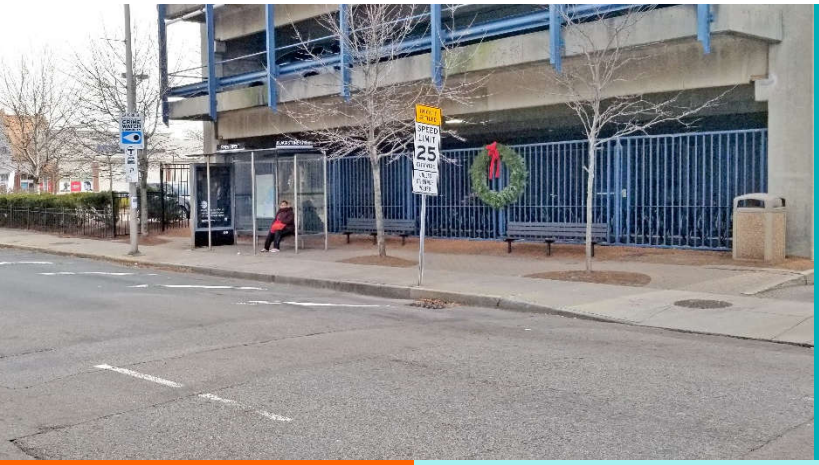
River Street Reconstruction

River Street Reconstruction Project

Alternatives Analysis Report

McMahon Associates
December 16, 2021



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1 Introduction

The City of Cambridge's River Street Reconstruction project will develop a new surface design for River Street and select adjacent areas while upgrading the street's sanitary sewer, stormwater, and water subsurface infrastructure. This new surface design is primarily intended to improve corridor and intersection safety for all travel modes while meeting a number of other goals:

- Better integrate transit accommodations and pedestrian and bicycle facilities.
- Provide sufficient capacity for future travel demands.
- Engage the local community while still meeting the needs of the various users.
- Contribute to overall enhancement of the neighborhood.
- Meet the City's goals and planning initiatives related to infrastructure, transportation and mode share, urban design, climate and environment, open space and health, and resiliency.

The following report provides a summary of the analysis and evaluation of transportation operations associated with the preferred alternative for the project. The process of determining the preferred alternative and the corresponding transportation operations is described below. The alternatives analysis describes the core project elements, the constraints of the surrounding area, and the process associated with the selection of a preferred alternative. Capacity analyses utilizing both macroscopic analysis software (Synchro) and microsimulation software (VISSIM) were completed for the preferred alternative. The following report provides a summary of findings associated with the existing and future operations both with and without the implementation of the proposed alternative on River Street.

1.1 Project Limits

The analysis presented as part of this report is based on the Existing conditions previously documented in the River Street Reconstruction Project Transportation Design Report, November 2019 ("Design Report"). The study area of the project includes River Street between Memorial Drive and Massachusetts Avenue, the intersections of Western Avenue at Franklin Street and at Green Street, and the bus terminal area at River Street and Magazine Street near Central Square, Carl Barron Plaza, Blackstone Street, and a portion of Green Street. For the purposes of this analysis, River Street is documented as an east/west alignment, with the majority of adjacent cross streets running north/south. The project area limits are depicted in Figure 1..

Figure 1: Project Limits & Study Area

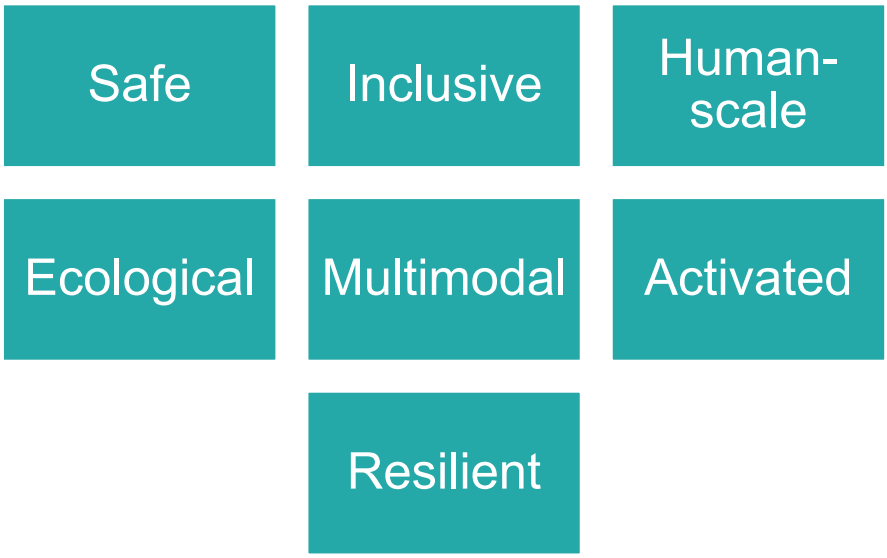
1.2 Existing Issues and Opportunities

As detailed in the Design Report, the Existing conditions along River Street present various challenges and opportunities to improve safety and efficiency for all modes throughout the corridor. Opportunities range from bringing sidewalks and pedestrian ramps into compliance with accessibility guidelines to improving traffic signal operations in order to better manage vehicle queues. Many of the opportunities identified focus on improving interactions between modes — such as achieving separation for cyclists from motor vehicles or allocating dedicated space for transit. Particular attention was paid to unsignalized crossing locations and locations where a large volume of pedestrians interacts with a large volume of buses (such as Carl Barron Plaza).

The intersections on either end of the corridor, Memorial Drive and Massachusetts Avenue, present challenges to the comfortable accommodation of all users on River Street. High volumes of vehicles use Memorial Drive, alongside many pedestrians and bicycles on the Paul Dudley White multi-use path. The River Street Reconstruction project presents an opportunity to improve the transition of vehicles from the higher-speed, throughway-like nature of Memorial Drive and Cambridge Street to the lower-speed neighborhood along River Street. In the vicinity of Massachusetts Avenue, meanwhile, there is an opportunity make bus circulation more efficient while improving bus stop accommodations and balancing the needs and safety of pedestrians, bicycles, and other vehicles.

1.3 Shared Design Goals

Before the development of alternatives, a set of shared goals to inform the design were decided upon through a public engagement process. This process included community meetings, pop-up outreach events, and the formation of the Working Group, a team of stakeholders, advocates, and neighbors chosen to represent the community in meetings with the City and the project team. The design goals developed from this process were comprised of descriptors that should apply to any future vision of the River Street corridor. The identified descriptors are:



1.4 Analysis Overview

To address the issues and opportunities identified in the Design Report in a manner that would reflect the shared design goals, different roadway design elements were identified and tested. The process of testing alternatives used data built off of the 2018 Existing conditions and 2030 Future Baseline conditions described in the Design Report.

The 2018 Existing conditions reflect the River Street corridor as it existed in 2018, based off of data recorded and observations made at that time. The development of the 2018 Existing conditions included collecting traffic volumes, observing peak hour vehicle queues, collecting physical roadway characteristics, and analyzing transit operations. These data formed the basis for the issues and opportunities for the corridor under the Existing and Future Baseline conditions. The 2030 Future Baseline conditions represent the River Street corridor as anticipated in 2030, without any of the changes considered in the River Street Reconstruction project. The changes between 2018 and 2030 include the anticipated population growth to take place in the area, planned development nearby, and potential future roadway changes or traffic signal optimizations that could take place to accommodate the change in roadway volumes. The 2018 Existing and 2030 Future Baseline conditions are described in detail in the Design Report.

With the 2018 Existing conditions and 2030 Future Baseline conditions established, the exploration of alternatives could take place. The potential alternatives reflected input from both the public and the Working Group. Location-specific comment maps and a street design exercise undertaken by the Working Group helped spur ideas to address

the issues and opportunities along the River Street corridor. These ideas were developed into the alternatives that would be considered for implementation. Some of these alternatives were aimed at improving a specific location, while others were relevant to the entire corridor. Corridor wide improvements and specific area improvements were examined for feasibility and compared against the shared design goals to ultimately be compiled into what would become the Preferred Alternative. Once the Preferred Alternative was determined, it was analyzed under a new set of conditions created by combining the Future Baseline conditions with design changes put forth in the Preferred Alternative. A description of the final Preferred Alternative can be found in Section 4 of this report. The underlying methodologies used in the analysis and development of the Preferred Alternative are described in the following section.

2 Analysis Methodologies

2.1 Peak Hour Volumes

The peak hour traffic volumes used for the 2018 Existing condition and 2030 Future Baseline condition were documented in the Design Report for the River Street Reconstruction project. To analyze the Preferred Alternative, Future Baseline peak hour traffic volumes were adjusted to create new volumes based on changes to the circulation patterns associated with the proposed design configuration. Bicycle volumes entering the River Street corridor were also grown to account for the anticipated increase in bicycle use on the corridor associated with the proposed separated bicycle facility. No changes to pedestrian volumes from the Future Baseline condition to the Preferred Alternative condition were made. The Preferred Alternative weekday morning and weekday afternoon peak hour pedestrian and bicycle volumes are depicted in Figure 2 and Figure 3 of this report. The Preferred Alternative peak hour vehicle volumes are depicted in Figure 4 and Figure 5 for the weekday morning and weekday afternoon peak hours, respectively.

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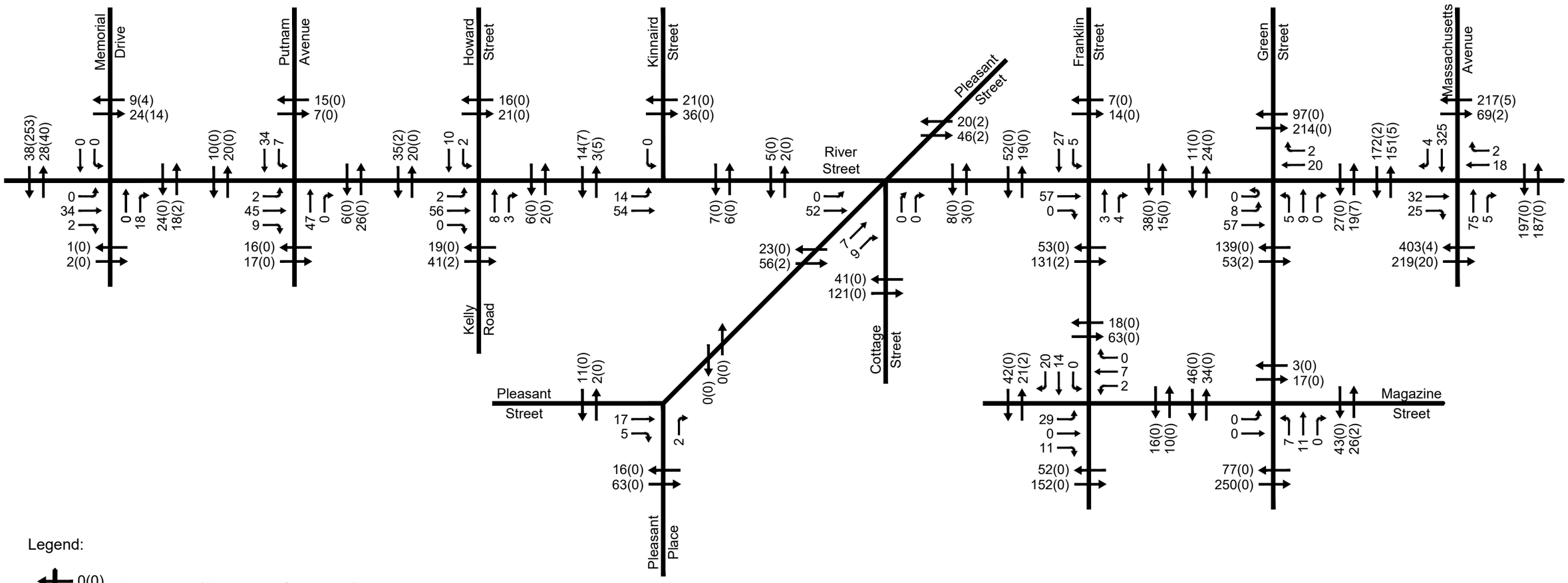

Legend:

0(0)
0(0) Pedestrians(Bicycles in Crosswalk)

0 Bicycles on Roadway

River Street Reconstruction

Figure 2
2030 Preferred Alternative Weekday Morning
Peak Hour Pedestrian/Bicycle Volumes
River Street Infrastructure and Streetscape Design
Cambridge, Massachusetts

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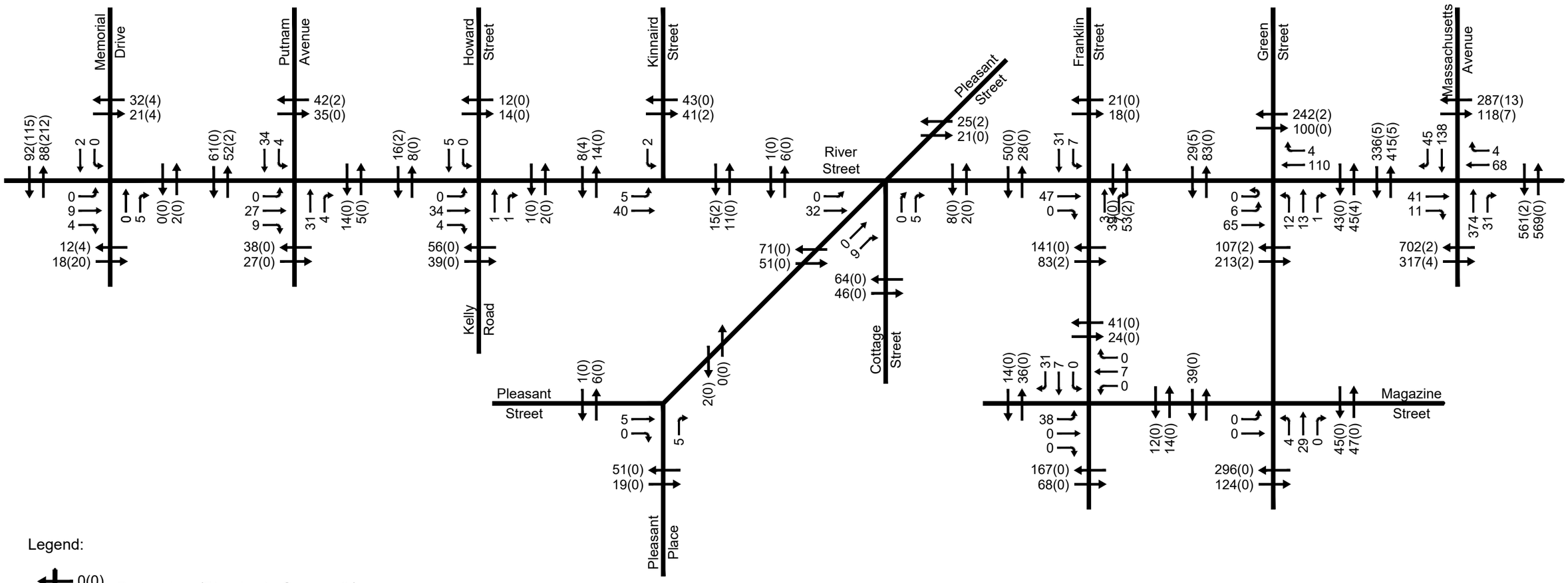

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0(0)
0(0) Pedestrians(Bicycles in Crosswalk)

0 Bicycles on Roadway

River Street Reconstruction

Figure 3
2030 Preferred Alternative Weekday Afternoon
Peak Hour Pedestrian/Bicycle Volumes
River Street Infrastructure and Streetscape Design
Cambridge, Massachusetts

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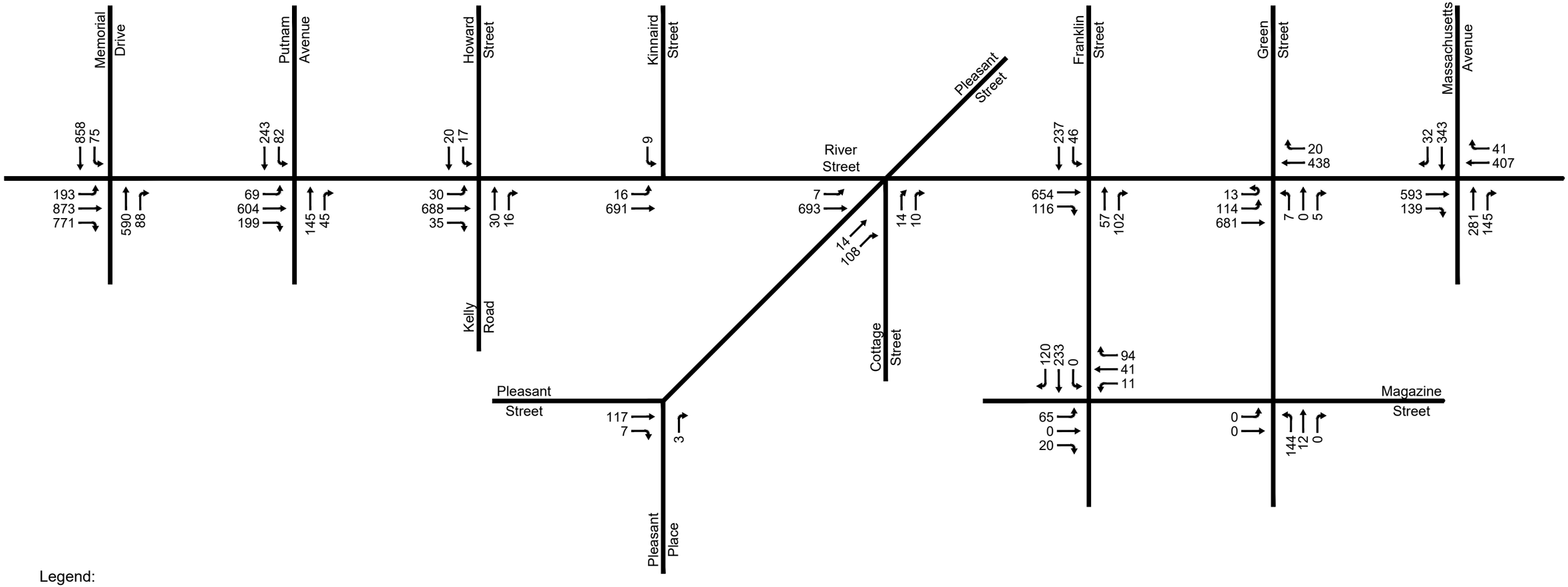

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0 Vehicles

River Street Reconstruction

Figure 4
2030 Preferred Alternative Weekday Morning
Peak Hour Vehicle Volumes
River Street Infrastructure and Streetscape Design
Cambridge, Massachusetts

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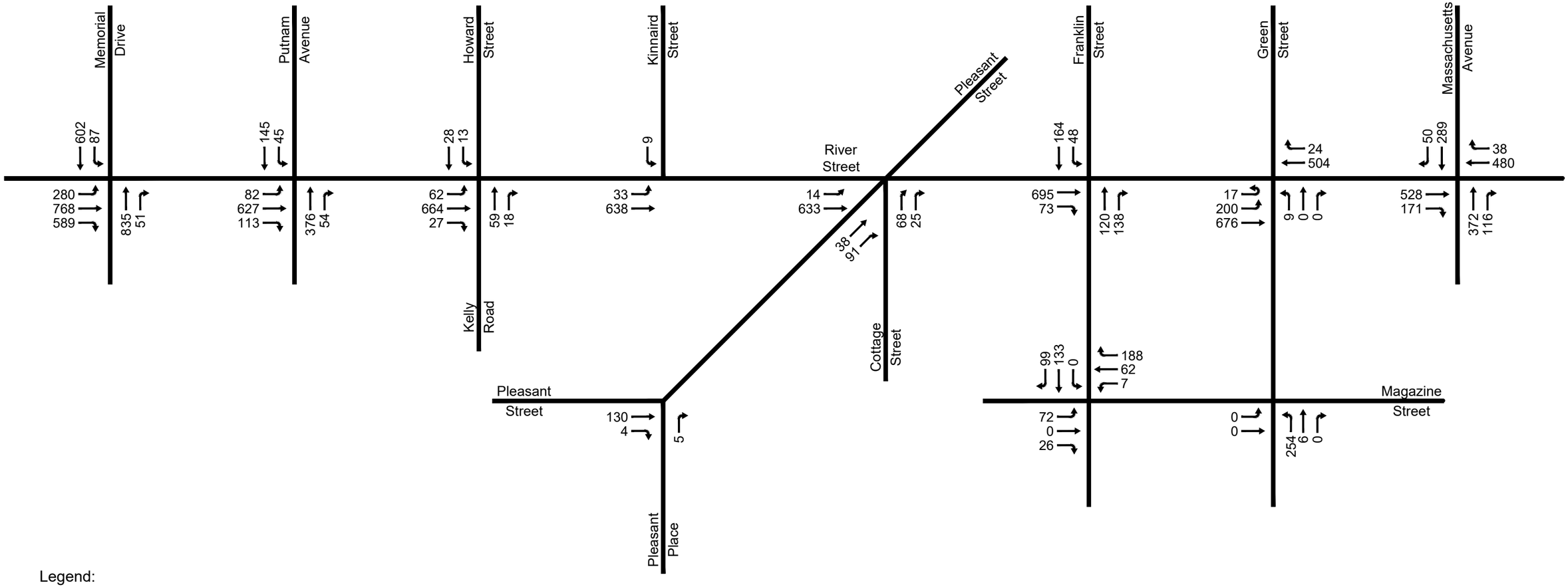

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River Street Reconstruction

Figure 5
2030 Preferred Alternative Weekday Afternoon
Peak Hour Vehicle Volumes
River Street Infrastructure and Streetscape Design
Cambridge, Massachusetts

2.2 Synchro Capacity Analysis

Intersection capacity analyses were conducted using the Synchro software at the study area intersections under the 2018 Existing conditions and 2030 Future Baseline conditions scenarios during the weekday morning and weekday afternoon peak hour traffic conditions. The analysis is based on Synchro capacity analysis methodologies and procedures contained in the *Highway Capacity Manual, 6th Edition* (HCM). Operating levels of service (LOS) for vehicles are reported on a scale of A to F where LOS A represents delays of 10 seconds or less and LOS F represents delays in excess of 50 seconds for unsignalized intersections and greater than 80 seconds for signalized intersections. Synchro capacity analysis does not have the depth of analysis to provide detailed analysis on pedestrian, bicycle and transit operations along the corridor. In order to capture the operations of other modes along the corridor, VISSIM micro simulation was utilized, as discussed in Section 2.3.

2.2.1 Existing Conditions Synchro Analysis

For the capacity analysis representing Existing conditions along the River Street corridor, a Synchro network was developed to include the following information at each of the study area intersections:

- Weekday morning and weekday afternoon peak hour volumes.
- Lane configurations.
- Signal timing, phasing, and coordination information.

The results of the 2018 Existing conditions capacity analysis are presented in subsequent sections of this report.

2.2.2 Future Baseline Conditions & Preferred Alternative Synchro Analyses

Capacity analyses for the 2030 Future Baseline conditions and Preferred Alternative were completed in order to represent projected future transportation conditions along River Street both without and with the proposed project in place. The 2030 Future Baseline conditions Synchro utilizes the 2018 Existing conditions Synchro network and then incorporates the 2030 Future Baseline conditions peak hour volumes and potential future roadway improvements within the study area. For the purposes of this analysis, the potential future roadway improvements include the optimization of existing traffic signal timings to reflect potential future adjustments based on growth in the area. No other substantial infrastructure changes were made for the 2030 Future Baseline Conditions.

The Preferred Alternative reflects the proposed improvements along River Street, described in more detail later in this report. The improvements generally include new lane and roadway configurations, new lane assignments, and changes to peak hour vehicular volumes based on changes to traffic patterns resulting from proposed project.

2.3 VISSIM Analysis

To provide a more sophisticated analysis and simulate multimodal transportation conditions (such as those on the River Street corridor), VISSIM software was used to build a traffic microsimulation model and analyze traffic operations of the study area. The VISSIM model was developed for Existing conditions, Future Baseline conditions, and the Preferred Alternative conditions. The following sections provide a description of the modeling and calibration methodologies associated with the VISSIM modeling efforts.

2.3.1 Existing Conditions

2.3.1.1 INPUTS

The VISSIM model of the 2018 Existing conditions used the Synchro capacity model (including the existing peak hour volumes, lane configurations, and traffic control information) as a basis for the analysis. Due to VISSIM's more detailed level of analysis, certain additions — such as crosswalks with pedestrian volumes, bicycle facilities with bike volumes, and transit bus routes, stops and frequency — were made to the VISSIM model to best reflect the Existing conditions along the corridor.

2.3.1.2 ANALYSIS AND METRIC OUTPUTS

The River Street corridor is part of a dense, urban roadway network, and transportation operations along the corridor vary based on activity and operations at adjacent and nearby intersections. The same is true of the simulations of the corridor performed in VISSIM where minor changes in vehicle frequency and patterns can result in different operations throughout the analyzed corridor. VISSIM provides the ability to run simulations multiple times with slight variations in volumes and arrival patterns of vehicles. Each simulation run is given a seed number and provides the same type of outputs for comparison to the other simulation runs. In order to best estimate typical conditions along the River Street corridor, seven simulation seeds were run for each condition and peak hour analyzed, and the average of the outputs for the seven simulations was used and summarized to represent the operations for each peak hour.

Each simulation run includes a seeding period which is the time in which vehicles, buses, pedestrians, and bicycles are being added to the modeled roadway network in a manner that would be representative of the conditions being modelled. Once the model is seeded, then data collection begins for a full simulation hour (representing the peak hour) of the various performance metrics.

Vehicle operations can be quantified in a number of ways. The results of the VISSIM simulations were analyzed using traditional traffic analysis measures, such as vehicle delay. Average vehicle delay identified by the VISSIM model was then reviewed in comparison to the HCM 6th Edition LOS threshold to apply the recognizable metric outputs of the model. Other performance measures obtained from the VISSIM model include vehicle queues and travel times between specific points on the corridor. The vehicle queues from VISSIM are reported in average queues and maximum queues for each approach to an intersection. Travel time metrics were utilized for general vehicle traffic and are also useful as a performance metric for buses. Bus travel times between stops can be consistently reported and travel time reliability is a key measure of effectiveness for transit. Because VISSIM simulates each individual vehicle and person within the study area, it is also possible to measure delay and travel times for specific vehicle types, such as for a specific MBTA route, and for non-vehicular modes.

2.3.1.3 CALIBRATION

The VISSIM model was calibrated for the Existing conditions based upon traffic volumes, observed queues and travel time runs collected along the roadway sections of the study area during the weekday morning and weekday afternoon peak hours. The data collected as part of the 2018 data collection effort were compared against the outputs of the Existing conditions VISSIM model. The main source of overall calibration included the comparison of field measured travel time runs along segments of the River Street corridor with the travel times extracted from the Existing conditions VISSIM model. Table 1provides a summary by segment of the field-measured and VISSIM-output travel times during the weekday morning and weekday afternoon peak hours.

Table 1: Existing Corridor Travel Time VISSIM Comparison

River Street Eastbound Segment	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	Field Measured	VISSIM Modeled	Field Measured	VISSIM Modeled
Memorial Dr to Putnam Ave	00:55	00:53	01:16	01:01
Putnam Ave to Howard St	00:42	00:44	01:12	00:54
Howard St to Franklin St	00:38	01:10	00:42	00:49
Franklin St to Green St	01:28	01:15	01:21	01:57
Green St to Mass Ave	01:07	00:53	01:02	00:47
Corridor Total	**04:50**	**04:55**	**05:33**	**05:28**

As shown in the table above, the overall travel times from the Existing conditions VISSIM model along the River Street corridor from Memorial Drive to Massachusetts Avenue are within five seconds of the field-observed travel time runs, equivalent to a difference of less than two percent. Comparable travel times between the field-observed runs and the VISSIM model outputs provide confidence in the accuracy of the model calibration for the Existing and future condition analyses.

Confirming that peak hour volumes traveling through the Existing conditions VISSIM model match the field counted peak hour traffic volumes is another tool for ensuring the VISSIM model is representative of Existing conditions. Utilizing the GEH statistic (a formula to compare two different traffic volume sets) the volume outputs of the model were reviewed against the peak hour traffic volumes to understand the accuracy of the model on the whole. A typical target for model calibration is to have a GEH statistic of less than 5.0 for at least 85% of all study area roadway segments. As shown in Table 2 below, all movements at key intersections along the River Street corridor in the VISSIM model meet this calibration metric. A full comparison of the peak hour volumes established in the Design Report and the volumes measured from the Existing conditions VISSIM model during the weekday morning and weekday afternoon peak hours are provided in Appendix A.

Table 2: VISSIM Model GEH Summary

	Intersection	GEH <5 for Individual Movements	
		Weekday Morning Peak Hour	Weekday Afternoon Peak Hour
River Street at	Putnam Ave	✓	✓
	Kelly Rd/Howard St	✓	✓
	Franklin St	✓	✓
	Green St	✓	✓
	Massachusetts Ave	✓	✓

1 GEH is a formula used in traffic engineering, traffic forecasting, and traffic modelling to compare two sets of traffic volumes

The last component of model calibration involves a review of the observed vehicle queues with the vehicle queues from the Existing conditions VISSIM model. Queues observed at the intersections of River Street and Putnam Avenue and River Street at Green Street were compared to the iterative outputs from VISSIM. Additional adjustment

to driver behaver was then applied to the Existing conditions VISSIM model to try and better match observed queues. A summary of the peak hour field observed queues and Existing model queues is provided in Appendix B.

The comparison of the peak hour volumes, vehicles queues, and travel time runs from the data collected in December 2018 to the outputs from VISSIM were utilized to calibrate the VISSIM model. Adjustments to the driving behavior of the vehicles in the network as well as specific changes to vehicle, pedestrian, bicycle and bus interactions were made in order to produce VISSIM outputs in line with the existing traffic conditions observed in the study area.

2.3.2 Future Baseline

2.3.2.1 INPUTS

The 2030 Future conditions VISSIM model used inputs from the 2018 Existing conditions analysis, as well as the 2030 Future Baseline volumes. The 2030 Future conditions VISSIM model also incorporated future year infrastructure modifications that are anticipated along with the expected growth in the area, as documented in the Design Report. Calibration efforts included as part of the Existing conditions VISSIM model, such as driving behavior and interaction adjustments, were carried over to the 2030 Future conditions VISSIM models. The results of the 2030 Future Baseline VISSIM model for the weekday morning and weekday afternoon peak hours are discussed in Section 5.2.1 of this report.

3 Exploration of Alternatives

3.1 Core Design Elements

Before determining and evaluating any alternatives, several aspects of the project were established as necessary across all scenarios. These core design elements stemmed from the goals of the project and input from the public and Working Group, as well as from City of Cambridge plans and policies. One major element identified was the need for a separated bike lane, as the 2015 Cambridge Bicycle Plan identified River Street as a recommended location for a separated facility. The 2019 Cycling Safety Ordinance reinforces this by requiring that all reconstruction projects follow the bike infrastructure recommendations in the 2015 Cambridge Bicycle Plan.

Other core elements to be incorporated into the proposed designs to the greatest extent feasible included:

- Address flooding and drainage capacity.
- Upgrade aging public and private utility infrastructure.
- Protect significant utilities which cannot be feasibly relocated.
- Preserve healthy trees.
- Maximize future trees and improve soil conditions.
- Maintain emergency vehicle access (16 to 18 feet).
- Maintain flexibility when routine maintenance or unexpected incidents block part of the road.
- Regulate parking to allow curbside space to be used more efficiently.
- Maintain regional freight and hazardous materials truck routes.
- Raise non-signalized side-street crossings.
- Improve intersection geometry to slow turns and improve sightlines, while accommodating buses and trucks.

3.2 Alternatives Overview

With the input of the public and the Working Group, numerous ideas were generated on how to meet the future challenges and opportunities present in the River Street corridor. These ideas were then refined further into specific transportation alternatives that reflected the core design elements and the design goals. The following concepts and ideas addressed different concerns along the River Street corridor – some along the entire corridor, with others aimed at improving a specific part of River Street:

Separated bicycle facility

- Essential to consider, as a core design element.
- All alternatives discussed would impact the entire length of the corridor.
- These alternatives included:
  - Traditional one-way separated bike lane.
  - Left-side separated bike lane.
  - Two-way separated bike lane.

Traffic operations

- Several potential alternatives addressed operations either throughout the corridor or in specific locations.
- One major decision was whether to — in whole or in part — reduce River Street to a single travel lane.
- Other alternatives considered included:
  - The installation of a bus-only lane.
  - Signal changes at various locations.
  - Revisions to traffic flow in the vicinity of Franklin Street and Green Street.

Pedestrian facilities

- River Street and its side streets were examined for potential pedestrian improvements.
- Alternatives considered throughout the corridor included:
  - Reducing crossing distances.
  - Raising crossings, especially on side-street crossings.
  - Curb extensions.
  - Opportunities to add pedestrian crossings.
- Location-specific alternatives included:
  - Signal timing and geometry changes at Putnam Avenue and River Street.
  - Changes to intersection geometry at Pleasant Street.

Placemaking and green infrastructure

- Some alternatives looked to create more vibrant spaces with green infrastructure along the River Street corridor.
- Tubman Square, at the intersections of River Street with Pleasant Street and Kinnaird Street, was identified as a potential location for this strategy.

3.3 Alternatives Analysis

Each alternative was tested using the methodology previously outlined, with the results summarized below. The alternatives that were both deemed feasible and aligned with the shared design goals were incorporated into the Preferred Alternative. Elements of the Preferred Alternative are denoted by an underline below.

3.3.1 Separated Bicycle Facilities

Left-side separated bike lane: While a left-side separated bike lane was expected to reduce the number of potential bus stop and driveway conflicts, it also exposed cyclists to more conflict points and had delay-causing transitions at either end of the corridor. The uncommon design of a left-side separated bike lane was also thought to be a source of potential confusion for users. Ultimately the left-side separated bike lane was deemed unfeasible since it was not consistent with a number of goals for the reconstruction project.

Two-way separated bike lane: A two-way separated bike lane was also considered, though this would require the removal of most curbside uses, including commercial loading and accessible parking. A two-way separated bike lane would also reduce the opportunity to provide activation spaces for local businesses and present a significant number of potential conflict points for cyclists traveling against the flow of traffic. Given the proximity of the Western Avenue one-way separated bike lane, the two-way separated bike lane on River Street was determined not to provide a sufficient level of additional access given the safety and connectivity concerns of a two-way facility.

One-way separated bike lane: A one-lane, one-way separated bike lane on the right side, with the eastbound flow of traffic on River Street, was deemed to be the feasible option that best addressed the shared design goals. The one-way separated bike lane would provide a directional pair to the bicycle facility on Western Avenue and would not result in the same connectivity issues as a two-way separated bike lane on either end of the River Street corridor.

