 mph, 95% Speed = 39.99 mph, Median = 32.55 mph
 10 mph Pace = 28 - 38, Number in Pace = 4534 (71.03%)
 Variance = 28.66, Standard Deviation = 5.35 mph

Speed Report

Job 307_059_VHB_ATR 1
 Area Worcester, MA
 Location Chandler Street, north of May Street (north)
 Dir Northbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	37	0	0	0	1	1	10	14	6	5	0	0	0	0	0	0	0
0100	28	0	0	0	0	1	4	13	7	2	1	0	0	0	0	0	0
0200	28	0	0	0	0	0	3	11	4	1	1	1	1	6	0	0	0
0300	10	0	0	0	0	0	0	2	5	3	0	0	0	0	0	0	0
0400	10	0	0	0	0	1	0	5	4	0	0	0	0	0	0	0	0
0500	37	0	0	1	0	3	7	9	13	4	0	0	0	0	0	0	0
0600	127	0	0	0	2	7	13	54	39	10	1	1	0	0	0	0	0
0700	295	0	0	2	9	44	64	110	57	7	2	0	0	0	0	0	0
0800	481	0	1	4	33	106	161	128	38	9	1	0	0	0	0	0	0
0900	330	0	0	1	4	34	77	137	71	6	0	0	0	0	0	0	0
1000	275	0	0	1	6	22	58	129	49	9	1	0	0	0	0	0	0
1100	349	0	0	1	8	37	83	154	58	8	0	0	0	0	0	0	0
1200	411	0	0	1	4	36	79	192	89	9	1	0	0	0	0	0	0
1300	349	0	0	0	3	26	74	161	77	7	1	0	0	0	0	0	0
1400	534	0	5	19	27	72	175	177	49	9	0	0	0	0	1	0	0
1500	489	0	0	0	3	44	101	224	108	8	1	0	0	0	0	0	0
1600	574	0	0	0	0	30	94	272	154	23	1	0	0	0	0	0	0
1700	620	0	0	0	5	45	121	321	117	10	1	0	0	0	0	0	0
1800	388	0	0	0	1	15	36	181	137	18	0	0	0	0	0	0	0
1900	305	0	0	0	1	20	35	124	102	21	2	0	0	0	0	0	0
2000	234	0	0	0	0	12	24	98	80	20	0	0	0	0	0	0	0
2100	201	0	0	0	1	11	21	69	87	12	0	0	0	0	0	0	0
2200	133	0	0	0	3	4	13	46	48	16	3	0	0	0	0	0	0
2300	77	0	0	0	0	3	9	28	26	9	2	0	0	0	0	0	0
Total	6322	0	6	30	111	574	1262	2659	1425	226	19	2	1	6	1	0	0

100.00% 0.00% 0.09% 0.47% 1.76% 9.08% 19.96% 42.06% 22.54% 3.57% 0.30% 0.03% 0.02% 0.09% 0.02% 0.00% 0.00%

Maximum = 65.4 mph, Minimum = 6.4 mph, Mean = 31.8 mph
 85% Speed = 36.74 mph, 95% Speed = 39.48 mph, Median = 32.44 mph
 10 mph Pace = 28 - 38, Number in Pace = 4406 (69.69%)
 Variance = 28.92, Standard Deviation = 5.38 mph

Speed Report

Job 307_059_VHB_ATR 1
 Area Worcester, MA
 Location Chandler Street, north of May Street (north)
 Dir Southbound
Wednesday, January 23, 2019

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	44	0	0	0	0	2	11	20	9	2	0	0	0	0	0	0	0
0100	18	0	0	0	2	0	4	8	3	1	0	0	0	0	0	0	0
0200	16	0	0	0	0	1	4	5	4	1	1	0	0	0	0	0	0
0300	14	0	0	0	0	0	2	2	6	3	0	1	0	0	0	0	0
0400	44	0	0	0	0	0	3	13	20	7	1	0	0	0	0	0	0
0500	129	0	0	0	0	0	17	41	51	19	1	0	0	0	0	0	0
0600	328	0	0	2	11	25	71	150	61	8	0	0	0	0	0	0	0
0700	608	0	0	0	12	71	197	283	42	3	0	0	0	0	0	0	0
0800	710	0	12	34	65	145	255	169	28	2	0	0	0	0	0	0	0
0900	464	0	1	4	11	49	158	173	63	5	0	0	0	0	0	0	0
1000	386	0	0	2	8	35	90	195	50	5	1	0	0	0	0	0	0
1100	374	0	0	0	5	34	94	164	69	8	0	0	0	0	0	0	0
1200	430	0	1	7	11	39	136	174	59	2	0	1	0	0	0	0	0
1300	453	0	0	2	10	66	143	178	48	5	1	0	0	0	0	0	0
1400	502	0	0	7	27	79	187	164	33	5	0	0	0	0	0	0	0
1500	554	0	0	5	12	51	184	248	50	4	0	0	0	0	0	0	0
1600	477	0	6	7	17	68	156	165	54	4	0	0	0	0	0	0	0
1700	402	0	1	0	4	36	110	190	58	3	0	0	0	0	0	0	0
1800	314	0	0	1	2	7	77	171	49	7	0	0	0	0	0	0	0
1900	300	0	0	0	2	8	88	150	49	3	0	0	0	0	0	0	0
2000	202	0	0	0	3	13	44	85	51	5	1	0	0	0	0	0	0
2100	144	0	0	0	2	6	35	60	32	5	2	0	2	0	0	0	0
2200	119	0	0	0	2	6	14	60	27	8	2	0	0	0	0	0	0
2300	82	0	0	0	0	5	9	40	24	4	0	0	0	0	0	0	0
Total	7114	0	21	71	206	746	2089	2908	940	119	10	2	2	0	0	0	0

100.00% 0.00% 0.30% 1.00% 2.90% 10.49% 29.36% 40.88% 13.21% 1.67% 0.14% 0.03% 0.03% 0.00% 0.00% 0.00% 0.00%

Maximum = 58.6 mph, Minimum = 6.5 mph, Mean = 30.1 mph
 85% Speed = 35.01 mph, 95% Speed = 37.75 mph, Median = 30.65 mph
 10 mph Pace = 26 - 36, Number in Pace = 5061 (71.14%)
 Variance = 27.93, Standard Deviation = 5.29 mph

Speed Report

Job 307_059_VHB_ATR 1
 Area Worcester, MA
 Location Chandler Street, north of May Street (north)
 Dir Southbound
Thursday, January 24, 2019

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	55	0	0	0	1	4	24	15	8	1	2	0	0	0	0	0	0
0100	13	0	0	1	0	1	2	7	0	2	0	0	0	0	0	0	0
0200	19	0	0	0	0	2	6	3	5	2	1	0	0	0	0	0	0
0300	13	0	0	0	0	1	2	3	4	2	0	1	0	0	0	0	0
0400	41	0	0	0	0	0	2	18	12	6	3	0	0	0	0	0	0
0500	122	0	0	0	0	2	8	39	53	16	4	0	0	0	0	0	0
0600	365	0	0	0	1	22	48	191	91	11	1	0	0	0	0	0	0
0700	629	0	1	0	13	43	169	324	74	5	0	0	0	0	0	0	0
0800	741	0	3	10	40	135	317	201	33	2	0	0	0	0	0	0	0
0900	497	0	0	1	12	53	144	223	58	5	0	1	0	0	0	0	0
1000	338	0	0	1	10	53	117	118	38	1	0	0	0	0	0	0	0
1100	445	0	0	0	9	45	162	173	55	1	0	0	0	0	0	0	0
1200	415	0	0	0	8	58	125	169	51	4	0	0	0	0	0	0	0
1300	390	0	0	1	9	34	107	178	58	3	0	0	0	0	0	0	0
1400	609	0	29	52	81	114	174	128	27	3	0	0	1	0	0	0	0
1500	478	0	0	0	3	39	162	216	55	3	0	0	0	0	0	0	0
1600	435	0	2	2	5	39	137	171	74	5	0	0	0	0	0	0	0
1700	364	0	0	0	1	23	116	159	60	5	0	0	0	0	0	0	0
1800	306	0	0	0	4	17	58	137	73	14	3	0	0	0	0	0	0
1900	294	0	0	1	2	12	71	146	56	5	1	0	0	0	0	0	0
2000	234	0	0	0	1	10	50	98	62	11	2	0	0	0	0	0	0
2100	206	0	0	1	2	7	54	99	38	5	0	0	0	0	0	0	0
2200	118	0	0	0	2	10	24	45	24	10	3	0	0	0	0	0	0
2300	80	0	0	0	0	3	15	41	15	4	2	0	0	0	0	0	0
Total	7207	0	35	70	204	727	2094	2902	1024	126	22	2	1	0	0	0	0

100.00% 0.00% 0.49% 0.97% 2.83% 10.09% 29.06% 40.27% 14.21% 1.75% 0.31% 0.03% 0.01% 0.00% 0.00% 0.00% 0.00%

Maximum = 55.3 mph, Minimum = 6.4 mph, Mean = 30.2 mph
 85% Speed = 35.23 mph, 95% Speed = 37.86 mph, Median = 30.81 mph
 10 mph Pace = 26 - 36, Number in Pace = 5095 (70.70%)
 Variance = 29.52, Standard Deviation = 5.43 mph

Speed Report

Job 307_059_VHB_ATR 2
 Area Worcester, MA
 Location May Street (north), northeast of Chandler Street
 Dir Northbound
Tuesday, January 22, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500	48	0	1	2	5	14	22	2	2	0	0	0	0	0	0	0	
1600	150	0	0	0	0	16	60	61	12	1	0	0	0	0	0	0	
1700	149	0	0	0	4	14	62	54	13	2	0	0	0	0	0	0	
1800	151	0	0	0	2	13	67	60	8	1	0	0	0	0	0	0	
1900	102	0	0	1	0	13	32	45	11	0	0	0	0	0	0	0	
2000	79	0	0	0	0	7	29	26	13	3	1	0	0	0	0	0	
2100	58	0	0	0	0	7	21	25	5	0	0	0	0	0	0	0	
2200	36	0	0	0	0	1	7	22	3	2	1	0	0	0	0	0	
2300	28	0	0	0	0	1	7	13	6	1	0	0	0	0	0	0	
Total	801	0	1	3	11	86	307	308	73	10	2	0	0	0	0	0	

100.00% 0.00% 0.12% 0.37% 1.37% 10.74% 38.33% 38.45% 9.11% 1.25% 0.25% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 49.1 mph, Minimum = 7.3 mph, Mean = 29.7 mph
 85% Speed = 33.89 mph, 95% Speed = 36.69 mph, Median = 29.92 mph
 10 mph Pace = 24 - 34, Number in Pace = 631 (78.78%)
 Variance = 19.66, Standard Deviation = 4.43 mph

Speed Report

Job 307_059_VHB_ATR 2
 Area Worcester, MA
 Location May Street (north), northeast of Chandler Street
 Dir Northbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	10	0	0	0	0	0	6	3	0	0	1	0	0	0	0	0	0
0100	4	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0
0200	5	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0
0300	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
0400	5	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0
0500	11	0	0	0	0	0	5	3	3	0	0	0	0	0	0	0	0
0600	36	0	0	0	0	4	12	19	1	0	0	0	0	0	0	0	0
0700	79	0	0	1	0	4	34	32	8	0	0	0	0	0	0	0	0
0800	116	0	0	0	1	14	47	48	4	1	1	0	0	0	0	0	0
0900	82	0	0	3	2	14	31	27	4	1	0	0	0	0	0	0	0
1000	91	0	0	0	2	13	43	29	4	0	0	0	0	0	0	0	0
1100	117	0	1	0	2	12	50	44	5	3	0	0	0	0	0	0	0
1200	139	0	0	0	5	20	45	56	13	0	0	0	0	0	0	0	0
1300	156	0	0	0	3	16	57	67	13	0	0	0	0	0	0	0	0
1400	203	0	0	2	15	48	90	39	9	0	0	0	0	0	0	0	0
1500	167	0	1	1	3	20	67	60	15	0	0	0	0	0	0	0	0
1600	164	0	0	0	1	10	61	71	20	1	0	0	0	0	0	0	0
1700	177	0	0	0	1	8	49	99	19	1	0	0	0	0	0	0	0
1800	135	0	0	0	0	6	47	61	20	1	0	0	0	0	0	0	0
1900	125	0	0	0	0	10	42	48	19	5	1	0	0	0	0	0	0
2000	90	0	0	0	1	4	29	41	12	3	0	0	0	0	0	0	0
2100	55	0	0	0	1	4	18	21	11	0	0	0	0	0	0	0	0
2200	41	0	0	0	2	3	14	14	5	2	1	0	0	0	0	0	0
2300	26	0	1	0	0	0	2	14	5	3	0	1	0	0	0	0	0
Total	2036	0	3	7	39	211	754	801	194	22	4	1	0	0	0	0	0

100.00% 0.00% 0.15% 0.34% 1.92% 10.36% 37.03% 39.34% 9.53% 1.08% 0.20% 0.05% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 50.2 mph, Minimum = 7.1 mph, Mean = 29.8 mph
 85% Speed = 34.17 mph, 95% Speed = 37.08 mph, Median = 30.03 mph
 10 mph Pace = 25 - 35, Number in Pace = 1557 (76.47%)
 Variance = 21.42, Standard Deviation = 4.63 mph

Speed Report

Job 307_059_VHB_ATR 2
 Area Worcester, MA
 Location May Street (north), northeast of Chandler Street
 Dir Northbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	16	0	0	0	0	0	3	8	4	0	1	0	0	0	0	0	0
0100	6	0	0	0	1	0	1	3	1	0	0	0	0	0	0	0	0
0200	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0400	4	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0
0500	11	0	0	0	0	1	2	5	3	0	0	0	0	0	0	0	0
0600	42	0	0	0	1	3	17	13	4	4	0	0	0	0	0	0	0
0700	92	0	0	0	1	8	33	38	10	1	1	0	0	0	0	0	0
0800	107	0	0	1	0	8	48	40	7	3	0	0	0	0	0	0	0
0900	90	0	0	0	2	7	37	33	9	1	1	0	0	0	0	0	0
1000	77	0	0	1	1	12	35	21	5	2	0	0	0	0	0	0	0
1100	130	0	0	1	2	22	62	37	6	0	0	0	0	0	0	0	0
1200	118	0	1	0	2	19	56	32	8	0	0	0	0	0	0	0	0
1300	116	0	0	0	4	12	39	42	16	3	0	0	0	0	0	0	0
1400	238	0	3	5	13	50	95	59	12	1	0	0	0	0	0	0	0
1500	55	0	0	0	2	1	19	27	6	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1107	0	4	8	29	143	449	364	91	15	3	1	0	0	0	0	0

100.00% 0.00% 0.36% 0.72% 2.62% 12.92% 40.56% 32.88% 8.22% 1.36% 0.27% 0.09% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 53.8 mph, Minimum = 7.1 mph, Mean = 29.1 mph
 85% Speed = 33.72 mph, 95% Speed = 36.72 mph, Median = 29.19 mph
 10 mph Pace = 24 - 34, Number in Pace = 814 (73.53%)
 Variance = 25.27, Standard Deviation = 5.03 mph

Speed Report

Job 307_059_VHB_ATR 2
 Area Worcester, MA
 Location May Street (north), northeast of Chandler Street
 Dir Southbound
Tuesday, January 22, 2019

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500	60	0	0	0	3	26	28	3	0	0	0	0	0	0	0	0	0
1600	191	0	0	1	16	31	89	48	6	0	0	0	0	0	0	0	0
1700	137	0	0	0	0	25	63	43	6	0	0	0	0	0	0	0	0
1800	91	0	1	0	0	9	49	28	3	1	0	0	0	0	0	0	0
1900	66	0	0	0	1	11	34	16	4	0	0	0	0	0	0	0	0
2000	49	0	0	0	4	6	18	18	2	1	0	0	0	0	0	0	0
2100	31	0	0	0	0	5	15	9	2	0	0	0	0	0	0	0	0
2200	18	0	0	1	1	1	8	5	2	0	0	0	0	0	0	0	0
2300	12	0	0	0	0	4	5	3	0	0	0	0	0	0	0	0	0
Total	655	0	1	2	25	118	309	173	25	2	0	0	0	0	0	0	0

100.00% 0.00% 0.15% 0.31% 3.82% 18.02% 47.18% 26.41% 3.82% 0.31% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 41.0 mph, Minimum = 8.5 mph, Mean = 27.9 mph
 85% Speed = 32.32 mph, 95% Speed = 34.71 mph, Median = 27.91 mph
 10 mph Pace = 23 - 33, Number in Pace = 509 (77.71%)
 Variance = 18.38, Standard Deviation = 4.29 mph

Speed Report

Job 307_059_VHB_ATR 2
 Area Worcester, MA
 Location May Street (north), northeast of Chandler Street
 Dir Southbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	4	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0
0100	4	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0300	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0400	8	0	0	0	0	1	4	3	0	0	0	0	0	0	0	0	0
0500	22	0	0	0	1	2	10	9	0	0	0	0	0	0	0	0	0
0600	49	0	0	0	3	5	13	23	5	0	0	0	0	0	0	0	0
0700	168	0	0	1	1	12	79	57	18	0	0	0	0	0	0	0	0
0800	175	0	0	0	4	23	87	54	7	0	0	0	0	0	0	0	0
0900	124	0	2	1	1	23	40	49	8	0	0	0	0	0	0	0	0
1000	93	0	0	0	1	10	43	37	2	0	0	0	0	0	0	0	0
1100	102	0	0	1	7	11	42	32	8	1	0	0	0	0	0	0	0
1200	120	0	0	0	3	19	47	39	12	0	0	0	0	0	0	0	0
1300	120	0	0	2	6	22	45	40	5	0	0	0	0	0	0	0	0
1400	170	0	0	3	19	46	72	28	1	1	0	0	0	0	0	0	0
1500	156	0	0	0	5	29	74	43	5	0	0	0	0	0	0	0	0
1600	155	0	0	0	1	21	72	53	6	2	0	0	0	0	0	0	0
1700	156	0	0	1	5	26	72	48	3	1	0	0	0	0	0	0	0
1800	109	0	0	0	1	10	49	40	9	0	0	0	0	0	0	0	0
1900	61	0	0	0	2	11	31	14	2	1	0	0	0	0	0	0	0
2000	47	0	0	0	1	4	24	14	4	0	0	0	0	0	0	0	0
2100	39	0	0	0	0	5	14	12	7	1	0	0	0	0	0	0	0
2200	20	0	0	0	0	3	8	8	1	0	0	0	0	0	0	0	0
2300	15	0	1	0	1	3	2	6	2	0	0	0	0	0	0	0	0
Total	1918	0	3	9	62	287	833	610	107	7	0	0	0	0	0	0	0
	100.00%	0.00%	0.16%	0.47%	3.23%	14.96%	43.43%	31.80%	5.58%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Maximum = 44.1 mph, Minimum = 6.5 mph, Mean = 28.5 mph
 85% Speed = 32.78 mph, 95% Speed = 35.46 mph, Median = 28.69 mph
 10 mph Pace = 24 - 34, Number in Pace = 1463 (76.28%)
 Variance = 20.06, Standard Deviation = 4.48 mph

Speed Report

Job 307_059_VHB_ATR 2
 Area Worcester, MA
 Location May Street (north), northeast of Chandler Street
 Dir Southbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	4	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0
0100	6	0	0	0	0	1	1	2	2	0	0	0	0	0	0	0	0
0200	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0300	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0400	6	0	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0
0500	22	0	0	0	0	1	11	8	2	0	0	0	0	0	0	0	0
0600	64	0	1	0	2	7	23	20	9	2	0	0	0	0	0	0	0
0700	185	0	0	0	4	12	82	72	14	1	0	0	0	0	0	0	0
0800	214	0	19	15	9	35	75	53	7	1	0	0	0	0	0	0	0
0900	116	0	1	0	2	15	56	32	8	2	0	0	0	0	0	0	0
1000	79	0	0	0	0	15	32	26	5	1	0	0	0	0	0	0	0
1100	110	0	0	0	3	39	50	17	1	0	0	0	0	0	0	0	0
1200	101	0	1	1	6	15	49	22	6	1	0	0	0	0	0	0	0
1300	85	0	2	0	1	21	38	22	1	0	0	0	0	0	0	0	0
1400	171	0	1	7	18	58	65	21	1	0	0	0	0	0	0	0	0
1500	47	0	0	0	0	5	17	22	3	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1214	0	25	23	46	224	503	324	60	9	0	0	0	0	0	0	0

100.00% 0.00% 2.06% 1.89% 3.79% 18.45% 41.43% 26.69% 4.94% 0.74% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 42.1 mph, Minimum = 6.6 mph, Mean = 27.4 mph
 85% Speed = 32.27 mph, 95% Speed = 35.30 mph, Median = 28.13 mph
 10 mph Pace = 23 - 33, Number in Pace = 895 (73.72%)
 Variance = 31.15, Standard Deviation = 5.58 mph

Speed Report

Job 307_059_VHB_ATR 3
 Area Worcester, MA
 Location Chandler Street, north of Claridge Drive
 Dir Northbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	39	0	0	0	0	0	2	6	17	11	2	0	0	1	0	0	0
0100	30	0	0	1	0	0	1	4	12	5	5	1	1	0	0	0	0
0200	29	0	0	0	0	0	1	1	11	8	8	0	0	0	0	0	0
0300	13	0	0	0	0	0	1	0	3	5	2	1	1	0	0	0	0
0400	22	0	0	0	0	0	0	2	7	5	5	2	1	0	0	0	0
0500	58	0	0	0	0	1	1	7	20	14	10	3	2	0	0	0	0
0600	153	0	0	1	1	2	5	34	59	32	14	2	3	0	0	0	0
0700	383	0	0	0	1	8	36	110	159	58	10	1	0	0	0	0	0
0800	529	0	0	0	5	29	107	136	174	62	13	2	0	0	0	1	0
0900	379	0	0	3	8	10	53	121	119	52	12	0	1	0	0	0	0
1000	359	0	0	1	8	11	34	121	136	37	10	1	0	0	0	0	0
1100	427	0	1	5	17	23	61	130	105	63	18	2	1	0	1	0	0
1200	573	0	0	2	8	22	60	164	205	90	21	1	0	0	0	0	0
1300	620	0	0	2	9	18	73	189	201	112	15	1	0	0	0	0	0
1400	730	0	0	2	9	27	74	243	260	92	17	5	1	0	0	0	0
1500	774	0	0	1	9	18	59	229	256	172	26	3	1	0	0	0	0
1600	859	0	0	3	7	34	127	290	286	88	21	3	0	0	0	0	0
1700	795	0	0	0	5	15	101	326	264	71	11	2	0	0	0	0	0
1800	567	0	0	0	1	2	28	166	260	88	17	4	1	0	0	0	0
1900	422	0	0	0	1	3	31	115	171	71	24	5	1	0	0	0	0
2000	329	0	0	0	1	2	13	66	136	86	17	6	1	1	0	0	0
2100	206	0	0	0	2	1	12	40	76	55	18	2	0	0	0	0	0
2200	170	0	0	0	0	1	7	29	70	40	14	5	3	1	0	0	0
2300	116	0	1	1	0	0	3	13	35	44	14	4	1	0	0	0	0
Total	8582	0	2	22	92	227	890	2542	3042	1361	324	56	19	3	1	1	0

100.00% 0.00% 0.02% 0.26% 1.07% 2.65% 10.37% 29.62% 35.45% 15.86% 3.78% 0.65% 0.22% 0.03% 0.01% 0.01% 0.00%

Maximum = 71.2 mph, Minimum = 6.5 mph, Mean = 35.6 mph
 85% Speed = 41.16 mph, 95% Speed = 44.79 mph, Median = 35.79 mph
 10 mph Pace = 31 - 41, Number in Pace = 5678 (66.16%)
 Variance = 34.89, Standard Deviation = 5.91 mph

Speed Report

Job 307_059_VHB_ATR 3
 Area Worcester, MA
 Location Chandler Street, north of Claridge Drive
 Dir Northbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	49	0	0	0	0	0	9	5	15	13	4	3	0	0	0	0	0
0100	32	0	0	0	0	0	2	10	9	6	4	1	0	0	0	0	0
0200	31	0	0	0	0	0	1	6	11	2	1	0	1	2	4	1	1
0300	11	0	0	0	0	0	1	1	4	0	3	2	0	0	0	0	0
0400	14	0	0	0	0	0	2	3	7	2	0	0	0	0	0	0	0
0500	46	0	0	0	3	0	3	7	19	7	5	2	0	0	0	0	0
0600	144	0	0	0	1	1	5	26	60	31	15	3	1	1	0	0	0
0700	349	0	0	0	1	6	27	92	139	64	18	1	0	1	0	0	0
0800	519	0	2	3	10	30	70	184	162	47	9	2	0	0	0	0	0
0900	394	0	0	1	11	26	56	129	119	47	5	0	0	0	0	0	0
1000	326	0	0	1	7	12	55	103	104	34	8	2	0	0	0	0	0
1100	417	0	0	1	3	16	82	143	124	37	8	2	1	0	0	0	0
1200	483	0	0	4	12	22	58	150	165	61	10	1	0	0	0	0	0
1300	422	0	0	1	5	14	41	147	158	41	12	3	0	0	0	0	0
1400	639	0	0	5	12	45	157	225	146	41	7	1	0	0	0	0	0
1500	559	0	0	3	11	11	68	182	193	78	11	2	0	0	0	0	0
1600	660	0	1	0	3	6	56	255	252	75	12	0	0	0	0	0	0
1700	711	0	0	2	12	11	96	266	236	77	10	1	0	0	0	0	0
1800	490	0	1	0	1	2	34	149	196	91	13	2	1	0	0	0	0
1900	385	0	0	0	1	8	13	91	177	81	13	1	0	0	0	0	0
2000	300	0	0	0	5	4	18	68	130	56	17	2	0	0	0	0	0
2100	256	0	0	0	2	2	7	43	102	70	25	5	0	0	0	0	0
2200	164	0	0	0	0	1	6	25	62	43	18	7	1	1	0	0	0
2300	102	0	0	0	0	0	1	14	33	34	8	9	3	0	0	0	0
Total	7503	0	4	21	100	217	868	2324	2623	1038	236	52	8	5	4	1	1

100.00% 0.00% 0.05% 0.28% 1.33% 2.89% 11.57% 30.97% 34.96% 13.83% 3.15% 0.69% 0.11% 0.07% 0.05% 0.01% 0.01%

Maximum = 82.7 mph, Minimum = 7.8 mph, Mean = 35.2 mph
 85% Speed = 40.66 mph, 95% Speed = 44.35 mph, Median = 35.40 mph
 10 mph Pace = 30 - 40, Number in Pace = 4987 (66.47%)
 Variance = 36.17, Standard Deviation = 6.01 mph

Speed Report

Job 307_059_VHB_ATR 3
 Area Worcester, MA
 Location Chandler Street, north of Claridge Drive
 Dir Southbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	42	0	0	0	0	4	29	7	2	0	0	0	0	0	0	0	0
0100	21	0	0	0	1	6	9	4	1	0	0	0	0	0	0	0	0
0200	15	0	0	0	0	2	8	4	1	0	0	0	0	0	0	0	0
0300	14	0	0	0	0	1	5	7	0	1	0	0	0	0	0	0	0
0400	49	0	0	0	0	4	12	28	5	0	0	0	0	0	0	0	0
0500	145	0	0	0	0	6	65	69	3	1	0	0	1	0	0	0	0
0600	346	0	0	1	2	52	213	73	4	1	0	0	0	0	0	0	0
0700	657	0	0	0	15	101	443	91	6	1	0	0	0	0	0	0	0
0800	766	0	1	20	131	310	271	25	3	4	1	0	0	0	0	0	0
0900	512	0	1	8	53	154	248	45	1	2	0	0	0	0	0	0	0
1000	426	0	1	3	13	104	257	46	2	0	0	0	0	0	0	0	0
1100	419	0	0	15	23	105	226	44	5	1	0	0	0	0	0	0	0
1200	464	0	0	3	21	152	236	39	7	2	2	0	0	0	0	2	0
1300	495	0	1	7	29	150	250	47	9	2	0	0	0	0	0	0	0
1400	550	0	1	5	39	187	254	49	11	4	0	0	0	0	0	0	0
1500	612	0	1	5	32	202	310	45	9	6	1	1	0	0	0	0	0
1600	536	0	3	8	34	232	221	27	7	3	1	0	0	0	0	0	0
1700	458	0	0	3	12	181	222	26	9	5	0	0	0	0	0	0	0
1800	372	0	0	6	9	117	197	31	10	1	1	0	0	0	0	0	0
1900	313	0	0	2	4	61	209	32	4	1	0	0	0	0	0	0	0
2000	208	0	0	0	5	35	124	40	3	1	0	0	0	0	0	0	0
2100	165	0	0	0	6	36	90	31	2	0	0	0	0	0	0	0	0
2200	128	0	0	1	5	18	71	29	4	0	0	0	0	0	0	0	0
2300	93	0	1	0	1	19	52	20	0	0	0	0	0	0	0	0	0
Total	7806	0	10	87	435	2239	4022	859	108	36	6	1	1	0	0	2	0

100.00% 0.00% 0.13% 1.11% 5.57% 28.68% 51.52% 11.00% 1.38% 0.46% 0.08% 0.01% 0.01% 0.00% 0.00% 0.03% 0.00%

Maximum = 71.5 mph, Minimum = 6.6 mph, Mean = 26.1 mph
 85% Speed = 29.70 mph, 95% Speed = 32.16 mph, Median = 26.45 mph
 10 mph Pace = 21 - 31, Number in Pace = 6420 (82.24%)
 Variance = 18.07, Standard Deviation = 4.25 mph

Speed Report

Job 307_059_VHB_ATR 3
 Area Worcester, MA
 Location Chandler Street, north of Claridge Drive
 Dir Southbound
Thursday, January 24, 2019

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	54	0	0	0	5	17	25	5	2	0	0	0	0	0	0	0	0
0100	17	0	0	0	0	4	10	2	1	0	0	0	0	0	0	0	0
0200	19	0	0	0	0	7	4	7	1	0	0	0	0	0	0	0	0
0300	12	0	0	0	0	2	5	4	0	1	0	0	0	0	0	0	0
0400	45	0	0	0	0	9	17	14	5	0	0	0	0	0	0	0	0
0500	137	0	0	0	0	9	74	47	7	0	0	0	0	0	0	0	0
0600	393	0	0	0	5	51	269	64	4	0	0	0	0	0	0	0	0
0700	695	0	0	0	7	115	499	69	5	0	0	0	0	0	0	0	0
0800	839	0	14	52	151	342	248	20	8	3	1	0	0	0	0	0	0
0900	544	0	1	15	48	171	265	43	1	0	0	0	0	0	0	0	0
1000	361	0	1	3	26	117	190	22	2	0	0	0	0	0	0	0	0
1100	470	0	1	4	45	197	195	27	1	0	0	0	0	0	0	0	0
1200	439	0	1	18	50	137	195	32	4	2	0	0	0	0	0	0	0
1300	418	0	0	5	23	142	223	24	0	0	1	0	0	0	0	0	0
1400	638	0	56	106	85	225	137	25	2	1	0	0	0	0	0	0	1
1500	538	0	3	9	29	190	274	31	2	0	0	0	0	0	0	0	0
1600	488	0	0	5	25	129	279	43	5	2	0	0	0	0	0	0	0
1700	439	0	0	7	17	143	230	40	1	1	0	0	0	0	0	0	0
1800	335	0	1	0	13	47	203	62	7	2	0	0	0	0	0	0	0
1900	325	0	0	1	13	65	190	53	3	0	0	0	0	0	0	0	0
2000	249	0	0	1	6	35	132	68	6	1	0	0	0	0	0	0	0
2100	218	0	0	1	5	42	126	40	4	0	0	0	0	0	0	0	0
2200	125	0	0	0	3	19	66	31	5	1	0	0	0	0	0	0	0
2300	86	0	0	0	0	11	44	26	5	0	0	0	0	0	0	0	0
Total	7884	0	78	227	556	2226	3900	799	81	14	2	0	0	0	0	0	1

100.00% 0.00% 0.99% 2.88% 7.05% 28.23% 49.47% 10.13% 1.03% 0.18% 0.03% 0.00% 0.00% 0.00% 0.00% 0.00% 0.01%

Maximum = 79.8 mph, Minimum = 6.2 mph, Mean = 25.4 mph
 85% Speed = 29.42 mph, 95% Speed = 31.65 mph, Median = 26.06 mph
 10 mph Pace = 21 - 31, Number in Pace = 6261 (79.41%)
 Variance = 22.60, Standard Deviation = 4.75 mph

Speed Report

Job 307_059_VHB_ATR 5
 Area Worcester, MA
 Location Chandler Street, southeast of May Street (south)
 Dir Northbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	27	0	0	0	1	0	9	16	0	0	0	1	0	0	0	0	0
0100	19	0	0	0	1	0	8	6	3	1	0	0	0	0	0	0	0
0200	18	0	0	0	0	1	4	10	3	0	0	0	0	0	0	0	0
0300	9	0	0	0	0	0	3	3	2	1	0	0	0	0	0	0	0
0400	15	0	0	0	0	0	2	7	5	1	0	0	0	0	0	0	0
0500	41	0	0	0	1	3	14	18	4	1	0	0	0	0	0	0	0
0600	95	0	0	0	0	8	39	39	8	1	0	0	0	0	0	0	0
0700	293	0	1	10	12	76	139	50	4	1	0	0	0	0	0	0	0
0800	439	0	12	63	93	164	86	18	2	0	0	0	0	0	1	0	0
0900	309	0	2	16	62	98	95	34	2	0	0	0	0	0	0	0	0
1000	245	0	1	10	31	83	89	28	3	0	0	0	0	0	0	0	0
1100	273	0	5	11	18	82	122	28	7	0	0	0	0	0	0	0	0
1200	320	0	5	31	54	109	94	26	1	0	0	0	0	0	0	0	0
1300	312	0	1	16	38	98	108	48	3	0	0	0	0	0	0	0	0
1400	415	0	3	13	40	134	173	46	6	0	0	0	0	0	0	0	0
1500	430	0	4	16	55	127	163	59	6	0	0	0	0	0	0	0	0
1600	503	0	3	23	83	126	196	69	3	0	0	0	0	0	0	0	0
1700	502	0	4	21	36	108	229	97	7	0	0	0	0	0	0	0	0
1800	321	0	0	9	11	27	162	97	13	2	0	0	0	0	0	0	0
1900	226	0	0	0	0	23	105	81	16	1	0	0	0	0	0	0	0
2000	188	0	0	0	0	12	83	73	17	3	0	0	0	0	0	0	0
2100	130	0	0	0	0	3	56	51	17	3	0	0	0	0	0	0	0
2200	105	0	0	0	0	5	31	53	12	4	0	0	0	0	0	0	0
2300	72	0	0	1	0	0	15	36	17	3	0	0	0	0	0	0	0
Total	5307	0	41	240	536	1287	2025	993	161	22	0	1	0	0	1	0	0

100.00% 0.00% 0.77% 4.52% 10.10% 24.25% 38.16% 18.71% 3.03% 0.41% 0.00% 0.02% 0.00% 0.00% 0.02% 0.00% 0.00%

Maximum = 66.6 mph, Minimum = 6.3 mph, Mean = 25.8 mph
 85% Speed = 31.26 mph, 95% Speed = 34.15 mph, Median = 26.40 mph
 10 mph Pace = 22 - 32, Number in Pace = 3492 (65.80%)
 Variance = 33.29, Standard Deviation = 5.77 mph

Speed Report

Job 307_059_VHB_ATR 5
 Area Worcester, MA
 Location Chandler Street, southeast of May Street (south)
 Dir Northbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	37	0	0	1	1	1	13	14	6	1	0	0	0	0	0	0	0
0100	23	0	0	0	0	3	5	10	5	0	0	0	0	0	0	0	0
0200	18	0	0	0	0	0	3	7	3	0	0	2	3	0	0	0	0
0300	8	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0
0400	9	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0
0500	35	0	0	0	0	8	10	11	6	0	0	0	0	0	0	0	0
0600	100	0	0	1	0	14	40	34	10	1	0	0	0	0	0	0	0
0700	279	0	2	7	17	55	123	65	10	0	0	0	0	0	0	0	0
0800	537	0	37	144	159	114	62	19	1	1	0	0	0	0	0	0	0
0900	291	0	3	14	38	75	111	42	7	0	1	0	0	0	0	0	0
1000	250	0	1	7	23	81	94	38	6	0	0	0	0	0	0	0	0
1100	271	0	5	17	29	71	108	37	4	0	0	0	0	0	0	0	0
1200	347	0	2	16	51	95	137	43	3	0	0	0	0	0	0	0	0
1300	295	0	2	6	36	73	135	36	7	0	0	0	0	0	0	0	0
1400	469	0	7	34	115	181	104	28	0	0	0	0	0	0	0	0	0
1500	358	0	0	3	13	84	150	96	12	0	0	0	0	0	0	0	0
1600	465	0	0	11	15	90	249	85	14	0	0	0	0	0	1	0	0
1700	476	0	1	12	26	98	219	109	10	1	0	0	0	0	0	0	0
1800	336	0	0	0	3	43	181	99	10	0	0	0	0	0	0	0	0
1900	247	0	0	1	7	21	106	98	14	0	0	0	0	0	0	0	0
2000	201	0	0	0	2	19	107	59	13	1	0	0	0	0	0	0	0
2100	182	0	0	0	1	15	71	68	27	0	0	0	0	0	0	0	0
2200	125	0	0	0	0	7	31	65	18	4	0	0	0	0	0	0	0
2300	72	0	0	0	0	2	26	29	10	5	0	0	0	0	0	0	0
Total	5431	0	60	274	536	1151	2089	1101	199	14	1	2	3	0	1	0	0

100.00% 0.00% 1.10% 5.05% 9.87% 21.19% 38.46% 20.27% 3.66% 0.26% 0.02% 0.04% 0.06% 0.00% 0.02% 0.00% 0.00%

Maximum = 66.7 mph, Minimum = 6.3 mph, Mean = 25.9 mph
 85% Speed = 31.54 mph, 95% Speed = 34.45 mph, Median = 26.73 mph
 10 mph Pace = 22 - 32, Number in Pace = 3573 (65.79%)
 Variance = 36.98, Standard Deviation = 6.08 mph

Speed Report

Job 307_059_VHB_ATR 5
 Area Worcester, MA
 Location Chandler Street, southeast of May Street (south)
 Dir Southbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	26	0	0	0	2	1	11	10	2	0	0	0	0	0	0	0	0
0100	10	0	0	0	0	1	2	3	3	1	0	0	0	0	0	0	0
0200	13	0	0	0	0	2	5	5	0	1	0	0	0	0	0	0	0
0300	11	0	0	0	0	0	3	6	1	0	1	0	0	0	0	0	0
0400	40	0	0	0	0	0	3	16	18	3	0	0	0	0	0	0	0
0500	113	0	0	0	0	2	27	50	32	2	0	0	0	0	0	0	0
0600	258	0	0	0	5	33	106	91	19	4	0	0	0	0	0	0	0
0700	423	0	0	1	19	72	161	146	23	1	0	0	0	0	0	0	0
0800	507	0	17	74	105	115	127	57	9	2	0	0	0	0	1	0	0
0900	302	0	2	1	29	49	145	64	10	2	0	0	0	0	0	0	0
1000	274	0	3	1	31	53	109	66	10	1	0	0	0	0	0	0	0
1100	273	0	0	1	16	72	115	60	7	2	0	0	0	0	0	0	0
1200	286	0	1	1	42	107	102	31	1	1	0	0	0	0	0	0	0
1300	220	0	2	4	16	73	82	38	5	0	0	0	0	0	0	0	0
1400	340	0	14	10	33	89	123	64	7	0	0	0	0	0	0	0	0
1500	330	0	1	2	35	66	147	69	10	0	0	0	0	0	0	0	0
1600	319	0	1	13	36	70	109	80	10	0	0	0	0	0	0	0	0
1700	264	0	0	0	9	42	116	87	8	2	0	0	0	0	0	0	0
1800	241	0	0	0	3	27	108	86	17	0	0	0	0	0	0	0	0
1900	197	0	0	0	3	24	74	78	18	0	0	0	0	0	0	0	0
2000	141	0	0	0	1	13	47	61	19	0	0	0	0	0	0	0	0
2100	102	0	0	0	1	5	31	45	17	3	0	0	0	0	0	0	0
2200	73	0	0	0	1	3	18	31	16	4	0	0	0	0	0	0	0
2300	57	0	0	0	0	2	18	28	9	0	0	0	0	0	0	0	0
Total	4820	0	41	108	387	921	1789	1272	271	29	1	0	0	0	0	1	0

100.00% 0.00% 0.85% 2.24% 8.03% 19.11% 37.12% 26.39% 5.62% 0.60% 0.02% 0.00% 0.00% 0.00% 0.02% 0.00% 0.00%

Maximum = 66.6 mph, Minimum = 6.4 mph, Mean = 27.2 mph
 85% Speed = 32.55 mph, 95% Speed = 35.51 mph, Median = 27.79 mph
 10 mph Pace = 23 - 33, Number in Pace = 3244 (67.30%)
 Variance = 32.79, Standard Deviation = 5.73 mph

Speed Report

Job 307_059_VHB_ATR 5
 Area Worcester, MA
 Location Chandler Street, southeast of May Street (south)
 Dir Southbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	33	0	0	0	1	3	14	6	7	0	2	0	0	0	0	0	0
0100	10	0	0	0	0	0	1	5	2	2	0	0	0	0	0	0	0
0200	16	0	0	0	0	1	6	2	5	2	0	0	0	0	0	0	0
0300	8	0	0	0	0	0	2	3	2	0	0	0	1	0	0	0	0
0400	33	0	0	0	0	1	5	12	9	6	0	0	0	0	0	0	0
0500	107	0	0	0	0	3	20	37	35	7	4	1	0	0	0	0	0
0600	280	0	0	3	6	33	87	116	33	2	0	0	0	0	0	0	0
0700	437	0	0	0	16	51	178	160	28	4	0	0	0	0	0	0	0
0800	484	0	17	76	110	102	126	46	5	2	0	0	0	0	0	0	0
0900	323	0	1	9	38	69	128	71	6	1	0	0	0	0	0	0	0
1000	237	0	0	7	29	59	93	43	6	0	0	0	0	0	0	0	0
1100	291	0	1	8	38	90	103	47	3	1	0	0	0	0	0	0	0
1200	286	0	1	11	36	80	103	45	8	2	0	0	0	0	0	0	0
1300	274	0	2	11	13	67	110	59	12	0	0	0	0	0	0	0	0
1400	462	0	36	135	110	83	58	36	4	0	0	0	0	0	0	0	0
1500	345	0	2	3	10	70	150	101	9	0	0	0	0	0	0	0	0
1600	296	0	0	6	17	39	110	101	20	2	1	0	0	0	0	0	0
1700	249	0	1	0	8	40	92	79	26	3	0	0	0	0	0	0	0
1800	219	0	1	2	2	11	55	108	30	9	1	0	0	0	0	0	0
1900	195	0	0	0	0	10	75	87	20	3	0	0	0	0	0	0	0
2000	163	0	0	0	0	12	43	70	29	8	0	1	0	0	0	0	0
2100	120	0	0	0	1	9	24	60	25	1	0	0	0	0	0	0	0
2200	77	0	0	0	1	2	17	28	26	3	0	0	0	0	0	0	0
2300	55	0	0	0	0	0	11	28	13	2	1	0	0	0	0	0	0
Total	5000	0	62	271	436	835	1611	1350	363	60	9	2	1	0	0	0	0

