Main Street and Bedford Avenue

Operational Analysis and Alternative Considerations

Town of Altavista, VA

June 2014

Strategically

Targeted

Affordable

Roadway

Solutions

Prepared for:
Virginia Department of Transportation

VDOT Virginia Department of Transportation

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1.0 Introduction

The Virginia Department of Transportation (VDOT) and the Town of Altavista identified the need to enhance intersection safety and operations at the intersections of Main Street (US Route 29 Business) at Bedford Avenue (Route 43) and Bedford Avenue (Route 43) at 7th Street (shown in **Figure 1**). These intersections currently do not adequately process vehicles during peak travel periods, resulting in delays for motorists. Therefore, the need was identified to evaluate the existing and future conditions at these two important intersections within the Town of Altavista. This evaluation will be used to identify potential transportation improvement solutions to assist VDOT and the Town of Altavista staff in their discussions with property owners and developers as they convey future plans and projects in the vicinity of the study intersections.

The purpose of this study is to evaluate potential improvements to the intersections of Main Street at Bedford Avenue and Bedford Avenue at 7th Street. The study focuses primarily on enhancing intersection operations and safety during typical weekday operations, with a secondary focus on addressing the goal for local leaders to consolidate the two intersections and improve the intersection aesthetics as an entry gateway into the Town of Altavista. The limits of this study area are the functional area of the intersections of Bedford Avenue with Main Street and 7th Street located in the Town of Altavista.

This report will document the following information: data collection and inventory; existing conditions analyses; future (no build) conditions analyses; development and analysis of three preliminary alternatives; results of the environmental desktop review; and the final recommendations with a plan of action to mitigate deficiencies at the study intersections. This report will serve as a technical document that describes and illustrates the feasibility of the proposed alternatives as well as the associated potential operational and safety impacts of each. The proposed alternatives focused primarily on improving operations and safety, while considering the vision of local leaders. The alternatives were evaluated based on the following criteria: level of service; safety factors; construction and maintenance costs; environmental impacts; and right-of-way impacts.

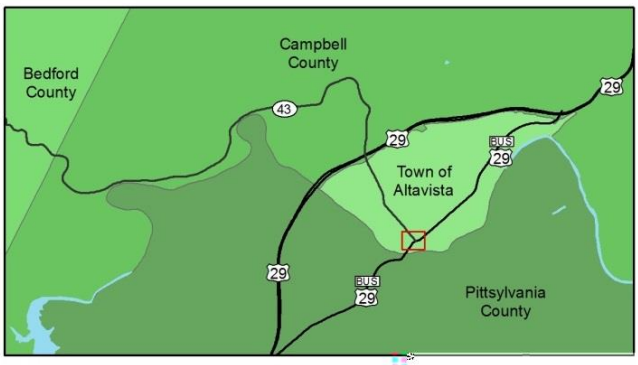
2.0 Existing Conditions

An inventory of existing roadway conditions was prepared along Bedford Avenue at the intersections with Main Street and 7th Street based on a field review conducted on May 8, 2014. Traffic, crash and geographic information system (GIS) data was used to document existing conditions. During the field review, the following information was collected and compiled:

- Digital photographs and video to capture the following elements of interest:
  - Roadway geometrics (lane widths and shoulder widths)
  - Posted speed limits
  - Sight distance deficiencies
  - Operational conditions
  - Safety-related issues
  - Potential constraints
- Observations of existing roadway conditions to determine opportunities for improvements to increase safety
- Observations of traffic operations including passenger cars and trucks

The existing conditions analyses were developed using the data collected during the field review including visual observations of the operational characteristics. This section of the report describes the analysis of the existing traffic conditions at the study intersections. The intent of the quantitative and qualitative analyses is to understand the current operations and safety issues at the intersections, which provides a baseline for the comparison of the proposed alternatives.

Figure 1: Location Map



Main Street and Bedford Avenue Operational Analysis and Alternative Considerations

Town of Altavista, VA

VDOT Virginia Department of Transportation

2.1 Existing Roadway Conditions

The following information provides a brief description of existing roadway characteristics of each facility, with existing roadway geometry, lane configurations, and storage lengths shown in **Figure 2**.

2.1.1 Main Street (US Route 29 Business)

Main Street (US Route 29 Business) is classified as a rural major collector according to VDOT's Town of Altavista 2005 Functional Classification map. The section of roadway within the immediate vicinity of the study intersections is oriented in a north-south direction and is a two-lane undivided roadway, with a narrow unpaved shoulder ranging from one to two feet wide, which is constrained by W-beam (standard GR-2) guardrail on the east side of the roadway. A curbed shoulder with an approximate five foot pedestrian sidewalk is provided on the west side of the roadway. **Photographs 1** and **2** show the northbound and southbound approaches of the Intersection of Main Street and Bedford Avenue, respectively. The posted Main Street speed limit is 25 MPH in the vicinity of Bedford Avenue, but increases to 35 MPH approximately 200 feet south of Bedford Avenue.

2.1.2 Bedford Avenue (Route 43)

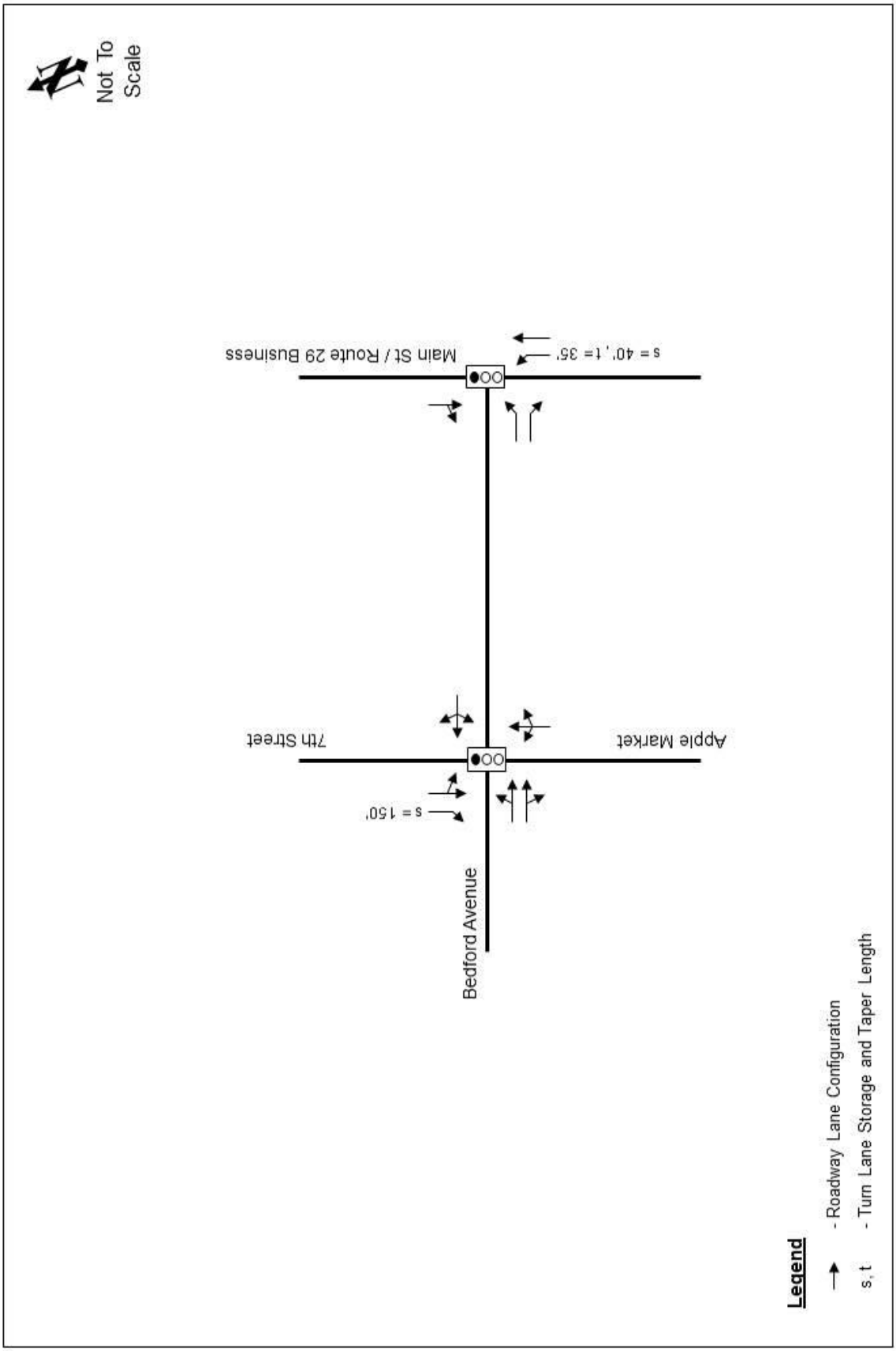
Bedford Avenue (Route 43) is also classified as a rural major collector according to VDOT's Town of Altavista 2005 Functional Classification map. The section of roadway within the project limits is oriented in an east-west direction and is a three-lane undivided roadway with two lanes in the eastbound direction and one lane in the westbound direction. Approximate five foot pedestrian sidewalks are provided on both sides of the roadway on the curbed shoulder. **Photographs 3** and **4** show the eastbound and westbound approaches at the intersection of Bedford Avenue at 7th Street, respectively. **Photograph 5** shows the eastbound approach at the intersection of Bedford Avenue and Main Street. The Bedford Avenue posted speed limit is 35 MPH through the study area; however, a flashing beacon operating on a time clock during the school calendar year indicating a school zone with a 25 MPH speed limit is located west of the study area in advance of Altavista High School (approximately 1,000 feet west of 7th Street).

2.1.3 7th Street

7th Street is classified as a rural minor collector as indicated by VDOT's Town of Altavista 2005 Functional Classification map. The section of roadway within the project limits is oriented in a north-south direction and is a two-lane undivided roadway with on-street parallel parking and approximate five foot sidewalks on both sides of the roadway on the curbed shoulder. **Photograph 6** shows the southbound approach at the intersection of 7th Street and Bedford Avenue. The posted speed limit on 7th Street within the study area is 25 MPH.

Photograph 1:
Northbound Approach – Main Street at Bedford Avenue

Photograph 2:
Southbound Approach – Main Street at Bedford Avenue


Not To Scale
Main St / Route 29 Business
s = 40', t = 35'
7th Street
Apple Market
s = 150'
Bedford Avenue
Legend
- Roadway Lane Configuration
s, t - Turn Lane Storage and Taper Length
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EXISTING 2014 LANE CONFIGURATION
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia
FIGURE 2

Photograph 3:
Eastbound Approach – Bedford Avenue at 7th Street

Photograph 4:
Westbound Approach – Bedford Avenue at 7th Street

Photograph 5:
Eastbound Approach – Bedford Avenue at Main Street

Photograph 6:
Southbound Approach – 7th Street at Bedford Avenue

2.2 Existing Intersection Conditions

Both study intersections currently operate as coordinated signalized intersections in a cluster intersection configuration. Intersection pedestrian accommodations and crosswalks are not provided across any of the intersection approaches within the study area. The northbound approach of the intersection of Main Street and Bedford Avenue provides insufficient sight distance to the signal head given the posted speed limit of 25 MPH. Northbound motorists have a sight distance of approximately 215 feet as shown in **Figure 7**; however, the required distance is 280 feet for a 25 MPH roadway (per the VDOT Road Design Manual). The primary land use within the vicinity of the subject intersections is commercial, with residential and civic (school) land uses located just west of the subject intersections along Bedford Avenue.

Photograph 7:
Northbound Approach – Sight Distance

2.3 Access

Several access points are located within the study area to serve commercial business parcels. Along the west side of Main Street, south of Bedford Avenue, two access points serve the Apple Market convenience store/gas station and are spaced approximately 60 feet apart (center-to-center) as shown in **Photograph 8**.

Photograph 8:
Access to Apple Market

3.0 Background Traffic Studies

The *Town of Altavista 2035 Transportation Plan* includes improvements that potentially may impact operations in the study area. A brief summary of the study is provided in this section of the report.

3.1 The Town of Altavista 2035 Transportation Plan

The *Town of Altavista 2035 Transportation Plan* created a three-phased improvement plan which identified short-term (2010), interim year (2020), and study year (2035) improvements for the town of Altavista. A review of the study identified the following improvements as impactful to the study area:

- Phase One: Base Year (2010)
  - Main Street Corridor – Modify and consolidate entrance ways to improve safety and access along the corridor
  - Main Street Bridge over Staunton River – Construct new two-lane bridge with multi-use trail over Staunton (Roanoke) River
- Phase Two: Interim Year (2020)
  - None
- Phase Three: Study Year (2035)
  - Main Street Widening – Widen Main Street to four lanes from 7th Street to corporate limits

The 2020 State Highway Plan, which is summarized in Table 2-7 in the *Town of Altavista 2035 Transportation Plan*, also included the following recommendations:

- Widen Bedford Avenue to four lanes (2020)
- Consolidate intersections; includes realignment and widening of Main Street between Roanoke River Bridge and Bedford Avenue (2020)

4.0 Traffic Volumes

4.1 Existing Traffic Volumes

Twelve-hour (7:00 AM – 7:00 PM) turning movement count (TMC) data was collected at the study intersections on Thursday, May 1, 2014. Based on the turning movement counts, the weekday AM and PM peak hours were computed to be 7:30-8:30 AM and 4:00-5:00 PM, respectively. The 2014 Existing AM and PM peak hour volumes at the study intersection are documented in **Figure 3**. The full 12-hour turning movement counts are provided in the Appendix. Based on the 2012 VDOT published traffic data, the approximate AADT volumes along study area roadways are as follows:

- Main Street north of Bedford Avenue – 7,200 vehicles per day (VPD)
- Main Street south of Bedford Avenue – 5,900 VPD
- Bedford Avenue – 5,200 VPD
- 7th Street – 3,300 VPD

4.2 Future 2035 Traffic Volumes

Historic AADT data provided by VDOT was analyzed between the years of 2001 – 2012 to compute an effective growth rate to be used in the development of the Horizon Year (2035) volumes. For all four roadway segments analyzed (Main Street north, Main Street south, Bedford Avenue, and 7th Streets), the calculated effective growth rate indicated that traffic volumes in the study area have been declining (a similar observation was made in *The Town of Altavista 2035 Transportation Study*). Therefore, a conservative positive growth rate of 1% per year was used for all routes within the study area. The Horizon Year (2035) AM and PM peak hours volumes at the study intersections are provided in **Figure 3**. **Appendix C** contains graphical depictions of existing (2014) and projected (2035) turning movement count data for the no build and alternative build conditions.