Figure 6: One-Way Separated Bicycle Facility Example

Western Avenue, Cambridge

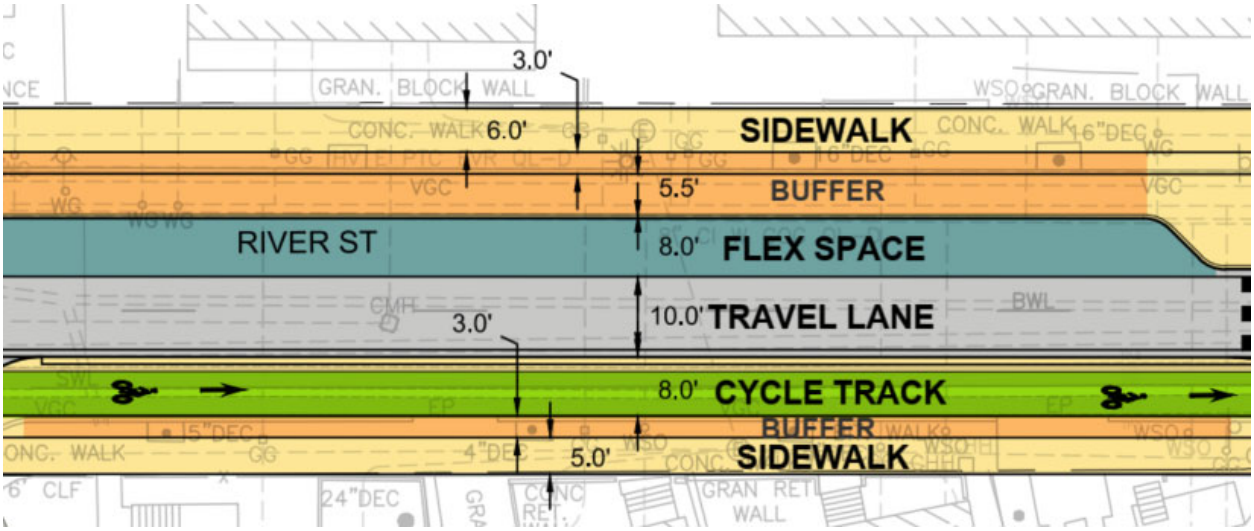
3.3.2 Traffic Operations

Reduction to Single Travel Lane: A reduction to a single general-use travel lane depicted in Figure 7 below was deemed infeasible due to the following primary factors:

- Emergency vehicle access is needed to/from the fire station located on River Street east of Kelly Road and Howard Street.
- The curb-to-curb width of the street must be a minimum of 18 feet to allow for emergency vehicles and maintenance operations. This would effectively result in a wide, single lane that could promote higher vehicle speeds, counter to the goals of the project.
- Occasional events such as crashes, breakdowns, and trash pickup would effectively close River Street to general traffic, causing delays and queues that could result in additional safety and operations issues.

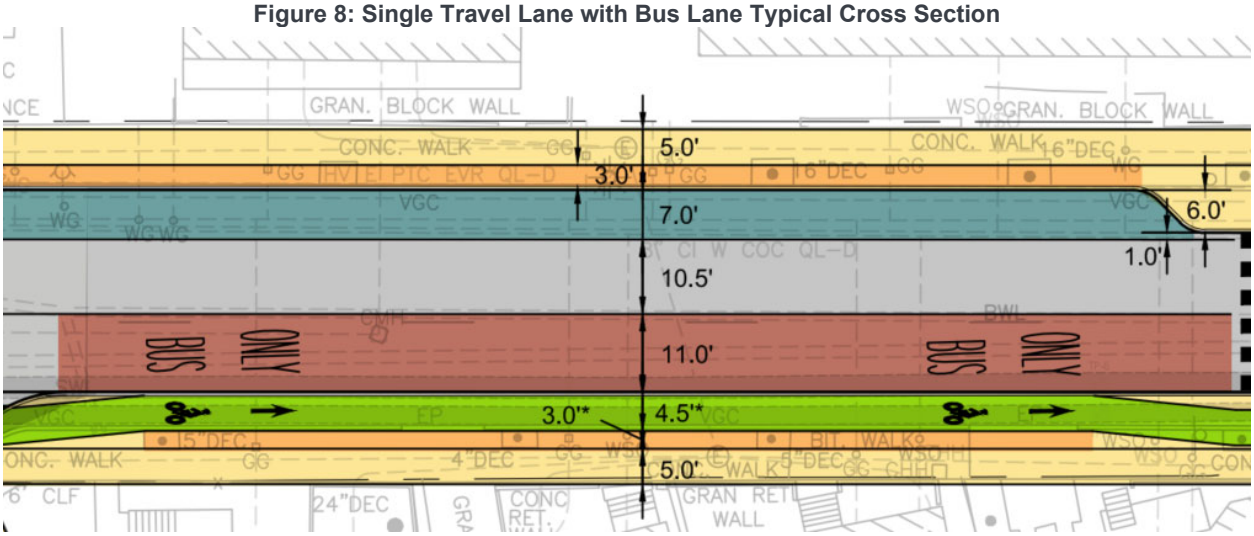
In addition to the above factors, reduction to a single travel lane along the length of River Street would potentially increase travel times for transit users on the MBTA 64 and 70 buses, reducing the overall effectiveness of the transit network traveling towards Central Square.

Figure 7: Single Travel Lane Typical Cross Section



Single General-Use Travel Lane Alongside a Bus-Only Lane: With a true one-lane option unworkable, it was determined that a single general-purpose lane alongside a bus-only lane, as illustrated in Figure 8, would be a more feasible option. The bus lane would reduce delay on the bus routes traveling to Central Square while providing additional roadway width for emergency access and vehicle operations during occasional events such as crashes. The bus lane would provide an opportunity to prioritize transit operations traveling towards the major transit hub of Central Square. While the bus-only lane would not generally be used by other traffic between intersections, the high numbers of riders on bus routes along River Street provide incentive to dedicate space to the efficient movement of transit vehicles. The single general-use lane, with turn lanes where appropriate, is projected to process projected future volumes — largely because the intersection of River Street at Massachusetts Avenue already operates with one through lane, limiting the overall throughput of the corridor.

Figure 8: Single Travel Lane with Bus Lane Typical Cross Section



Some variations from the bus-only lane would help operations throughout the corridor. First, two travel lanes would remain briefly at the beginning of the corridor, just east of Memorial Drive, to allow for the transition into the bus-only lane on River Street. Additionally, at each of the intersections along River Street, except Massachusetts Avenue, the bus lane and the right-turn lane would be combined.

Figure 9: Bus Lane and Bus Priority Signal Example

River Street from Franklin Street to Massachusetts Avenue Changes: A major consideration for traffic operations was the eastern segment of the River Street corridor, from Franklin Street to Massachusetts Avenue. With numerous intersections, converging bus routes, and a high volume of pedestrians, this area required a close look at both roadway geometry and traffic signal control. For the segment of River Street between Franklin Street and Massachusetts Avenue, alternatives were reviewed which continued the River Street bus lane to Massachusetts Avenue. Due to the potential for traffic congestion, delay and queuing within this segment of the corridor, maintaining the bus-only lane would be key to providing reliable transit service. In addition to the expected reduction in delay for riders, the reconfiguration of this segment to include a bus-only lane would also be expected to facilitate smoother operations in the primary traffic flow approaching Massachusetts Avenue by eliminating the need for buses to merge into general traffic shortly before the intersection.

Green Street Bus/Bikeway*:* The intersection of Green Street and Magazine Street currently experiences a number of safety and operational challenges, particularly for pedestrians trying to cross Green Street and for buses attempting to depart the stops on Green Street. In order to address some of these issues, the closure of Green Street to traffic other than buses and bicycles was analyzed. This proposed closure would require the directional change of Magazine Street to one-way westbound and the conversion of Franklin Street to two-way travel between Magazine Street and River Street. The resulting rerouting of vehicle traffic is reflected in the Preferred Alternative volumes and is not shown to result in significant operational issues at nearby intersections. At the intersection of River Street at Green Street, fewer vehicles and fewer potential conflict points should improve the safety conditions for all modes, while also reducing delays for buses traveling northbound on Green Street.

Traffic Signal Modifications: Other alternatives examined related to traffic signal changes at a number of locations along the River Street corridor.

River Street and Putnam Avenue Leading Pedestrian/Bicycle Intervals: To improve operations of the River Street single general-purpose eastbound travel lane, the pedestrian phasing at the intersection of River Street and Putnam Avenue would be changed from exclusive to concurrent with leading pedestrian/bicycle intervals. Concerns regarding additional conflicts between pedestrians and turning vehicles were noted. However, the lead pedestrian interval, implementation of curb extensions, and adjustments to the corner radii are expected to improve sightlines, reduce crossing distances, and help mitigate the introduction of pedestrian and turning vehicle conflicts.

River Street and Kelly Road/Howard Street Signal Elimination: Changes to the intersection of River Street and Kelly Road/Howard Street were also considered. An evaluation was completed of whether the existing signal was warranted based on vehicular traffic volumes. While the traffic volumes did not specifically warrant the presence of a traffic signal, the signal was proposed to be maintained based on the following benefits it provides:

- Assists school children traveling to the Amigos School with a signalized crossing, a designated Safe Routes to School location.
- Stops traffic for the Fire Department, during emergency pre-emption.
- Helps mitigate potential increased traffic volumes on Kelly Road/Howard Street resulting from any changes to Tubman Square (discussed below).

River Street and Massachusetts Avenue Dedicated Bus Phases: At River Street's intersection with Massachusetts Avenue, a dedicated signal phase would be provided for buses using the proposed bus lane to travel through the intersection without conflicts from general vehicle traffic or other modes. This bus-only phase would be expected to substantially reduce delay for riders on the bus routes served by River Street. Sensitivity analyses suggested that, though the additional phase for transit vehicles to enter the signalized intersection unobstructed would result in increased vehicle delays for general traffic, the overall increase is within acceptable ranges. The actual real-world increase in vehicle delay may be offset in part or in full by the reduction in friction previously associated with the movements of the bus into and out of general traffic. Further analysis determined that actuated transit phases which can be activated multiple times per cycle would minimize delay for buses. The short phase length is expected to limit each transit phase to serving one bus per cycle. However, because the transit phase is able to run up to twice per cycle, the next waiting bus would only have to wait through approximately half of the next cycle before another transit phase occurred. Thus, the inclusion of two transit phases per cycle was adopted into the Preferred Alternative.

3.3.3 Pedestrian Facilities

While the previous sections have discussed pedestrian improvements at specific signalized intersections, pedestrian improvements are proposed along the majority of the River Street corridor. Among the main pedestrian priorities throughout the corridor were shorter, more visible crossings and raised side street crossings such as those depicted below.

Figure 10: Pedestrian Facility Examples

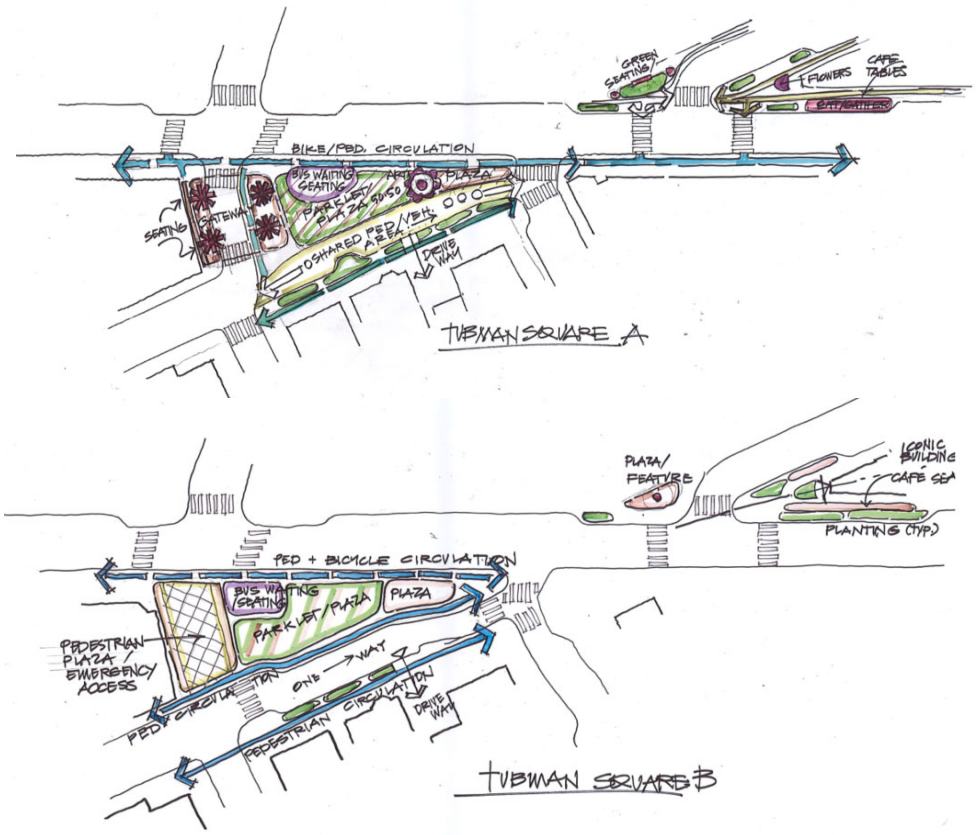
Among the measures deemed feasible and adopted into the Preferred Alternative are:

- Curb extensions at all unsignalized pedestrian crossings across River Street between Putnam Avenue and Pleasant Street.
- Changes to intersection geometry to improve safety at Pleasant Street north of River Street.
- Sidewalk level crosswalks across all unsignalized intersecting roadways.
- Proposed rectangular rapid flashing beacons (RRFBs) at all eight marked, unsignalized River Street crossing locations.
- The reduction of crosswalk widths at key locations including across the intersection of Pleasant Street and Cottage Street.
- The proposed closure of Green Street between River Street and Magazine Street to general traffic and the directional change of Magazine Street to one-way westbound would be expected to reduce conflict points and improve the pedestrian experience at that intersection.

3.3.4 Placemaking and Green Infrastructure

A number of alternatives for the Tubman Square area were discussed during the alternatives development process. Many of these proposed the closure or partial closure of either the small section of Pleasant Street directly adjacent to River Street or the similar stretch of Kinnaird Street. Figure 11

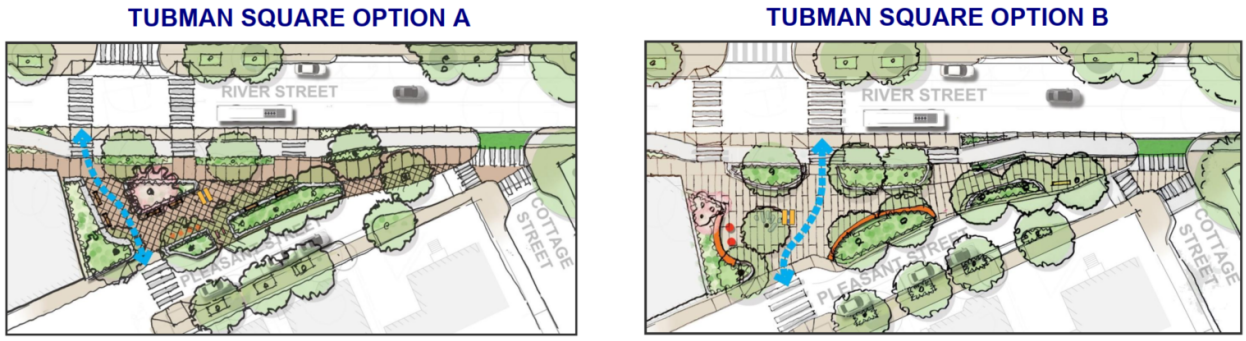
Figure 11: Tubman Square Concepts



An analysis was performed to estimate the possible rerouting of vehicles related to each potential closure. Based on existing travel patterns, origins and destinations for the vehicles which currently utilize each roadway segment being considered for closure were estimated. Alternative routing for these vehicles was estimated based on these origins and destinations. The majority of these alternative routes involved only rerouting vehicles at Tubman Square itself, with vehicles currently using Kinnaird Street instead using Pleasant Street and vice-versa. However, a portion of the rerouted vehicles were projected to reach River Street via alternatives to Tubman Square, instead utilizing Kelly Road, Howard Street, and Putnam Avenue. During the summer of 2020, Kinnaird Street between River Street and Pleasant Street was utilized as a construction staging area and closed to vehicle traffic. The COVID-19 pandemic prevented any formal study of the results of the closure, but no major operations or traffic issues were reported to the project team.

Based on a review of access, potential open space, and transportation needs, the decisions to close the short segment of Kinnaird Street was selected (as depicted below in Figure 12).

Figure 12: Tubman Square Alternatives



4 Preferred Alternative

The Preferred Alternative for the River Street corridor was developed based on the key decisions described in Section 3 and a review of the corridor as a whole. The Preferred Alternative is detailed more completely in the following sections, and the results of the analyses that helped to establish the Preferred Alternative are provided in Section 5. The chart below presents descriptions of the Preferred Alternative.

4.1 Overview of Preferred Alternative

Throughout Corridor	• Sidewalks on both sides of street. • Single general-purpose travel lane. • Single bus-only lane. • Separated bike lane along south side of River Street. • On-street parking in some areas on north side of street.
Memorial Drive Intersection	• No major geometry or phasing changes from Existing conditions. • Cycle length of signal changed to 150 seconds in order to coordinate with Putnam Avenue.
Putnam Avenue Intersection	• Signal phasing changes to two phases with leading pedestrian/bicycle intervals. • Concurrent pedestrian and bicycle phasing with protected intersection geometry. • River Street right turn features a mountable turn apron to allow larger vehicles to complete the movement.
Howard Street/ Kelly Road Intersection	• Signal phasing changes to two phases with leading pedestrian/bicycle intervals. • Shortened pedestrian crossings.
Tubman Square	• Kinnaird Street would be closed south of River Street; traffic would be diverted to Kelly Road and Pleasant Street. • Reconfiguration of the Pleasant Street and Cottage Street interection with River Street.
Franklin Street Intersection	• Magazine Street between Green Street and Franklin Street would be changed from bi-directional to one-way westbound. • Franklin Street between Magazine Street and Western Avenue would be changed to two-way. • New signals would be installed at Franklin Street's intersections with Western Avenue and River Street.
Green Street/ Massachusetts Avenue Intersection	• Removal of existing median island between Green Street and Massachusetts Avenue. • Green Street between Magazine Street and River Street would be limited to buses and bicycles only, other general traffic would be rerouted to Franklin Street. • Signal phasing changes to provide improved pedestrian safety and transit operations.

The following sections include illustrations of the proposed Preferred Alternative roadway geometry.

Figure 13: Memorial Drive to Putnam Avenue

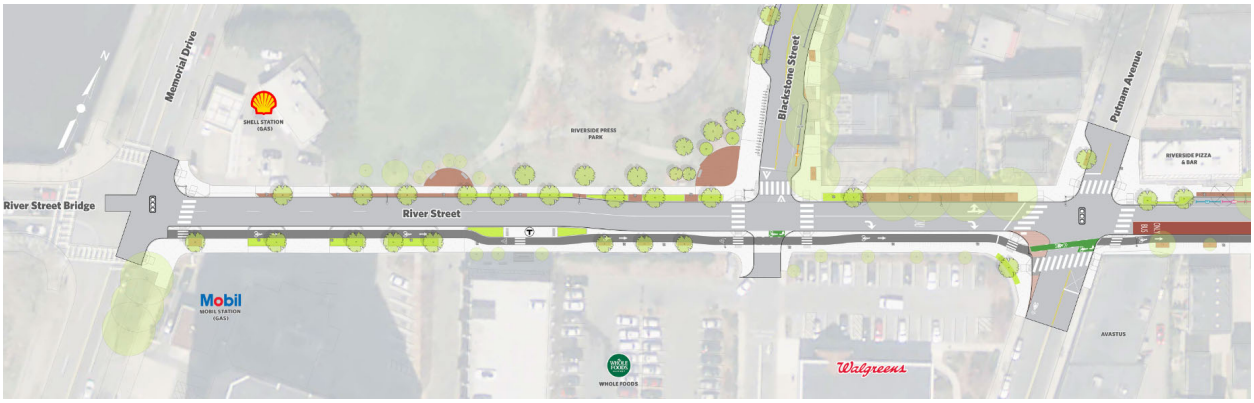


Figure 14: Putnam Avenue to Howard Street/Kelly Road

Figure 15: Tubman Square

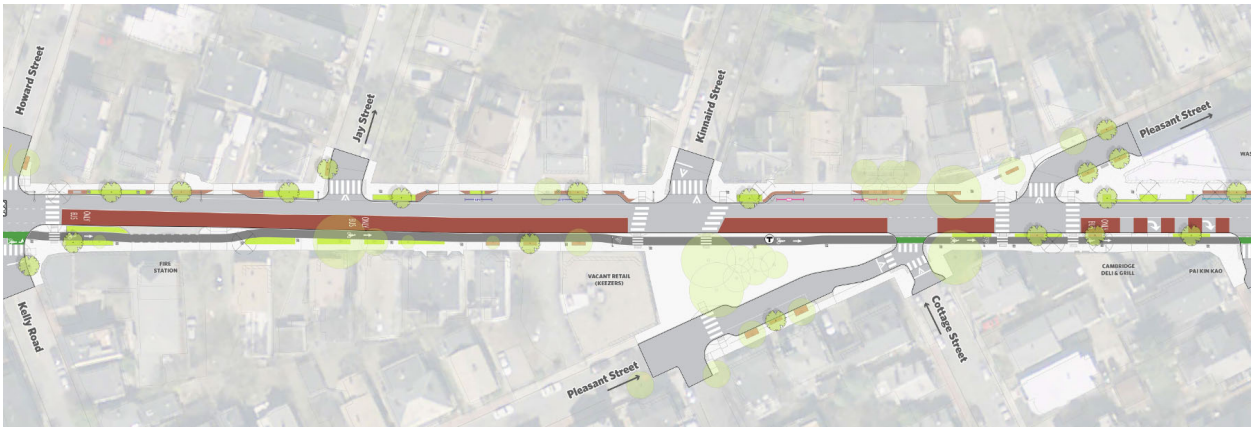
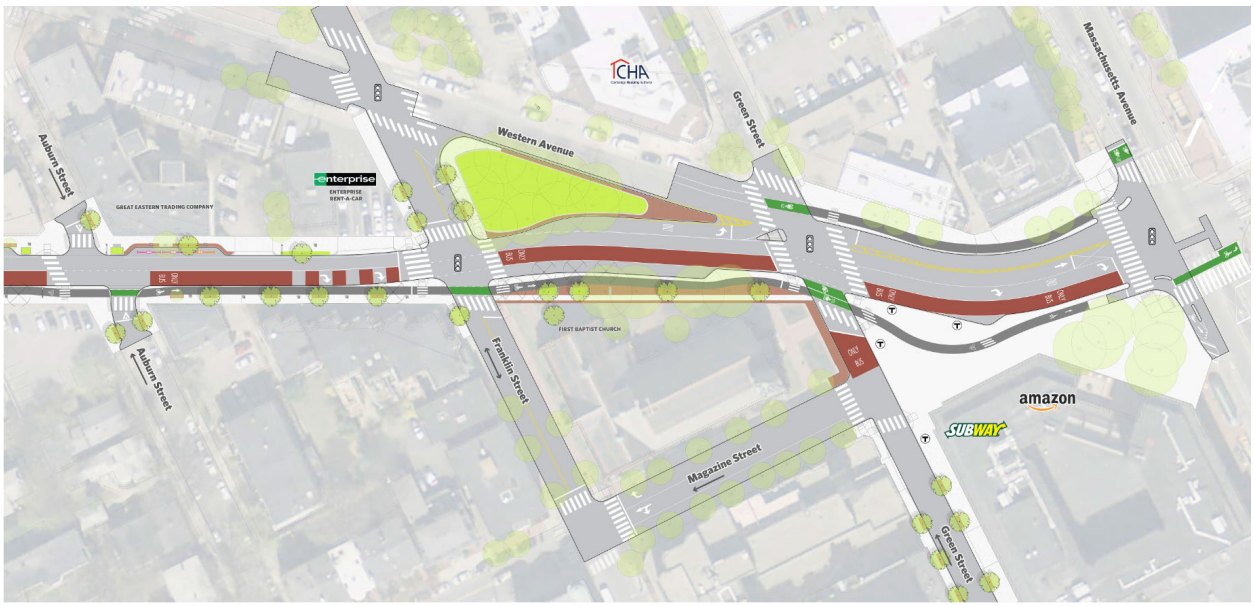


Figure 16: Franklin Street to Massachusetts Avenue



4.1.1 Transit Impacts

In addition to the geometric and signal changes detailed above, the Preferred Alternative would involve the rerouting of transit vehicles in the vicinity of River Street. Route 47, which currently starts and ends its runs at Massachusetts Avenue and Pearl Street, would instead depart from and return to the Green Street and Magazine Street stop, departing via Magazine Street and Franklin Street, and returning via Pearl Street and Green Street. Route 83 and Route 91 buses would also be rerouted from turning around on Magazine Street in the eastbound direction to River Street in the eastbound direction.

The proposed changes at Carl Barron Plaza and the surrounding area would move the Route 83 and Route 91 layovers from the existing busway on River Street to the west on River Street within a new layover area. The Preferred Alternative would also include the relocation of the Route 47 layover from Massachusetts Avenue to Green Street south of Magazine Street.

A Bus Lane on River Street Would Serve…

- Approximately 3,400 daily riders from MBTA buses and private shuttles
- 10 MBTA bus trips and 402 riders in the AM peak hour (8:30 – 9:30), plus 24 private shuttle trips
- 9 MBTA bus trips and 175 riders in the PM peak hour (6:00 – 7:00), plus 31 private shuttle trips
- 30% more riders with the re-routing of Route 64 from Magazine Street to River Street

It is likely that bus ridership will increase further in the future due to the efficiency of the bus lane. The Preferred Alternative with the bus lane shows a ***travel time savings of 4-5 minutes over the existing condition***. It is also expected that the bus lane would provide more reliable and on-time bus service[1].

4.1.2 Curb Use Impacts

The Preferred Alternative includes the reallocation of curb use regulations based on project goals and needs, community input, and a parking utilization and turnover study completed in 2018. The results of the 2018 parking study showed that currently, the curb space along River Street is primarily used for longer-term vehicle storage.[2] Reallocating curb use regulations therefore allows the Preferred Alternative to serve more users and meet more goals of the project including access for residents and local businesses, as well as activating and greening the street. By transitioning a larger portion of the parking along River Street from unregulated parking to time- and user-limited uses, the Preferred Alternative condition could serve a larger number of people in a day.

The existing and proposed curb regulations under the Preferred Alternative are shown in Table 3 for the entire study area and in Table 4 for River Street. In addition to changes to the vehicular regulations, the Preferred Alternative reallocates the curb space to provide dedicated space for additional crosswalks with curb extensions, curb extensions for seating at eateries, and landscaped areas for trees and planters.[3]

1 2,719 MBTA riders based on total daily load out at River Street opposite Blackstone Street (MBTA APC 2018 data). Includes routes 64, 70, and 70A. 420 private shuttle riders based on data provided by BioMed, Alexandria, TripAdvisor, and MASCO in January 2020. Peak hour riders based on total load out for trips within these hours. 30% increase based on increase in stop ridership at River Street opposite Blackstone Street from 269 to 345 with the re-routing of Route 64.

2 Detailed information on existing parking inventory, utilization and turnover available in Summary of Parking Utilization Findings (January 10, 2019) and Transportation Design Report (November 7, 2019).

3 A detailed summary of proposed curb regulations and impacts compiled separately and provided to the City of Cambridge on February 5, 2021.

Table 3: Summary of Parking Impacts – Complete Study Area

Regulation		Existing	Preferred Alternative	% Retained
All Parking		**505**	**448**	**89%**
Unregulated[1]		81	12	15%
Resident		388	400	103%
Accessible		16	14	88%
Meter	8AM - 6PM	16	4	106%
	8AM - 8PM	0	13	
Loading	8AM - 6PM[2]	4	5	125%

1 Includes 12 additional spaces on Montague Street not included in the original parking inventory as part of the utilization study, and two fewer spaces on River Street based on further refinements to the parking inventory as the design advanced

2 One 40-foot loading zone counted as two spaces

Table 4: Summary of Parking Impacts – River Street Only

Regulation		Existing	Preferred Alternative	% Retained
All Parking		**69**	**39**	**57%**
Unregulated[1]		51	0	0%
Resident		0	17	100%+
Accessible		4	2	50%
Meter	8AM - 6PM	13	2	115%
	8AM - 8PM	0	13	
Loading	8AM - 6PM[2]	1	5	500%

1 Includes two fewer spaces on River Street than the parking utilization study, based on further refinements to the parking inventory as the design advanced

2 One 40-foot loading zone counted as two spaces

5 Analysis Results

In the development and evaluation of the Preferred Alternative, the projected impacts of the proposed conditions to vehicles, transit, bicyclists, and pedestrians were analyzed. Synchro capacity analyses software was utilized to develop and analyze the impact of the Preferred Alternative geometry on vehicle traffic, and VISSIM micro-simulation software was utilized both to provide a more precise measure of the impacts to vehicle traffic, but also to analyze the impacts to bus transit, bicyclists, and pedestrians.

5.1 Synchro Results

5.1.1 Level of Service Criteria

The *Highway Capacity Manual, 6th Edition* (HCM) is a publication of the Transportation Research Board of the National Academies of Science which provides standards for the analysis of roadway facilities including signalized and unsignalized intersections. To represent the efficiency of overall vehicle operations, the HCM recommends using average vehicle delay expressed as a level-of-service (LOS) on a scale of A to F. LOS A represents delays of 10 seconds or less and LOS F represents delays in excess of 50 seconds for unsignalized intersections and greater than 80 seconds for signalized intersections.

5.1.2 Capacity Analysis Results

Intersection capacity analysis was conducted using Synchro capacity analysis software to evaluate the traffic conditions during the weekday morning and weekday afternoon peak hours under the 2018 Existing, 2030 Baseline and 2030 Preferred Alternative conditions.

The overall results of the intersection capacity analysis for the signalized study area intersections are presented in Table 5 below, and the results for the stop-controlled approaches to each of the unsignalized study area intersections are presented in Table 6. A more detailed summary of the capacity analysis for each study area intersection is provided in Appendix C.

Table 5: Synchro Capacity Analysis, Signalized Intersections

Intersection	Peak Period	2018 Existing LOS[1]	2018 Existing Delay[2]	2018 Existing ICU[3]	2030 Baseline LOS	2030 Baseline Delay	2030 Baseline ICU	2030 Pref. Alt. LOS	2030 Pref. Alt. Delay	2030 Pref. Alt. ICU
River Street at Memorial Drive	AM	F	127.0	0.89	F	132.7	0.91	F	130.1	0.91
	PM	F	115.5	0.90	F	100.8	0.91	F	119.9	0.91
River Street at Putnam Avenue	AM	D	35.3	0.52	D	43.4	0.65	D	36.3	0.75
	PM	C	32.9	0.61	D	41.9	0.67	D	35.9	0.81
River Street at Howard Street & Kelly Road	AM	B	15.3	0.37	B	18.7	0.38	B	16.6	0.55
	PM	B	15.1	0.37	B	18.3	0.38	A	9.0	0.56
River Street at Franklin Street	AM	-	-	-	-	-	-	D	53.0	0.71
	PM	-	-	-	-	-	-	E	69.7	0.76
River Street at Western Avenue & Green Street	AM	B	13.5	0.65	B	13.8	0.68	C	29.2	0.53
	PM	C	22.7	0.65	D	50.4	0.69	D	40.0	0.63
Franklin Street at Western Avenue	AM	-	-	-	-	-	-	D	51.6	0.51
	PM	-	-	-	-	-	-	C	24.7	0.53
River Street at Massachusetts Avenue & Prospect Street	AM	C	25.7	0.58	F	110.8	0.59	D	38.9	0.66
	PM	C	22.3	0.58	F	166.5	0.60	E	76.7	0.64

1 Level-of-Service
2 Average vehicle delay (s)
3 Intersection capacity utilization ratio
- Not applicable

A review of the Synchro capacity analysis results for the signalized intersections within the project study area indicates that the Preferred Alternative would result in similar or improved overall average vehicle delays during the weekday morning and weekday afternoon peak hours when compared to Existing conditions and the 2030 Baseline condition.

Under the Preferred Alternative, the intersections of River Street at Franklin Street and Western Avenue at Franklin Street are proposed to be placed under signal control. Capacity analysis results for the intersection of Franklin Street with River Street and with Western Avenue under the Existing and Baseline conditions are provided in the unsignalized summary table provided below. The intersection of River Street at Franklin Street is shown to operate at overall LOS D during the weekday morning peak hour and overall LOS E during the weekday afternoon peak hour under the Preferred Alternative. The intersection of Franklin Street and Western Avenue is shown to operate at overall LOS D or better during each of the peak hours studied under the Preferred Alternative condition.

Of note, the intersection of River Street at Massachusetts Avenue & Prospect Street is shown to experience a significant increase in average vehicle delay under future Baseline conditions. The increase in delay is primarily due to the increase in conflicting pedestrians modeled under the future year conditions. The additional conflicting

pedestrian decreases capacity for the right turning movements at the intersection, which results in significantly higher average vehicle delay. Under the Preferred Alternative condition, the addition of the transit phases into the signal alters how the signal is modeled in Synchro and is not showing as much average vehicle delay, even though the same number of conflicting pedestrians are included. With the more detailed analysis completed through the VISSIM modeling efforts on the project, no adjustment or calibration to the Synchro modeling was completed as part of this effort.

An evaluation of pedestrian, bicycle, transit, and vehicular operations is provided in the next VISSIM analysis section.