100.00% 0.00% 1.24% 5.42% 8.72% 16.70% 32.22% 27.00% 7.26% 1.20% 0.18% 0.04% 0.02% 0.00% 0.00% 0.00% 0.00%

Maximum = 57.8 mph, Minimum = 6.3 mph, Mean = 27.1 mph
 85% Speed = 33.44 mph, 95% Speed = 36.63 mph, Median = 28.02 mph
 10 mph Pace = 24 - 34, Number in Pace = 3001 (60.02%)
 Variance = 45.37, Standard Deviation = 6.74 mph

Speed Report

Job 307_059_VHB_ATR 6
 Area Worcester, MA
 Location May Street (south), southwest of Chandler Street
 Dir Northbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	13	0	0	0	1	7	4	1	0	0	0	0	0	0	0	0	0
0100	16	0	0	0	3	6	5	1	1	0	0	0	0	0	0	0	0
0200	9	0	0	0	0	1	6	2	0	0	0	0	0	0	0	0	0
0300	4	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0
0400	6	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0
0500	13	0	0	0	3	5	4	1	0	0	0	0	0	0	0	0	0
0600	49	0	0	0	5	27	12	4	1	0	0	0	0	0	0	0	0
0700	119	0	0	5	48	42	24	0	0	0	0	0	0	0	0	0	0
0800	141	0	2	34	65	37	3	0	0	0	0	0	0	0	0	0	0
0900	147	0	1	36	79	29	2	0	0	0	0	0	0	0	0	0	0
1000	152	0	0	25	88	30	7	2	0	0	0	0	0	0	0	0	0
1100	182	0	1	32	97	45	7	0	0	0	0	0	0	0	0	0	0
1200	216	0	4	41	115	44	8	3	0	0	0	0	1	0	0	0	0
1300	221	0	2	31	100	78	8	2	0	0	0	0	0	0	0	0	0
1400	263	0	5	61	127	62	5	1	2	0	0	0	0	0	0	0	0
1500	272	0	4	44	142	70	8	4	0	0	0	0	0	0	0	0	0
1600	263	0	10	32	143	66	12	0	0	0	0	0	0	0	0	0	0
1700	251	0	6	27	110	98	9	1	0	0	0	0	0	0	0	0	0
1800	216	0	2	14	68	97	30	4	1	0	0	0	0	0	0	0	0
1900	161	0	0	6	36	64	52	3	0	0	0	0	0	0	0	0	0
2000	140	0	0	2	41	61	29	7	0	0	0	0	0	0	0	0	0
2100	85	0	0	2	20	31	30	2	0	0	0	0	0	0	0	0	0
2200	64	0	0	2	6	34	19	2	1	0	0	0	0	0	0	0	0
2300	38	0	0	0	5	20	8	4	1	0	0	0	0	0	0	0	0
Total	3041	0	37	394	1303	957	295	47	7	0	0	0	1	0	0	0	0

100.00% 0.00% 1.22% 12.96% 42.85% 31.47% 9.70% 1.55% 0.23% 0.00% 0.00% 0.00% 0.03% 0.00% 0.00% 0.00% 0.00%

Maximum = 57.1 mph, Minimum = 6.3 mph, Mean = 19.5 mph
 85% Speed = 24.21 mph, 95% Speed = 27.18 mph, Median = 19.13 mph
 10 mph Pace = 14 - 24, Number in Pace = 2293 (75.40%)
 Variance = 20.57, Standard Deviation = 4.54 mph

Speed Report

Job 307_059_VHB_ATR 6
 Area Worcester, MA
 Location May Street (south), southwest of Chandler Street
 Dir Northbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	21	0	0	1	3	8	6	2	1	0	0	0	0	0	0	0	0
0100	14	0	0	0	2	5	5	2	0	0	0	0	0	0	0	0	0
0200	13	0	0	1	3	2	2	1	0	3	1	0	0	0	0	0	0
0300	3	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0
0400	5	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0
0500	15	0	0	0	3	2	8	2	0	0	0	0	0	0	0	0	0
0600	58	0	0	2	6	19	24	5	1	1	0	0	0	0	0	0	0
0700	112	0	0	3	27	62	19	0	1	0	0	0	0	0	0	0	0
0800	140	0	3	27	68	35	7	0	0	0	0	0	0	0	0	0	0
0900	173	0	1	27	112	26	7	0	0	0	0	0	0	0	0	0	0
1000	151	0	2	28	75	36	7	3	0	0	0	0	0	0	0	0	0
1100	205	0	8	42	113	38	4	0	0	0	0	0	0	0	0	0	0
1200	215	0	4	41	99	59	12	0	0	0	0	0	0	0	0	0	0
1300	185	0	0	15	72	78	18	2	0	0	0	0	0	0	0	0	0
1400	264	0	19	101	99	43	2	0	0	0	0	0	0	0	0	0	0
1500	247	0	3	15	88	123	17	1	0	0	0	0	0	0	0	0	0
1600	245	0	1	15	92	111	23	2	1	0	0	0	0	0	0	0	0
1700	264	0	4	24	78	107	46	3	2	0	0	0	0	0	0	0	0
1800	198	0	1	9	34	78	69	7	0	0	0	0	0	0	0	0	0
1900	155	0	0	2	30	66	48	8	0	0	1	0	0	0	0	0	0
2000	124	0	0	3	22	49	41	9	0	0	0	0	0	0	0	0	0
2100	104	0	0	1	11	44	44	4	0	0	0	0	0	0	0	0	0
2200	61	0	0	3	8	20	21	7	1	1	0	0	0	0	0	0	0
2300	35	0	0	0	3	10	18	4	0	0	0	0	0	0	0	0	0
Total	3007	0	46	360	1049	1023	451	64	7	5	2	0	0	0	0	0	0

100.00% 0.00% 1.53% 11.97% 34.89% 34.02% 15.00% 2.13% 0.23% 0.17% 0.07% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%

Maximum = 47.2 mph, Minimum = 6.3 mph, Mean = 20.4 mph
 85% Speed = 25.61 mph, 95% Speed = 28.30 mph, Median = 20.19 mph
 10 mph Pace = 15 - 25, Number in Pace = 2080 (69.17%)
 Variance = 24.98, Standard Deviation = 5.00 mph

Speed Report

Job 307_059_VHB_ATR 6
 Area Worcester, MA
 Location May Street (south), southwest of Chandler Street
 Dir Southbound
Wednesday, January 23, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	22	0	1	2	2	2	2	4	5	3	1	0	0	0	0	0	0
0100	15	0	0	2	4	0	1	0	5	1	2	0	0	0	0	0	0
0200	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
0300	4	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0
0400	10	0	0	0	0	0	0	2	3	2	3	0	0	0	0	0	0
0500	40	0	0	3	4	1	1	10	6	8	4	2	0	0	1	0	0
0600	99	0	0	2	15	2	3	15	32	20	8	1	1	0	0	0	0
0700	276	0	6	13	61	31	20	40	69	24	8	4	0	0	0	0	0
0800	333	0	31	82	108	40	37	22	12	0	1	0	0	0	0	0	0
0900	246	0	39	55	71	21	18	24	17	0	1	0	0	0	0	0	0
1000	209	0	2	24	59	32	42	31	14	4	1	0	0	0	0	0	0
1100	200	0	8	20	47	29	40	42	9	4	1	0	0	0	0	0	0
1200	257	0	5	24	69	42	52	39	19	5	2	0	0	0	0	0	0
1300	235	0	2	25	60	37	54	35	15	7	0	0	0	0	0	0	0
1400	256	0	16	15	59	32	48	50	27	8	1	0	0	0	0	0	0
1500	321	0	2	21	72	52	76	60	26	11	1	0	0	0	0	0	0
1600	300	0	2	27	79	54	59	59	20	0	0	0	0	0	0	0	0
1700	238	0	4	16	60	36	52	50	15	5	0	0	0	0	0	0	0
1800	175	0	1	8	29	28	28	43	25	13	0	0	0	0	0	0	0
1900	146	0	0	2	19	4	12	38	50	18	1	2	0	0	0	0	0
2000	107	0	0	5	20	5	4	26	27	13	3	4	0	0	0	0	0
2100	92	0	0	4	22	16	2	13	15	11	6	0	1	2	0	0	0
2200	68	0	0	3	17	5	2	7	20	14	0	0	0	0	0	0	0
2300	48	0	0	5	11	1	4	7	8	10	0	2	0	0	0	0	0
Total	3699	0	119	358	889	470	557	619	439	184	44	15	2	2	1	0	0

100.00% 0.00% 3.22% 9.68% 24.03% 12.71% 15.06% 16.73% 11.87% 4.97% 1.19% 0.41% 0.05% 0.05% 0.03% 0.00% 0.00%

Maximum = 65.1 mph, Minimum = 6.3 mph, Mean = 25.5 mph
 85% Speed = 36.24 mph, 95% Speed = 41.27 mph, Median = 25.11 mph
 10 mph Pace = 13 - 23, Number in Pace = 1403 (37.93%)
 Variance = 91.24, Standard Deviation = 9.55 mph

Speed Report

Job 307_059_VHB_ATR 6
 Area Worcester, MA
 Location May Street (south), southwest of Chandler Street
 Dir Southbound
Thursday, January 24, 2019



Time	Total	Speed Bins (mph)															
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
0000	28	0	0	4	4	1	3	9	4	3	0	0	0	0	0	0	0
0100	12	0	0	2	4	2	1	1	1	1	0	0	0	0	0	0	0
0200	5	0	0	1	1	0	0	2	0	0	1	0	0	0	0	0	0
0300	4	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0
0400	13	0	0	0	1	1	0	2	3	2	4	0	0	0	0	0	0
0500	37	0	0	3	6	2	0	4	10	3	7	1	1	0	0	0	0
0600	131	0	0	2	12	7	5	19	35	41	6	2	2	0	0	0	0
0700	306	0	4	20	69	35	45	41	46	36	9	1	0	0	0	0	0
0800	354	0	69	91	77	34	22	32	20	8	1	0	0	0	0	0	0
0900	276	0	15	45	73	38	37	31	24	10	3	0	0	0	0	0	0
1000	190	0	1	13	59	22	40	34	15	3	2	0	1	0	0	0	0
1100	244	0	7	27	75	43	34	29	23	6	0	0	0	0	0	0	0
1200	234	0	16	38	74	24	25	20	27	7	3	0	0	0	0	0	0
1300	203	0	0	8	46	32	39	38	26	13	1	0	0	0	0	0	0
1400	276	0	48	65	65	28	35	24	9	2	0	0	0	0	0	0	0
1500	241	0	3	9	40	24	43	64	40	14	3	1	0	0	0	0	0
1600	255	0	1	12	32	33	32	68	47	27	2	0	1	0	0	0	0
1700	239	0	1	10	38	24	30	64	53	14	5	0	0	0	0	0	0
1800	163	0	0	13	35	8	12	26	36	26	5	2	0	0	0	0	0
1900	150	0	0	3	14	11	10	34	36	34	7	1	0	0	0	0	0
2000	126	0	0	6	27	5	8	19	26	24	7	4	0	0	0	0	0
2100	132	0	0	4	38	13	5	21	26	16	6	2	1	0	0	0	0
2200	80	0	0	2	22	11	5	7	14	8	7	2	2	0	0	0	0
2300	42	0	0	1	6	8	3	3	6	9	2	2	2	0	0	0	0
Total	3741	0	165	379	818	406	434	592	528	309	82	18	10	0	0	0	0

100.00% 0.00% 4.41% 10.13% 21.87% 10.85% 11.60% 15.82% 14.11% 8.26% 2.19% 0.48% 0.27% 0.00% 0.00% 0.00% 0.00%

Maximum = 59.7 mph, Minimum = 6.2 mph, Mean = 26.4 mph
 85% Speed = 38.20 mph, 95% Speed = 43.11 mph, Median = 26.51 mph
 10 mph Pace = 12 - 22, Number in Pace = 1299 (34.72%)
 Variance = 112.37, Standard Deviation = 10.60 mph

Classification Report

Job # 307_059_VHB_ATR 1
Area Worcester, MA
Location Chandler Street, north of May Street (north)
Direction Northbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	31	0	27	4	0	0	0	0	0	0	0	0	0	0
0100	26	0	22	4	0	0	0	0	0	0	0	0	0	0
0200	23	0	17	6	0	0	0	0	0	0	0	0	0	0
0300	10	0	7	2	0	0	1	0	0	0	0	0	0	0
0400	17	0	12	4	0	1	0	0	0	0	0	0	0	0
0500	35	0	26	8	0	1	0	0	0	0	0	0	0	0
0600	119	0	94	22	3	0	0	0	0	0	0	0	0	0
0700	314	0	279	29	4	2	0	0	0	0	0	0	0	0
0800	416	0	328	70	4	11	1	1	0	0	0	0	0	1
0900	326	1	213	85	7	18	1	0	0	1	0	0	0	0
1000	272	0	217	50	1	2	1	1	0	0	0	0	0	0
1100	332	0	277	41	2	10	1	0	0	1	0	0	0	0
1200	390	0	326	56	0	8	0	0	0	0	0	0	0	0
1300	419	0	356	55	4	4	0	0	0	0	0	0	0	0
1400	532	0	440	77	7	8	0	0	0	0	0	0	0	0
1500	570	0	456	103	4	7	0	0	0	0	0	0	0	0
1600	653	0	568	74	4	6	1	0	0	0	0	0	0	0
1700	624	0	547	70	1	6	0	0	0	0	0	0	0	0
1800	414	0	353	54	0	7	0	0	0	0	0	0	0	0
1900	279	0	238	34	1	6	0	0	0	0	0	0	0	0
2000	237	0	209	27	0	1	0	0	0	0	0	0	0	0
2100	147	0	128	19	0	0	0	0	0	0	0	0	0	0
2200	119	0	107	11	0	1	0	0	0	0	0	0	0	0
2300	78	0	66	12	0	0	0	0	0	0	0	0	0	0
Total	6383	1	5313	917	42	99	6	2	0	2	0	0	0	1
	100.00%	0.02%	83.24%	14.37%	0.66%	1.55%	0.09%	0.03%	0.00%	0.03%	0.00%	0.00%	0.00%	0.02%

Classification Report

Job # 307_059_VHB_ATR 1
Area Worcester, MA
Location Chandler Street, north of May Street (north)
Direction Northbound
Thursday, January 24, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	37	0	34	2	0	1	0	0	0	0	0	0	0	0
0100	28	0	27	1	0	0	0	0	0	0	0	0	0	0
0200	28	0	26	2	0	0	0	0	0	0	0	0	0	0
0300	10	0	8	1	1	0	0	0	0	0	0	0	0	0
0400	10	0	7	2	0	1	0	0	0	0	0	0	0	0
0500	37	0	29	7	0	1	0	0	0	0	0	0	0	0
0600	127	0	102	18	3	4	0	0	0	0	0	0	0	0
0700	295	0	266	18	1	7	2	1	0	0	0	0	0	0
0800	481	0	416	50	10	3	1	0	0	1	0	0	0	0
0900	330	0	291	36	1	1	1	0	0	0	0	0	0	0
1000	275	1	232	29	5	7	1	0	0	0	0	0	0	0
1100	349	0	307	35	2	3	1	1	0	0	0	0	0	0
1200	411	0	356	51	2	1	1	0	0	0	0	0	0	0
1300	349	0	282	59	4	3	0	0	0	1	0	0	0	0
1400	534	0	455	64	8	7	0	0	0	0	0	0	0	0
1500	489	0	395	80	3	10	1	0	0	0	0	0	0	0
1600	574	0	474	88	2	9	0	0	0	1	0	0	0	0
1700	620	0	532	77	1	10	0	0	0	0	0	0	0	0
1800	388	0	329	52	2	5	0	0	0	0	0	0	0	0
1900	305	0	268	32	1	4	0	0	0	0	0	0	0	0
2000	234	0	200	31	1	2	0	0	0	0	0	0	0	0
2100	201	0	183	18	0	0	0	0	0	0	0	0	0	0
2200	133	0	117	16	0	0	0	0	0	0	0	0	0	0
2300	77	0	70	7	0	0	0	0	0	0	0	0	0	0
Total	6322	1	5406	776	47	79	8	2	0	3	0	0	0	0
	100.00%	0.02%	85.51%	12.27%	0.74%	1.25%	0.13%	0.03%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 1
Area Worcester, MA
Location Chandler Street, north of May Street (north)
Direction Southbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	44	0	41	2	0	1	0	0	0	0	0	0	0	0
0100	18	0	15	1	0	2	0	0	0	0	0	0	0	0
0200	16	0	13	3	0	0	0	0	0	0	0	0	0	0
0300	14	0	11	1	0	0	1	0	0	1	0	0	0	0
0400	44	0	27	14	1	2	0	0	0	0	0	0	0	0
0500	129	0	93	33	0	2	0	0	0	1	0	0	0	0
0600	328	0	257	62	4	3	2	0	0	0	0	0	0	0
0700	608	0	523	78	2	4	1	0	0	0	0	0	0	0
0800	710	0	597	93	4	14	1	0	0	1	0	0	0	0
0900	464	0	383	60	8	10	2	1	0	0	0	0	0	0
1000	386	0	306	63	2	12	2	1	0	0	0	0	0	0
1100	374	0	279	77	4	12	2	0	0	0	0	0	0	0
1200	430	0	367	50	3	9	1	0	0	0	0	0	0	0
1300	453	0	400	42	2	8	0	0	0	1	0	0	0	0
1400	502	0	429	49	8	16	0	0	0	0	0	0	0	0
1500	554	0	496	49	3	6	0	0	0	0	0	0	0	0
1600	477	0	436	34	1	6	0	0	0	0	0	0	0	0
1700	402	0	362	33	1	5	1	0	0	0	0	0	0	0
1800	314	0	283	26	0	5	0	0	0	0	0	0	0	0
1900	300	0	276	19	1	4	0	0	0	0	0	0	0	0
2000	202	0	183	13	0	6	0	0	0	0	0	0	0	0
2100	144	0	136	5	2	1	0	0	0	0	0	0	0	0
2200	119	0	110	7	0	2	0	0	0	0	0	0	0	0
2300	82	0	76	4	0	2	0	0	0	0	0	0	0	0
Total	7114	0	6099	818	46	132	13	2	0	4	0	0	0	0
	100.00%	0.00%	85.73%	11.50%	0.65%	1.86%	0.18%	0.03%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 1
Area Worcester, MA
Location Chandler Street, north of May Street (north)
Direction Southbound
Thursday, January 24, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	55	0	49	5	0	0	0	0	0	1	0	0	0	0
0100	13	0	11	2	0	0	0	0	0	0	0	0	0	0
0200	19	0	17	1	1	0	0	0	0	0	0	0	0	0
0300	13	0	13	0	0	0	0	0	0	0	0	0	0	0
0400	41	0	31	10	0	0	0	0	0	0	0	0	0	0
0500	122	0	94	28	0	0	0	0	0	0	0	0	0	0
0600	365	0	283	72	4	4	2	0	0	0	0	0	0	0
0700	629	0	545	77	0	7	0	0	0	0	0	0	0	0
0800	741	0	647	76	7	10	0	1	0	0	0	0	0	0
0900	497	0	443	46	2	4	1	0	0	1	0	0	0	0
1000	338	0	289	33	5	10	0	1	0	0	0	0	0	0
1100	445	0	392	44	0	9	0	0	0	0	0	0	0	0
1200	415	0	353	52	1	7	1	0	0	1	0	0	0	0
1300	390	0	335	39	6	9	1	0	0	0	0	0	0	0
1400	609	1	539	48	10	10	0	1	0	0	0	0	0	0
1500	478	0	420	39	2	14	2	1	0	0	0	0	0	0
1600	435	0	379	40	5	10	1	0	0	0	0	0	0	0
1700	364	0	334	24	0	5	1	0	0	0	0	0	0	0
1800	306	0	281	22	0	3	0	0	0	0	0	0	0	0
1900	294	0	266	19	2	7	0	0	0	0	0	0	0	0
2000	234	0	208	23	1	2	0	0	0	0	0	0	0	0
2100	206	0	182	21	2	1	0	0	0	0	0	0	0	0
2200	118	0	106	12	0	0	0	0	0	0	0	0	0	0
2300	80	0	72	8	0	0	0	0	0	0	0	0	0	0
Total	7207	1	6289	741	48	112	9	4	0	3	0	0	0	0
	100.00%	0.01%	87.26%	10.28%	0.67%	1.55%	0.12%	0.06%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 3
Area Worcester, MA
Location Chandler Street, north of Claridge Drive
Direction Northbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	39	0	6	32	0	1	0	0	0	0	0	0	0	0
0100	30	0	3	25	0	2	0	0	0	0	0	0	0	0
0200	29	0	2	21	1	5	0	0	0	0	0	0	0	0
0300	13	0	0	11	0	1	1	0	0	0	0	0	0	0
0400	22	0	2	16	0	4	0	0	0	0	0	0	0	0
0500	58	0	14	36	1	7	0	0	0	0	0	0	0	0
0600	153	0	39	102	1	10	1	0	0	0	0	0	0	0
0700	383	0	105	253	7	18	0	0	0	0	0	0	0	0
0800	529	0	192	296	11	28	1	1	0	0	0	0	0	0
0900	379	1	75	250	13	39	0	0	0	1	0	0	0	0
1000	359	0	57	268	3	29	0	1	1	0	0	0	0	0
1100	427	2	87	306	6	25	0	0	0	1	0	0	0	0
1200	573	0	181	346	6	40	0	0	0	0	0	0	0	0
1300	620	0	203	370	8	39	0	0	0	0	0	0	0	0
1400	730	0	226	449	14	41	0	0	0	0	0	0	0	0
1500	774	0	270	426	14	64	0	0	0	0	0	0	0	0
1600	859	0	296	500	7	54	1	0	0	0	0	1	0	0
1700	795	0	239	514	3	39	0	0	0	0	0	0	0	0
1800	567	0	159	364	3	41	0	0	0	0	0	0	0	0
1900	422	0	115	282	5	20	0	0	0	0	0	0	0	0
2000	329	0	74	239	2	14	0	0	0	0	0	0	0	0
2100	206	0	45	145	0	16	0	0	0	0	0	0	0	0
2200	170	0	28	132	3	7	0	0	0	0	0	0	0	0
2300	116	0	24	86	0	6	0	0	0	0	0	0	0	0
Total	8582	3	2442	5469	108	550	4	2	1	2	0	1	0	0
	100.00%	0.03%	28.45%	63.73%	1.26%	6.41%	0.05%	0.02%	0.01%	0.02%	0.00%	0.01%	0.00%	0.00%

41 20.5
 53 13.25
 33.75

Classification Report

Job # 307_059_VHB_ATR 3
Area Worcester, MA
Location Chandler Street, north of Claridge Drive
Direction Northbound
Thursday, January 24, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	49	0	18	28	1	2	0	0	0	0	0	0	0	0
0100	32	0	9	22	0	1	0	0	0	0	0	0	0	0
0200	31	0	7	21	0	3	0	0	0	0	0	0	0	0
0300	11	0	3	6	1	1	0	0	0	0	0	0	0	0
0400	14	0	2	8	0	4	0	0	0	0	0	0	0	0
0500	46	0	5	34	0	7	0	0	0	0	0	0	0	0
0600	144	0	27	101	5	10	1	0	0	0	0	0	0	0
0700	349	0	101	215	6	27	0	0	0	0	0	0	0	0
0800	519	0	230	258	10	20	1	0	0	0	0	0	0	0
0900	394	0	136	227	2	28	1	0	0	0	0	0	0	0
1000	326	0	97	193	9	25	1	0	1	0	0	0	0	0
1100	417	0	138	244	4	30	0	1	0	0	0	0	0	0
1200	483	0	141	309	6	27	0	0	0	0	0	0	0	0
1300	422	0	110	265	5	41	0	0	0	1	0	0	0	0
1400	639	1	254	337	8	39	0	0	0	0	0	0	0	0
1500	559	0	146	359	6	46	2	0	0	0	0	0	0	0
1600	660	0	151	457	5	46	1	0	0	0	0	0	0	0
1700	711	0	213	456	2	40	0	0	0	0	0	0	0	0
1800	490	0	130	318	4	38	0	0	0	0	0	0	0	0
1900	385	0	87	270	3	25	0	0	0	0	0	0	0	0
2000	300	0	70	217	0	13	0	0	0	0	0	0	0	0
2100	256	0	38	204	0	14	0	0	0	0	0	0	0	0
2200	164	0	18	133	0	13	0	0	0	0	0	0	0	0
2300	102	0	6	84	0	12	0	0	0	0	0	0	0	0
Total	7503	1	2137	4766	77	512	7	1	1	1	0	0	0	0
	100.00%	0.01%	28.48%	63.52%	1.03%	6.82%	0.09%	0.01%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 3
Area Worcester, MA
Location Chandler Street, north of Claridge Drive
Direction Southbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	42	0	40	2	0	0	0	0	0	0	0	0	0	0
0100	21	0	18	2	0	1	0	0	0	0	0	0	0	0
0200	15	0	13	2	0	0	0	0	0	0	0	0	0	0
0300	14	0	12	0	0	0	1	0	0	1	0	0	0	0
0400	49	0	39	8	1	1	0	0	0	0	0	0	0	0
0500	145	0	117	27	0	0	0	0	0	1	0	0	0	0
0600	346	0	300	40	3	1	2	0	0	0	0	0	0	0
0700	657	0	611	44	1	0	1	0	0	0	0	0	0	0
0800	766	0	719	41	2	4	0	0	0	0	0	0	0	0
0900	512	0	468	33	5	4	1	0	0	1	0	0	0	0
1000	426	0	387	32	1	6	0	0	0	0	0	0	0	0
1100	419	1	385	28	1	3	0	0	0	0	0	0	0	1
1200	464	0	436	23	1	4	0	0	0	0	0	0	0	0
1300	495	0	474	18	0	3	0	0	0	0	0	0	0	0
1400	550	0	512	29	4	5	0	0	0	0	0	0	0	0
1500	612	0	586	23	1	2	0	0	0	0	0	0	0	0
1600	536	1	515	17	0	2	1	0	0	0	0	0	0	0
1700	458	0	440	16	0	2	0	0	0	0	0	0	0	0
1800	372	0	355	17	0	0	0	0	0	0	0	0	0	0
1900	313	1	299	10	1	2	0	0	0	0	0	0	0	0
2000	208	0	196	12	0	0	0	0	0	0	0	0	0	0
2100	165	0	159	5	1	0	0	0	0	0	0	0	0	0
2200	128	0	122	6	0	0	0	0	0	0	0	0	0	0
2300	93	0	90	3	0	0	0	0	0	0	0	0	0	0
Total	7806	3	7293	438	22	40	6	0	0	3	0	0	0	1
	100.00%	0.04%	93.43%	5.61%	0.28%	0.51%	0.08%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.01%

Classification Report

Job # 307_059_VHB_ATR 3
Area Worcester, MA
Location Chandler Street, north of Claridge Drive
Direction Southbound
Thursday, January 24, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	54	0	50	3	0	0	0	0	0	1	0	0	0	0
0100	17	0	15	2	0	0	0	0	0	0	0	0	0	0
0200	19	0	17	1	1	0	0	0	0	0	0	0	0	0
0300	12	0	12	0	0	0	0	0	0	0	0	0	0	0
0400	45	0	39	6	0	0	0	0	0	0	0	0	0	0
0500	137	0	122	15	0	0	0	0	0	0	0	0	0	0
0600	393	0	339	46	3	2	3	0	0	0	0	0	0	0
0700	695	0	651	42	0	2	0	0	0	0	0	0	0	0
0800	839	0	772	52	9	2	3	1	0	0	0	0	0	0
0900	544	1	506	31	5	0	1	0	0	0	0	0	0	0
1000	361	0	329	25	1	4	1	1	0	0	0	0	0	0
1100	470	0	433	35	0	1	1	0	0	0	0	0	0	0
1200	439	0	404	26	1	5	1	2	0	0	0	0	0	0
1300	418	0	388	23	2	4	1	0	0	0	0	0	0	0
1400	638	0	583	38	11	2	2	2	0	0	0	0	0	0
1500	538	0	501	32	1	2	2	0	0	0	0	0	0	0
1600	488	1	448	29	2	5	1	1	0	1	0	0	0	0
1700	439	0	405	30	1	1	1	1	0	0	0	0	0	0
1800	335	0	317	15	1	2	0	0	0	0	0	0	0	0
1900	325	0	307	16	0	2	0	0	0	0	0	0	0	0
2000	249	0	231	17	1	0	0	0	0	0	0	0	0	0
2100	218	0	199	17	2	0	0	0	0	0	0	0	0	0
2200	125	0	117	8	0	0	0	0	0	0	0	0	0	0
2300	86	0	79	7	0	0	0	0	0	0	0	0	0	0
Total	7884	2	7264	516	41	34	17	8	0	2	0	0	0	0
	100.00%	0.03%	92.14%	6.54%	0.52%	0.43%	0.22%	0.10%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 5
Area Worcester, MA
Location Chandler Street, southeast of May Street (south)
Direction Northbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	27	0	25	2	0	0	0	0	0	0	0	0	0	0
0100	19	0	16	3	0	0	0	0	0	0	0	0	0	0
0200	18	0	12	5	0	1	0	0	0	0	0	0	0	0
0300	9	0	8	1	0	0	0	0	0	0	0	0	0	0
0400	15	0	13	2	0	0	0	0	0	0	0	0	0	0
0500	41	0	31	7	2	1	0	0	0	0	0	0	0	0
0600	95	0	84	9	2	0	0	0	0	0	0	0	0	0
0700	293	0	272	10	6	5	0	0	0	0	0	0	0	0
0800	439	0	390	32	10	5	1	1	0	0	0	0	0	0
0900	309	1	262	33	8	3	2	0	0	0	0	0	0	0
1000	245	0	220	21	1	1	1	0	0	0	0	0	0	0
1100	273	0	246	20	2	3	1	0	0	1	0	0	0	0
1200	320	0	288	28	1	3	0	0	0	0	0	0	0	0
1300	312	0	277	28	3	4	0	0	0	0	0	0	0	0
1400	415	0	373	35	4	3	0	0	0	0	0	0	0	0
1500	430	0	371	54	2	2	0	0	0	1	0	0	0	0
1600	503	0	448	50	2	2	1	0	0	0	0	0	0	0
1700	502	0	451	41	2	7	0	0	0	1	0	0	0	0
1800	321	0	287	28	2	4	0	0	0	0	0	0	0	0
1900	226	0	200	21	2	3	0	0	0	0	0	0	0	0
2000	188	0	173	13	0	2	0	0	0	0	0	0	0	0
2100	130	0	117	13	0	0	0	0	0	0	0	0	0	0
2200	105	0	96	9	0	0	0	0	0	0	0	0	0	0
2300	72	0	66	6	0	0	0	0	0	0	0	0	0	0
Total	5307	1	4726	471	49	49	6	2	0	3	0	0	0	0
	100.00%	0.02%	89.05%	8.88%	0.92%	0.92%	0.11%	0.04%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 5
Area Worcester, MA
Location Chandler Street, southeast of May Street (south)
Direction Northbound
Thursday, January 24, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	37	0	34	2	0	1	0	0	0	0	0	0	0	0
0100	23	0	23	0	0	0	0	0	0	0	0	0	0	0
0200	18	0	17	1	0	0	0	0	0	0	0	0	0	0
0300	8	0	7	0	1	0	0	0	0	0	0	0	0	0
0400	9	0	5	3	0	1	0	0	0	0	0	0	0	0
0500	35	0	28	6	1	0	0	0	0	0	0	0	0	0
0600	100	0	86	6	2	4	2	0	0	0	0	0	0	0
0700	279	0	261	13	3	2	0	0	0	0	0	0	0	0
0800	537	0	491	28	9	5	1	1	0	1	0	0	0	1
0900	291	0	264	24	2	1	0	0	0	0	0	0	0	0
1000	250	0	211	25	6	7	1	0	0	0	0	0	0	0
1100	271	0	240	22	2	3	2	1	0	1	0	0	0	0
1200	347	0	318	25	2	2	0	0	0	0	0	0	0	0
1300	295	0	252	35	4	3	0	0	0	1	0	0	0	0
1400	469	0	425	36	6	2	0	0	0	0	0	0	0	0
1500	358	0	311	38	3	6	0	0	0	0	0	0	0	0
1600	465	1	409	50	0	4	1	0	0	0	0	0	0	0
1700	476	0	440	30	1	5	0	0	0	0	0	0	0	0
1800	336	0	290	39	2	5	0	0	0	0	0	0	0	0
1900	247	0	224	19	2	2	0	0	0	0	0	0	0	0
2000	201	0	186	13	1	1	0	0	0	0	0	0	0	0
2100	182	0	169	13	0	0	0	0	0	0	0	0	0	0
2200	125	0	113	12	0	0	0	0	0	0	0	0	0	0
2300	72	0	62	10	0	0	0	0	0	0	0	0	0	0
Total	5431	1	4866	450	47	54	7	2	0	3	0	0	0	1
	100.00%	0.02%	89.60%	8.29%	0.87%	0.99%	0.13%	0.04%	0.00%	0.06%	0.00%	0.00%	0.00%	0.02%

Classification Report

Job # 307_059_VHB_ATR 5
Area Worcester, MA
Location Chandler Street, southeast of May Street (south)
Direction Southbound
Wednesday, January 23, 2019

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequests@BostonTrafficData.com
 www.BostonTrafficData.com

Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	26	0	20	6	0	0	0	0	0	0	0	0	0	0
0100	10	0	9	1	0	0	0	0	0	0	0	0	0	0
0200	13	0	12	1	0	0	0	0	0	0	0	0	0	0
0300	11	0	8	1	0	0	1	0	0	1	0	0	0	0
0400	40	0	25	11	1	3	0	0	0	0	0	0	0	0
0500	113	0	81	31	0	1	0	0	0	0	0	0	0	0
0600	258	0	192	59	3	4	0	0	0	0	0	0	0	0
0700	423	0	342	77	1	3	0	0	0	0	0	0	0	0
0800	507	0	403	86	4	11	1	2	0	0	0	0	0	0
0900	302	0	249	46	2	4	1	0	0	0	0	0	0	0
1000	274	0	233	35	1	5	0	0	0	0	0	0	0	0
1100	273	0	222	43	1	6	1	0	0	0	0	0	0	0
1200	286	0	257	24	1	2	1	1	0	0	0	0	0	0
1300	220	2	194	21	0	3	0	0	0	0	0	0	0	0
1400	340	1	286	41	2	9	0	1	0	0	0	0	0	0
1500	330	0	286	41	2	1	0	0	0	0	0	0	0	0
1600	319	0	280	33	0	4	1	1	0	0	0	0	0	0
1700	264	0	231	30	1	2	0	0	0	0	0	0	0	0
1800	241	0	211	28	0	2	0	0	0	0	0	0	0	0
1900	197	0	180	15	1	1	0	0	0	0	0	0	0	0
2000	141	0	124	13	0	4	0	0	0	0	0	0	0	0
2100	102	0	97	4	1	0	0	0	0	0	0	0	0	0
2200	73	0	68	5	0	0	0	0	0	0	0	0	0	0
2300	57	0	55	2	0	0	0	0	0	0	0	0	0	0
Total	4820	3	4065	654	21	65	6	5	0	1	0	0	0	0
	100.00%	0.06%	84.34%	13.57%	0.44%	1.35%	0.12%	0.10%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 6
Area Worcester, MA
Location May Street (south), southwest of Chandler Street
Direction Northbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	13	0	13	0	0	0	0	0	0	0	0	0	0	0
0100	16	0	16	0	0	0	0	0	0	0	0	0	0	0
0200	9	0	9	0	0	0	0	0	0	0	0	0	0	0
0300	4	0	4	0	0	0	0	0	0	0	0	0	0	0
0400	6	0	5	1	0	0	0	0	0	0	0	0	0	0
0500	13	0	13	0	0	0	0	0	0	0	0	0	0	0
0600	49	0	44	4	1	0	0	0	0	0	0	0	0	0
0700	119	0	109	10	0	0	0	0	0	0	0	0	0	0
0800	141	0	135	4	1	0	1	0	0	0	0	0	0	0
0900	147	0	131	14	1	1	0	0	0	0	0	0	0	0
1000	152	0	136	13	0	1	2	0	0	0	0	0	0	0
1100	182	0	168	11	1	1	1	0	0	0	0	0	0	0
1200	216	0	206	10	0	0	0	0	0	0	0	0	0	0
1300	221	0	204	15	1	1	0	0	0	0	0	0	0	0
1400	263	0	242	18	2	1	0	0	0	0	0	0	0	0
1500	272	0	245	25	0	2	0	0	0	0	0	0	0	0
1600	263	0	251	12	0	0	0	0	0	0	0	0	0	0
1700	251	0	236	14	1	0	0	0	0	0	0	0	0	0
1800	216	0	195	20	0	0	0	0	0	1	0	0	0	0
1900	161	0	151	9	0	0	0	1	0	0	0	0	0	0
2000	140	0	133	7	0	0	0	0	0	0	0	0	0	0
2100	85	0	80	5	0	0	0	0	0	0	0	0	0	0
2200	64	0	59	4	0	0	1	0	0	0	0	0	0	0
2300	38	0	37	1	0	0	0	0	0	0	0	0	0	0
Total	3041	0	2822	197	8	7	5	1	0	1	0	0	0	0
	100.00%	0.00%	92.80%	6.48%	0.26%	0.23%	0.16%	0.03%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 6
Area Worcester, MA
Location May Street (south), southwest of Chandler Street
Direction Southbound
Wednesday, January 23, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	22	0	5	15	0	1	1	0	0	0	0	0	0	0
0100	15	0	3	9	0	2	1	0	0	0	0	0	0	0
0200	2	0	0	1	0	1	0	0	0	0	0	0	0	0
0300	4	0	0	4	0	0	0	0	0	0	0	0	0	0
0400	10	0	0	8	0	2	0	0	0	0	0	0	0	0
0500	40	0	5	24	2	9	0	0	0	0	0	0	0	0
0600	99	0	18	67	0	13	1	0	0	0	0	0	0	0
0700	276	0	99	157	1	17	1	0	0	1	0	0	0	0
0800	333	0	188	124	4	14	1	2	0	0	0	0	0	0
0900	246	0	151	81	6	7	1	0	0	0	0	0	0	0
1000	209	0	104	91	4	9	1	0	0	0	0	0	0	0
1100	200	0	103	81	3	11	2	0	0	0	0	0	0	0
1200	257	0	157	81	2	16	1	0	0	0	0	0	0	0
1300	235	0	124	104	3	3	1	0	0	0	0	0	0	0
1400	256	0	151	78	7	19	1	0	0	0	0	0	0	0
1500	321	0	165	135	3	18	0	0	0	0	0	0	0	0
1600	300	0	179	105	1	14	0	1	0	0	0	0	0	0
1700	238	0	145	82	1	9	1	0	0	0	0	0	0	0
1800	175	0	98	66	2	9	0	0	0	0	0	0	0	0
1900	146	0	58	77	3	8	0	0	0	0	0	0	0	0
2000	107	0	50	51	0	6	0	0	0	0	0	0	0	0
2100	92	0	40	47	1	4	0	0	0	0	0	0	0	0
2200	68	0	25	38	0	2	3	0	0	0	0	0	0	0
2300	48	0	19	26	0	1	2	0	0	0	0	0	0	0
Total	3699	0	1887	1552	43	195	18	3	0	1	0	0	0	0
	100.00%	0.00%	51.01%	41.96%	1.16%	5.27%	0.49%	0.08%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%

Classification Report

Job # 307_059_VHB_ATR 6
Area Worcester, MA
Location May Street (south), southwest of Chandler Street
Direction Southbound
Thursday, January 24, 2019



Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	28	0	16	10	0	1	0	0	0	1	0	0	0	0
0100	12	0	6	4	0	0	2	0	0	0	0	0	0	0
0200	5	0	3	1	0	0	1	0	0	0	0	0	0	0
0300	4	0	1	3	0	0	0	0	0	0	0	0	0	0
0400	13	0	1	10	0	2	0	0	0	0	0	0	0	0
0500	37	0	18	13	2	4	0	0	0	0	0	0	0	0
0600	131	0	38	67	1	23	2	0	0	0	0	0	0	0
0700	306	0	129	153	2	21	1	0	0	0	0	0	0	0
0800	354	0	242	92	5	13	1	1	0	0	0	0	0	0
0900	276	0	164	94	2	15	1	0	0	0	0	0	0	0
1000	190	0	109	66	3	10	2	0	0	0	0	0	0	0
1100	244	0	134	90	3	15	2	0	0	0	0	0	0	0
1200	234	0	107	110	3	12	2	0	0	0	0	0	0	0
1300	203	0	100	91	1	11	0	0	0	0	0	0	0	0
1400	276	1	201	59	3	10	1	1	0	0	0	0	0	0
1500	241	0	126	101	3	9	2	0	0	0	0	0	0	0
1600	255	0	84	143	5	15	8	0	0	0	0	0	0	0
1700	239	0	100	127	2	9	1	0	0	0	0	0	0	0
1800	163	0	72	81	3	6	1	0	0	0	0	0	0	0
1900	150	0	59	80	3	4	4	0	0	0	0	0	0	0
2000	126	0	58	59	0	8	1	0	0	0	0	0	0	0
2100	132	0	59	63	0	10	0	0	0	0	0	0	0	0
2200	80	0	23	52	0	2	3	0	0	0	0	0	0	0
2300	42	0	11	28	0	2	1	0	0	0	0	0	0	0
Total	3741	1	1861	1597	41	202	36	2	0	1	0	0	0	0
	100.00%	0.03%	49.75%	42.69%	1.10%	5.40%	0.96%	0.05%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%