5.0 Proposed Alternatives

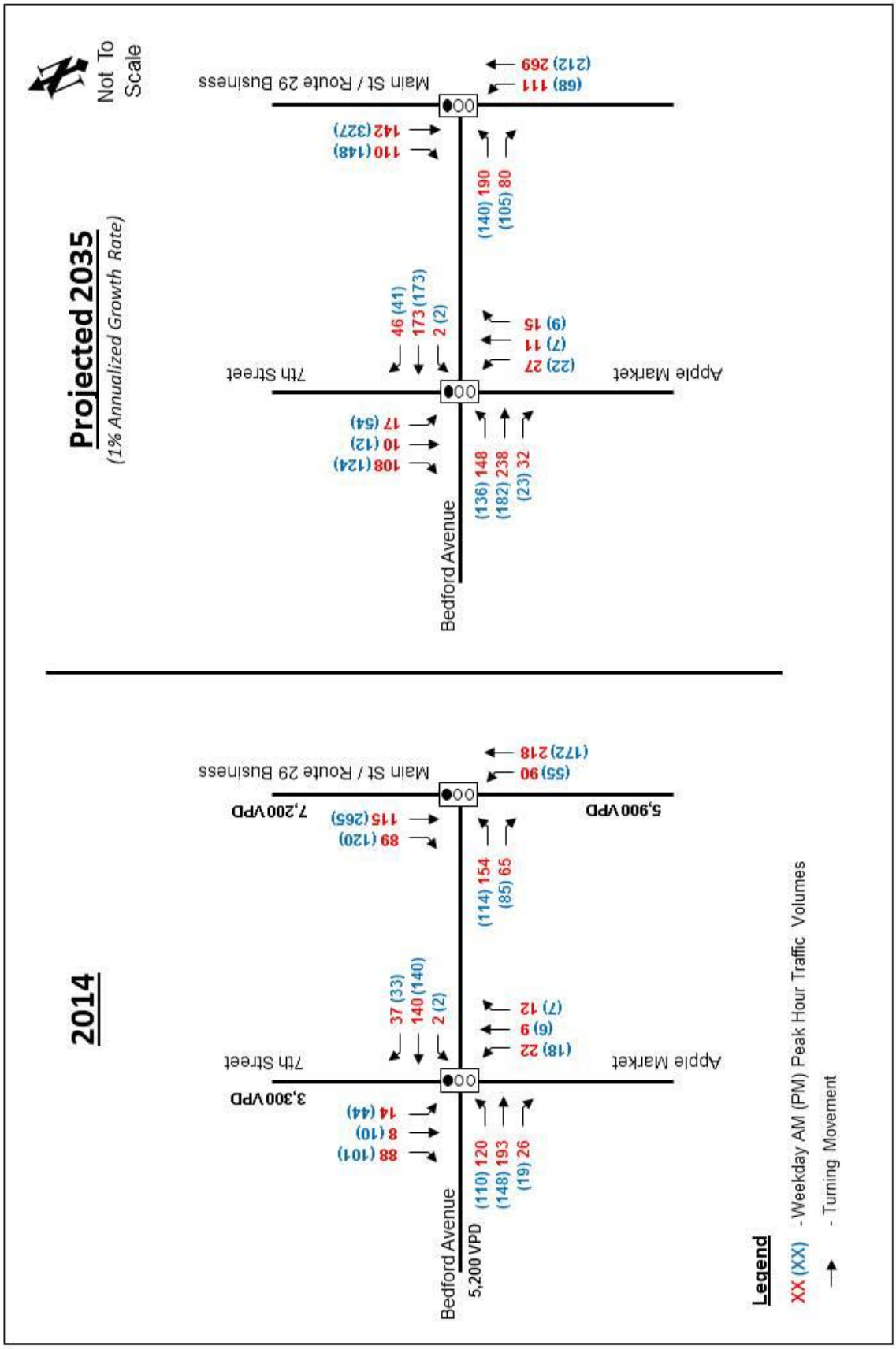
Three proposed alternatives were developed based on improving operations, access management, and addressing one of the recommendations in the 2020 State Highway Plan – consolidate the intersections of Main Street/Bedford Avenue and Bedford Avenue/7th Street.

5.1 Alternative 1 – Slip-Lane and Restricted 7th Street Access

Alternative 1 consists of the construction of an exclusive unsignalized northbound through movement slip lane on Main Street, restriction of egress from 7th Street, and site access modifications. Some of the key planning level design elements included:

- Construction of two-foot wide median to allow free-flow northbound movements along Main Street
- Pedestrian accommodations at Main Street/Bedford Avenue (e.g., push buttons, crosswalks, ramps, etc.)
- Construction of improved storage capacity for the northbound left-turn movement onto Bedford Avenue
- Construction of a raised median to prohibit the southbound through and left-turn movements from 7th Street
- Construction of a retaining wall along the east side of the northbound Main Street approach lanes to support the widened roadway profile
- Consolidate driveway entrances to the Apple Market

The primary benefit to intersection operations under this alternative would be recognized in the free-flow operation of the northbound through movement. The raised median would allow this movement to operate as an unsignalized movement through the intersection, reducing the volume of traffic required to be processed at the traffic signal. In terms of capacity for the northbound left-turn movement, this alternative also provides more than triple the amount of storage and taper length when compared to the existing conditions, reducing the potential for queuing impacts to the northbound through movement.



EXISTING AND PROJECT (2035) TURNING MOVEMENT VOLUMES
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia

FIGURE 3

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To satisfy the objective of intersection consolidation, the southbound approach along 7th Street is proposed to be restricted to a right-turn only movement. Existing traffic volumes indicate that this approach carries relatively low volumes with less than 35% of turning movements accounting for the through and left-turn movements. By restricting access, traffic volumes are redistributed to the primary thoroughfare (Main Street), improving ingress and egress to the Apple Market as few conflicting movements are present. Lastly, the number and location of site driveways at the Apple Market were consolidated on Main Street to better accommodate VDOT's Access Management Guidelines. Due to the limited distance between the Staunton (Roanoke) River Bridge and the study intersections, the minimum spacing of 225 feet between a full access entrance and signalized intersection could not be achieved.

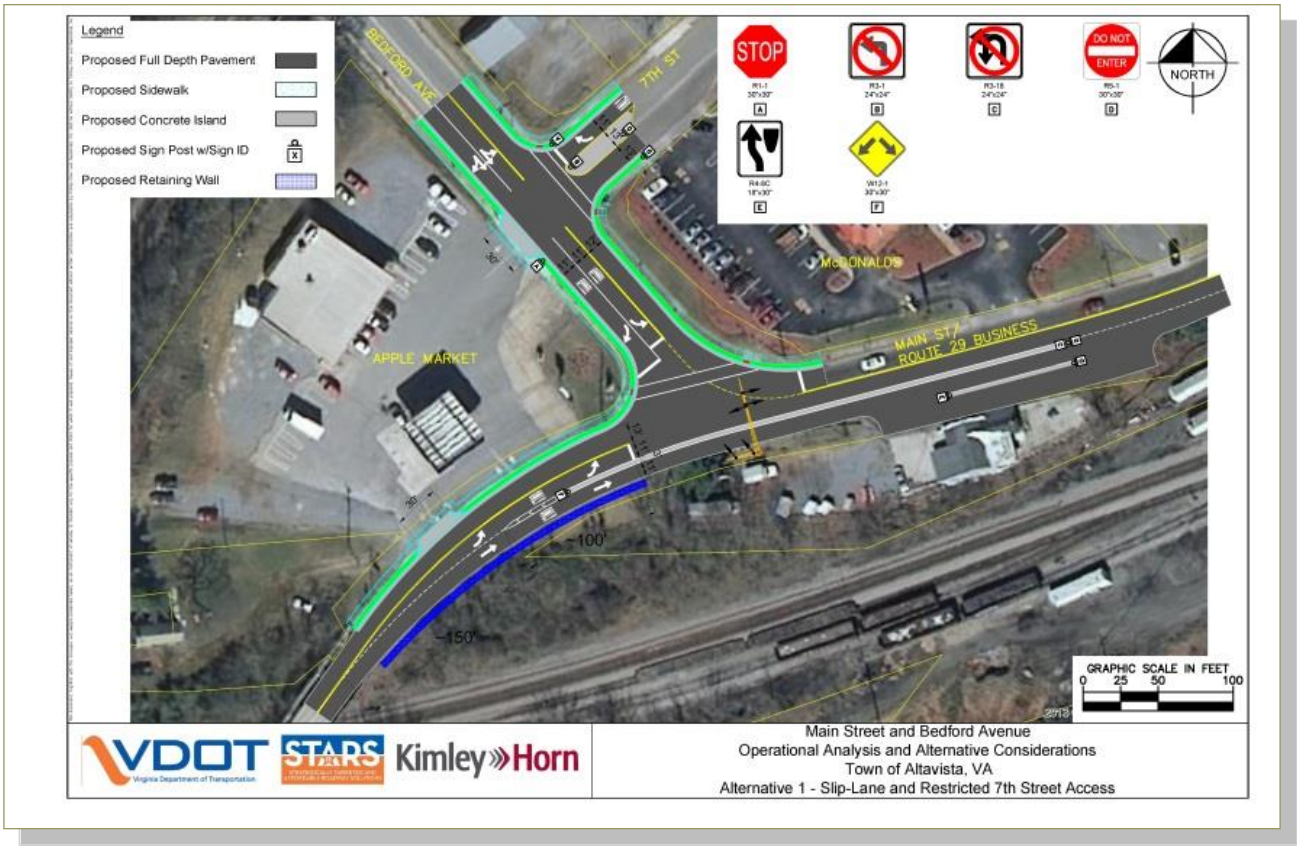


Figure 4: Alternative 1 Slip-Lane and Restricted 7th Street Access

In terms of constructability, a major element of this design includes earthwork to support a widened approach to the intersection of Main Street and Bedford Avenue. Given the limited space between the roadway and the Norfolk Southern Railway to the south and considering the grade differential, an approximate 225-foot retaining wall will likely be required. In addition, in order to meet the minimum AASHTO standards for horizontal curvature for a roadway with a design speed assumed to be 30 MPH, a centerline radius of 250 feet is required. To achieve this minimum design radius, the extents of proposed roadway improvements extend beyond the existing terminus of the bridge. As such, this alternative is contingent upon the replacement of the bridge. Limited right-of-way impacts are anticipated in the vicinity of the intersection improvements; however, coordination with the Norfolk Southern Railroad can be expected in order to construct the retaining wall and subsequent bridge improvements. A schematic of proposed Alternative 1 is shown in **Figure 4**, with a larger format drawing provided in **Appendix B**.

5.2 Alternative 2 – Single Roundabout

Alternative 2 consists of reconfiguring the subject intersections to a consolidated one-lane roundabout. The proposed roundabout would eliminate the need for turn lanes identified in Alternative 1. In addition to an improvement to intersection capacity, the proposed roundabout could potentially improve safety as well by reducing the number of conflict points in the intersection. Based on VDOT's Proposed Safety Improvements form, the installation of a roundabout can reduce crashes by as much as 72% in all intersection-related crashes. The proposed roundabout would also mitigate the existing limited sight distance on the northbound approach and could become a traffic calming feature.

Based on a review of available right-of-way, it is anticipated that the roundabout will require the acquisition of right-of-way from the Apple Market parcel. The impacts to right-of-way extend well beyond the existing curb line and would necessitate the relocation of the existing fueling stations, which could present obstacles during design and construction depending on the condition of existing underground fuel tanks. Limited impacts to the McDonald's property, specifically a few parking spaces, are also anticipated. While roundabouts are known to improve safety, a rural roundabout can cause challenges to unfamiliar drivers and at this location, it will also impact existing access to surrounding developments. Some of the key planning level design elements include:

- Construction of a roundabout at the approximate location of the existing intersection of Bedford Avenue and 7th Street
- Single-lane approaches to the roundabout with splitter islands (minimum 50' length)
- Decorative retaining wall around McDonald's parking lot
- Significant improvements to Apple Market site anticipated (e.g., relocation of fueling stations, potential relocation and/or removal of fuel storage tanks, driveways, new asphalt, parking spaces)
- Construction of a slip lane on northbound Main Street
- Provision for a large landscape area to be used for a water feature and/or Town gateway feature
- Pedestrian accommodations around the new roundabout

The analysis herein was based on minimum design requirements found in the VDOT Road Design Manual – Appendix F and the National Cooperative Highway Research Program (NCHRP) Report 672: *Roundabouts: An Informational Guide*, Second Edition, 2010. Using an inscribed circle diameter of 130 feet (minimum inscribed diameter to accommodate a WB-67 truck (source: NCHRP Report)), the proposed roundabout was approximately located at the intersection of Bedford Avenue and 7th Street. This location would allow for the construction of a northbound free-flow slip lane along Main Street (similar to Alternative 1).

Given this location, as previously mentioned, notable impacts to the Apple Market are expected; however, the northbound approach geometry on Main Street would not necessitate the replacement of the existing bridge. To minimize potential conflicts within the vicinity of the approach lanes to the roundabout, all site driveways are proposed to be relocated from the current locations. In addition, site access to the Apple Market would be limited to a single access point on Main Street. Right-of-way encroachment would require the relocation of the fueling stations on site as well as the underground fuel tanks. As shown in **Figure 5** (provided in large format in **Appendix B**), the fueling stations could be relocated to the southwest quadrant of the site, with additional parking provided for adjacent to the building. Fuel truck access should be a consideration under all alternatives that modify site access to the Apple Market.