Table 6: Synchro Capacity Analysis, Unsignalized Intersections

Intersection	Peak Period	Movement		2018 Existing				2030 Baseline				2030 Pref. Alternative			
				LOS[1]	Delay[2]	V/C[3]	95th Q[4]	LOS	Delay	V/C	95th Q	LOS	Delay	V/C	95th Q
River Street at Kinnaird Street	AM	NB	TR	C	22.6	0.23	20	C	24.6	0.25	23	-	-	-	-
		SB	LT/L	C	16.6	0.06	5	C	17.5	0.07	5	C	19.5	0.07	5
	PM	NB	TR	D	25.7	0.33	35	D	28.9	0.36	40	-	-	-	-
		SB	LT/L	C	18.3	0.08	8	C	19.8	0.09	8	C	19.5	0.07	5
River Street at Pleasant Street	AM	NEB	R	B	12.5	0.21	20	B	12.8	0.22	20	-	-	-	-
	PM	NEB	R	B	11.5	0.16	15	B	11.7	0.16	15	-	-	-	-
River Street at Cottage Street	AM	NB	TR	B	12.5	0.21	5	B	11.8	0.07	5	C	19.7	0.40	45
	PM	NB	TR	B	11.5	0.16	18	B	12.4	0.20	18	C	22.2	0.54	78
River Street at Franklin Street	AM	NB	TR	-	-	-	-	-	-	-	-	-	-	-	-
		SB	LT	C	17.6	0.54	80	C	18.6	0.56	85	-	-	-	-
	PM	NB	TR	-	-	-	-	-	-	-	-	-	-	-	-
		SB	LT	C	15.9	0.40	48	C	16.6	0.42	53	-	-	-	-
Franklin Street at Western Avenue	AM	NB	L	-	-	-	-	-	-	-	-	-	-	-	-
		SB	TR	C	17.2	0.47	63	C	19.2	0.51	73	-	-	-	-
	PM	NB	L	-	-	-	-	-	-	-	-	-	-	-	-
		SB	TR	C	15.6	0.32	33	C	17.6	0.36	40	-	-	-	-
Green Street at Magazine Street	AM	EB	LT	A	8.3	0.12	10	A	8.3	0.12	10	-	-	-	-
		NB	LTR/LT	A	9.3	0.25	25	A	9.3	0.25	25	-	-	-	-
	PM	EB	LT	A	8.4	0.12	10	A	8.4	0.12	10	-	-	-	-
		NB	LTR/LT	A	9.9	0.36	40	A	9.9	0.36	40	-	-	-	-

1 Level-of-Service
2 Average vehicle delay (s)
3 Volume-to-capacity ratio
4 95th percentile queue length (ft)
- Not applicable

A review of the Synchro capacity analysis results of the critical approaches to the unsignalized intersections within the study area indicates that the Preferred Alternative is shown to result in generally acceptable delays during the weekday morning and weekday afternoon peak hours. An evaluation of pedestrian, bicycle, transit and vehicular operations is provided in the next VISSIM analysis section.

5.2 VISSIM Results

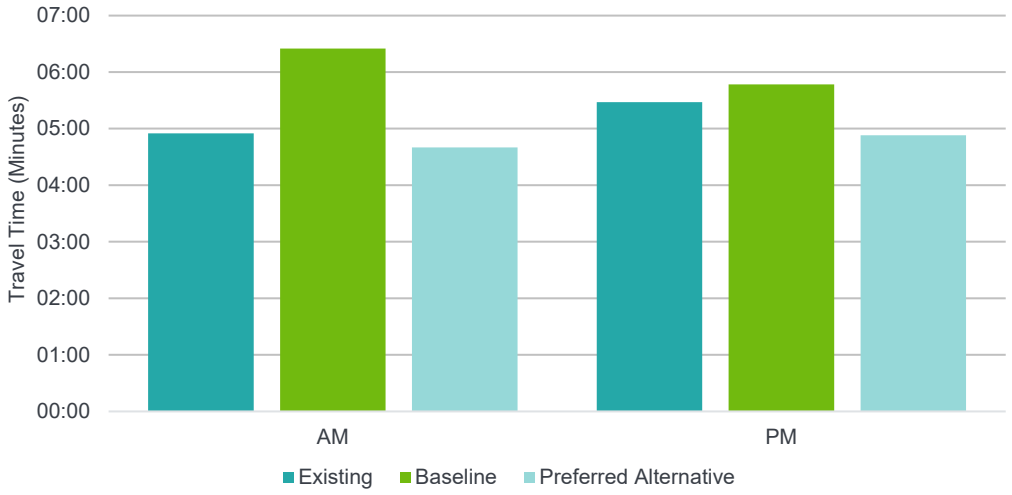
5.2.1 VISSIM Analysis

As described in previous sections of this report, VISSIM modeling was completed for the weekday morning and weekday afternoon peak hours under the Existing, Baseline and Preferred Alternative conditions. The following sections discuss the results of the VISSIM model as it relates to transit vehicles, pedestrians, bicycles and general traffic along River Street. The VISSIM model was primarily used to determine travel times along the River Street corridor and the delay experienced at individual intersections for each of the modes analyzed.

5.2.2 Travel Times

Vehicle travel times for general traffic were obtained from the VISSIM modeling under the Existing, Baseline and Preferred Alternative conditions. The travel times were recorded from a vehicle's entrance to the River Street corridor at Memorial Drive to a vehicle's exit of the corridor at Massachusetts Avenue. The average travel times for all vehicles on the River Street corridor during the weekday morning and weekday afternoon are shown in the chart below.

Figure 17: River Street Corridor Travel Times – All Vehicles

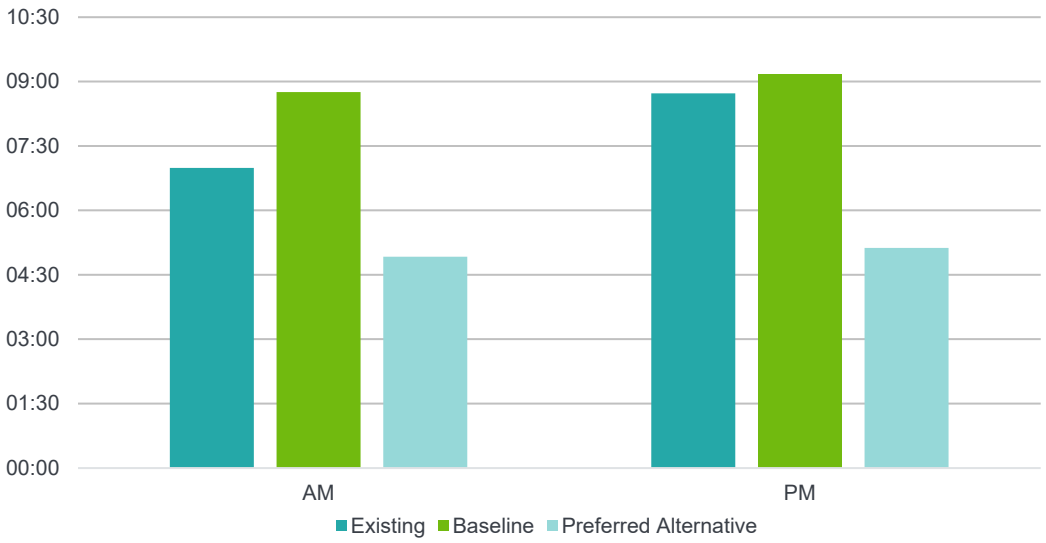


As shown, the proposed changes made under the Preferred Alternative condition are shown to effectively offset the projected growth in vehicle volumes and other modes under the Baseline condition. The improved signal coordination and traffic management results in overall travel times under the Preferred Alternative that are shown to be approximately the same as the Existing condition. Travel times along individual segments of the corridor are shown to change from Existing and Baseline conditions to the Preferred Alternative. These changes are due to the proposed

single travel lane for general traffic. With the single lane, vehicles queues on River Street shift from the roadway segment between Massachusetts Avenue to Franklin Street to the segment west of Franklin Street.

Travel times for the two existing MBTA bus routes (64 and 70) were measured for the length of the River Street corridor from Memorial Drive to Massachusetts Avenue. Travel times for the buses along the corridor include the travel time between bus stops as well as time to stop at the bus stops. The average travel times for the 64 and 70 bus routes are presented in the chart below.

Figure 18: Route 64/70 Average Inbound Travel Times



As shown, during the weekday morning and weekday afternoon peak hours the MBTA 64 and 70 bus routes are projected to travel the length of the River Street corridor in less than half the time with the proposed bus lane in place under the Preferred Alternative condition, relative to Existing or Baseline conditions.

With travel times for general traffic projected to remain approximately the same as the Existing condition and the travel times for buses along the corridor projected to be significantly reduced, overall person delay along the River Street corridor is projected to be decreased with the Preferred Alternative in place. This reduction in person delay along the River Street corridor would be further increased when accounting for the significantly higher number of people per vehicle on a bus compared to in private vehicles. A full summary of travel times along the corridor and by segment is provided in Appendix D.

5.2.3 Vehicle Queues

The VISSIM model provides measurements of vehicle queues at each of the study area intersections. As part of the calibration of the VISSIM model, field observations of peak hour queues lengths at key study area intersections were completed. A complete summary of the field observed queues and queues from the VISSIM model for the Existing, Baseline and Preferred Alternative conditions are summarized, by intersection movement, as an attachment to this report. The following table summarizes the average EB queue on River Street at each of the signalized intersections from the VISSIM model under Existing, Baseline, and Preferred Alternative.

Table 7: Existing & Projected River Street Queues VISSIM Comparison

Intersection	Peak Period	Movement	Average Queue, in Feet Existing	Baseline	Pref. Alt.
River St at Putnam Ave	AM	EB LTR/LT	136	264	225
		R	-	-	68
	PM	EB LTR/LT	179	181	288
		R	-	-	41
River St at Horward St/	AM	EB LTR/LT	81	71	209
Kelly Rd		R	-	-	47
	PM	EB LTR/LT	161	144	91
		R	-	-	16
River St at Franklin St	AM	EB TR/T	156	446	452
		R	-	-	20
	PM	EB TR/T	251	240	462
		R	-	-	16
River St at Green St	AM	EB L	135	183	53
		T	135	183	53
	PM	EB L	142	137	95
		T	142	137	90
River St at	AM	EB T	224	268	79
Massachusetts Ave		R	224	268	79
	PM	EB T	258	220	53
		R	258	220	53

Average queues on River Street approaching its intersection with Putnam Avenue and Howard Street/Kelly Road are shown to increase under certain peak hours for each intersection over the Baseline conditions. However, queues are shown to be managed within the available roadway segment lengths along River Street through coordination between the signals from Memorial Drive to Howard Street/Kelly Road.

As shown in the summary table above, the queues along River Street traveling in the eastbound direction are shown to shift from the Existing and Baseline conditions to the Preferred Alternative. Under the preferred alternative vehicle queues space would occur within a signal travel lane instead of two full travel lanes which is expected to increase queues on certain segments of the corridor. The average queues at the intersection of River Street and Franklin Street are shown to increase during the weekday afternoon peak hour. However, queues within the roadway segments between Franklin Street and Massachusetts Avenue are shown to be reduced from the Existing and Baseline conditions.

5.2.4 Pedestrian Delay

Overall average delay experienced by pedestrians was collected from the VISSIM model for each of the signalized study area intersections. Average pedestrian delays at the existing signalized study area intersections during the weekday morning and afternoon peak hours are shown in the charts below.

Figure 19: Weekday Morning Average Pedestrian Delay

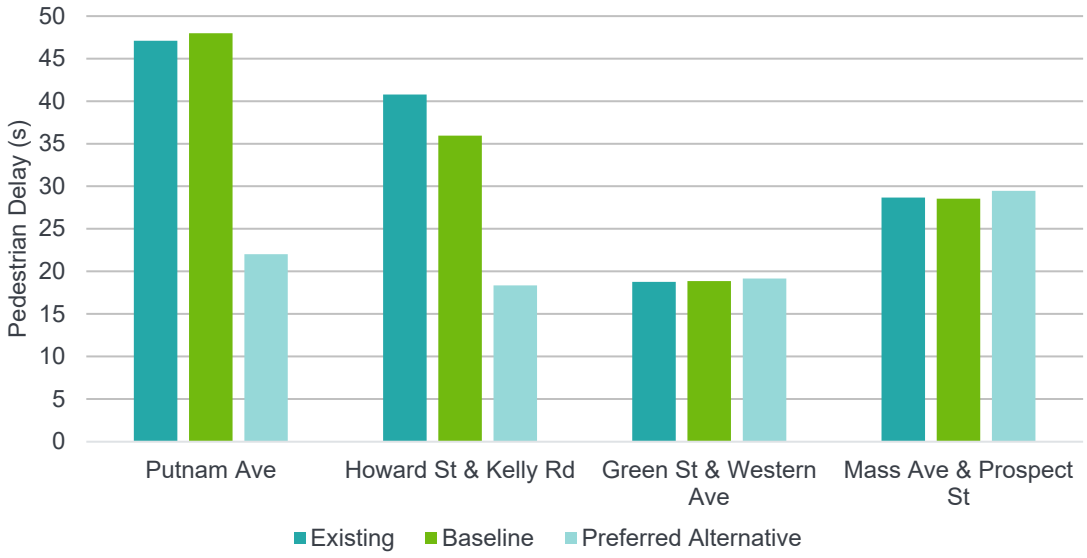
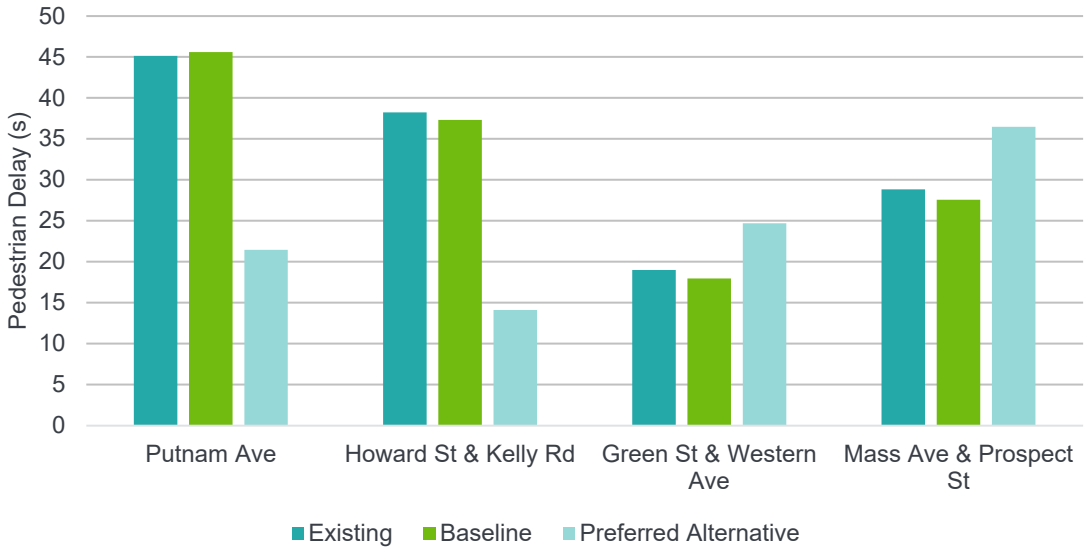


Figure 20: Weekday Afternoon Average Pedestrian Delay



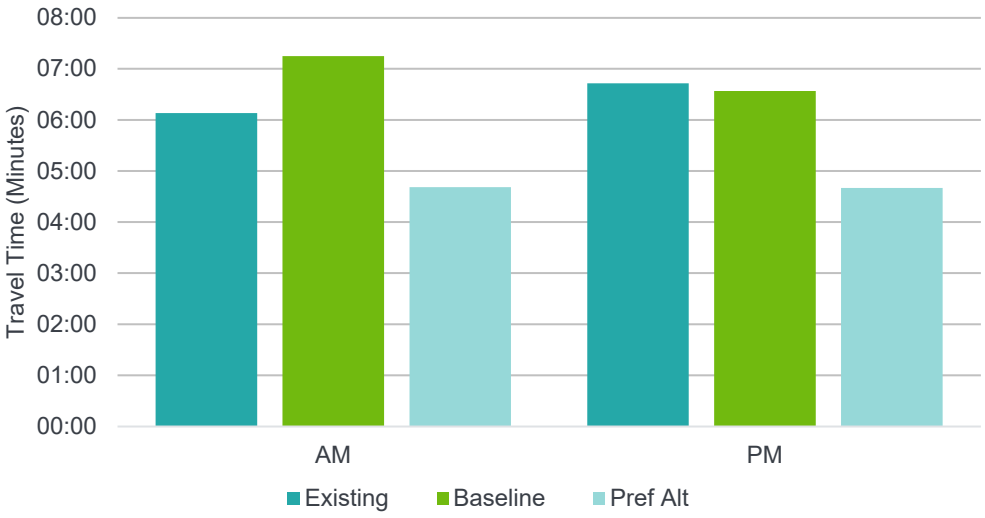
Under the Preferred Alternative condition, average pedestrian delay is projected to decrease by approximately half of the cycle length at River Street's intersections with Putnam Avenue and Kelly Road/Howard Street, due to their conversion from exclusive pedestrian phasing to concurrent pedestrian phasing. Average pedestrian delay at the intersection of River Street/Western Avenue at Green Street is shown to increase by approximately 2% during the weekday morning peak hour and by approximately 30% during the weekday afternoon peak hour relative to Existing conditions. This increase is due in part to the reduction of concurrent pedestrian phasing with northbound Green Street traffic. Due to Green Street northbound becoming exclusive to buses and bikes, conflicting pedestrian movements were determined to present an undue risk to crossing pedestrians. For this reason, combined with the overall reduction in northbound Green Street traffic, less time in the signal cycle is available for pedestrians crossing River Street/Western Avenue. It is expected that pedestrian patterns in the area would adjust to the change, potentially crossing at other locations and reducing the overall increase in pedestrian delay at the intersection.

At the intersection of River Street/Prospect Street at Massachusetts Avenue, pedestrian delay is estimated to increase by about 3% during the weekday morning peak hour and by approximately 26% during the weekday afternoon peak hour under the Preferred Alternative compared to Existing conditions. This increase in pedestrian delay is primarily due to the adjustments to the lead pedestrian interval in order to accommodate the exclusive transit phases. The shortened lead pedestrian interval under the Preferred Alternative reduces the amount of unconflicted crossing time at the intersection, leading to an increase in delay experienced by pedestrians. Additionally, the two transit phases per cycle contribute to the increase in pedestrian delay experienced under the Preferred Alternative as no pedestrian movements are allowed when this phase is called. Post-construction review of the tradeoffs between transit delay and pedestrian delay at this location may be warranted.

5.2.5 Bicycle Travel Times

The primary objective of bicycle improvements as part of the River Street Reconstruction project was to provide safer, separated facilities. A summary of the bicycle travel times along the River Street corridor from Memorial Drive to Massachusetts Avenue under Existing, Baseline, and Preferred Alternative conditions is provided in Figure 21 below.

Figure 21: Bicycle Travel Times



Although the primary focus of the proposed separated bicycle facilities is to improve safety and comfort for bicyclists, the Preferred Alternative condition is also shown to result in decreased travel times for bicyclists along the River Street corridor. The separated facility provides queueing space approaching each of the corridor signals, allowing people on bikes to take advantage of the proposed lead bicycle intervals under the Preferred Alternative and leading to reduced delay. The overall effect of this may be somewhat overestimated in Figure 21 due to how the bicycles were modeled in the general travel lanes under Existing and Baseline conditions VISSIM model. However, the proposed changes are ultimately expected to improve safety, comfort, and travel times for people traveling on bicycles on River Street.

6 Conclusion

Incorporating technical analyses using programs such as Synchro and VISSIM, close observation of conditions in the field, and local expertise provided through input from the Working Group, public and City staff, the Preferred Alternative identified in this report is shown to meet the goals and needs of the River Street Reconstruction Project on numerous fronts. This includes improving safety across modes and throughout the corridor, while providing sufficient capacity for future travel demands – including accommodations for transit, pedestrians, and bicyclists. Most importantly, it meets the shared design goals created by the community, as detailed below:

6.1 Goals Met

Safe

- Implements separated bicycle facility with protected intersection at Putnam Avenue.
- Enhances pedestrian facilities, including more visible pedestrian crossings of side streets.
- Updates signal phasing in Green Street/Massachusetts Avenue area to improve pedestrian safety.

Inclusive

- By focusing on the movement of people, and not just cars, through the corridor, design allows more users to access comfortable and efficient transportation.

Human-scale

- Design achieves better separation between the high-speed, high-volume roads to the west and the neighborhood corridor of River Street.

Ecological

- Transit efficiency and operational improvements around Massachusetts Avenue and Green Street could lead to lower congestion and thus, lower emissions.
- Improvement of transit, bicyle, and pedestrian facilities may encourage more users to shift from car travel to other modes.

Multimodal

- Installs both a dedicated transit lane a separated bicycle facility.
- Improves sidewalks and crossings to make the streetscape more comfortable for pedestrians.
- Maintains a lane for general traffic, with low impact on capacity.

Activated

- Maintenance of wide sidewalks allows for activation spaces along corridor.
- Redesign of Tubman Square allows for a more user-friendly public space.
- Geometric and signal changes allow for easier access to Carl Barron Plaza and Massachusetts Avenue.

Resilient

- Streetscape redesign allows for the improvement of drainage along River Street.

6.2 Next Steps

Having taken into account all the shared design goals, core elements and existing constraints of the River Street Reconstruction Project, the design identified as the preferred alternative in this report could be advanced to the 25% design process. From there, it was presented to the public in a virtual public meeting as well as through a StoryMap website in November 2020. Incorporating this public review, 75% design plans were developed and submitted to the City for review in January 2021. While these designs will continue to be adjusted and refined, changes are not anticipated to vary significantly from the findings of this report.

Appendix A: VISSIM Volumes Comparison

APPENDIX A: VISSIM VOLUMES COMPARISON

Weekday Morning Peak Hour
River Street Reconstruction
Cambridge, MA

			Volumes								
			Existing			Baseline			Preferred Alt.		
Intersection	Dir.	Turn	Input	Output	GEH	Input	Output	GEH	Input	Output	GEH
River Street at	EB	L	193	186	0.51	193	193	0.00	193	191	0.14
Memorial Drive		T	831	800	1.09	873	893	0.67	873	849	0.82
		R	771	766	0.18	771	742	1.05	771	764	0.25
	NB	T	581	582	0.04	590	598	0.33	590	596	0.25
		R	88	95	0.73	88	109	2.12	88	91	0.32
	SB	L	75	77	0.23	75	79	0.46	75	73	0.23
		T	855	845	0.34	858	852	0.21	858	857	0.03
River Street at	EB	L	66	67	0.12	69	80	1.27	69	75	0.71
Putnam Avenue		T	601	578	0.95	604	766	6.19	604	694	3.53
		R	163	167	0.31	199	216	1.18	199	233	2.31
	NB	T	76	76	0.00	117	134	1.52	145	181	2.82
		R	16	42	4.83	45	80	4.43	45	45	0.00
	SB	L	82	88	0.65	82	110	2.86	82	98	1.69
		T	197	209	0.84	243	264	1.32	243	255	0.76
River Street at	EB	L	30	28	0.37	30	41	1.85	30	35	0.88
Howard Street & Kelly Road		T	659	633	1.02	691	858	6.00	688	749	2.28
		R	32	32	0.00	32	40	1.33	35	41	0.97
	NB	T	22	23	0.21	22	36	2.60	30	40	1.69
		R	4	4	0.00	8	6	0.76	16	15	0.25
	SB	L	17	16	0.25	17	18	0.24	17	16	0.25
		T	16	18	0.49	19	24	1.08	20	30	2.00
River Street at	EB	L	8	14	1.81	8	22	3.61	16	16	0.00
Kinnaird Street		T	655	628	1.07	691	831	5.07	691	774	3.07
		R	3	3	0.00	3	4	0.53	0	0	-
	NB	T	43	48	0.74	43	52	1.31	0	0	-
		R	0	0	-	0	0	-	0	0	-
	SB	L	9	8	0.34	9	9	0.00	9	8	0.34
		T	1	2	0.82	1	4	1.90	0	0	-
River Street at	EB	BL	7	6	0.39	7	9	0.71	7	6	0.39
Pleasant Street & Cottage Street		T	657	625	1.26	693	822	4.69	693	774	2.99
	NB	BR	14	12	0.55	14	9	1.47	14	13	0.27
		R	10	9	0.32	10	8	0.67	10	9	0.32
	NEB	T	4	1	1.90	4	1	1.90	14	23	2.09
		BR	89	75	1.55	89	72	1.89	108	97	1.09
River Street at	EB	T	609	579	1.23	645	728	3.17	654	726	2.74
Franklin Street		R	125	115	0.91	125	139	1.22	116	144	2.46
	NB	T	0	0	-	0	0	-	57	78	2.56
		R	0	0	-	0	0	-	102	121	1.80
	SB	L	46	39	1.07	46	39	1.07	46	34	1.90
		T	237	227	0.66	237	233	0.26	237	172	4.55

Intersection	Dir.	Turn	Volumes								
			Existing			Baseline			Preferred Alt.		
			Input	Output	GEH	Input	Output	GEH	Input	Output	GEH
River Street at	EB	U	13	14	0.27	13	17	1.03	13	16	0.79
Green Street & Western Avenue		L	60	55	0.66	60	68	1.00	114	126	1.10
		T	579	541	1.61	615	674	2.32	681	746	2.43
	WB	T	387	357	1.56	438	470	1.50	438	437	0.05
		R	20	17	0.70	20	23	0.65	20	21	0.22
	NB	L	78	79	0.11	78	89	1.20	7	8	0.37
		T	67	76	1.06	67	92	2.80	0	7	3.74
		R	52	47	0.71	52	49	0.42	5	0	3.16
Magazine Street at	EB	L	64	70	0.73	64	73	1.09	0	0	-
Green Street		T	9	3	2.45	9	4	1.96	0	0	-
	NB	L	22	26	0.82	22	31	1.75	144	182	2.98
		T	133	133	0.00	133	157	1.99	12	15	0.82
		R	1	5	2.31	1	6	2.67	0	0	-
River Street at	EB	T	520	470	2.25	593	574	0.79	593	608	0.61
Massachusetts Avenue		R	119	119	0.00	139	155	1.32	139	137	0.17
& Prospect Street	WB	T	360	352	0.42	407	464	2.73	407	431	1.17
		R	30	28	0.37	41	38	0.48	41	39	0.32
	NB	T	197	175	1.61	281	256	1.53	281	255	1.59
		R	119	138	1.68	145	175	2.37	145	174	2.30
	SB	T	308	413	5.53	343	605	12.03	343	605	12.03
		R	28	24	0.78	32	30	0.36	32	27	0.92
Franklin Street at	WB	L	66	67	0.12	66	85	2.19	66	19	7.21
Western Avenue		T	409	381	1.41	460	491	1.42	389	473	4.05
	NB	L	0	0	-	0	0	-	57	0	10.68
	SB	T	217	200	1.18	217	187	2.11	217	188	2.04
		R	4	3	0.53	4	3	0.53	4	2	1.15
Franklin Street at	EB	L	0	0	-	0	0	-	65	74	1.08
Magazine Street		T	65	71	0.73	65	71	0.73	0	0	-
		R	20	24	0.85	20	27	1.44	20	23	0.65
	WB	L	11	11	0.00	11	13	0.58	11	22	2.71
		T	13	14	0.27	13	19	1.50	41	20	3.80
		R	0	0	-	0	0	-	94	0	13.71
	SB	L	11	9	0.63	11	11	0.00	0	0	-
		T	231	210	1.41	231	228	0.20	233	205	1.89
		R	120	122	0.18	120	132	1.07	120	111	0.84

APPENDIX A: VISSIM VOLUMES COMPARISON

Weekday Afternoon Peak Hour
River Street Reconstruction
Cambridge, MA

			Volumes								
			Existing			Baseline			Preferred Alt.		
Intersection	Dir.	Turn	Input	Output	GEH	Input	Output	GEH	Input	Output	GEH
River Street at	EB	L	280	258	1.34	280	265	0.91	280	281	0.06
Memorial Drive		T	744	678	2.48	768	708	2.21	768	741	0.98
		R	589	575	0.58	589	580	0.37	589	585	0.17
	NB	T	831	806	0.87	835	787	1.69	835	846	0.38
		R	51	54	0.41	51	54	0.41	51	52	0.14
	SB	L	87	77	1.10	87	85	0.22	87	84	0.32
		T	599	597	0.08	602	590	0.49	602	618	0.65
River Street at	EB	L	79	76	0.34	82	77	0.56	82	65	1.98
Putnam Avenue		T	624	634	0.40	627	660	1.30	627	659	1.26
		R	95	100	0.51	113	106	0.67	113	160	4.02
	NB	T	257	203	3.56	330	250	4.70	376	380	0.21
		R	31	45	2.27	54	65	1.43	54	52	0.27
	SB	L	45	45	0.00	45	59	1.94	45	60	2.07
		T	104	112	0.77	145	143	0.17	145	164	1.53
River Street at	EB	L	62	53	1.19	62	56	0.78	62	60	0.26
Howard Street & Kelly Road		T	642	600	1.69	668	662	0.23	664	653	0.43
		R	23	44	3.63	23	50	4.47	27	48	3.43
	NB	T	45	45	0.00	45	49	0.58	59	62	0.39
		R	2	2	0.00	4	1	1.90	18	16	0.49
	SB	L	13	11	0.58	13	12	0.28	13	17	1.03
		T	21	22	0.22	25	25	0.00	28	32	0.73
River Street at	EB	L	19	20	0.23	19	22	0.66	33	19	2.75
Kinnaird Street		T	610	574	1.48	638	635	0.12	638	676	1.48
		R	4	4	0.00	4	5	0.47	0	0	-
	NB	T	76	68	0.94	76	66	1.19	0	0	-
		R	1	1	0.00	1	1	0.00	0	0	-
	SB	L	9	10	0.32	9	9	0.00	9	11	0.63
		T	3	2	0.63	3	2	0.63	0	0	-
River Street at	EB	BL	14	11	0.85	14	11	0.85	14	13	0.27
Pleasant Street & Cottage Street		T	605	561	1.82	633	627	0.24	633	668	1.37
	NB	BR	68	58	1.26	68	56	1.52	68	66	0.24
		R	25	22	0.62	25	23	0.41	25	26	0.20
	NEB	T	8	1	3.30	8	2	2.68	38	18	3.78
		BR	71	72	0.12	71	75	0.47	91	112	2.08
River Street at	EB	T	655	550	4.28	683	617	2.59	695	703	0.30
Franklin Street		R	85	69	1.82	85	75	1.12	73	91	1.99
	NB	T	0	0	-	0	0	-	120	119	0.09
		R	0	0	-	0	0	-	138	123	1.31
	SB	L	48	32	2.53	48	40	1.21	48	50	0.29
		T	164	123	3.42	164	145	1.53	164	180	1.22

Intersection	Dir.	Turn	Volumes								
			Existing			Baseline			Preferred Alt.		
			Input	Output	GEH	Input	Output	GEH	Input	Output	GEH
River Street at	EB	U	17	17	0.00	17	17	0.00	17	19	0.47
Green Street & Western Avenue		L	134	104	2.75	134	115	1.70	200	197	0.21
		T	552	448	4.65	580	514	2.82	676	665	0.42
	WB	T	428	366	3.11	504	463	1.86	504	407	4.54
		R	24	19	1.08	24	23	0.21	24	21	0.63
	NB	L	159	129	2.50	159	140	1.55	9	17	2.22
		T	82	77	0.56	82	91	0.97	0	17	5.83
		R	68	49	2.48	68	51	2.20	0	2	2.00
Magazine Street at	EB	L	71	80	1.04	71	92	2.33	0	0	-
Green Street		T	12	4	2.83	12	4	2.83	0	0	-
	NB	L	21	22	0.22	21	22	0.22	254	232	1.41
		T	235	176	4.12	235	191	3.01	6	36	6.55
		R	4	6	0.89	4	7	1.28	0	0	-
River Street at	EB	T	480	384	4.62	528	440	4.00	528	504	1.06
Massachusetts Avenue		R	157	115	3.60	171	133	3.08	171	160	0.86
& Prospect Street	WB	T	415	334	4.19	480	413	3.17	480	387	4.47
		R	32	24	1.51	38	30	1.37	38	32	1.01
	NB	T	288	401	6.09	372	642	11.99	372	691	13.84
		R	77	71	0.70	116	104	1.14	116	110	0.56
	SB	T	229	258	1.86	289	344	3.09	289	378	4.87
		R	39	55	2.33	50	79	3.61	50	44	0.88
Franklin Street at	WB	L	76	57	2.33	76	65	1.31	76	65	1.31
Western Avenue		T	529	451	3.52	605	554	2.12	455	474	0.88
	NB	L	0	0	-	0	0	-	120	0	15.49
	SB	T	138	100	3.48	138	121	1.49	138	169	2.50
		R	6	31	5.81	6	35	6.41	6	7	0.39
Franklin Street at	EB	L	0	0	-	0	0	-	72	107	3.70
Magazine Street		T	72	81	1.03	72	93	2.31	0	0	-
		R	26	23	0.61	26	22	0.82	26	28	0.38
	WB	L	7	9	0.71	7	9	0.71	7	14	2.16
		T	16	13	0.79	16	13	0.79	62	55	0.92
		R	1	0	1.41	1	0	1.41	188	0	19.39
	SB	L	13	10	0.88	13	10	0.88	0	0	-
		T	132	99	3.07	132	111	1.91	133	149	1.35
		R	99	83	1.68	99	97	0.20	99	123	2.28

River Street Reconstruction

Appendix B: VISSIM Queues Comparison

APPENDIX B: VISSIM QUEUES COMPARISON

Weekday Morning Peak Hour
River Street Reconstruction
Cambridge, MA

			Field Measured Queues			VISSIM Queues					
				5-Min		Existing		Baseline		Preferred Alt.	
Intersection	Dir.	Turn	Average	Max Avg.	Max	Average	Max	Average	Max	Average	Max
River Street at	EB	L	-	-	-	818	1,555	1,141	1,562	386	617
Memorial Drive		T	-	-	-	744	1,555	1,141	1,562	386	617
		R	-	-	-	743	1,555	1,141	1,562	386	617
	NB	T	-	-	-	117	434	107	376	114	385
		R	-	-	-	118	434	107	376	114	385
	SB	L	-	-	-	201	697	248	632	169	621
		T	-	-	-	201	697	248	632	169	621
River Street at	EB	L	195	270	620	136	514	264	728	225	714
Putnam Avenue		T	195	270	-	136	514	264	728	225	714
		R	50	390	610	136	514	264	728	68	670
	NB	T	20	75	205	21	158	26	161	18	146
		R	-	-	-	21	158	26	161	18	146
	SB	L	-	-	-	71	331	76	356	194	513
		T	130	160	340	71	331	76	356	194	513
River Street at	EB	L	-	-	-	81	380	71	423	209	743
Howard Street & Kelly Road		T	-	-	-	81	380	71	423	209	743
		R	-	-	-	81	380	71	423	47	672
	NB	T	-	-	-	9	71	5	57	6	71
		R	-	-	-	9	71	5	57	6	71
	SB	L	-	-	-	8	68	6	67	6	64
		T	-	-	-	8	68	6	67	6	64
River Street at	EB	L	-	-	-	38	248	100	453	94	494
Kinnaird Street		T	-	-	-	38	245	99	450	94	494
		R	-	-	-	38	242	98	447	-	-
	NB	T	-	-	-	8	90	5	85	-	-
		R	-	-	-	8	90	5	85	-	-
	SB	L	-	-	-	3	32	0	28	1	33
		T	-	-	-	3	25	0	28	-	-
River Street at	EB	BL	-	-	-	26	170	114	308	162	356
Pleasant Street &		T	-	-	-	11	111	33	143	27	147
Cottage Street	NB	BR	-	-	-	12	76	33	143	75	235
		R	-	-	-	12	76	33	143	75	235
	NEB	T	-	-	-	15	100	55	175	75	235
		BR	-	-	-	15	100	55	175	75	235
River Street at	EB	T	-	-	-	156	568	446	815	452	812
Franklin Street		R	-	-	-	156	568	446	815	20	422
	NB	T	-	-	-	-	-	-	-	56	181
		R	-	-	-	-	-	-	-	56	181
	SB	L	-	-	-	37	148	43	166	22	189
		T	-	-	-	37	148	43	166	22	189