Automatic Traffic Recorder Data

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 1A
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: WSU North Entrance/Exit Drives
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	5	45	0	0	0	155	10	0	4	0	8	0	0	0	0
7:15 AM	0	17	51	0	0	0	157	16	0	3	0	9	0	0	0	0
7:30 AM	0	29	54	0	0	0	164	21	0	2	0	7	0	0	0	0
7:45 AM	0	48	62	0	0	0	168	34	0	5	0	10	0	0	0	0
8:00 AM	0	66	60	0	0	0	150	47	0	7	0	13	0	0	0	0
8:15 AM	0	45	44	0	0	0	175	38	0	6	0	12	0	0	0	0
8:30 AM	0	23	40	0	0	0	154	28	0	7	0	10	0	0	0	0
8:45 AM	0	21	33	0	0	0	108	26	0	6	0	9	0	0	0	0
12:00 PM	0	15	83	0	0	0	55	9	0	11	0	12	0	0	0	0
12:15 PM	0	20	80	0	0	0	60	8	0	11	0	17	0	0	0	0
12:30 PM	1	23	81	0	0	0	68	9	0	10	0	22	0	0	0	0
12:45 PM	0	16	80	0	0	0	75	7	0	12	0	21	0	0	0	0
1:00 PM	0	9	76	0	0	0	71	4	0	13	0	19	0	0	0	0
1:15 PM	0	7	79	0	0	0	67	6	0	11	0	15	0	0	0	0
1:30 PM	0	4	81	0	0	0	77	8	0	8	0	11	0	0	0	0
1:45 PM	0	8	88	0	0	0	65	8	0	11	0	20	0	0	0	0
2:00 PM	0	12	99	0	0	0	82	7	0	13	0	28	0	0	0	0
2:15 PM	0	11	121	0	0	0	107	9	0	17	0	35	0	0	0	0
2:30 PM	0	10	139	0	0	0	96	11	0	21	0	42	0	0	0	0
2:45 PM	0	9	131	0	0	0	103	8	0	16	0	28	0	0	0	0
3:00 PM	0	8	127	0	0	0	114	4	0	11	0	13	0	0	0	0
3:15 PM	0	13	130	0	0	0	107	6	0	12	0	18	0	0	0	0
3:30 PM	0	17	133	0	0	0	95	8	0	10	0	23	0	0	0	0
3:45 PM	0	16	145	0	0	0	87	9	0	13	0	25	0	0	0	0
4:00 PM	0	15	148	0	0	0	93	8	0	15	0	27	0	0	0	0
4:15 PM	0	16	138	0	0	0	92	12	0	16	0	24	0	0	0	0
4:30 PM	1	15	137	0	0	0	92	16	0	15	0	18	0	0	0	0
4:45 PM	0	17	140	0	0	0	88	13	0	17	0	19	0	0	0	0
5:00 PM	0	19	134	0	0	0	81	9	0	18	0	18	0	0	0	0
5:15 PM	0	18	133	0	0	0	60	7	0	12	0	20	0	0	0	0
5:30 PM	0	20	125	0	0	0	53	5	0	6	0	19	0	0	0	0
5:45 PM	0	18	123	0	0	0	52	5	0	5	0	17	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	188	220	0	0	0	657	140	0	20	0	42	0	0	0	0
PHF	0.81				0.94				0.78				0.00			
HV %	0.0%	0.0%	4.1%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOUR 3:45 PM to 4:45 PM	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	62	568	0	0	0	364	45	0	59	0	94	0	0	0	0
PHF	0.97				0.95				0.91				0.00			
HV %	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 Location: Location 1A
 Street 1: Worcester, MA
 Street 2: Chandler Street
 Count Date: WSU North Entrance/Exit Drives
 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



HEAVY VEHICLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	2	0	0	0	5	0	0	1	0	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	2	0	0	0	1	0	0	0	0	1	0	0	0	0
12:15 PM	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
1:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
2:00 PM	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0
2:15 PM	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0
2:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM PHF	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	12	0	0	0	7	0	0	1	0	0	0	0	0	0
	0.75				0.35				0.25				0.00			

PM PEAK HOUR 3:45 PM to 4:45 PM PHF	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	5	0	0	0	7	0	0	1	0	0	0	0	0	0
	0.63				0.58				0.25				0.00			

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTD #: Location 1A
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: WSU North Entrance/Exit Drives
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

PEDESTRIANS & BICYCLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
7:30 AM	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0
7:45 AM	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0
8:00 AM	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0
8:15 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
8:30 AM	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0
8:45 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
12:00 PM	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0
12:15 PM	0	0	0	6	0	0	0	0	0	0	0	2	0	0	0	0
12:30 PM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
12:45 PM	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0
1:00 PM	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0
1:15 PM	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
1:30 PM	0	0	0	6	0	0	0	0	0	0	0	8	0	0	0	0
1:45 PM	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0
2:00 PM	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0
2:15 PM	0	0	0	10	0	0	0	0	0	0	0	14	0	0	0	0
2:30 PM	0	0	0	3	0	0	0	0	0	0	0	7	0	0	0	0
2:45 PM	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0
3:00 PM	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0
3:15 PM	0	0	0	0	0	2	0	0	0	0	0	10	0	0	0	0
3:30 PM	0	1	0	1	0	1	0	0	0	0	0	2	0	0	0	0
3:45 PM	0	1	0	1	0	0	0	0	0	0	0	4	0	0	0	0
4:00 PM	0	0	0	2	0	0	0	0	0	0	0	5	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
4:30 PM	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0	0
5:00 PM	0	0	0	1	0	0	0	0	0	0	0	9	0	0	0	0
5:15 PM	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0
5:30 PM	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	6	0	0	0	0	0	0	0	7	0	0	0	0

PM PEAK HOUR 3:45 PM to 4:45 PM	Chandler Street Northbound				Chandler Street Southbound				WSU North Entrance/Exit Driveways Eastbound				Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	1	0	4	0	0	0	0	0	0	0	16	0	0	0	0

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 1B
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: Chandler M. Elementary Driveways
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	50	0	0	0	163	0	0	0	0	0	0	0	0	0
7:15 AM	1	0	68	0	0	0	166	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	83	1	0	1	170	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	109	6	0	6	172	0	0	0	0	0	0	1	0	1
8:00 AM	0	0	119	21	0	11	152	0	0	0	0	0	0	35	0	7
8:15 AM	0	0	77	23	1	12	174	0	0	0	0	0	0	30	0	11
8:30 AM	0	0	60	3	0	1	163	0	0	0	0	0	0	6	0	3
8:45 AM	0	0	54	4	0	1	116	0	0	0	0	0	0	3	0	0
12:00 PM	0	0	98	0	0	0	67	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	100	0	0	1	76	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	105	0	0	0	91	0	0	0	0	0	0	1	0	0
12:45 PM	0	0	96	1	0	0	96	0	0	0	0	0	0	1	0	0
1:00 PM	0	0	85	1	0	0	90	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	86	2	0	0	82	0	0	0	0	0	0	1	0	0
1:30 PM	0	0	85	0	0	0	88	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	96	2	0	0	85	0	0	0	0	0	0	1	0	0
2:00 PM	0	0	110	2	0	1	109	0	0	0	0	0	0	3	0	1
2:15 PM	1	0	132	3	0	1	141	0	0	0	0	0	0	1	0	0
2:30 PM	0	0	147	4	1	0	137	0	0	0	0	0	0	5	0	1
2:45 PM	0	0	140	1	0	1	130	0	0	0	0	0	0	3	0	0
3:00 PM	0	0	135	1	0	0	127	0	0	0	0	0	0	1	0	0
3:15 PM	1	0	143	0	0	0	125	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	150	1	0	0	118	0	0	0	0	0	0	1	0	0
3:45 PM	0	0	160	0	1	0	111	0	0	0	0	0	0	0	0	0
4:00 PM	1	0	162	0	0	1	119	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	154	1	0	0	116	0	0	0	0	0	0	1	0	0
4:30 PM	1	0	153	0	0	0	111	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	157	0	0	0	107	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	153	0	0	0	99	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	151	1	0	0	80	0	0	0	0	0	0	1	0	0
5:30 PM	0	0	144	2	0	0	72	0	0	0	0	0	0	1	0	1
5:45 PM	1	0	141	0	0	0	69	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	388	51	1	30	668	0	0	0	0	0	0	66	0	19
PHF	0.78				0.93				0.00				0.51			
HV %	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOUR 2:15 PM to 3:15 PM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	0	554	9	1	2	535	0	0	0	0	0	0	10	0	1
PHF	0.93				0.95				0.00				0.46			
HV %	0.0%	0.0%	0.7%	33.3%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 1B
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: Chandler M. Elementary Driveways
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



HEAVY VEHICLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	2	0	0	0	5	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	3	0	1	3	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	3	0	0	1	0	0	0	0	0	0	4	0	1
2:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
3:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
<i>PHF</i>	0	0	12	0	0	0	7	0	0	0	0	0	0	0	0	0
	0.75				0.35				0.00				0.00			

PM PEAK HOUR 2:00 PM to 3:00 PM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
<i>PHF</i>	0	0	2	6	0	1	6	0	0	0	0	0	0	5	0	1
	0.67				0.44				0.00				0.30			

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 1B
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: Chandler M. Elementary Driveways
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

PEDESTRIANS & BICYCLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
12:15 PM	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
12:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
1:15 PM	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	2
1:30 PM	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
2:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	3	0	0	0	10	0	0	0	0	0	0	0	2
2:30 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2
2:45 PM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	2
3:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0
3:45 PM	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
4:00 PM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	3

PM PEAK HOUR 2:15 PM to 3:15 PM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Chandler Magnet Elementary Driveways Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	4	0	0	0	16	0	0	0	0	0	0	0	7

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 Location #: Location 2
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: May Street (N.) & WSU Driveway
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	2	45	13	0	3	156	4	0	0	0	0	0	21	1	5
7:15 AM	0	5	62	15	0	3	158	6	0	0	0	0	0	27	1	7
7:30 AM	0	9	76	17	0	7	155	8	0	0	0	0	0	32	3	8
7:45 AM	0	7	97	21	0	11	152	10	0	0	0	0	0	37	1	18
8:00 AM	0	5	112	25	0	12	168	7	0	0	0	0	0	41	0	28
8:15 AM	2	4	80	22	0	13	187	4	0	0	0	0	0	36	2	20
8:30 AM	0	3	52	19	0	10	154	5	0	0	0	0	0	31	0	11
8:45 AM	1	3	48	17	0	8	107	4	0	0	0	0	0	27	0	10
12:00 PM	0	4	92	20	0	10	54	3	0	0	0	0	0	21	0	6
12:15 PM	0	2	93	27	0	12	60	4	0	0	0	0	0	19	0	7
12:30 PM	0	0	98	33	0	11	78	3	0	0	0	0	0	16	0	7
12:45 PM	1	1	91	28	0	10	83	4	0	0	0	0	0	18	0	6
1:00 PM	0	1	82	22	0	7	81	2	0	0	0	0	0	19	1	4
1:15 PM	0	1	83	20	0	4	78	1	0	0	0	0	0	17	0	5
1:30 PM	0	2	79	19	0	6	80	2	0	0	0	0	0	14	0	6
1:45 PM	0	2	93	27	0	8	75	3	0	0	0	1	0	19	1	5
2:00 PM	0	3	109	35	0	14	94	4	0	0	0	0	0	24	3	3
2:15 PM	0	4	125	33	0	25	113	5	0	0	0	0	0	25	1	11
2:30 PM	0	6	133	30	0	16	123	3	0	0	0	0	0	25	0	18
2:45 PM	0	3	124	26	0	13	118	2	0	0	0	1	0	27	1	17
3:00 PM	0	2	118	22	0	10	115	3	0	0	0	0	0	29	1	18
3:15 PM	1	2	125	26	0	7	117	2	0	0	0	0	0	27	0	19
3:30 PM	0	3	132	29	0	6	111	2	0	0	0	0	0	25	0	19
3:45 PM	0	1	143	26	0	5	103	3	0	0	0	1	0	23	1	17
4:00 PM	0	0	145	23	0	10	109	1	0	0	0	0	0	20	1	18
4:15 PM	0	1	138	31	0	15	102	0	0	0	0	0	0	24	0	17
4:30 PM	0	1	139	38	0	8	103	1	0	0	0	0	0	27	1	15
4:45 PM	0	0	141	39	0	4	102	1	0	0	0	0	0	25	0	16
5:00 PM	0	0	138	40	0	5	94	0	0	0	0	0	0	21	1	15
5:15 PM	0	0	136	36	0	7	74	0	0	0	0	1	0	26	0	16
5:30 PM	0	0	129	31	0	5	67	1	0	0	0	0	0	30	0	17
5:45 PM	0	0	127	28	0	6	64	0	0	0	0	0	0	27	0	15

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	2	25	365	85	0	43	662	29	0	0	0	0	0	146	6	74
PHF	0.84				0.90				0.00				0.82			
HV %	0.0%	0.0%	2.5%	4.7%	0.0%	7.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.0%	0.0%

PM PEAK HOUR 2:15 PM to 3:15 PM	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	15	500	111	0	64	469	13	0	0	0	1	0	106	3	64
PHF	0.93				0.95				0.25				0.90			
HV %	0.0%	0.0%	1.2%	0.0%	0.0%	1.6%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	1.6%

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTD #: Location 2
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: May Street (N.) & WSU Driveway
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



HEAVY VEHICLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	1	2	0	0	0	0	0	0	0	0	0	3	0	0
8:15 AM	0	0	2	2	0	1	1	0	0	0	0	0	0	1	0	0
8:30 AM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1
2:30 PM	0	0	3	0	0	0	4	0	0	0	0	0	0	1	0	0
2:45 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0
4:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM PHF	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	9	4	0	3	5	0	0	0	0	0	0	4	0	0
	0.81				0.40				0.00				0.33			

PM PEAK HOUR 2:00 PM to 3:00 PM PHF	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	5	0	0	2	8	0	0	0	0	0	0	1	0	1
	0.42				0.63				0.00				0.50			

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTD #: Location 2
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: May Street (N.) & WSU Driveway
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
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PEDESTRIANS & BICYCLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	1
12:45 PM	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	4	0	0	0	7	0	0	0	0
1:15 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0
2:00 PM	0	0	0	1	0	0	0	5	0	0	0	2	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1
2:45 PM	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0
3:15 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
3:30 PM	0	1	0	0	0	0	0	1	0	0	0	2	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	1	0	0	0	11	0	0	0	0
4:00 PM	0	0	0	1	0	0	0	2	0	0	0	8	0	0	0	0
4:15 PM	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	2	0	0	0	9	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2

PM PEAK HOUR 2:15 PM to 3:15 PM	Chandler Street Northbound				Chandler Street Southbound				WSU Driveway Eastbound				May Street (North) Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	1	0	0	0	6	0	0	0	9	0	0	0	2

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 3
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: Claridge Drive
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	59	0	0	2	175	0	0	0	0	0	0	0	0	1
7:15 AM	0	0	82	0	0	0	185	0	0	0	0	0	0	1	0	0
7:30 AM	0	0	102	1	0	0	187	0	0	0	0	0	0	2	0	0
7:45 AM	0	0	125	0	0	1	188	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	141	2	0	0	209	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	107	1	0	1	224	0	0	0	0	0	0	3	0	1
8:30 AM	0	0	73	0	1	0	184	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	69	0	0	0	135	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	116	1	0	1	74	0	0	0	0	0	0	2	0	0
12:15 PM	0	0	122	0	0	0	79	0	0	0	0	0	0	1	0	0
12:30 PM	0	0	128	1	1	0	93	0	0	0	0	0	0	0	0	2
12:45 PM	0	0	121	2	0	1	101	0	0	0	0	0	0	2	0	0
1:00 PM	0	0	105	2	0	3	97	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	104	0	0	2	93	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	99	2	0	0	94	0	0	0	0	0	0	0	0	1
1:45 PM	0	0	121	1	0	0	95	0	0	0	0	0	0	0	0	1
2:00 PM	0	0	147	0	0	0	118	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	162	2	0	2	136	0	0	0	0	0	0	3	0	0
2:30 PM	0	0	166	0	0	4	144	0	0	0	0	0	0	0	0	3
2:45 PM	0	0	152	2	0	0	146	0	0	0	0	0	0	0	0	1
3:00 PM	0	0	140	1	0	3	141	0	0	0	0	0	0	1	0	2
3:15 PM	0	0	152	2	0	1	144	0	0	0	0	0	0	1	0	2
3:30 PM	0	0	164	2	0	0	136	0	0	0	0	0	0	0	0	0
3:45 PM	1	0	168	0	0	0	127	0	0	0	0	0	0	0	0	2
4:00 PM	0	0	165	2	1	2	126	0	0	0	0	0	0	0	0	2
4:15 PM	1	0	169	5	0	1	125	0	0	0	0	0	0	1	0	1
4:30 PM	0	0	178	1	0	0	130	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	179	1	0	0	127	0	0	0	0	0	0	2	0	1
5:00 PM	0	0	177	1	0	0	115	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	171	1	0	2	99	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	159	2	0	0	97	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	155	1	0	0	91	0	0	0	0	0	0	1	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	475	4	0	2	808	0	0	0	0	0	0	5	0	2
PHF	0.84				0.90				0.00				0.44			
HV %	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOUR 4:00 PM to 5:00 PM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	0	691	9	1	3	508	0	0	0	0	0	0	3	0	4
PHF	0.97				0.98				0.00				0.58			
HV %	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTD #: Location 3
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: Claridge Drive
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



HEAVY VEHICLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM PHF	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	13	0	0	0	9	0	0	0	0	0	0	0	0	0
	0.81				0.75				0.00				0.00			

PM PEAK HOUR 2:30 PM to 3:30 PM PHF	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	7	0	0	0	9	0	0	0	0	0	0	0	0	0
	0.58				0.45				0.00				0.00			

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 3
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: Claridge Drive
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

PEDESTRIANS & BICYCLES

Start Time	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0	2
8:30 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	3
12:30 PM	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	2
12:45 PM	0	1	0	2	0	0	0	2	0	0	0	0	0	0	0	2
1:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
1:15 PM	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	2
1:45 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
2:00 PM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	1
2:30 PM	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	3
2:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	1	0	1	0	3	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	4

PM PEAK HOUR 4:00 PM to 5:00 PM	Chandler Street Northbound				Chandler Street Southbound				Eastbound				Claridge Drive Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	2	0	1	0	4	0	0	0	0	0	0	0	6

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 4
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: May St (S.) & Chandler St Lot Drive
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	U-Turn	Left	Thru (Lot)	Right	U-Turn	Left (Lot)	Bear Left	Thru	U-Turn	Hard Left	Thru	Right (Lot)	U-Turn	Left (Chandler)	Left (May)	Right
7:00 AM	0	23	0	2	0	0	115	60	0	7	36	0	0	0	0	0
7:15 AM	0	27	0	2	0	1	122	63	0	10	55	0	0	0	0	0
7:30 AM	1	31	0	2	0	2	116	71	0	12	72	0	0	0	0	0
7:45 AM	0	32	0	3	0	2	109	77	0	29	93	0	0	0	0	0
8:00 AM	0	31	0	2	0	1	118	90	0	38	112	1	0	0	0	0
8:15 AM	0	30	0	2	0	2	124	101	0	28	78	0	0	0	0	0
8:30 AM	0	31	2	1	0	2	106	76	0	18	42	2	0	0	0	0
8:45 AM	0	29	1	1	0	1	85	49	0	16	40	0	0	0	0	0
12:00 PM	0	49	0	3	0	0	45	31	0	5	68	0	0	0	0	0
12:15 PM	0	57	0	4	0	0	47	33	0	6	65	0	0	0	0	0
12:30 PM	1	63	1	5	0	0	54	39	0	7	66	0	0	0	0	0
12:45 PM	0	56	1	6	0	0	59	44	0	6	62	0	0	12	1	5
1:00 PM	0	47	0	4	0	0	57	40	0	6	57	1	0	5	0	3
1:15 PM	0	48	0	5	0	0	58	35	0	5	55	0	0	1	0	1
1:30 PM	0	46	0	4	0	0	53	41	0	4	53	0	0	3	0	2
1:45 PM	0	50	0	6	0	0	49	46	0	6	72	0	0	1	0	0
2:00 PM	0	53	0	5	0	0	61	57	0	5	90	0	0	3	1	4
2:15 PM	0	56	0	12	0	0	72	67	0	5	97	0	0	7	1	11
2:30 PM	0	58	0	18	0	0	78	66	0	4	103	0	0	4	0	5
2:45 PM	0	57	0	12	0	0	83	63	0	6	95	0	0	1	1	2
3:00 PM	0	55	0	6	0	0	80	62	0	5	85	0	0	2	0	1
3:15 PM	0	56	0	8	0	0	81	64	0	7	97	0	0	1	0	1
3:30 PM	0	57	0	7	0	0	79	57	0	8	107	0	0	1	1	2
3:45 PM	0	60	0	6	0	0	78	50	0	9	106	0	0	2	0	3
4:00 PM	0	62	0	4	0	0	77	49	0	10	104	0	0	1	0	1
4:15 PM	0	61	0	5	0	0	80	47	0	9	113	0	0	2	0	1
4:30 PM	1	59	0	3	0	0	79	51	0	10	120	0	0	2	0	0
4:45 PM	0	68	0	7	0	0	76	53	0	8	112	0	0	0	0	0
5:00 PM	0	75	0	11	0	0	65	50	0	9	102	0	0	0	0	1
5:15 PM	0	65	0	7	0	0	53	46	0	7	106	0	0	1	0	1
5:30 PM	0	54	0	3	0	0	54	43	0	5	107	1	0	1	0	0
5:45 PM	0	52	0	2	0	0	52	40	0	4	103	0	0	0	0	1

AM PEAK HOUR 7:30 AM to 8:30 AM	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	U-Turn	Left	Thru (Lot)	Right	U-Turn	Left (Lot)	Bear Left	Thru	U-Turn	Hard Left	Thru	Right (Lot)	U-Turn	Left (Chandler)	Left (May)	Right
	1	124	0	9	0	7	467	339	0	107	355	1	0	0	0	0
<i>PHF</i>	0.96				0.90				0.77				0.00			
<i>HV %</i>	0.0%	2.4%	0.0%	0.0%	0.0%	0.0%	0.6%	1.8%	0.0%	1.9%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOUR 2:15 PM to 3:15 PM	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	U-Turn	Left	Thru (Lot)	Right	U-Turn	Left (Lot)	Bear Left	Thru	U-Turn	Hard Left	Thru	Right (Lot)	U-Turn	Left (Chandler)	Left (May)	Right
	0	226	0	48	0	0	313	258	0	20	380	0	0	14	2	19
<i>PHF</i>	0.90				0.98				0.93				0.46			
<i>HV %</i>	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	1.3%	1.9%	0.0%	10.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTD #: Location 4
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: May St (S.) & Chandler St Lot Drive
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
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 www.BostonTrafficData.com

HEAVY VEHICLES

Start Time	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	U-Turn	Left	Thru (Lot)	Right	U-Turn	Left (Lot)	Bear Left	Thru	U-Turn	Hard Left	Thru	Right (Lot)	U-Turn	Left (Chandler)	Left (May)	Right
7:00 AM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
7:15 AM	0	2	0	0	0	0	0	1	0	2	2	0	0	0	0	0
7:30 AM	0	1	0	0	0	0	1	0	0	0	3	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0
8:00 AM	0	1	0	0	0	0	0	3	0	1	2	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	1	1	0	1	3	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0
12:30 PM	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
1:00 PM	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0
1:15 PM	0	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
1:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
2:30 PM	0	1	0	0	0	0	3	2	0	1	2	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3:00 PM	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
3:45 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
4:00 PM	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:15 AM to 8:15 AM PHF	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	U-Turn	Left	Thru (Lot)	Right	U-Turn	Left (Lot)	Bear Left	Thru	U-Turn	Hard Left	Thru	Right (Lot)	U-Turn	Left (Chandler)	Left (May)	Right
	0	4	0	0	0	0	2	6	0	3	9	0	0	0	0	0
	0.50				0.67				0.75				0.00			

PM PEAK HOUR 2:30 PM to 3:30 PM PHF	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	U-Turn	Left	Thru (Lot)	Right	U-Turn	Left (Lot)	Bear Left	Thru	U-Turn	Hard Left	Thru	Right (Lot)	U-Turn	Left (Chandler)	Left (May)	Right
	0	2	0	0	0	0	5	4	0	2	5	0	0	0	0	0
	0.50				0.45				0.58				0.00			

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 4
 Location: Worcester, MA
 Street 1: Chandler Street
 Street 2: May St (S.) & Chandler St Lot Drive
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

PEDESTRIANS & BICYCLES

Start Time	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	Left	Thru (Lot)	Right	Peds	Left (Lot)	Bear Left	Thru	Peds	Hard Left	Thru	Right (Lot)	Peds	Left (Chandler)	Left (May)	Right	Peds
7:00 AM	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	3
7:15 AM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
7:30 AM	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	3
7:45 AM	0	0	0	6	0	0	0	0	0	0	0	6	0	0	0	2
8:00 AM	0	0	0	19	0	0	0	0	0	0	0	19	0	0	0	0
8:15 AM	0	0	0	28	0	0	0	0	0	0	0	28	0	0	0	1
8:30 AM	0	0	0	16	0	0	0	0	0	0	0	16	0	0	0	1
8:45 AM	0	0	0	7	0	0	0	0	0	0	0	6	0	0	0	0
12:00 PM	0	0	0	3	0	0	0	0	0	0	0	4	0	0	0	0
12:15 PM	0	0	0	4	0	0	0	0	0	0	0	5	0	0	0	1
12:30 PM	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0
12:45 PM	0	0	0	6	0	0	0	0	0	0	0	7	0	0	0	2
1:00 PM	0	0	0	5	0	0	0	0	0	0	0	5	0	0	0	1
1:15 PM	0	0	0	6	0	0	0	0	0	1	0	5	0	0	0	3
1:30 PM	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	6
1:45 PM	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	2
2:00 PM	0	0	0	5	0	0	0	0	0	0	0	6	0	0	0	3
2:15 PM	0	0	0	25	0	0	0	0	0	0	0	25	0	0	0	2
2:30 PM	0	0	0	17	0	0	0	0	0	0	0	16	0	0	0	1
2:45 PM	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	1
3:00 PM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
3:15 PM	0	0	0	6	0	0	1	0	0	0	0	6	0	0	0	1
3:30 PM	0	0	0	5	0	0	1	0	0	1	0	5	0	0	0	2
3:45 PM	0	0	0	7	0	0	0	0	0	0	0	6	0	0	0	1
4:00 PM	0	0	0	9	0	0	0	0	0	0	0	4	0	0	0	1
4:15 PM	0	0	0	8	0	0	0	0	0	0	0	7	0	0	0	0
4:30 PM	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	1
4:45 PM	0	0	0	4	0	0	1	0	0	0	0	4	0	0	0	2
5:00 PM	0	0	0	5	0	0	0	0	0	0	0	5	0	0	0	0
5:15 PM	0	0	0	4	0	0	0	0	0	0	0	3	0	0	0	1
5:30 PM	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	1
5:45 PM	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	Left	Thru (Lot)	Right	Peds	Left (Lot)	Bear Left	Thru	Peds	Hard Left	Thru	Right (Lot)	Peds	Left (Chandler)	Left (May)	Right	Peds
	0	0	0	56	0	0	0	0	0	0	0	56	0	0	0	6

PM PEAK HOUR 2:15 PM to 3:15 PM	May Street (South) Northbound				Chandler Street Southbound				Chandler Street Northwestbound				Chandler Street Lot Driveway Westbound			
	Left	Thru (Lot)	Right	Peds	Left (Lot)	Bear Left	Thru	Peds	Hard Left	Thru	Right (Lot)	Peds	Left (Chandler)	Left (May)	Right	Peds
	0	0	0	48	0	0	0	0	0	0	0	47	0	0	0	4

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 5
 Location: Worcester, MA
 Street 1: May Street
 Street 2: WSU South Entrance/Exit Drives
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	19	21	0	0	0	55	12	0	4	0	10	0	0	0	0
7:15 AM	0	28	25	0	0	0	60	13	0	4	0	15	0	0	0	0
7:30 AM	0	46	28	0	0	0	46	38	0	6	0	17	0	0	0	0
7:45 AM	0	80	33	0	0	0	45	61	0	2	0	21	0	0	0	0
8:00 AM	1	84	32	0	0	0	66	62	0	1	0	21	0	0	0	0
8:15 AM	0	66	27	0	0	0	72	57	0	5	0	21	0	0	0	0
8:30 AM	0	30	32	0	0	0	62	32	0	2	0	19	0	0	0	0
8:45 AM	0	21	27	0	0	0	52	13	0	4	0	5	0	0	0	0
12:00 PM	0	9	38	0	0	0	24	12	0	14	0	22	0	0	0	0
12:15 PM	0	18	53	0	0	0	30	9	0	8	0	22	0	0	0	0
12:30 PM	0	38	48	0	0	0	26	21	0	22	0	43	0	0	0	0
12:45 PM	0	29	34	0	0	0	27	24	0	29	0	83	0	0	0	0
1:00 PM	0	14	33	0	0	0	37	9	0	18	0	38	0	0	0	0
1:15 PM	0	12	49	0	0	0	33	7	0	4	0	30	0	0	0	0
1:30 PM	0	13	44	0	0	0	38	7	0	6	0	7	0	0	0	0
1:45 PM	0	11	51	0	0	0	44	8	0	5	0	19	0	0	0	0
2:00 PM	0	12	40	0	1	0	50	12	0	17	0	53	0	0	0	0
2:15 PM	0	17	21	0	0	0	56	17	0	47	0	71	0	0	0	0
2:30 PM	0	11	37	0	3	0	61	6	0	36	0	34	0	0	0	0
2:45 PM	0	18	49	0	0	0	60	10	0	20	0	37	0	0	0	0
3:00 PM	0	18	43	0	0	0	57	10	0	18	0	40	0	0	0	0
3:15 PM	0	10	49	0	0	0	55	16	0	15	0	39	0	0	0	0
3:30 PM	0	21	48	0	0	0	51	15	0	16	0	41	0	0	0	0
3:45 PM	0	20	57	0	0	0	43	16	0	9	0	47	0	0	0	0
4:00 PM	0	19	50	0	0	0	34	25	0	16	0	48	0	0	0	0
4:15 PM	0	36	54	0	0	0	40	16	0	12	0	46	0	0	0	0
4:30 PM	0	15	50	0	0	0	48	14	0	13	0	42	0	0	0	0
4:45 PM	0	30	63	0	0	0	41	20	0	12	0	39	0	0	0	0
5:00 PM	0	28	61	0	0	0	43	16	0	25	0	46	0	0	0	0
5:15 PM	0	17	63	0	0	0	35	18	0	9	0	29	0	0	0	0
5:30 PM	0	27	46	0	0	0	38	10	0	11	0	39	0	0	0	0
5:45 PM	0	26	48	0	0	0	30	14	0	6	0	26	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	276	120	0	0	0	229	218	0	14	0	80	0	0	0	0
PHF	0.85				0.87				0.90				0.00			
HV %	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	3.5%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOUR 4:15 PM to 5:15 PM	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	109	228	0	0	0	172	66	0	62	0	173	0	0	0	0
PHF	0.91				0.96				0.83				0.00			
HV %	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTM #: Location 5
 Location: Worcester, MA
 Street 1: May Street
 Street 2: WSU South Entrance/Exit Drives
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F



HEAVY VEHICLES

Start Time	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1:45 PM	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
2:30 PM	0	0	1	0	0	0	3	0	0	0	0	1	0	0	0	0
2:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:15 AM to 8:15 AM	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
<i>PHF</i>	0	0	4	0	0	0	9	0	0	0	0	1	0	0	0	0
	0.50				0.56				0.25				0.00			

PM PEAK HOUR 2:15 PM to 3:15 PM	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
<i>PHF</i>	0	0	2	0	0	0	7	0	0	0	0	2	0	0	0	0
	0.50				0.58				0.50				0.00			

Client: Nicolás H. Bosonetto, PE
 Project #: 307_059_VHB
 BTD #: Location 5
 Location: Worcester, MA
 Street 1: May Street
 Street 2: WSU South Entrance/Exit Drives
 Count Date: 2/5/2019
 Day of Week: Tuesday
 Weather: Mostly Sunny, 55°F

BOSTON TRAFFIC DATA

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PEDESTRIANS & BICYCLES

Start Time	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	2	0	0	0	25	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	7	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	0	9	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	2	0	0	0	20	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	1	0	0	0	7	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	2	0	0	0	10	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	1	0	0	0	8	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
3:15 PM	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0
3:30 PM	0	0	0	0	0	1	0	1	0	0	0	7	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	8	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	0	0	0	0	2	0	0	0	38	0	0	0	0

PM PEAK HOUR 4:15 PM to 5:15 PM	May Street Northbound				May Street Southbound				WSU South Entrance/Exit Driveways Eastbound				Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
	0	0	0	0	0	1	0	2	0	0	0	24	0	0	0	0

NOTE: Peak hour summaries here correspond to peak hours identified for passenger car and heavy vehicles combined.

Appendix C

Special Speed Regulations

July 28, 1971

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

Mr Sullivan

SPECIAL SPEED REGULATION NO. 628

Highway Location:

BLACKSTONE, MILLVILLE, UXBRIDGE,
NORTHBRIDGE, GRAFTON, MILLBURY,
WORCESTER, PAXTON, RUTLAND,
OAKHAM, BARRE, PETERSHAM, NEW
SALEM, ORANGE

Authority in Control:

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

Name of Highways:

Blackstone - State Highway - Route 122				
Millville	"	"	"	"
Uxbridge	"	"	"	"
Northbridge	"	"	"	"
Grafton	"	"	"	"
Millbury	"	"	"	"
Worcester	"	"	"	"
Paxton	"	"	"	"
Rutland	"	"	"	"
Oakham	"	"	"	"
Barre	"	"	"	"
Petersham	"	"	"	"
New Salem	"	"	"	"
Orange	"	"	"	"

In accordance with the provisions of Section 18 of Chapter 90 of the General Laws (Ter. Ed.) the following Special Speed Regulation is hereby promulgated:

Special Speed Regulation numbered 230 dated April 3, 1962 and number 230-A dated June 2, 1964 is hereby amended by striking out the Regulations in their entirety, inserting in place thereof the following revision and addenda.

The following designated speed limits are established at which motor vehicles may be operated in the areas described:

NORTHBOUND

Beginning in Blackstone at the beginning of State Highway,
thence northerly

0.52 miles at 25 miles per hour
0.75 " " 30 " " "
0.83 " " 40 " " " to the Millville line

Thence northerly in Millville

0.30 miles at 40 miles per hour
0.29 " " 25 " " "

0.67 miles at 35 miles per hour
 0.40 " " 40 " " " to the Uxbridge line,

Thence northerly in Uxbridge

0.06 miles at 40 miles per hour
 2.22 " " 50 " " "
 0.62 " " 40 " " "
 0.56 " " 35 " " "
 0.24 " " 30 " " " to the end of State

Highway, south of town.

And beginning again in Uxbridge, at the beginning of State Highway,
 north of town,
 thence northerly

0.83 miles at 30 miles per hour
 0.28 " " 35 " " "
 0.11 " " 30 " " " to the Northbridge line,

Thence northerly in Northbridge

0.08 miles at 30 miles per hour
 0.48 " " 35 " " "
 0.55 " " 40 " " "
 0.28 " " 45 " " "
 0.62 " " 40 " " "
 0.21 " " 30 " " "
 0.87 " " 40 " " "
 0.26 " " 35 " " "
 0.55 " " 40 " " " ending 7 feet south of

the end of State Highway.

And beginning again in Northbridge, at the beginning of State Highway,
 north of town,
 thence northerly

0.51 miles at 40 miles per hour
 0.27 " " 45 " " " to the Grafton line,

Thence northerly in Grafton

0.39 miles at 45 miles per hour
~~0.32 " " 40 " " " 0.32 mi @ 35 - Rev~~
 0.39 " " 30 " " "
 0.29 " " 35 " " "
 0.27 " " 40 " " "
 1.45 " " 45 " " "
 0.58 " " 40 " " "
 0.92 " " 35 " " "
 0.38 " " 40 " " "
 0.42 " " 30 " " "
 1.07 " " 35 " " " to the Millbury line,

Thence northerly in Millbury
0.80 miles at 35 miles per hour to the end of State Highway,

Beginning again in Worcester, at the beginning of State Highway, thence northerly

0.40 miles at 40 miles per hour
0.85 " " 35 " " "
0.11 " " 40 " " " to the Paxton line,

Thence northerly in Paxton

*Rev. 3.07 mi
40*

0.50 miles at 40 miles per hour
2.27 " " 45 " " "
0.30 " " 40 " " "
0.30 0.42 " " 30 " " "
0.50 0.47 " " 40 " " "
1.39 " " 50 45 625-B " " "
0.01 " " 45 " " " to the Rutland line,

*2/15/00
3.07 @ 40
0.42 @ 30
0.47 @ 40
1.40 @ 45*

Thence northerly in Rutland

0.57 miles at 45 miles per hour
2.38 " " 50 " " "
0.81 " " 45 " " "
0.67 " " 50 " " "
0.04 " " 45 " " " to the Oakham line,

Thence northerly in Oakham

1.69 miles at 45 miles per hour
1.14 " " 50 " " " to the Barre line,

Thence northerly in Barre

1.26 miles at 50 miles per hour
1.34 " " 45 " " "
0.47 " " 40 " " "
0.30 " " 30 " " "
0.64 " " 40 " " "
0.34 " " 30 " " " to the end of State Highway,

south of town.

And beginning in Barre, at the beginning of State Highway, north of town, thence northerly

0.32 miles at 35 miles per hour
1.33 " " 45 " " "
0.57 " " 50 " " "
1.58 " " 45 " " " to the Petersham line,

Thence northerly in Petersham

3.21 miles at 45 miles per hour
0.29 " " 25 " " "
3.71 " " 45 " " "
0.43 " " 50 " " " to the New Salem line,

Thence northerly in New Salem

2.50 miles at 50 miles per hour

1.04 " " 45 " " "

0.10 " " 30 " " " to the junction of

Route 202.

Beginning again in Orange, at the junction of Route 202,

Thence northerly 0.35 miles at 45 miles per hour

0.59 miles at 50 miles per hour

0.31 " " 45 " " "

0.91 " " 40 " " " ending at the end of
State Highway; the total distance being 56.25 miles.

SOUTHBOUND

Beginning in Orange 194 feet south of the beginning of State Highway,
thence southerly

0.91 miles at 40 miles per hour

0.31 " " 45 " " "

0.59 " " 50 " " "

0.31 " " 45 " " "

0.04 " " 30 " " " to the junction of
Route 202.

Beginning again in New Salem, 148 feet south of the junction of
Route 202,
thence southerly

1.11 miles at 45 miles per hour

2.50 " " 50 " " " to the Petersham line,

Thence southerly in Petersham

0.43 miles at 50 miles per hour

3.71 " " 45 " " "

0.25 " " 25 " " "

3.21 " " 45 " " " to the Barre line,

Thence southerly in Barre

1.58 miles at 45 miles per hour

0.57 " " 50 " " "

1.33 " " 45 " " "

0.32 " " 35 " " " to 50 feet north of the
end of State Highway.

And beginning again in Barre at the beginning of State Highway,
south of town,
thence southerly

0.34 miles at 30 miles per hour

0.64 " " 40 " " "

0.30 " " 30 " " "

0.46 " " 40 " " "

1.34 miles at 45 miles per hour
 1.26 " " 50 " " " to the Oakham line,

Thence southerly in Oakham

1.14 miles at 50 miles per hour
 1.69 " " 45 " " " to the Rutland line,

Thence southerly in Rutland

0.04 miles at 45 miles per hour
 0.67 " " 50 " " "
 0.81 " " 45 " " "
 2.38 " " 50 " " "
 0.57 " " 45 " " " to the Paxton line,

Thence southerly in Paxton

0.01 miles at 45 miles per hour
 1.39 " " 50 ⁴⁰ ^{628-B} " " *Rev*
 0.50 ⁴⁷ " " 40 " " "
 0.20 ⁴² " " 30 " " "
 0.30 " " 40 " " "
 2.27 " " 45 ⁴⁰ " " "
 0.50 " " 40 " " " to the Worcester line,

2/15/60

*0.41 @ 45
 1.39 @ 40
 0.47 @ 40
 0.42 @ 30
 30.7 @ 40*

Det 3.07 Mi @ 40

Thence southerly in Worcester

0.11 miles at 40 miles per hour
 0.85 " " 35 " " *Det 30*
 0.36 " " 40 " " " to 125 feet north of
 the end of State Highway. *Rev to 35*

Beginning again in Millbury at the beginning of State Highway, thence southerly

0.80 miles at 35 miles per hour to the Grafton line,

Thence southerly in Grafton

1.07 miles at 35 miles per hour
 0.42 " " 30 " " "
 0.38 " " 40 " " "
 0.92 " " 35 " " "
 0.58 " " 40 " " "
 1.45 " " 45 " " "
 0.27 " " 40 " " "
 0.29 " " 35 " " "
 0.39 " " 30 " " "
 0.32 " " 40 " " "
 0.39 " " 45 " " " to the Northbridge line,

0.32 Mi @ 35 M.P.H. Rev

Thence southerly in Northbridge

0.27 miles at 45 miles per hour
 0.51 " " 40 " " " to the end of State

Highway, north of town.

And beginning again at the beginning of State highway, south of town,
thence southerly

0.56	miles	at	40	miles	per	hour	
0.26	"	"	35	"	"	"	
0.87	"	"	40	"	"	"	
0.21	"	"	30	"	"	"	
0.62	"	"	40	"	"	"	
0.28	"	"	45	"	"	"	
0.55	"	"	40	"	"	"	
0.57	"	"	35	"	"	"	to the Uxbridge line

Thence southerly in Uxbridge

0.11	miles	at	30	miles	per	hour	
0.28	"	"	35	"	"	"	
0.81	"	"	30	"	"	"	ending 99 feet north of

the end of State highway.

And beginning in Uxbridge, at the beginning of State Highway,
south of town,
thence southerly

0.24	miles	at	30	miles	per	hour	
0.56	"	"	35	"	"	"	
0.62	"	"	40	"	"	"	
2.22	"	"	50	"	"	"	
0.06	"	"	40	"	"	"	to the Millville line,

Thence southerly in Millville

0.40	miles	at	40	miles	per	hour	
0.67	"	"	35	"	"	"	
0.29	"	"	25	"	"	"	
0.30	"	"	40	"	"	"	to the Blackstone line,

Thence southerly in Blackstone

0.83	miles	at	40	miles	per	hour	
0.75	"	"	30	"	"	"	
0.52	"	"	25	"	"	"	ending at the end of

State Highway; the total distance being 56.01 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Section 14 of Chapter 90.

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify in writing that this regulation is consistent with the public interest.

Standard signs must be erected at the beginning of each zone.

FOR THE DEPARTMENT

Date: July 28, 1971

By: *Edward J. Ribbs*
EDWARD J. RIBBS
COMMISSIONER

for Highway Engineering

Richard M. Laughlin
Registrar of Motor Vehicles

Mr. Sullivan

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

SPECIAL SPEED REGULATION NO. 628-C

Highway Location:	GRAFTON
Authority In Control:	COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
Name of Highway:	GRAFTON-STATE HIGHWAY-ROUTE 122

In accordance with the provisions of Section 18 Chapter 90 of the General Laws (Ter. Ed.) the following Special Speed Regulation is hereby promulgated:

Special Speed Regulation number 628 dated July 28, 1971 is hereby amended in Grafton as follows:

The following designated speed limits are established at which motor vehicles may be operated in the areas described.