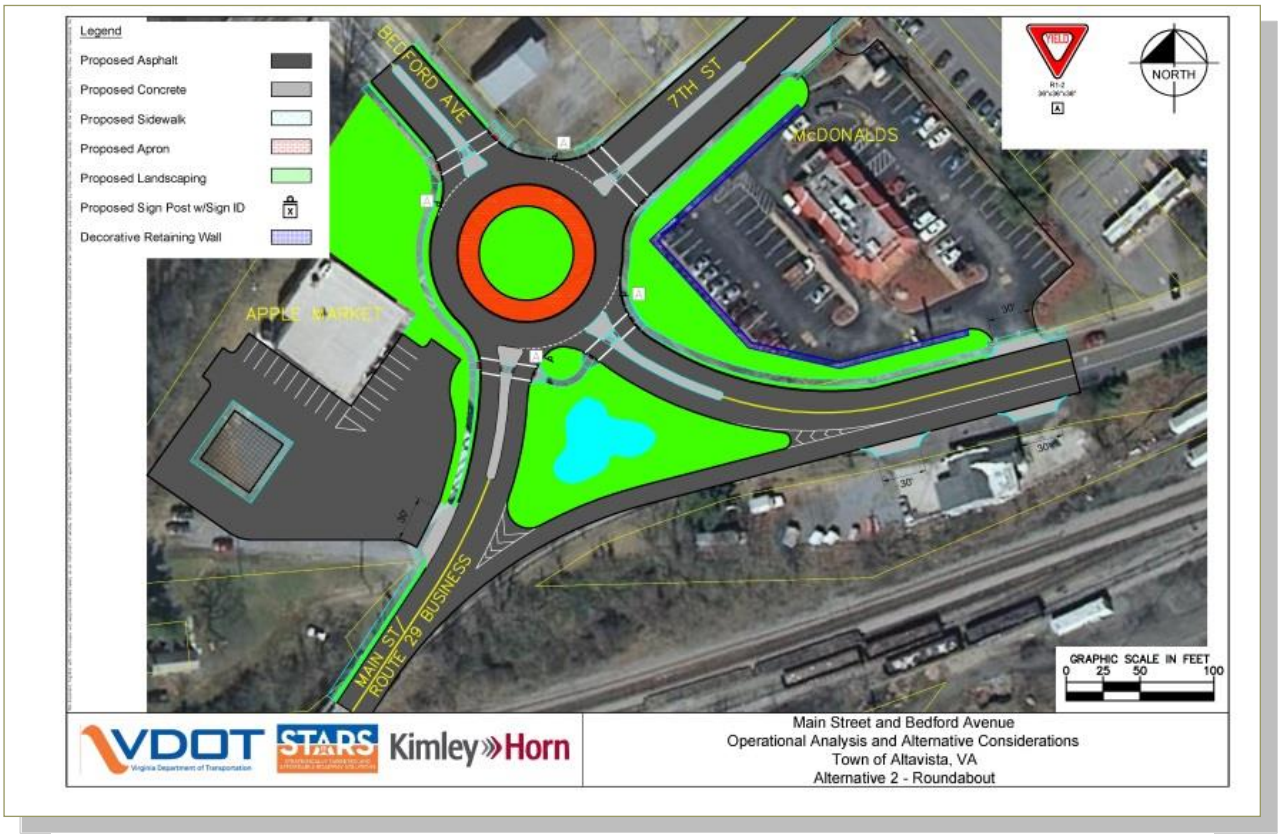


Figure 5: Alternative 2 – Single Roundabout

5.3 Alternative 3 – Peanut Roundabout

Alternative 3 consists of two, one-lane roundabouts configured adjacent to each other, referred to herein as a peanut roundabout configuration. As with Alternative 2, similar safety improvements could be expected based on VDOT's Proposed Safety Improvements form. The intent of the peanut roundabout is to maintain the alignment of existing roadways and locate the roundabouts at the existing intersections. This configuration also limits the degree of right-of-way impacts to adjacent parcels, although impacts are still identified for the Apple Market and McDonald's. The roundabouts, shown in **Figure 6** (also contained in **Appendix B**), are also sized to provide an inscribed diameter of 130 feet for similar reasons to accommodate the radii of turning trucks.

The layout represents the accommodation of the recommended roundabout design standards, but further evaluation of the radii and island sizes will be required beyond this planning level evaluation. A turning template exhibit is provided in **Appendix B** to depict the potential conflict points of a WB-67 truck traveling through the peanut roundabout. In terms of site access, site driveways for the Apple Market and McDonald's are recommended to be relocated away from the roundabout (where possible). Ingress and egress of fuel trucks at the Apple Market is accommodated, but only in a single travel direction.

Trucks would be required to enter by way of Bedford Avenue and then exit to the south along Main Street. Although this is a restrictive travel pattern, it does allow the trucks to bypass the roundabout altogether. Parking lot enhancements would be needed on the Apple Market site, but from a preliminary standpoint, it appears that this alternative would not impact the fueling stations or underground storage tanks. As with Alternative 2, the northbound approach geometry along Main Street would not necessitate the replacement of the existing bridge. Some of the key planning level design elements include:

- Construction of two, one-lane interconnected roundabouts (peanut configuration) at the approximate location of the existing intersections of Main Street and Bedford Avenue and Bedford Avenue and 7th Street
- Single-lane approaches to the roundabout with splitter islands (minimum 50' length)
- Decorative retaining wall around McDonald's parking lot
- Moderate improvements to Apple Market site anticipated (e.g. driveways, new asphalt/parking, landscaping)
- Provision for a large landscape area within each roundabout with the potential for use as a Town gateway entry feature
- Pedestrian accommodations around the new roundabouts

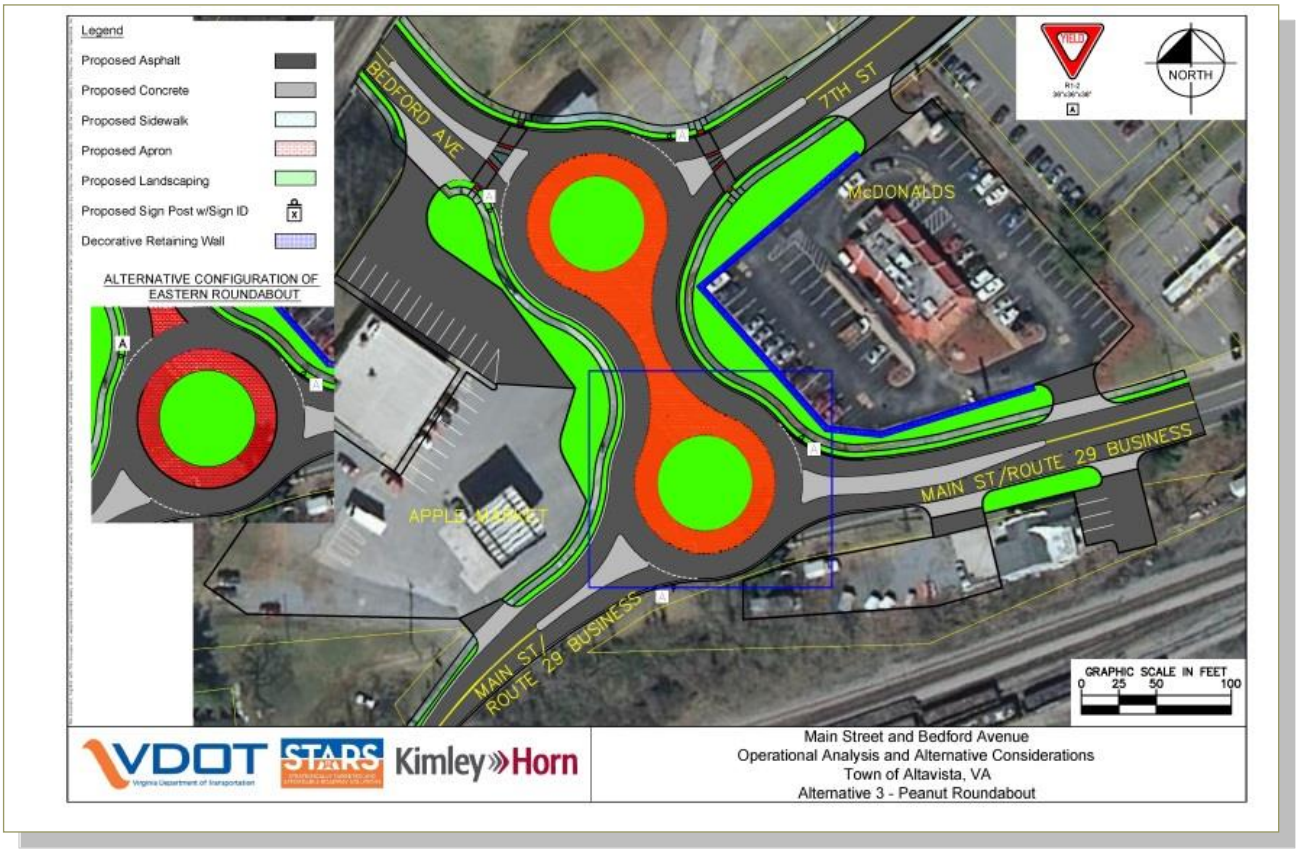


Figure 6: Alternative 3 – Peanut Roundabout

A variation of this alternative (referred to as Alternative 3B) is depicted in the inset of **Figure 6** to show a break in the center truck apron that would allow southbound through movements to bypass the roundabout at Bedford Avenue and 7th Street. This option provides a more direct path to the bridge heading out of town for the heavier southbound movement. The drawback to this break in the truck apron is that it presents two yield points (conflict points) within the roundabout, which is otherwise the objective of this configuration. The analysis of 2035 conditions presented in this report considers the primary peanut configuration as well as the cut-through alternative.

5.4 No-Build Condition Considerations

The following improvements are under the no-build condition:

- Access management: consolidate the existing site driveways to the Apple Market on Main Street to better satisfy VDOT Access Management guidelines.

- Pedestrian accommodations: Provide pushbutton actuated pedestrian signal displays at the two intersections in conjunction with striped crosswalks.
- Sight distance mitigation: Consider installing a near-side traffic signal display on the vertical support of the signal pole in the southwest corner to improve visibility of the signal for northbound vehicles.

6.0 Traffic Signal Warrant Analysis

Traffic signal warrant analyses were performed at the intersections of Main Street at Bedford Avenue and Bedford Avenue at 7th Street to determine if traffic signals are warranted based on existing and future year traffic volumes. The traffic signal warrants were performed in accordance with the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD). The MUTCD is published by the Federal Highway Administration and is nationally recognized and adopted by all fifty states as the standard for determining traffic signal needs. Projected traffic volumes for 2035 and proposed Alternative # 1 geometry were compared to the conditions or "warrants" as specified in the MUTCD Traffic Signal Warrants 1, 2, and 3; Warrants 4-9 are not based on vehicular volumes and were not evaluated as part of this study. The satisfaction of a traffic signal warrant or warrants shall not in itself justify traffic signal control at these intersections.

All turning movements were included in the analysis. Minor street right-turn movements from eastbound Bedford Avenue onto southbound Main Street and from southbound 7th Street onto westbound Bedford Avenue were not reduced or removed. Thresholds for the vehicular volume warrants were not reduced for any geometric characteristics or speed conditions. The 12-hour volumes utilized in the signal warrant analyses and thresholds for each warrant are provided in **Table 1**.

Warrant 1 (Eight-Hour Vehicular Volume), Warrant 2 (Four-Hour Vehicular Volume), and Warrant 3 (Peak Hour) were evaluated at both study intersections. The existing 2014 twelve-hour traffic volumes were used to derive the 2035 twelve-hour traffic volumes, at a 1 percent growth rate, which were used in these analyses. The results of the traffic signal warrant analyses are shown in **Table 1**.

Table 1: Traffic Signal Warrant Analysis Results

	Warrant 1A	Warrant 1B	Warrant 1 Combination	Warrant 2	Warrant 3
Main Street at Bedford Avenue	Not Met (1 of 8 hours satisfied)	Not Met (0 of 8 hours satisfied)	Not Met (1 of 8 hours satisfied)	Not Met (0 of 4 hours satisfied)	Not Met
Bedford Avenue at 7th Street	Not Met (0 of 8 hours satisfied)	Not Met (0 of 8 hours satisfied)	Not Met (0 of 8 hours satisfied)	Not Met (0 of 4 hours satisfied)	Not Met

Based on the projected 2035 conditions, the study intersections do not meet traffic signal Warrant 1, Warrant 2, or Warrant 3. The study intersections should be monitored if existing traffic patterns and/or land use changes occur within the vicinity of the study intersections. Should the recommendations of this study proceed to construction, it is recommended that a traffic signal warrant analysis be conducted at that time with updated traffic volume data.

7.0 Traffic Operational Analysis

Traffic operational analyses were conducted to evaluate the overall performance of the subject intersection under existing and future scenarios. All traditional intersection analyses were conducted using *Synchro Professional 8.0* while all roundabout analyses were conducted using *SIDRA Intersection 6.0*. Analyses were performed for the following scenarios:

1. **2014 Existing** – existing traffic demand, roadway configurations, and signal operations
2. **2035 No Build** – projected 2035 traffic demand with existing roadway configurations and enhanced traffic signal control to allow for optimized progression between intersections
3. **2035 Alternative 1** – projected 2035 traffic demand with proposed Alternative 1 roadway configurations and traffic reassignment
4. **2035 Alternative 2** – projected 2035 traffic demand with proposed Alternative 2 roadway configurations (one single-lane roundabout) and associated traffic reassignment
5. **2035 Alternative 3** – projected 2035 traffic demand with proposed Alternative 3 roadway configurations (single-lane peanut roundabout) and associated traffic reassignment

7.1 Synchro and SIDRA Analysis

Capacity analyses allow traffic engineers to assess the operational conditions and identify the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern the methodology for evaluating capacity and the quality of service provided to road users traveling through a roadway network. There are six letter grades for Levels of Service (LOS) ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

Intersection level of service is defined in terms of delay (seconds per vehicle), a measure of driver discomfort, frustration, fuel consumption, and lost travel time. **Table 2** summarizes the delay associated with each unsignalized and roundabout intersection LOS category.