Intersection	Dir.	Turn	Field Measured Queues			VISSIM Queues					
				5-Min		Existing		Baseline		Preferred Alt.	
			Average	Max Avg.	Max	Average	Max	Average	Max	Average	Max
River Street at	EB	U	25	60	120	135	261	183	258	53	282
Green Street & Western Avenue		L	190	325	540	135	261	183	258	53	282
		T	35	125	460	135	261	183	258	53	282
	WB	T	70	115	210	11	298	15	321	64	313
		R	-	-	-	11	298	15	321	64	313
	NB	L	50	100	320	48	123	45	128	2	95
		T	-	-	-	48	123	45	128	2	95
		R	10	35	100	43	117	39	120	2	95
Magazine Street at	EB	L	-	-	-	49	199	24	168	-	-
Green Street		T	-	-	-	49	199	24	168	-	-
	NB	L	-	-	-	95	257	67	264	15	167
		T	-	-	-	95	257	67	264	15	167
		R	-	-	-	95	257	67	264	-	-
River Street at	EB	T	-	-	-	224	351	268	357	79	292
Massachusetts Avenue		R	-	-	-	224	351	268	357	79	292
& Prospect Street	WB	T	-	-	-	88	361	62	368	81	373
		R	-	-	-	88	361	62	368	81	373
	NB	T	-	-	-	44	269	48	285	76	284
		R	-	-	-	44	269	48	285	76	284
	SB	T	-	-	-	98	381	43	346	56	378
		R	-	-	-	98	381	43	346	56	378
Franklin Street at	WB	L	-	-	-	2	170	16	319	11	130
Western Avenue		T	-	-	-	2	170	16	319	11	130
	NB	L	-	-	-	-	-	-	-	-	-
	SB	T	-	-	-	73	154	119	158	98	134
		R	-	-	-	73	154	119	158	98	134
Franklin Street at	EB	L	-	-	-	-	-	-	-	4	63
Magazine Street		T	-	-	-	9	87	3	58	-	-
		R	-	-	-	9	87	3	58	4	63
	WB	L	-	-	-	1	51	2	53	9	91
		T	-	-	-	1	38	1	39	9	92
		R	-	-	-	-	-	-	-	-	-
	SB	L	-	-	-	37	234	40	245	-	-
		T	-	-	-	37	234	40	245	23	181
		R	-	-	-	37	234	40	245	23	181

APPENDIX B: VISSIM QUEUES COMPARISON

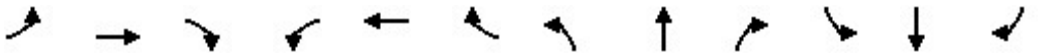
Weekday Afternoon Peak Hour
River Street Reconstruction
Cambridge, MA

			Field Measured Queues			VISSIM Queues					
				5-Min		Existing		Baseline		Preferred Alt.	
Intersection	Dir.	Turn	Average	Max Avg.	Max	Average	Max	Average	Max	Average	Max
River Street at	EB	L	-	-	-	209	974	340	911	262	619
Memorial Drive		T	-	-	-	137	974	340	911	262	619
		R	-	-	-	134	974	340	911	262	619
	NB	T	-	-	-	172	617	177	565	153	520
		R	-	-	-	173	617	177	565	153	520
	SB	L	-	-	-	84	378	80	374	95	417
		T	-	-	-	84	378	80	374	95	417
River Street at	EB	L	160	215	325	179	593	181	560	288	742
Putnam Avenue		T	170	225	-	179	593	181	560	288	742
		R	170	225	550	179	593	181	560	41	660
	NB	T	205	275	430	371	504	446	504	513	767
		R	-	-	-	371	504	446	504	513	767
	SB	L	-	-	-	63	288	215	472	79	304
		T	75	110	200	63	288	215	472	79	304
River Street at	EB	L	-	-	-	161	572	144	477	91	759
Howard Street & Kelly Road		T	-	-	-	161	572	144	477	91	759
		R	-	-	-	161	572	144	477	16	536
	NB	T	-	-	-	9	94	8	88	10	114
		R	-	-	-	9	94	8	88	10	114
	SB	L	-	-	-	16	115	26	119	6	73
		T	-	-	-	16	115	26	119	6	73
River Street at	EB	L	-	-	-	70	284	64	288	66	515
Kinnaird Street		T	-	-	-	70	282	64	285	66	515
		R	-	-	-	69	279	63	282	-	-
	NB	T	-	-	-	11	94	6	91	-	-
		R	-	-	-	11	94	6	91	-	-
	SB	L	-	-	-	6	46	2	30	5	59
		T	-	-	-	6	44	2	30	-	-
River Street at	EB	BL	-	-	-	56	255	65	216	231	357
Pleasant Street &		T	-	-	-	20	121	21	119	24	146
Cottage Street	NB	BR	-	-	-	39	168	48	149	145	236
		R	-	-	-	39	168	48	149	145	236
	NEB	T	-	-	-	28	142	38	125	145	236
		BR	-	-	-	28	142	38	125	145	236
River Street at	EB	T	-	-	-	251	656	240	629	462	812
Franklin Street		R	-	-	-	251	656	240	629	16	283
	NB	T	-	-	-	-	-	-	-	74	181
		R	-	-	-	-	-	-	-	74	181
	SB	L	-	-	-	38	152	36	162	48	212
		T	-	-	-	38	152	36	162	48	212

Intersection	Dir.	Turn	Field Measured Queues			VISSIM Queues					
				5-Min		Existing		Baseline		Preferred Alt.	
			Average	Max Avg.	Max	Average	Max	Average	Max	Average	Max
River Street at	EB	U	50	95	200	142	260	137	250	95	288
Green Street & Western Avenue		L	130	210	600	142	260	137	250	90	284
		T	35	80	400	142	260	137	250	90	284
	WB	T	35	95	280	57	324	55	327	103	317
		R	-	-	-	57	324	55	327	103	317
	NB	L	95	120	260	46	115	63	125	3	93
		T	-	-	-	46	115	63	125	3	93
		R	25	50	100	46	115	56	118	3	93
Magazine Street at	EB	L	-	-	-	76	221	56	195	-	-
Green Street		T	-	-	-	76	221	56	195	-	-
	NB	L	-	-	-	136	331	197	433	36	257
		T	-	-	-	136	331	197	433	36	257
		R	-	-	-	136	331	197	433	-	-
River Street at	EB	T	-	-	-	258	348	220	353	53	286
Massachusetts Avenue		R	-	-	-	258	348	220	353	53	286
& Prospect Street	WB	T	-	-	-	72	352	77	363	90	375
		R	-	-	-	72	352	77	363	90	375
	NB	T	-	-	-	45	282	127	290	97	292
		R	-	-	-	45	282	127	290	97	292
	SB	T	-	-	-	114	386	57	343	45	335
		R	-	-	-	114	386	57	343	45	335
Franklin Street at	WB	L	-	-	-	37	253	44	312	29	305
Western Avenue		T	-	-	-	37	253	44	312	29	305
	NB	L	-	-	-	-	-	-	-	-	-
	SB	T	-	-	-	47	151	55	153	78	134
		R	-	-	-	47	151	55	153	78	134
Franklin Street at	EB	L	-	-	-	-	-	-	-	13	117
Magazine Street		T	-	-	-	36	163	32	106	-	-
		R	-	-	-	36	163	32	106	13	117
	WB	L	-	-	-	1	52	1	46	25	201
		T	-	-	-	1	39	1	33	25	202
		R	-	-	-	-	-	-	-	-	-
	SB	L	-	-	-	15	148	35	175	-	-
		T	-	-	-	15	148	35	175	18	146
		R	-	-	-	15	148	35	175	18	146

River Street Reconstruction

Appendix C: Synchro Capacity Analysis



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	520	119	0	360	30	0	197	119	0	308	28
Future Volume (vph)	0	520	119	0	360	30	0	197	119	0	308	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	10	11	11	10
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		70	0		35
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1792	1252	0	1721	0	0	1531	1422	0	1670	1449
Flt Permitted												
Satd. Flow (perm)	0	1792	590	0	1721	0	0	1531	766	0	1670	876
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		127			355			293			490	
Travel Time (s)		3.5			9.7			6.7			11.1	
Confl. Peds. (#/hr)			384			231			210			179
Confl. Bikes (#/hr)						10						
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.79	0.79	0.79	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	6%	29%	2%	6%	17%	2%	20%	6%	2%	10%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	571	131	0	415	0	0	249	151	0	367	33
Turn Type		NA	custom		NA			NA	custom		NA	custom
Protected Phases		1 2			2			4			4	
Permitted Phases			6						8			8
Detector Phase		1 2	6		2			4	8		4	8
Switch Phase												
Minimum Initial (s)			5.0		10.0			10.0	5.0		10.0	5.0
Minimum Split (s)			34.0		44.0			41.0	26.0		41.0	26.0
Total Split (s)			34.0		44.0			41.0	26.0		41.0	26.0
Total Split (%)			37.8%		48.9%			45.6%	28.9%		45.6%	28.9%
Yellow Time (s)			3.0		3.0			3.0	3.0		3.0	3.0
All-Red Time (s)			2.0		2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)			5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag			Lag		Lag				Lag			Lag
Lead-Lag Optimize?			Yes		Yes				Yes			Yes
Recall Mode			Max		Max			Max	Max		Max	Max
Act Effct Green (s)		47.0	29.0		39.0			36.0	21.0		36.0	21.0
Actuated g/C Ratio		0.52	0.32		0.43			0.40	0.23		0.40	0.23
v/c Ratio		0.61	0.69		0.56			0.41	0.85		0.55	0.16
Control Delay		11.5	40.9		27.2			13.0	63.5		28.4	34.1
Queue Delay		1.2	0.0		2.0			0.8	0.0		0.0	0.0
Total Delay		12.7	40.9		29.2			13.8	63.5		28.4	34.1

Lane Group	Ø1	Ø5	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	5	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	1.0	5.0	5.0
Minimum Split (s)	5.0	15.0	15.0
Total Split (s)	5.0	15.0	15.0
Total Split (%)	6%	17%	17%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Max	Max	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B	D		C			B	E		C	C
Approach Delay		18.0			29.2			32.6			28.9	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)		232	66		190			79	83		205	18
Queue Length 95th (ft)		342	#157		291			109	#156		m266	m32
Internal Link Dist (ft)		47			275			213			410	
Turn Bay Length (ft)									70			35
Base Capacity (vph)		935	190		745			612	178		668	204
Starvation Cap Reductn		2	0		193			150	0		0	0
Spillback Cap Reductn		174	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.75	0.69		0.75			0.54	0.85		0.55	0.16

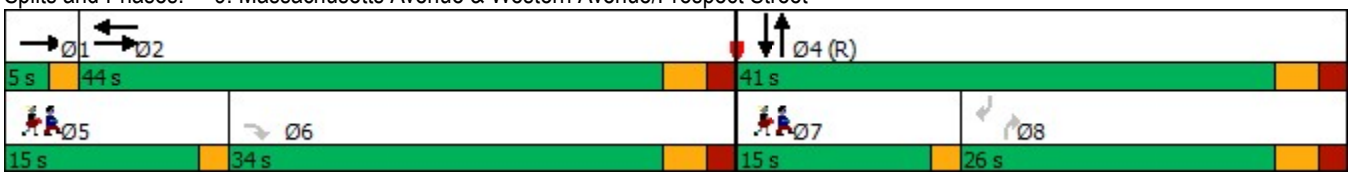
Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 4:NBSB, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 58.3% ICU Level of Service B
Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Massachusetts Avenue & Western Avenue/Prospect Street



Lane Group	Ø1	Ø5	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

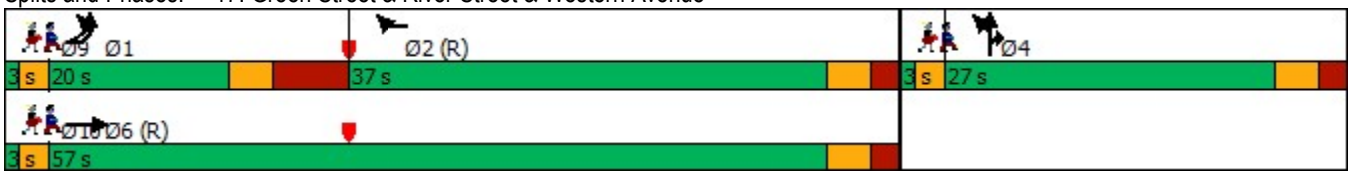
Intersection Summary

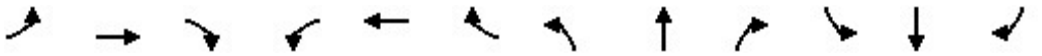
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
Lane Configurations											
Traffic Volume (vph)	13	60	579	387	20	78	67	52			
Future Volume (vph)	13	60	579	387	20	78	67	52			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	15	15	12	12	12			
Grade (%)			0%				0%				
Storage Length (ft)		100		0		0		0			
Storage Lanes		1		1		0		1			
Taper Length (ft)		25				25					
Satd. Flow (prot)	0	1703	3202	1702	0	0	1699	1335			
Flt Permitted		0.950					0.974				
Satd. Flow (perm)	0	1703	3202	1702	0	0	1648	1335			
Right Turn on Red	Yes				No			No			
Satd. Flow (RTOR)		133									
Link Speed (mph)			25				30				
Link Distance (ft)			256				125				
Travel Time (s)			7.0				2.8				
Confl. Peds. (#/hr)					238	27		40			
Confl. Bikes (#/hr)					11						
Peak Hour Factor	0.92	0.92	0.92	0.98	0.98	0.90	0.90	0.90			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	0%	3%	9%	6%	10%	14%	3%	21%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0			
Parking (#/hr)											
Mid-Block Traffic (%)			0%				0%				
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	79	629	415	0	0	161	58			
Turn Type	custom	Prot	NA	Prot		Split	NA	Prot			
Protected Phases	1	1	6	2		4	4	4	3	9	10
Permitted Phases	1										
Detector Phase	1	1	6	2		4	4	4			
Switch Phase											
Minimum Initial (s)	8.0	8.0	15.0	15.0		15.0	15.0	15.0	1.0	1.0	1.0
Minimum Split (s)	16.0	16.0	37.0	24.0		27.0	27.0	27.0	3.0	3.0	3.0
Total Split (s)	20.0	20.0	57.0	37.0		27.0	27.0	27.0	3.0	3.0	3.0
Total Split (%)	22.2%	22.2%	63.3%	41.1%		30.0%	30.0%	30.0%	3%	3%	3%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	2.0	2.0	2.0
All-Red Time (s)	5.0	5.0	2.0	2.0		2.0	2.0	2.0	0.0	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0			
Total Lost Time (s)		8.0	5.0	5.0			5.0	5.0			
Lead/Lag	Lag	Lag				Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	C-Max	C-Max		Max	Max	Max	Max	Max	Max
Act Effct Green (s)		8.0	52.0	39.2			22.0	22.0			
Actuated g/C Ratio		0.09	0.58	0.44			0.24	0.24			
v/c Ratio		0.29	0.34	0.56			0.39	0.18			
Control Delay		4.4	10.6	10.2			31.7	28.7			
Queue Delay		0.0	0.0	0.2			0.0	0.0			
Total Delay		4.4	10.7	10.3			31.7	28.7			

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
LOS		A	B	B			C	C			
Approach Delay			10.0				30.9				
Approach LOS			A				C				
Queue Length 50th (ft)		0	91	55			77	26			
Queue Length 95th (ft)		11	124	77			135	58			
Internal Link Dist (ft)			176				45				
Turn Bay Length (ft)		100									
Base Capacity (vph)		342	1850	741			415	326			
Starvation Cap Reductn		0	0	34			0	0			
Spillback Cap Reductn		0	157	0			0	0			
Storage Cap Reductn		0	0	0			0	0			
Reduced v/c Ratio		0.23	0.37	0.59			0.39	0.18			

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 1 (1%), Referenced to phase 2:WBR and 6:EBT, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 65.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 17: Green Street & River Street & Western Avenue





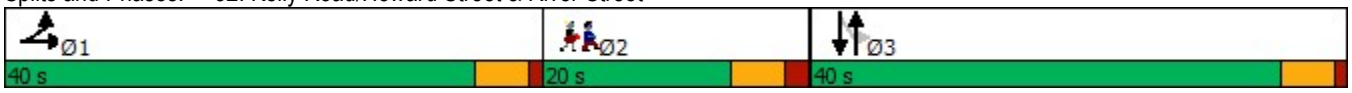
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	659	32	0	0	0	0	22	4	17	16	0
Future Volume (vph)	30	659	32	0	0	0	0	22	4	17	16	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	14	14	14	11	11	11
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3258	0	0	0	0	0	1980	0	0	1595	0
Flt Permitted		0.998									0.819	
Satd. Flow (perm)	0	3258	0	0	0	0	0	1980	0	0	1340	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		907			486			204			452	
Travel Time (s)		24.7			13.3			4.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			31						3			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.69	0.69	0.69
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	6%	3%	2%	2%	2%	2%	0%	0%	18%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	801	0	0	0	0	0	32	0	0	48	0
Turn Type	Split	NA						NA		Perm	NA	
Protected Phases	1	1						3			3	
Permitted Phases										3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	5.0	5.0						7.0		7.0	7.0	
Minimum Split (s)	10.0	10.0						12.0		12.0	12.0	
Total Split (s)	40.0	40.0						40.0		40.0	40.0	
Total Split (%)	40.0%	40.0%						40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.0						5.0			5.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	Max	Max						Min		Min	Min	
Act Effct Green (s)		35.6						8.0			8.0	
Actuated g/C Ratio		0.52						0.12			0.12	
v/c Ratio		0.48						0.14			0.31	
Control Delay		13.5						30.7			35.6	
Queue Delay		0.0						0.0			0.0	
Total Delay		13.5						30.7			35.6	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B						C			D	
Approach Delay		13.5						30.7			35.6	
Approach LOS		B						C			D	
Queue Length 50th (ft)		121						13			20	
Queue Length 95th (ft)		182						33			39	
Internal Link Dist (ft)		827			406			124			372	
Turn Bay Length (ft)												
Base Capacity (vph)		1685						1024			693	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.48						0.03			0.07	

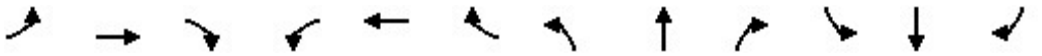
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 68.9			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 36.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 32: Kelly Road/Howard Street & River Street



Lane Group	Ø2
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



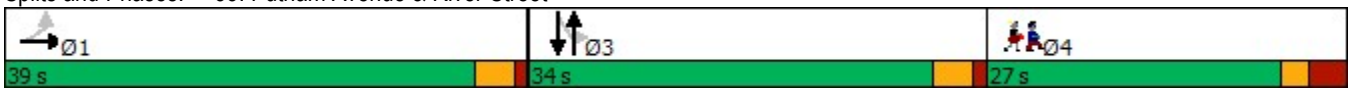
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	601	163	0	0	0	0	76	16	82	197	0
Future Volume (vph)	66	601	163	0	0	0	0	76	16	82	197	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	13	13	13
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3274	0	0	0	0	0	1677	0	0	1867	0
Flt Permitted		0.996									0.870	
Satd. Flow (perm)	0	3274	0	0	0	0	0	1677	0	0	1649	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		33										
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		714			907			489			555	
Travel Time (s)		19.5			24.7			11.1			12.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			25						26			
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	5%	8%	2%	2%	2%	2%	4%	38%	5%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	932	0	0	0	0	0	108	0	0	349	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		1						3			3	
Permitted Phases	1									3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	10.0	10.0						15.0		15.0	15.0	
Minimum Split (s)	14.0	14.0						19.0		19.0	19.0	
Total Split (s)	39.0	39.0						34.0		34.0	34.0	
Total Split (%)	39.0%	39.0%						34.0%		34.0%	34.0%	
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		4.0						4.0			4.0	
Lead/Lag								Lead		Lead	Lead	
Lead-Lag Optimize?								Yes		Yes	Yes	
Recall Mode	Max	Max						Max		Max	Max	
Act Effct Green (s)		35.0						30.0			30.0	
Actuated g/C Ratio		0.35						0.30			0.30	
v/c Ratio		0.80						0.21			0.71	
Control Delay		34.4						27.6			40.2	
Queue Delay		0.0						0.0			0.0	
Total Delay		34.4						27.6			40.2	

Lane Group	Ø4
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	27%
Yellow Time (s)	2.0
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C						C			D	
Approach Delay		34.4						27.6			40.2	
Approach LOS		C						C			D	
Queue Length 50th (ft)		270						51			197	
Queue Length 95th (ft)		344						89			255	
Internal Link Dist (ft)		634			827			409			475	
Turn Bay Length (ft)												
Base Capacity (vph)		1167						503			494	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.80						0.21			0.71	

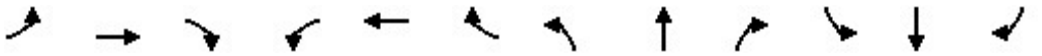
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 35.3		Intersection LOS: D	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 33: Putnam Avenue & River Street



Lane Group	Ø4
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	831	771	0	0	0	0	581	88	75	855	0
Future Volume (vph)	193	831	771	0	0	0	0	581	88	75	855	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	10	10	10	10	10	10
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3393	1599	0	0	0	0	3234	0	0	3317	0
Flt Permitted		0.991									0.597	
Satd. Flow (perm)	0	3363	1599	0	0	0	0	3234	0	0	1988	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								12				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		427			714			463			449	
Travel Time (s)		11.6			19.5			10.5			10.2	
Confl. Peds. (#/hr)	18								16	16		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96	0.96	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	6%	1%	2%	2%	2%	2%	1%	2%	3%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1125	847	0	0	0	0	697	0	0	1000	0
Turn Type	Perm	NA	Prot					NA		pm+pt	NA	
Protected Phases		8	8					2		1	6	
Permitted Phases	8									6		
Detector Phase	8	8	8					2		1	6	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0					22.0		5.0	25.0	
Minimum Split (s)	29.0	29.0	29.0					28.0		10.0	31.0	
Total Split (s)	43.0	43.0	43.0					45.0		15.0	60.0	
Total Split (%)	30.7%	30.7%	30.7%					32.1%		10.7%	42.9%	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0					2.0		1.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		7.0	7.0					6.0			6.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes		
Recall Mode	None	None	None					Max		Max	Max	
Act Effct Green (s)		49.0	49.0					39.0			54.0	
Actuated g/C Ratio		0.35	0.35					0.28			0.39	
v/c Ratio		0.96	1.52					0.77			1.17	
Control Delay		62.0	274.2					52.1			127.6	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		62.0	274.2					52.1			127.6	

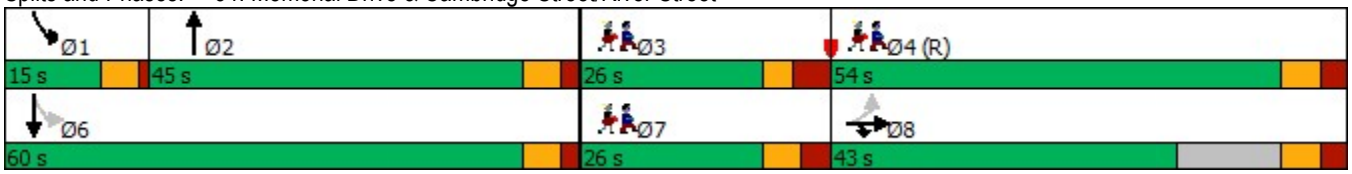
Lane Group	Ø3	Ø4	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	4	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.0	19.0	24.0
Total Split (s)	26.0	54.0	26.0
Total Split (%)	19%	39%	19%
Yellow Time (s)	3.0	4.0	4.0
All-Red Time (s)	4.0	3.0	3.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	None	C-Max	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	F					D			F	
Approach Delay		153.2						52.1			127.6	
Approach LOS		F						D			F	
Queue Length 50th (ft)		525	~1072					303			~519	
Queue Length 95th (ft)		#672	#1325					378			#707	
Internal Link Dist (ft)		347			634			383			369	
Turn Bay Length (ft)												
Base Capacity (vph)		1177	559					909			852	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.96	1.52					0.77			1.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 30 (21%), Referenced to phase 4:Ped, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay: 127.0		Intersection LOS: F	
Intersection Capacity Utilization 89.3%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 34: Memorial Drive & Cambridge Street/River Street



Lane Group	Ø3	Ø4	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	66	409	0	0	0	0	0	217	4
Future Vol, veh/h	0	0	0	66	409	0	0	0	0	0	217	4
Conflicting Peds, #/hr	0	0	0	33	0	0	0	0	0	0	0	32
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	94	94	94	92	92	92	85	85	85
Heavy Vehicles, %	2	2	2	14	6	2	2	2	2	2	3	25
Mvmt Flow	0	0	0	70	435	0	0	0	0	0	255	5

Major/Minor	Major2			Minor2		
Conflicting Flow All	33	0	0	-	608	467
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	4.24	-	-	-	6.53	6.45
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.326	-	-	-	4.027	3.525
Pot Cap-1 Maneuver	1505	-	0	0	409	551
Stage 1	-	-	0	0	501	-
Stage 2	-	-	0	0	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	1505	-	-	-	0	551
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-

Approach	WB	SB
HCM Control Delay, s	1	17.2
HCM LOS		C

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	1505	-	551
HCM Lane V/C Ratio	0.047	-	0.472
HCM Control Delay (s)	7.5	0	17.2
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.1	-	2.5

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	609	125	0	0	0	0	0	0	46	237	0
Future Vol, veh/h	0	609	125	0	0	0	0	0	0	46	237	0
Conflicting Peds, #/hr	0	0	164	0	0	0	0	0	0	47	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	92	92	92	92	92	92	86	86	86
Heavy Vehicles, %	2	8	2	2	2	2	2	2	2	4	6	2
Mvmt Flow	0	621	128	0	0	0	0	0	0	53	276	0

Major/Minor	Major1			Minor2		
Conflicting Flow All	-	0	0	358	913	-
Stage 1	-	-	-	0	0	-
Stage 2	-	-	-	358	913	-
Critical Hdwy	-	-	-	6.88	6.62	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	5.88	5.62	-
Follow-up Hdwy	-	-	-	3.54	4.06	-
Pot Cap-1 Maneuver	0	-	-	609	~ 265	0
Stage 1	0	-	-	-	-	0
Stage 2	0	-	-	672	341	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	609	0	-
Mov Cap-2 Maneuver	-	-	-	609	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	672	0	-

Approach	EB	SB
HCM Control Delay, s	0	17.6
HCM LOS		C

Minor Lane/Major Mvmt	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	609
HCM Lane V/C Ratio	-	-	0.54
HCM Control Delay (s)	-	-	17.6
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	3.2

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

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	11	746	0	0	0	0	0	14	0	0
Future Vol, veh/h	11	746	0	0	0	0	0	14	0	0
Conflicting Peds, #/hr	61	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	22355	-	0	-	22355	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	91	91	91	92	92	92	60	60	92	92
Heavy Vehicles, %	0	7	2	2	2	2	2	7	2	2
Mvmt Flow	12	820	0	0	0	0	0	23	0	0

Major/Minor	Major1			Minor1		
Conflicting Flow All	61	0	-	-	420	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	4.1	-	-	-	6.9	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	2.2	-	-	-	3.3	
Pot Cap-1 Maneuver	1555	-	0	0	588	
Stage 1	-	-	0	0	-	
Stage 2	-	-	0	0	-	
Platoon blocked, %		-				
Mov Cap-1 Maneuver	1555	-	-	-	588	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	

Approach	EB	NB
HCM Control Delay, s	0.1	11.6
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT
Capacity (veh/h)	588	1555	-
HCM Lane V/C Ratio	0.068	0.008	-
HCM Control Delay (s)	11.6	7.3	0
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.2	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	655	3	0	0	0	0	43	0	9	1	0
Future Vol, veh/h	8	655	3	0	0	0	0	43	0	9	1	0
Conflicting Peds, #/hr	51	0	70	0	0	0	0	0	11	11	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	92	92	92	72	72	72	50	50	50
Heavy Vehicles, %	13	7	0	2	2	2	2	0	2	22	0	2
Mvmt Flow	9	720	3	0	0	0	0	60	0	18	2	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	51	0	0	-	861	443	470	862	-
Stage 1	-	-	-	-	810	-	51	51	-
Stage 2	-	-	-	-	51	-	419	811	-
Critical Hdwy	4.36	-	-	-	6.5	6.94	7.94	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.5	-
Follow-up Hdwy	2.33	-	-	-	4	3.32	3.72	4	-
Pot Cap-1 Maneuver	1477	-	-	0	295	562	433	295	0
Stage 1	-	-	-	0	396	-	-	-	0
Stage 2	-	-	-	0	-	-	532	396	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1417	-	-	-	264	531	340	264	-
Mov Cap-2 Maneuver	-	-	-	-	264	-	340	264	-
Stage 1	-	-	-	-	370	-	-	-	-
Stage 2	-	-	-	-	-	-	441	370	-

Approach	EB	NB	SB
HCM Control Delay, s	0.1	22.6	16.6
HCM LOS		C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	264	1417	-	-	330
HCM Lane V/C Ratio	0.226	0.006	-	-	0.061
HCM Control Delay (s)	22.6	7.6	0	-	16.6
HCM Lane LOS	C	A	A	-	C
HCM 95th %tile Q(veh)	0.8	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	89	4	0	0	0	0	1	2	2	2	0
Future Vol, veh/h	41	89	4	0	0	0	0	1	2	2	2	0
Conflicting Peds, #/hr	21	0	70	70	0	21	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	92	92	92	38	38	38	33	33	33
Heavy Vehicles, %	0	9	0	2	2	2	2	0	0	0	0	2
Mvmt Flow	54	117	5	0	0	0	0	3	5	6	6	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	21	0	0	-	319	190	253	321	-
Stage 1	-	-	-	-	298	-	21	21	-
Stage 2	-	-	-	-	21	-	232	300	-
Critical Hdwy	4.1	-	-	-	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1608	-	-	0	601	857	704	599	0
Stage 1	-	-	-	0	671	-	-	-	0
Stage 2	-	-	-	0	-	-	775	669	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1581	-	-	-	518	781	665	516	-
Mov Cap-2 Maneuver	-	-	-	-	518	-	665	516	-
Stage 1	-	-	-	-	588	-	-	-	-
Stage 2	-	-	-	-	-	-	738	587	-

Approach	EB	NB	SB
HCM Control Delay, s	2.3	10.5	11.3
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	668	1581	-	-	581
HCM Lane V/C Ratio	0.012	0.034	-	-	0.021
HCM Control Delay (s)	10.5	7.4	0	-	11.3
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	664	0	0	0	0	93
Future Vol, veh/h	664	0	0	0	0	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	92	92	73	73
Heavy Vehicles, %	7	2	2	2	2	10
Mvmt Flow	730	0	0	0	0	127

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	-		-	365
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.1
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.4
Pot Cap-1 Maneuver	-	0		0	609
Stage 1	-	0		0	-
Stage 2	-	0		0	-
Platoon blocked, %	-				
Mov Cap-1 Maneuver	-	-		-	609
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NE
HCM Control Delay, s	0	12.5
HCM LOS		B

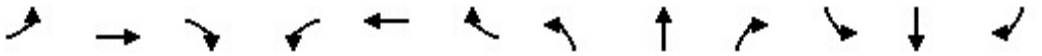
Minor Lane/Major Mvmt	NELn1	EBT
Capacity (veh/h)	609	-
HCM Lane V/C Ratio	0.209	-
HCM Control Delay (s)	12.5	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.8	-

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	9	0	0	0	0	22	133	1	0	0	0
Future Vol, veh/h	64	9	0	0	0	0	22	133	1	0	0	0
Peak Hour Factor	0.83	0.83	0.83	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92
Heavy Vehicles, %	8	100	2	2	2	2	36	15	0	2	2	2
Mvmt Flow	77	11	0	0	0	0	27	160	1	0	0	0
Number of Lanes	0	1	0	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	8.3	9.3
HCM LOS	A	A

Lane	NBLn1	EBLn1
Vol Left, %	14%	88%
Vol Thru, %	85%	12%
Vol Right, %	1%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	156	73
LT Vol	22	64
Through Vol	133	9
RT Vol	1	0
Lane Flow Rate	188	88
Geometry Grp	1	1
Degree of Util (X)	0.245	0.115
Departure Headway (Hd)	4.691	4.694
Convergence, Y/N	Yes	Yes
Cap	759	768
Service Time	2.764	2.694
HCM Lane V/C Ratio	0.248	0.115
HCM Control Delay	9.3	8.3
HCM Lane LOS	A	A
HCM 95th-tile Q	1	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	480	157	0	415	32	0	288	77	0	229	39
Future Volume (vph)	0	480	157	0	415	32	0	288	77	0	229	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		70	0		35
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1845	1442	0	1768	0	0	1759	1568	0	1759	1615
Flt Permitted												
Satd. Flow (perm)	0	1845	563	0	1768	0	0	1759	561	0	1759	700
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		113			355			293			490	
Travel Time (s)		3.1			9.7			6.7			11.1	
Confl. Peds. (#/hr)			650			336			548			368
Confl. Bikes (#/hr)						38						
Peak Hour Factor	0.97	0.97	0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	3%	12%	2%	3%	6%	2%	8%	3%	2%	8%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	495	162	0	465	0	0	303	81	0	239	41
Turn Type		NA	custom		NA			NA	custom		NA	custom
Protected Phases		1 2			2			4			4	
Permitted Phases			6						8			8
Detector Phase		1 2	6		2			4	8		4	8
Switch Phase												
Minimum Initial (s)			5.0		10.0			10.0	5.0		10.0	5.0
Minimum Split (s)			34.0		44.0			15.0	20.0		15.0	20.0
Total Split (s)			40.0		50.0			35.0	20.0		35.0	20.0
Total Split (%)			44.4%		55.6%			38.9%	22.2%		38.9%	22.2%
Yellow Time (s)			3.0		3.0			3.0	3.0		3.0	3.0
All-Red Time (s)			2.0		2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)			5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag			Lag		Lag				Lag			Lag
Lead-Lag Optimize?			Yes		Yes				Yes			Yes
Recall Mode			Max		Max			Max	Max		Max	Max
Act Effct Green (s)		53.0	35.0		45.0			30.0	15.0		30.0	15.0
Actuated g/C Ratio		0.59	0.39		0.50			0.33	0.17		0.33	0.17
v/c Ratio		0.46	0.74		0.53			0.52	0.87		0.41	0.35
Control Delay		8.4	43.7		18.8			20.8	94.2		14.0	29.3
Queue Delay		0.4	0.0		1.9			1.1	0.0		0.0	0.0
Total Delay		8.8	43.7		20.7			21.9	94.2		14.0	29.3