GRAFTON-NORTHBOUND

By striking out the clause reading:
0.32 miles at 40 miles per hour

And inserting in place thereof:
0.32 miles at 35 miles per hour

GRAFTON-SOUTHBOUND

By striking out the clause reading:
0.32 miles at 40 miles per hour

And inserting in place thereof:
0.32 miles at 35 miles per hour

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provision of this regulation shall not, however, abrogate in any sense, Section 14 of Chapter 90.

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly do hereby certify in writing, that this regulation is consistent with the public interest.

Standard signs must be erected at the beginning of each zone.

DATE: January 17, 1979

DEPARTMENT OF PUBLIC WORKS

BY:

[Handwritten Signature]
Traffic Engineer

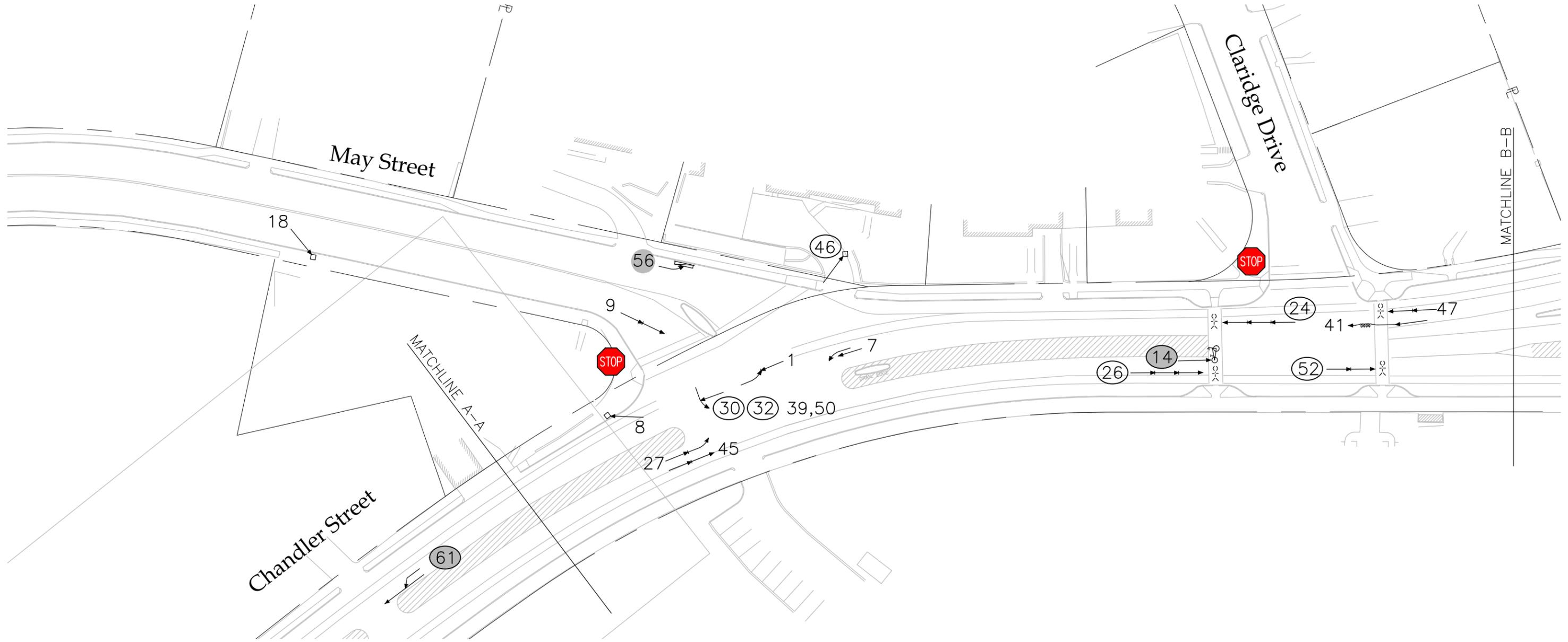
[Handwritten Signature]
Chief Deputy Registrar

Appendix D

Road Safety Audit Collision Diagram

TYPES OF COLLISION	SYMBOLS	SEVERITY	ACCIDENT SUMMARY										TRAFFIC CONTROL				
			TYPE	DAYLIGHT			NIGHT			TOTALS				TRAFFIC SIGNAL	STOP SIGN	YIELD SIGN	
				FATAL	INJURY	PROP. DAM.	FATAL	INJURY	PROP. DAM.	FATAL	INJURY	PROP. DAM.	TOTAL				
REAR END HEAD ON SIDE SWIPE OUT OF CONTROL LEFT TURN RIGHT ANGLE	MOVING VEHICLE BACKING VEHICLE PARKED VEHICLE FIXED OBJECT PEDESTRIAN (INVOLVED) PEDESTRIAN (NOT INVOLVED) BICYCLIST (INVOLVED) ANIMAL	FATAL CRASH INJURY CRASH															
		LIGHTING CONDITION DAYLIGHT DARK-LIGHTED ROADWAY	ANGLE		4	7		1	2		5	9	14				
			REAR-END		7	17		2	2		9	19	28				
			HEAD-ON														
			LEFT TURN			7			1			8	8				
			SIDESWIPE			1		1	1		1	2	3				
			FIXED OBJECT		1	2			1		1	3	4				
			PARKED CAR			3			1			4	4				
			OTHER			1		1			1	1	2				
			TOTAL		12	38		5	8		17	46	63				

1. CRASH SUMMARY JANUARY 2016 - DECEMBER 2018
- 2.



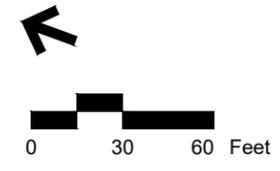
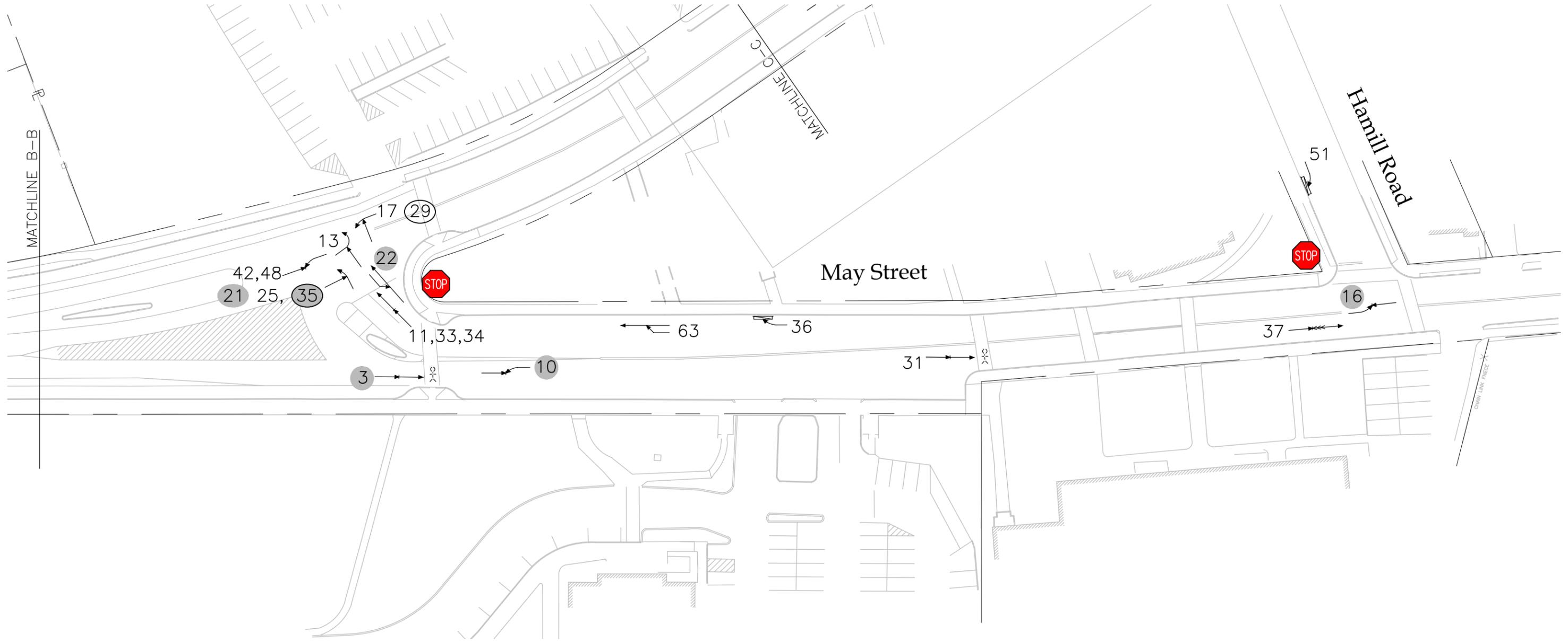
vhb **Figure 1B**
 Collision Diagram
 Chandler Street at May Street
 Worcester, Massachusetts

TYPES OF COLLISION	SYMBOLS	SEVERITY	ACCIDENT SUMMARY										TRAFFIC CONTROL				
			TYPE	DAYLIGHT			NIGHT			TOTALS				TRAFFIC SIGNAL	STOP SIGN	YIELD SIGN	
				FATAL	INJURY	PROP. DAM.	FATAL	INJURY	PROP. DAM.	FATAL	INJURY	PROP. DAM.	TOTAL				
REAR END HEAD ON SIDE SWIPE OUT OF CONTROL LEFT TURN RIGHT ANGLE	MOVING VEHICLE BACKING VEHICLE PARKED VEHICLE FIXED OBJECT PEDESTRIAN (INVOLVED) PEDESTRIAN (NOT INVOLVED) BICYCLIST (INVOLVED) ANIMAL	FATAL CRASH INJURY CRASH															
		LIGHTING CONDITION DAYLIGHT DARK-LIGHTED ROADWAY															
			ANGLE		4	7		1	2		5	9	14				
			REAR-END		7	17		2	2		9	19	28				
			HEAD-ON														
			LEFT TURN			7			1			8	8				
			SIDESWIPE			1		1	1		1	2	3				
			FIXED OBJECT		1	2			1		1	3	4				
			PARKED CAR			3			1			4	4				
			OTHER			1		1			1	1	2				
			TOTAL		12	38		5	8		17	46	63				



NOTES

1. CRASH SUMMARY JANUARY 2016 - DECEMBER 2018
- 2.



vhb **Figure 1C**
 Collision Diagram
 Chandler Street at May Street
 Worcester, Massachusetts

TYPES OF COLLISION	SYMBOLS	SEVERITY	ACCIDENT SUMMARY										TRAFFIC CONTROL			
			TYPE	DAYLIGHT			NIGHT			TOTALS				TRAFFIC SIGNAL	STOP SIGN	YIELD SIGN
				FATAL	INJURY	PROP. DAM.	FATAL	INJURY	PROP. DAM.	FATAL	INJURY	PROP. DAM.	TOTAL			
REAR END HEAD ON SIDE SWIPE OUT OF CONTROL LEFT TURN RIGHT ANGLE	MOVING VEHICLE BACKING VEHICLE PARKED VEHICLE FIXED OBJECT PEDESTRIAN (INVOLVED) PEDESTRIAN (NOT INVOLVED) BICYCLIST (INVOLVED) ANIMAL	FATAL CRASH INJURY CRASH LIGHTING CONDITION: DAYLIGHT DARK-LIGHTED ROADWAY	ANGLE		4	7		1	2		5	9	14	TRAFFIC SIGNAL STOP SIGN YIELD SIGN	NOTES	1. CRASH SUMMARY JANUARY 2016 - DECEMBER 2018 2.
REAR-END		7	17		2	2		9	19	28						
HEAD-ON																
LEFT TURN						7			1			8	8			
SIDESWIPE						1		1	1		1	2	3			
FIXED OBJECT					1	2			1		1	3	4			
PARKED CAR						3			1			4	4			
OTHER						1		1			1	1	2			
TOTAL						12	38		5	8		17	46	63		

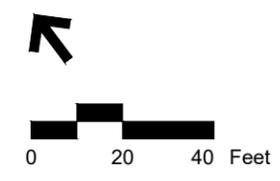
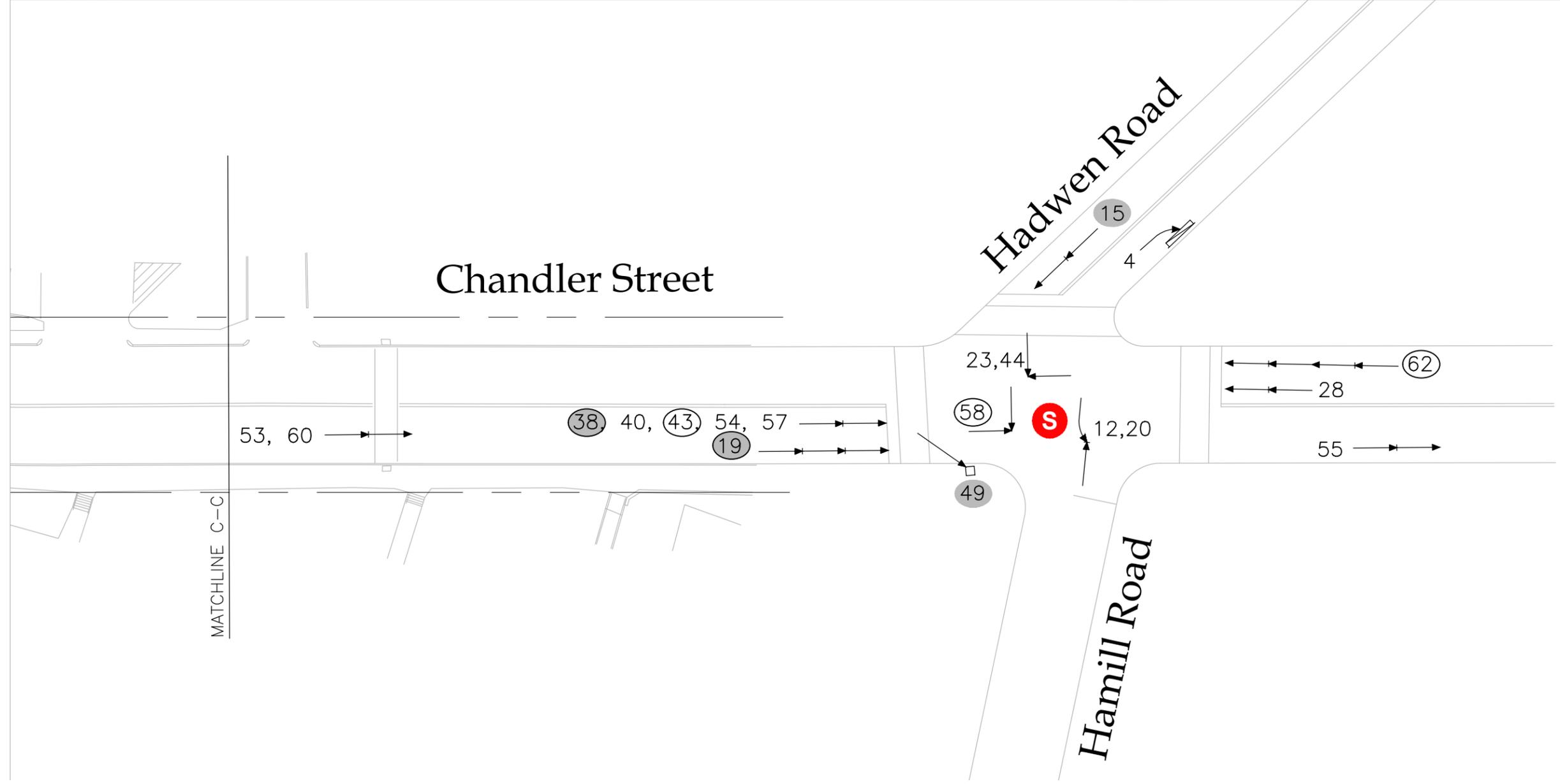


Figure 1D
 Collision Diagram
 Chandler Street at May Street
 Worcester, Massachusetts

Appendix E

Traffic Signal Warrants

2009 MUTCD

TRAFFIC SIGNAL WARRANT ANALYSIS (VOLUME BASED)

Intersection: **Chandler Street at May Street (North)**

Major Street Direction: Northbound-Southbound

Year: **2019** Condition: **Existing, seasonally adjusted, half of right-turns removed**

Operating speed on major roadway: **35** mph

Number of approaches: **3**

Required approach volumes

Warrant 1 EIGHT-HOUR VEHICULAR VOLUME		Minimum*	Adjusted Minimum**
Warrant 1A MINIMUM VEHICULAR VOLUME (8 hours of day)			
Major Street :	1 Lane(s) on each approach	500	500
Minor Street :	1 Lane(s) on each approach	150	150
Warrant 1B INTERRUPTION OF CONTINUOUS TRAFFIC (8 hours of day)			
Major Street :	1 Lane(s) on each approach	750	750
Minor Street :	1 Lane(s) on each approach	75	75
80 PERCENT SATISFACTION OF WARRANT 1A AND WARRANT 1B		Warrant 1A	Warrant 1B
Major Street :	1 Lane(s) on each approach	400	600
Minor Street :	1 Lane(s) on each approach	120	60

Warrant 2 FOUR HOUR VEHICULAR VOLUME	
Major Street :	1 Lane(s) on each approach
Minor Street :	1 Lane(s) on each approach

If "verify" indicated, see Figure 4C-1 or 4C-2.
25 = accuracy of regression equations

Warrant 3 PEAK HOUR VOLUME	
Major Street :	1 Lane(s) on each approach
Minor Street :	1 Lane(s) on each approach

If "verify" indicated, see Figure 4C-3 or 4C-4.
25 = accuracy of regression equations

Hour	Entering Vol. Minor Road+	Entering Vol. on Major Road		Tot. Ent. Vol. On Major Rd	Meets the following volume-based warrants?				
		Northbound	Southbound		1A	1B	80%(1A&1B)	2	3
6:00 - 7:00 AM	39	146	348	494	No	No	No	No	No
7:00 - 8:00 AM	134	365	644	1010	No	Yes	Yes	Yes	No
8:00 - 9:00 AM	139	505	753	1257	No	Yes	Yes	Yes	Yes
9:00 - 10:00 AM	99	362	492	853	No	Yes	No	No	No
10:00 - 11:00 AM	74	342	409	752	No	No	No	No	No
11:00 - 12:00 AM	81	407	396	804	No	Yes	No	No	No
12:00 - 1:00 PM	95	547	456	1002	No	Yes	No	No	No
1:00 - 2:00 PM	95	591	480	1072	No	Yes	No	Yes	No
2:00 - 3:00 PM	135	696	532	1229	No	Yes	Yes	Yes	No
3:00 - 4:00 PM	124	738	587	1326	No	Yes	Yes	Yes	No
4:00 - 5:00 PM	123	819	506	1325	No	Yes	Yes	Yes	No
5:00 - 6:00 PM	124	758	426	1185	No	Yes	Yes	Yes	No
6:00 - 7:00 PM	87	541	333	874	No	Yes	No	No	No
					No	Yes	No	Yes	Yes
					Warrants Met?	1	2	3	3
						Yes	Yes	Yes	Yes

*From the criteria described for the warrant in the MUTCD.

**If the operating speed is higher than 40mph then the volumes can be adjusted to 70%. (If no adjusted minimum, the minimum from the previous column is shown)

+If more than one approach, report the approach that has the higher volume.

NON-VOLUME-BASED WARRANTS

Warrant 4, Minimum Pedestrian Volume:
 Peak Four Hour Pedestrian Volumes: 0
 (non-concurrent) 0
 0
 0

Warrant 5, School Crossing:
 See MUTCD for details.

Warrant 6, Coordinated Signal System:
 See MUTCD for details.

Warrant 7, Crash Experience:
 # of accidents "correctable by signalization" occurring in the last 12 months: 0

Warrant 8, Roadway Network:
 See MUTCD for details.

Source: Manual on Uniform Traffic Control Devices (MUTCD); 2009 Edition

2009 MUTCD

TRAFFIC SIGNAL WARRANT ANALYSIS (VOLUME BASED)

Intersection: **Chandler Street at May Street (South)**

Major Street Direction: Northbound-Southbound

Year: **2019** Condition: **Existing, seasonally adjusted**

Operating speed on major roadway: **35** mph

Number of approaches: **3**

Required approach volumes

Warrant 1 EIGHT-HOUR VEHICULAR VOLUME		Minimum*	Adjusted Minimum**
Warrant 1A MINIMUM VEHICULAR VOLUME (8 hours of day)			
Major Street :	1 Lane(s) on each approach	500	500
Minor Street :	1 Lane(s) on each approach	150	150
Warrant 1B INTERRUPTION OF CONTINUOUS TRAFFIC (8 hours of day)			
Major Street :	1 Lane(s) on each approach	750	750
Minor Street :	1 Lane(s) on each approach	75	75
80 PERCENT SATISFACTION OF WARRANT 1A AND WARRANT 1B		Warrant 1A	Warrant 1B
Major Street :	1 Lane(s) on each approach	400	600
Minor Street :	1 Lane(s) on each approach	120	60

Warrant 2 FOUR HOUR VEHICULAR VOLUME		
Major Street :	1 Lane(s) on each approach	If "verify" indicated, see Figure 4C-1 or 4C-2. 25 = accuracy of regression equations
Minor Street :	1 Lane(s) on each approach	

Warrant 3 PEAK HOUR VOLUME		
Major Street :	1 Lane(s) on each approach	If "verify" indicated, see Figure 4C-3 or 4C-4. 25 = accuracy of regression equations
Minor Street :	1 Lane(s) on each approach	

Hour	Entering Vol. Minor Road+	Entering Vol. on Major Road		Tot. Ent. Vol. On Major Rd	Meets the following volume-based warrants?				
		Northbound	Southbound		1A	1B	80%(1A&1B)	2	3
6:00 - 7:00 AM	52	101	367	467	No	No	No	No	No
7:00 - 8:00 AM	126	311	696	1007	No	Yes	Yes	Yes	No
8:00 - 9:00 AM	149	465	812	1277	No	Yes	Yes	Yes	Yes
9:00 - 10:00 AM	156	328	543	870	Yes	Yes	Yes	Yes	No
10:00 - 11:00 AM	161	260	452	711	Yes	No	Yes	No	No
11:00 - 12:00 AM	193	289	444	734	Yes	No	Yes	Yes	No
12:00 - 1:00 PM	229	339	492	831	Yes	Yes	Yes	Yes	No
1:00 - 2:00 PM	234	331	525	855	Yes	Yes	Yes	Yes	No
2:00 - 3:00 PM	279	440	583	1023	Yes	Yes	Yes	Yes	Yes
3:00 - 4:00 PM	288	456	649	1105	Yes	Yes	Yes	Yes	Yes
4:00 - 5:00 PM	279	533	568	1101	Yes	Yes	Yes	Yes	Yes
5:00 - 6:00 PM	266	532	485	1018	Yes	Yes	Yes	Yes	Yes
6:00 - 7:00 PM	229	340	394	735	Yes	No	Yes	Yes	No
					Yes	Yes	Yes	Yes	Yes
					Warrants Met?	1	2	3	
						Yes	Yes	Yes	Yes

*From the criteria described for the warrant in the MUTCD.

**If the operating speed is higher than 40mph then the volumes can be adjusted to 70%. (If no adjusted minimum, the minimum from the previous column is shown)

+If more than one approach, report the approach that has the higher volume.

NON-VOLUME-BASED WARRANTS

Warrant 4, Minimum Pedestrian Volume:
 Peak Four Hour Pedestrian Volumes:
 (non-concurrent)

Warrant 5, School Crossing:
 See MUTCD for details.

Warrant 6, Coordinated Signal System:
 See MUTCD for details.

Warrant 7, Crash Experience:
 # of accidents "correctable by signalization" occurring in the last 12 months:

Warrant 8, Roadway Network:
 See MUTCD for details.

Source: Manual on Uniform Traffic Control Devices (MUTCD); 2009 Edition

Appendix F

Intersection Capacity Analysis

Intersection						
Int Delay, s/veh	13.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖
Traffic Vol, veh/h	130	10	110	365	490	350
Future Vol, veh/h	130	10	110	365	490	350
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	77	77	90	90
Heavy Vehicles, %	2	2	0	0	1	1
Mvmt Flow	135	10	143	474	544	389

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1304	544	544	0	0
Stage 1	544	-	-	-	-
Stage 2	760	-	-	-	-
Critical Hdwy	6.42	6.22	4.1	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.2	-	-
Pot Cap-1 Maneuver	177	539	1035	-	0
Stage 1	582	-	-	-	0
Stage 2	462	-	-	-	0
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	144	539	1035	-	-
Mov Cap-2 Maneuver	144	-	-	-	-
Stage 1	473	-	-	-	-
Stage 2	462	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	112.6	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	1035	-	144	539	-
HCM Lane V/C Ratio	0.138	-	0.94	0.019	-
HCM Control Delay (s)	9	0	120.3	11.8	-
HCM Lane LOS	A	A	F	B	-
HCM 95th %tile Q(veh)	0.5	-	6.6	0.1	-

Intersection												
Int Delay, s/veh	29.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔			↔			↔	
Traffic Vol, veh/h	0	0	0	150	5	75	25	375	90	45	680	30
Future Vol, veh/h	0	0	0	150	5	75	25	375	90	45	680	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	82	82	82	84	84	84	90	90	90
Heavy Vehicles, %	0	0	0	3	0	0	0	2	5	7	1	0
Mvmt Flow	0	0	0	183	6	91	30	446	107	50	756	33

Major/Minor	Minor1	Major1	Major2				
Conflicting Flow All	1379	1395	446	789	0	-	446
Stage 1	506	506	-	-	-	-	-
Stage 2	873	889	-	-	-	-	-
Critical Hdwy	6.43	6.5	6.2	4.1	-	-	4.17
Critical Hdwy Stg 1	5.43	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.5	-	-	-	-	-
Follow-up Hdwy	3.527	4	3.3	2.2	-	-	2.263
Pot Cap-1 Maneuver	~ 159	143	617	840	-	0	1088
Stage 1	603	543	-	-	-	0	-
Stage 2	407	364	-	-	-	0	-
Platoon blocked, %							
Mov Cap-1 Maneuver	~ 139	0	617	840	-	-	1088
Mov Cap-2 Maneuver	~ 139	0	-	-	-	-	-
Stage 1	575	0	-	-	-	-	-
Stage 2	374	0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	163.1	0.6	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	840	-	139	813	1088	-	-
HCM Lane V/C Ratio	0.035	-	1.316	0.12	0.046	-	-
HCM Control Delay (s)	9.4	0	244.8	10	8.5	0	-
HCM Lane LOS	A	A	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	11.5	0.4	0.1	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh	22.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗		↖	↗	↘
Traffic Vol, veh/h	260	20	40	460	320	205
Future Vol, veh/h	260	20	40	460	320	205
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	150	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	93	93	98	98
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	289	22	43	495	327	209

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	908	327	327	0	0
Stage 1	327	-	-	-	-
Stage 2	581	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	308	719	1244	-	0
Stage 1	735	-	-	-	0
Stage 2	563	-	-	-	0
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	293	719	1244	-	-
Mov Cap-2 Maneuver	293	-	-	-	-
Stage 1	700	-	-	-	-
Stage 2	563	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	82.4	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	1244	-	293	719	-
HCM Lane V/C Ratio	0.035	-	0.986	0.031	-
HCM Control Delay (s)	8	0	88	10.2	-
HCM Lane LOS	A	A	F	B	-
HCM 95th %tile Q(veh)	0.1	-	10.2	0.1	-

Intersection

Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔			↔			↔	
Traffic Vol, veh/h	0	0	0	100	2	70	1	580	135	40	430	5
Future Vol, veh/h	0	0	0	100	2	70	1	580	135	40	430	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	95	95	95	97	97	97	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	105	2	74	1	598	139	42	453	5

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1140	1142	598	458	0	598
Stage 1	600	600	-	-	-	-
Stage 2	540	542	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	4.1
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	2.2
Pot Cap-1 Maneuver	224	202	506	1114	-	989
Stage 1	552	493	-	-	0	-
Stage 2	588	523	-	-	0	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	211	0	506	1114	-	989
Mov Cap-2 Maneuver	211	0	-	-	-	-
Stage 1	551	0	-	-	-	-
Stage 2	554	0	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.4	0	0.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1114	-	211	1243	989	-	-
HCM Lane V/C Ratio	0.001	-	0.499	0.061	0.043	-	-
HCM Control Delay (s)	8.2	0	37.9	8.1	8.8	0	-
HCM Lane LOS	A	A	E	A	A	A	-
HCM 95th %tile Q(veh)	0	-	2.5	0.2	0.1	-	-

Intersection

Int Delay, s/veh	28.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗		↘↗	↗	↘
Traffic Vol, veh/h	145	10	120	405	540	385
Future Vol, veh/h	145	10	120	405	540	385
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	77	77	90	90
Heavy Vehicles, %	2	2	0	0	1	1
Mvmt Flow	151	10	156	526	600	428

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1438	600	600	0	-	0
Stage 1	600	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.1	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.2	-	-	-
Pot Cap-1 Maneuver	~ 147	501	987	-	-	0
Stage 1	548	-	-	-	-	0
Stage 2	424	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 114	501	987	-	-	-
Mov Cap-2 Maneuver	~ 114	-	-	-	-	-
Stage 1	426	-	-	-	-	-
Stage 2	424	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	248.9	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	987	-	114	501	-
HCM Lane V/C Ratio	0.158	-	1.325	0.021	-
HCM Control Delay (s)	9.3	0	265.2	12.3	-
HCM Lane LOS	A	A	F	B	-
HCM 95th %tile Q(veh)	0.6	-	10.2	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh	57.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔			↔			↔	
Traffic Vol, veh/h	0	0	0	165	5	85	30	415	100	50	750	35
Future Vol, veh/h	0	0	0	165	5	85	30	415	100	50	750	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	82	82	82	84	84	84	90	90	90
Heavy Vehicles, %	0	0	0	3	0	0	0	2	5	7	1	0
Mvmt Flow	0	0	0	201	6	104	36	494	119	56	833	39

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1531	1550	494
Stage 1	566	566	-
Stage 2	965	984	-
Critical Hdwy	6.43	6.5	6.2
Critical Hdwy Stg 1	5.43	5.5	-
Critical Hdwy Stg 2	5.43	5.5	-
Follow-up Hdwy	3.527	4	3.3
Pot Cap-1 Maneuver	~ 128	115	579
Stage 1	566	511	-
Stage 2	368	329	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 107	0	579
Mov Cap-2 Maneuver	~ 107	0	-
Stage 1	530	0	-
Stage 2	329	0	-

Approach	WB	NB	SB
HCM Control Delay, s	\$ 325.7	0.7	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	782	-	107	659	1044	-	-
HCM Lane V/C Ratio	0.046	-	1.881	0.167	0.053	-	-
HCM Control Delay (s)	9.8	0	\$ 497	11.6	8.6	0	-
HCM Lane LOS	A	A	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	16.4	0.6	0.2	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	127.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔
Traffic Vol, veh/h	285	20	45	510	355	225
Future Vol, veh/h	285	20	45	510	355	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	250	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	58	58	98	98
Heavy Vehicles, %	0	0	0	0	1	0
Mvmt Flow	317	22	78	879	362	230
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1397	362	362	0	0	
Stage 1	362	-	-	-	-	
Stage 2	1035	-	-	-	-	
Critical Hdwy	6.4	6.2	4.1	-	-	
Critical Hdwy Stg 1	5.4	-	-	-	-	
Critical Hdwy Stg 2	5.4	-	-	-	-	
Follow-up Hdwy	3.5	3.3	2.2	-	-	
Pot Cap-1 Maneuver	~ 157	687	1208	-	0	
Stage 1	709	-	-	-	0	
Stage 2	345	-	-	-	0	
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 137	687	1208	-	-	
Mov Cap-2 Maneuver	~ 137	-	-	-	-	
Stage 1	620	-	-	-	-	
Stage 2	345	-	-	-	-	
Approach	EB	NB	SB			
HCM Control Delay, s	\$ 621.7	0.7	0			
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	
Capacity (veh/h)	1208	-	137	687	-	
HCM Lane V/C Ratio	0.064	-	2.311	0.032	-	
HCM Control Delay (s)	8.2	0	\$ 664.6	10.4	-	
HCM Lane LOS	A	A	F	B	-	
HCM 95th %tile Q(veh)	0.2	-	26.9	0.1	-	
Notes						
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔	↔			↔			↔	
Traffic Vol, veh/h	0	0	0	110	2	75	1	640	150	45	475	5
Future Vol, veh/h	0	0	0	110	2	75	1	640	150	45	475	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	95	95	95	97	97	97	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	0	0	0	116	2	79	1	660	155	47	500	5

Major/Minor	Minor1	Major1	Major2				
Conflicting Flow All	1259	1261	660	505	0	-	660
Stage 1	662	662	-	-	-	-	-
Stage 2	597	599	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2
Pot Cap-1 Maneuver	190	172	467	1070	-	0	938
Stage 1	517	462	-	-	-	0	-
Stage 2	554	494	-	-	-	0	-
Platoon blocked, %							
Mov Cap-1 Maneuver	177	0	467	1070	-	-	938
Mov Cap-2 Maneuver	177	0	-	-	-	-	-
Stage 1	516	0	-	-	-	-	-
Stage 2	515	0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.5	0	0.8
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1070	-	177	932	938	-	-
HCM Lane V/C Ratio	0.001	-	0.654	0.087	0.05	-	-
HCM Control Delay (s)	8.4	0	57.3	9.2	9	0	-
HCM Lane LOS	A	A	F	A	A	A	-
HCM 95th %tile Q(veh)	0	-	3.8	0.3	0.2	-	-

MOVEMENT SUMMARY

 Site: 101 [May North FVAM (Site Folder: General)]

Chandler at May North
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Chandler NB														
3	L2	30	0.0	33	0.0	0.412	6.2	LOS A	2.7	69.0	0.24	0.10	0.24	26.0
8	T1	415	2.0	451	2.0	0.412	6.3	LOS A	2.7	69.0	0.24	0.10	0.24	25.5
18	R2	100	5.0	109	5.0	0.412	6.4	LOS A	2.7	69.0	0.24	0.10	0.24	24.8
Approach		545	2.4	592	2.4	0.412	6.3	LOS A	2.7	69.0	0.24	0.10	0.24	25.4
East: May North														
1	L2	165	3.0	179	3.0	0.338	8.4	LOS A	1.6	41.0	0.62	0.60	0.62	23.3
6	T1	5	0.0	5	0.0	0.338	8.2	LOS A	1.6	41.0	0.62	0.60	0.62	22.9
16	R2	85	0.0	92	0.0	0.338	8.2	LOS A	1.6	41.0	0.62	0.60	0.62	22.4
Approach		255	1.9	277	1.9	0.338	8.3	LOS A	1.6	41.0	0.62	0.60	0.62	23.0
North: Chandler SB														
7	L2	50	7.0	54	7.0	0.854	23.3	LOS C	24.1	696.4	0.77	1.23	1.79	22.9
4	T1	750	21.0	815	21.0	0.854	23.7	LOS C	24.1	696.4	0.77	1.23	1.79	22.5
14	R2	35	0.0	38	0.0	0.854	23.1	LOS C	24.1	696.4	0.77	1.23	1.79	22.0
Approach		835	19.3	908	19.3	0.854	23.6	LOS C	24.1	696.4	0.77	1.23	1.79	22.5
All Vehicles		1635	11.0	1777	11.0	0.854	15.5	LOS C	24.1	696.4	0.57	0.75	1.09	23.5

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: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 101 [May North FVPM (Site Folder: General)]

Chandler at May North
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Chandler NB														
3	L2	1	0.0	1	0.0	0.566	8.2	LOS A	5.1	127.6	0.29	0.12	0.29	25.6
8	T1	640	1.0	696	1.0	0.566	8.3	LOS A	5.1	127.6	0.29	0.12	0.29	25.1
18	R2	150	0.0	163	0.0	0.566	8.2	LOS A	5.1	127.6	0.29	0.12	0.29	24.5
Approach		791	0.8	860	0.8	0.566	8.3	LOS A	5.1	127.6	0.29	0.12	0.29	25.0
East: May North														
1	L2	110	0.0	120	0.0	0.302	9.2	LOS A	1.3	33.3	0.67	0.67	0.67	23.2
6	T1	2	0.0	2	0.0	0.302	9.2	LOS A	1.3	33.3	0.67	0.67	0.67	22.8
16	R2	75	0.0	82	0.0	0.302	9.2	LOS A	1.3	33.3	0.67	0.67	0.67	22.2
Approach		187	0.0	203	0.0	0.302	9.2	LOS A	1.3	33.3	0.67	0.67	0.67	22.8
North: Chandler SB														
7	L2	45	0.0	49	0.0	0.416	6.5	LOS A	2.7	68.0	0.37	0.21	0.37	27.7
4	T1	475	1.0	516	1.0	0.416	6.6	LOS A	2.7	68.0	0.37	0.21	0.37	27.1
14	R2	5	0.0	5	0.0	0.416	6.5	LOS A	2.7	68.0	0.37	0.21	0.37	26.3
Approach		525	0.9	571	0.9	0.416	6.6	LOS A	2.7	68.0	0.37	0.21	0.37	27.1
All Vehicles		1503	0.7	1634	0.7	0.566	7.8	LOS A	5.1	127.6	0.36	0.22	0.36	25.4

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: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\vhb\gbl\proj\Worcester\13294.01 Worc-Intersect-Chandler\tech\Sidra\FDR\608961 SIDRA.sip9

MOVEMENT SUMMARY

 Site: 101 [May South FVAM (Site Folder: General)]

Chandler Street at May Street (South)
 w/o Relocated WSU
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: May														
3a	L1	145	2.0	158	2.0	0.228	7.4	LOS A	1.0	24.7	0.61	0.60	0.61	23.1
18	R2	10	0.0	11	0.0	0.228	7.3	LOS A	1.0	24.7	0.61	0.60	0.61	22.5
Approach		155	1.9	168	1.9	0.228	7.4	LOS A	1.0	24.7	0.61	0.60	0.61	23.1
East: Chandler NB														
1	L2	120	2.0	130	2.0	0.466	7.8	LOS A	3.0	77.9	0.45	0.29	0.45	25.6
16a	R1	405	3.0	440	3.0	0.466	7.8	LOS A	3.0	77.9	0.45	0.29	0.45	25.1
Approach		525	2.8	571	2.8	0.466	7.8	LOS A	3.0	77.9	0.45	0.29	0.45	25.2
NorthWest: Chandler SB														
7ax	L1	540	1.0	587	1.0	0.710	12.0	LOS B	7.7	193.7	0.63	0.38	0.63	23.0
14ax	R1	385	2.0	418	2.0	0.710	12.0	LOS B	7.7	193.7	0.63	0.38	0.63	24.3
Approach		925	1.4	1005	1.4	0.710	12.0	LOS B	7.7	193.7	0.63	0.38	0.63	23.5
All Vehicles		1605	1.9	1745	1.9	0.710	10.2	LOS B	7.7	193.7	0.57	0.37	0.57	24.0

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: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\vhb\gbl\proj\Worcester\13294.01 Worc-Intersect-Chandler\tech\Sidra\FDR\608961 SIDRA.sip9

MOVEMENT SUMMARY

 Site: 101 [May South FVPM (Site Folder: General)]

Chandler Street at May Street (South)
 w/o Relocated WSU
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: May														
3a	L1	285	1.0	310	1.0	0.361	7.9	LOS A	1.9	46.9	0.59	0.52	0.59	23.0
18	R2	20	0.0	22	0.0	0.361	7.9	LOS A	1.9	46.9	0.59	0.52	0.59	22.3
Approach		305	0.9	332	0.9	0.361	7.9	LOS A	1.9	46.9	0.59	0.52	0.59	23.0
East: Chandler NB														
1	L2	45	3.0	49	3.0	0.557	10.7	LOS B	5.0	125.1	0.67	0.67	0.84	25.1
16a	R1	485	0.0	527	0.0	0.557	10.5	LOS B	5.0	125.1	0.67	0.67	0.84	26.2
Approach		530	0.3	576	0.3	0.557	10.6	LOS B	5.0	125.1	0.67	0.67	0.84	26.1
NorthWest: Chandler SB														
7ax	L1	355	1.0	386	1.0	0.394	5.7	LOS A	2.6	65.5	0.21	0.08	0.21	24.6
14ax	R1	225	1.0	245	1.0	0.394	5.7	LOS A	2.6	65.5	0.21	0.08	0.21	26.0
Approach		580	1.0	630	1.0	0.394	5.7	LOS A	2.6	65.5	0.21	0.08	0.21	25.1
All Vehicles		1415	0.7	1538	0.7	0.557	8.0	LOS A	5.0	125.1	0.46	0.40	0.53	25.0

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: US HCM 6.

Delay Model: HCM Delay Formula (Geometric Delay is not included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\vhb\gbl\proj\Worcester\13294.01 Worc-Intersect-Chandler\tech\Sidra\FDR\608961 SIDRA.sip9

Appendix G

Design Designation Calculation



101 Walnut Street
 Watertown, MA 02472
 Telephone (617) 924-1770
 Fax (617) 924-2286
www.vhb.com

DESIGN DESIGNATION DATA

Job Number: 13294.01

Date: 7-Dec-20

Preparer: PJB

Checked by: ELT

Average Daily Traffic (ADT) = $8,043 + 7,845 = 15,888$ vpd
 ATR 3 Average of Jan 23 and Jan 24 of 2019 Data

Seasonally Adjusted ADT = $15,888 * 1.06\% = 16,056$ vpd

K Factor = $\frac{859 + 536}{15,888} = 0.09$
 4 PM to 5 PM on Jan 23, 2019

D = $\frac{859}{859 + 536} = 61.6\%$ NB

Peak Hour % Trucks = $\frac{40 + 2}{1,395} = 3.0\%$

Daily % Trucks = $\frac{541 + 55}{15,888} = 3.8\%$
 From Classification Counts

Design Year ADT = Background: $16,056 * (1+.01)^{10} = 17,736$
 Project: 0
 Other Specific Projects: 0
 Total: $17,736$ vpd

DHV = $17,736 * 0.09 = 1,596$ vph

DDHV = $1,596 * 61.6\% = 983$ vph

Appendix H

608961 10% Design Memo



To: MassDOT

Date: January 21, 2021

Memorandum

Project #: 13294.01

From: VHB

Re: 10% Design for Chandler Street and May Street
Worcester, MA
MassDOT Project 608961

The following memorandum has been prepared to accompany VHB's 10% design plans for Chandler Street between May Street north and May Street south. A Road Safety Audit (RSA) was conducted in 2020 and has recently been approved by MassDOT. Details of the safety concerns and suggested improvements can be found in that document.