Table 2: Unsignalized Intersection Level of Service Criteria

LOS	Intersection Delay (sec/veh)	
	Unsignalized	Roundabout/Signals
A	0 - 10	0 - 10
B	>10 - 15	>10 –20
C	>15 - 25	>20–35
D	>25 – 35	>35 – 55
E	>35 – 50	>55 – 80
F	>50	>80

** Source: Transportation Research Board, Highway Capacity Manual 2000*

7.1.1 Intersection Capacity Analysis

The unsignalized study intersection was analyzed using Synchro 8 based on methodologies in the HCM 2000. The roundabout study intersection was analyzed using SIDRA Intersection 6.0 based on the SIDRA Model methodologies which uses the HCM 2010 traffic signal delay thresholds to determine LOS. To evaluate the study intersection, existing and projected traffic volume data was used in conjunction with existing and proposed geometric data to determine the LOS. For the analysis, the following assumptions were made:

- Heavy vehicle percentages varied between 1% and 6% during the AM peak, and were less than 2% during the PM peak hour. To reflect the average vehicle type in the study area, a common heavy vehicle percentage of 2% was used.
- Peak hour factor (PHF) from TMC data with the following adjustments:
  - Existing Conditions: Minimum Peak Hour Factor (PHF) of 0.60 for all lane groups (consistent with the *Town of Altavista 2035 Transportation Plan*)
  - Future Conditions: Minimum PHF of 0.92 for all lane groups

The following sections provide a discussion of LOS and delay results for the five alternatives. Projected 2035 turning movement count data used to evaluate the alternative scenarios can be found in **Appendix C**. **Figure 8** through **Figure 12**, included at the end of this section of the report, present level of service for each scenario in a schematic format.

1. 2014 Existing

Table 3 presents the LOS and delay by movement, approach, and for the overall intersection during the 2014 AM and PM peak hours at the intersection of Main Street and Bedford Avenue. All movements operate at a LOS D or better, with an overall intersection LOS C during the AM and PM peak hours. The delay for the eastbound right-turn movement is highest during the AM peak hour (LOS D), which can be attributed to the conflicting southbound through and right-turn movements as well as general side street delay during mainline operations. However, the volume of this movement is the lowest of all turning movements at the intersection, so the impacts of the delay are not as significant considering overall intersection operations. The corresponding Synchro output sheets are included in the **Appendix D**.

2014 AM and PM peak hour LOS and delay is presented in

Table 4 for the intersection of Bedford Avenue and 7th Street. Mainline operations provide for minimal delay to through and left-turning movements, with average approach delay of less than 5 seconds. However, the delay of overall signal operations and coordinated operations as a cluster intersection with the intersection of Main Street and Bedford Avenue, the delay for side street movements is much greater, with overall approach delay of greater than 35 seconds, operating at LOS D during the AM and PM peak hours. As with the eastbound right-turn movement at the intersection of Main Street and Bedford Avenue, the higher delay affects a low volume of vehicles, resulting in a benefit to mainline operations and overall intersection LOS B during the AM and PM peak hours. The corresponding Synchro output sheets are included in the **Appendix D**.

Table 3: Synchro Capacity Analysis – Intersection LOS Summary 2014 Existing Conditions
Main Street and Bedford Avenue (Signalized)

Lane Group	Eastbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Main Street				Main Street					
Left	24.9	C	27.1	C	11.5	B	12.6	B	--	--	--	--	Delay	Delay
Through	--	--	--	--	11.7	B	10.4	B	27.2	C	29.2	C	21.4	24.6
Right	39.5	D	34.9	C	--	--	--	--	--	--	--	--	LOS	LOS
Approach	29.1	C	30.4	C	11.6	B	11.0	B	27.2	C	29.2	C	C	C

NOTE: Lane configurations with a shared through lane shown as "through" lane group; with shared left-right lane shown as "left" lane group.

Table 4: Synchro Capacity Analysis – Intersection LOS Summary 2014 Existing Conditions
Bedford Avenue and 7th Street (Signalized)

Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Bedford Avenue				Apple Market				7th Street					
Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Delay	Delay
Through	2.8	A	3.0	A	2.0	A	1.8	A	39.1	D	44.6	D	37.3	D	46.9	D	10.3	14.5
Right	--	--	--	--	--	--	--	--	--	--	--	--	36.3	D	42.8	D	LOS	LOS
Approach	2.8	A	3.0	A	2.0	A	1.8	A	39.1	D	44.6	D	36.6	D	44.6	D	B	B

NOTE: Lane configurations with a shared through lane shown as "through" lane group; with shared left-right lane shown as "left" lane group.

2. 2035 No Build

Analysis of 2035 No Build conditions was performed assuming enhanced traffic signal control would be in place by the analysis year, maintaining existing general operations. This improvement was reflected in Synchro by modeling the two intersections as independent signalized intersections (i.e., no cluster) running the same cycle length, with splits developed by movement and a programmed offset at each intersection to maintain coordination between the two intersections. This operation reflects the current capabilities of smart traffic control equipment available on the market today. **Table 5** presents the projected LOS and delay during the 2035 AM and PM peak hours at the intersection of Main Street and Bedford Avenue under no build conditions. All movements operate at a LOS D or better, with an overall intersection LOS B during the AM and PM peak hours. As compared to 2014 Existing conditions, this represents an improvement in LOS from C to B and a reduction in overall intersection delay of more than 10 seconds during both peak hours. As with 2014 Existing conditions, the eastbound approach and associated movements are projected to experience the greatest delay; however, this is at the benefit of mainline operations. The corresponding Synchro output sheets are included in the **Appendix D**.

Table 5: Synchro Capacity Analysis – Intersection LOS Summary 2035 No Build Conditions
Main Street and Bedford Avenue (Signalized)

Lane Group	Eastbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Main Street				Main Street					
Left	29.7	C	29.9	C	5.1	A	5.1	A	--	--	--	--	Delay	Delay
Through	--	--	--	--	5.6	A	4.2	A	14.2	B	13.6	B	15.8	15.8
Right	36.7	D	37.4	D	--	--	--	--	--	--	--	--	LOS	LOS
Approach	31.8	C	33.1	C	5.4	A	4.4	A	14.2	B	13.6	B	B	B

NOTE: Lane configurations with a shared through lane shown as "through" lane group; with shared left-right lane shown as "left" lane group.

Future year 2035 AM and PM peak hour LOS and delays are presented in **Table 6** for the intersection of Bedford Avenue and 7th Street. Mainline operations provide for minimal delay to through and left-turning movements, with an average approach delay of less than 5 seconds. Compared to 2014 Existing conditions, side street delay is reduced to LOS B and C during the AM and PM peak hours, respectively. This positive result can be attributed to the specific development and application of splits to serve each movement. In addition, the enhanced operations allows for the flexibility of operating at a lower cycle length that is consistent with the demand for the independent intersections, not based on the cluster of intersections. Overall LOS A is expected during the AM and PM peak hours. The corresponding Synchro output sheets are included in the **Appendix D**.

Table 6: Synchro Capacity Analysis – Intersection LOS Summary 2035 No Build Conditions
Bedford Avenue and 7th Street (Signalized)

Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Bedford Avenue				Apple Market				7th Street					
Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Delay	Delay
Through	3.9	A	3.5	A	2.0	A	1.8	A	19.9	B	23.7	C	19.5	B	25.6	C	6.9	9.0
Right	--	--	--	--	--	--	--	--	--	--	--	--	19.0	B	23.1	C	LOS	LOS
Approach	3.9	A	3.5	A	2.0	A	1.8	A	19.9	B	23.7	C	19.1	B	24.0	C	A	A

NOTE: Lane configurations with a shared through lane shown as "through" lane group; with shared left-right lane shown as "left" lane group.

3. 2035 Alternative 1 – Slip-Lane and Restricted 7th Street Access

2035 Build conditions for Alternative 1 were evaluated in Synchro, similar to the no-build conditions; however, the northbound through movement was not evaluated in terms of LOS or delay as it would not be controlled by a traffic signal in this alternative. The northbound through movement was modeled as a bypass lane to the intersection. **Table 7** presents the LOS and delay projected to occur during the 2035 AM and PM peak hours at the intersection of Main Street and Bedford Avenue under Alternative 1 build conditions. All movements operate at a LOS C or better, with an overall intersection LOS B during the AM and PM peak hours. When compared to the 2035 no-build conditions, the results indicate a slightly higher overall intersection delay during the PM peak hour. However, as previously mentioned, the analysis does not consider the low delay experienced by the northbound through movement volume. Considering the impacts to the total volume at the intersection, including the uncontrolled through movement, this alternative has a total cumulative delay that is less than the no-build alternative. The corresponding Synchro output sheets are included in the **Appendix D**.

Table 7: Synchro Capacity Analysis – Intersection LOS Summary 2035 Build Conditions Alternative 1
Main Street and Bedford Avenue (Signalized)

Lane Group	Eastbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Main Street				Main Street					
Left	25.8	C	25.2	C	4.9	A	5.9	A	--	--	--	--	Delay	Delay
Through	--	--	--	--	--	--	--	--	13.3	B	14.9	B	15.8	16.2
Right	16.6	B	19.5	B	--	--	--	--	--	--	--	--	LOS	LOS
Approach	23.5	C	23.7	C	4.9	A	5.9	A	13.3	B	14.9	B	B	B

NOTE: Lane configurations with a shared through lane shown as "through" lane group; with shared left-right lane shown as "left" lane group.

† Synchro does not provide level of service or delay for movements with no conflicting volumes.

Future year 2035 AM and PM peak hour LOS and delay is presented in **Table 8** for the intersection of Bedford Avenue and 7th Street. Under Alternative 1 build condition, this intersection will be unsignalized, configured with stop-controlled side street approaches and free-flow mainline operations. Given this configuration and the uninhibited flow of through and right-turn movements on Bedford Avenue, LOS and delay are not reported. These movements effectively operate with little to no delay without the presence of conflicting movements. Side street delay is greatest on the northbound approach, which operates as a shared left, through, and right-turn movement. An overall LOS and delay is not reported for this intersection due to the lack of conflicts for mainline movements. Compared to no-build conditions, the side street delay is comparable, with little to no delay along Bedford Avenue.

As such, this intersection under Alternative 1 build conditions also offers improvements in overall operations in terms of delay reduction for overall operations. The corresponding Synchro output sheets are included in the **Appendix D**.

Table 8: Synchro Capacity Analysis – Intersection LOS Summary 2035 Build Conditions Alternative 1 Bedford Avenue and 7th Street (Unsignalized)

Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Bedford Avenue				Apple Market				7th Street					
Left	5.0	A	5.2	A	0.5	A	0.6	A	--	--	--	--	--	--	--	--	Delay	Delay
Through	†	†	†	†	†	†	†	†	25.3	D	22.7	C	--	--	--	--	--	--
Right	†	†	†	†	†	†	†	†	--	--	--	--	10.4	B	10.4	B	LOS	LOS
Approach	--	--	--	--	--	--	--	--	25.3	D	22.7	C	10.4	B	10.4	B	--	--

NOTE: Lane configurations with a shared through lane shown as "through" lane group; with shared left-right lane shown as "left" lane group.

† Synchro does not provide level of service or delay for movements with no conflicting volumes.

4. 2035 Alternative 2 – Single Roundabout

Projected 2035 Build conditions for the sinigle roundabout in Alternative 2 were evaluated using SIDRA. Delay and level of service for the northbound through movement on Main Street was not evaluated as it would not be controlled by a traffic signal in this alternative. Similar to Alternative 1, this movement was modeled as a bypass lane to the roundabout. **Table 9** presents the LOS and delay expected during the 2035 AM and PM peak hours at the roundabout.

Table 9: SIDRA Capacity Analysis – Intersection LOS Summary 2035 Build Conditions Alternative 2 Roundabout with Main Street Slip Lane

Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM		AM		PM			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
	Bedford Avenue				Main Street				Main Street				7th Street					
Left	7.7	A	11.4	B	8.4	A	9.4	A	7.6	A	7.3	A	8.5	A	10.7	B	Delay	Delay
Through	3.6	A	7.3	A	4.3	A	5.3	A	3.5	A	3.2	A	4.3	A	6.6	A	4.7	7.0
Right	3.9	A	7.6	A	4.6	A	5.6	A	1.4	A	1.4	A	4.7	A	6.9	A	LOS	LOS
Approach	5.1	A	9.0	A	6.7	A	8.1	A	3.2	A	2.9	A	5.0	A	7.6	A	A	A

All movements and approaches are projected to operate at LOS B or better during the AM and PM peak hours. No movement is projected to experience over 12 seconds of delay to navigate through the single-lane roundabout. The overall delay is 4.7 and 7.0 seconds per vehicle during the AM and PM peak hours respectively, which is less than the no-build combined overall delay projected at the two signalized intersections. As such, the roundabout under Alternative 2 build conditions offers improvements in overall operations in terms of delay reduction for overall operations. This is primarly due to the reduced number of conflicting vehicles due to the northbound bypass lane and the reduced number of approaches. The roundabout consists of four approaches and the total number of approaches at the two signalized intersections is six. The corresponding SIDRA output sheets are included in the **Appendix D**.

5. 2035 Alternative 3 – Peanut Roundabout

Projected 2035 Build conditions for the peanut roundabout configuration under Alternative 3 were evaluated using SIDRA. **Table 10** presents the LOS and delay expected during the 2035 AM and PM peak hours at the peanut roundabout.

Table 10: SIDRA Capacity Analysis – Intersection LOS Summary 2035 Build Conditions Alternative 3 Peanut Roundabout

Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
	Bedford Avenue				Bedford Avenue								7th Street					
U-Turn					7.4	A	7.9	A									Delay	Delay
Left					4.8	A	5.0	A					8.0	A	10.3	A	4.5	6.7
Right	3.3	A	6.1	A	1.6	A	1.8	A					5.0	A	7.3	A	LOS	LOS
Approach	3.3	A	6.1	A	5.4	A	6.5	A					5.6	A	8.4	A	A	A
	Bedford Avenue								Main Street				Main Street					
U-Turn	6.3	A	6.3	A													Delay	Delay
Left	4.2	A	4.2	A					10.0	B	7.6	A					4.6	3.0
Right	1.0	A	1.0	A					7.0	A	4.6	A	2.7	A	2.6	A	LOS	LOS
Approach	2.7	A	2.1	A					8.0	A	5.5	A	2.7	A	2.6	A	A	A

All movements and approaches are projected to operate at LOS A during the AM and PM peak hours. The combined overall delay for both roundabouts is less than 10 seconds per vehicle during the peak hours, which is less than the no-build combined overall delay projected at the two signalized intersections. As such, the roundabout under Alternative 2 build conditions offers improvements in overall operations in terms of delay reduction for overall operations when compared to no-build conditions. The corresponding SIDRA output sheets are included in the **Appendix D**. Vehicles traveling through the peanut roundabout will experience more delay when compared to the single roundabout due to the increased distance to travel;however the difference is minimual.