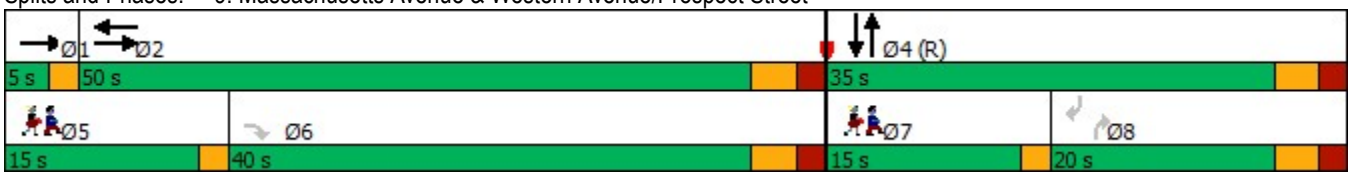
Lane Group	Ø1	Ø5	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	5	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	1.0	1.0	13.0
Minimum Split (s)	5.0	15.0	15.0
Total Split (s)	5.0	15.0	15.0
Total Split (%)	6%	17%	17%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Max	Max	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A	D		C			C	F		B	C
Approach Delay		17.4			20.7			37.2			16.3	
Approach LOS		B			C			D			B	
Queue Length 50th (ft)		74	81		160			76	39		86	19
Queue Length 95th (ft)		98	#188		269			124	#131		m119	m37
Internal Link Dist (ft)		33			275			213			410	
Turn Bay Length (ft)									70			35
Base Capacity (vph)		1086	218		884			586	93		586	116
Starvation Cap Reductn		215	0		266			115	0		0	0
Spillback Cap Reductn		45	0		75			0	0		14	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.57	0.74		0.75			0.64	0.87		0.42	0.35

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 35 (39%), Referenced to phase 4:NBSB, Start of Green
Natural Cycle: 85
Control Type: Pretimed
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 22.3 Intersection LOS: C
Intersection Capacity Utilization 58.3% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Massachusetts Avenue & Western Avenue/Prospect Street



Lane Group	Ø1	Ø5	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

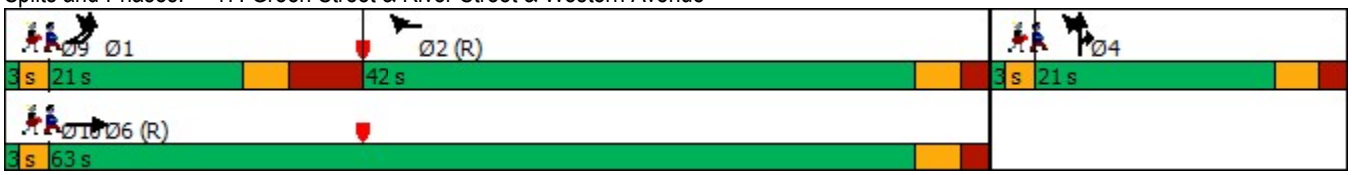
Intersection Summary

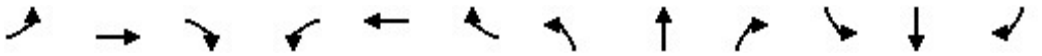
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
Lane Configurations											
Traffic Volume (vph)	17	134	552	428	24	159	82	68			
Future Volume (vph)	17	134	552	428	24	159	82	68			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	12	12	12	12			
Grade (%)			0%				0%				
Storage Length (ft)		100		0		0		0			
Storage Lanes		1		1		0		1			
Taper Length (ft)		25				25					
Satd. Flow (prot)	0	1773	3505	1584	0	0	1747	1615			
Flt Permitted		0.950					0.968				
Satd. Flow (perm)	0	1773	3505	1584	0	0	1451	1615			
Right Turn on Red	Yes				No			No			
Satd. Flow (RTOR)		133									
Link Speed (mph)			25				30				
Link Distance (ft)			256				125				
Travel Time (s)			7.0				2.8				
Confl. Peds. (#/hr)					264	91		70			
Confl. Bikes (#/hr)					61						
Peak Hour Factor	0.98	0.98	0.98	0.93	0.93	0.85	0.85	0.85			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	0%	2%	3%	4%	0%	8%	0%	0%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0			
Parking (#/hr)											
Mid-Block Traffic (%)			0%				0%				
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	154	563	486	0	0	283	80			
Turn Type	Prot	Prot	NA	Prot		Split	NA	Prot			
Protected Phases	1	1	6	2		4	4	4	3	9	10
Permitted Phases											
Detector Phase	1	1	6	2		4	4	4			
Switch Phase											
Minimum Initial (s)	8.0	8.0	15.0	15.0		15.0	15.0	15.0	1.0	1.0	1.0
Minimum Split (s)	16.0	16.0	37.0	24.0		21.0	21.0	21.0	3.0	3.0	3.0
Total Split (s)	21.0	21.0	63.0	42.0		21.0	21.0	21.0	3.0	3.0	3.0
Total Split (%)	23.3%	23.3%	70.0%	46.7%		23.3%	23.3%	23.3%	3%	3%	3%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	2.0	2.0	2.0
All-Red Time (s)	5.0	5.0	2.0	2.0		2.0	2.0	2.0	0.0	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0			
Total Lost Time (s)		8.0	5.0	5.0			5.0	5.0			
Lead/Lag	Lag	Lag				Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	C-Max	C-Max		Max	Max	Max	Max	Max	Max
Act Effct Green (s)		9.3	58.0	40.7			16.0	16.0			
Actuated g/C Ratio		0.10	0.64	0.45			0.18	0.18			
v/c Ratio		0.51	0.25	0.68			0.91	0.28			
Control Delay		15.7	7.1	12.6			71.4	35.1			
Queue Delay		0.0	0.0	0.0			0.0	0.0			
Total Delay		15.7	7.1	12.6			71.4	35.1			

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
LOS		B	A	B			E	D			
Approach Delay			9.0				63.4				
Approach LOS			A				E				
Queue Length 50th (ft)		11	63	33			160	40			
Queue Length 95th (ft)		65	87	329			#279	76			
Internal Link Dist (ft)			176				45				
Turn Bay Length (ft)		100									
Base Capacity (vph)		369	2258	716			310	287			
Starvation Cap Reductn		0	0	0			0	0			
Spillback Cap Reductn		0	35	0			0	0			
Storage Cap Reductn		0	0	0			0	0			
Reduced v/c Ratio		0.42	0.25	0.68			0.91	0.28			

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 89 (99%), Referenced to phase 2:WBR and 6:EBT, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 22.7		Intersection LOS: C	
Intersection Capacity Utilization 64.7%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 17: Green Street & River Street & Western Avenue





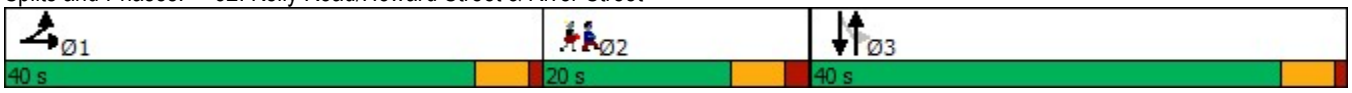
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	642	23	0	0	0	0	45	2	13	21	0
Future Volume (vph)	62	642	23	0	0	0	0	45	2	13	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3511	0	0	0	0	0	1887	0	0	1808	0
Flt Permitted		0.996									0.850	
Satd. Flow (perm)	0	3511	0	0	0	0	0	1887	0	0	1567	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		907			486			204			452	
Travel Time (s)		24.7			13.3			4.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			19									
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.78	0.78	0.78	0.77	0.77	0.77
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	2%	0%	0%	8%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	758	0	0	0	0	0	61	0	0	44	0
Turn Type	Split	NA						NA		Perm	NA	
Protected Phases	1	1						3			3	
Permitted Phases										3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	5.0	5.0						7.0		7.0	7.0	
Minimum Split (s)	10.0	10.0						12.0		12.0	12.0	
Total Split (s)	40.0	40.0						40.0		40.0	40.0	
Total Split (%)	40.0%	40.0%						40.0%		40.0%	40.0%	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.0						5.0			5.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	Max	Max						Min		Min	Min	
Act Effct Green (s)		35.7						7.9			7.9	
Actuated g/C Ratio		0.52						0.11			0.11	
v/c Ratio		0.42						0.28			0.25	
Control Delay		12.6						33.5			33.4	
Queue Delay		0.0						0.0			0.0	
Total Delay		12.6						33.5			33.4	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B						C			C	
Approach Delay		12.6						33.5			33.4	
Approach LOS		B						C			C	
Queue Length 50th (ft)		110						26			19	
Queue Length 95th (ft)		164						51			40	
Internal Link Dist (ft)		827			406			124			372	
Turn Bay Length (ft)												
Base Capacity (vph)		1819						978			812	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.42						0.06			0.05	

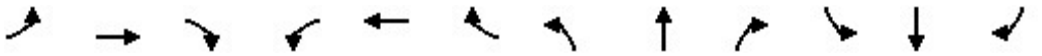
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 68.8			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 37.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 32: Kelly Road/Howard Street & River Street



Lane Group	Ø2
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



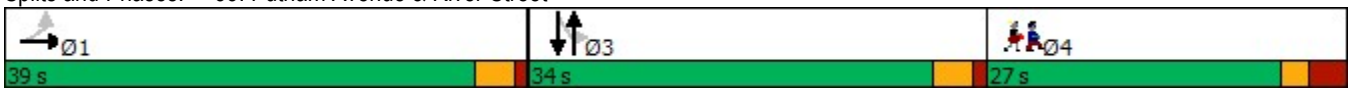
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	624	95	0	0	0	0	257	31	45	104	0
Future Volume (vph)	79	624	95	0	0	0	0	257	31	45	104	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3450	0	0	0	0	0	1850	0	0	1860	0
Flt Permitted		0.995									0.643	
Satd. Flow (perm)	0	3450	0	0	0	0	0	1850	0	0	1214	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		16										
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		714			907			489			555	
Travel Time (s)		19.5			24.7			11.1			12.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			15						17			
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.82	0.82	0.82	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	2%	1%	0%	2%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	858	0	0	0	0	0	351	0	0	172	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		1						3			3	
Permitted Phases	1									3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	10.0	10.0						15.0		15.0	15.0	
Minimum Split (s)	14.0	14.0						19.0		19.0	19.0	
Total Split (s)	39.0	39.0						34.0		34.0	34.0	
Total Split (%)	39.0%	39.0%						34.0%		34.0%	34.0%	
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		4.0						4.0			4.0	
Lead/Lag								Lead		Lead	Lead	
Lead-Lag Optimize?								Yes		Yes	Yes	
Recall Mode	Max	Max						Max		Max	Max	
Act Effct Green (s)		35.0						30.0			30.0	
Actuated g/C Ratio		0.35						0.30			0.30	
v/c Ratio		0.71						0.63			0.47	
Control Delay		31.3						36.3			33.8	
Queue Delay		0.0						0.0			0.0	
Total Delay		31.3						36.3			33.8	

Lane Group	Ø4
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	27%
Yellow Time (s)	2.0
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C						D			C	
Approach Delay		31.3						36.3			33.8	
Approach LOS		C						D			C	
Queue Length 50th (ft)		241						193			89	
Queue Length 95th (ft)		312						257			149	
Internal Link Dist (ft)		634			827			409			475	
Turn Bay Length (ft)												
Base Capacity (vph)		1217						555			364	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.71						0.63			0.47	

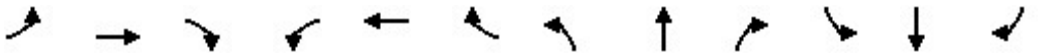
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 32.9		Intersection LOS: C	
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 33: Putnam Avenue & River Street



Lane Group	Ø4
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	744	589	0	0	0	0	831	51	87	599	0
Future Volume (vph)	280	744	589	0	0	0	0	831	51	87	599	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3512	1615	0	0	0	0	3574	0	0	3584	0
Flt Permitted		0.987									0.496	
Satd. Flow (perm)	0	3457	1615	0	0	0	0	3574	0	0	1788	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								5				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		427			714			463			449	
Travel Time (s)		11.6			19.5			10.5			10.2	
Confl. Peds. (#/hr)	22								1	1		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.84	0.84	0.84	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	2%	0%	0%	1%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1219	701	0	0	0	0	949	0	0	754	0
Turn Type	Perm	NA	Prot					NA		pm+pt	NA	
Protected Phases		8	8					2		1	6	
Permitted Phases	8									6		
Detector Phase	8	8	8					2		1	6	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0					22.0		5.0	25.0	
Minimum Split (s)	29.0	29.0	29.0					28.0		10.0	31.0	
Total Split (s)	43.0	43.0	43.0					48.0		19.0	67.0	
Total Split (%)	30.7%	30.7%	30.7%					34.3%		13.6%	47.9%	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0					2.0		1.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		7.0	7.0					6.0			6.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes		
Recall Mode	C-Max	C-Max	C-Max					Max		Max	Max	
Act Effct Green (s)		42.0	42.0					42.0			61.0	
Actuated g/C Ratio		0.30	0.30					0.30			0.44	
v/c Ratio		1.18	1.45					0.88			0.80	
Control Delay		132.3	249.3					57.2			37.6	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		132.3	249.3					57.2			37.6	

Lane Group	Ø3	Ø4	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	4	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.0	19.0	24.0
Total Split (s)	30.0	43.0	30.0
Total Split (%)	21%	31%	21%
Yellow Time (s)	3.0	4.0	4.0
All-Red Time (s)	4.0	3.0	3.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	None	C-Max	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

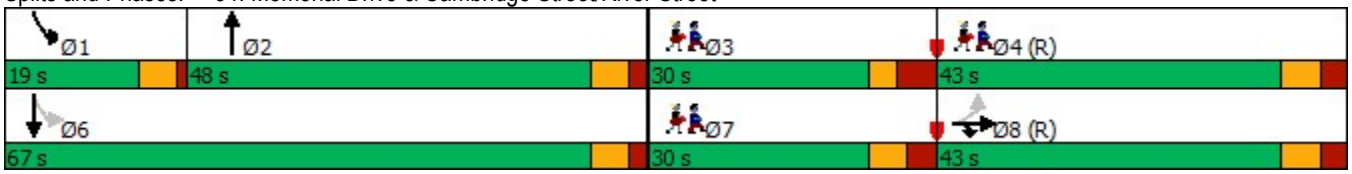
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		F	F					E			D	
Approach Delay		175.0						57.2			37.6	
Approach LOS		F						E			D	
Queue Length 50th (ft)		~696	~867					432			254	
Queue Length 95th (ft)		#745	#1005					#528			313	
Internal Link Dist (ft)		347			634			383			369	
Turn Bay Length (ft)												
Base Capacity (vph)		1037	484					1075			945	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		1.18	1.45					0.88			0.80	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 30 (21%), Referenced to phase 4:Ped and 8:EBTL, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.45			
Intersection Signal Delay: 115.5		Intersection LOS: F	
Intersection Capacity Utilization 90.0%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 34: Memorial Drive & Cambridge Street/River Street



Lane Group	Ø3	Ø4	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	76	529	0	0	0	0	0	138	6
Future Vol, veh/h	0	0	0	76	529	0	0	0	0	0	138	6
Conflicting Peds, #/hr	0	0	0	38	0	0	0	0	0	0	0	46
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	93	93	93	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	9	4	2	2	2	2	2	0	0
Mvmt Flow	0	0	0	82	569	0	0	0	0	0	150	7

Major/Minor	Major2			Minor2		
Conflicting Flow All	38	0	0	-	771	615
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	38	-
Critical Hdwy	4.19	-	-	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.281	-	-	-	4	3.3
Pot Cap-1 Maneuver	1528	-	0	0	333	495
Stage 1	-	-	0	0	429	-
Stage 2	-	-	0	0	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	1528	-	-	-	0	495
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-

Approach	WB	SB
HCM Control Delay, s	0.9	15.6
HCM LOS		C

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	1528	-	495
HCM Lane V/C Ratio	0.053	-	0.316
HCM Control Delay (s)	7.5	0	15.6
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.2	-	1.3

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	655	85	0	0	0	0	0	0	48	164	0
Future Vol, veh/h	0	655	85	0	0	0	0	0	0	48	164	0
Conflicting Peds, #/hr	0	0	200	0	0	0	0	0	0	83	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	92	92	92	92	92	92	95	95	95
Heavy Vehicles, %	2	3	0	2	2	2	2	2	2	2	4	2
Mvmt Flow	0	697	90	0	0	0	0	0	0	51	173	0

Major/Minor	Major1			Minor2		
Conflicting Flow All	-	0	0	432	987	-
Stage 1	-	-	-	0	0	-
Stage 2	-	-	-	432	987	-
Critical Hdwy	-	-	-	6.84	6.58	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	5.84	5.58	-
Follow-up Hdwy	-	-	-	3.52	4.04	-
Pot Cap-1 Maneuver	0	-	-	552	243	0
Stage 1	0	-	-	-	-	0
Stage 2	0	-	-	622	319	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	552	0	-
Mov Cap-2 Maneuver	-	-	-	552	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	622	0	-

Approach	EB	SB
HCM Control Delay, s	0	15.9
HCM LOS		C

Minor Lane/Major Mvmt	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	552
HCM Lane V/C Ratio	-	-	0.404
HCM Control Delay (s)	-	-	15.9
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.9

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	22	676	0	0	0	0	0	68	0	0
Future Vol, veh/h	22	676	0	0	0	0	0	68	0	0
Conflicting Peds, #/hr	42	0	0	0	0	0	0	42	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	22355	-	0	-	22355	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	94	94	94	92	92	92	78	78	92	92
Heavy Vehicles, %	7	2	2	2	2	2	2	0	2	2
Mvmt Flow	23	719	0	0	0	0	0	87	0	0

Major/Minor	Major1			Minor1	
Conflicting Flow All	42	0	-	-	369
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.24	-	-	-	6.98
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.27	-	-	-	3.34
Pot Cap-1 Maneuver	1529	-	0	0	622
Stage 1	-	-	0	0	-
Stage 2	-	-	0	0	-
Platoon blocked, %		-			
Mov Cap-1 Maneuver	1529	-	-	-	622
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0.3	12.2
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT
Capacity (veh/h)	622	1529	-
HCM Lane V/C Ratio	0.192	0.015	-
HCM Control Delay (s)	12.2	7.4	0.1
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.7	0	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	610	4	0	0	0	0	76	1	9	3	0
Future Vol, veh/h	19	610	4	0	0	0	0	76	1	9	3	0
Conflicting Peds, #/hr	75	0	82	0	0	0	0	0	24	24	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	92	92	92	92	92	92	50	50	50
Heavy Vehicles, %	5	2	0	2	2	2	2	0	0	0	0	2
Mvmt Flow	20	642	4	0	0	0	0	83	1	18	6	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	75	0	0	-	841	429	502	843	-
Stage 1	-	-	-	-	766	-	75	75	-
Stage 2	-	-	-	-	75	-	427	768	-
Critical Hdwy	4.2	-	-	-	6.5	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.25	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1501	-	-	0	303	580	457	303	0
Stage 1	-	-	-	0	415	-	-	-	0
Stage 2	-	-	-	0	-	-	581	414	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1394	-	-	-	254	535	312	254	-
Mov Cap-2 Maneuver	-	-	-	-	254	-	312	254	-
Stage 1	-	-	-	-	374	-	-	-	-
Stage 2	-	-	-	-	-	-	442	373	-

Approach	EB	NB	SB
HCM Control Delay, s	0.3	25.7	18.3
HCM LOS		D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	256	1394	-	-	295
HCM Lane V/C Ratio	0.327	0.014	-	-	0.081
HCM Control Delay (s)	25.7	7.6	0.1	-	18.3
HCM Lane LOS	D	A	A	-	C
HCM 95th %tile Q(veh)	1.4	0	-	-	0.3

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	82	1	0	0	0	0	3	2	4	3	0
Future Vol, veh/h	72	82	1	0	0	0	0	3	2	4	3	0
Conflicting Peds, #/hr	17	0	62	0	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	92	92	92	63	63	63	58	58	58
Heavy Vehicles, %	0	5	0	2	2	2	2	0	0	0	0	2
Mvmt Flow	91	104	1	0	0	0	0	5	3	7	5	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	17	0	0	-	366	169	310	366	-
Stage 1	-	-	-	-	349	-	17	17	-
Stage 2	-	-	-	-	17	-	293	349	-
Critical Hdwy	4.1	-	-	-	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1613	-	-	0	566	880	646	566	0
Stage 1	-	-	-	0	637	-	-	-	0
Stage 2	-	-	-	0	-	-	719	637	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1587	-	-	-	492	828	599	492	-
Mov Cap-2 Maneuver	-	-	-	-	492	-	599	492	-
Stage 1	-	-	-	-	563	-	-	-	-
Stage 2	-	-	-	-	-	-	667	563	-

Approach	EB	NB	SB
HCM Control Delay, s	3.4	11.2	11.7
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	587	1587	-	-	548
HCM Lane V/C Ratio	0.014	0.057	-	-	0.022
HCM Control Delay (s)	11.2	7.4	0	-	11.7
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	619	0	0	0	0	79
Future Vol, veh/h	619	0	0	0	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	92	92	76	76
Heavy Vehicles, %	3	2	2	2	2	5
Mvmt Flow	659	0	0	0	0	104

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	-		-	330
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.35
Pot Cap-1 Maneuver	-	0		0	657
Stage 1	-	0		0	-
Stage 2	-	0		0	-
Platoon blocked, %	-				
Mov Cap-1 Maneuver	-	-		-	657
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NE
HCM Control Delay, s	0	11.5
HCM LOS		B

Minor Lane/Major Mvmt	NELn1	EBT
Capacity (veh/h)	657	-
HCM Lane V/C Ratio	0.158	-
HCM Control Delay (s)	11.5	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.6	-

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	71	12	0	0	0	0	21	235	4	0	0	0
Future Vol, veh/h	71	12	0	0	0	0	21	235	4	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92
Heavy Vehicles, %	0	83	2	2	2	2	19	5	75	2	2	2
Mvmt Flow	79	13	0	0	0	0	24	264	4	0	0	0
Number of Lanes	0	1	0	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	8.4	9.9
HCM LOS	A	A

Lane	NBLn1	EBLn1
Vol Left, %	8%	86%
Vol Thru, %	90%	14%
Vol Right, %	2%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	260	83
LT Vol	21	71
Through Vol	235	12
RT Vol	4	0
Lane Flow Rate	292	92
Geometry Grp	1	1
Degree of Util (X)	0.356	0.122
Departure Headway (Hd)	4.392	4.772
Convergence, Y/N	Yes	Yes
Cap	809	756
Service Time	2.47	2.772
HCM Lane V/C Ratio	0.361	0.122
HCM Control Delay	9.9	8.4
HCM Lane LOS	A	A
HCM 95th-tile Q	1.6	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	593	139	0	407	41	0	281	145	0	343	32
Future Volume (vph)	0	593	139	0	407	41	0	281	145	0	343	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	10	11	11	10
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		70	0		35
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1792	1252	0	1701	0	0	1531	1422	0	1670	1449
Flt Permitted												
Satd. Flow (perm)	0	1792	123	0	1701	0	0	1531	695	0	1670	803
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		127			355			293			490	
Travel Time (s)		3.5			9.7			6.7			11.1	
Confl. Peds. (#/hr)			440			262			236			203
Confl. Bikes (#/hr)						18						
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.79	0.79	0.79	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	6%	29%	2%	6%	17%	2%	20%	6%	2%	10%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	652	153	0	477	0	0	356	184	0	408	38
Turn Type		NA	custom		NA			NA	custom		NA	custom
Protected Phases		1 2			2			4			4	
Permitted Phases			6						8			8
Detector Phase		1 2	6		2			4	8		4	8
Switch Phase												
Minimum Initial (s)			1.0		10.0			10.0	5.0		10.0	5.0
Minimum Split (s)			5.0		44.0			41.0	26.0		41.0	26.0
Total Split (s)			34.0		44.0			41.0	26.0		41.0	26.0
Total Split (%)			37.8%		48.9%			45.6%	28.9%		45.6%	28.9%
Yellow Time (s)			2.0		3.0			3.0	3.0		3.0	3.0
All-Red Time (s)			0.0		2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)			2.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag			Lag		Lag				Lag			Lag
Lead-Lag Optimize?			Yes		Yes				Yes			Yes
Recall Mode			Max		Max			Max	Max		Max	Max
Act Effct Green (s)		47.0	32.0		39.0			36.0	21.0		36.0	21.0
Actuated g/C Ratio		0.52	0.36		0.43			0.40	0.23		0.40	0.23
v/c Ratio		0.70	3.56		0.65			0.58	1.14		0.61	0.20
Control Delay		14.3	1218.7		18.8			15.2	135.5		29.2	34.2
Queue Delay		3.1	0.0		0.9			1.5	0.0		0.0	0.0
Total Delay		17.4	1218.7		19.7			16.7	135.5		29.2	34.2

Lane Group	Ø1	Ø5	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	5	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	1.0	5.0	5.0
Minimum Split (s)	5.0	15.0	15.0
Total Split (s)	5.0	15.0	15.0
Total Split (%)	6%	17%	17%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Max	Max	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B	F		B			B	F		C	C
Approach Delay		245.7			19.7			57.2			29.6	
Approach LOS		F			B			E			C	
Queue Length 50th (ft)		280	~136		143			110	~123		231	21
Queue Length 95th (ft)		410	#258		191			169	#214		m299	m36
Internal Link Dist (ft)		47			275			213			410	
Turn Bay Length (ft)									70			35
Base Capacity (vph)		935	43		737			612	162		668	187
Starvation Cap Reductn		0	0		89			115	0		0	0
Spillback Cap Reductn		184	0		0			0	0		0	0
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		0.87	3.56		0.74			0.72	1.14		0.61	0.20

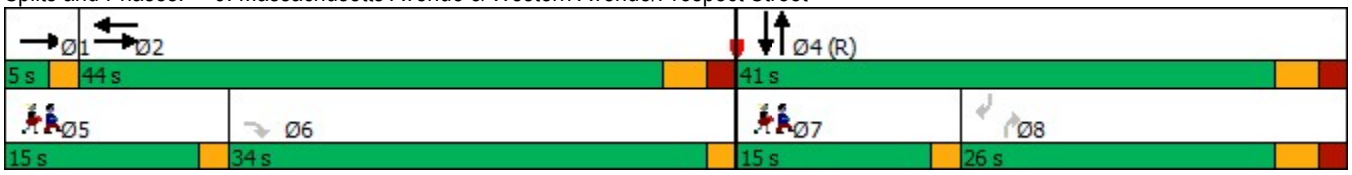
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 41 (46%), Referenced to phase 4:NBSB, Start of Green			
Natural Cycle: 150			
Control Type: Pretimed			
Maximum v/c Ratio: 3.56			
Intersection Signal Delay: 110.8		Intersection LOS: F	
Intersection Capacity Utilization 58.9%		ICU Level of Service B	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Massachusetts Avenue & Western Avenue/Prospect Street



Lane Group	Ø1	Ø5	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

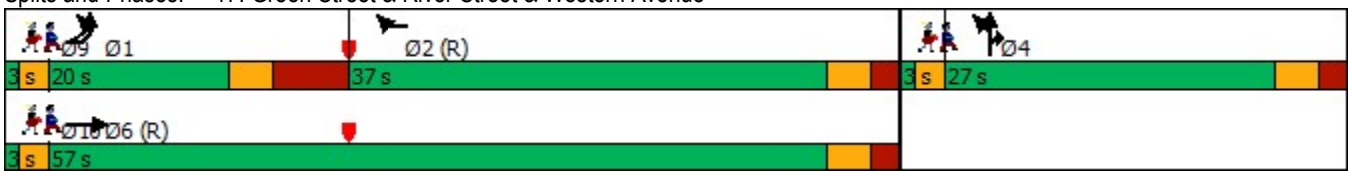
Intersection Summary

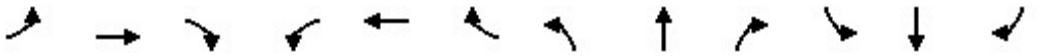
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
Lane Configurations											
Traffic Volume (vph)	13	60	615	438	20	78	67	52			
Future Volume (vph)	13	60	615	438	20	78	67	52			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	15	15	12	12	12			
Grade (%)			0%				0%				
Storage Length (ft)		100		0		0		0			
Storage Lanes		1		1		0		1			
Taper Length (ft)		25				25					
Satd. Flow (prot)	0	1703	3202	1703	0	0	1699	1335			
Flt Permitted		0.950					0.974				
Satd. Flow (perm)	0	1703	3202	1703	0	0	1640	1335			
Right Turn on Red	Yes				No			No			
Satd. Flow (RTOR)		133									
Link Speed (mph)			25				30				
Link Distance (ft)			256				125				
Travel Time (s)			7.0				2.8				
Confl. Peds. (#/hr)					269	31		47			
Confl. Bikes (#/hr)					20						
Peak Hour Factor	0.92	0.92	0.92	0.98	0.98	0.90	0.90	0.90			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	0%	3%	9%	6%	10%	14%	3%	21%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0			
Parking (#/hr)											
Mid-Block Traffic (%)			0%				0%				
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	79	668	467	0	0	161	58			
Turn Type	custom	Prot	NA	Prot		Split	NA	Prot			
Protected Phases	1	1	6	2		4	4	4	3	9	10
Permitted Phases	1										
Detector Phase	1	1	6	2		4	4	4			
Switch Phase											
Minimum Initial (s)	8.0	8.0	15.0	15.0		15.0	15.0	15.0	1.0	1.0	1.0
Minimum Split (s)	16.0	16.0	37.0	24.0		27.0	27.0	27.0	3.0	3.0	3.0
Total Split (s)	20.0	20.0	57.0	37.0		27.0	27.0	27.0	3.0	3.0	3.0
Total Split (%)	22.2%	22.2%	63.3%	41.1%		30.0%	30.0%	30.0%	3%	3%	3%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	2.0	2.0	2.0
All-Red Time (s)	5.0	5.0	2.0	2.0		2.0	2.0	2.0	0.0	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0			
Total Lost Time (s)		8.0	5.0	5.0			5.0	5.0			
Lead/Lag	Lag	Lag				Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	C-Max	C-Max		Max	Max	Max	Max	Max	Max
Act Effct Green (s)		8.0	52.0	39.2			22.0	22.0			
Actuated g/C Ratio		0.09	0.58	0.44			0.24	0.24			
v/c Ratio		0.29	0.36	0.63			0.39	0.18			
Control Delay		4.4	10.8	11.3			31.7	28.7			
Queue Delay		0.0	0.1	0.3			0.0	0.0			
Total Delay		4.4	10.9	11.7			31.7	28.7			

Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
LOS		A	B	B			C	C			
Approach Delay			10.2				30.9				
Approach LOS			B				C				
Queue Length 50th (ft)		0	98	57			77	26			
Queue Length 95th (ft)		11	133	106			135	58			
Internal Link Dist (ft)			176				45				
Turn Bay Length (ft)		100									
Base Capacity (vph)		342	1850	741			415	326			
Starvation Cap Reductn		0	0	42			0	0			
Spillback Cap Reductn		0	222	0			0	0			
Storage Cap Reductn		0	0	0			0	0			
Reduced v/c Ratio		0.23	0.41	0.67			0.39	0.18			

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 1 (1%), Referenced to phase 2:WBR and 6:EBT, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 17: Green Street & River Street & Western Avenue





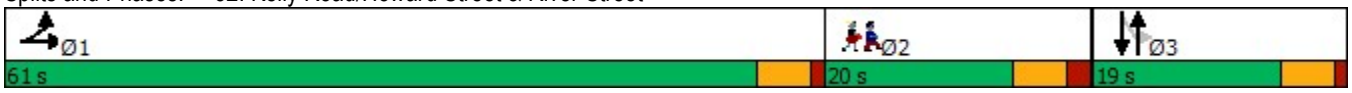
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	691	32	0	0	0	0	22	8	17	19	0
Future Volume (vph)	30	691	32	0	0	0	0	22	8	17	19	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	14	14	14	11	11	11
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3261	0	0	0	0	0	1943	0	0	1607	0
Flt Permitted		0.998									0.834	
Satd. Flow (perm)	0	3261	0	0	0	0	0	1943	0	0	1372	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		907			486			204			452	
Travel Time (s)		24.7			13.3			4.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			56						5			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.69	0.69	0.69
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	6%	3%	2%	2%	2%	2%	0%	0%	18%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	837	0	0	0	0	0	37	0	0	53	0
Turn Type	Split	NA						NA		Perm	NA	
Protected Phases	1	1						3			3	
Permitted Phases										3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	5.0	5.0						7.0		7.0	7.0	
Minimum Split (s)	10.0	10.0						12.0		12.0	12.0	
Total Split (s)	61.0	61.0						19.0		19.0	19.0	
Total Split (%)	61.0%	61.0%						19.0%		19.0%	19.0%	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.0						5.0			5.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	Min	Min						Min		Min	Min	
Act Effct Green (s)		22.0						8.3			8.3	
Actuated g/C Ratio		0.40						0.15			0.15	
v/c Ratio		0.65						0.13			0.26	
Control Delay		17.8						25.8			28.6	
Queue Delay		0.0						0.0			0.0	
Total Delay		17.8						25.8			28.6	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B						C			C	
Approach Delay		17.8						25.8			28.6	
Approach LOS		B						C			C	
Queue Length 50th (ft)		127						12			17	
Queue Length 95th (ft)		196						34			38	
Internal Link Dist (ft)		827			406			124			372	
Turn Bay Length (ft)												
Base Capacity (vph)		3042						526			371	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.28						0.07			0.14	

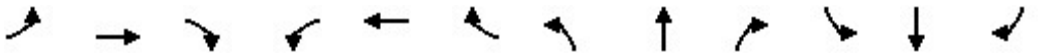
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 55.6			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 37.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 32: Kelly Road/Howard Street & River Street



Lane Group	Ø2
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	604	199	0	0	0	0	117	45	82	243	0
Future Volume (vph)	69	604	199	0	0	0	0	117	45	82	243	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	13	13	13
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3231	0	0	0	0	0	1593	0	0	1874	0
Flt Permitted		0.996									0.798	
Satd. Flow (perm)	0	3231	0	0	0	0	0	1593	0	0	1514	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		41										
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		714			907			489			555	
Travel Time (s)		19.5			24.7			11.1			12.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			45						47			
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	5%	8%	2%	2%	2%	2%	4%	38%	5%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	981	0	0	0	0	0	191	0	0	407	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		1						3			3	
Permitted Phases	1									3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	10.0	10.0						15.0		15.0	15.0	
Minimum Split (s)	14.0	14.0						19.0		19.0	19.0	
Total Split (s)	37.0	37.0						36.0		36.0	36.0	
Total Split (%)	37.0%	37.0%						36.0%		36.0%	36.0%	
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		4.0						4.0			4.0	
Lead/Lag								Lead		Lead	Lead	
Lead-Lag Optimize?								Yes		Yes	Yes	
Recall Mode	Min	Min						Min		Min	Min	
Act Effct Green (s)		32.0						29.4			29.4	
Actuated g/C Ratio		0.33						0.30			0.30	
v/c Ratio		0.89						0.39			0.88	
Control Delay		41.5						29.4			54.3	
Queue Delay		0.0						0.0			0.0	
Total Delay		41.5						29.4			54.3	