EXISTING CONDITIONS

Chandler Street in Worcester is also known as Route 122, which is classified as an Urban Principal Arterial with a posted speed limit of 30 MPH. The existing intersections within the project limits are unsignalized. The existing roadway consists of two 11-foot travel lanes, two 5-foot bike lanes, 8-foot on-street parallel parking spaces on both sides of the roadway, and a large varied with painted gored median. An existing sidewalk with a typical width of 9-feet is located on the west side of Chandler Street while a 5-foot sidewalk exists on the east side of Chandler Street. The east side has a grass buffer while the west does not.

Automated Traffic Recorders (ATRs) were deployed at six locations within the project limits in 2019 to collect vehicle classifications, speeds, and volumes. Additionally, six Turning Movement Counts (TMCs) were collected at the various intersections to collect vehicular, pedestrian, and bicycle movements. The raw data will be provided with the Functional Design Report to be submitted with the 25% Design Submission. Volume figures are included with this memo.

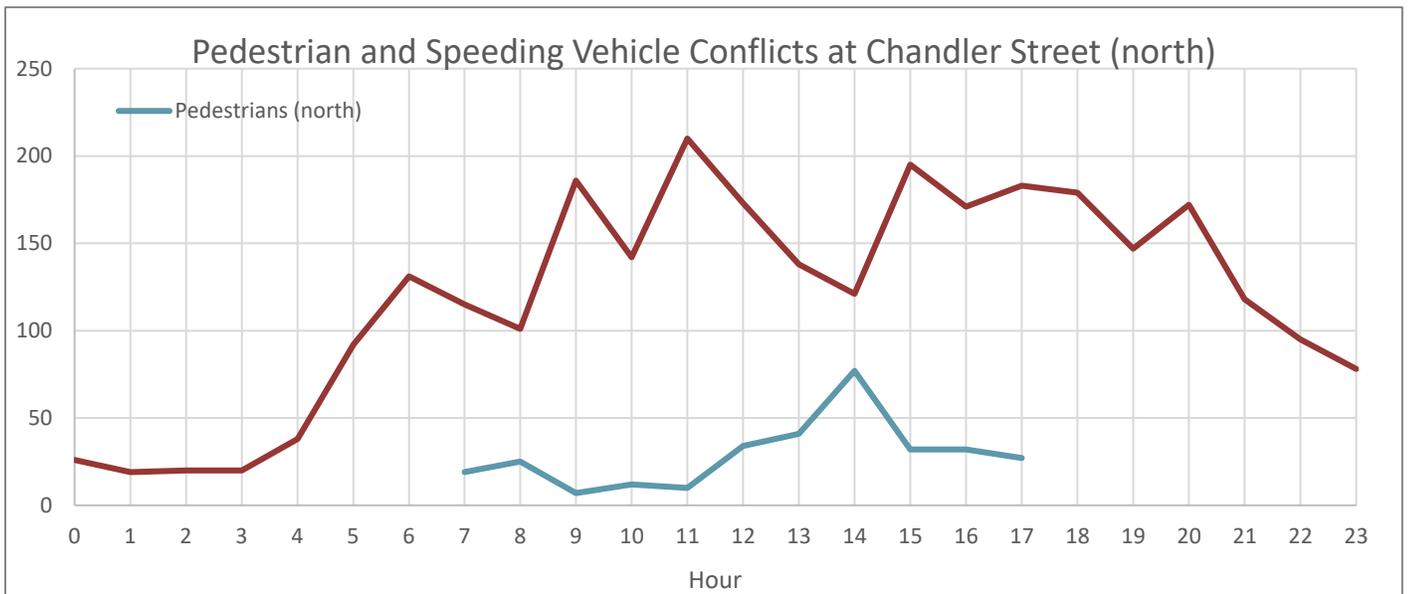
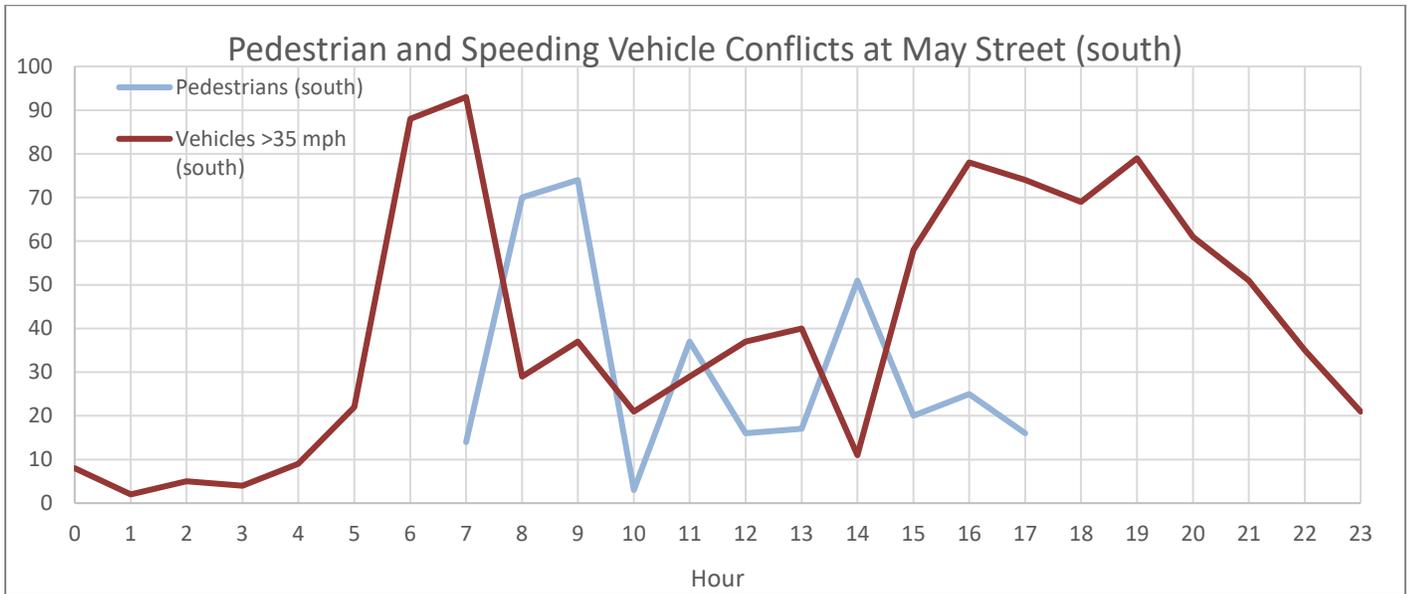
Vehicle-Speeds

- Speed limits within project limits are 30 MPH and within a thickly settled area. There are two school zones within the project limits – the May Street Elementary School is posted as a 20 MPH school zone and the Chandler Magnet Elementary School is not posted. The follow table summarizes vehicle-speeds:

ATR Location	Location	85 th Percentile Speed (MPH)	
		Northbound	Southbound
1	Chandler Street north of May Street (north)	37	35
2	May Street north of Chandler Street	34	32
3	Chandler Street north of Claridge Drive	41	29
4	Claridge Drive	Only Volume Collected	
5	Chandler Street south of May Street (south)	31	33
6	May Street south of Chandler Street (south)	25	37

120 Front Street
Suite 500
Worcester, MA 01608
P 508.752.1001

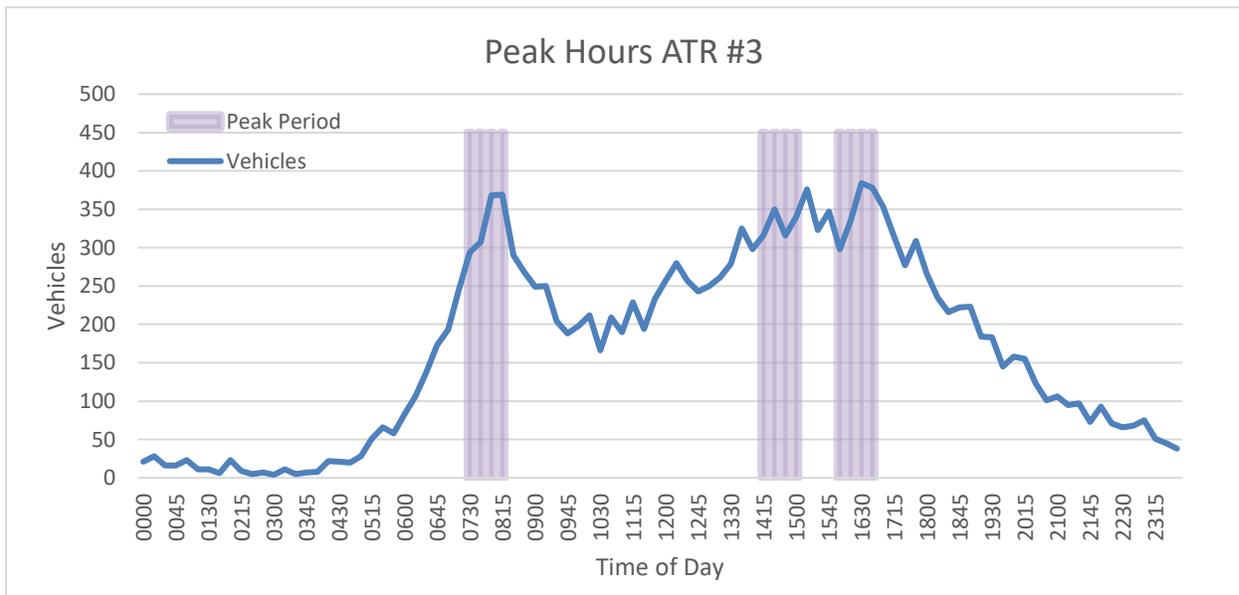
- Based on the data collected, there appears to be a speeding issue within the Study Area. Southbound traffic appears to speed up significantly as it veers onto May Street south. At ATR location #6, 18.6% of May Street southbound traffic is traveling above 35 MPH throughout the day. This volume and speed of traffic is directly in conflict with significant numbers of pedestrians and the May Street Elementary School zone.



- At the northern section, vehicle speeds for northbound traffic appears to speed up as it passes Claridge Drive. At ATR location #3, 56% of northbound traffic is traveling at or above 35 MPH throughout the day. This traffic is in direct conflict with the pedestrian traffic across Chandler Street at WSU.

Traffic Volumes

- Traffic volume data from the six ATRs was analyzed to determine peak hours. While each ATR had a slightly different peak period, in aggregate it was determined that the project area experiences three distinct peak volumes with differing traffic patterns:
 1. The morning peak occurs from 7:30 AM to 8:30 AM as both commuter and school traffic overlap;
 2. The midday school peak occurs from 2:15 PM to 3:15 PM as school dismissal occurs; and
 3. The evening peak occurs from 4:00 PM to 5:00 PM.
- Daily traffic volumes along Chandler Street in 2019 just north of Claridge Street was observed to be approximately 16,000 vehicles per day once seasonally.



Traffic Signal Warrant Analysis

Traffic signal warrants analyses were performed for both intersections under 2019 existing conditions to evaluate the possibility for traffic signal control. The methodology used to determine if traffic signal controls are warranted is based

on the criteria set in the Manual on Uniform Traffic Control Devices (MUTCD)¹. There are nine warrants defined in the MUTCD.

The table below presents the results of the three most commonly utilized warrants analysis completed for both intersections. The traffic signal warrants analysis worksheets will be provided with the Functional Design Report to be submitted with the 25% Design Submission.

▪ **Traffic Signal Warrants Analysis Summary**

	Warrant 1 ^a	Warrant 2 ^b	Warrant 3 ^c
2019 Existing Conditions	Met	Met	Met
Chandler Street at May Street (North)	Yes	Yes	Yes
Chandler Street at May Street (South)	Yes	Yes	Yes

^aEight-hour volume warrant.
^bFour-hour volume warrant.
^cPeak hour volume warrant.

As shown by the results presented in the above table, traffic signals are justified at both intersections based on three volume-based MUTCD warrants. There are six other warrants that these intersections likely do not meet. These are:

- Warrant 4 -Pedestrian Volume: Pedestrian volumes would need to exceed 107 persons per hour for four hours or 133 persons per hour for one hour to meet criteria for this warrant. A cursory review the Turning Movement Counts show that these thresholds are not likely to be met.
- Warrant 5-School Crossing: A gap study would be required to establish if there are not adequate gaps in the traffic stream to accommodate students and there must be a minimum of twenty (20) students in the highest hour. A cursory review the Turning Movement Counts show that this threshold is not likely to be met.
- Warrant 6 – Coordinated Signal System: The signalized intersection of Chandler Street at Hadwen Road and Hamill Road is approximately 600 feet from the southern Chandler Street/May Street intersection. It is preferable to apply this warrant to intersections spaced 1,000 feet or more apart.
- Warrant 7 – Crash Experience: There would need to be 5 or more crashes within a 12-month period that are correctable by traffic signal control. While high crash locations, there were not 5 or more crashes within the most recent 12-months that could be corrected by signalization.
- Warrant 8 – Roadway Network

¹ Manual on Uniform Traffic Control Devices; Part 4 – Highway Traffic Signals; U.S. Department of Transportation/Federal Highway Administration; 2009 Edition.

- Warrant 9 – Intersection Near a Grade Crossing

DESIGN CONSIDERATIONS

Several alternatives were considered for this project, including two signalized intersections and a combination of new traffic signals and a roundabout, and the attached preferred alternative which includes two roundabouts. The following summarizes design considerations for the project:

- Traffic signal warrants are met for both intersections for signalization, however,
 - if the intersections are signalized, on-street parking that falls within the intersection would need to be removed. Parking within an intersection is not permitted. Parking impacts are summarized below.
 - traffic signals would not provide the traffic calming benefits when compared to roundabouts. Based on the speed data above, speeding is an issue.
 - traffic signals would not reduce the pedestrian crossing width and a signalized pedestrian phase would create additional vehicle-delay and add queuing to the corridor.
- Bicycle accommodations for urban corridors with the traffic volumes and speeds noted above, should include additional enhancements to separate the bicyclist from vehicular traffic.
- Roundabouts create shorter crossing segments for pedestrians and utilize channelized segments to reduce the width of the roadway, which in turn reduce vehicle speeds and position the driver for improved visibility of a pedestrian crossing the street.
- The southerly roundabout could provide an opportunity to improve access and circulation to the University. The proposed concept sketches in what a fourth leg might look like, however, the design for this has not been finalized until the City discusses with WSU. See proposed design section below.

OPERATIONAL ASSESSMENT

The operational analysis for the weekday morning and evening existing conditions (2019), future no-build conditions (2029) and build conditions (2029) for both traffic signals and roundabouts are provided below. Analysis worksheets as well as analysis procedures and methodologies will be included in the Functional Design Report to be submitted with the 25% Design Submission.

The STOP-controlled approaches at both locations operate poorly during both peak periods and will continue to do so unless changes are made. While the queues and delays are not as extreme as reported by the analysis, the driver delay and vehicle queues are extensive. Under roundabout operation, the movements that are free-flow under current conditions will experience most queues during the peak periods. Traffic signal control at both locations operate at acceptable levels of service but vehicle queues will be difficult to manage.

Capacity Analysis Summary

AM Peak/ PM Peak	2019 – Weekday Existing Conditions				2029 – Weekday No-Build Conditions				Roundabout Control 2029 – Weekday Future Conditions				Traffic Signal Control 2029 – Weekday Future Conditions				
	Movement	Delay ²	LOS ³	95th Queue ⁵	Movement	Delay	LOS	95th Queue	Movement	Delay	LOS	95th Queue	Movement	V/C	Delay	LOS	95th Queue
Chandler Street at May Street (North)																	
May Street	WB LTR	356.3/ 48.8	F/ E	478/ 123	WB LTR	670.1/ 92.9	F/ F	663/ 195	WB LTR	8.5/ 9.7	A/ A	17/ 14	WB LTR	0.79/ 0.66	42.0/ 42.0	D/ D	#220/ 158
Chandler Street	NB LTR	9.4/ 8.2	A/ A	3/ 0	NB LTR	9.8/ 8.4	A/ A	3/ 0	NB LTR	7.7/ 11.9	A/ B	34/ 75	NB LTR	0.51/ 0.63	3.0/ 3.0	A/ A	m23/ 235
Chandler Street	SB LTR	8.8/ 9.3	A/ A	5/ 5	SB LTR	9.1/ 9.7	A/ A	5/ 5	SB LTR	23.3/ 8.3	C/ A	278/ 34	SB LTR	0.76/ 0.46	12.3/ 6.0	B/ A	411/ 201
	Overall	59.1/ 6.5			Overall	110.8/ 12			Overall	15.8/ 10.4	C/ B		Overall	0.76/ 0.63	13.8/ 8.9	B/ A	
Chandler Street at May Street (South)																	
May Street	WB L	153.4/ 91.2	F/ F	185/ 258	WB L	349.9/ 697.1	F/ F	285/ 683	WB LR	7.6/ 8.2	A/ A	10/ 19	WB L	0.55/ 0.90	36.3/ 64.5	D/ E	#139/ #337
	WB R	11.8/10.2	B/ B	3/ 3	WB R	12.3/10.4	B/ B	3/ 3	WB R				WB R	0.01/ 0.01	26.4/ 31.4	C/ C	14/ 23
Chandler Street	NB TL	11/ 1.1	B/ A	18/ 3	NB TL	11.8/ 8.9	B/ A	23/ 8	NB TL	8.8/ 12.8	A/ B	35/ 72	NB T	0.65/ 0.48	48.1/ 42.4	D/ D	120/ 52
Chandler Street	SB T	0/ 0	A/ A	0/ 0	SB T	0/ 0	A/ A	0/ 0	SB TR	22.7/ 8.0	C/ B	285/ 38	NB R	0.79/ 0.77	32.6/ 27.7	C/ C	#316/ 363
	SB R	0/ 0	A/ A	0/ 0	SB R	0/ 0	A/ A	0/ 0					SB T	0.90/ 0.79	30.6/ 37.7	C/ D	m#429/ #416
	Overall	13.2/ 19.5			Overall	29.3/117.4			Overall	16.7/ 9.9	C/ A		Overall	0.86/ 0.86	25.9/ 33.8	C/ C	

1 V/C – Volume-to-capacity ratio
 2 Delay – Control delay per vehicle
 3 LOS – Level-of-Service
 4 50th– 50th percentile queue length estimate, in feet,
 5 95th–95th percentile queue length estimate, in feet, NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound, L = left-turn; T = through; R = right-turn
 # 95th percentile volume exceeds capacity, queue may be longer
 m Volume for 95th percentile queue is metered by upstream signal

PROPOSED DESIGN

- Two roundabouts are proposed that would remove the existing skew from the intersections. An optional access to/ from the WSU Campus at the southerly roundabout is shown as dashed lines.
- A 10-foot shared use path along both sides of the project limits, with an approximate 3-foot buffer between the path and shoulder.
- Proposed on-street parking on both sides of the roadway.
- Curb extensions at intersections and crosswalks where on-street parking is provided to provide enhanced visibility of pedestrians entering crosswalks.
- Provide a narrower roadway throughout the corridor to encourage appropriate vehicle speeds.
- Raised median with landscaped or streetscape treatments (TBD) to reduce dangerous roadway maneuvers. Also, the roundabout center islands provide landscaping opportunities.
- Due to the proposed improvements, some on-street parking spaces will be lost. The table below shows the number of spaces lost at each location.
- This concept will require permanent easements from Worcester State University property. Temporary easements are approximately shown on the concept and are necessary for grading and tying into existing conditions during construction.

ON-STREET PARKING SUMMARY			
Location	Existing	Proposed	Difference
<i>Roundabouts</i>			
Northern intersection: Claridge Dr to May St (north)	52	44	-8
Southern Intersection: Claridge Dr to May St (south)	42	27	-15
Total	94	71	-23
<i>Signalized Intersections</i>			
Northern intersection: Claridge Dr to May St (north)	52	49	-3
Southern Intersection – Claridge Dr to May St (south)	42	28	-14
Total	94	77	-17

Parking Notes: The above parking table assumes that each vehicle takes up 22-feet in length. This measurement was used to determine the existing and proposed number of parking spaces. This length was used to determine an accurate comparison. The on-street parking on the plans can be striped as an open shoulder if the City chooses to do so. This would

allow for vehicles to park more closely to each other and could add to the parking availability summarized above. The existing counts noted above remove illegal parking spaces that are too close to intersections, driveways, within intersections, partially within bus stops, and within no parking zone. The illegal count is around 24 spaces within the Study Area and is not included in the existing total above.

RIGHT-OF-WAY IMPACTS (ESTIMATED)

The dual roundabout option requires impacts to land adjacent to the roadway layout while also creating options to provide additional landscaped areas adjacent to and within the roadway. Some of the estimated impacts and landscape additions are summarized below. These numbers will be confirmed as the design advances. See attached plans for more details

- Estimated Impacts to WSU
 - 1,576 SF for roadway purposes
 - 5,261 SF for a shared use path and grass buffers between the path and the curb line
 - Total estimated 6,837 SF
- Potential area available to WSU for use
 - 6,153 SF on the easterly side of the southern roundabout
- Additional landscaping within roadway layout
 - 8,883 SF in medians and islands including the roundabout center islands
 - Note this does not include buffer area between paths and curbs, which would be additional

SUMMARY

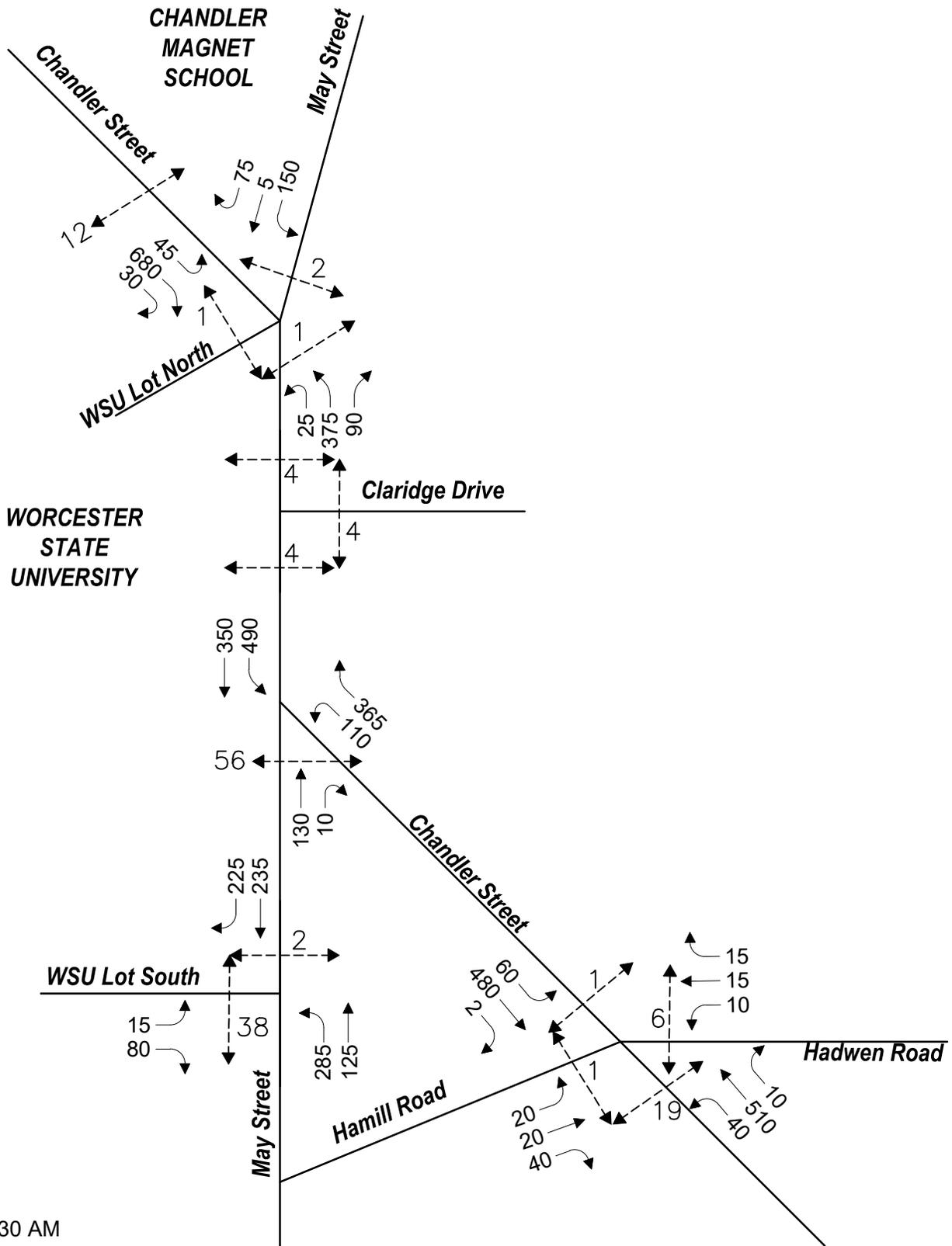
The benefit of providing dual roundabouts includes:

- *Minimize Conflict Points* – Roundabouts minimize conflict points for all roadway users, by eliminating the left-turn movements.
- *Reduction in Speed* – Roundabouts in series provide an effective way to reduce vehicle speeds. If signals are proposed, vehicles can speed up to make the green at the next signal.
- *Shorter pedestrian crossings* – The proposed pedestrian crossings at roundabouts are shorter than signalized intersections. The splitter island refuge area provides the ability for pedestrians to focus on one traffic stream at a time while crossing.
- *Access Management* – Improved Access Management to WSU driveways. May Street to the south could improve access and circulation with a fourth leg added to the roundabout.
- *Traffic Calming* – The dual roundabouts as well as the proposed boulevard will reduce speeds complementing a complete streets atmosphere for all users.

- *Environmental Impacts* – Roundabout can reduce idle time by eliminating stop and start movements caused by queued vehicles at signalized intersections.
- *Aesthetics* - The dual roundabouts can be a gateway feature for this corridor to the neighborhood and Worcester State University (WSU).
- *Maintenance* – Roundabouts require less maintenance than signalized intersections.
- *Operations* – Roundabouts typically function better than traffic signals, as vehicle-queues and delays are not stop and go.

Traffic Volume Figures

xx → **Traffic Volume**
 xx ←--→ **Pedestrian Volume**



2019 Weekday Morning
 Peak Hour Traffic Volumes
 Seasonally Adjusted & Rounded

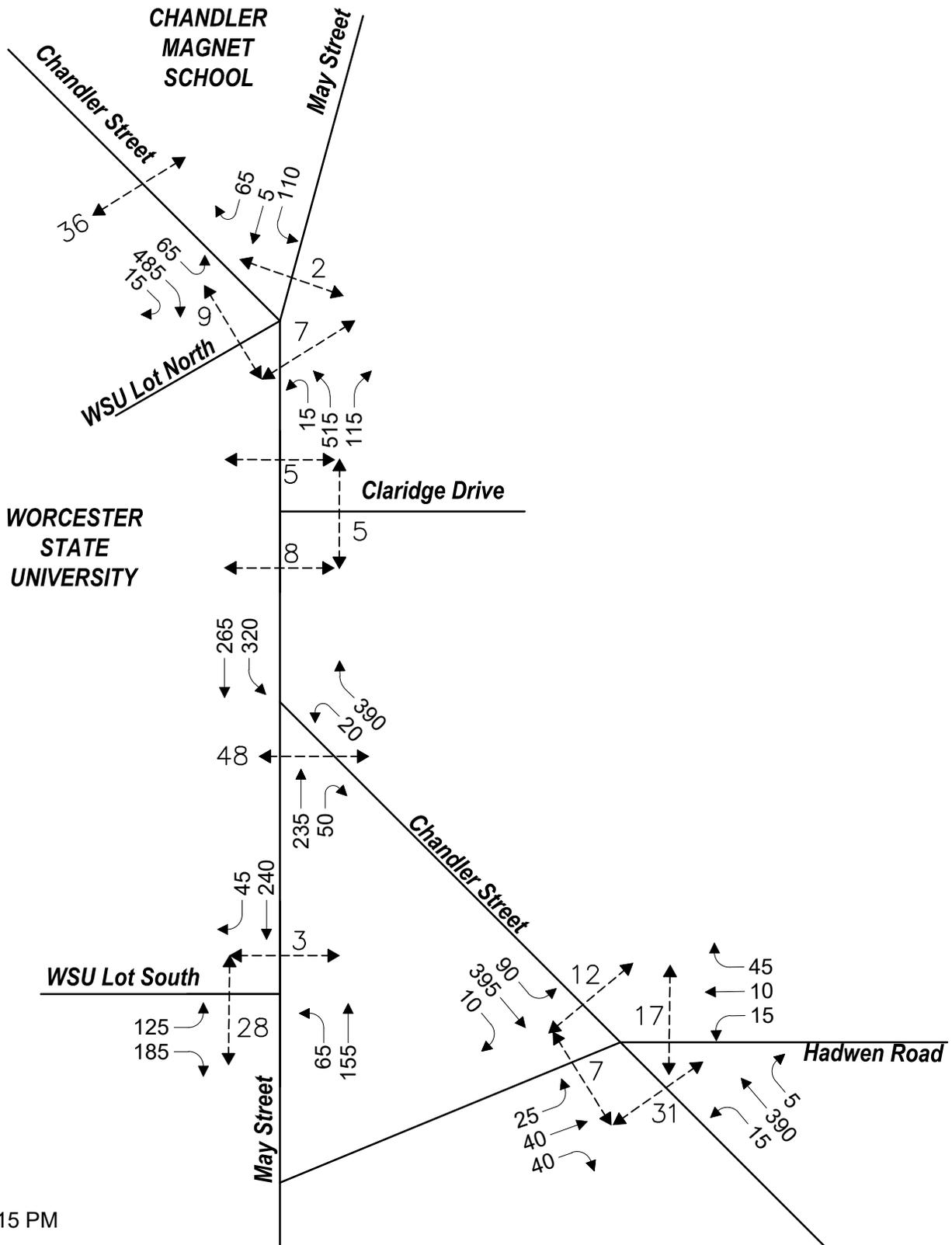
Figure 1

Chandler Street
 Worcester, MA



Not to Scale

xx → Traffic Volume
 xx ←--→ Pedestrian Volume



2019 Weekday School
 Peak Hour Traffic Volumes
 Seasonally Adjusted & Rounded

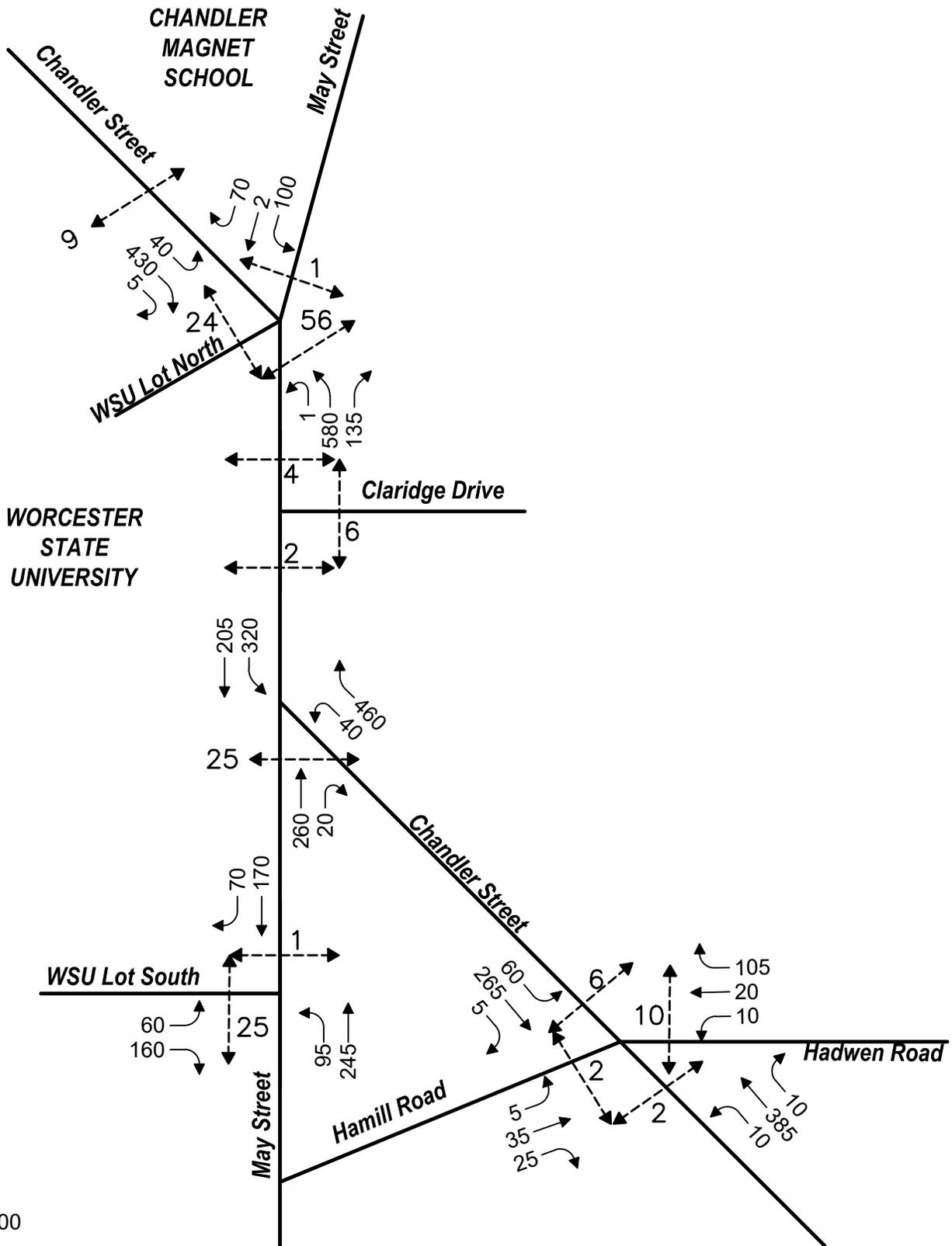
Figure 2

Chandler Street
 Worcester, MA



Not to Scale

xx → Traffic Volume
 xx ←--- Pedestrian Volume



4:00 - 5:00



2019 Weekday Evening
 Peak Hour Traffic Volumes
 Seasonally Adjusted & Rounded

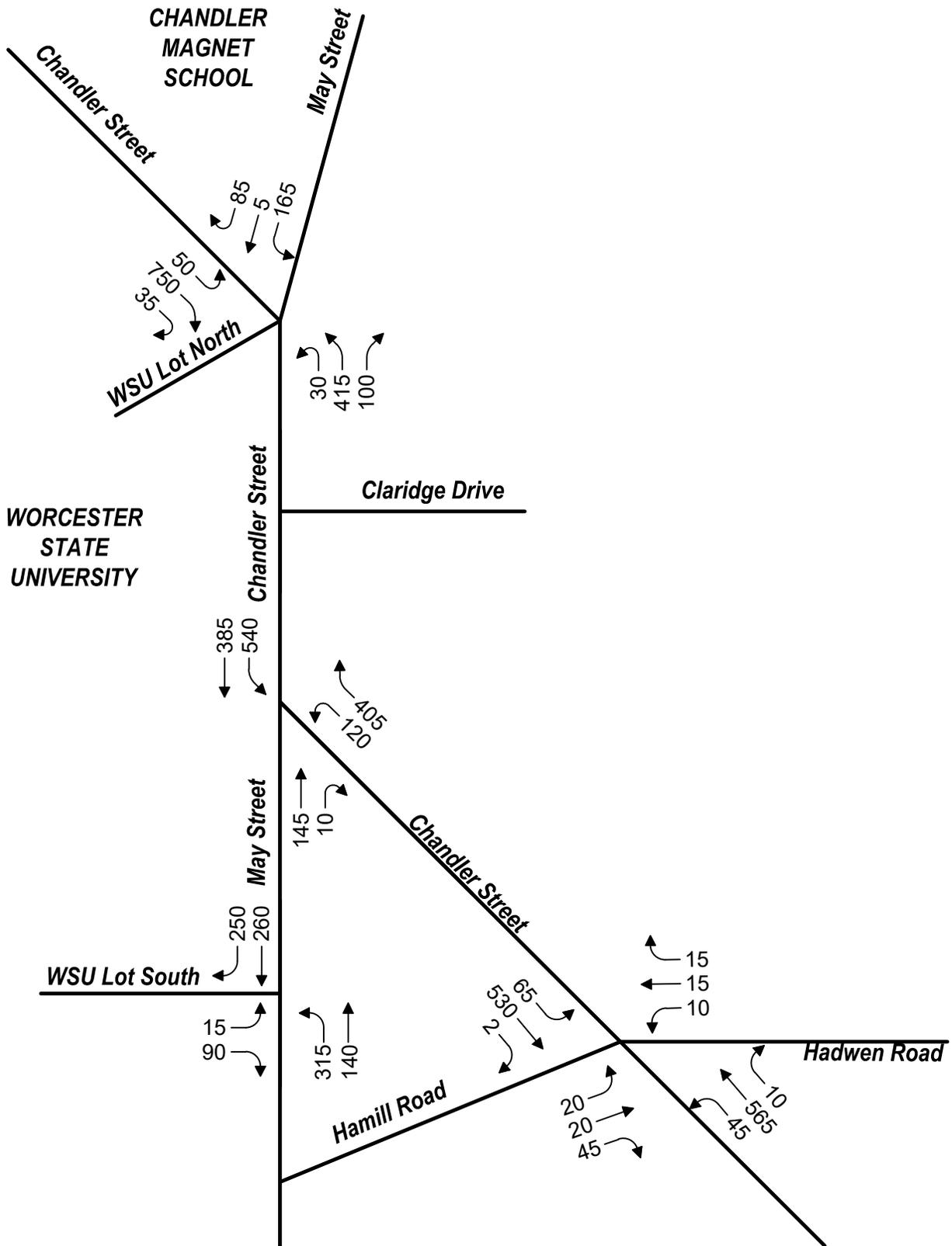
Figure 3

Chandler Street
 Worcester, MA



Not to Scale

xx → Traffic Volume



2029 Weekday Morning Peak Hour Traffic Volumes

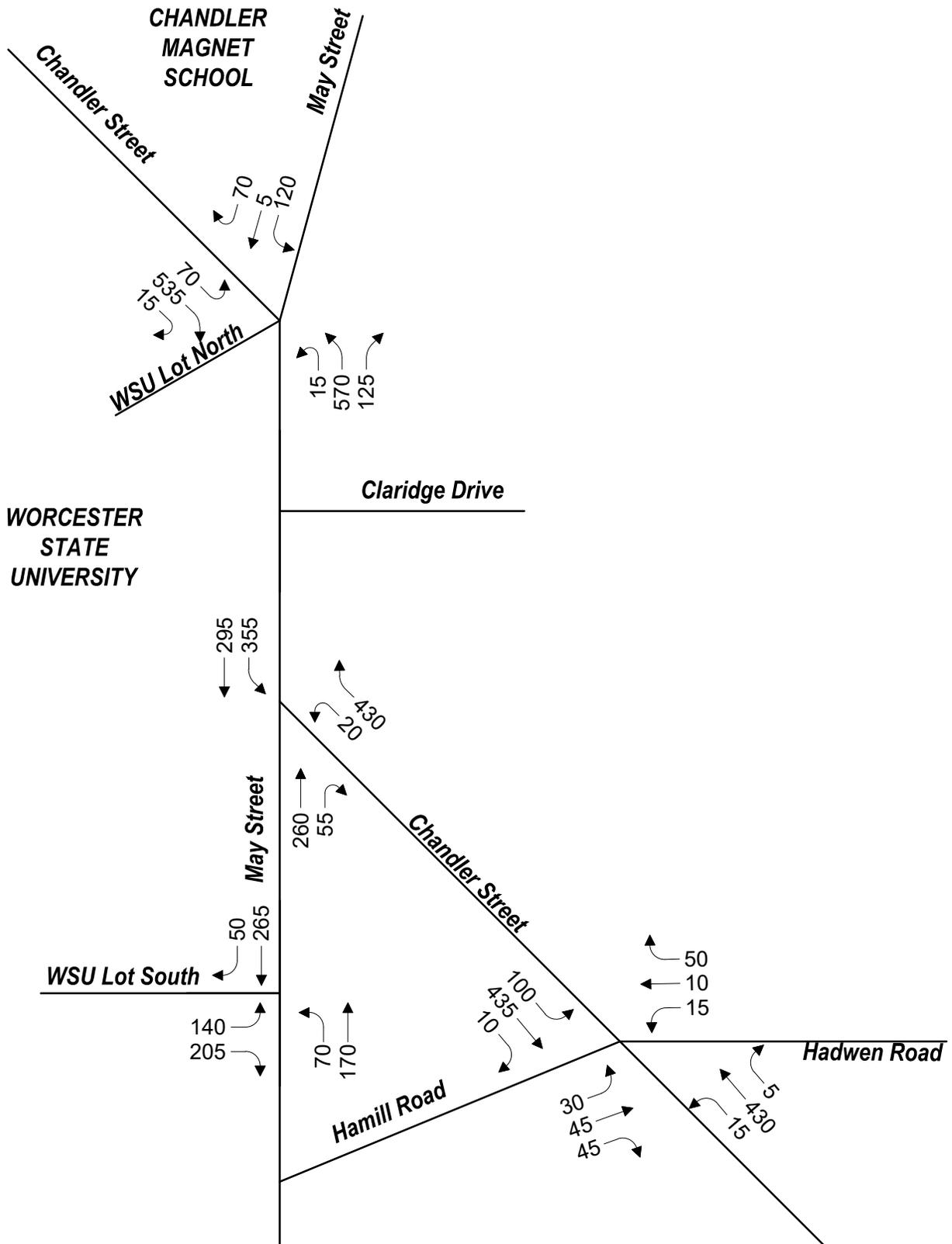
Figure 4

Chandler Street Worcester, MA



Not to Scale

xx → Traffic Volume



2029 Weekday School Peak Hour Traffic Volumes

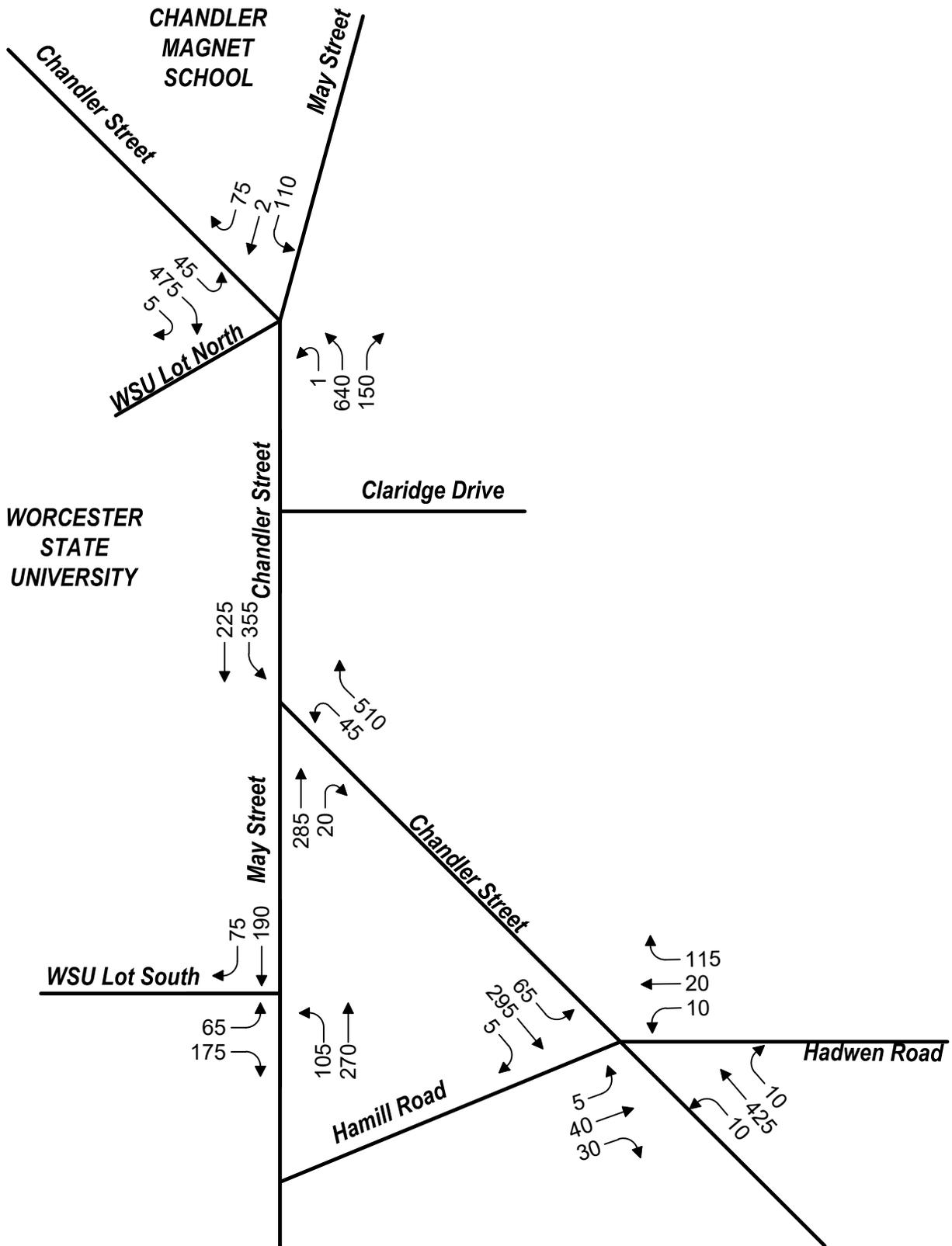
Figure 5

Chandler Street Worcester, MA



Not to Scale

xx → Traffic Volume



2029 Weekday Evening Peak Hour Traffic Volumes

Figure 6

Chandler Street Worcester, MA



Not to Scale

Appendix I

2016 Preliminary Corridor Assessment

Chandler Street Improvement Project

Worcester, Massachusetts

PREPARED FOR

Worcester Department of Public Works
& Parks (DPW&P)
20 East Worcester Street
Worcester, MA 01604

PREPARED BY



Vanasse Hangen Brustlin
Union Station, Suite 219
2 Washington Square
Worcester, MA 01604

OCTOBER 18, 2016



Memorandum

To: Worcester Department of Public
Works and Parks (DPW&P)

Date: August 4, 2016
Revised October 18, 2016
Project #: 13294.00

From: Matthew Chase, P.E., PTOE
Associate/ Project Manager

Re: Chandler Street Improvement Project

John Bechard, P.E.
Senior Principal/ Regional Director

STUDY BACKGROUND

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by the Worcester Department of Public Works and Parks (DPW&P) to provide a review of traffic, pedestrian, and bicycle conditions along Chandler Street directly adjacent to the Worcester State University (WSU) Campus. As part of this effort corridor safety was reviewed along with on-street parking constraints and corridor improvement opportunities.