6. 2035 Alternative 3B –Peanut Roundabout with Cut Through

Projected 2035 Build conditions for the peanut roundabout under Alternative 3B were evaluated using SIDRA. The peanut roundabout under Alternative 3B includes a cut through for the southbound through movement on Main Street. This configuration reduces the travel distance through the peanut roundabout for the heavy southbound movement on Main Street. **Table 11** presents the LOS and delay expected during the 2035 AM and PM peak hours at the peanut roundabout.

Similar to Alternate 3B, all movements and approaches are projected to operate at LOS B or better during the AM and PM peak hours. The combined overall delay through the two roundabouts is comparable to Alternative 3; however the rounabout at Bedford Avenue and Main Street incurrs more of the delay due to the additional movement through the roundabout. The diffeference in overall delay is minimual when compared to Alternative 3.

Table 11: SIDRA Capacity Analysis – Intersection LOS Summary 2035 Build Conditions Alternative 3B Peanut Roundabout with Cut Through for Southbound Main Street

Lane Group	Eastbound				Westbound				Northbound				Southbound				Overall	
	AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
	Bedford Avenue				Bedford Avenue								7th Street					
U-Turn																	Delay	Delay
Left					4.2	A	4.2	A					6.7	A	7.5	A	2.7	5.8
Right	1.6	A	7.4	A	1.0	A	1.0	A					3.7	A	4.5	A	LOS	LOS
Approach	1.6	A	7.4	A	3.7	A	3.8	A					4.3	A	5.5	A	A	A
	Bedford Avenue								Main Street				Main Street					
U-Turn	8.2	A	11.4	B													Delay	Delay
Left	6.0	A	9.2	A					10.4	B	7.6	A	7.0	A	6.9	A	6.4	6.4
Right	2.8	A	6.1	A					7.3	A	4.6	A	2.7	A	2.6	A	LOS	LOS
Approach	5.2	A	8.2	A					8.4	A	5.5	A	5.2	A	5.6	A	A	A

7.1.2 Queuing Analysis

Queue length, or the distance at which stopped vehicles accumulate at an intersection, is another performance measure of the intersection's operational characteristics. Lengthy queues may be indicative of capacity or operational issues such as a needed turn lane, which helps in the identification of potential solutions. A queuing analysis was completed for the study intersections under both AM and PM peak hour conditions for each of the aforementioned scenarios. For unsignalized intersection conditions, Synchro plus SimTraffic 8 was used to perform a 60-minute simulation for the analyses. The maximum observed queue length, measured in feet, was reported for each lane group based on an average of 10 simulation runs. For roundabout intersection conditions, SIDRA Intersection 6.0 was used to project the 95th percentile queue length, measured in feet, for each lane group.

Detailed 95th percentile queue length data produced for the different scenarios can be found in **Appendix D**. Overall, among the different scenarios, the greatest 95th percentile queue length was determined to be 450 feet during the PM peak hour for Alternative 1 in 2035. However, the majority of queue lengths were less than or equal to 350 feet. **Table 12** provides a brief overview of the largest 95th percentile queue length for any given movement for each scenario.

Table 12: Highest 95th Percentile Queue Length by Scenario

Scenario	Max Queue (ft)	Max Queue (ft)
Time of Day	AM Peak Hour	PM Peak Hour
2014 (Existing)	325	350
2035 (No Build)	350	325
2035 Alternative 1	300	450
2035 Alternative 2	100	150
2035 Alternative 3	125	125
2035 Alternative 3B	150	125

NOTE: Queue lengths are rounded up to the nearest 25 feet.

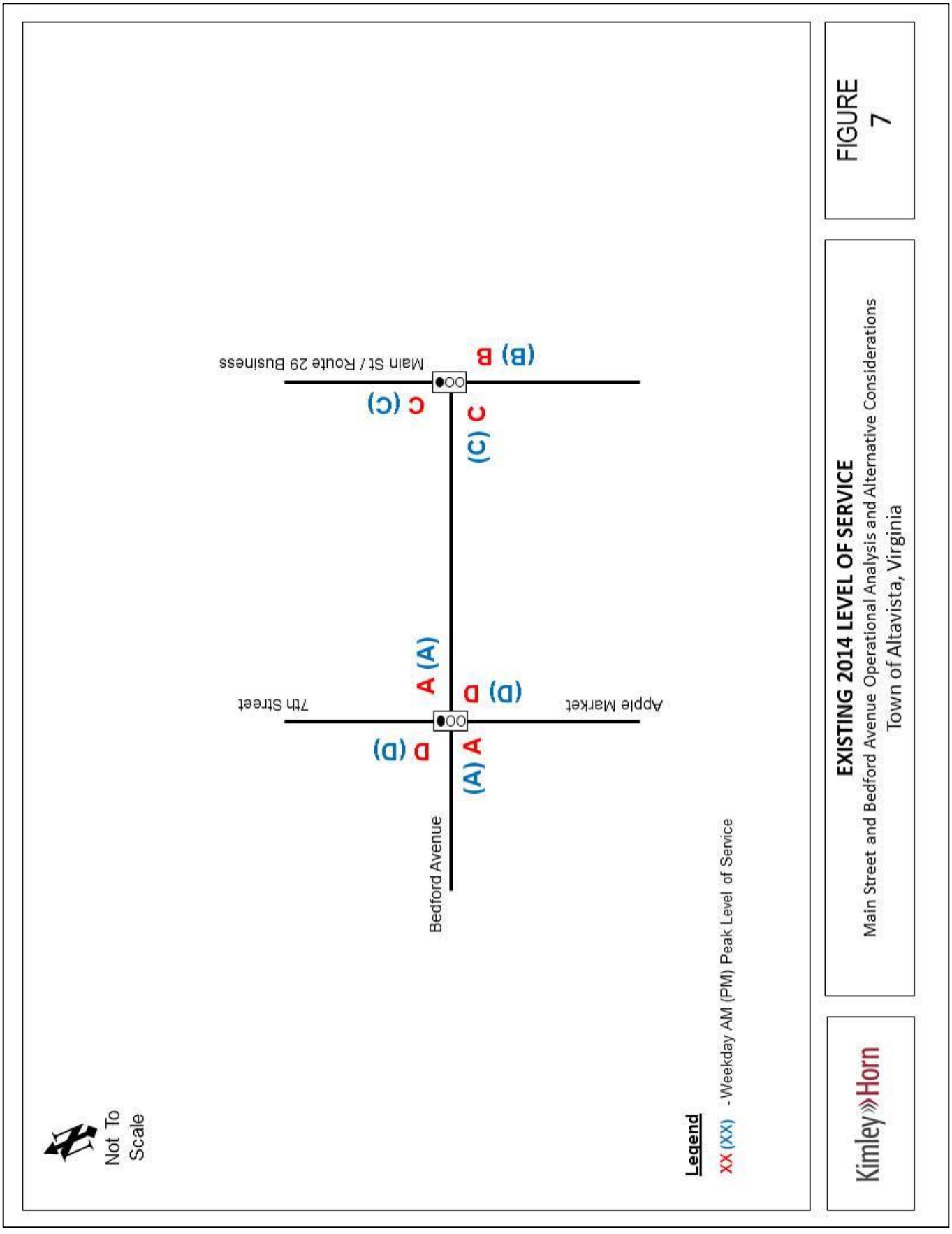
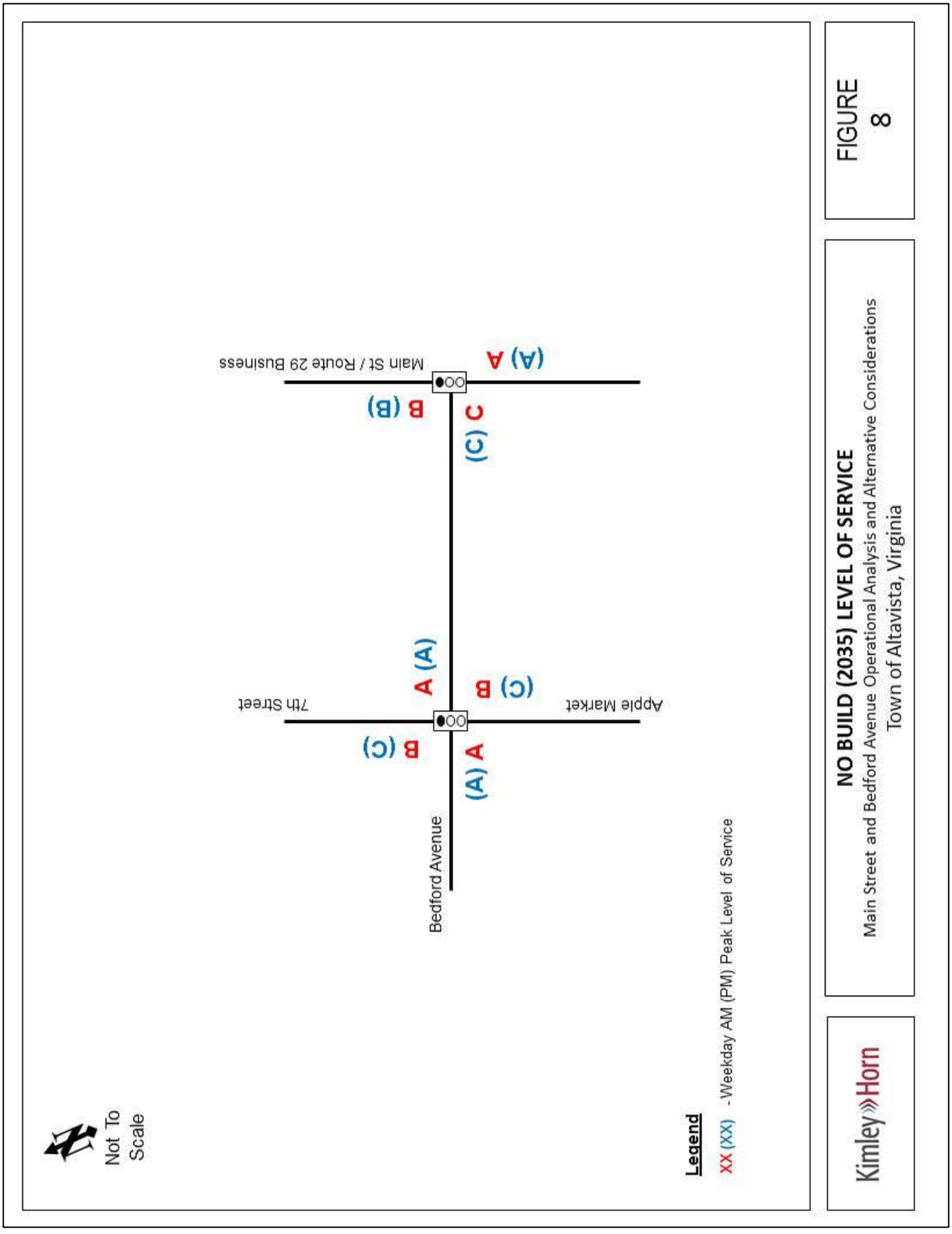


FIGURE 7
EXISTING 2014 LEVEL OF SERVICE
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia
Kimley»Horn
Not To Scale
Legend
XX (XX) - Weekday AM (PM) Peak Level of Service
Bedford Avenue
Main St / Route 29 Business
7th Street
Apple Market
A (A)
D (D)
C (C)
B (B)


Main St / Route 29 Business
(A) A
B (B)
(C) C
7th Street
A (A)
(C) B
Apple Market
B (C)
(A) A
Bedford Avenue
Legend
XX (XX) - Weekday AM (PM) Peak Level of Service
Not To Scale
Kimley»Horn
NO BUILD (2035) LEVEL OF SERVICE
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia
FIGURE
8