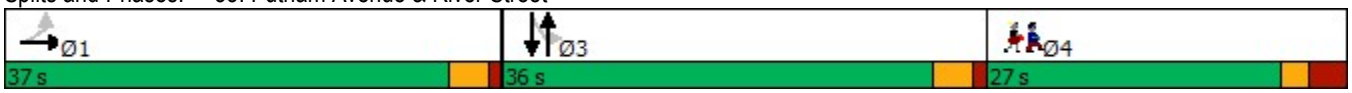
Lane Group	Ø4
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	27%
Yellow Time (s)	2.0
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D						C			D	
Approach Delay		41.5						29.4			54.3	
Approach LOS		D						C			D	
Queue Length 50th (ft)		299						94			240	
Queue Length 95th (ft)		#412						145			#308	
Internal Link Dist (ft)		634			827			409			475	
Turn Bay Length (ft)												
Base Capacity (vph)		1136						530			504	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.86						0.36			0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 96.5			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 43.4		Intersection LOS: D	
Intersection Capacity Utilization 64.9%		ICU Level of Service C	
Analysis Period (min) 15			

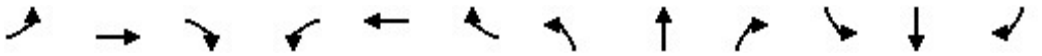
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 33: Putnam Avenue & River Street



Lane Group	Ø4
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	873	771	0	0	0	0	590	88	75	858	0
Future Volume (vph)	193	873	771	0	0	0	0	590	88	75	858	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	10	10	10	10	10	10
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3392	1599	0	0	0	0	3231	0	0	3317	0
Flt Permitted		0.991									0.587	
Satd. Flow (perm)	0	3355	1599	0	0	0	0	3231	0	0	1955	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								12				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		427			714			463			449	
Travel Time (s)		11.6			19.5			10.5			10.2	
Confl. Peds. (#/hr)	23								18	18		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96	0.96	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	6%	1%	2%	2%	2%	2%	1%	2%	3%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1171	847	0	0	0	0	707	0	0	1004	0
Turn Type	Perm	NA	Prot					NA		pm+pt	NA	
Protected Phases		8	8					2		1	6	
Permitted Phases	8									6		
Detector Phase	8	8	8					2		1	6	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0					22.0		5.0	25.0	
Minimum Split (s)	29.0	29.0	29.0					28.0		10.0	31.0	
Total Split (s)	58.0	58.0	58.0					44.0		12.0	56.0	
Total Split (%)	41.4%	41.4%	41.4%					31.4%		8.6%	40.0%	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0					2.0		1.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		7.0	7.0					6.0			6.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes		
Recall Mode	Ped	Ped	Ped					Ped		Min	Ped	
Act Effct Green (s)		53.0	53.0					39.5			50.0	
Actuated g/C Ratio		0.38	0.38					0.28			0.36	
v/c Ratio		0.92	1.40					0.77			1.35	
Control Delay		54.2	224.3					51.8			203.9	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		54.2	224.3					51.8			203.9	

Lane Group	Ø3	Ø4	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	4	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	26.0	19.0	26.0
Total Split (s)	26.0	58.0	26.0
Total Split (%)	19%	41%	19%
Yellow Time (s)	3.0	4.0	4.0
All-Red Time (s)	4.0	3.0	3.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Ped	C-Max	Ped
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

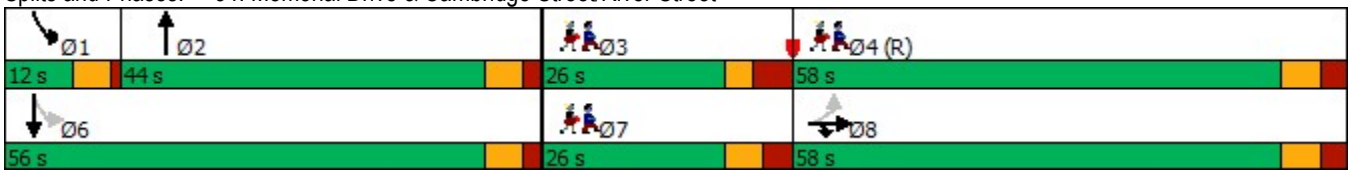
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D	F					D			F	
Approach Delay		125.6						51.8			203.9	
Approach LOS		F						D			F	
Queue Length 50th (ft)		532	~1029					306			~629	
Queue Length 95th (ft)		#671	#1282					383			#765	
Internal Link Dist (ft)		347			634			383			369	
Turn Bay Length (ft)												
Base Capacity (vph)		1270	605					920			741	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.92	1.40					0.77			1.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 4:Ped, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.40			
Intersection Signal Delay: 132.7		Intersection LOS: F	
Intersection Capacity Utilization 90.8%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 34: Memorial Drive & Cambridge Street/River Street



Lane Group	Ø3	Ø4	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	66	460	0	0	0	0	0	217	4
Future Vol, veh/h	0	0	0	66	460	0	0	0	0	0	217	4
Conflicting Peds, #/hr	0	0	0	39	0	0	0	0	0	0	0	37
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	94	94	94	92	92	92	85	85	85
Heavy Vehicles, %	2	2	2	14	6	2	2	2	2	2	3	25
Mvmt Flow	0	0	0	70	489	0	0	0	0	0	255	5

Major/Minor	Major2			Minor2		
Conflicting Flow All	39	0	0	-	668	526
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	4.24	-	-	-	6.53	6.45
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.326	-	-	-	4.027	3.525
Pot Cap-1 Maneuver	1497	-	0	0	378	509
Stage 1	-	-	0	0	474	-
Stage 2	-	-	0	0	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	1497	-	-	-	0	509
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-

Approach	WB	SB
HCM Control Delay, s	0.9	19.2
HCM LOS		C

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	1497	-	509
HCM Lane V/C Ratio	0.047	-	0.511
HCM Control Delay (s)	7.5	0	19.2
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.1	-	2.9

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	645	125	0	0	0	0	0	0	46	237	0
Future Vol, veh/h	0	645	125	0	0	0	0	0	0	46	237	0
Conflicting Peds, #/hr	0	0	186	0	0	0	0	0	0	53	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	92	92	92	92	92	92	86	86	86
Heavy Vehicles, %	2	8	2	2	2	2	2	2	2	4	6	2
Mvmt Flow	0	658	128	0	0	0	0	0	0	53	276	0

Major/Minor	Major1			Minor2		
Conflicting Flow All	-	0	0	382	972	-
Stage 1	-	-	-	0	0	-
Stage 2	-	-	-	382	972	-
Critical Hdwy	-	-	-	6.88	6.62	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	5.88	5.62	-
Follow-up Hdwy	-	-	-	3.54	4.06	-
Pot Cap-1 Maneuver	0	-	-	588	~ 244	0
Stage 1	0	-	-	-	-	0
Stage 2	0	-	-	654	320	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	588	0	-
Mov Cap-2 Maneuver	-	-	-	588	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	654	0	-

Approach	EB	SB
HCM Control Delay, s	0	18.6
HCM LOS		C

Minor Lane/Major Mvmt	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	588
HCM Lane V/C Ratio	-	-	0.56
HCM Control Delay (s)	-	-	18.6
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	3.4

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

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	11	782	0	0	0	0	0	14	0	0
Future Vol, veh/h	11	782	0	0	0	0	0	14	0	0
Conflicting Peds, #/hr	70	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	22355	-	0	-	22355	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	91	91	91	92	92	92	60	60	92	92
Heavy Vehicles, %	0	7	2	2	2	2	2	7	2	2
Mvmt Flow	12	859	0	0	0	0	0	23	0	0

Major/Minor	Major1			Minor1		
Conflicting Flow All	70	0	-	-	441	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	4.1	-	-	-	6.9	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	2.2	-	-	-	3.3	
Pot Cap-1 Maneuver	1544	-	0	0	570	
Stage 1	-	-	0	0	-	
Stage 2	-	-	0	0	-	
Platoon blocked, %		-				
Mov Cap-1 Maneuver	1544	-	-	-	570	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	

Approach	EB	NB
HCM Control Delay, s	0.2	11.8
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT
Capacity (veh/h)	570	1544	-
HCM Lane V/C Ratio	0.07	0.008	-
HCM Control Delay (s)	11.8	7.3	0.1
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.2	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	691	3	0	0	0	0	43	0	9	1	0
Future Vol, veh/h	8	691	3	0	0	0	0	43	0	9	1	0
Conflicting Peds, #/hr	57	0	79	0	0	0	0	0	13	13	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	92	92	92	72	72	72	50	50	50
Heavy Vehicles, %	13	7	0	2	2	2	2	0	2	22	0	2
Mvmt Flow	9	759	3	0	0	0	0	60	0	18	2	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	57	0	0	-	915	473	498	916	-
Stage 1	-	-	-	-	858	-	57	57	-
Stage 2	-	-	-	-	57	-	441	859	-
Critical Hdwy	4.36	-	-	-	6.5	6.94	7.94	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.5	-
Follow-up Hdwy	2.33	-	-	-	4	3.32	3.72	4	-
Pot Cap-1 Maneuver	1469	-	-	0	275	538	413	274	0
Stage 1	-	-	-	0	376	-	-	-	0
Stage 2	-	-	-	0	-	-	515	376	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1403	-	-	-	243	504	317	242	-
Mov Cap-2 Maneuver	-	-	-	-	243	-	317	242	-
Stage 1	-	-	-	-	349	-	-	-	-
Stage 2	-	-	-	-	-	-	422	349	-

Approach	EB	NB	SB
HCM Control Delay, s	0.1	24.6	17.5
HCM LOS		C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	243	1403	-	-	307
HCM Lane V/C Ratio	0.246	0.006	-	-	0.065
HCM Control Delay (s)	24.6	7.6	0	-	17.5
HCM Lane LOS	C	A	A	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	89	4	0	0	0	0	1	2	2	2	0
Future Vol, veh/h	41	89	4	0	0	0	0	1	2	2	2	0
Conflicting Peds, #/hr	24	0	79	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	92	92	92	38	38	38	33	33	33
Heavy Vehicles, %	0	9	0	2	2	2	2	0	0	0	0	2
Mvmt Flow	54	117	5	0	0	0	0	3	5	6	6	0

Major/Minor	Major1			Minor1			Minor2			
Conflicting Flow All	24	0	0	-	331	199	256	333	-	
Stage 1	-	-	-	-	307	-	24	24	-	
Stage 2	-	-	-	-	24	-	232	309	-	
Critical Hdwy	4.1	-	-	-	6.5	6.2	7.1	6.5	-	
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-	
Pot Cap-1 Maneuver	1604	-	-	0	592	847	701	590	0	
Stage 1	-	-	-	0	665	-	-	-	0	
Stage 2	-	-	-	0	-	-	775	663	0	
Platoon blocked, %		-	-							
Mov Cap-1 Maneuver	1573	-	-	-	503	762	661	502	-	
Mov Cap-2 Maneuver	-	-	-	-	503	-	661	502	-	
Stage 1	-	-	-	-	577	-	-	-	-	
Stage 2	-	-	-	-	-	-	738	575	-	

Approach	EB	NB	SB
HCM Control Delay, s	2.3	10.6	11.4
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	650	1573	-	-	571
HCM Lane V/C Ratio	0.012	0.034	-	-	0.021
HCM Control Delay (s)	10.6	7.4	0	-	11.4
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	700	0	0	0	0	93
Future Vol, veh/h	700	0	0	0	0	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	92	92	73	73
Heavy Vehicles, %	7	2	2	2	2	10
Mvmt Flow	769	0	0	0	0	127

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	-		-	385
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.1
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.4
Pot Cap-1 Maneuver	-	0		0	591
Stage 1	-	0		0	-
Stage 2	-	0		0	-
Platoon blocked, %	-				
Mov Cap-1 Maneuver	-	-		-	591
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NE
HCM Control Delay, s	0	12.8
HCM LOS		B

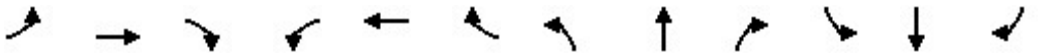
Minor Lane/Major Mvmt	NELn1	EBT
Capacity (veh/h)	591	-
HCM Lane V/C Ratio	0.216	-
HCM Control Delay (s)	12.8	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.8	-

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	9	0	0	0	0	22	133	1	0	0	0
Future Vol, veh/h	64	9	0	0	0	0	22	133	1	0	0	0
Peak Hour Factor	0.83	0.83	0.83	0.92	0.92	0.92	0.83	0.83	0.83	0.92	0.92	0.92
Heavy Vehicles, %	8	100	2	2	2	2	36	15	0	2	2	2
Mvmt Flow	77	11	0	0	0	0	27	160	1	0	0	0
Number of Lanes	0	1	0	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	8.3	9.3
HCM LOS	A	A

Lane	NBLn1	EBLn1
Vol Left, %	14%	88%
Vol Thru, %	85%	12%
Vol Right, %	1%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	156	73
LT Vol	22	64
Through Vol	133	9
RT Vol	1	0
Lane Flow Rate	188	88
Geometry Grp	1	1
Degree of Util (X)	0.245	0.115
Departure Headway (Hd)	4.691	4.694
Convergence, Y/N	Yes	Yes
Cap	759	768
Service Time	2.764	2.694
HCM Lane V/C Ratio	0.248	0.115
HCM Control Delay	9.3	8.3
HCM Lane LOS	A	A
HCM 95th-tile Q	1	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	528	171	0	480	38	0	372	116	0	289	50
Future Volume (vph)	0	528	171	0	480	38	0	372	116	0	289	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		70	0		35
Storage Lanes	0		1	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1845	1442	0	1757	0	0	1759	1568	0	1759	1615
Flt Permitted												
Satd. Flow (perm)	0	1845	526	0	1757	0	0	1759	154	0	1759	158
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		113			355			293			490	
Travel Time (s)		3.1			9.7			6.7			11.1	
Confl. Peds. (#/hr)			734			385			617			415
Confl. Bikes (#/hr)						68						
Peak Hour Factor	0.97	0.97	0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	3%	12%	2%	3%	6%	2%	8%	3%	2%	8%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	544	176	0	540	0	0	392	122	0	301	52
Turn Type		NA	custom		NA			NA	custom		NA	custom
Protected Phases		1 2			2			4			4	
Permitted Phases			6						8			8
Detector Phase		1 2	6		2			4	8		4	8
Switch Phase												
Minimum Initial (s)			5.0		10.0			10.0	5.0		10.0	5.0
Minimum Split (s)			34.0		44.0			15.0	20.0		15.0	20.0
Total Split (s)			40.0		50.0			35.0	20.0		35.0	20.0
Total Split (%)			44.4%		55.6%			38.9%	22.2%		38.9%	22.2%
Yellow Time (s)			3.0		3.0			3.0	3.0		3.0	3.0
All-Red Time (s)			2.0		2.0			2.0	2.0		2.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)			5.0		5.0			5.0	5.0		5.0	5.0
Lead/Lag			Lag		Lag				Lag			Lag
Lead-Lag Optimize?			Yes		Yes				Yes			Yes
Recall Mode			Max		Max			Max	Max		Max	Max
Act Effct Green (s)		53.0	35.0		45.0			30.0	15.0		30.0	15.0
Actuated g/C Ratio		0.59	0.39		0.50			0.33	0.17		0.33	0.17
v/c Ratio		0.50	0.86		0.62			0.67	4.88		0.51	2.00
Control Delay		27.0	77.6		21.3			24.5	1830.8		15.2	565.6
Queue Delay		37.1	0.0		47.0			1.9	0.0		0.1	20.1
Total Delay		64.1	77.6		68.3			26.4	1830.8		15.3	585.7

Lane Group	Ø1	Ø5	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	5	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	1.0	1.0	13.0
Minimum Split (s)	5.0	15.0	15.0
Total Split (s)	5.0	15.0	15.0
Total Split (%)	6%	17%	17%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Max	Max	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	E		E			C	F		B	F
Approach Delay		67.4			68.3			454.7			99.4	
Approach LOS		E			E			F			F	
Queue Length 50th (ft)		282	108		210			112	~133		101	~48
Queue Length 95th (ft)		384	#224		341			143	#225		m138	m#85
Internal Link Dist (ft)		33			275			213			410	
Turn Bay Length (ft)									70			35
Base Capacity (vph)		1086	204		878			586	25		586	26
Starvation Cap Reductn		570	0		266			86	0		0	0
Spillback Cap Reductn		146	0		379			0	0		24	8
Storage Cap Reductn		0	0		0			0	0		0	0
Reduced v/c Ratio		1.05	0.86		1.08			0.78	4.88		0.54	2.89

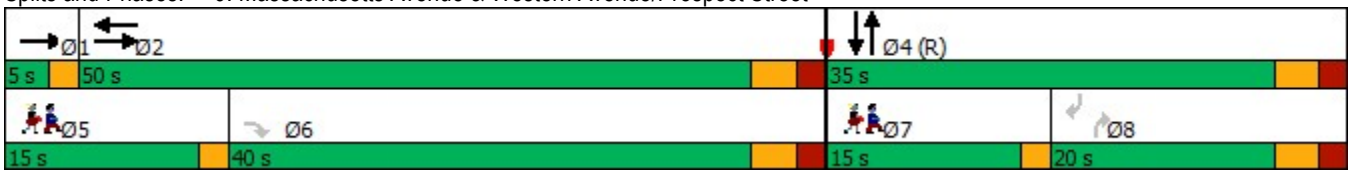
Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 35 (39%), Referenced to phase 4:NBSB, Start of Green	
Natural Cycle: 105	
Control Type: Pretimed	
Maximum v/c Ratio: 4.88	
Intersection Signal Delay: 166.5	Intersection LOS: F
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Massachusetts Avenue & Western Avenue/Prospect Street



Lane Group	Ø1	Ø5	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

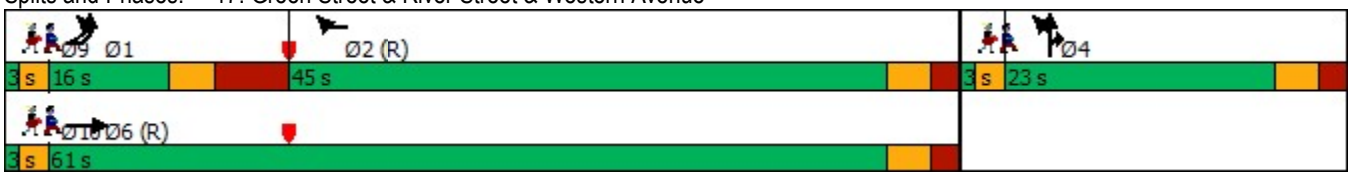
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
Lane Configurations											
Traffic Volume (vph)	17	134	580	504	24	159	82	68			
Future Volume (vph)	17	134	580	504	24	159	82	68			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	12	12	12	12			
Grade (%)			0%				0%				
Storage Length (ft)		100		0		0		0			
Storage Lanes		1		1		0		1			
Taper Length (ft)		25				25					
Satd. Flow (prot)	0	1773	3505	1583	0	0	1747	1615			
Flt Permitted		0.950					0.968				
Satd. Flow (perm)	0	1773	3505	1583	0	0	1412	1615			
Right Turn on Red	Yes				No			No			
Satd. Flow (RTOR)		133									
Link Speed (mph)			25				30				
Link Distance (ft)			256				125				
Travel Time (s)			7.0				2.8				
Confl. Peds. (#/hr)					297	103		82			
Confl. Bikes (#/hr)					110						
Peak Hour Factor	0.98	0.98	0.98	0.93	0.93	0.85	0.85	0.85			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	0%	2%	3%	4%	0%	8%	0%	0%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0			
Parking (#/hr)											
Mid-Block Traffic (%)			0%				0%				
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	154	592	568	0	0	283	80			
Turn Type	Prot	Prot	NA	Prot		Split	NA	Prot			
Protected Phases	1	1	6	2		4	4	4	3	9	10
Permitted Phases											
Detector Phase	1	1	6	2		4	4	4			
Switch Phase											
Minimum Initial (s)	8.0	8.0	15.0	15.0		15.0	15.0	15.0	1.0	1.0	1.0
Minimum Split (s)	16.0	16.0	37.0	24.0		21.0	21.0	21.0	3.0	3.0	3.0
Total Split (s)	16.0	16.0	61.0	45.0		23.0	23.0	23.0	3.0	3.0	3.0
Total Split (%)	17.8%	17.8%	67.8%	50.0%		25.6%	25.6%	25.6%	3%	3%	3%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	2.0	2.0	2.0
All-Red Time (s)	5.0	5.0	2.0	2.0		2.0	2.0	2.0	0.0	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0			
Total Lost Time (s)		8.0	5.0	5.0			5.0	5.0			
Lead/Lag	Lag	Lag				Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes				Yes	Yes	Yes	Yes	Yes	
Recall Mode	Min	Min	C-Max	C-Max		Max	Max	Max	Max	Max	Max
Act Effct Green (s)		8.0	56.0	40.0			18.0	18.0			
Actuated g/C Ratio		0.09	0.62	0.44			0.20	0.20			
v/c Ratio		0.55	0.27	0.81			0.81	0.25			
Control Delay		18.3	8.1	49.7			54.1	32.8			
Queue Delay		0.0	0.1	54.1			0.0	0.0			
Total Delay		18.3	8.2	103.8			54.1	32.8			

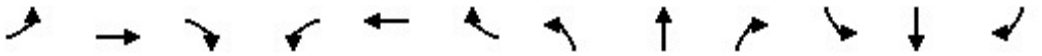
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBT	NBR	Ø3	Ø9	Ø10
LOS		B	A	F			D	C			
Approach Delay			10.3				49.4				
Approach LOS			B				D				
Queue Length 50th (ft)		11	73	341			155	39			
Queue Length 95th (ft)		69	99	m433			#256	74			
Internal Link Dist (ft)			176				45				
Turn Bay Length (ft)		100									
Base Capacity (vph)		278	2180	703			349	323			
Starvation Cap Reductn		0	0	321			0	0			
Spillback Cap Reductn		0	472	0			0	0			
Storage Cap Reductn		0	0	0			0	0			
Reduced v/c Ratio		0.55	0.35	1.49			0.81	0.25			

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 42 (47%), Referenced to phase 2:WBR and 6:EBT, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 50.4		Intersection LOS: D	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Green Street & River Street & Western Avenue





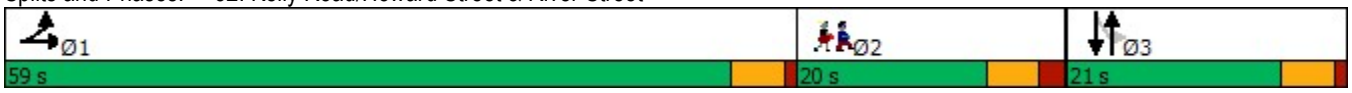
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	668	23	0	0	0	0	45	4	13	25	0
Future Volume (vph)	62	668	23	0	0	0	0	45	4	13	25	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3511	0	0	0	0	0	1879	0	0	1817	0
Flt Permitted		0.996									0.870	
Satd. Flow (perm)	0	3511	0	0	0	0	0	1879	0	0	1608	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		907			486			204			452	
Travel Time (s)		24.7			13.3			4.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			34									
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.78	0.78	0.78	0.77	0.77	0.77
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	2%	0%	0%	8%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	785	0	0	0	0	0	63	0	0	49	0
Turn Type	Split	NA						NA		Perm	NA	
Protected Phases	1	1						3			3	
Permitted Phases										3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	5.0	5.0						7.0		7.0	7.0	
Minimum Split (s)	10.0	10.0						12.0		12.0	12.0	
Total Split (s)	59.0	59.0						21.0		21.0	21.0	
Total Split (%)	59.0%	59.0%						21.0%		21.0%	21.0%	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.0						5.0			5.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	Min	Min						Min		Min	Min	
Act Effct Green (s)		19.1						8.0			8.0	
Actuated g/C Ratio		0.36						0.15			0.15	
v/c Ratio		0.61						0.22			0.20	
Control Delay		17.3						25.5			25.6	
Queue Delay		0.0						0.0			0.0	
Total Delay		17.3						25.5			25.6	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	20%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B						C			C	
Approach Delay		17.3						25.5			25.6	
Approach LOS		B						C			C	
Queue Length 50th (ft)		114						19			15	
Queue Length 95th (ft)		173						46			38	
Internal Link Dist (ft)		827			406			124			372	
Turn Bay Length (ft)												
Base Capacity (vph)		3323						614			526	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.24						0.10			0.09	

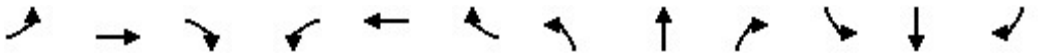
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 52.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 38.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 32: Kelly Road/Howard Street & River Street



Lane Group	Ø2
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	627	113	0	0	0	0	330	54	45	145	0
Future Volume (vph)	82	627	113	0	0	0	0	330	54	45	145	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3431	0	0	0	0	0	1839	0	0	1868	0
Flt Permitted		0.995									0.457	
Satd. Flow (perm)	0	3431	0	0	0	0	0	1839	0	0	864	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		20										
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		714			907			489			555	
Travel Time (s)		19.5			24.7			11.1			12.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)			27						31			
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.82	0.82	0.82	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	2%	1%	0%	2%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	884	0	0	0	0	0	468	0	0	219	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		1						3			3	
Permitted Phases	1									3		
Detector Phase	1	1						3		3	3	
Switch Phase												
Minimum Initial (s)	10.0	10.0						15.0		15.0	15.0	
Minimum Split (s)	14.0	14.0						19.0		19.0	19.0	
Total Split (s)	39.0	39.0						34.0		34.0	34.0	
Total Split (%)	39.0%	39.0%						34.0%		34.0%	34.0%	
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		4.0						4.0			4.0	
Lead/Lag								Lead		Lead	Lead	
Lead-Lag Optimize?								Yes		Yes	Yes	
Recall Mode	Min	Min						Min		Min	Min	
Act Effct Green (s)		30.7						28.1			28.1	
Actuated g/C Ratio		0.33						0.30			0.30	
v/c Ratio		0.78						0.85			0.85	
Control Delay		33.6						48.2			62.2	
Queue Delay		0.0						0.0			0.0	
Total Delay		33.6						48.2			62.2	

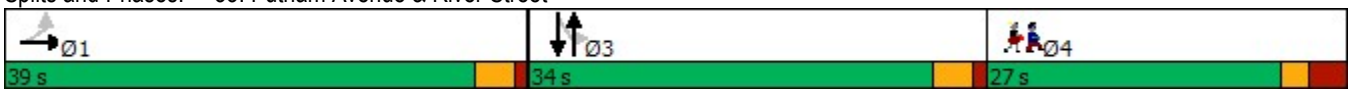
Lane Group	Ø4
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	27%
Yellow Time (s)	2.0
All-Red Time (s)	3.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C						D			E	
Approach Delay		33.6						48.2			62.2	
Approach LOS		C						D			E	
Queue Length 50th (ft)		250						272			127	
Queue Length 95th (ft)		323						#364			#251	
Internal Link Dist (ft)		634			827			409			475	
Turn Bay Length (ft)												
Base Capacity (vph)		1299						591			277	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.68						0.79			0.79	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 94.1			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 41.9		Intersection LOS: D	
Intersection Capacity Utilization 66.5%		ICU Level of Service C	
Analysis Period (min) 15			

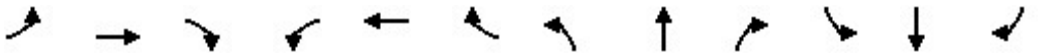
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 33: Putnam Avenue & River Street



Lane Group	Ø4
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	768	589	0	0	0	0	835	51	87	602	0
Future Volume (vph)	280	768	589	0	0	0	0	835	51	87	602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3512	1615	0	0	0	0	3574	0	0	3584	0
Flt Permitted		0.987									0.512	
Satd. Flow (perm)	0	3445	1615	0	0	0	0	3574	0	0	1846	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								4				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		427			714			463			449	
Travel Time (s)		11.6			19.5			10.5			10.2	
Confl. Peds. (#/hr)	27								1	1		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.84	0.84	0.84	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	2%	0%	0%	1%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1247	701	0	0	0	0	953	0	0	758	0
Turn Type	Perm	NA	Prot					NA		pm+pt	NA	
Protected Phases		8	8					2		1	6	
Permitted Phases	8									6		
Detector Phase	8	8	8					2		1	6	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0					22.0		5.0	25.0	
Minimum Split (s)	29.0	29.0	29.0					28.0		10.0	31.0	
Total Split (s)	59.0	59.0	59.0					41.0		10.0	51.0	
Total Split (%)	42.1%	42.1%	42.1%					29.3%		7.1%	36.4%	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0					2.0		1.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		7.0	7.0					6.0			6.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes		
Recall Mode	Ped	Ped	Ped					Ped		Min	Ped	
Act Effct Green (s)		52.0	52.0					35.0			45.0	
Actuated g/C Ratio		0.37	0.37					0.25			0.32	
v/c Ratio		0.97	1.17					1.06			1.18	
Control Delay		63.1	133.0					97.8			136.6	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		63.1	133.0					97.8			136.6	

Lane Group	Ø3	Ø4	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	4	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	30.0	19.0	30.0
Total Split (s)	30.0	59.0	30.0
Total Split (%)	21%	42%	21%
Yellow Time (s)	3.0	4.0	4.0
All-Red Time (s)	4.0	3.0	3.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Ped	C-Max	Ped
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	F					F			F	
Approach Delay		88.3						97.8			136.6	
Approach LOS		F						F			F	
Queue Length 50th (ft)		585	~758					~501			~382	
Queue Length 95th (ft)		#634	#896					#639			#542	
Internal Link Dist (ft)		347			634			383			369	
Turn Bay Length (ft)												
Base Capacity (vph)		1279	599					896			643	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.97	1.17					1.06			1.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 0 (0%), Referenced to phase 4:Ped, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.18			
Intersection Signal Delay: 100.8		Intersection LOS: F	
Intersection Capacity Utilization 90.7%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 34: Memorial Drive & Cambridge Street/River Street

Lane Group	Ø3	Ø4	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	76	605	0	0	0	0	0	138	6
Future Vol, veh/h	0	0	0	76	605	0	0	0	0	0	138	6
Conflicting Peds, #/hr	0	0	0	43	0	0	0	0	0	0	0	53
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	93	93	93	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	9	4	2	2	2	2	2	0	0
Mvmt Flow	0	0	0	82	651	0	0	0	0	0	150	7

Major/Minor	Major2			Minor2		
Conflicting Flow All	43	0	0	-	858	704
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	4.19	-	-	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.281	-	-	-	4	3.3
Pot Cap-1 Maneuver	1522	-	0	0	297	440
Stage 1	-	-	0	0	394	-
Stage 2	-	-	0	0	-	-
Platoon blocked, %		-				
Mov Cap-1 Maneuver	1522	-	-	-	0	440
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-

Approach	WB	SB
HCM Control Delay, s	0.8	17.6
HCM LOS		C

Minor Lane/Major Mvmt	WBL	WBT	SBLn1
Capacity (veh/h)	1522	-	440
HCM Lane V/C Ratio	0.054	-	0.356
HCM Control Delay (s)	7.5	0	17.6
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.2	-	1.6

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	683	85	0	0	0	0	0	0	48	164	0
Future Vol, veh/h	0	683	85	0	0	0	0	0	0	48	164	0
Conflicting Peds, #/hr	0	0	226	0	0	0	0	0	0	94	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	92	92	92	92	92	92	95	95	95
Heavy Vehicles, %	2	3	0	2	2	2	2	2	2	2	4	2
Mvmt Flow	0	727	90	0	0	0	0	0	0	51	173	0

Major/Minor	Major1			Minor2		
Conflicting Flow All	-	0	0	458	1043	-
Stage 1	-	-	-	0	0	-
Stage 2	-	-	-	458	1043	-
Critical Hdwy	-	-	-	6.84	6.58	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	5.84	5.58	-
Follow-up Hdwy	-	-	-	3.52	4.04	-
Pot Cap-1 Maneuver	0	-	-	531	225	0
Stage 1	0	-	-	-	-	0
Stage 2	0	-	-	604	300	0
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	531	0	-
Mov Cap-2 Maneuver	-	-	-	531	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	604	0	-

Approach	EB	SB
HCM Control Delay, s	0	16.6
HCM LOS		C

Minor Lane/Major Mvmt	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	531
HCM Lane V/C Ratio	-	-	0.42
HCM Control Delay (s)	-	-	16.6
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	2.1

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	22	704	0	0	0	0	0	68	0	0
Future Vol, veh/h	22	704	0	0	0	0	0	68	0	0
Conflicting Peds, #/hr	48	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	22355	-	0	-	22355	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	94	94	94	92	92	92	78	78	92	92
Heavy Vehicles, %	7	2	2	2	2	2	2	0	2	2
Mvmt Flow	23	749	0	0	0	0	0	87	0	0

Major/Minor	Major1			Minor1	
Conflicting Flow All	48	0	-	-	385
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.24	-	-	-	6.98
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.27	-	-	-	3.34
Pot Cap-1 Maneuver	1522	-	0	0	608
Stage 1	-	-	0	0	-
Stage 2	-	-	0	0	-
Platoon blocked, %		-			
Mov Cap-1 Maneuver	1522	-	-	-	608
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0.3	12.4
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT
Capacity (veh/h)	608	1522	-
HCM Lane V/C Ratio	0.196	0.015	-
HCM Control Delay (s)	12.4	7.4	0.1
HCM Lane LOS	B	A	A
HCM 95th %tile Q(veh)	0.7	0	-

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	19	638	4	0	0	0	0	76	1	9	3	0
Future Vol, veh/h	19	638	4	0	0	0	0	76	1	9	3	0
Conflicting Peds, #/hr	86	0	93	0	0	0	0	0	28	28	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	92	92	92	92	92	92	50	50	50
Heavy Vehicles, %	5	2	0	2	2	2	2	0	0	0	0	2
Mvmt Flow	20	672	4	0	0	0	0	83	1	18	6	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	86	0	0	-	893	459	532	895	-
Stage 1	-	-	-	-	807	-	86	86	-
Stage 2	-	-	-	-	86	-	446	809	-
Critical Hdwy	4.2	-	-	-	6.5	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.25	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1487	-	-	0	283	554	435	282	0
Stage 1	-	-	-	0	397	-	-	-	0
Stage 2	-	-	-	0	-	-	567	396	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1365	-	-	-	231	505	283	230	-
Mov Cap-2 Maneuver	-	-	-	-	231	-	283	230	-
Stage 1	-	-	-	-	353	-	-	-	-
Stage 2	-	-	-	-	-	-	423	352	-