The Study Area includes both the northern and southern intersections of May Street at Chandler Street and is a section of Chandler Street approximately 1,500 linear feet. This area is a highly traveled arterial roadway that serves as a major mobility corridor for the City of Worcester. It is VHB's understanding that this project is being reviewed to address the following existing issues and future concerns:

- **Parking:** The demand for on- and off-street parking in this area has increased significantly over the years and it appears that residents, students at WSU, and the Chandler Magnet School, etc. are competing for on-street parking spaces. One of the issues revealed during this study include students parking in residential neighborhoods.
- **Pedestrian Safety:** There are concerns about the openness of the pavement and distances that pedestrians need to walk across Chandler Street. In addition, the locations of crosswalks (midblock and at intersections) may not be accommodating user's needs and pedestrians are not visible due to on-street parking restricting visibility of pedestrians stepping off the curb.
- **Vehicle Speeds:** The openness of pavement has limited control over vehicle turning movements and speeds. Vehicles have been observed speeding through this corridor, and with the intersections being open, turning movements are not well defined and conflicts occur in turning movements.
- **Safety at Intersections:** Crashes are somewhat higher than normal for the Study Area unsignalized intersections, as compared to the region. This could be related to the lack of lane designations.
- **Bicycle Accommodations:** The corridor has minimal pavement striping when it comes to identifying shoulders, turn lanes and on-street parking. Bicyclists using the corridor do not have a define travel path.

To guide the development of this study, the following goals have been developed:

- **Public Participation:** Conduct public outreach meetings and provide an online survey to resident in this neighborhood (by DPW&P), to develop an understanding of issues, concerns and needs of all users of the corridor to assist in developing a set of recommended improvements.
- **Identification of Issues:** Perform a review of existing conditions data, field observations, and previous outreach meetings, studies, etc. coordinated by DPW&P and WSU students to identify issues.

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- Operational Characteristics: Determine existing operational characteristics at intersections and note any deficiencies.
- Development of Alternatives: Formulate recommendations that are compatible with the characteristics of the area and address issues and concerns.

STUDY AREA

The Study Area consists of the portion of Chandler Street bounded by the northerly edge of the WSU Campus (approximately 541 Chandler Street) and extending to either side of the northern intersection of Chandler Street at May Street and the southern intersection of Chandler Street at May Street. It is noted that Chandler Street and May Street converge between these two intersections. The Study Area also includes a review of issues surrounding the intersection of Claridge Drive at Chandler Street; which falls between the two May Street intersections. Figure 1 depicts the Study Area. It is noted that Chandler Street is an Urban Principal Arterial and is on the National Highway System network, while May Street north and south is an Urban Collector roadway.

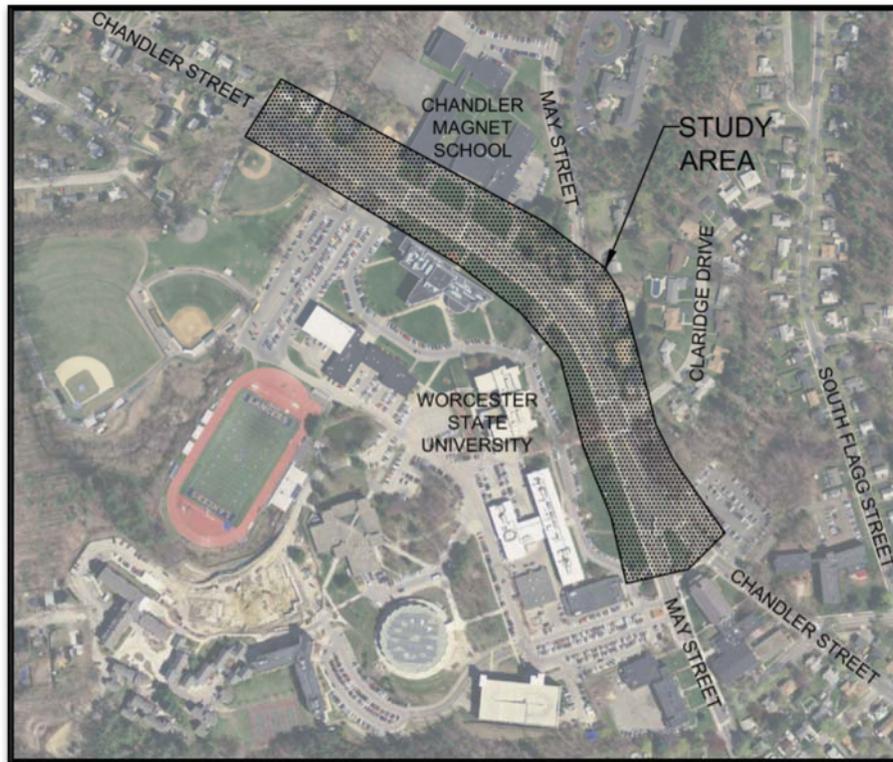


Figure 1. Study Area

PUBLIC OUTREACH

As part of this Project, VHB attended the following meetings and field walks to gain a better understanding of the existing issues and future concerns within the Study Area.

1. Thursday, November 19, 2015: Field walk with Worcester DPW&P, Worcester State University (WSU) Representatives, City Police, and concerned residents. Goal of field walk was to listen to issues and concerns along the corridor.
2. Thursday, November 19, 2015: Neighborhood meeting at the Worcester State University Auditorium. Approximately 35 residents and public officials attended a meeting with VHB and Worcester DPW&P present to discuss issues and opportunities for the corridor.

In addition to attending these two meetings, VHB has reviewed information provided by DPW&P in the form of emails from residents, questions/ responses to a survey prepared and distributed by DPW&P, and traffic assessments prepared by WSU students. Using this information, VHB has prepared conceptual improvement sketches to address the issues and concerns that were heard.

INFORMATION REVIEWED

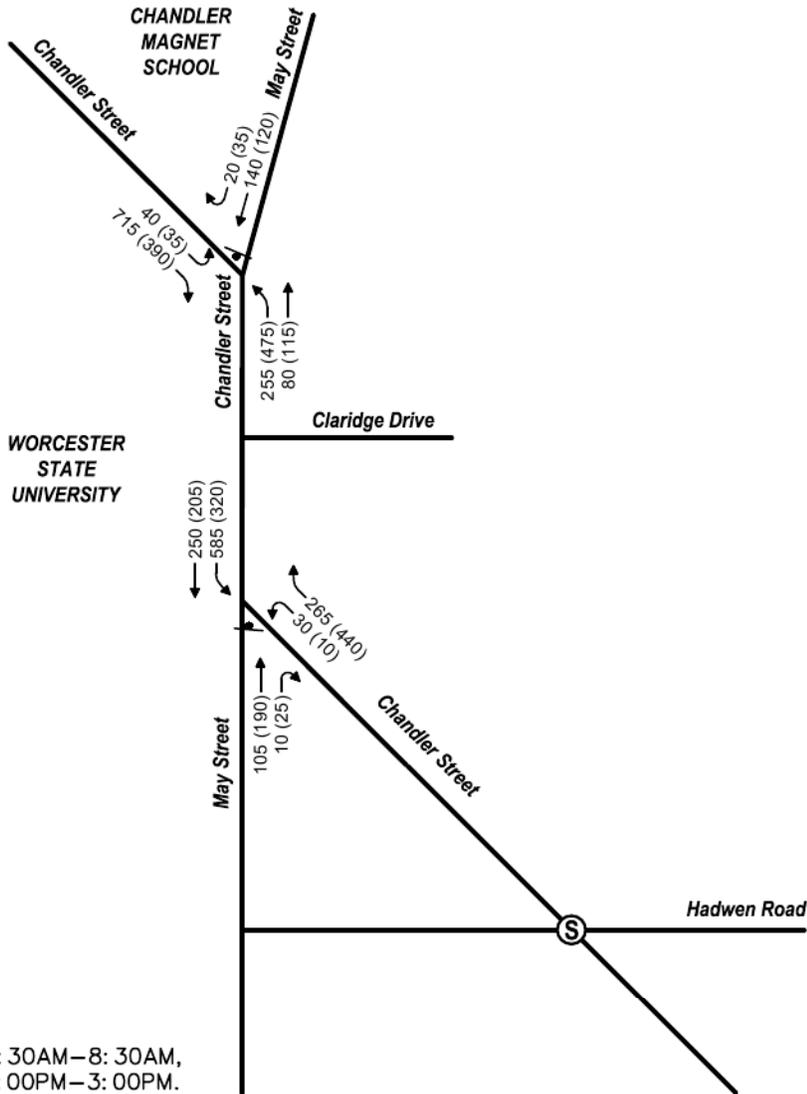
The following was reviewed to provide guidance for the development of conceptual improvement plans or treatments to be implemented.

- A field visit of the Site was made in November 2015 used to make general observations of traffic conditions and street characteristics.
- Background information provided by the DPW&P along with intersection capacity analyses.
- Roundabout conceptual designs prepared by the DPW&P; it is noted that these concepts were tweaked and incorporated into one of the improvement plans.
- Speed information and traffic counts publicly available from MassDOT for four (4) locations within or adjacent to the Study Area.
- Turning Movement Counts (TMC) taken while Worcester State University (WSU) was in and out of session.
- Pedestrian counts taken while WSU was in session.
- Inventory of available on-street parking locations, and quantity of vehicles parked in these locations during school and vacation times.
- Crash data for the years 2010 through 2013 collected from MassDOT's crash database.
- Assessments prepared by WSU Students.
- Results of a survey administered to area residents by DPW&P.

EXISTING TRAFFIC CONDITIONS

VHB made use of turning movement counts conducted by WSU students and DPW&P staff, and developed intersection geometry diagrams for the Study Area. Figure 2 shows the weekday morning and afternoon peak hour traffic volumes for the two Chandler Street and May Street intersections (north and south) while Worcester State University was not in session (March 2015). Figure 3 shows the weekday evening peak hour volumes while the university was in session (December 2015). Raw traffic counts can be found in Attachment A.

 **Stop Controlled**
 **Signalized Intersection**
 AM (PM) → **Traffic Volume**



NOTES:

1. AM PEAK IS FROM 7:30AM-8:30AM, PM PEAK IS FROM 2:00PM-3:00PM.
2. DATA COLLECTED BY WORCESTER DPW&P ON MARCH 2015.



Not to Scale

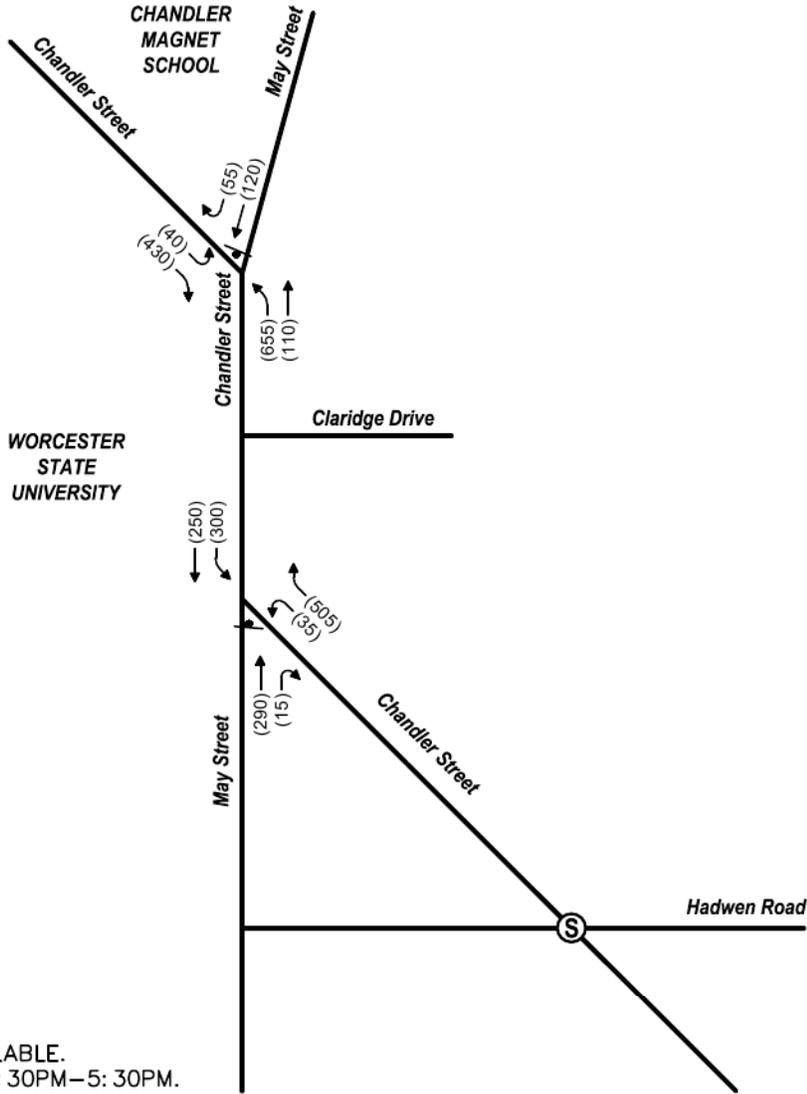
Vanasse Hangen Brustlin, Inc.

2015 Existing Weekday
Peak Hour Traffic Volumes
WSU Not In Session

Figure 2

Chandler Street Improvement Project
Worcester, Massachusetts

 Stop Controlled
 Signalized Intersection
 (PM) → Traffic Volume



NOTES:

1. AM PEAK IS UNAVAILABLE.
2. PM PEAK IS FROM 4:30PM-5:30PM.
3. DATA COLLECTED BY WORCESTER STATE UNIVERSITY STUDENTS ON 12-2-2015 AND 12-3-2015.



Not to Scale

Vanasse Hangen Brustlin, Inc.

2015 Existing Weekday
 Peak Hour Traffic Volumes
 WSU In Session

Figure 3

Chandler Street Improvement Project
 Worcester, Massachusetts

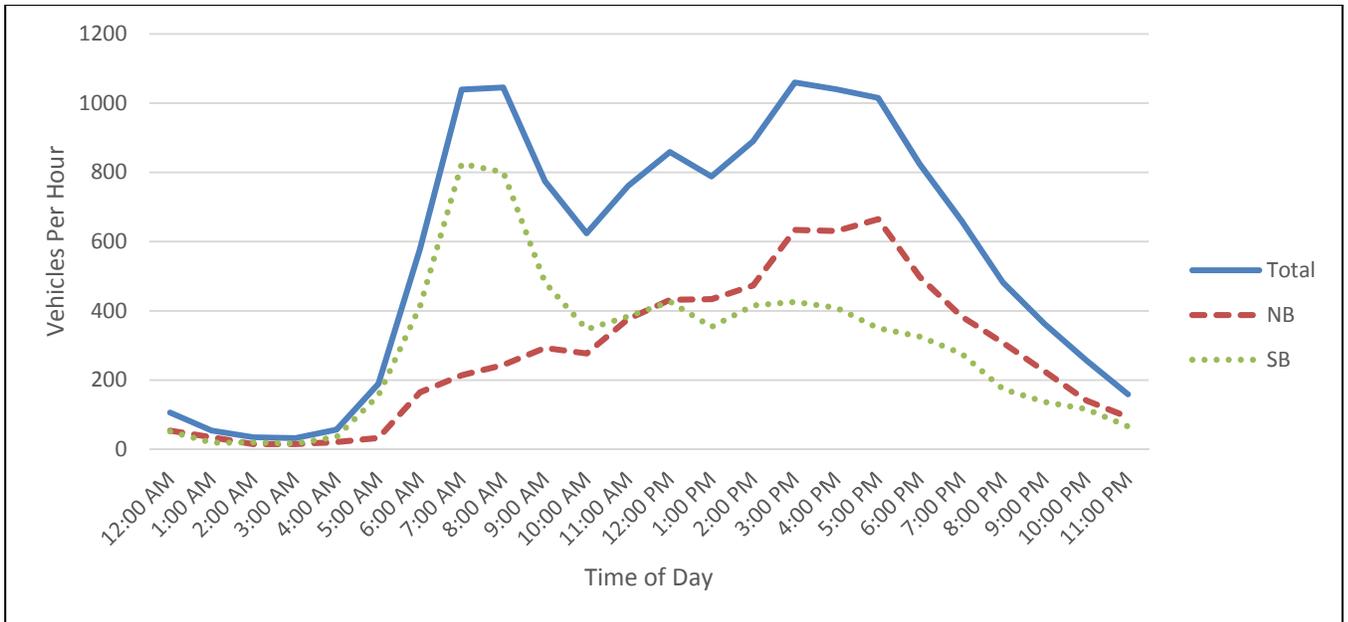


Figure 4. Daily Traffic on Chandler Street North of May Street

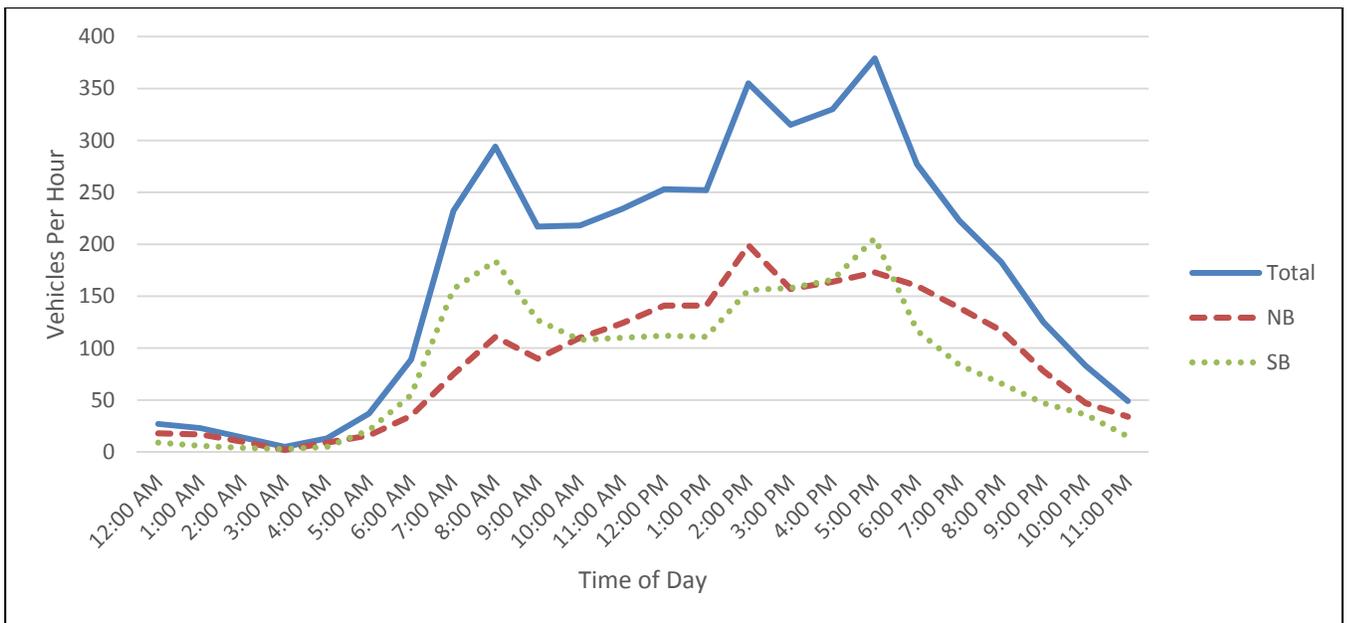


Figure 5. Daily Traffic on May Street North of Chandler Street

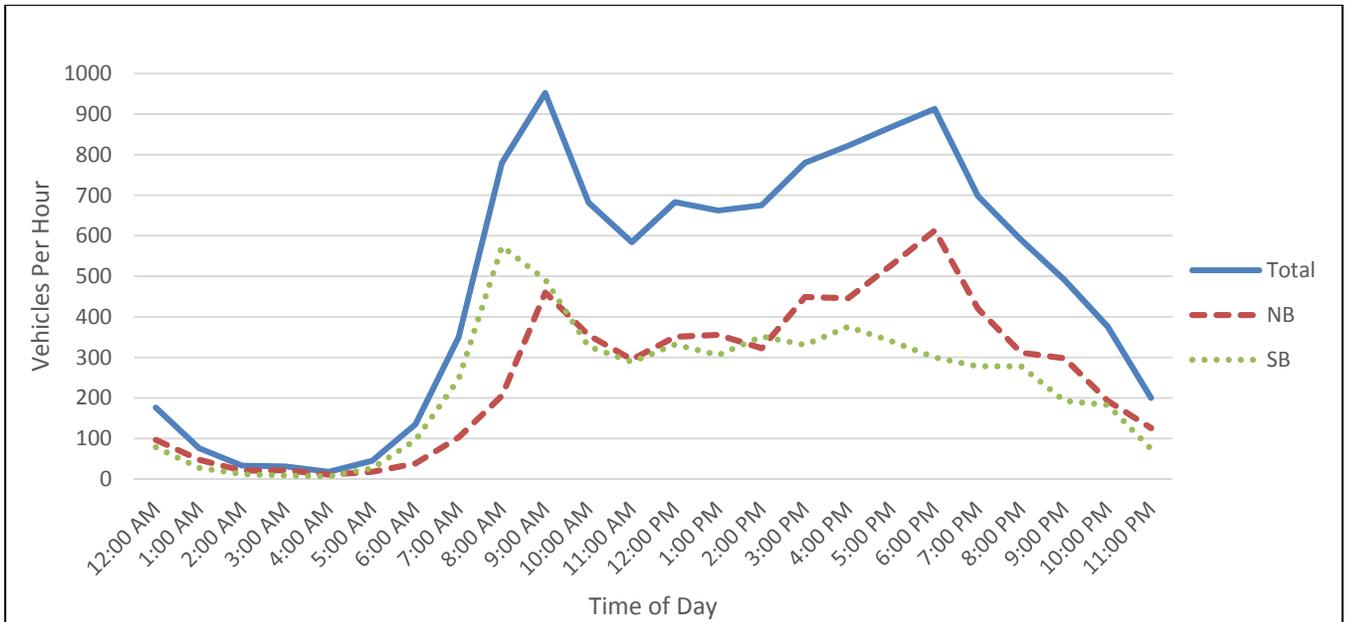


Figure 6. Daily Traffic on Chandler Street South of May Street

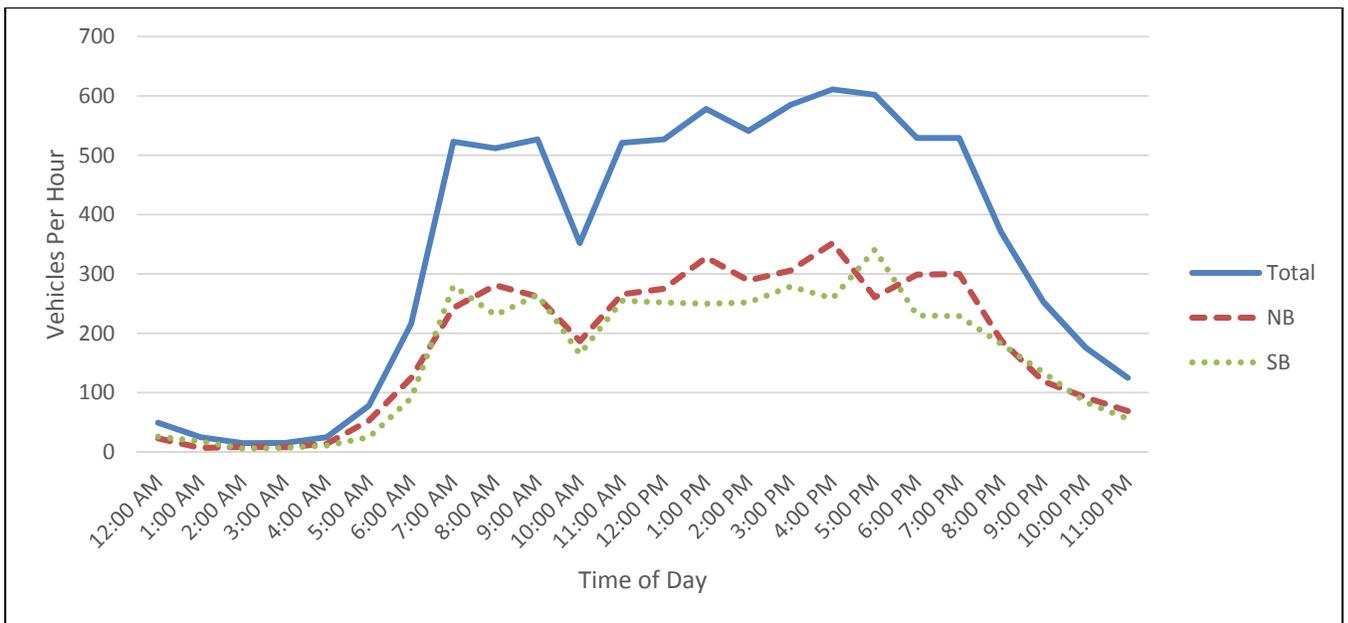


Figure 7. Daily Traffic on May Street South of Chandler Street

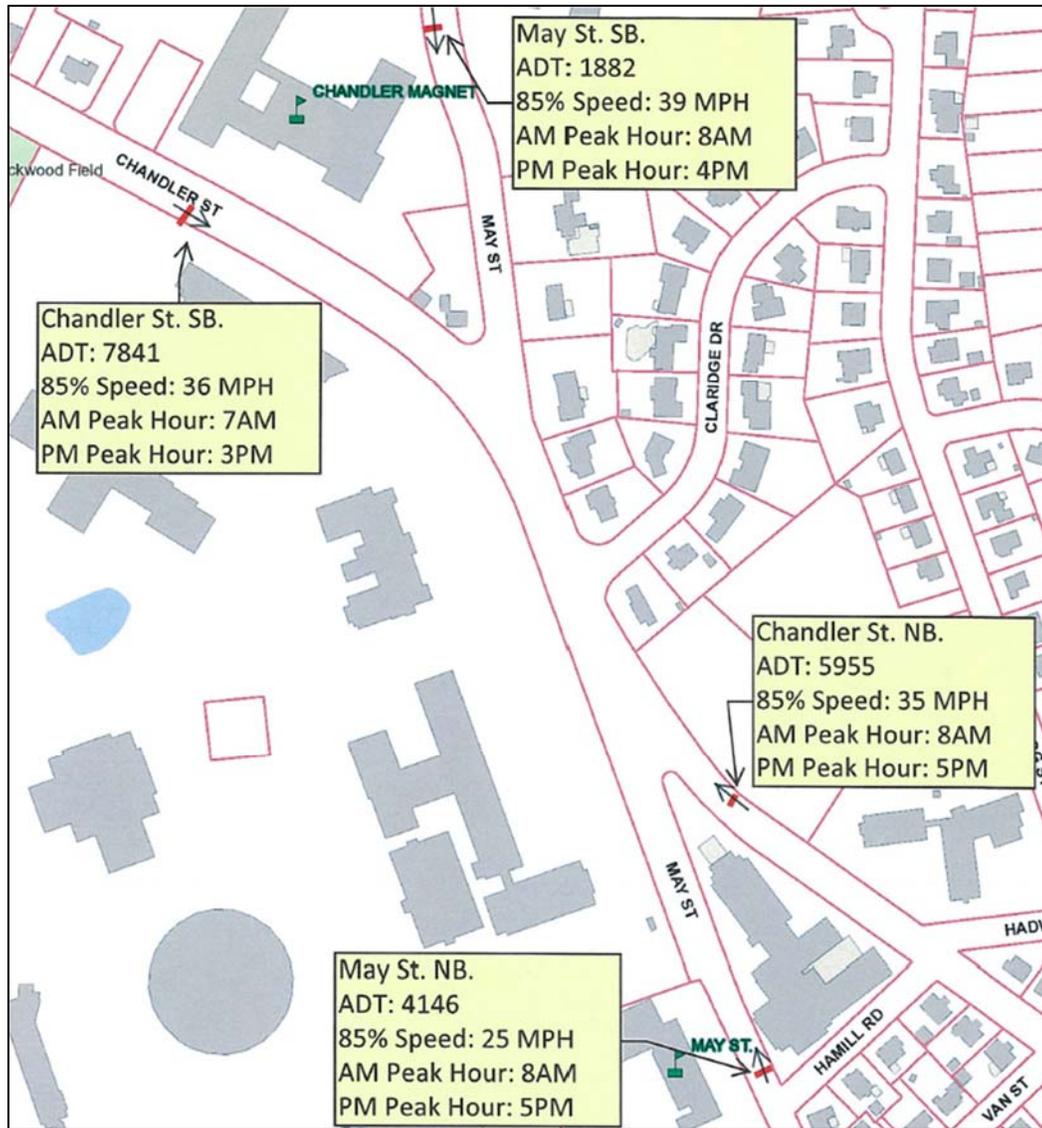


Figure 8. MassDOT Speed Data

EXISTING SAFETY ASSESSMENT

To identify crash trends in the Study Area, the most current crash data for the study area intersections were obtained from MassDOT from 2010 through 2013. This data was then evaluated where a crash rate was calculated using the existing traffic volumes determined in the December 2015 turning movement counts and the average number of crashes per year over a four year period. For intersections, crash rates are expressed as "Crashes Per Million Entering Vehicles" (MEV). It is noted that the MassDOT average crash rate for unsignalized intersections in MassDOT District 3 (Worcester) is 0.65 crashes as of 2016. A crash rate higher than this suggests that existing conditions, such as roadway geometry or existing signal phasing, may be influencing the number or type of crashes at a particular intersection.

Based on the available data from MassDOT, both of the intersections analyzed as part of this review exhibited above average crash rates:

- Chandler Street at May Street (North): 20 total incidents; Crash Rate: 0.78.
0 fatal injuries and 7 non-fatal injuries.
- Chandler Street at May Street (South): 22 total incidents; Crash Rate: 0.87.
0 fatal injuries and 5 non-fatal injuries.

Table 2 summarizes the findings from the MassDOT data. It is noted that Chandler Street (north) was once on the MassDOT Crash Cluster Database (for 2009 to 2011), but is not on the latest database (2012 to 2014). Should the DPW&P want to pursue Highway Safety Improvement Program (HSIP) funding for this project, crash reports would need to be pulled from the Police Department so that the number of incidents, and type of crash, can be determined and evaluated by the MassDOT safety team to see if the location warrants putting cluster area back in the database. If it were to be back on the list, a formal Road Safety Audit (RSA) with MassDOT involvement would need to be conducted.

Table 2. Intersection Incidents

	May at Chandler (north)	May at Chandler (south)	Total
Year			
2010	6	8	14
2011	5	4	9
2012	4	4	8
2013	5	6	11
Total	20	22	42
Collision Type			
Angle	9	14	23
Head-on	1	0	1
Rear-end	5	7	12
Single vehicle crash	4	1	5
Unknown	1	0	1
Crash Severity			
Fatal injury	0	0	0
Non-fatal injury	7	5	12
Property damage only (none injured)	11	16	27
Not Reported	1	1	2
Unknown	1	0	1
Time of Day			
Weekday, 7:00 AM - 9:00 AM	2	3	5
Weekday, 4:00 PM - 6:00 PM	6	2	8
Saturday, 11:00 AM - 2:00 PM	1	2	3
Weekday, other time	7	13	20
Weekend, other time	4	2	6
Pavement Conditions			
Dry	15	16	31
Wet	5	4	9
Snow	0	1	1
Ice	0	1	1
Non Motorist (Bike, Pedestrian)			
Total	2	2	4
Crash Rates (D3 2016 Average 0.65)	0.78	0.87	

In addition to intersection crash data, crashes that occurred between the Study Area intersections were also reviewed. This is called a segment crash analysis and is calculated for roadway segments. Investigating crashes that occur over a particular roadway segment does help to provide a view of the potential problems along an overall corridor or between intersections. Totals for segment crashes were much lower than intersection crash totals and do not appear to be a major concern for the Study Area. These data are shown in Table 3. Raw reports for all crashes queried from the MassDOT database can be found in Attachment B.

Table 3. Corridor Incidents

	Chandler Street North of May Street	Chandler Street South of May Street	May Street South of Chandler Street	Total
Year				
2011	0	1	0	1
2012	2	0	0	2
2013	4	1	1	6
Total	6	2	1	9
Collision Type				
Angle	1	1	0	2
Rear-end	4	1	1	6
Single vehicle crash	1	0	0	1
Crash Severity				
Non-fatal injury	4	0	0	4
Property damage only (none injured)	2	2	1	5
Time of Day				
Weekday, 7:00 AM - 9:00 AM	1	0	1	2
Weekday, 4:00 PM - 6:00 PM	1	0	0	1
Weekday, other time	2	0	0	2
Weekend, other time	2	2	0	4
Pavement Conditions				
Dry	4	2	1	7
Wet	1	0	0	1
Ice	1	0	0	1
Non Motorist (Bike, Pedestrian)				
Total	0	0	0	0

Additionally, crash data from the Worcester Police Department (WPD) was provided to VHB for the period between July 16, 2014 and July 16, 2015 for Chandler Street from Hunthurst Circle to Van Street, and May Street from Ashbury Road to Chandler Street. It is noted that the two reports reviewed by VHB had several incidents that were on both summaries. The following 22 traffic incidents were reported along this section of the corridor:

- 5 incidents with injuries,
- 10 with only property damage,
- 1 pedestrian incident, 5 hit and runs, and
- 1 incident with no report detail.

These reports can also be found in Attachment B.

EXISTING ON STREET PARKING

Observations of parking along Chandler Street and other nearby streets was conducted by WSU using field visits and aerial imagery. It appears that parking spaces inside a radius of approximately 2,000-feet from the campus were counted, and this cordon appears to represent a walkable area to park for Worcester State students. The total number of potential legal curb spaces within this area was determined by WSU to be approximately 1,217 spaces. Complete data for the parking counts can be found in Attachment C.

When school was in session, it was recorded that approximately 238 vehicles were found to be parked in these areas. The following summarizes some of the streets that contained the most parked cars and the occupancy. There is more information in the attachment. It is noted that if the occupancy exceeds 100%, it is likely that vehicles are parking more closely together than what could be allocated if on-street parking was striped.

- Chandler Street from Hunthurst Circle to Durant Way; 70 cars parked in an area that appears to accommodate an estimated 190 spaces (37% occupancy);
- May Street (north) from Chandler Street to #378 Chandler Street; 52 cars parked in an area that appears to accommodate an estimated 124 spaces (42% occupancy);
- May Street (south) from Chandler Street to Rupert Street; 28 cars parked in an area that appears to accommodate an estimated 20 spaces (140% occupancy);
- Underwood Street; 10 cars parked in an area that appears to accommodate an estimated 37 spaces (27% occupancy);
- Hunthurst Circle; 10 cars parked in an area that appears to accommodate an estimated 123 spaces (8% occupancy); and
- A survey of parked cars was conducted on Hawden Road and South Flagg Street and two notable features of the results was that (i.) the majority of the parked cars were not registered to nearby addresses, and (ii.) vehicle turnover was high.

It should be noted that the area studied for parking analysis is significantly larger than VHB's Study Area; which primarily focused on the Chandler Street within the limits of May Street north and south.

EXISTING PEDESTRIAN COUNTS

Pedestrians were observed by WSU when school was in session in April 2015. The results are shown in Figure 9; which VHB graphed and raw counts can be found in Attachment A. The following provides a brief overview of these observations:

- Location 1: Chandler Street/ May Street (north) totaled 43 pedestrians crossing eastbound and 34 crossing westbound (77 total) from 7AM to 5PM, which is a location that does not have a designated crosswalk.
- Location 2, 3 and 4: Chandler Street/ Claridge Drive is a busy intersection when considering all three crosswalks; which totaled 196 pedestrians crossing all three legs of the intersection from 7AM to 5PM, the following provides a breakdown:
 - Location 2, northern leg of intersection, 22 pedestrians crossing eastbound and 51 crossing westbound;
 - Location 3, eastern leg of intersection, 28 pedestrians crossing northbound and 22 crossing southbound; and
 - Location 4, southern leg of intersection, 53 pedestrians crossing eastbound and 20 crossing westbound.
- Location 5: Chandler Street/ May Street (south) near the WSU parking lot totaled 314 pedestrians with 151 crossing eastbound and 163 crossing westbound.
- A total of 587 pedestrians crossed Chandler Street between the two May Street intersections. It is noted that pedestrian data was not collected across the eastern leg of May Street (north).

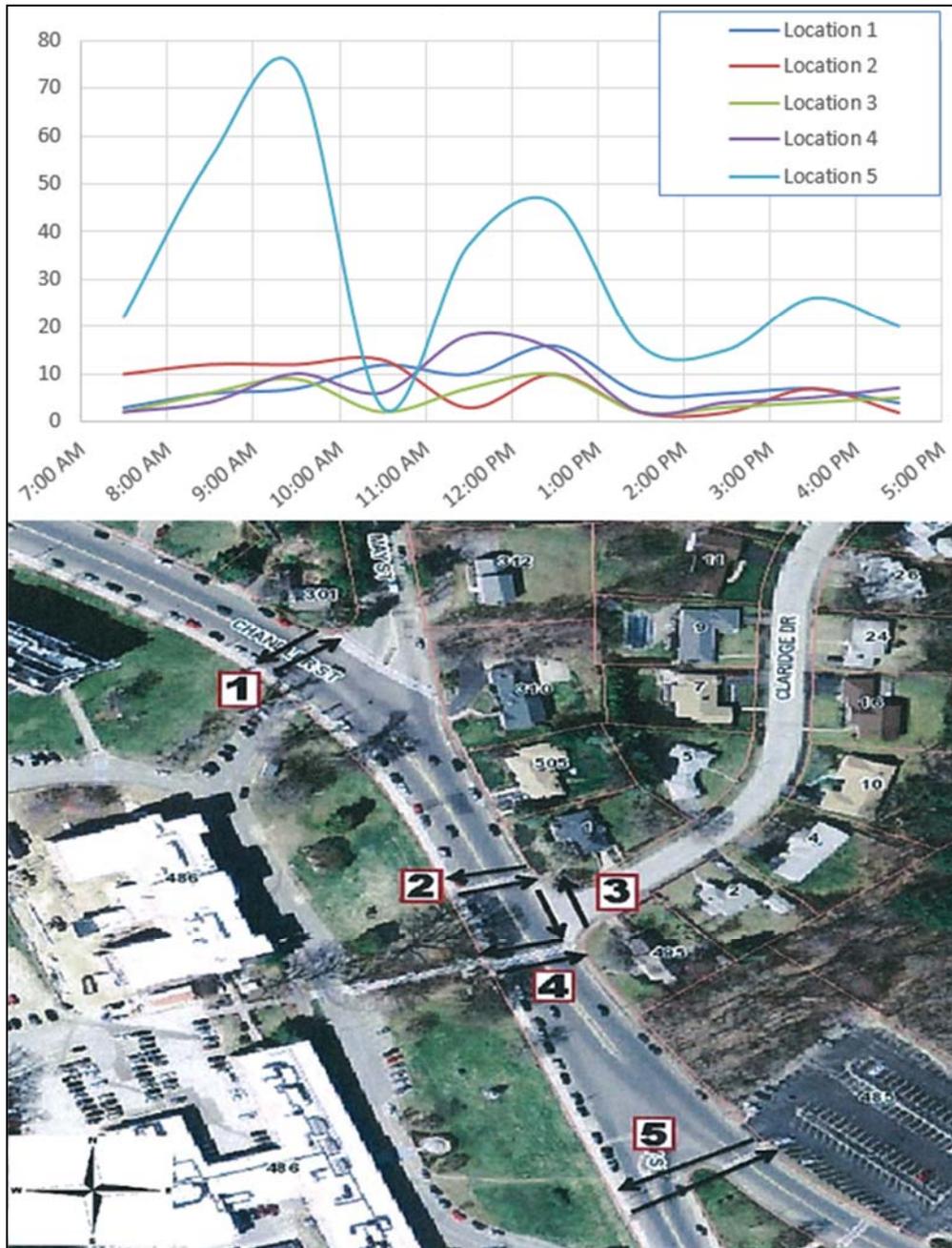


Figure 9. Pedestrian Volumes

COMMUNITY SURVEY RESULTS

As an important factor in any public redevelopment project, local opinion was solicited and considered while weighing design alternatives. A survey was prepared by DPW&P and emailed out to abutting residents in January 2016 with 488 surveys being emailed out and 59 were returned. Streets with the most participation in the survey included Chandler Street (11 responses), Zenith Drive (9 responses), May Street North (9 responses), South Flagg Street (5 responses), and Claridge Drive (4 responses). Overall results were mixed but the follow trends could be observed:

- Dissatisfaction with WSU for failing to keep pace with increased demand for parking caused by its students.
- Much greater concern about the safety of the southern May-Chandler intersection than the northern May-Chandler intersection.
- Few issues with the Chandler Street and Claridge Drive intersection.
- Concern about pedestrian crossing safety, especially where parked vehicles impede line of sight of pedestrians stepping off curb.
- Complaints about pedestrian behavior and underutilization of crosswalks.
- A majority of people consider traffic a higher priority than parking, although those who favor parking were more vocal.
- No consensus about which time of day has the worst traffic conditions.
- Complete lack of interest in bicycle accommodations, even though respondents acknowledge that bike safety could be improved.
- Moderate interest in signaling the Chandler-May intersections.
- More concern with the May Street Elementary School than the Chandler Magnet school, especially with the safety of the younger students attending this school. However, this portion of May Street is outside the Study Area.
- Many expressed satisfaction with the existing configuration and indicated that the behavior/speed of drivers was the main issue. Speed traps were suggested a few times.