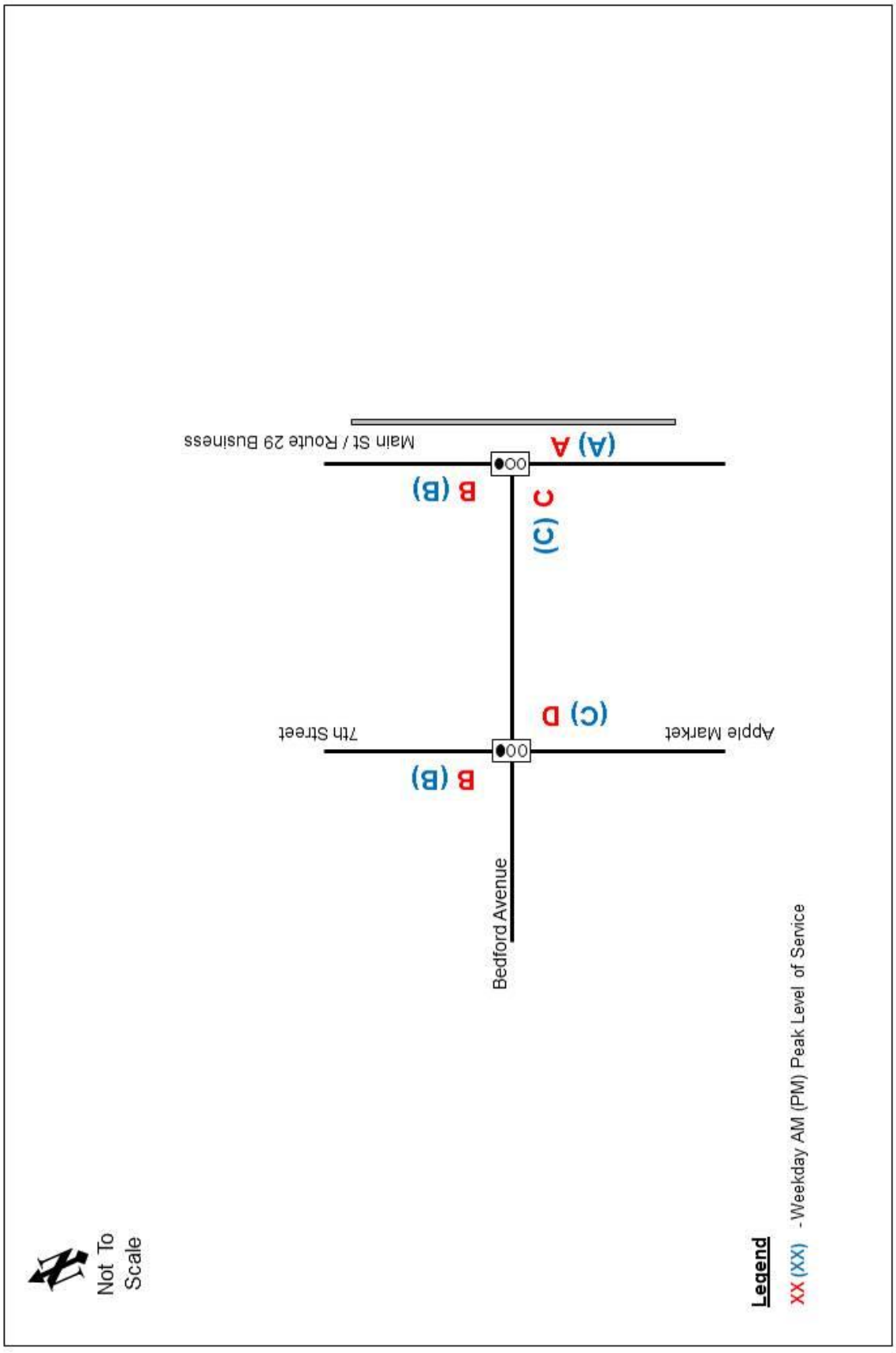
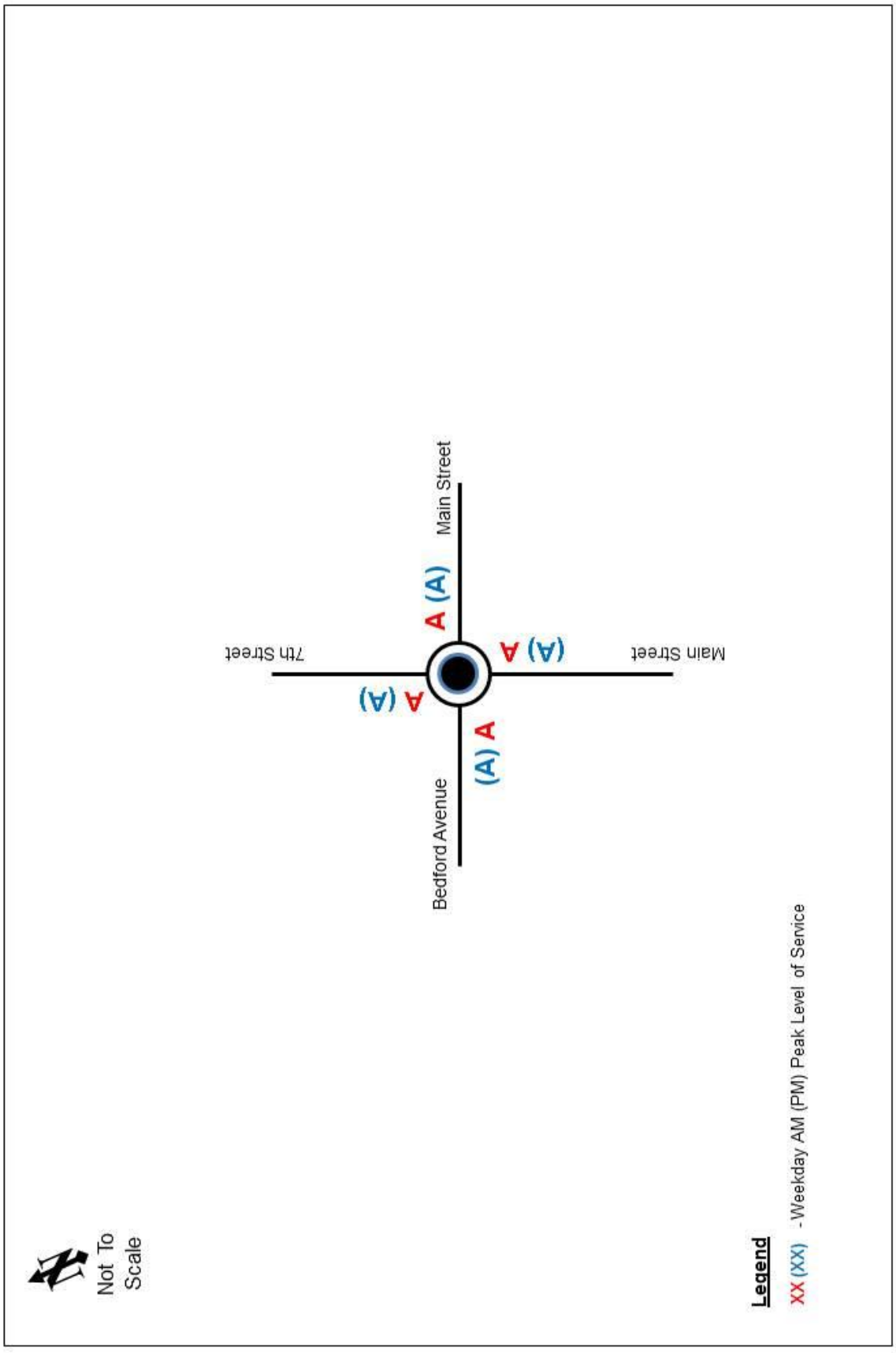


FIGURE 9

ALTERNATIVE 1 (2035) LEVEL OF SERVICE
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia

Kimley»Horn


Main Street
7th Street
Main Street
Bedford Avenue
A (A)
A (A)
A (A)
(A) A
Legend
XX (XX) - Weekday AM (PM) Peak Level of Service
Not To Scale
Kimley»Horn
ALTERNATIVE 2 (2035) LEVEL OF SERVICE
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia
FIGURE 10

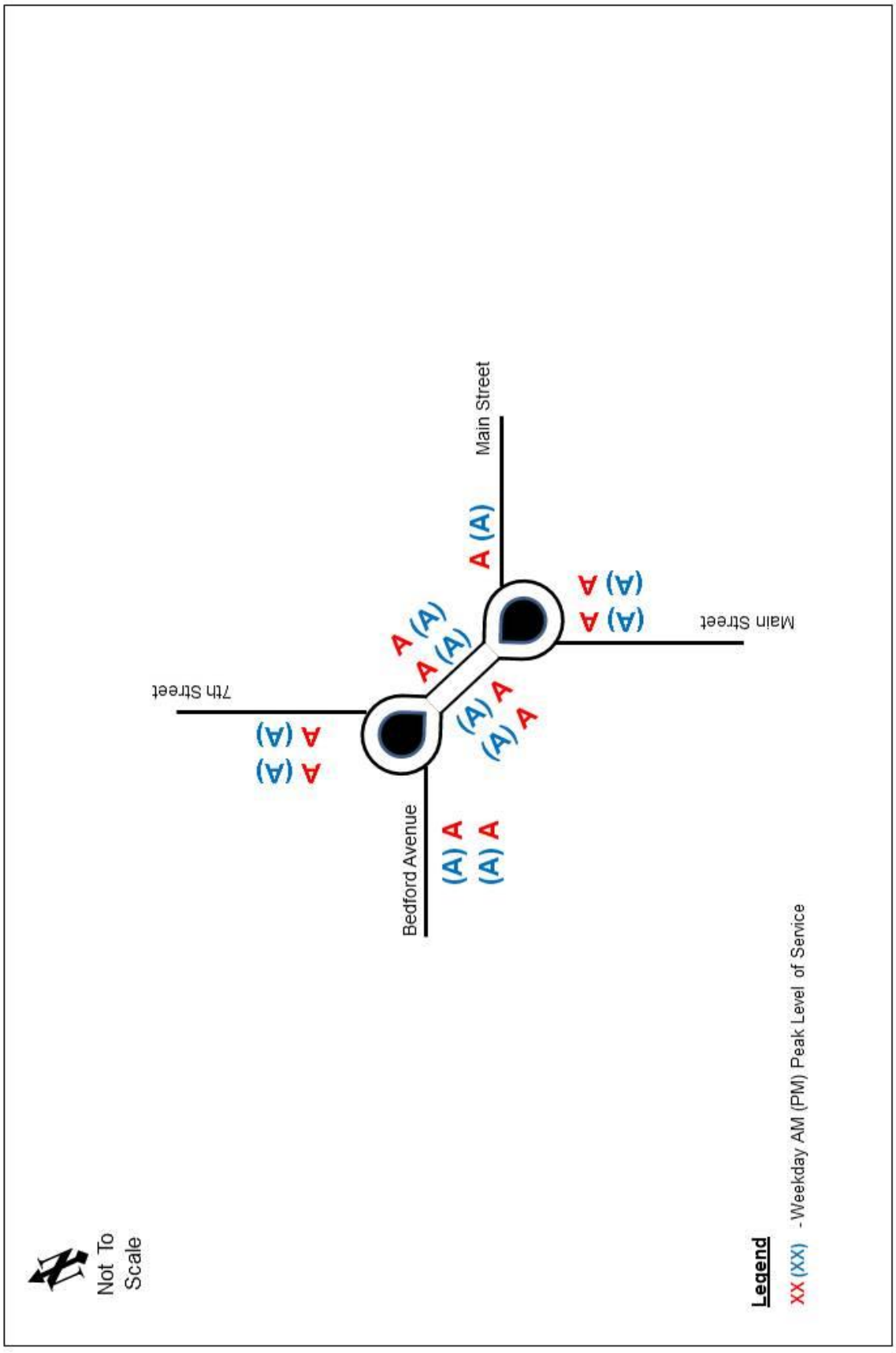


FIGURE 11

ALTERNATIVE 3 (2035) LEVEL OF SERVICE
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia

Kimley»Horn

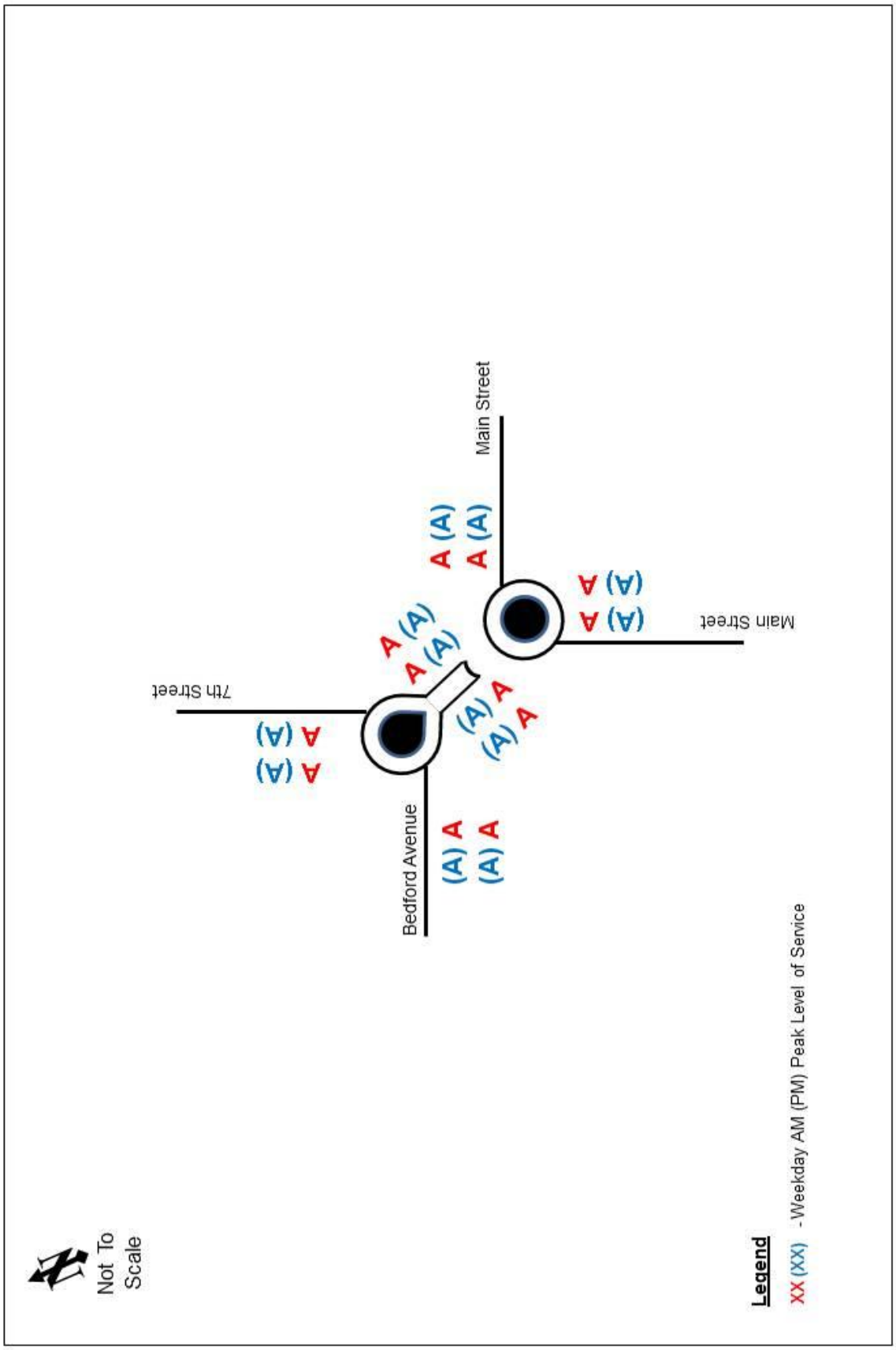


FIGURE 12

ALTERNATIVE 3B (2035) LEVEL OF SERVICE
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations
Town of Altavista, Virginia