Approach	EB	NB	SB
HCM Control Delay, s	0.3	28.9	19.8
HCM LOS		D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	233	1365	-	-	268
HCM Lane V/C Ratio	0.359	0.015	-	-	0.09
HCM Control Delay (s)	28.9	7.7	0.1	-	19.8
HCM Lane LOS	D	A	A	-	C
HCM 95th %tile Q(veh)	1.6	0	-	-	0.3

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	83	1	0	0	0	0	3	2	4	3	0
Future Vol, veh/h	72	83	1	0	0	0	0	3	2	4	3	0
Conflicting Peds, #/hr	19	0	70	0	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	92	92	92	63	63	63	58	58	58
Heavy Vehicles, %	0	5	0	2	2	2	2	0	0	0	0	2
Mvmt Flow	91	105	1	0	0	0	0	5	3	7	5	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	19	0	0	-	377	178	313	377	-
Stage 1	-	-	-	-	358	-	19	19	-
Stage 2	-	-	-	-	19	-	294	358	-
Critical Hdwy	4.1	-	-	-	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1611	-	-	0	558	870	643	558	0
Stage 1	-	-	-	0	631	-	-	-	0
Stage 2	-	-	-	0	-	-	719	631	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1582	-	-	-	480	812	595	480	-
Mov Cap-2 Maneuver	-	-	-	-	480	-	595	480	-
Stage 1	-	-	-	-	553	-	-	-	-
Stage 2	-	-	-	-	-	-	667	553	-

Approach	EB	NB	SB
HCM Control Delay, s	3.4	11.4	11.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	574	1582	-	-	540
HCM Lane V/C Ratio	0.014	0.058	-	-	0.022
HCM Control Delay (s)	11.4	7.4	0	-	11.8
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	647	0	0	0	0	79
Future Vol, veh/h	647	0	0	0	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	92	92	76	76
Heavy Vehicles, %	3	2	2	2	2	5
Mvmt Flow	688	0	0	0	0	104

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	-		-	344
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.35
Pot Cap-1 Maneuver	-	0		0	643
Stage 1	-	0		0	-
Stage 2	-	0		0	-
Platoon blocked, %	-				
Mov Cap-1 Maneuver	-	-		-	643
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NE
HCM Control Delay, s	0	11.7
HCM LOS		B

Minor Lane/Major Mvmt	NELn1	EBT
Capacity (veh/h)	643	-
HCM Lane V/C Ratio	0.162	-
HCM Control Delay (s)	11.7	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.6	-

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	71	12	0	0	0	0	21	235	4	0	0	0
Future Vol, veh/h	71	12	0	0	0	0	21	235	4	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92
Heavy Vehicles, %	0	83	2	2	2	2	19	5	75	2	2	2
Mvmt Flow	79	13	0	0	0	0	24	264	4	0	0	0
Number of Lanes	0	1	0	0	0	0	0	1	0	0	0	0

Approach	EB	NB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left		EB
Conflicting Lanes Left	0	1
Conflicting Approach Right	NB	
Conflicting Lanes Right	1	0
HCM Control Delay	8.4	9.9
HCM LOS	A	A

Lane	NBLn1	EBLn1
Vol Left, %	8%	86%
Vol Thru, %	90%	14%
Vol Right, %	2%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	260	83
LT Vol	21	71
Through Vol	235	12
RT Vol	4	0
Lane Flow Rate	292	92
Geometry Grp	1	1
Degree of Util (X)	0.356	0.122
Departure Headway (Hd)	4.392	4.772
Convergence, Y/N	Yes	Yes
Cap	809	756
Service Time	2.47	2.772
HCM Lane V/C Ratio	0.361	0.122
HCM Control Delay	9.9	8.4
HCM Lane LOS	A	A
HCM 95th-tile Q	1.6	0.4

Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR2	NER	Ø1	Ø5	Ø6
Lane Configurations												
Traffic Volume (vph)	593	139	407	41	281	145	343	32	7			
Future Volume (vph)	593	139	407	41	281	145	343	32	7			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	11	10	11	10	12			
Grade (%)	0%		0%		0%		0%					
Storage Length (ft)		0		0		70			0			
Storage Lanes		1		0		1			1			
Taper Length (ft)												
Satd. Flow (prot)	1792	1252	1680	0	1531	1422	1670	1449	1611			
Flt Permitted												
Satd. Flow (perm)	1792	412	1680	0	1531	662	1670	700	1611			
Right Turn on Red				No		No		No				
Satd. Flow (RTOR)												
Link Speed (mph)	25		25		30		30					
Link Distance (ft)	127		355		293		490					
Travel Time (s)	3.5		9.7		6.7		11.1					
Confl. Peds. (#/hr)		440		262		236		203				
Confl. Bikes (#/hr)				18								
Peak Hour Factor	0.91	0.91	0.94	0.94	0.79	0.79	0.84	0.84	0.92			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	6%	29%	6%	17%	20%	6%	10%	4%	2%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0			
Parking (#/hr)												
Mid-Block Traffic (%)	0%		0%		0%		0%					
Shared Lane Traffic (%)												
Lane Group Flow (vph)	652	153	477	0	356	184	408	38	8			
Turn Type	NA	custom	NA		NA	custom	NA	custom	custom			
Protected Phases	1 2		2		4		4		5 6	1	5	6
Permitted Phases		14				11		11				
Detector Phase	1 2	14	2		4	11	4	11	5 6			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0	5.0	5.0	5.0		3.0	3.0	3.0
Minimum Split (s)		21.0	10.0		23.0	23.0	23.0	23.0		5.0	10.0	10.0
Total Split (s)		27.0	32.0		33.0	23.0	33.0	23.0		5.0	10.0	10.0
Total Split (%)		30.0%	35.6%		36.7%	25.6%	36.7%	25.6%		6%	11%	11%
Yellow Time (s)		3.0	3.0		3.0	3.0	3.0	3.0		2.0	3.0	3.0
All-Red Time (s)		2.0	2.0		2.0	2.0	2.0	2.0		0.0	4.0	4.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0				
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0				
Lead/Lag		Lag	Lag			Lag		Lag		Lead		
Lead-Lag Optimize?		Yes	Yes			Yes		Yes		Yes		
Recall Mode		Max	C-Max		Max	Max	Max	Max		Ped	None	None
Act Effct Green (s)	43.0	30.0	35.0		36.0	26.0	36.0	26.0	6.0			
Actuated g/C Ratio	0.48	0.33	0.39		0.40	0.29	0.40	0.29	0.07			
v/c Ratio	0.76	1.12	0.73		0.58	0.97	0.61	0.19	0.07			
Control Delay	20.7	126.2	27.4		20.0	80.8	26.2	29.4	20.1			
Queue Delay	11.7	0.0	1.2		1.3	0.0	0.1	0.0	0.0			
Total Delay	32.4	126.2	28.6		21.3	80.8	26.3	29.4	20.1			

Lane Group	Ø7	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Grade (%)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Growth Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Parking (#/hr)		
Mid-Block Traffic (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	7	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	10.0	10.0
Total Split (s)	10.0	10.0
Total Split (%)	11%	11%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Ped	Ped
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

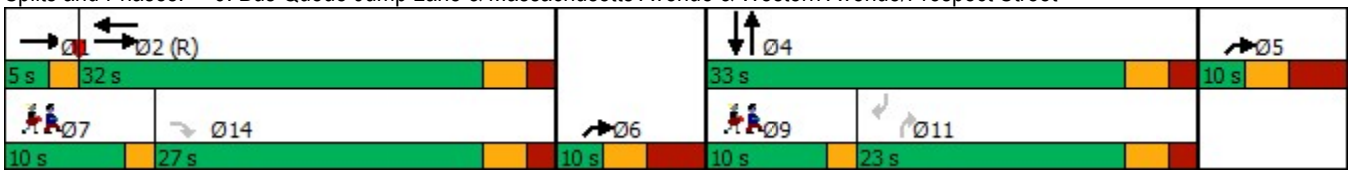
Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR2	NER	Ø1	Ø5	Ø6
LOS	C	F	C		C	F	C	C	C			
Approach Delay	50.2		28.6		41.6		26.6					
Approach LOS	D		C		D		C					
Queue Length 50th (ft)	113	~92	169		71	76	118	11	3			
Queue Length 95th (ft)	m#504	m#164	#440		168	#225	m272	m29	m4			
Internal Link Dist (ft)	47		275		213		410					
Turn Bay Length (ft)						70		35				
Base Capacity (vph)	856	137	653		612	190	668	202	107			
Starvation Cap Reductn	97	0	55		108	0	0	0	0			
Spillback Cap Reductn	186	0	18		0	0	16	0	0			
Storage Cap Reductn	0	0	0		0	0	0	0	0			
Reduced v/c Ratio	0.97	1.12	0.80		0.71	0.97	0.63	0.19	0.07			

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 38.9 Intersection LOS: D
Intersection Capacity Utilization 65.9% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Bus Queue Jump Lane & Massachusetts Avenue & Western Avenue/Prospect Street



Lane Group	Ø7	Ø9
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

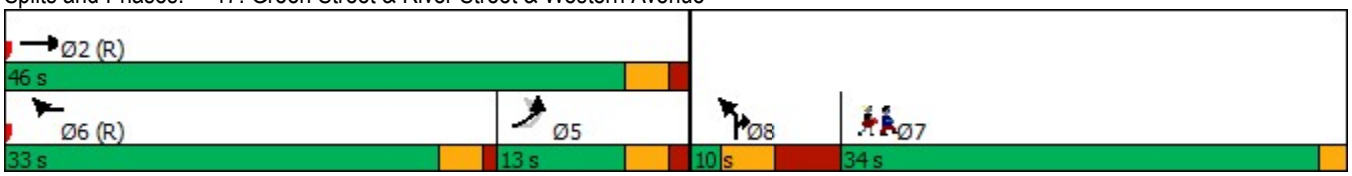
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBR	Ø7
Lane Configurations								
Traffic Volume (vph)	13	127	681	438	20	7	5	
Future Volume (vph)	13	127	681	438	20	7	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	11	11	15	15	12	12	
Grade (%)			0%					
Storage Length (ft)		100		0		0	0	
Storage Lanes		1		1		1	1	
Taper Length (ft)		25				25		
Satd. Flow (prot)	0	1699	1685	1703	0	1583	1335	
Flt Permitted		0.950				0.950		
Satd. Flow (perm)	0	1699	1685	1703	0	729	1335	
Right Turn on Red	No				No		No	
Satd. Flow (RTOR)								
Link Speed (mph)			25					
Link Distance (ft)			256					
Travel Time (s)			7.0					
Confl. Peds. (#/hr)					269	31	47	
Confl. Bikes (#/hr)					20			
Peak Hour Factor	0.92	0.92	0.92	0.98	0.98	0.90	0.90	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	0%	3%	9%	6%	10%	14%	21%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	
Parking (#/hr)								
Mid-Block Traffic (%)			0%					
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	152	740	467	0	8	6	
Turn Type	custom	Prot	NA	Prot		Prot	Prot	
Protected Phases		5	2	6		8	8	7
Permitted Phases	5							
Detector Phase	5	5	2	6		8	8	
Switch Phase								
Minimum Initial (s)	5.0	5.0	15.0	15.0		2.0	2.0	5.0
Minimum Split (s)	9.5	9.5	19.5	19.5		10.0	10.0	34.0
Total Split (s)	13.0	13.0	46.0	33.0		10.0	10.0	34.0
Total Split (%)	14.4%	14.4%	51.1%	36.7%		11.1%	11.1%	38%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.5	3.5	2.0
All-Red Time (s)	1.5	1.5	1.5	1.0		4.5	4.5	0.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5	4.5	4.0		8.0	8.0	
Lead/Lag	Lag	Lag		Lead		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes		Yes	Yes	Yes
Recall Mode	Max	Max	C-Max	C-Max		None	None	Ped
Act Effct Green (s)		8.5	47.5	35.0		2.0	2.0	
Actuated g/C Ratio		0.09	0.53	0.39		0.02	0.02	
v/c Ratio		0.95	0.83	0.71		0.23	0.21	
Control Delay		73.9	15.9	19.2		58.3	59.2	
Queue Delay		0.0	9.6	0.5		0.0	0.0	
Total Delay		73.9	25.5	19.7		58.3	59.2	

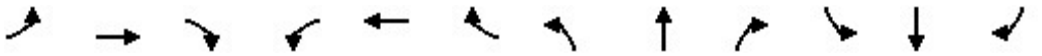
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBR	Ø7
LOS		E	C	B		E	E	
Approach Delay			33.8					
Approach LOS			C					
Queue Length 50th (ft)		92	90	68		5	3	
Queue Length 95th (ft)		m#123	m#539	#384		19	16	
Internal Link Dist (ft)			176					
Turn Bay Length (ft)		100						
Base Capacity (vph)		160	889	661		35	29	
Starvation Cap Reductn		0	128	35		0	0	
Spillback Cap Reductn		0	23	0		0	0	
Storage Cap Reductn		0	0	0		0	0	
Reduced v/c Ratio		0.95	0.97	0.75		0.23	0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 39 (43%), Referenced to phase 2:EBT and 6:WBR, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 29.2		Intersection LOS: C	
Intersection Capacity Utilization 53.2%		ICU Level of Service A	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Green Street & River Street & Western Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	66	389	0	71	0	0	0	217	4
Future Volume (vph)	0	0	0	66	389	0	71	0	0	0	217	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	13	13	13	13	13	16	16	16	16	16	16
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1819	0	2006	0	0	0	2057	0
Flt Permitted					0.993		0.950					
Satd. Flow (perm)	0	0	0	0	1794	0	2006	0	0	0	2057	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)											1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		129			334			144			152	
Travel Time (s)		2.9			7.6			3.3			3.5	
Confl. Peds. (#/hr)				39								37
Confl. Bikes (#/hr)												29
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	14%	6%	2%	2%	2%	2%	2%	3%	25%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	484	0	77	0	0	0	260	0
Turn Type				Perm	NA		Prot				NA	
Protected Phases					6		3 4				8	
Permitted Phases				6								
Detector Phase				6	6		3 4				8	
Switch Phase												
Minimum Initial (s)				10.0	10.0						5.0	
Minimum Split (s)				24.5	24.5						9.5	
Total Split (s)				43.0	43.0						15.0	
Total Split (%)				47.8%	47.8%						16.7%	
Yellow Time (s)				3.0	3.0						3.5	
All-Red Time (s)				2.0	2.0						1.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						4.5	
Lead/Lag				Lag	Lag						Lead	
Lead-Lag Optimize?				Yes	Yes						Yes	
Recall Mode				C-Max	C-Max						Max	
Act Effct Green (s)					38.0		18.0				10.5	
Actuated g/C Ratio					0.42		0.20				0.12	
v/c Ratio					0.64		0.19				1.08	
Control Delay					15.6		10.5				126.1	
Queue Delay					0.5		1.5				3.3	
Total Delay					16.0		12.0				129.4	

Lane Group	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Lane Width (ft)						
Grade (%)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor						
Growth Factor						
Heavy Vehicles (%)						
Bus Blockages (#/hr)						
Parking (#/hr)						
Mid-Block Traffic (%)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Turn Type						
Protected Phases	1	2	3	4	5	7
Permitted Phases						
Detector Phase						
Switch Phase						
Minimum Initial (s)	1.0	10.0	1.0	5.0	1.0	1.0
Minimum Split (s)	5.0	24.0	5.0	13.0	5.0	5.0
Total Split (s)	5.0	43.0	5.0	17.0	5.0	5.0
Total Split (%)	6%	48%	6%	19%	6%	6%
Yellow Time (s)	2.0	3.0	2.0	3.0	2.0	2.0
All-Red Time (s)	0.0	2.0	2.0	1.0	0.0	1.5
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lead	Lag			Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes
Recall Mode	Ped	C-Max	Max	Max	Ped	Max
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					B		B				F	
Approach Delay					16.0			12.0			129.4	
Approach LOS					B			B			F	
Queue Length 50th (ft)					68		14				~170	
Queue Length 95th (ft)					m107		m15				m#288	
Internal Link Dist (ft)		49			254			64			72	
Turn Bay Length (ft)												
Base Capacity (vph)					757		401				240	
Starvation Cap Reductn					29		208				0	
Spillback Cap Reductn					59		0				2	
Storage Cap Reductn					0		0				0	
Reduced v/c Ratio					0.69		0.40				1.09	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 32 (36%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 51.6 Intersection LOS: D
Intersection Capacity Utilization 51.0% ICU Level of Service A
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

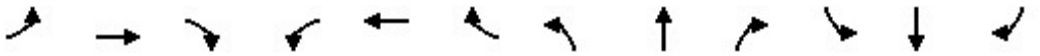
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Franklin Street & Western Avenue

Lane Group	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	654	116	0	0	0	0	71	115	46	237	0
Future Volume (vph)	0	654	116	0	0	0	0	71	115	46	237	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	8	8	8	16	16	16	16	16	16
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1701	1531	0	0	0	0	1934	0	0	2021	0
Flt Permitted											0.992	
Satd. Flow (perm)	0	1701	779	0	0	0	0	1934	0	0	1894	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182					76				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		712			256			222			144	
Travel Time (s)		19.4			7.0			5.0			3.3	
Confl. Peds. (#/hr)			186							53		
Confl. Bikes (#/hr)			57									
Peak Hour Factor	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	8%	2%	2%	2%	2%	2%	2%	2%	4%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	667	118	0	0	0	0	202	0	0	329	0
Turn Type		NA	Perm					NA		custom	NA	
Protected Phases		2						4		7 8	7 8	
Permitted Phases			2							8		
Detector Phase		2	2					4		7 8	7 8	
Switch Phase												
Minimum Initial (s)		10.0	10.0					5.0				
Minimum Split (s)		24.0	24.0					13.0				
Total Split (s)		43.0	43.0					17.0				
Total Split (%)		47.8%	47.8%					18.9%				
Yellow Time (s)		3.0	3.0					3.0				
All-Red Time (s)		2.0	2.0					1.0				
Lost Time Adjust (s)		0.0	0.0					0.0				
Total Lost Time (s)		5.0	5.0					4.0				
Lead/Lag		Lag	Lag									
Lead-Lag Optimize?		Yes	Yes									
Recall Mode		C-Max	C-Max					Max				
Act Effct Green (s)		38.0	38.0					13.0			16.5	
Actuated g/C Ratio		0.42	0.42					0.14			0.18	
v/c Ratio		0.93	0.27					0.59			0.89	
Control Delay		46.5	2.2					29.9			19.6	
Queue Delay		19.4	0.0					0.1			39.6	
Total Delay		65.9	2.2					29.9			59.3	

Lane Group	Ø1	Ø3	Ø5	Ø6	Ø7	Ø8
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Lane Width (ft)						
Grade (%)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor						
Growth Factor						
Heavy Vehicles (%)						
Bus Blockages (#/hr)						
Parking (#/hr)						
Mid-Block Traffic (%)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Turn Type						
Protected Phases	1	3	5	6	7	8
Permitted Phases						
Detector Phase						
Switch Phase						
Minimum Initial (s)	1.0	1.0	1.0	10.0	1.0	5.0
Minimum Split (s)	5.0	5.0	5.0	24.5	5.0	9.5
Total Split (s)	5.0	5.0	5.0	43.0	5.0	15.0
Total Split (%)	6%	6%	6%	48%	6%	17%
Yellow Time (s)	2.0	2.0	2.0	3.0	2.0	3.5
All-Red Time (s)	0.0	2.0	0.0	2.0	1.5	1.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lead		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes
Recall Mode	Ped	Max	Ped	C-Max	Max	Max
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	A					C			E	
Approach Delay		56.4						29.9			59.3	
Approach LOS		E						C			E	
Queue Length 50th (ft)		351	0					66			45	
Queue Length 95th (ft)		#577	9					137			m46	
Internal Link Dist (ft)		632			176			142			64	
Turn Bay Length (ft)			100									
Base Capacity (vph)		718	434					344			370	
Starvation Cap Reductn		0	0					0			63	
Spillback Cap Reductn		70	0					3			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		1.03	0.27					0.59			1.07	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 32 (36%), Referenced to phase 2:EBT and 6:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 53.0 Intersection LOS: D
Intersection Capacity Utilization 71.1% ICU Level of Service C
Analysis Period (min) 15

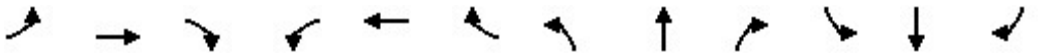
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Franklin Street & River Street

Lane Group	Ø1	Ø3	Ø5	Ø6	Ø7	Ø8
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	688	35	0	0	0	0	30	16	17	20	0
Future Volume (vph)	30	688	35	0	0	0	0	30	16	17	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	14	14	14	11	11	11
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1729	1516	0	0	0	0	1897	0	0	1609	0
Flt Permitted		0.998									0.867	
Satd. Flow (perm)	0	1721	1178	0	0	0	0	1897	0	0	1413	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		907			486			204			452	
Travel Time (s)		24.7			13.3			4.6			10.3	
Confl. Peds. (#/hr)	35		59						7	7		
Confl. Bikes (#/hr)			56						5			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.69	0.69	0.69
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	6%	3%	2%	2%	2%	2%	0%	0%	18%	6%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	797	39	0	0	0	0	57	0	0	54	0
Turn Type	Split	NA	Perm					NA		Perm	NA	
Protected Phases	2	2						8			4	
Permitted Phases			2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					5.0		5.0	5.0	
Minimum Split (s)	17.0	17.0	17.0					19.0		20.0	20.0	
Total Split (s)	40.0	40.0	40.0					20.0		20.0	20.0	
Total Split (%)	57.1%	57.1%	57.1%					28.6%		28.6%	28.6%	
Yellow Time (s)	3.0	3.0	3.0					3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0					2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		5.0	5.0					5.0			5.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Max		Max	Max	
Act Effct Green (s)		35.0	35.0					15.0			15.0	
Actuated g/C Ratio		0.50	0.50					0.21			0.21	
v/c Ratio		0.92	0.07					0.14			0.18	
Control Delay		16.1	5.5					23.4			24.3	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		16.1	5.5					23.4			24.3	

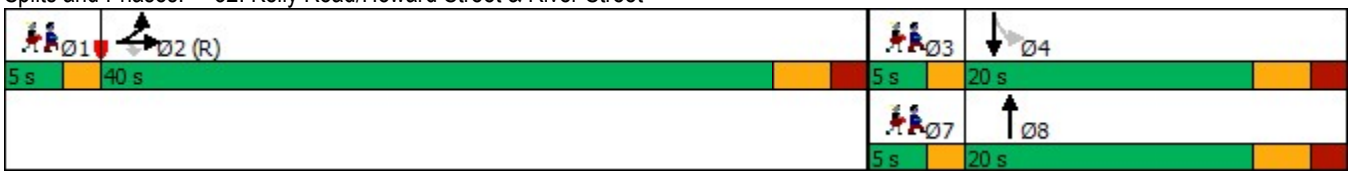
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	7%	7%	7%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Min	Min	Min
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B	A					C			C	
Approach Delay		15.6						23.4			24.3	
Approach LOS		B						C			C	
Queue Length 50th (ft)		113	5					20			19	
Queue Length 95th (ft)		m117	m6					43			36	
Internal Link Dist (ft)		827			406			124			372	
Turn Bay Length (ft)			100									
Base Capacity (vph)		864	589					406			302	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.92	0.07					0.14			0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 63 (90%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 16.6		Intersection LOS: B	
Intersection Capacity Utilization 55.0%		ICU Level of Service A	
Analysis Period (min) 15			

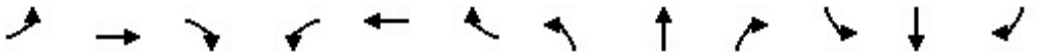
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Kelly Road/Howard Street & River Street



Lane Group	Ø1	Ø3	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	604	199	0	0	0	0	117	45	82	243	0
Future Volume (vph)	69	604	199	0	0	0	0	117	45	82	243	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	13	13	13
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1799	1495	0	0	0	0	1528	0	0	1874	0
Flt Permitted		0.995									0.806	
Satd. Flow (perm)	0	1789	1300	0	0	0	0	1528	0	0	1497	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)			137									
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		219			907			489			555	
Travel Time (s)		6.0			24.7			11.1			12.6	
Confl. Peds. (#/hr)	21		31						28	28		
Confl. Bikes (#/hr)			45						47			
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	5%	8%	2%	2%	2%	2%	4%	38%	5%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	757	224	0	0	0	0	191	0	0	407	0
Turn Type	custom	NA	Perm					NA		Perm	NA	
Protected Phases	2	2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0					21.0		21.0	21.0	
Total Split (s)	36.0	36.0	36.0					24.0		24.0	24.0	
Total Split (%)	51.4%	51.4%	51.4%					34.3%		34.3%	34.3%	
Yellow Time (s)	3.0	3.0	3.0					3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0					2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		5.0	5.0					5.0			5.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Max		Max	Max	
Act Effct Green (s)		31.0	31.0					19.0			19.0	
Actuated g/C Ratio		0.44	0.44					0.27			0.27	
v/c Ratio		0.95	0.34					0.46			1.00	
Control Delay		27.2	7.1					25.6			74.5	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		27.2	7.1					25.6			74.5	

Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	7%	7%	7%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Ped	Ped	Ped
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A					C			E	
Approach Delay		22.6						25.6			74.5	
Approach LOS		C						C			E	
Queue Length 50th (ft)		316	53					68			~175	
Queue Length 95th (ft)		m329	m55					117			#287	
Internal Link Dist (ft)		139			827			409			475	
Turn Bay Length (ft)			100									
Base Capacity (vph)		796	652					414			406	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.95	0.34					0.46			1.00	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 46 (66%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 36.3		Intersection LOS: D	
Intersection Capacity Utilization 75.0%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

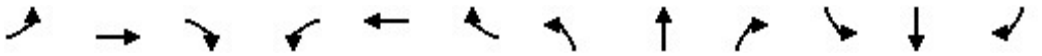
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 33: Putnam Avenue & River Street

Lane Group	Ø1	Ø3	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	873	771	0	0	0	0	590	88	75	858	0
Future Volume (vph)	193	873	771	0	0	0	0	590	88	75	858	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	10	10	10	10	10	10
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3392	1599	0	0	0	0	3231	0	0	3317	0
Flt Permitted		0.991									0.592	
Satd. Flow (perm)	0	3355	1599	0	0	0	0	3231	0	0	1972	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								12				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		969			293			463			449	
Travel Time (s)		26.4			8.0			10.5			10.2	
Confl. Peds. (#/hr)	23								18	18		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96	0.96	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	6%	1%	2%	2%	2%	2%	1%	2%	3%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1171	847	0	0	0	0	707	0	0	1004	0
Turn Type	Perm	NA	Prot					NA		pm+pt	NA	
Protected Phases		8	8					2		1	6	
Permitted Phases	8									6		
Detector Phase	8	8	8					2		1	6	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0					22.0		5.0	25.0	
Minimum Split (s)	29.0	29.0	29.0					28.0		10.0	31.0	
Total Split (s)	43.0	43.0	43.0					45.0		15.0	60.0	
Total Split (%)	30.7%	30.7%	30.7%					32.1%		10.7%	42.9%	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0					2.0		1.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		7.0	7.0					6.0			6.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes		
Recall Mode	None	None	None					Max		Max	Max	
Act Effct Green (s)		49.0	49.0					39.0			54.0	
Actuated g/C Ratio		0.35	0.35					0.28			0.39	
v/c Ratio		1.00	1.52					0.78			1.19	
Control Delay		70.8	274.2					52.7			132.1	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		70.8	274.2					52.7			132.1	

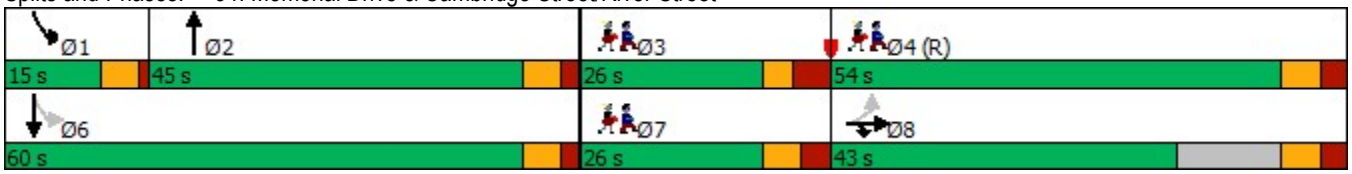
Lane Group	Ø3	Ø4	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	4	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.0	19.0	24.0
Total Split (s)	26.0	54.0	26.0
Total Split (%)	19%	39%	19%
Yellow Time (s)	3.0	4.0	4.0
All-Red Time (s)	4.0	3.0	3.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	None	C-Max	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	F					D			F	
Approach Delay		156.2						52.7			132.1	
Approach LOS		F						D			F	
Queue Length 50th (ft)		558	~1072					308			~527	
Queue Length 95th (ft)		#718	#1325					385			#713	
Internal Link Dist (ft)		889			213			383			369	
Turn Bay Length (ft)												
Base Capacity (vph)		1174	559					908			847	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		1.00	1.52					0.78			1.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 30 (21%), Referenced to phase 4:Ped, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay: 130.1		Intersection LOS: F	
Intersection Capacity Utilization 90.8%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 34: Memorial Drive & Cambridge Street/River Street



Lane Group	Ø3	Ø4	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	7	693	0	0	0	0	0	47	0	0
Future Vol, veh/h	7	693	0	0	0	0	0	47	0	0
Conflicting Peds, #/hr	70	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	22355	-	0	-	22355	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	91	91	91	92	92	92	92	92	92	92
Heavy Vehicles, %	0	7	2	2	2	2	2	7	2	2
Mvmt Flow	8	762	0	0	0	0	0	51	0	0

Major/Minor	Major1			Minor1	
Conflicting Flow All	70	0	-	-	773
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	3.3
Pot Cap-1 Maneuver	1544	-	0	0	402
Stage 1	-	-	0	0	-
Stage 2	-	-	0	0	-
Platoon blocked, %		-			
Mov Cap-1 Maneuver	1544	-	-	-	402
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0.1	19.7
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT
Capacity (veh/h)	402	1544	-
HCM Lane V/C Ratio	0.395	0.005	-
HCM Control Delay (s)	19.7	7.3	0
HCM Lane LOS	C	A	A
HCM 95th %tile Q(veh)	1.8	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	691	0	0	9	0
Future Vol, veh/h	16	691	0	0	9	0
Conflicting Peds, #/hr	57	0	0	0	13	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	16979	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	92	92	50	50
Heavy Vehicles, %	13	7	2	2	22	2
Mvmt Flow	18	759	0	0	18	0

Major/Minor	Major1		Minor2	
Conflicting Flow All	57	0	865	-
Stage 1	-	-	57	-
Stage 2	-	-	808	-
Critical Hdwy	4.23	-	6.62	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.62	-
Follow-up Hdwy	2.317	-	3.698	-
Pot Cap-1 Maneuver	1480	-	299	0
Stage 1	-	-	-	0
Stage 2	-	-	406	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1413	-	267	-
Mov Cap-2 Maneuver	-	-	267	-
Stage 1	-	-	-	-
Stage 2	-	-	388	-

Approach	EB	SB
HCM Control Delay, s	0.2	19.5
HCM LOS		C

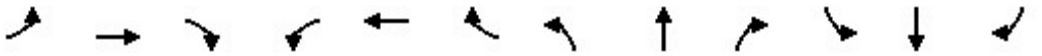
Minor Lane/Major Mvmt	EBL	EBT	SBLn1
Capacity (veh/h)	1413	-	267
HCM Lane V/C Ratio	0.012	-	0.067
HCM Control Delay (s)	7.6	0	19.5
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0	-	0.2

Intersection	
Intersection Delay, s/veh	5
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	144	12	0	0
Future Vol, veh/h	0	0	144	12	0	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.92	0.92
Heavy Vehicles, %	8	2	36	15	2	2
Mvmt Flow	0	0	173	14	0	0
Number of Lanes	0	0	0	1	0	0

Approach	NB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	5
HCM LOS	A

Lane	NBLn1
Vol Left, %	92%
Vol Thru, %	8%
Vol Right, %	0%
Sign Control	Stop
Traffic Vol by Lane	156
LT Vol	144
Through Vol	12
RT Vol	0
Lane Flow Rate	188
Geometry Grp	0
Degree of Util (X)	0
Departure Headway (Hd)	0
Convergence, Y/N	Yes
Cap	0
Service Time	0
HCM Lane V/C Ratio	0
HCM Control Delay	5
HCM Lane LOS	N
HCM 95th-tile Q	0



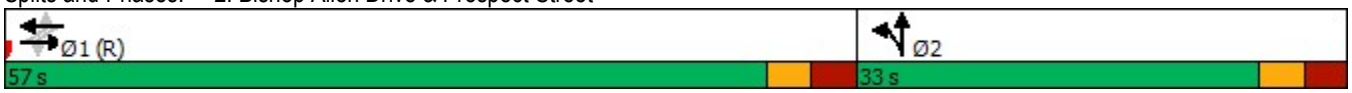
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	476	95	46	327	28	172	59	78	0	0	0
Future Volume (vph)	26	476	95	46	327	28	172	59	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	1673	0	1805	1754	0	0	1607	0	0	0	0
Flt Permitted	0.481			0.325				0.973				
Satd. Flow (perm)	705	1673	0	543	1754	0	0	1374	0	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		355			435			306			588	
Travel Time (s)		9.7			11.9			7.0			13.4	
Confl. Peds. (#/hr)	404		357	357		404	110		85			
Confl. Bikes (#/hr)			61			54			9			
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.94	0.94	0.94	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	5%	0%	0%	4%	0%	1%	0%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	595	0	51	390	0	0	329	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Split	NA				
Protected Phases		1			1		2	2				
Permitted Phases	1			1								
Detector Phase	1	1		1	1		2	2				
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0				
Minimum Split (s)	57.0	57.0		57.0	57.0		25.0	25.0				
Total Split (s)	57.0	57.0		57.0	57.0		33.0	33.0				
Total Split (%)	63.3%	63.3%		63.3%	63.3%		36.7%	36.7%				
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0				
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0				
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0				
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0				
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes				
Recall Mode	Max	Max		Max	Max		Max	Max				
Act Effct Green (s)	51.0	51.0		51.0	51.0			27.0				
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.30				
v/c Ratio	0.07	0.63		0.17	0.39			0.68				
Control Delay	6.3	9.2		11.1	12.3			36.2				
Queue Delay	0.0	0.1		0.0	0.5			0.0				
Total Delay	6.3	9.3		11.1	12.9			36.2				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A		B	B			D				
Approach Delay		9.1			12.7			36.2				
Approach LOS		A			B			D				
Queue Length 50th (ft)	4	105		13	115			164				
Queue Length 95th (ft)	m5	m151		33	177			260				
Internal Link Dist (ft)		275			355			226			508	
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	399	948		307	993			482				
Starvation Cap Reductn	0	15		0	0			0				
Spillback Cap Reductn	0	0		0	269			0				
Storage Cap Reductn	0	0		0	0			0				
Reduced v/c Ratio	0.07	0.64		0.17	0.54			0.68				