OPERATIONAL ASSESSMENT

Understanding the operations of an intersection can be critical in understanding how well that location is processing traffic. With this in mind, the DPW&P prepared and provided VHB with an intersection operations assessment for the following two Study Area unsignalized intersections: (i.) May Street north at Chandler Street; and (ii.) May Street south at Chandler Street.

Levels-of-Service Criteria

Level-of-service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure of a number of factors including roadway geometrics, speed, travel delay and freedom to maneuver. Level-of-service provides an index to the operational qualities of a roadway segment or an intersection. Level-of-service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing congested operating conditions.

For this study, capacity analyses were completed for the unsignalized intersections within the Study Area using SYNCHRO traffic analysis software. In addition, these two unsignalized intersections were then analyzed with the assumption that they would be signalized. It is noted that this signalized operational assessment uses the existing traffic volumes. This analysis was performed to determine if a signalized intersection would be a viable improvement option and provide improved operations.

It is noted that level-of-service designation is reported differently for unsignalized and signalized intersections. For unsignalized intersections, the analysis assumes that traffic on the mainline is not affected by traffic on side streets. The LOS is only determined for left-turns from the main street and/ or all movements from the minor street. For signalized intersections, the analysis considers the operation of each lane or lane group entering the intersection and the LOS designation for overall conditions for all approaches. The evaluation criteria used to analyze intersections is based on the HCM.¹

The existing conditions analyses results for the two unsignalized intersections are summarized in Table 4 and 5 below. The following provides a summary of these findings:

- The operational assessment was prepared using traffic counts from March 2015. This data was collected by WSU students and when the University was on Spring Break. This assessment gives a decent snapshot of the potential operations; however, the LOS will likely be worse when school is in session. This was determined by reviewing the partial traffic counts collected in December 2015 by DPW&P (for the weekday evening only), where the traffic volumes are higher along Chandler Street and May Street south.
- From reviewing the results of the existing unsignalized analysis in Table 4, it is clear that there is delay being experienced when exiting May Street north or south onto Chandler Street. This is apparent by seeing a LOS of E or worse for these approaches.
- Table 5 indicates that the two May Street intersections operate well when signalized; however, as previously stated this assessment was prepared using counts when students were on Spring Break. Additional analysis will eventually be needed with new counts for both the morning and evening peak hours when school is in session. This should be performed during design so that intersection geometrics (and cost estimates presented later in this memorandum) can be confirmed.

¹ [Highway Capacity Manual](#); Transportation Research Board; Washington, D.C.

Table 4: Existing Unsignalized Intersection Capacity Analysis (2015)

Location	Movement	2015 Existing Conditions				
		D ^a	v/c ^b	Del ^c	LOS ^d	95 Q ^e
<i>Chandler Street at May Street – North Intersection</i>						
Weekday Morning	SB L	138	0.78	69	F	5
	SB R	20	0.03	10	B	1
Weekday Evening	SB L	120	0.58	40	E	3
	SB R	34	0.07	13	B	1
<i>Chandler Street at May Street – South Intersection</i>						
Weekday Morning	EB L/R	117	0.53	36	E	3
Weekday Evening	EB L/R	216	0.86	64	F	7

Operational assessment prepared by DPW&P and provided to VHB for this summary.

- a. Demand in vehicles per hour
- b. v/c = volume to capacity ratio
- c. delay = average intersection delay, measured in seconds
- d. LOS = level-of-service
- e. 95th percentile queue, in vehicles

Table 5: Proposed Signalized Intersection Capacity Analysis (2015)

Location	Movement	2015 Existing Weekday Morning					2015 Existing Weekday Evening				
		v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q
Chandler Street & May Street - North	EB L/T	0.71	11	B	106	243	0.52	8	A	41	99
	WB T	0.24	5	A	25	61	0.57	9	A	48	114
	WB R	0.10	2	A	0	12	0.16	2	A	0	14
	SB L	0.38	17	B	29	73	0.28	12	B	15	53
	SB R	0.06	8	A	0	12	0.08	5	A	0	14
	Overall	0.71	10	A			0.57	8	A		
Chandler Street & May Street - South	EB L/R	0.33	14	B	25	41	0.48	15	B	34	91
	NB L/T	0.23	5	A	23	56	0.53	9	A	58	146
	SB T/R	0.59	9	A	102	#306	0.56	9	A	59	152
	Overall	0.59	9	A			0.56	10	A		

Operational assessment prepared by DPW&P and provided to VHB for this summary.

- a. Volume to capacity ratio.
- b. Average total delay, in seconds per vehicle.
- c. Level-of-service.
- d. 50th percentile queue, in feet.
- e. 95th percentile queue, in feet.
- ~ Volume exceeds capacity, queue is theoretically infinite.
- # 95th percentile volume exceeds capacity, queue may be longer.

CONCEPTUAL DEVELOPMENT

As part of this review, VHB has developed three conceptual improvement plans for the corridor; which are aimed at improving vehicle travel patterns, pedestrian access and walkability, bicycle accommodations, and implementing traffic calming measures. Conceptual sketches are attached to this memorandum as Figures 10.1 and 10.2 (Concept 1: Unsignalized Intersections, Raised Median), Figure 11.1 and 11.2 (Concept 2: Signalized Intersections, Raised Median), and Figure 12.1, and 12.2 (Concept 3: Roundabouts, Raised Median). For each concept the potential change in the number of on-street parking spaces, as a result of implementing these improvements, has been noted.

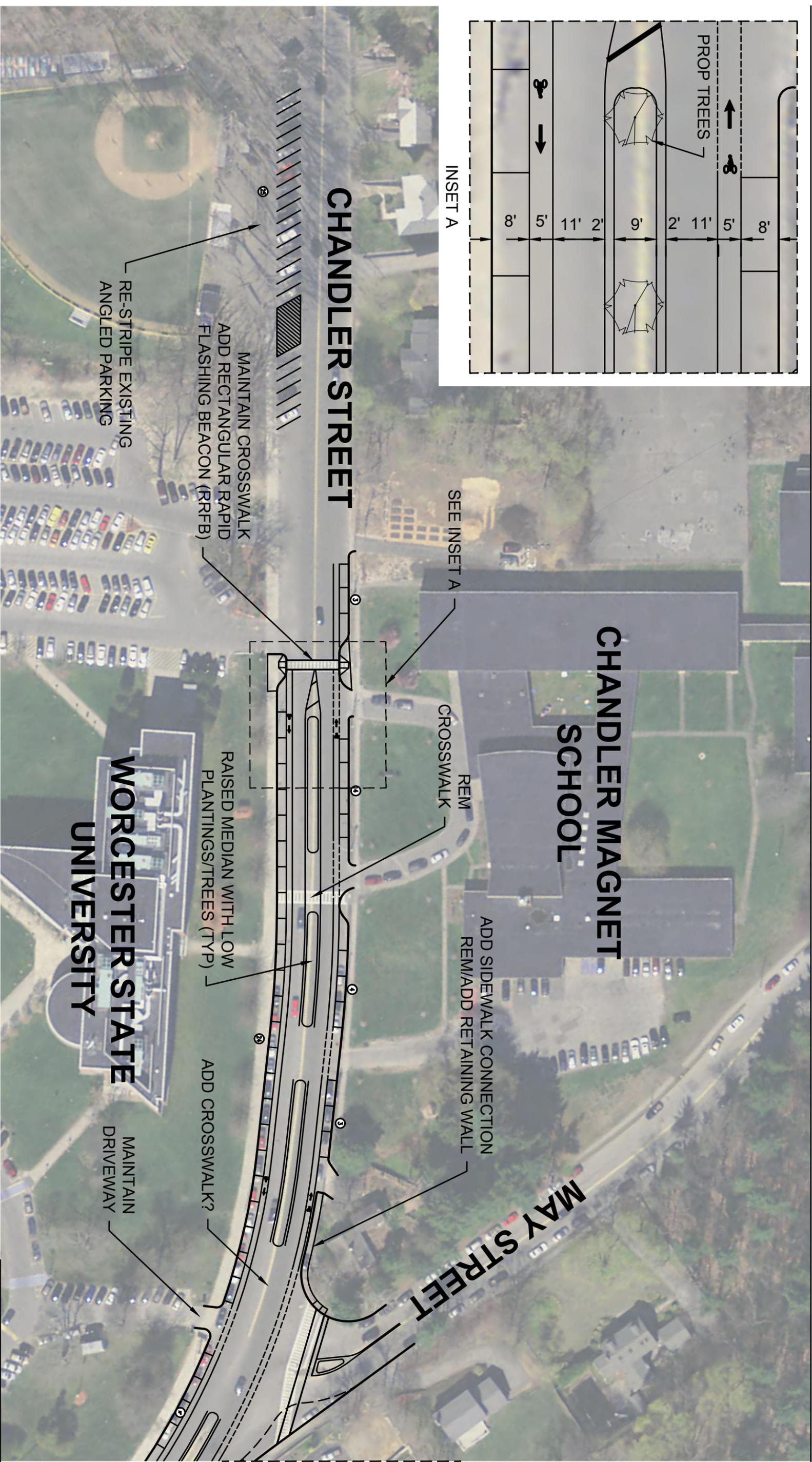
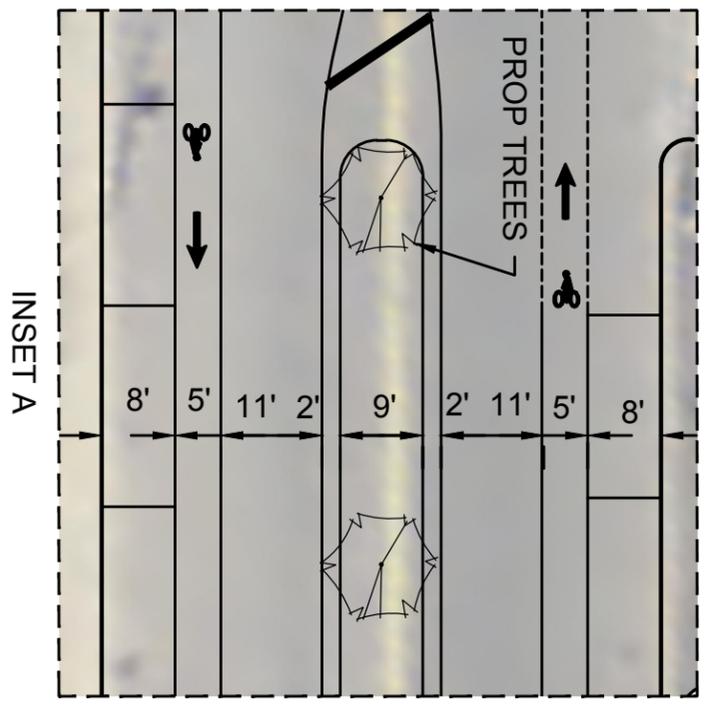
The following provides a brief description of the three improvements reviewed:

- Concept 1: Unsignalized intersections at May Street (north and south) at Chandler Street. A raised median with low plantings and narrow trees would be proposed and the intersections would be reconfigured to improve traffic flow and safety.
- Concept 2: Is Concept 1, but with the intersections of May Street (north and south) at Chandler Street signalized.
- Concept 3: A roundabout would be proposed at each of the May Street (north and south) at Chandler Street intersections. A raised median with low plantings and narrow trees would be proposed where applicable.

Concept 1: Unsignalized Intersections, Raised Median

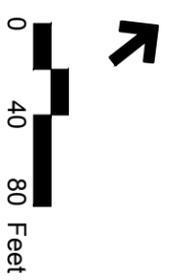
The following summarizes the improvements proposed as part of Concept 1:

- See Figures 10.1 and 10.2 for Concept 1.
- Striping of parallel curbside parallel parking spaces, adding bicycle lanes, and raised medians. Six (6) on-street parking spaces are eliminated as a result of these improvements. Existing on-street parking was estimated at 93 spaces, with proposed parking estimated at 87 spaces; this includes the parking in front of the park.
- Rectangular Rapid Flashing Beacons (RRFB) would be proposed on either end of the corridor; or at a total of three crosswalk locations. One to the north at the Chandler Magnet School and two to the south across May Street and Chandler Street (leading to/from the WSU parking lot).
- Inset A on the conceptual improvement sketch illustrates the anticipated lane, median and shoulder width for this improvement alternative. In general, 11-foot travel lanes, 5-foot shoulders and 8-foot parking stalls would be proposed. The median would be raised with low plantings and potentially narrow trees that would not block drivers' line of sight.
- Neck downs to the curbing at crosswalk would be provided where crosswalks are currently present or would remain. While not ideal for snow plowing, it provides the better visibility (and protection) of pedestrians wanting to cross a street with on-street parking. One crosswalk in front of the Chandler Magnet School would be eliminated; which is driven by feedback from outreach and field walks. The northerly crosswalk would be maintained due to its close proximity of the WSU parking lot.



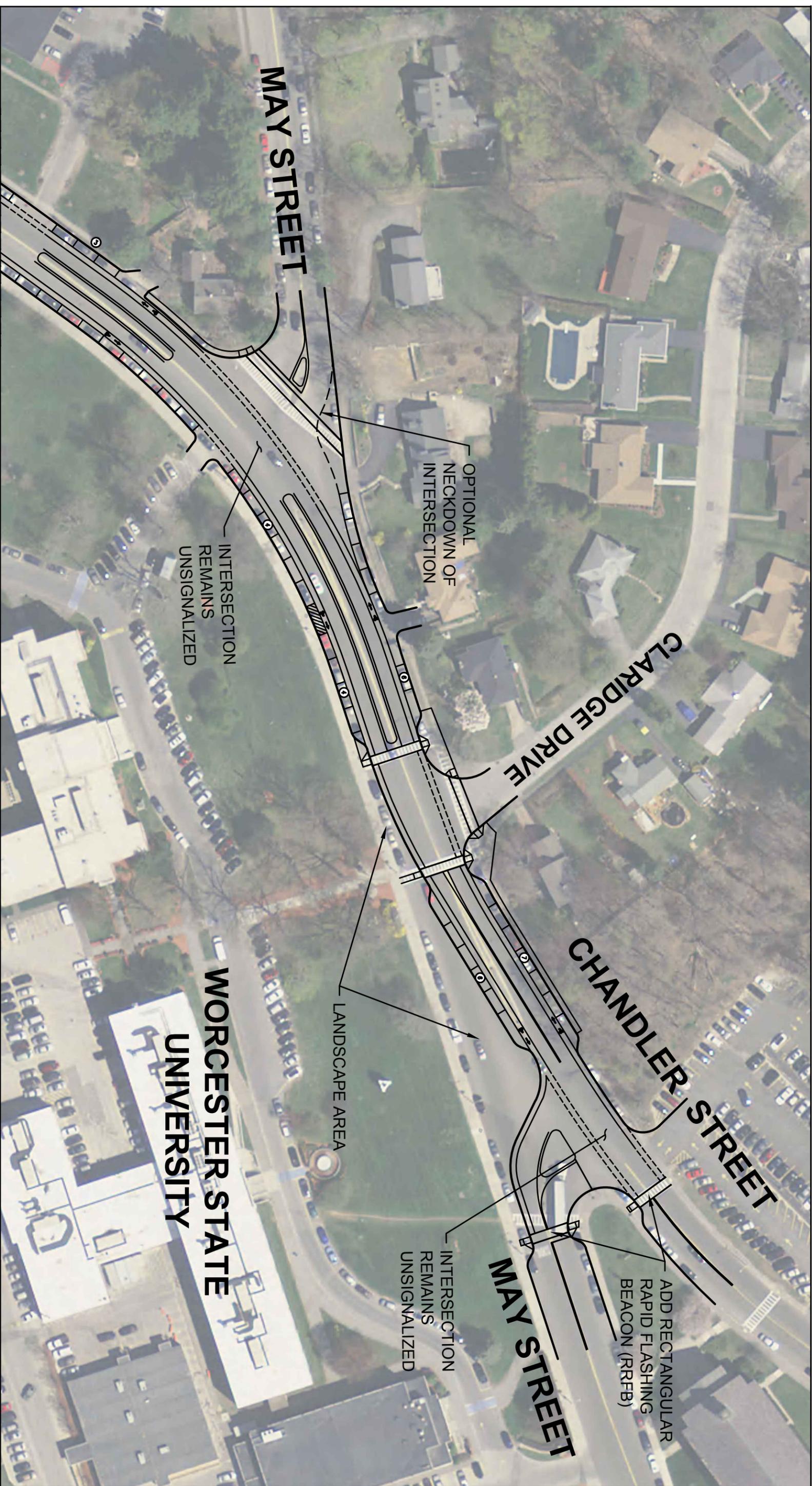
SEE FIGURE 10.2

EXISTING PARKING	93 SPACES
PROPOSED PARKING	87 SPACES
CHANGE IN PARKING	-6 SPACES



Vanasse Hangen Brustlin, Inc.

Figure 10.1
 Concept 1
 Chandler Street Improvements
 Worcester State University
 Worcester, Massachusetts



SEE FIGURE 10.1



- It is noted that there appears to be a need to have a crosswalk located at the northerly leg of the May Street (north) intersection with Chandler Street, as there was 77 pedestrians that crossed this area over a 10-hour period. A proposed crosswalk is not shown on the conceptual improvement plan; however, if proposed a stone retaining wall would need to be removed and a larger retaining wall constructed to accommodate the widening. Also, a utility pole(s) and guy anchor may need to be moved/ reset. This location is in close proximity to one of the WSU driveways.
- The intersection of May Street (north) could be narrowed (or necked down) when departing Chandler Street and turning right onto May Street. This would require curbing modifications and driveway changes to the adjacent home.
- All crosswalks are maintained at the Claridge Street intersection.
- The intersection of May Street (south) could also be significantly narrowed (or necked down) when departing Chandler Street to May Street (south). This dramatic change would help improve sight lines and control vehicle speeds by making vehicles turn more closely at a 90-degree angle.
- This concept and associated estimate, assumes that there are minor utility pole adjustments or relocations. Drainage modifications would be realized with raised medians, neck downs, and significant changes to the geometrics at the unsignalized intersections.
- The order of magnitude construction cost estimate for this concept would include new granite curbing where needed to accommodate neck downs and changes to intersection configurations (assumes that not all curbing would be new), new pavement markings, three RRFBs, milling and overlay the entire project limits, and full depth reconstruction in select areas. The anticipated construction cost could be approximately \$2M; however, the following is noted:
 - If the center medians were not raised, the construction cost could decrease by approximately \$240,000 (not including contingencies) depending on treatments such as asphalt, landscaping, decorative brick, etc.
- It is noted that the cost estimate prepared below should be used for planning purposes only, as more engineering is needed to firm up this estimate.
- It is noted that this cost estimate has been prepared assuming that the project would be on the MassDOT/ State Transportation Improvement Program (TIP), so contingencies, etc. have been added.

It is noted that Concept 1 was also investigated to have angled parking instead of parallel parking. This alternative was reviewed since it would have increased the amount of on-street parking by approximately 40 spaces (93 existing to 133 proposed); rather than eliminate approximately six as Concept 1 does. This alternative was eliminated by the City, as it would remove the raised median to accommodate angled parking, and the backup maneuvers performed by vehicles were deemed not safe.

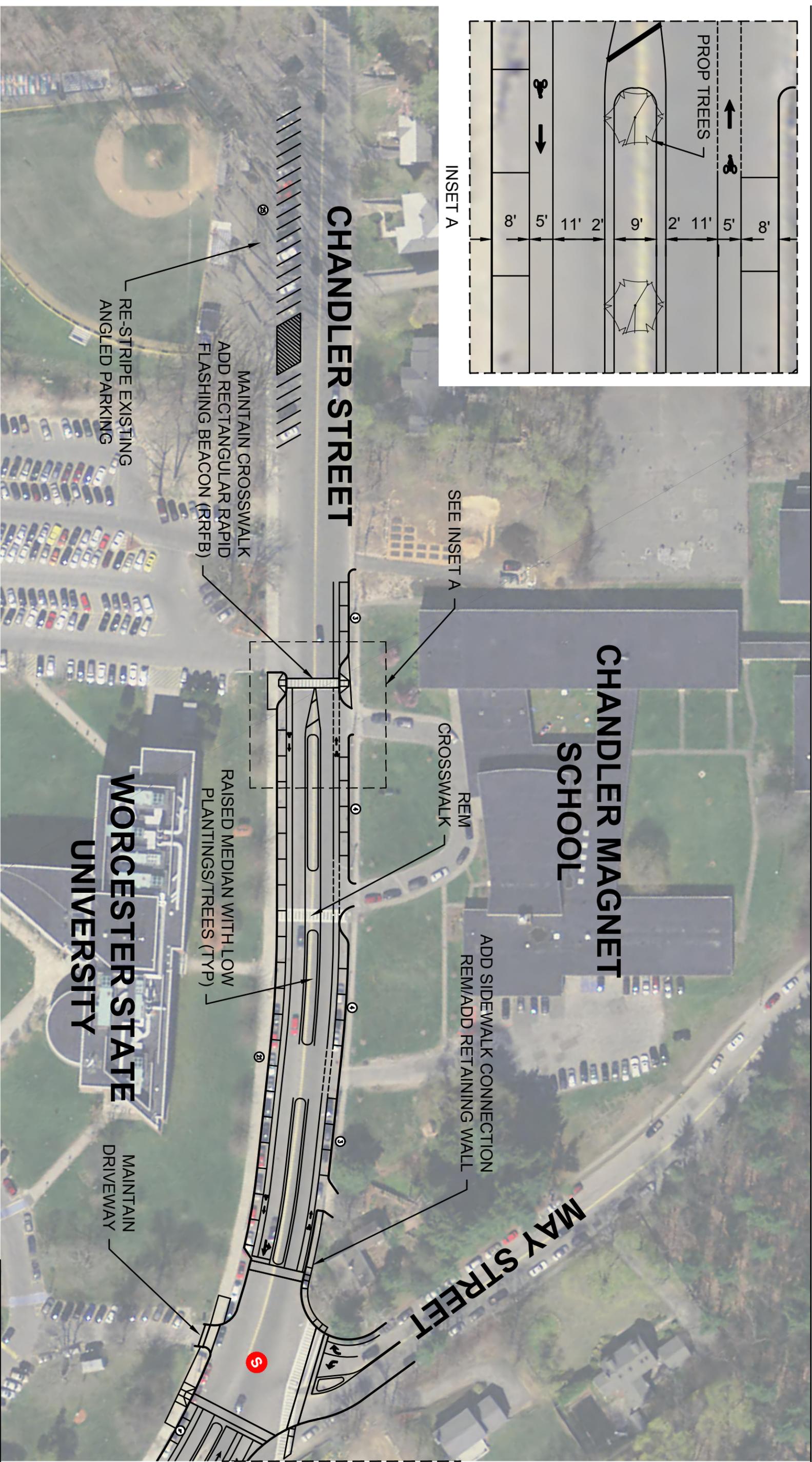
Concept 1: Order of Magnitude Cost Estimate (Unsignalized Intersections, Raised Median)

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>		<u>Total Cost</u>
Granite Curb	\$ 40	/FT	1,300 FT	\$ 52,000
Signing & Pavement Markings	\$ 50,000	/LS	1 LS	\$ 50,000
Rectangular Rapid Flashing Beacons (RRFB)	\$ 18,000	/EA	3 EA	\$ 54,000
Full Depth Widening	\$ 90	/SY	1,333 SY	\$ 120,000
Pavement Milling & Overlay	\$ 40	/SY	11,000 SY	\$ 440,000
Retaining Wall	\$ 600	/LF	200 FT	\$ 120,000
Drainage	\$ 100,000	/LS	1 LS	\$ 100,000
Raised Medians and Plantings	\$ 300	/LF	800 LF	\$ 240,000
Sub Total:				\$ 1,176,000
Police (10%)				\$ 117,600
Mobilization (3%)				\$ 35,280
MassDOT Contingency (10%)				\$ 117,600
Traffic Management (5%)				\$ 58,800
Utility Relocation (estimated)				\$ 100,000
Contingency (Sidewalks, and other unknowns estimated at 30%)				\$ 352,800
Order of Magnitude Total:				\$ 1,958,080

Concept 2: Signalized Intersections, Raised Median

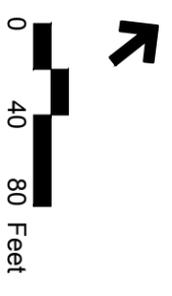
Concept 2 would basically incorporate the same principles as Concept 1 (Raised Median) above; however, the following would be included:

- See Figures 11.1 and 11.2 for Concept 2.
- The summary from Concept 1 above would apply to this concept as well; however, the two RRFB at the May Street south intersection would now not be needed since this intersection (and the adjacent crosswalks) would be signalized.
- VHB performed a preliminary traffic signal warrant analysis for both of the May Street intersections and it appears that volume warrants are met to signalize these locations. It is noted that this is based on the limited traffic data that was available from MassDOT and supplemented with traffic counts provided by DPW&P.
- Adding traffic signals to the two intersections would warrant adding crosswalks and wheelchair ramps on all approaches to each of the May Street intersections; which has been illustrated in the attached concept.



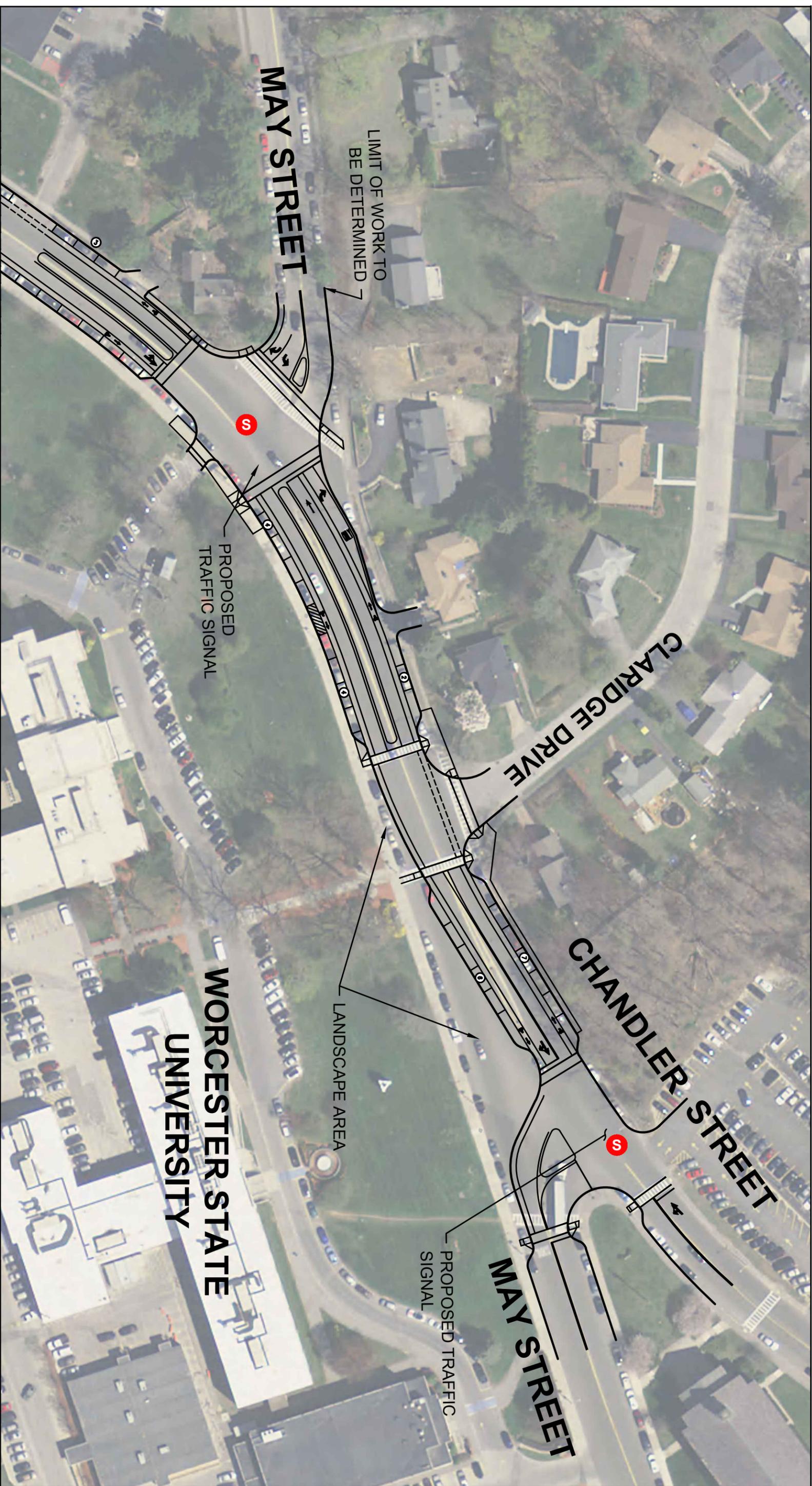
SEE FIGURE 11.2

EXISTING PARKING	93 SPACES
PROPOSED PARKING	78 SPACES
CHANGE IN PARKING	-15 SPACES



Vanasse Hangen Brustlin, Inc.

Figure 11.1
 Concept 2
 Chandler Street Improvements
 Worcester State University
 Worcester, Massachusetts



SEE FIGURE 11.1



- This concept has a net decrease of 15 parking spaces; which is a result removing parking spaces within a signalized intersection. Existing on-street parking was estimated at 93 spaces, with proposed parking estimated at 78 spaces; this includes the parking in front of the park.
- Additional traffic counts and analyses are required to verify lane configurations, signal head placements, and determine if additional widening is required. Additional utility relocation costs could be realized depending on placement of traffic signal equipment.
- The order of magnitude construction cost estimate for Concept 2 (Traffic Signals) was estimated at approximately \$2.7M.
- It is noted that the cost estimate prepared below should be used for planning purposes only, as more engineering and analysis is needed to firm up the costs associated with this improvement alternative.
- It is noted that this cost estimate has been prepared assuming that the project would be on the MassDOT/ State Transportation Improvement Program (TIP).

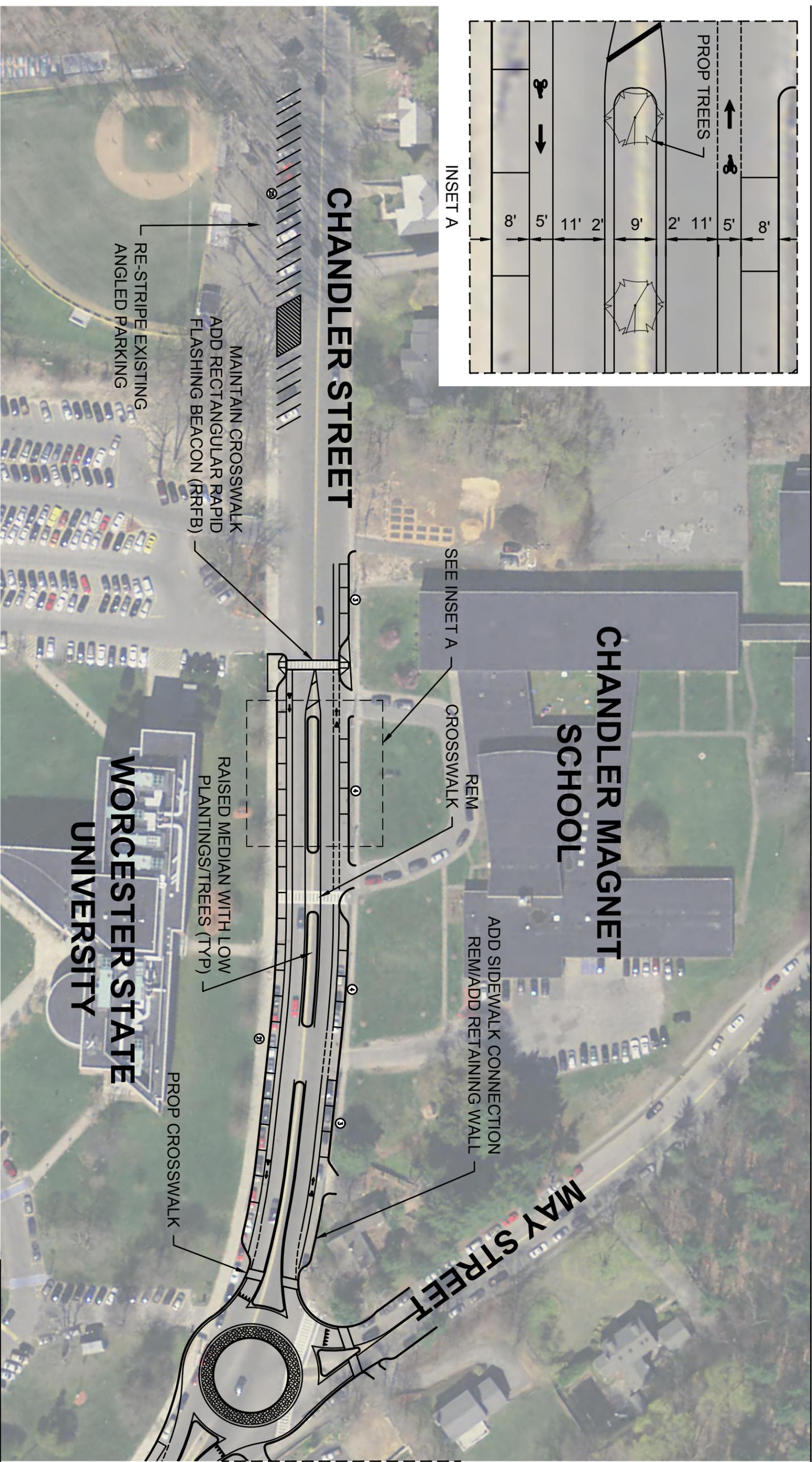
Concept 2: Order of Magnitude Cost Estimate (Signalized Intersections, Raised Median)

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>		<u>Total Cost</u>
Granite Curb	\$40	/FT	1,300 FT	\$52,000
Signing & Pavement Markings	\$50,000	/LS	1 LS	\$50,000
Rectangular Rapid Flashing Beacons (RRFB)	\$18,000	/EA	1 EA	\$18,000
Full Depth Reconstruction	\$90	/SY	1,333 SY	\$120,000
Pavement Milling & Overlay	\$40	/SY	11,000 SY	\$440,000
Retaining Wall	\$600	/LF	200 FT	\$120,000
Drainage	\$100,000	/LS	1 LS	\$100,000
Raised Medians and Plantings	\$300	/LF	800 LF	\$240,000
Traffic Signal Systems (Mast Arms, Pedestrian Heads, Loops, etc.)	\$250,000	/EA	2 EA	\$500,000
			Sub Total:	\$1,640,000
			Police (10%)	\$164,000
			Mobilization (3%)	\$49,200
			MassDOT Contingency (10%)	\$164,000
			Traffic Management (5%)	\$82,000
			Utility Relocation (estimated)	\$100,000
			Contingency (Sidewalks, and other unknowns estimated at 30%)	\$492,000
			Order of Magnitude Total:	\$2,691,200

Concept 3 (Roundabouts, Raised Median)

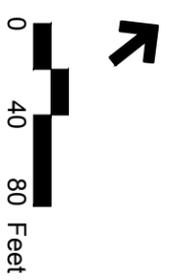
Concepts 3 was reviewed as an alternative to signalization. The following summarizes these findings:

- See Figure 12.1 and 12.2 for Concept 3.
- The improvements proposed are fairly consistent with Concept 1, with respect to raised median, neck downs, crosswalks, etc.; however, roundabouts are proposed at each of the May Street intersections.
- From an operations standpoint, a roundabout is anticipated to operate at a slightly better LOS for all approaches and would have less future maintenance as compared to a traffic signal.
- With the roundabout at May Street (north), a proposed crosswalk could be considered on the northerly leg. With the addition of a roundabout at this location, the driveway to WSU would need to be closed due to its close proximity with the center circle travel lane.
- With the roundabout at May Street (south), significant changes to the approaches from the parking lot and May Street northbound would be needed to accommodate the layout of the roundabout including the separation of approaches and meeting deflection upon entering the roundabout.
- This concept has a net decrease of 14 parking spaces; which is a result of the layout of each roundabout at the intersection. Existing on-street parking was estimated at 93 spaces, with proposed parking estimated at 79 spaces; this includes the parking in front of the park.
- The order of magnitude construction cost estimate for Concept 3 was estimated at approximately \$4.4M.
- It is noted that the cost estimate prepared below should be used for planning purposes only, as more engineering and analysis is needed to firm up the costs associated with this improvement alternative.
- It is noted that this cost estimate has been prepared assuming that the project would be funding through the MassDOT/ State Transportation Improvement Program (TIP) and with MassDOT oversight.



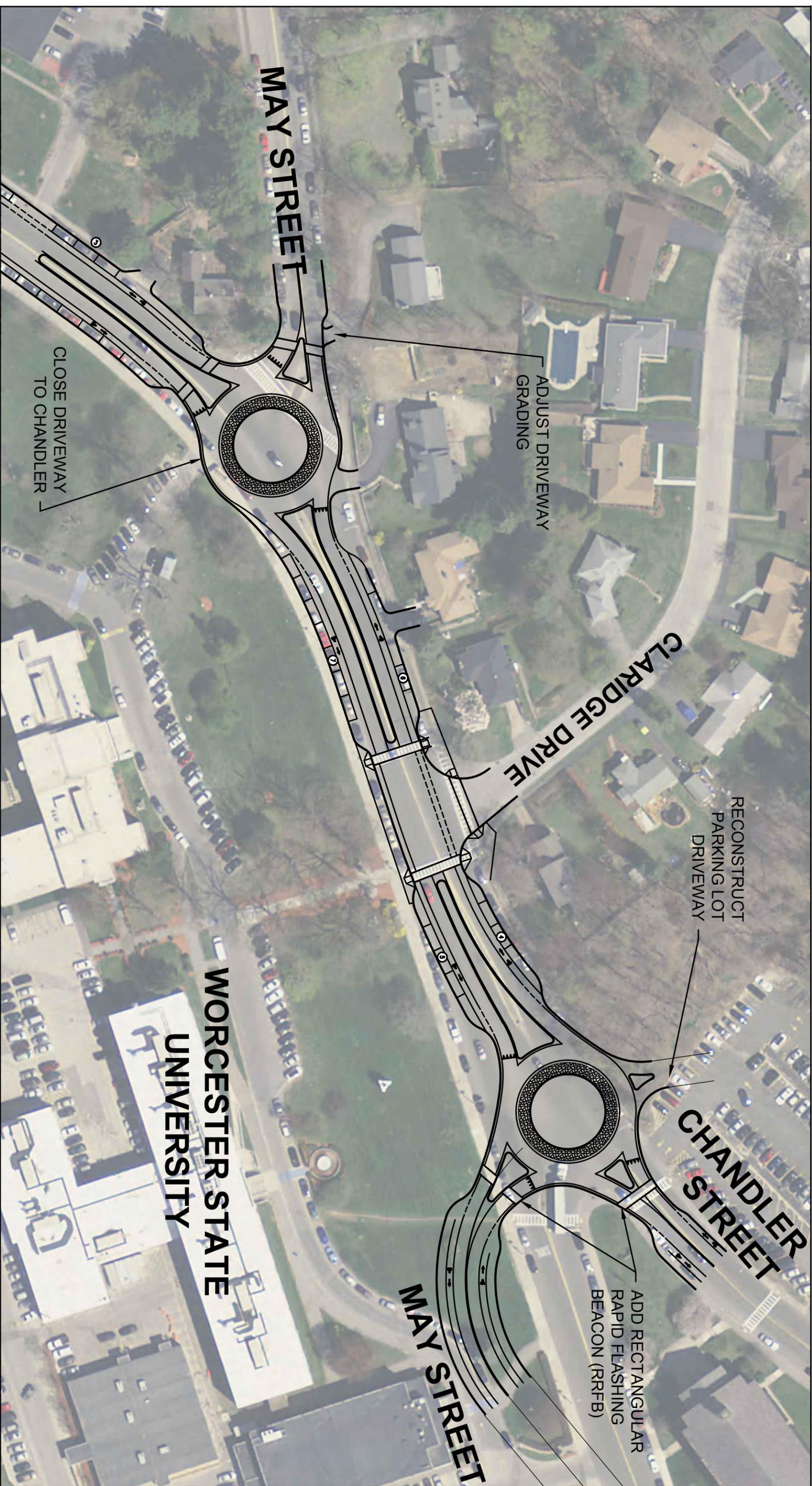
SEE FIGURE 12.2

EXISTING PARKING	93 SPACES
PROPOSED PARKING	79 SPACES
CHANGE IN PARKING	-14 SPACES



Vanasse Hangen Brustlin, Inc.