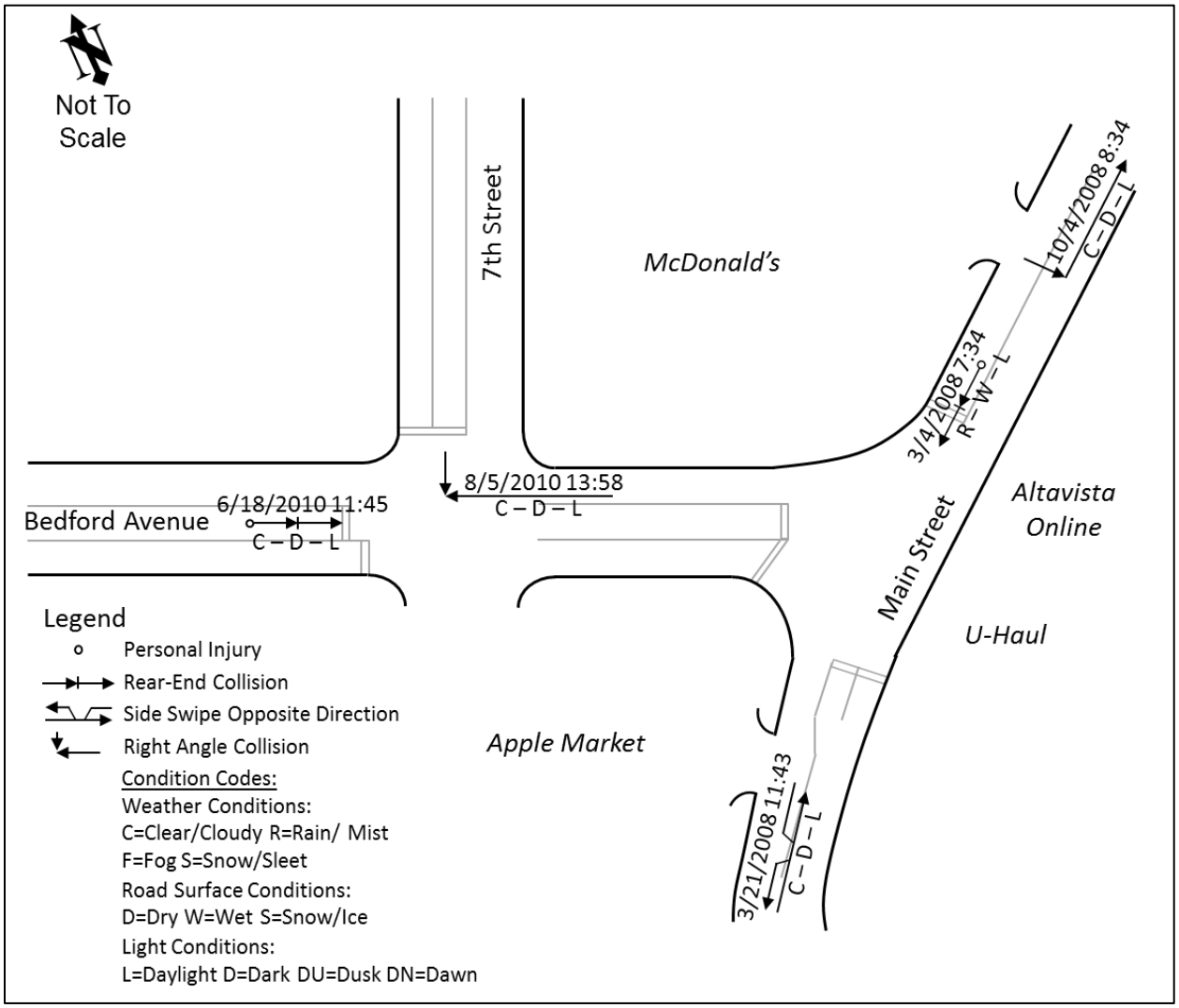
Kimley»Horn

7.2 Crash Analysis

Crash analysis for the intersections of Main Street at Bedford Avenue and Bedford Avenue at 7th Street was conducted using the latest five years of available crash data. Crash reports from January 1, 2008 to December 31, 2012 were obtained from VDOT's Roadway Network System (RNS). Five crashes were reported within a 500-foot radius of the study intersections in the 5-year analysis period; three located near the intersection of Main Street and Bedford Avenue and two located near the intersection of Bedford Avenue and 7th Street.

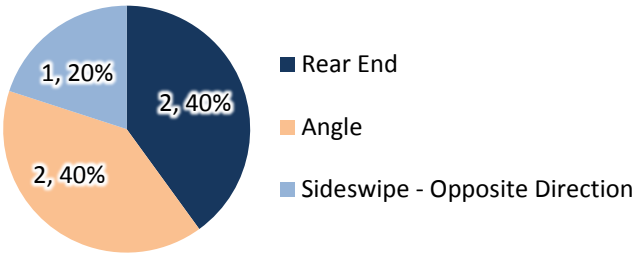
Overall, there was no pattern of crashes at these intersections. **Figure 13** illustrates the five crash locations and corresponding crash characteristics. The following subsections provide additional information associated with the five total crashes that occurred at the study intersections.

Figure 13: Collision Diagram



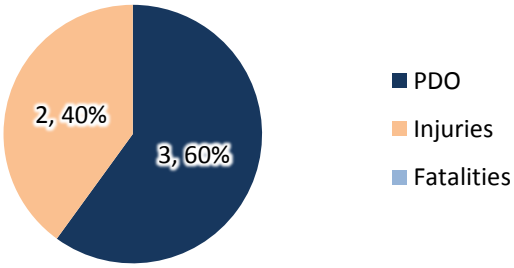
7.2.1 Crash Trends

Crash Type



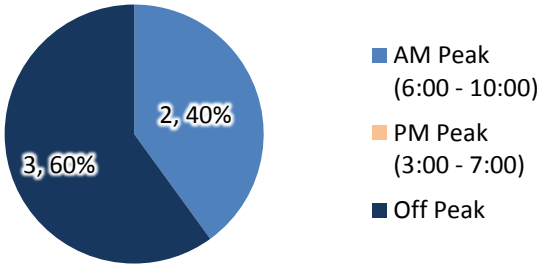
- The predominant crash types were rear end and angle (2 crashes each or40% each)

Crash Severity



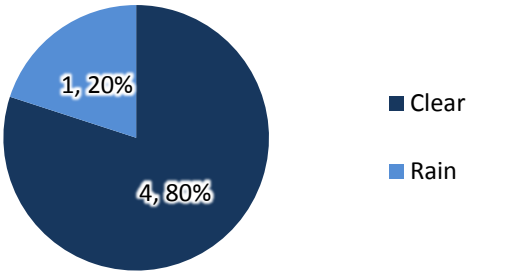
- No fatal crashes occurred
- 2 crashes (40%) resulted in an injury
- 3 crashes (60%) resulted in property damage only

Time of Day



- The majority of crashes (3 total crashes or 60%) occurred during off peak hours
- Two total peak period crashes occurred during the AM peak period

Weather Conditions



- The majority of crashes (4 total crashes or 80%) occurred under clear/cloudy weather conditions
- The remaining crash occurred under rainy weather conditions

Light Conditions

All five crashes occurred during daylight conditions at the study intersections.

8.0 Environmental Analysis

A brief desktop analysis consisting of database searches and mapping review at the study intersections was conducted for the purpose of evaluating certain environmental circumstances that may affect improvements or require further evaluation. Information that was reviewed included the following:

- Wetlands and streams,
- Floodplains,
- Threatened and endangered species,
- Historic resources,
- Publicly-owned and conservation lands,
- Minority/low-income populations, and
- Hazardous materials.

Based on the review of the aforementioned topics, the two potential impacts related to the recommended alternatives pertain to minority/low-income populations and hazardous materials. More specifically, these are concerns related to the improvements identified in Alternative 2 and Alternative 3. Without information regarding the current property and/or business owners of the McDonald's and Apple Market businesses, the impacts related to minority/low-income populations cannot be dismissed. This finding should be verified in the event federal funds are required for construction of the recommended improvements. In addition, an assessment of hazardous materials would be required for these two alternatives given the presence of the Apple Market gas station and expected impacts to right-of-way. A comprehensive summary of the results of the desktop analysis can be found in **Appendix F**.

9.0 Planning Level Cost Estimates

Conceptual level sketches for Alternative 1 (**Figure 4,** also **Appendix B**), Alternative 2 (**Figure 5,** also **Appendix B**), and Alternative 3 (**Figure 6**, also **Appendix B**) were developed based on aerial mapping. Survey was not conducted as part of this operational and planning study. The conceptual sketches were used to determine quantities and develop planning level cost estimates summarized in **Tables 13** through **16**. Unit prices used to develop cost estimates were based on recent bid prices of projects similar in scale in conjunction with the current VDOT posted statewide average unit costs for standard pay items. Given the high level planning nature of this study, the quantities-based approach to develop a cost estimate for unit pay items was generalized into major construction activities, such as pavement improvements, pedestrian accommodations, sidewalk improvements, and pavement markings. Construction incidentals, contingency, preliminary engineering, and right-of-way costs were assessed to be percentages of the roadway construction costs as shown in the cost estimate tables. As previously mentioned, the no-build condition assumed the installation of an enhanced traffic signal controller with pedestrian accommodations provided. In addition, the recommendation to consolidate site driveways at the Apple Market was accounted for and a brief planning level cost estimate was prepared for these minor elements for the no-build condition.

10.0 Benefit-Cost Analysis

A benefit-cost (B/C) analysis was conducted for each of the proposed alternatives to compare the cost effectiveness of each alternative. To quantify the benefit that each of the proposed alternatives, the annual delay savings resulting from the proposed improvements were calculated.

Table 13: Planning Level Cost Estimate – Future No Build Conditions

Item	Unit	Quantity	Unit Cost	Amount
Pavement and Sidewalk Items				
Minor Pavement Improvements	LS	1	$ 17,800	$ 17,800
Driveway Consolidation	EA	1	$ 2,400	$ 2,400
Sidewalk Improvements	LS	1	$ 19,900	$ 19,900
Traffic Signal Improvements				
Pedestrian Signal Accommodations	LS	1	$ 16,800	$ 16,800
Traffic Signal Operational Enhancements	LS	1	$ 19,200	$ 19,200
Miscellaneous Items				
Topsoil & Seeding	SY	60	$ 5	$ 300
Erosion & Sediment Control				
Silt Fence	LF	500	$ 2	$ 1,000
Mobilization	LS	1	$ 10,000	$ 10,000
Maintenance of Traffic (MOT)			8% of Roadway Subtotal	$ 5,000
			Roadway Subtotal =	**$ 92,400**
Contingency			25% of Roadway Subtotal	$ 23,100
			TOTAL COST (Roadway Subtotal + Contingency) =	**$ 115,500**
Construction, Engineering, & Inspection (CEI)			25% of TOTAL COST	$ 30,000
Preliminary Engineering (Survey, Desig, Geotech, Design)			15% of TOTAL COST	$ 15,000
Right-of-Way Acquisition and Utility Relocation			50% of Roadway Subtotal	$ 46,200
			CEI, Preliminary Engineering, and Right-of-Way Subtotal =	**$ 91,200**
			Project Total =	**$ 206,700**
			Project Total (Rounded to the Nearest $10,000) =	**$ 210,000**

*Note: values presented reflect current year (2014) dollars.

Consistent with the *2009 National Household Travel Survey (NHTS),* average vehicle occupancies of 1.13 and 1.74 were assumed for work trips and non-work trips, respectively, assuming 250 work days per year and 60% of peak hour volumes are work trips. Similarly, VDOTs *Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis*, 2011, was used to determine the hourly values for travel time savings for each occupant in a vehicle in Virginia as $22.90/hour and $12.00/hour for work and non-work trips, respectively.

To determine annual peak hour delay savings, the calculated delay reduction per vehicle (based on Synchro and Sidra analyses) in each respective peak hour was multiplied by the peak hour traffic volume in both intersections to produce a compounded delay as shown in

Table 17.

Using the compounded delay savings and identified values for travel time savings, the annual cost benefits for each alternative were determined, shown in

Table 18. The annual cost benefit of reducing delay was divided by the sum of the annual maintenance and operations cost and the planning level cost estimate, based on service life, to determine the benefit-cost ratio for each alternative, summarized in **Table 19**. Detailed maintenance and operations cost tables can be found in **Appendix G**.

While the delay benefits associated with Alternative 2 are the highest, the high initial cost lowers its benefit-cost ratio. The benefit-cost ratio for Alternative 3 is higher due to the lower initial costs it accrues; although the benefits are lower than those for Alternative 2 both alternatives have a benefit-cost ratio of 0.305. Alternative 1 presents relatively low delay benefits and is anticipated to accrue high annual maintenance and operations costs due to the traffic signal, giving it a low benefit-cost ratio.

Table 14: Planning Level Cost Estimate – Alternative 1

Item	Unit	Quantity	Unit Cost	Amount
Grading Items				
Clearing & Grubbing	AC	0.5	$ 10,000	$ 5,000
MSE Wall	LS	1	$ 500,000	$ 500,000
Pavement and Sidewalk Items				
Existing Pavement Improvements	LS	1	$ 80,500	$ 80,500
New Pavement Construction	LS	1	$ 101,800	$ 101,800
Driveway Consolidation/Reconstruction	EA	2	$ 2,400	$ 4,800
Sidewalk Improvements	LS	1	$ 32,000	$ 32,000
Traffic Signal Improvements				
Remove & Dispose Existing Signal	LS	1	$ 4,000	$ 4,000
Traffic Signal Improvements	LS	1	$ 97,300	$ 97,300
Pedestrian Signal Accommodations	LS	1	$ 9,300	$ 9,300
Signing & Marking				
Signs and Sign Posts	LS	1	$ 8,900	$ 8,900
Pavement Markings	LS	1	$ 7,000	$ 7,000
Miscellaneous Items				
Lighting System (up to 10 luminaires)	LS	1	$ 50,000	$ 50,000
Topsoil & Seeding	SY	220	$ 5	$ 1,100
Guardrail (GR-2)	LF	420	$ 35	$ 14,700
Guardrail Terminal (GR-9)	EA	1	$ 3,000	$ 3,000
Erosion & Sediment Control				
Silt Fence	LF	2,000	$ 2	$ 4,000
Mobilization	LS	1	$ 90,000	$ 90,000
Maintenance of Traffic (MOT)			8% of Roadway Subtotal	$ 75,000
			Roadway Subtotal =	**$ 1,088,400**
Contingency			25% of Roadway Subtotal	$ 272,100
			TOTAL COST (Roadway Subtotal + Contingency) =	**$ 1,360,500**
Construction, Engineering, & Inspection (CEI)			25% of TOTAL COST	$ 340,000
Preliminary Engineering (Survey, Desig, Geotech, Design)			15% of TOTAL COST	$ 205,000
Right-of-Way Acquisition and Utility Relocation			50% of Roadway Subtotal	$ 544,200
			CEI, Preliminary Engineering, and Right-of-Way Subtotal =	**$ 1,089,200**
			Project Total =	**$ 2,449,700**
			Project Total (Rounded to the Nearest $10,000) =	**$ 2,450,000**

*Note: values presented reflect current year (2014) dollars.