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 18 (20%), Referenced to phase 1:EBWB, Start of Green			
Natural Cycle: 85			
Control Type: Pretimed			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bishop Allen Drive & Prospect Street



Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR2	NER	Ø1	Ø5	Ø6
Lane Configurations												
Traffic Volume (vph)	528	171	480	38	372	116	289	50	7			
Future Volume (vph)	528	171	480	38	372	116	289	50	7			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	11	10	12	12	12			
Grade (%)	0%		0%		0%		0%					
Storage Length (ft)		0		0		70			0			
Storage Lanes		1		0		1			1			
Taper Length (ft)												
Satd. Flow (prot)	1845	1442	1745	0	1701	1463	1759	1615	1611			
Flt Permitted												
Satd. Flow (perm)	1845	226	1745	0	1701	392	1759	602	1611			
Right Turn on Red				No		No		No				
Satd. Flow (RTOR)												
Link Speed (mph)	25		25		30		30					
Link Distance (ft)	113		355		293		490					
Travel Time (s)	3.1		9.7		6.7		11.1					
Confl. Peds. (#/hr)		734		385		617		415				
Confl. Bikes (#/hr)				68								
Peak Hour Factor	0.97	0.97	0.96	0.96	0.95	0.95	0.96	0.96	0.92			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	3%	12%	3%	6%	8%	3%	8%	0%	2%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0			
Parking (#/hr)												
Mid-Block Traffic (%)	0%		0%		0%		0%					
Shared Lane Traffic (%)												
Lane Group Flow (vph)	544	176	540	0	392	122	301	52	8			
Turn Type	NA	custom	NA		NA	custom	NA	custom	custom			
Protected Phases	1 2		2		4		4		5 6	1	5	6
Permitted Phases		14				11		11				
Detector Phase	1 2	14	2		4	11	4	11	5 6			
Switch Phase												
Minimum Initial (s)		5.0	5.0		5.0	5.0	5.0	5.0		3.0	3.0	3.0
Minimum Split (s)		22.0	10.0		10.0	22.0	10.0	22.0		5.0	10.0	10.0
Total Split (s)		28.0	33.0		32.0	22.0	32.0	22.0		5.0	10.0	10.0
Total Split (%)		31.1%	36.7%		35.6%	24.4%	35.6%	24.4%		6%	11%	11%
Yellow Time (s)		3.0	3.0		3.0	3.0	3.0	3.0		2.0	3.0	3.0
All-Red Time (s)		2.0	2.0		2.0	2.0	2.0	2.0		0.0	4.0	4.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0				
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0				
Lead/Lag		Lag	Lag			Lag		Lag		Lead		
Lead-Lag Optimize?		Yes	Yes			Yes		Yes		Yes		
Recall Mode		Ped	C-Max		Max	Max	Max	Max		Ped	None	None
Act Effct Green (s)	44.0	31.0	36.0		35.0	25.0	35.0	25.0	6.0			
Actuated g/C Ratio	0.49	0.34	0.40		0.39	0.28	0.39	0.28	0.07			
v/c Ratio	0.60	2.29	0.77		0.59	1.13	0.44	0.31	0.07			
Control Delay	11.2	621.8	30.3		17.1	145.9	13.3	22.8	21.3			
Queue Delay	0.6	0.0	2.1		1.1	0.0	0.0	1.3	0.0			
Total Delay	11.8	621.8	32.4		18.2	145.9	13.3	24.1	21.3			

Lane Group	Ø7	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Grade (%)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Growth Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Parking (#/hr)		
Mid-Block Traffic (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	7	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	10.0	10.0
Total Split (s)	10.0	10.0
Total Split (%)	11%	11%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Ped	Ped
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR2	NER	Ø1	Ø5	Ø6
LOS	B	F	C		B	F	B	C	C			
Approach Delay	160.9		32.4		48.5		14.9					
Approach LOS	F		C		D		B					
Queue Length 50th (ft)	54	~159	288		166	~76	88	20	2			
Queue Length 95th (ft)	m142	m#203	#529		#339	#214	m221	m55	9			
Internal Link Dist (ft)	33		275		213		410					
Turn Bay Length (ft)						70		35				
Base Capacity (vph)	902	77	697		661	108	684	167	107			
Starvation Cap Reductn	116	0	65		104	0	0	0	0			
Spillback Cap Reductn	0	0	55		0	0	0	37	0			
Storage Cap Reductn	0	0	0		0	0	0	0	0			
Reduced v/c Ratio	0.69	2.29	0.85		0.70	1.13	0.44	0.40	0.07			

Intersection Summary

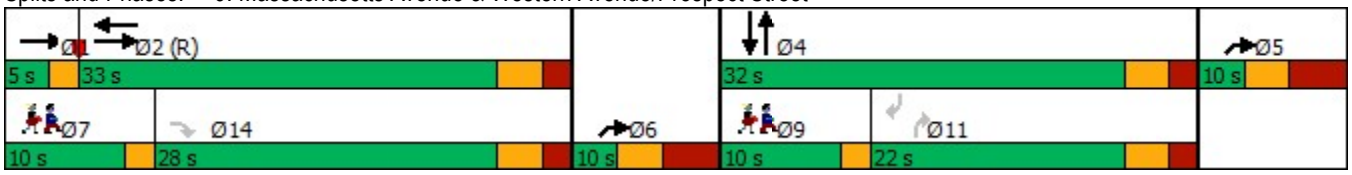
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 35 (39%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.29
Intersection Signal Delay: 76.7 Intersection LOS: E
Intersection Capacity Utilization 64.0% ICU Level of Service C
Analysis Period (min) 15
Description:

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Massachusetts Avenue & Western Avenue/Prospect Street



Lane Group	Ø7	Ø9
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

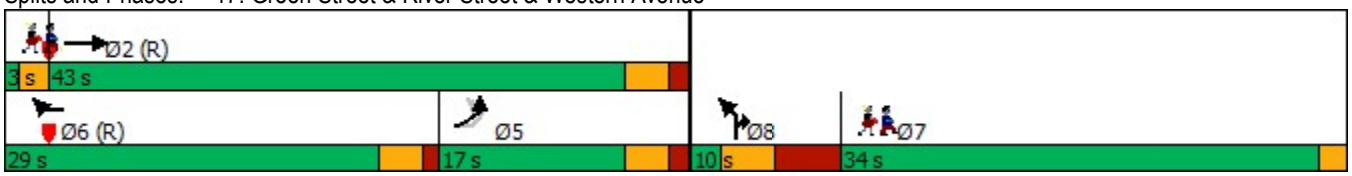
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBR	Ø1	Ø7
Lane Configurations									
Traffic Volume (vph)	17	216	676	504	24	9	0		
Future Volume (vph)	17	216	676	504	24	9	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	12	12	12		
Grade (%)			0%						
Storage Length (ft)		100		0		0	0		
Storage Lanes		1		1		1	1		
Taper Length (ft)		25				25			
Satd. Flow (prot)	0	1772	1845	1583	0	1671	1900		
Flt Permitted		0.950				0.950			
Satd. Flow (perm)	0	1772	1845	1583	0	228	1900		
Right Turn on Red	No				No		No		
Satd. Flow (RTOR)									
Link Speed (mph)			25						
Link Distance (ft)			256						
Travel Time (s)			7.0						
Confl. Peds. (#/hr)					297	103	82		
Confl. Bikes (#/hr)					110				
Peak Hour Factor	0.98	0.98	0.98	0.93	0.93	0.85	0.85		
Growth Factor	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	2%	3%	4%	0%	8%	0%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0		
Parking (#/hr)									
Mid-Block Traffic (%)			0%						
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	237	690	568	0	11	0		
Turn Type	custom	Prot	NA	Prot		Prot	Prot		
Protected Phases		5	2	6		8	8	1	7
Permitted Phases	5								
Detector Phase	5	5	2	6		8	8		
Switch Phase									
Minimum Initial (s)	5.0	5.0	15.0	15.0		1.0	1.0	1.0	5.0
Minimum Split (s)	9.5	9.5	19.5	19.5		10.0	10.0	3.0	34.0
Total Split (s)	17.0	17.0	43.0	29.0		10.0	10.0	3.0	34.0
Total Split (%)	18.9%	18.9%	47.8%	32.2%		11.1%	11.1%	3%	38%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.5	3.5	2.0	2.0
All-Red Time (s)	1.5	1.5	1.5	1.0		4.5	4.5	0.0	0.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)		4.5	4.5	4.0		8.0	8.0		
Lead/Lag	Lag	Lag	Lag	Lead		Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Recall Mode	Max	Max	C-Max	C-Max		None	None	Ped	Ped
Act Effct Green (s)		12.5	42.9	33.0		2.0			
Actuated g/C Ratio		0.14	0.48	0.37		0.02			
v/c Ratio		0.96	0.78	0.98		0.30			
Control Delay		57.1	12.3	49.8		63.3			
Queue Delay		0.0	13.4	0.0		0.0			
Total Delay		57.1	25.7	49.8		63.3			

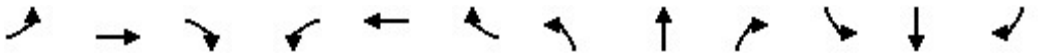
Lane Group	EBL2	EBL	EBT	WBR	WBR2	NBL	NBR	Ø1	Ø7
LOS		E	C	D		E			
Approach Delay			33.7						
Approach LOS			C						
Queue Length 50th (ft)		141	93	122		6			
Queue Length 95th (ft)		m#160	m257	#587		#24			
Internal Link Dist (ft)			176						
Turn Bay Length (ft)		100							
Base Capacity (vph)		246	879	580		37			
Starvation Cap Reductn		0	179	0		0			
Spillback Cap Reductn		0	5	0		0			
Storage Cap Reductn		0	0	0		0			
Reduced v/c Ratio		0.96	0.99	0.98		0.30			

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 32 (36%), Referenced to phase 2:EBT and 6:WBR, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 40.0 Intersection LOS: D
Intersection Capacity Utilization 62.7% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Green Street & River Street & Western Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	76	455	0	120	0	0	0	138	6
Future Volume (vph)	0	0	0	76	455	0	120	0	0	0	138	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	16	16	16	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1802	0	2006	0	0	0	1840	0
Flt Permitted					0.993		0.950					
Satd. Flow (perm)	0	0	0	0	1776	0	2006	0	0	0	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)											2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		129			334			144			152	
Travel Time (s)		2.9			7.6			3.3			3.5	
Confl. Peds. (#/hr)				43								53
Confl. Bikes (#/hr)												29
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	9%	4%	2%	2%	2%	2%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	571	0	130	0	0	0	157	0
Turn Type				Perm	NA		Prot				NA	
Protected Phases					6		3 4				8	
Permitted Phases				6								
Detector Phase				6	6		3 4				8	
Switch Phase												
Minimum Initial (s)				10.0	10.0						5.0	
Minimum Split (s)				24.5	24.5						9.5	
Total Split (s)				45.0	45.0						13.0	
Total Split (%)				50.0%	50.0%						14.4%	
Yellow Time (s)				3.0	3.0						3.0	
All-Red Time (s)				2.0	2.0						1.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						4.0	
Lead/Lag				Lag	Lag						Lead	
Lead-Lag Optimize?				Yes	Yes						Yes	
Recall Mode				C-Max	C-Max						Max	
Act Effct Green (s)					40.0		17.0				9.0	
Actuated g/C Ratio					0.44		0.19				0.10	
v/c Ratio					0.72		0.34				0.85	
Control Delay					9.1		5.2				79.5	
Queue Delay					1.9		5.5				6.9	
Total Delay					11.0		10.7				86.3	

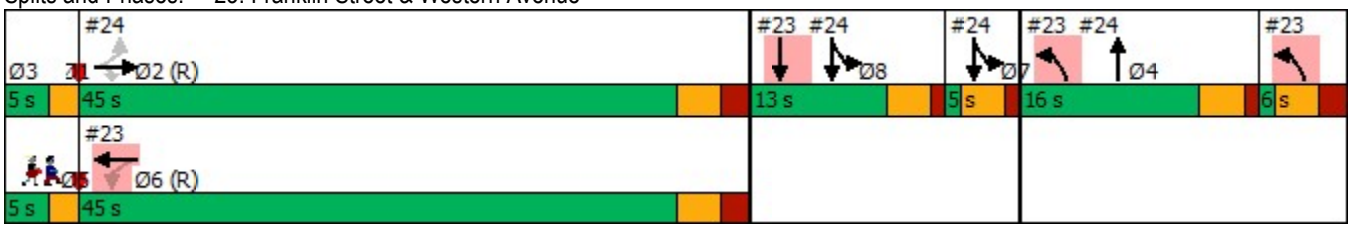
Lane Group	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Lane Width (ft)						
Grade (%)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor						
Growth Factor						
Heavy Vehicles (%)						
Bus Blockages (#/hr)						
Parking (#/hr)						
Mid-Block Traffic (%)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Turn Type						
Protected Phases	1	2	3	4	5	7
Permitted Phases						
Detector Phase						
Switch Phase						
Minimum Initial (s)	1.0	10.0	1.0	4.5	1.0	1.0
Minimum Split (s)	5.0	24.5	6.0	10.0	5.0	5.0
Total Split (s)	5.0	45.0	6.0	16.0	5.0	5.0
Total Split (%)	6%	50%	7%	18%	6%	6%
Yellow Time (s)	2.0	3.0	3.0	3.0	2.0	3.0
All-Red Time (s)	0.0	2.0	2.0	1.0	0.0	1.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lead	Lag			Lead	Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes
Recall Mode	Max	C-Max	None	Max	Ped	Max
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS					B		B				F	
Approach Delay					11.0			10.7			86.3	
Approach LOS					B			B			F	
Queue Length 50th (ft)					18		9				91	
Queue Length 95th (ft)					m54		m9				m#192	
Internal Link Dist (ft)		49			254			64			72	
Turn Bay Length (ft)												
Base Capacity (vph)					789		378				185	
Starvation Cap Reductn					64		191				0	
Spillback Cap Reductn					100		0				12	
Storage Cap Reductn					0		0				0	
Reduced v/c Ratio					0.83		0.70				0.91	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 22 (24%), Referenced to phase 2:EBTL and 6:, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 24.7		Intersection LOS: C	
Intersection Capacity Utilization 53.4%		ICU Level of Service A	
Analysis Period (min) 15			

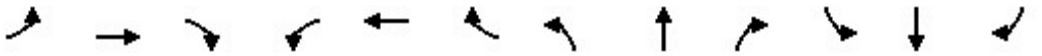
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: Franklin Street & Western Avenue



Lane Group	Ø1	Ø2	Ø3	Ø4	Ø5	Ø7
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	695	73	0	0	0	0	150	154	48	164	0
Future Volume (vph)	0	695	73	0	0	0	0	150	154	48	164	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	8	8	8	16	16	16	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1845	1615	0	0	0	0	1968	0	0	1815	0
Flt Permitted											0.989	
Satd. Flow (perm)	0	1845	753	0	0	0	0	1968	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194					47				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		712			256			222			144	
Travel Time (s)		19.4			7.0			5.0			3.3	
Confl. Peds. (#/hr)			226							94		
Confl. Bikes (#/hr)			47									
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	3%	0%	2%	2%	2%	2%	2%	2%	2%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	739	78	0	0	0	0	330	0	0	224	0
Turn Type		NA	Perm					NA		custom	NA	
Protected Phases		2						4		7 8	7 8	
Permitted Phases	2		2							8		
Detector Phase	2	2	2					4		7 8	7 8	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					4.5				
Minimum Split (s)	24.5	24.5	24.5					10.0				
Total Split (s)	45.0	45.0	45.0					16.0				
Total Split (%)	50.0%	50.0%	50.0%					17.8%				
Yellow Time (s)	3.0	3.0	3.0					3.0				
All-Red Time (s)	2.0	2.0	2.0					1.0				
Lost Time Adjust (s)		0.0	0.0					0.0				
Total Lost Time (s)		5.0	5.0					4.0				
Lead/Lag	Lag	Lag	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	C-Max	C-Max	C-Max					Max				
Act Effct Green (s)		40.0	40.0					12.0			14.0	
Actuated g/C Ratio		0.44	0.44					0.13			0.16	
v/c Ratio		0.90	0.18					1.09			0.79	
Control Delay		39.6	0.9					111.4			24.2	
Queue Delay		26.3	0.0					2.7			16.5	
Total Delay		65.9	0.9					114.1			40.7	

Lane Group	Ø1	Ø3	Ø5	Ø6	Ø7	Ø8
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Lane Width (ft)						
Grade (%)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor						
Growth Factor						
Heavy Vehicles (%)						
Bus Blockages (#/hr)						
Parking (#/hr)						
Mid-Block Traffic (%)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Turn Type						
Protected Phases	1	3	5	6	7	8
Permitted Phases						
Detector Phase						
Switch Phase						
Minimum Initial (s)	1.0	1.0	1.0	10.0	1.0	5.0
Minimum Split (s)	5.0	6.0	5.0	24.5	5.0	9.5
Total Split (s)	5.0	6.0	5.0	45.0	5.0	13.0
Total Split (%)	6%	7%	6%	50%	6%	14%
Yellow Time (s)	2.0	3.0	2.0	3.0	3.0	3.0
All-Red Time (s)	0.0	2.0	0.0	2.0	1.0	1.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lead		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes
Recall Mode	Max	None	Ped	C-Max	Max	Max
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	A					F			D	
Approach Delay		59.7						114.1			40.7	
Approach LOS		E						F			D	
Queue Length 50th (ft)		377	0					~189			51	
Queue Length 95th (ft)		#610	0					#356			m63	
Internal Link Dist (ft)		632			176			142			64	
Turn Bay Length (ft)			100									
Base Capacity (vph)		820	442					303			282	
Starvation Cap Reductn		0	0					0			48	
Spillback Cap Reductn		113	0					2			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		1.05	0.18					1.10			0.96	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 22 (24%), Referenced to phase 2:EBTL and 6:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 69.7 Intersection LOS: E
Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

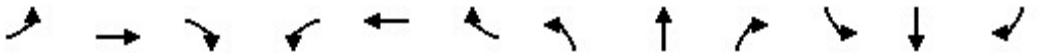
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: Franklin Street & River Street

Lane Group	Ø1	Ø3	Ø5	Ø6	Ø7	Ø8
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	664	27	0	0	0	0	59	18	13	28	0
Future Volume (vph)	62	664	27	0	0	0	0	59	18	13	28	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1858	1615	0	0	0	0	1950	0	0	1823	0
Flt Permitted		0.996									0.901	
Satd. Flow (perm)	0	1848	1162	0	0	0	0	1950	0	0	1664	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		907			486			204			452	
Travel Time (s)		24.7			13.3			4.6			10.3	
Confl. Peds. (#/hr)	24		88						3	3		
Confl. Bikes (#/hr)			34									
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.78	0.78	0.78	0.77	0.77	0.77
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	2%	0%	0%	8%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	757	28	0	0	0	0	99	0	0	53	0
Turn Type	Split	NA	Perm					NA		Perm	NA	
Protected Phases	2	2						8			4	
Permitted Phases			2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0					8.0		8.0	8.0	
Minimum Split (s)	20.5	20.5	20.5					15.5		15.5	15.5	
Total Split (s)	40.0	40.0	40.0					20.0		20.0	20.0	
Total Split (%)	57.1%	57.1%	57.1%					28.6%		28.6%	28.6%	
Yellow Time (s)	3.0	3.0	3.0					3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0					2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		5.0	5.0					5.0			5.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Max		Max	Max	
Act Effct Green (s)		35.0	35.0					15.0			15.0	
Actuated g/C Ratio		0.50	0.50					0.21			0.21	
v/c Ratio		0.81	0.05					0.24			0.15	
Control Delay		6.1	2.9					24.6			23.7	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		6.1	2.9					24.6			23.7	

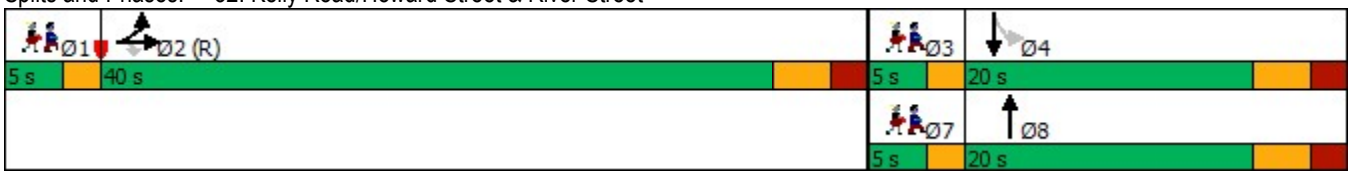
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	7%	7%	7%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Min	Min	Min
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		A	A					C			C	
Approach Delay		6.0						24.6			23.7	
Approach LOS		A						C			C	
Queue Length 50th (ft)		63	2					36			19	
Queue Length 95th (ft)		m66	m2					62			39	
Internal Link Dist (ft)		827			406			124			372	
Turn Bay Length (ft)			100									
Base Capacity (vph)		929	581					417			356	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.81	0.05					0.24			0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 61 (87%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 55.6%		ICU Level of Service B	
Analysis Period (min) 15			

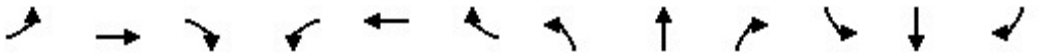
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 32: Kelly Road/Howard Street & River Street



Lane Group	Ø1	Ø3	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	627	113	0	0	0	0	330	54	45	145	0
Future Volume (vph)	82	627	113	0	0	0	0	330	54	45	145	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		100	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1856	1583	0	0	0	0	1814	0	0	1868	0
Flt Permitted		0.994									0.458	
Satd. Flow (perm)	0	1816	1288	0	0	0	0	1814	0	0	866	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)			94									
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		220			907			489			555	
Travel Time (s)		6.0			24.7			11.1			12.6	
Confl. Peds. (#/hr)	74		60						18	18		
Confl. Bikes (#/hr)			27						31			
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.82	0.82	0.82	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	2%	1%	0%	2%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	762	122	0	0	0	0	468	0	0	219	0
Turn Type	custom	NA	Perm					NA		Perm	NA	
Protected Phases	2	2						8			4	
Permitted Phases	2		2							4		
Detector Phase	2	2	2					8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0					5.0		5.0	5.0	
Minimum Split (s)	19.0	19.0	19.0					13.5		13.5	13.5	
Total Split (s)	35.0	35.0	35.0					25.0		25.0	25.0	
Total Split (%)	50.0%	50.0%	50.0%					35.7%		35.7%	35.7%	
Yellow Time (s)	3.0	3.0	3.0					3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0					2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		5.0	5.0					5.0			5.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max					Max		Max	Max	
Act Effct Green (s)		30.0	30.0					20.0			20.0	
Actuated g/C Ratio		0.43	0.43					0.29			0.29	
v/c Ratio		0.96	0.20					0.90			0.89	
Control Delay		25.4	5.7					48.3			62.4	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		25.4	5.7					48.3			62.4	

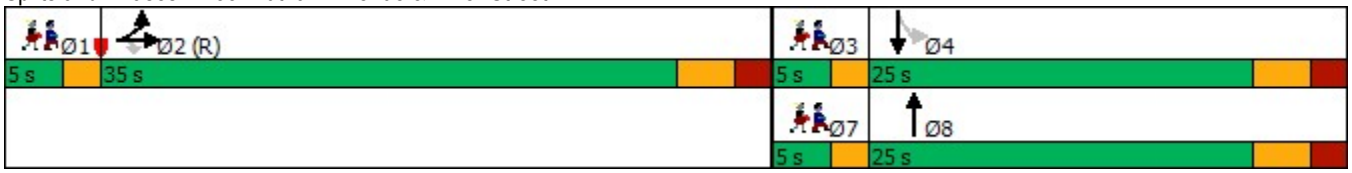
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	7%	7%	7%
Yellow Time (s)	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	Ped	Ped	Ped
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C	A					D			E	
Approach Delay		22.7						48.3			62.4	
Approach LOS		C						D			E	
Queue Length 50th (ft)		348	17					193			90	
Queue Length 95th (ft)		m234	m14					#306			#201	
Internal Link Dist (ft)		140			827			409			475	
Turn Bay Length (ft)			100									
Base Capacity (vph)		795	605					518			247	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		0.96	0.20					0.90			0.89	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 42 (60%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 35.9		Intersection LOS: D	
Intersection Capacity Utilization 81.0%		ICU Level of Service D	
Analysis Period (min) 15			

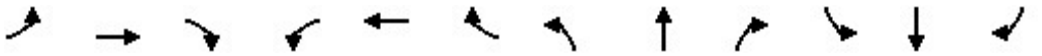
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 33: Putnam Avenue & River Street



Lane Group	Ø1	Ø3	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	768	589	0	0	0	0	835	51	87	602	0
Future Volume (vph)	280	768	589	0	0	0	0	835	51	87	602	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3512	1615	0	0	0	0	3574	0	0	3584	0
Flt Permitted		0.987									0.496	
Satd. Flow (perm)	0	3445	1615	0	0	0	0	3574	0	0	1788	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								5				
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		951			301			463			449	
Travel Time (s)		25.9			8.2			10.5			10.2	
Confl. Peds. (#/hr)	27								1	1		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.84	0.84	0.84	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	2%	0%	0%	1%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1247	701	0	0	0	0	953	0	0	758	0
Turn Type	Perm	NA	Prot					NA		pm+pt	NA	
Protected Phases		8	8					2		1	6	
Permitted Phases	8									6		
Detector Phase	8	8	8					2		1	6	
Switch Phase												
Minimum Initial (s)	22.0	22.0	22.0					22.0		5.0	25.0	
Minimum Split (s)	29.0	29.0	29.0					28.0		10.0	31.0	
Total Split (s)	43.0	43.0	43.0					48.0		19.0	67.0	
Total Split (%)	30.7%	30.7%	30.7%					34.3%		13.6%	47.9%	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0	3.0					2.0		1.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		7.0	7.0					6.0			6.0	
Lead/Lag	Lag	Lag	Lag					Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes					Yes		Yes		
Recall Mode	C-Max	C-Max	C-Max					Max		Max	Max	
Act Effct Green (s)		42.0	42.0					42.0			61.0	
Actuated g/C Ratio		0.30	0.30					0.30			0.44	
v/c Ratio		1.21	1.45					0.89			0.80	
Control Delay		144.6	249.3					57.5			37.9	
Queue Delay		0.0	0.0					0.0			0.0	
Total Delay		144.6	249.3					57.5			37.9	

Lane Group	Ø3	Ø4	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	4	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.0	19.0	24.0
Total Split (s)	30.0	43.0	30.0
Total Split (%)	21%	31%	21%
Yellow Time (s)	3.0	4.0	4.0
All-Red Time (s)	4.0	3.0	3.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	None	C-Max	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			

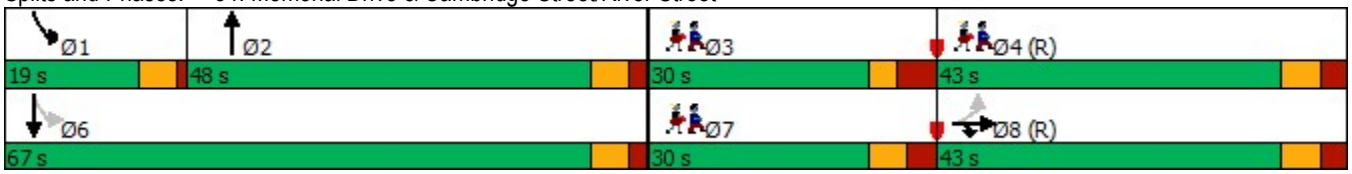
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		F	F					E			D	
Approach Delay		182.3						57.5			37.9	
Approach LOS		F						E			D	
Queue Length 50th (ft)		~726	~867					434			256	
Queue Length 95th (ft)		#774	#1005					#535			315	
Internal Link Dist (ft)		871			221			383			369	
Turn Bay Length (ft)												
Base Capacity (vph)		1033	484					1075			945	
Starvation Cap Reductn		0	0					0			0	
Spillback Cap Reductn		0	0					0			0	
Storage Cap Reductn		0	0					0			0	
Reduced v/c Ratio		1.21	1.45					0.89			0.80	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 30 (21%), Referenced to phase 4:Ped and 8:EBTL, Start of Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.45			
Intersection Signal Delay: 119.9		Intersection LOS: F	
Intersection Capacity Utilization 90.7%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 34: Memorial Drive & Cambridge Street/River Street



Lane Group	Ø3	Ø4	Ø7
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	14	633	0	0	0	0	0	126	0	0
Future Vol, veh/h	14	633	0	0	0	0	0	126	0	0
Conflicting Peds, #/hr	48	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	22355	-	0	-	22355	-
Grade, %	-	0	-	-	0	-	0	-	0	-
Peak Hour Factor	94	94	100	92	92	92	92	92	92	92
Heavy Vehicles, %	7	2	2	2	2	2	2	0	2	2
Mvmt Flow	15	673	0	0	0	0	0	137	0	0

Major/Minor	Major1			Minor1	
Conflicting Flow All	48	0	-	-	683
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.17	-	-	-	6.24
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	3.336
Pot Cap-1 Maneuver	1528	-	0	0	446
Stage 1	-	-	0	0	-
Stage 2	-	-	0	0	-
Platoon blocked, %		-			
Mov Cap-1 Maneuver	1528	-	-	-	446
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0.2	22.2
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT
Capacity (veh/h)	446	1528	-
HCM Lane V/C Ratio	0.541	0.01	-
HCM Control Delay (s)	22.2	7.4	0
HCM Lane LOS	C	A	A
HCM 95th %tile Q(veh)	3.1	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	33	638	0	0	9	0
Future Vol, veh/h	33	638	0	0	9	0
Conflicting Peds, #/hr	86	0	0	0	28	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	16979	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	50	50
Heavy Vehicles, %	5	2	2	2	0	2
Mvmt Flow	35	672	0	0	18	0

Major/Minor	Major1		Minor2	
Conflicting Flow All	86	0	856	-
Stage 1	-	-	86	-
Stage 2	-	-	770	-
Critical Hdwy	4.15	-	6.4	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.4	-
Follow-up Hdwy	2.245	-	3.5	-
Pot Cap-1 Maneuver	1492	-	331	0
Stage 1	-	-	-	0
Stage 2	-	-	460	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	1370	-	267	-
Mov Cap-2 Maneuver	-	-	267	-
Stage 1	-	-	-	-
Stage 2	-	-	422	-

Approach	EB	SB
HCM Control Delay, s	0.4	19.5
HCM LOS		C

Minor Lane/Major Mvmt	EBL	EBT	SBLn1
Capacity (veh/h)	1370	-	267
HCM Lane V/C Ratio	0.025	-	0.067
HCM Control Delay (s)	7.7	0	19.5
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.1	-	0.2

Intersection	
Intersection Delay, s/veh	5
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	250	6	0	0
Future Vol, veh/h	0	0	250	6	0	0
Peak Hour Factor	0.90	0.90	0.89	0.89	0.92	0.92
Heavy Vehicles, %	0	2	19	5	2	2
Mvmt Flow	0	0	281	7	0	0
Number of Lanes	0	0	0	1	0	0

Approach	NB
Opposing Approach	
Opposing Lanes	0
Conflicting Approach Left	
Conflicting Lanes Left	0
Conflicting Approach Right	
Conflicting Lanes Right	0
HCM Control Delay	5
HCM LOS	A

Lane	NBLn1
Vol Left, %	98%
Vol Thru, %	2%
Vol Right, %	0%
Sign Control	Stop
Traffic Vol by Lane	256
LT Vol	250
Through Vol	6
RT Vol	0
Lane Flow Rate	288
Geometry Grp	0
Degree of Util (X)	0
Departure Headway (Hd)	0
Convergence, Y/N	Yes
Cap	0
Service Time	0
HCM Lane V/C Ratio	0
HCM Control Delay	5
HCM Lane LOS	N
HCM 95th-tile Q	0

River Street Reconstruction

Appendix D: VISSIM Travel Times

APPENDIX D: VISSIM TRAVEL TIMES

River Street Reconstruction
Cambridge, MA

River Street Eastbound Segment	Weekday Morning Peak Hour				Weekday Afternoon Peak Hour			
		VISSIM				VISSIM		
	Field Measured	Existing	Baseline	Preferred Alternative	Field Measured	Existing	Baseline	Preferred Alternative
Memorial Dr to Putnam Ave	00:55	00:53	01:20	00:55	01:16	01:01	01:04	01:10
Putnam Ave to Howard St	00:42	00:44	00:43	00:59	01:12	00:54	00:53	00:48
Howard St to Franklin St	00:38	01:10	01:55	01:53	00:42	00:49	01:48	02:03
Franklin St to Green St	01:28	01:15	01:24	00:22	01:21	01:57	01:18	00:25
Green St to Mass Ave	01:07	00:53	01:03	00:31	01:02	00:47	00:44	00:27
Corridor Total	**04:50**	**04:55**	**06:25**	**04:40**	**05:33**	**05:28**	**05:47**	**04:53**

MBTA Bus Route Travel Times

Route	Dir.	Approx. APC Segment	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour				
			APC[1]		VISSIM			APC		VISSIM		
			10th	90th	Existing	Baseline	Preferred Alternative	10th	90th	Existing	Baseline	Preferred Alternative
70/70A	IB	River/Memorial to Mass/Prospect	07:20	21:23	07:05	08:40	04:53	04:37	20:59	08:53	09:33	05:01
	OB	Franklin/Sidney to Western/Franklin	03:50	09:30	08:57	09:20	07:06	05:43	11:49	08:53	09:06	07:55
64	IB	Magazine/Putnam to Mass/Prospect	01:48	01:48	06:48	08:56	05:01	02:30	02:30	08:06	07:41	04:31
	OB	Mass/Prospect to Western/Franklin	01:06	03:00	01:37	01:48	02:22	00:30	00:48	01:47	01:40	02:16
64/70	IB	River/Memorial to Mass/Prospect	-	-	06:59	08:45	04:55	-	-	08:44	09:11	05:08
47	IB	Magazine/River to Pearl/Franklin	00:57	13:28	05:53	01:12	01:00	00:28	01:20	07:20	02:01	-
	OB	Brookline/Franklin to Green/Magazine	06:46	17:39	02:04	02:29	01:15	01:56	23:56	02:28	03:06	02:12
83/91	IB	Mass/Prospect to Magazine/River	02:21	11:20	04:33	04:51	04:02	04:46	17:17	05:04	04:49	04:24
	OB	Magazine/River to Mass/Prospect	00:56	03:27	03:21	03:00	01:42	02:08	05:41	04:52	02:41	01:47

1 Real-world travel times from Fall 2018 MBTA Automatic Passenger Counter data.