Figure 12.1
 Concept 3
 Chandler Street Improvements
 Worcester State University
 Worcester, Massachusetts



SEE FIGURE 12.1



Vanasse Hangen Brustlin, Inc.

Figure 12.2

Concept 3

Chandler Street Improvements
Worcester State University
Worcester, Massachusetts

Concept 3: Order of Magnitude Cost Estimate (Roundabouts)

<u>Description</u>	<u>Unit Price</u>	<u>Quantity</u>		<u>Total Cost</u>
Granite Curb (not in median)	\$40	/FT	2,500 FT	\$100,000
Signing & Pavement Markings	\$40,000	/LS	1 LS	\$40,000
Rectangular Rapid Flashing Beacons (RRFB)	\$18,000	/EA	3 EA	\$54,000
Pavement Milling & Overlay	\$40	/SY	10,100 SY	\$404,000
Retaining Wall	\$600	/LF	200 FT	\$120,000
Drainage Modifications	\$300,000	/LS	1 LS	\$300,000
Raised Landscaped Median	\$300	/LF	600 FT	\$180,000
Roundabouts (full depth, splitters, mounting circle, curbing, etc.)	\$800,000	/EA	2 EA	\$1,600,000
			Sub Total:	\$2,798,000
			Police (10%)	\$279,800
			Mobilization (3%)	\$83,940
			MassDOT Contingency (10%)	\$279,800
			Traffic Management (8%)	\$223,840
			Utility Relocation (estimated)	\$200,000
			Contingency (Loam/ seed, sidewalks, and other unknowns estimated at 20%)	\$559,600
			Order of Magnitude Total:	\$4,424,980

RECOMMENDATIONS

VHB has reviewed data that has been collected by DPW&P and by WSU for this effort. It is noted that we have relied on this information (along with some supplemental data from MassDOT) to prepare our assessments. It is recommended that the City perform additional outreach to vet the improvements presented above. Once an improvement plan has been vetted and selected, it is recommended that additional traffic data be collected. This data would include roadway counts and supplemental turning movement counts that would be used to perform additional operational assessments. As previously noted, traffic counts used for this assessment were collected when WSU was not in session. In addition, a future conditions operational analysis should be reviewed (potentially projecting out to a 10-year horizon) for the two intersections. This would be completed to confirm that additional improvements (not identified), or revisions to these improvements, are not needed. These efforts could happen during the next steps of the design process.

Attachments:

- A. Traffic Counts**
- B. Crash Data**
- C. Parking Counts**

Attachment A: Traffic Counts

North Intersection	Chandler Street - NB		Chandler Street - SB		May Street SB		Total
	Through	Right	Left	Through	Left	Right	
7:30AM-7:45AM	57	22	7	184	37	4	311
7:45AM-8:00AM	60	17	13	174	32	3	299
8:00AM-8:15AM	74	28	12	184	37	8	343
8:15AM-8:30PM	64	15	8	175	32	5	299
8:30AM-8:45AM	86	13	7	140	18	7	271
8:45AM-9:00AM	83	15	2	138	31	0	269

North Intersection	Chandler Street - NB		Chandler Street - SB		May Street SB		Total
	Through	Right	Left	Through	Left	Right	
1:30PM-1:45PM	79	28	8	93	16	5	229
1:45PM-2:00PM	79	22	7	75	19	3	205
2:00PM-2:15PM	122	32	6	100	29	6	295
2:15PM-2:30PM	122	27	6	100	18	9	282
2:30PM-2:45PM	125	33	11	95	41	13	318
2:45PM-3:00PM	105	22	10	97	32	6	272

South Intersection	Chandler Street - NB		Chandler Street - SB		May Street NB		Total
	Through	Left	Through	Right	Left	Right	
7:30AM-7:45AM	47	1	155	62	29	0	294
7:45AM-8:00AM	59	4	142	51	26	1	283
8:00AM-8:15AM	69	8	144	72	26	4	323
8:15AM-8:30PM	60	15	144	65	26	5	315
8:30AM-8:45AM	74	4	108	52	29	1	268
8:45AM-9:00AM	61	5	96	65	38	1	266

South Intersection	Chandler Street - NB		Chandler Street - SB		May Street NB		Total
	Through	Left	Through	Right	Left	Right	
1:30PM-1:45PM	62	3	60	35	30	0	190
1:45PM-2:00PM	82	2	70	36	46	2	238
2:00PM-2:15PM	109	2	89	42	54	2	298
2:15PM-2:30PM	115	2	78	35	44	6	280
2:30PM-2:45PM	117	2	94	54	54	12	333
2:45PM-3:00PM	99	5	60	76	40	4	284

Worcester State University
Wednesday, December 2, 2015 and Thursday, December 3, 2015

North Intersection	Chandler Street - NB		Chandler Street - SB		May Street - SB		Total
	Through	Right	Left	Through	Left	Right	
4:00PM-4:15PM	159	30	9	123	28	14	363
4:15PM-4:30PM	149	19	8	99	23	8	306
4:30PM-4:45PM	142	27	10	136	24	11	350
4:45PM-5:00PM	162	21	8	96	35	8	330
5:00PM-5:15PM	167	25	8	91	34	14	339
5:15PM-5:30PM	182	37	16	110	25	23	393
5:30PM-5:45PM	146	30	8	86	30	15	315
5:45PM-6:00PM	146	39	3	90	40	12	330

South Intersection	Chandler Street - NB		Chandler Street - SB		May Street - NB		Total
	Through	Left	Through	Right	Left	Right	
4:00PM-4:15PM	125	6	83	64	66	11	355
4:15PM-4:30PM	122	6	67	62	54	4	315
4:30PM-4:45PM	109	11	96	68	71	0	355
4:45PM-5:00PM	125	12	66	57	68	4	332
5:00PM-5:15PM	125	6	65	60	70	7	333
5:15PM-5:30PM	144	5	71	64	81	2	367
5:30PM-5:45PM	136	7	65	47	43	1	299
5:45PM-6:00PM	123	6	68	53	56	3	309

Worcester State University Pedestrian Activity

Time	Location 1		Location 2		Location 3		Location 4		Location 5		Total
	Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Eastbound	Westbound	
7 AM - 8 AM	0	3	0	10	1	1	0	2	2	20	39
8 AM - 9 AM	0	6	0	12	6	0	2	2	1	54	83
9 AM - 10 AM	3	4	3	9	2	7	9	1	40	24	102
10 AM - 11 AM	6	6	1	12	0	2	6	0	2	1	36
11 AM - 12 PM	5	5	2	1	3	4	11	7	20	17	75
12 PM - 1 PM	12	4	5	5	6	4	11	4	33	13	97
1 PM - 2 PM	3	3	2	0	2	0	1	1	12	4	28
2 PM - 3 PM	5	1	2	0	1	2	3	1	7	8	30
3 PM - 4 PM	6	1	5	2	3	1	4	1	14	12	49
4 PM - 5 PM	3	1	2	0	4	1	6	1	10	10	38



Attachment B: Crash Data



Worcester Police Department

INCIDENT REPORT

All Accidents at Chandler/Hunthurst to Van

7/16/2014 to 7/16/2015



Inc. #	Prim. Type	Prim. IBR	Rel. Inc. #	Start Date Start Time Start Day	End Date End Time End Day	Origin Action Taken Status	Type	IBR	Officer	Sector Route Council PSA	Inc. Location
ACC - ACCIDENT PROPERTY DAMAGE - 9 Incidents, 9 Offenses											
2014000072799	YES	YES	N.A.	2014-07-20 12:26 SUN.	2014-07-20 12:26 SUN.	911 PHONE REPORT OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	CUTLIFFE, CHRISTOPHER [C675]	N.W. R18 5 W231	501 CHANDLER ST, WORCESTER, MA 01602
2014000096946	YES	YES	N.A.	2014-09-15 08:08 MON.	2014-09-15 08:08 MON.	911 PHONE REPORT OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	GALLIVAN, TIMOTHY P [G679]	S.W. R14 5 W331	526 CHANDLER ST, WORCESTER, MA 01602
2014000097032	YES	YES	N.A.	2014-09-15 11:27 MON.	2014-09-15 11:27 MON.	CALL/SERVICE CANCEL OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	N.A.	N.W. R18 5 W332	CHANDLER ST / MAY ST, WORCESTER, MA 01602
2014000101499	YES	YES	N.A.	2014-09-26 19:51 FRI.	2014-09-26 19:51 FRI.	911 PHONE ASSISTING PARTY OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	JOHANSON, KEVIN R [J765]	N.W. R18 5 W221	473 CHANDLER ST, WORCESTER, MA 01602
2015000036972	YES	YES	N.A.	2015-04-18 14:28 SAT.	2015-04-18 14:28 SAT.	CALL/SERVICE UNFOUNDED OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	LOONEY, THOMAS P JR [L686]	S.W. R14 5 W332	MAY ST / CHANDLER ST, WORCESTER, MA 01602
2015000039468	YES	YES	N.A.	2015-04-26 17:01 SUN.	2015-04-26 17:01 SUN.	CALL/SERVICE RESOLVED OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	JOHANSON, KEVIN R [J765]	N.W. R18 5 W221	473 CHANDLER ST, WORCESTER, MA 01602
2015000047826	YES	YES	N.A.	2015-05-20 15:53 WED.	2015-05-20 15:53 WED.	CALL/SERVICE RESOLVED OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	MASON, MICHAEL [M101]	N.W. R18 5 W332	CHANDLER ST / MAY ST, WORCESTER, MA 01602
2015000056201	YES	YES	N.A.	2015-06-12 18:07 FRI.	2015-06-12 18:07 FRI.	911 PHONE REPORT OPEN	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	MASON, MICHAEL [M101]	N.W. R18 5 W332	CLARIDGE DR / CHANDLER ST, WORCESTER, MA 01602

Inc. #	Start Date	End Date	Origin	Type	IBR	Officer	Sector	Inc. Location
Prim. Type	Start Time	End Time	Action Taken				Route	
Prim. IBR	Start Day	End Day	Status				Council	
Rel. Inc. #							PSA	
ACC - ACCIDENT PROPERTY DAMAGE - 9 Incidents, 9 Offenses								
2015000062932	2015-07-01	2015-07-01	911 PHONE	ACC - ACCIDENT	N.A.	N.A.	N.W.	473 CHANDLER
YES	11:58	11:58	CANCEL	PROPERTY			R18	ST.
YES	WED.	WED.	OPEN	DAMAGE			5	WORCESTER,
N.A.							W221	MA 01602
ACH - ACCIDENT HIT AND RUN - 4 Incidents, 4 Offenses								
2014000102488	2014-09-29	2014-09-29	CALL/SERVICE	ACH - ACCIDENT	N.A.	CARROLL,	N.W.	CHANDLER ST /
YES	09:38	09:38	GONE ON ARRIVAL	HIT AND RUN		BRIAN F	R18	MAY ST,
YES	MON.	MON.	OPEN			[C787]	5	WORCESTER,
N.A.							W332	MA 01602
2014000106599	2014-10-10	2014-10-10	911 PHONE	ACH - ACCIDENT	N.A.	CUTLIFFE,	N.W.	545 CHANDLER
YES	07:29	07:29	REPORT	HIT AND RUN		CHRISTOPHER	R18	ST,
YES	FRI.	FRI.	OPEN			[C675]	5	WORCESTER,
N.A.							W331	MA 01602
2014000106611	2014-10-10	2014-10-10	PATROL INITIATED	ACH - ACCIDENT	N.A.	CUTLIFFE,	N.W.	545 CHANDLER
YES	08:49	08:49	REPORT	HIT AND RUN		CHRISTOPHER	R18	ST,
YES	FRI.	FRI.	OPEN			[C675]	5	WORCESTER,
N.A.							W331	MA 01602
2015000011645	2015-02-04	2015-02-04	CALL/SERVICE	ACH - ACCIDENT	N.A.	SANTLEY,	S.W.	540 CHANDLER
YES	20:40	20:40	REPORT	HIT AND RUN		CHRISTOPHER	R14	ST,
YES	WED.	WED.	OPEN			[S180]	5	WORCESTER,
N.A.							W331	MA 01602
ACI - ACCIDENT PERSONAL INJURY - 3 Incidents, 3 Offenses								
2015000012228	2015-02-06	2015-02-06	911 PHONE	ACI - ACCIDENT	N.A.	TOLSON,	S.W.	MAY ST /
YES	13:26	13:26	REPORT	PERSONAL INJURY		JOSEPH L	R14	CHANDLER ST,
YES	FRI.	FRI.	OPEN			[T747]	5	WORCESTER,
N.A.							W332	MA 01602
2015000036540	2015-04-17	2015-04-17	911 PHONE	ACI - ACCIDENT	N.A.	CARROLL,	N.W.	HADWEN RD /
YES	10:56	10:56	REPORT	PERSONAL INJURY		BRIAN F	R18	CHANDLER ST,
YES	FRI.	FRI.	OPEN			[C787]	5	WORCESTER,
N.A.							W221	MA 01602
2015000038136	2015-04-22	2015-04-22	911 PHONE	ACI - ACCIDENT	N.A.	CARROLL,	N.W.	CHANDLER ST /
YES	12:28	12:28	REPORT	PERSONAL INJURY		BRIAN F	R18	MAY ST,
YES	WED.	WED.	OPEN			[C787]	5	WORCESTER,
N.A.							W332	MA 01602
ACN - ACCIDENT NO REPORT - 1 Incidents, 1 Offenses								
2014000094418	2014-09-08	2014-09-08	911 PHONE	ACN - ACCIDENT	N.A.	TOLSON,	N.W.	501 CHANDLER
YES	14:14	14:14	ASSISTING PARTY	NO REPORT		JOSEPH L	R18	ST,
YES	MON.	MON.	OPEN			[T747]	5	WORCESTER,
N.A.							W231	MA 01602

Inc. #	Start Date	End Date	Origin	Type	IBR	Officer	Sector	Inc. Location
Prim. IBR	Start Time	End Time	Action Taken				Route	
Rel. Inc. #	Start Day	End Day	Status				Council	
ACP - ACCIDENT PEDESTRIAN - 1 Incidents, 1 Offenses								
2015000034836	2015-04-12	2015-04-12	911 PHONE	ACP - ACCIDENT	N.A.	SMITH, JEREMY	N.W.	487 CHANDLER
YES	13:09	13:09	REPORT	PEDESTRIAN		M [S695]	R18	ST.
YES	SUN.	SUN.	OPEN				5	WORCESTER,
N.A.							W231	MA 01602

18 Total Incidents

18 Total Offenses



Worcester Police Department

INCIDENT REPORT

May / Asbury to Van Street

7/16/2014 to 7/16/2015



Inc. #	Start Date	End Date	Origin	Type	IBR	Officer	Sector	Inc. Location
Prim. Type	Start Time	End Time	Action Taken				Route	
Rel. Inc. #	Start Day	End Day	Status				Council	PSA
ACC - ACCIDENT PROPERTY DAMAGE - 6 Incidents, 6 Offenses								
2014000072799	2014-07-20	2014-07-20	911 PHONE REPORT	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	CUTLIFFE, CHRISTOPHER [C675]	N.W. R18 5	501 CHANDLER ST, WORCESTER, MA 01602
	12:26	12:26	OPEN				W231	
	SUN.	SUN.						
	N.A.							
2014000097032	2014-09-15	2014-09-15	CALL/SERVICE CANCEL	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	N.A.	N.W. R18 5	CHANDLER ST / MAY ST, WORCESTER, MA 01602
	11:27	11:27	OPEN				W332	
	MON.	MON.						
	N.A.							
2015000036972	2015-04-18	2015-04-18	CALL/SERVICE UNFOUNDED	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	LOONEY, THOMAS P JR [L686]	S.W. R14 5	MAY ST / CHANDLER ST, WORCESTER, MA 01602
	14:28	14:28	OPEN				W332	
	SAT.	SAT.						
	N.A.							
2015000047826	2015-05-20	2015-05-20	CALL/SERVICE RESOLVED	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	MASON, MICHAEL [M101]	N.W. R18 5	CHANDLER ST / MAY ST, WORCESTER, MA 01602
	15:53	15:53	OPEN				W332	
	WED.	WED.						
	N.A.							
2015000056201	2015-06-12	2015-06-12	911 PHONE REPORT	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	MASON, MICHAEL [M101]	N.W. R18 5	CLARIDGE DR / CHANDLER ST, WORCESTER, MA 01602
	18:07	18:07	OPEN				W332	
	FRI.	FRI.						
	N.A.							
2015000065485	2015-07-07	2015-07-07	PATROL INITIATED	ACC - ACCIDENT PROPERTY DAMAGE	N.A.	DALY, THOMAS G [D271]	S.W. R14 5	262 MAY ST, WORCESTER, MA 01602
	09:54	09:54	REPORT OPEN				W311	
	TUE.	TUE.						
	N.A.							
ACH - ACCIDENT HIT AND RUN - 2 Incidents, 2 Offenses								
2014000102488	2014-09-29	2014-09-29	CALL/SERVICE GONE ON ARRIVAL	ACH - ACCIDENT HIT AND RUN	N.A.	CARROLL, BRIAN F [C787]	N.W. R18 5	CHANDLER ST / MAY ST, WORCESTER, MA 01602
	09:38	09:38	OPEN				W332	
	MON.	MON.						
	N.A.							

Inc. #	Start Date	End Date	Origin	Type	IBR	Officer	Sector	Inc. Location
Prim. Type	Start Time	End Time	Action Taken				Route	
Prim. IBR	Start Day	End Day	Status				Council	
Rel. Inc. #							PSA	
ACH - ACCIDENT HIT AND RUN - 2 Incidents, 2 Offenses								
2014000114550	2014-11-01	2014-11-01	911 PHONE	ACH - ACCIDENT	N.A.	MCCANN, SEAN	S.W.	258 MAY ST,
YES	04:34	04:34	UNFOUNDED	HIT AND RUN		P [M768]	R14	WORCESTER,
YES	SAT.	SAT.	OPEN				5	MA 01602
N.A.							W311	
ACI - ACCIDENT PERSONAL INJURY - 4 Incidents, 4 Offenses								
2014000105985	2014-10-08	2014-10-08	911 PHONE	ACI - ACCIDENT	N.A.	ORTIZ, JOSE A	N.W.	351 MAY ST,
YES	14:56	14:56	REPORT	PERSONAL INJURY		[O802]	R18	WORCESTER,
YES	WED.	WED.	OPEN				5	MA 01602
N.A.							W331	
2014000127295	2014-12-09	2014-12-09	911 PHONE	ACI - ACCIDENT	N.A.	REYNOLDS,	N.W.	340 MAY ST,
YES	06:57	06:57	REPORT	PERSONAL INJURY		TIMOTHY C	R18	WORCESTER,
YES	TUE.	TUE.	OPEN			[R774]	5	MA 01602
N.A.							W231	
2015000012228	2015-02-06	2015-02-06	911 PHONE	ACI - ACCIDENT	N.A.	TOLSON,	S.W.	MAY ST /
YES	13:26	13:26	REPORT	PERSONAL INJURY		JOSEPH L	R14	CHANDLER ST,
YES	FRI.	FRI.	OPEN			[T747]	5	WORCESTER,
N.A.							W332	MA 01602
2015000038136	2015-04-22	2015-04-22	911 PHONE	ACI - ACCIDENT	N.A.	CARROLL,	N.W.	CHANDLER ST /
YES	12:28	12:28	REPORT	PERSONAL INJURY		BRIAN F	R18	MAY ST,
YES	WED.	WED.	OPEN			[C787]	5	WORCESTER,
N.A.							W332	MA 01602
ACN - ACCIDENT NO REPORT - 1 Incidents, 1 Offenses								
2014000094418	2014-09-08	2014-09-08	911 PHONE	ACN - ACCIDENT	N.A.	TOLSON,	N.W.	501 CHANDLER
YES	14:14	14:14	ASSISTING PARTY	NO REPORT		JOSEPH L	R18	ST,
YES	MON.	MON.	OPEN			[T747]	5	WORCESTER,
N.A.							W231	MA 01602
ACP - ACCIDENT PEDESTRIAN - 1 Incidents, 1 Offenses								
2015000034836	2015-04-12	2015-04-12	911 PHONE	ACP - ACCIDENT	N.A.	SMITH, JEREMY	N.W.	487 CHANDLER
YES	13:09	13:09	REPORT	PEDESTRIAN		M [S695]	R18	ST,
YES	SUN.	SUN.	OPEN				5	WORCESTER,
N.A.							W231	MA 01602
14 Total Incidents								
14 Total Offenses								

Sub Group	Crash ID	Town	Year	Crash Date	Crash Time	Crash Severity	Total Vehicles	Total Injured	Total Fatalis	Collision manner	Road Surface	Lighting
NO GROUP	2621126	WORCESTER	2010	1/19/2010	9:44 AM	Property damage only (none injured)		2	0	0 Rear-end	Snow	Daylight
NO GROUP	2622366	WORCESTER	2010	1/30/2010	5:50 AM	Not Reported		2	0	0 Rear-end	Dry	Dark - lighted roadway
NO GROUP	2623069	WORCESTER	2010	3/13/2010	12:39 PM	Property damage only (none injured)		2	0	0 Rear-end	Wet	Daylight
NO GROUP	2623695	WORCESTER	2010	3/15/2010	7:23 PM	Property damage only (none injured)		2	0	0 Angle	Wet	Dark - lighted roadway
NO GROUP	2640927	WORCESTER	2010	6/13/2010	1:47 AM	Non-fatal injury		1	1	0 Single vehicle crash	Wet	Dark - lighted roadway
NO GROUP	2652377	WORCESTER	2010	6/30/2010	12:34 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	2667015	WORCESTER	2010	7/30/2010	6:48 PM	Non-fatal injury		2	1	0 Angle	Dry	Daylight
NO GROUP	2686829	WORCESTER	2010	9/4/2010	12:20 PM	Non-fatal injury		2	1	0 Rear-end	Dry	Daylight
NO GROUP	2683457	WORCESTER	2010	9/7/2010	6:30 PM	Property damage only (none injured)		2	0	0 Rear-end	Dry	Daylight
NO GROUP	2698092	WORCESTER	2010	10/18/2010	11:30 AM	Non-fatal injury		1	1	0 Single vehicle crash	Dry	Daylight
NO GROUP	2702337	WORCESTER	2010	10/29/2010	9:30 AM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	2711298	WORCESTER	2010	11/18/2010	5:31 PM	Property damage only (none injured)		2	0	0 Rear-end	Dry	Dark - lighted roadway
NO GROUP	2713310	WORCESTER	2010	11/24/2010	9:35 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Dark - lighted roadway
NO GROUP	2714316	WORCESTER	2010	11/27/2010	12:19 PM	Property damage only (none injured)		1	0	0 Angle	Dry	Daylight
NO GROUP	3100456	WORCESTER	2011	2/13/2011	00:00 AM	Not Reported		1	0	0 Single vehicle crash	Dry	Dark - lighted roadway
NO GROUP	2736883	WORCESTER	2011	4/11/2011	8:14 AM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	2737083	WORCESTER	2011	4/26/2011	4:07 PM	Non-fatal injury		2	1	0 Angle	Dry	Daylight
NO GROUP	2734740	WORCESTER	2011	5/28/2011	10:22 AM	Property damage only (none injured)		3	0	0 Angle	Dry	Daylight
NO GROUP	2742972	WORCESTER	2011	6/21/2011	10:53 AM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	2784972	WORCESTER	2011	7/19/2011	7:00 PM	Non-fatal injury		1	1	0 Angle	Dry	Daylight
NO GROUP	2955225	WORCESTER	2011	9/13/2011	12:34 PM	Non-fatal injury		2	2	0 Rear-end	Dry	Daylight
NO GROUP	2955140	WORCESTER	2011	9/15/2011	5:07 PM	Non-fatal injury		1	1	0 Head-on	Dry	Daylight
NO GROUP	3151791	WORCESTER	2011	10/17/2011	9:25 AM	Non-fatal injury		4	1	0 Unknown	Dry	Daylight
NO GROUP	3146130	WORCESTER	2011	10/25/2011	12:25 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3264233	WORCESTER	2012	1/1/2012	1:26 PM	Property damage only (none injured)		1	0	0 Single vehicle crash	Ice	Dark - lighted roadway
NO GROUP	3251900	WORCESTER	2012	2/29/2012	12:25 PM	Property damage only (none injured)		2	0	0 Rear-end	Wet	Daylight
NO GROUP	3261932	WORCESTER	2012	3/5/2012	1:56 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3265658	WORCESTER	2012	3/14/2012	5:27 PM	Non-fatal injury		1	1	0 Angle	Dry	Daylight
NO GROUP	3297332	WORCESTER	2012	6/9/2012	2:08 AM	Unknown		1	0	0 Single vehicle crash	Wet	Dark - lighted roadway
NO GROUP	3353116	WORCESTER	2012	8/7/2012	00:00 AM	Property damage only (none injured)		1	0	0 Single vehicle crash	Dry	Dark - lighted roadway
NO GROUP	3364736	WORCESTER	2012	9/14/2012	5:22 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3385282	WORCESTER	2012	9/28/2012	12:45 PM	Property damage only (none injured)		2	0	0 Rear-end	Wet	Daylight
NO GROUP	3380748	WORCESTER	2012	10/10/2012	1:00 PM	Non-fatal injury		2	1	0 Angle	Wet	Daylight
NO GROUP	3380572	WORCESTER	2012	10/15/2012	7:55 PM	Property damage only (none injured)		2	0	0 Angle	Wet	Dusk
NO GROUP	3386029	WORCESTER	2013	1/18/2013	5:15 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Dark - lighted roadway
NO GROUP	3386634	WORCESTER	2013	1/22/2013	2:15 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3400558	WORCESTER	2013	3/10/2013	6:32 PM	Non-fatal injury		2	1	0 Rear-end	Dry	Daylight
NO GROUP	3400547	WORCESTER	2013	3/10/2013	7:39 PM	Non-fatal injury		2	1	0 Rear-end	Dry	Dark - lighted roadway
NO GROUP	3398536	WORCESTER	2013	3/24/2013	12:33 PM	Property damage only (none injured)		2	0	0 Rear-end	Dry	Daylight
NO GROUP	3533836	WORCESTER	2013	5/4/2013	7:35 AM	Non-fatal injury		2	1	0 Rear-end	Dry	Daylight
NO GROUP	3534734	WORCESTER	2013	5/10/2013	12:29 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3594086	WORCESTER	2013	6/25/2013	4:13 PM	Non-fatal injury		2	1	0 Rear-end	Dry	Daylight
NO GROUP	3591181	WORCESTER	2013	7/9/2013	9:30 AM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3658837	WORCESTER	2013	9/23/2013	2:45 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3658661	WORCESTER	2013	9/27/2013	00:00 AM	Non-fatal injury		2	1	0 Rear-end	Dry	Daylight
NO GROUP	3739252	WORCESTER	2013	10/2/2013	3:00 PM	Property damage only (none injured)		2	0	0 Angle	Dry	Daylight
NO GROUP	3750045	WORCESTER	2013	11/6/2013	8:20 AM	Property damage only (none injured)		2	0	0 Rear-end	Dry	Daylight
NO GROUP	3750202	WORCESTER	2013	11/15/2013	1:01 PM	Property damage only (none injured)		2	0	0 Rear-end	Dry	Daylight
NO GROUP	3756712	WORCESTER	2013	11/26/2013	8:15 PM	Property damage only (none injured)		2	0	0 Angle	Wet	Dark - lighted roadway
NO GROUP	3756174	WORCESTER	2013	12/6/2013	9:17 PM	Property damage only (none injured)		2	0	0 Angle	Wet	Dark - lighted roadway
NO GROUP	3770415	WORCESTER	2013	12/11/2013	8:30 AM	Property damage only (none injured)		2	0	0 Rear-end	Ice	Daylight

Weather	Street	Intersection	Distance From Nearest Intersection
Snow/Cloudy	MAY STREET Rte 122 W / CHANDLER STREET / Rte 122	MAY STREET Rte 122 W / CHANDLER STREET / Rte 122	
Clear	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Cloudy/Rain	MAY STREET	MAY STREET	501 CHANDLER STREET
Rain	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Cloudy	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Clear	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Clear	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Clear			30 feet E from Intersection 505 CHANDLER STREET / MAY STREET
Clear			486 CHANDLER STREET
Clear/Cloudy			486 CHANDLER STREET
Cloudy/Cloudy	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Clear			486 CHANDLER STREET
Clear			486 CHANDLER STREET
Clear			501 CHANDLER STREET
Clear			486 CHANDLER STREET
Clear/Cloudy	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Clear			486 CHANDLER STREET
Clear			475 CHANDLER STREET
Clear			486 CHANDLER STREET
Clear	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Clear	CHANDLER STREET / CLARIDGE DRIVE	CHANDLER STREET / CLARIDGE DRIVE	
Clear			486 CHANDLER STREET
Clear			486 CHANDLER STREET
Clear	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Clear			486 CHANDLER STREET
Rain	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Cloudy/Snow	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Cloudy	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Clear	CLARIDGE DRIVE / CHANDLER STREET	CLARIDGE DRIVE / CHANDLER STREET	
Cloudy	CHANDLER STREET / MAY STREET	CHANDLER STREET / MAY STREET	
Clear/Clear			534 CHANDLER STREET
Clear			MAY STREET / CHANDLER STREET Rte 122
Rain			486 CHANDLER STREET
Rain/Rain			533 CHANDLER STREET
Rain	MAY STREET / CHANDLER STREET / FLAGG STREET	MAY STREET / CHANDLER STREET / FLAGG STREET	
Clear			486 CHANDLER STREET
Clear/Clear	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Clear			525 CHANDLER STREET
Clear			525 CHANDLER STREET
Clear			475 CHANDLER STREET
Clear/Clear	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Cloudy	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Clear			525 CHANDLER STREET
Cloudy			486 CHANDLER STREET
Clear	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Cloudy	CHANDLER STREET / CLARIDGE DRIVE	CHANDLER STREET / CLARIDGE DRIVE	
Clear			486 CHANDLER STREET / MAY STREET
Clear			280 MAY STREET
Clear			486 CHANDLER STREET / CLARIDGE DRIVE
Rain/Cloudy			486 CHANDLER STREET / CLARIDGE DRIVE
Rain/Sleet, hail (freezing rain or drizzle)	MAY STREET / CHANDLER STREET	MAY STREET / CHANDLER STREET	
Clear			525 CHANDLER STREET Rte 122 S

Vehicles Travel Directions	Most Harmful Events	Distance from Nearest Landmark
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported / V2: Not reported	V1: Collision with motor vehicle in traffic / V2: Not reported	
V1: Northbound / V2: Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Westbound	V1: Not reported / V2: Not reported	
V1: Westbound	V1: Collision with fence	
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Southbound / V2: Northbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Westbound / V2: Not reported	V1: Collision with parked motor vehicle / V2: Collision with motor vehicle in traffic	
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	WORCESTER STATE COLLEGE
V1: Northbound	V1: Collision with cyclist (bicycle, tricycle, unicycle, pedal car)	
V1: Westbound / V2: Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Not reported	WORCESTER STATE COLLEGE
V1: Eastbound	V1: Collision with other fixed object (wall, building, tunnel, etc.)	
V1: Westbound	V1: Not reported	
V1: Southbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Westbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported / V2: Not reported / V3: Not reported	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic / V3: Collision with parked motor vehicle	BET SHALOM
V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported	V1: Collision with cyclist (bicycle, tricycle, unicycle, pedal car)	
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound	V1: Collision with pedestrian	
V1: Not reported / V2: Not reported / V3: Westbound / V4: Not reported	V1: Unknown / V2: Collision with motor vehicle in traffic / V3: Collision with motor vehicle in traffic / V4: Collision with motor vehicle in traffic	
V1: Westbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Eastbound	V1: Collision with utility pole	
V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Westbound	V1: Collision with cyclist (bicycle, tricycle, unicycle, pedal car)	
V1: Northbound	V1: Collision with light pole or other post/support	
V1: Westbound	V1: Collision with light pole or other post/support	
V1: Eastbound / V2: Westbound	V1: Unknown / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Southbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported / V2: Not reported	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported / V2: Not reported	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Southbound / V2: Southbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Northbound / V2: Northbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported / V2: Not reported	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Northbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Westbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	WORCESTER STATE UNIVERSITY
V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	WORCESTER STATE UNIVERSITY
V1: Northbound / V2: Northbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	STUDENT AFFAIRS
V1: Westbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Eastbound / V2: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	
V1: Not reported / V2: Not reported	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	WORCESTER STATE COLLEGE

Non Motorist Type	X Coordinate	Y Coordinate	Crash Data Id
	171858.1406	890960.1252	3568063
	171858.1406	890960.1252	3568222
	171863.2336	890950.7515	3568744
	171858.1406	890960.1252	3568778
	171815.0783	891051.875	3569870
	171858.1406	890960.1252	3570069
	171858.1406	890960.1252	3570422
	171820.807	891044.748	3570885
	171812.6486	891054.8895	3570909
P2,Pedalcyclist (bicycle, tricycle, unicycle, pedal car)	171812.6486	891054.8895	3571453
	171858.1406	890960.1252	3571601
	171812.6486	891054.8895	3571930
	171812.6486	891054.8895	3572014
	171865.6188	890946.3616	3572043
	171812.6486	891054.8895	3668969
	171858.1406	890960.1252	3669614
	171812.6486	891054.8895	3669770
	172012.1941	890791.3136	3680134
	171812.6486	891054.8895	3680356
P2,Pedalcyclist (bicycle, tricycle, unicycle, pedal car)	171858.1406	890960.1252	3680661
	171858.1406	890960.1252	3681230
P2,Pedestrian	171812.6486	891054.8895	3681260
	171812.6486	891054.8895	3681703
	171858.1406	890960.1252	3681795
	171858.1406	890960.1252	3684443
	171858.1406	890960.1252	3686228
	171858.1406	890960.1252	3686530
P2,Pedalcyclist (bicycle, tricycle, unicycle, pedal car)	171858.1406	890960.1252	3686565
	171815.0783	891051.875	3687260
	171529.0105	891229.1811	3687752
	171815.0783	891051.8752	3687941
	171812.6486	891054.8895	3687941
	171541.6459	891222.2734	3688126
	171815.0783	891051.875	3688220
	171812.6486	891054.8895	4307892
	171858.1406	890960.1252	4307980
	171631.2438	891173.2074	4308692
	171631.2438	891173.2074	4308693
	172012.1941	890791.3136	4308839
	171815.0783	891051.875	4309359
	171815.0783	891051.875	4309436
P2,Pedestrian	171631.2438	891173.2074	4310015
	171812.6486	891054.8895	4310161
	171858.1406	890960.1252	4311034
	171858.1406	890960.1252	4311089
	171915.2041	890799.3884	4311166
	171858.1404	890960.1256	4311592
	171858.1404	890960.1256	4311753
	171858.1404	890960.1256	4311956
	171815.0783	891051.875	4312158
	171631.635	891172.993	4312232

Attachment C: Parking Counts

WORCESTER STATE UNIVERSITY NEIGHBORHOOD
PARKING SUPPLY STUDY

ROADWAY	SEGMENT LENGTH	CURB LENGTH	Corners	Corner Clearance	HYDRANTS	HYDRANT CLEARANCE	DW	x14.8 = DW Ft	NP areas (footage)	TOTAL RESTRICTS	CURB VS RESTRICTS	Legal Curb SPACES (23)	R.P.P.
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CHANDLER STREET Hunthurst to Durant	3,930	7,860	19	380	6	60	47	695.6	2343	3478.6	4,381	190.5	NO
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MAY STREET (North) Chandler to #378	1,660	3,320	6	120	3	30	14	207.2	105	462.2	2,858	124.3	NO
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MAY STREET (South) Chandler to Rupert	1,600	3,200	11	220	1	10	17	251.6	2252	2733.6	466	20.3	NO
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BARR STREET E.P.L.	572	1,144	4	80	2	20	13	192.4	0	292.4	852	37.0	NO
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ASBURY STREET E.P.L.	632	1,264	4	80	1	10	15	222	0	312	952	41.4	NO
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CLARIDGE DRIVE E.P.L.	929	1,858	4	80	2	20	17	251.6	947	1298.6	559	24.3	YES
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SO. FLAGG Hadwen to Barr	2,295	4,590	12	240	4	40	43	636.4	2295	3211.4	1,379	59.9	YES
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SHERWOOD ROAD E.P.L.	917	1,834	4	80	1	10	23	340.4	0	430.4	1,404	61.0	NO
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WESTVIEW ROAD Hadwen to #55	530	1,060	4	80	1	10	7	103.6	0	193.6	866	37.7	NO
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PERROT STREET E.P.L.	384	768	4	80	1	10	6	88.8	0	178.8	589	25.6	NO
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WORCESTER STATE UNIVERSITY NEIGHBORHOOD
PARKING SUPPLY STUDY

ROADWAY	SEGMENT LENGTH	CURB LENGTH	Corners	Corner Clearance	HYDRANTS	HYDRANT CLEARANCE	DW	x14.8 = DW Ft	NP areas (footage)	TOTAL RESTRICTS	CURB VS RESTRICTS	Legal Curb SPACES (23)	R.P.P.
DURANT WAY	649	1,298	4	80	1	10	13	192.4	0	282.4	1,016	44.2	NO
E.P.L.													
HAMIL ROAD	314	628	4	80	2	20	4	59.2	468	627.2	1	0.0	YES
E.P.L.													
VAN STREET	488	976	4	80	2	20	11	162.8	713	975.8	0	0.0	YES
E.P.L.													
RUTH STREET	531	1,062	4	80	2	20	10	148	18	266	796	34.6	NO
E.P.L.													
UNDERWOOD STREET	571	1,142	6	120	2	20	10	148	0	288	854	37.1	NO
E.P.L.													
RUPERT STREET	352	704	4	80	1	10	7	103.6	0	193.6	510	22.2	NO
E.P.L.													
HARTSHORN ROAD	216	432	3	60	1	10	1	14.8	0	84.8	347	15.1	NO
Underwood to Rupert													
ZENITH DRIVE	3,197	6,394	10	200	7	70	61	902.8	5222	6394.8	-1	0.0	YES
E.P.L.													
MARCY STREET	1,225	2,450	4	80	1	10	11	162.8	2198	2450.8	-1	0.0	YES
Zenith to Wamsutta													
BUCKLEY ROAD	688	1,376	2	40	2	20	9	133.2	0	193.2	1,183	51.4	NO
E.P.L. (part PVT)													

WORCESTER STATE UNIVERSITY NEIGHBORHOOD
PARKING SUPPLY STUDY

ROADWAY	SEGMENT LENGTH	CURB LENGTH	Corners	Corner Clearance	HYDRANTS	HYDRANT CLEARANCE	DW	x14.8 = DW Ft	NP areas (footage)	TOTAL RESTRICTS	CURB VS RESTRICTS	Legal Curb SPACES (23')	R.P.P.
QUISSETT ROAD E.P.L. (part PVT)	821	1,642	4	80	0	0	4	59.2	1502	1641.2	1	0.0	YES
GLENDALE STREET #36 to end	1,845	3,690	15	300	4	40	47	695.6	0	1035.6	2,654	115.4	NO
CHICOPEE STREET E.P.L. (part PVT)	919	1,838	6	120	3	30	17	251.6	0	401.6	1,436	62.5	NO
CANDLEWOOD ROAD PVT	X	.	.	.	.	.	.	.	.	.	.	.	PVT
ADA ROAD PVT	X	.	.	.	.	.	.	.	.	.	.	.	PVT
PATCHES RES. DRIVE E.P.L.	1,057	2,114	8	160	2	20	21	310.8	0	490.8	1,623	70.6	NO
KAY STREET E.P.L.	313	626	4	80	0	0	8	118.4	0	198.4	428	18.6	NO
HUNTHURST CIRCLE E.P.L.	1,773	3,546	6	120	2	20	38	562.4	0	702.4	2,844	123.6	NO
TOTALS	28,408	56,816	160	3,200	54	540	474	7,015	18,063	28,818	27,998	1,217.3	
	SEGMENT LENGTH	CURB LENGTH	Corners	Corner Clearance	HYDRANTS	HYDRANT CLEARANCE	DW	x14.8 = DW Ft	NP areas (footage)	TOTAL RESTRICTS	CURB VS RESTRICTS	Legal Curb SPACES (23')	

**WORCESTER STATE UNIVERSITY NEIGHBORHOOD
PARKING DEMAND STUDY**

ROADWAY	ESTIMATED PARKING INVENTORY	VEHICLES PARKED			
		RESIDENTIAL 4:00 A.M.	SPRING BREAK	GOOGLE EARTH	NORMAL SCHOOL DAY
CHANDLER STREET Hunthurst to Durant	190.5	2	23	61	70
MAY STREET (North) Chandler to #378	124.3	7	9	30	52
MAY STREET (South) Chandler to Rupert	20.3	11	0	23	28
BARR STREET E.P.L.	37.0	3	2	2	0
ASBURY STREET E.P.L.	41.4	2	3	3	2
CLARIDGE DRIVE E.P.L.	24.3	0	0	1	1
SO. FLAGG Hadwen to Barr	59.9	3	5	13	9
SHERWOOD ROAD E.P.L.	61.0	9	8	6	5
WESTVIEW ROAD Hadwen to #55	37.7	2	1	3	2
PERROT STREET E.P.L.	25.6	4	2	1	4
DURANT WAY E.P.L.	44.2	2	0	2	3
HAMIL ROAD E.P.L.	0.0	0	0	3	0
VAN STREET E.P.L.	0.0	0	0	1	1
RUTH STREET E.P.L.	34.6	16	6	10	5
UNDERWOOD STREET	37.1	21	8	9	10

**WORCESTER STATE UNIVERSITY NEIGHBORHOOD
PARKING DEMAND STUDY**

E.P.L.

RUPERT STREET	22.2	6	1	2	3
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E.P.L.

HARTSHORN ROAD	15.1	6	3	9	2
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Underwood to Rupert

ZENITH DRIVE	0.0	19	5	10	4
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E.P.L.

MARCY STREET	0.0	2	1	4	1
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Zenith to Wamsutta

BUCKLEY ROAD	51.4	2	1	1	0
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E.P.L. (part PVT)

QUISSETT ROAD	0.0	1	1	0	0
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E.P.L. (part PVT)

GLENDALE STREET	115.4	4	3	4	1
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#36 to end

CHICOPEE STREET	62.5	0	0	8	5
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E.P.L. (part PVT)

CANDLEWOOD ROAD	0.0	0	0	0	0
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PVT

ADA ROAD	0.0	4	5	4	4
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PVT

PATCHES RES. DRIVE	70.6	8	4	5	4
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E.P.L.

KAY STREET	18.6	7	2	3	2
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E.P.L.

HUNTHURST CIRCLE	123.6	3	1	5	10
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E.P.L.

WORCESTER STATE UNIVERSITY NEIGHBORHOOD
PARKING DEMAND STUDY

Hadwen Road	46.0	1	2	2	8
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Chandler St to Westview St

Wamsutta Street	34.0	6	1	1	2
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May St to Marcy St