Table 15: Planning Level Cost Estimate – Alternative 2

Item	Unit	Quantity	Unit Cost	Amount
Grading Items				
Clearing & Grubbing	AC	0.2	$ 10,000	$ 2,000
MSE Wall	LS	1	$ 100,000	$ 100,000
Drainage Items				
Construct BMP	LS	1	$ 75,000	$ 75,000
Modifications to Drainage System	LS	1	$ 85,000	$ 85,000
Pavement and Sidewalk Items				
Existing Pavement Improvements	LS	1	$ 132,000	$ 132,000
New Pavement Construction	LS	1	$ 329,600	$ 329,600
Driveway Consolidation/Reconstruction	EA	4	$ 1,600	$ 6,400
Sidewalk Improvements	LS	1	$ 56,300	$ 56,300
Signing & Marking				
Signs and Sign Posts	LS	1	$ 11,200	$ 11,200
Pavement Markings	LS	1	$ 5,400	$ 5,400
Miscellaneous Items				
Remove & Dispose Existing Signal	LS	1	$ 4,000	$ 4,000
Relocate Fueling Station and Fuel Tanks	LS	1	$ 200,000	$ 200,000
Lighting System (up to 10 luminaires)	LS	1	$ 50,000	$ 50,000
Topsoil & Seeding	SY	3,500	$ 5	$ 17,500
Guardrail (GR-2)	LF	385	$ 35	$ 13,500
Guardrail Terminal (GR-9)	EA	1	$ 3,000	$ 3,000
Erosion & Sediment Control				
Silt Fence	LF	2,500	$ 2	$ 5,000
Mobilization	LS	1	$ 135,000	$ 135,000
Maintenance of Traffic (MOT)			8% of Roadway Subtotal	$ 90,000
			Roadway Subtotal =	**$ 1,320,900**
Contingency			25% of Roadway Subtotal	$ 330,200
			TOTAL COST (Roadway Subtotal + Contingency) =	**$ 1,651,100**
Construction, Engineering, & Inspection (CEI)			25% of TOTAL COST	$ 412,800
Preliminary Engineering (Survey, Desig, Geotech, Design)			15% of TOTAL COST	$ 250,000
Right-of-Way Acquisition and Utility Relocation			50% of Roadway Subtotal	$ 660,500
			CEI, Preliminary Engineering, and Right-of-Way Subtotal =	**$ 1,323,300**
			Project Total =	**$ 2,974,400**
			Project Total (Rounded to the Nearest $10,000) =	**$ 2,980,000**

*Note: values presented reflect current year (2014) dollars.

Table 16: Planning Level Cost Estimate – Alternative 3

Item	Unit	Quantity	Unit Cost	Amount
Grading Items				
Clearing & Grubbing	AC	0.2	$ 10,000	$ 2,000
MSE Wall	LS	1	$ 100,000	$ 100,000
Drainage Items				
Modifications to Drainage System	LS	1	$ 85,000	$ 85,000
Pavement and Sidewalk Items				
Existing Pavement Improvements	LS	1	$ 115,100	$ 115,100
New Pavement Construction	LS	1	$ 355,900	$ 355,900
Driveway Consolidation/Reconstruction	EA	6	$ 2,400	$ 14,400
Sidewalk Improvements	LS	1	$ 53,700	$ 53,700
Signing & Marking				
Signs and Sign Posts	LS	1	$ 9,300	$ 9,300
Pavement Markings	LS	1	$ 4,300	$ 4,300
Miscellaneous Items				
Remove & Dispose Existing Signal	LS	1	$ 4,000	$ 4,000
Lighting System (up to 10 luminaires)	LS	1	$ 50,000	$ 50,000
Topsoil & Seeding	SY	2,080	$ 5	$ 10,400
Guardrail (GR-2)	LF	190	$ 35	$ 6,700
Guardrail Terminal (GR-9)	EA	1	$ 3,000	$ 3,000
Erosion & Sediment Control				
Silt Fence	LF	2,500	$ 2	$ 5,000
Mobilization	LS	1	$ 120,000	$ 120,000
Maintenance of Traffic (MOT)			8% of Roadway Subtotal	$ 65,000
			Roadway Subtotal =	**$ 1,003,800**
Contingency			25% of Roadway Subtotal	$ 251,000
			TOTAL COST (Roadway Subtotal + Contingency) =	**$ 1,254,800**
Construction, Engineering, & Inspection (CEI)			25% of TOTAL COST	$ 313,700
Preliminary Engineering (Survey, Desig, Geotech, Design)			15% of TOTAL COST	$ 190,000
Right-of-Way Acquisition and Utility Relocation			50% of Roadway Subtotal	$ 501,900
			CEI, Preliminary Engineering, and Right-of-Way Subtotal =	**$ 1,005,600**
			Project Total =	**$ 2,260,400**
			Project Total (Rounded to the Nearest $10,000) =	**$ 2,270,000**

*Note: values presented reflect current year (2014) dollars.

Table 17: Vehicle Delay per Alternative

Scenario	Number of Vehicles		Compounded Delay (sec/veh)		Compounded Delay (sec)		Compounded Delay Savings (sec)		
	AM	PM	AM	PM	AM	PM	AM	PM	Total
No-Build	1,728	1,785	11.5	12.8	19,922	22,844	--	--	--
Alternative 1	1,721	1,744	7.4	8.3	12,693	14,535	**7,229**	**8,309**	**15,538**
Alternative 2	1,233	1,321	4.7	7.0	5,795	9,247	**14,127**	**13,597**	**27,724**
Alternative 3	1,789	1,813	5.5	6.5	9,840	11,744	**10,082**	**11,101**	**21,182**

* Delay measurement includes vehicles in free movements with 0.0 seconds delay

Table 18: Vehicle Delay Cost Saving per Alternative

Scenario	Non-Work Trip Delay Cost ($)		Work Trip Delay Cost ($)		Total Delay Cost ($)		Total Delay Savings ($)		
	AM	PM	AM	PM	AM	PM	AM	PM	Total
No-Build	$11,324	$12,985	$21,766	$24,959	$33,090	$37,944	--	--	--
Alternative 1	$7,215	$8,262	$13,868	$15,881	$21,083	$24,143	**$12,007**	**$13,801**	**$25,808**
Alternative 2	$3,294	$5,256	$6,332	$10,103	$9,626	$15,359	**$23,464**	**$22,585**	**$46,049**
Alternative 3	$5,593	$6,675	$10,751	$12,831	$16,344	$19,506	**$16,745**	**$18,438**	**$35,184**

Table 19: Benefit/Cost Summary

Scenario	Peak Hour	Delay Reduction (sec)	Annual Cost Benefits	Life Cycle Cost Benefits	Annual M&O Cost	Life Cycle M&O Cost	Planning Level Cost Estimate	B/C
No-Build	AM	--	--	--	$2,548	$139,125	$230,000	--
	PM	--						
Alternative 1	AM	4.2	$25,808	$516,158	$3,184	$109,755	$2,590,000	**0.201**
	PM	4.5						
Alternative 2	AM	6.8	$46,049	$920,986	$598	$31,620	$3,140,000	**0.305**
	PM	5.8						
Alternative 3	AM	6.0	$35,184	$703,674	$482	$33,000	$2,390,000	**0.305**
	PM	6.3						

11.0 Conclusions and Recommendations

The goal of this study was to develop and provide a recommendation for a future year configuration for the two study intersections that enhances intersection operations and safety during typical weekday, peak hour operations. A secondary focus of this study was to evaluate alternatives that address the goal for local leaders to consolidate the two intersections and improve the intersection aesthetics as an entry gateway into the Town of Altavista. To accomplish these goals, an evaluation matrix was developed to compare the No-Build and Build Alternatives based on a range of criteria, which included:

- Intersection Level of Service (Delay),
- Safety Impacts,
- Right-of-Way Impacts,
- Environmental Impacts,
- Maintenance Costs, and
- Construction Costs.

Considering the evaluation criteria, each alternative (including No-Build) was evaluated on a scale of low, medium, or high, where low reflects preferable ranking (i.e., higher score) and high reflects a less preferable ranking (i.e., lower score). Ultimately, the alternative with the highest resultant score value out of 18 was deemed the recommended alternative to consider for future development. The roundabout alternatives (Alternative 2 and Alternative 3) were both scored as low with regard to intersection level of service and safety impacts. Based on the design and operational characteristics of a roundabout, they typically operate well in terms of reducing approach and overall delay (given the appropriate distribution of traffic volumes) and also reduce the number and severity of crashes due to the low-speed operations.

Right-of-way impacts were evaluated based on the conceptual level sketches developed for each alternative (see **Appendix B**) with respect to GIS data provided by VDOT. Alternative 1 and Alternative 2 are projected to have the highest impacts related to the potential encroachment on Norfolk Southern Railroad property and the Apple Market fuel station relocation, respectively. Although encroachment upon Norfolk Southern right-of-way could potentially be minimized, any impacts to rail operations and the owner's right-of-way typically results in significant permitting costs, potential delays, and can be prohibitive to implementing the design. As such, the railroad impacts were considered as a high impact. Alternative 3 is expected to impact the Apple Market, although such impacts are expected to be limited to curb adjustments and driveway relocations.

The environmental impacts are generally low in terms of wetlands, threatened and endangered species, or historic resources. Additional details regarding the desktop environmental review are included in **Appendix F**. The greatest anticipated environmental impacts pertain to Alternative 2 and Alternative 3. Impacts to specific populations (whether residential or business) can necessitate additional countermeasures during planning and design. Given the potential business impacts associated with these alternatives, the degree of impact was considered to be medium. However, the potential hazardous materials associated with the fuel station relocation in Alternative 2 resulted in the rating of this alternative as a high impact.

Considering the final criteria (maintenance and construction costs), the two are somewhat complementary to each other. The signalized alternatives (i.e. No-Build and Alternative 1) are projected to have life cycle costs greater than $100,000 through 2035 given the annual equipment maintenance and staff time. Thus, the signalized conditions were assessed as a high impact, while the roundabouts a low impact. Conversely, the roundabout alternatives were both rated as high construction costs given the degree of roadway geometry reconfiguration, while the No-Build signalized alternative was rated as low. Due to the high anticipated cost associated with the retaining wall construction in Alternative 1, the subsequent planning level estimate is expected to exceed $2 million, which was considered as the threshold for a high rating.

From the evaluation matrix, Alternative 3 achieved the highest score of 14 out of 18, with the No-Build and Alternative 2 conditions a point behind each at 13 and 12, respectively. Alternative 1 achieved the lowest score of 10. Considering the results of the analysis and other relevant evaluation criteria, the No-Build and roundabout alternatives would be expected to satisfy the objective of this study to the same degree. Given the narrow margin between the three, it is recommended that Alternative 3 be considered should a funding source be identified for further planning, design, and construction. Otherwise, in the absence of available project funding, the No-Build condition should adequately meet the traffic demands of the subject intersection. **Table 20** provides the complete evaluation matrix used in the assessment of the No-Build and Alternative Build conditions.

Table 20: Evaluation Matrix

	Metric / Alternative	Intersection Level of Service (Delay)	Safety Impacts	Right-of-Way Impacts	Environmental Impacts	Maintenance Costs	Construction Costs	Score (out of 18)	Rank (Best to Worst)
No-Build	No Build Conditions (provide enhanced equipment and ped accommodations only)	High	Medium	Low	Low	High	Low	13	2
		No LOS improvements	Two signalized intersections	Improvements mostly within existing ROW	Minimal drainage impacts	>$100,000 Life Cycle Cost	$230k		
Alternative 1	Northbound Slip Lane w/Restricted Access at 7th Street	Medium	Medium	High	Low	High	High	10	4
		LOS B for Bedford and 7th Street	One signalized intersection	Potential impacts to Railroad ROW	Minimal drainage impacts	>$100,000 Life Cycle Cost	$2.6 Million		
Alternative 2	Traditional Roundabout	Low	Low	High	High	Low	High	12	3
		LOS A for all approaches	Low-speed roundabout	Impacts to Apple Market gas tanks	Impact to Apple Market gas tanks	<$50,000 Life Cycle Cost	$3.1 Million		
Alternative 3	Double ("Peanut") Roundabout	Low	Low	Medium	Medium	Low	High	14	1
		LOS A for all approaches	Low-speed roundabout	Property impacts to Apple Market	Additional roadway footprint	<$50,000 Life Cycle Cost	$2.4 Million		

Low --> Medium --> High

More Preferred -------> Less Preferred

Appendix A: Traffic Data

48-Hour Tube Counts

Site ID:	ADT A	Job:	14-089 RS Min
Site Reference:	ADT A	GPS:	37.10894, -79.29314
Location:	Bedford Ave., west of 7th St.		
Start Date:	5/6/2014	Start Time:	12:00:00 AM
End Date:	5/8/2014	End Time:	12:15:00 AM

Date	Time	Lane	1	2	3
5/6/2014	0:15	1	3	0	0
5/6/2014	0:15	2	8	0	0
5/6/2014	0:30	1	2	0	0
5/6/2014	0:30	2	1	0	0
5/6/2014	0:45	1	0	0	0
5/6/2014	0:45	2	1	0	0
5/6/2014	1:00	1	1	0	0
5/6/2014	1:00	2	1	0	0
5/6/2014	1:15	1	2	0	0
5/6/2014	1:15	2	2	0	0
5/6/2014	1:30	1	0	0	0
5/6/2014	1:30	2	0	0	0
5/6/2014	1:45	1	0	0	0
5/6/2014	1:45	2	1	0	0
5/6/2014	2:00	1	3	0	0
5/6/2014	2:00	2	0	0	0
5/6/2014	2:15	1	0	0	0
5/6/2014	2:15	2	1	0	0
5/6/2014	2:30	1	2	0	0
5/6/2014	2:30	2	0	0	0
5/6/2014	2:45	1	0	0	0
5/6/2014	2:45	2	0	0	0
5/6/2014	3:00	1	2	0	0
5/6/2014	3:00	2	0	0	0
5/6/2014	3:15	1	0	0	0
5/6/2014	3:15	2	2	0	0
5/6/2014	3:30	1	0	0	0
5/6/2014	3:30	2	0	0	0
5/6/2014	3:45	1	0	0	0
5/6/2014	3:45	2	1	0	0

Date	Time	Lane	1	2	3
5/6/2014	4:00	1	2	0	0
5/6/2014	4:00	2	0	0	0
5/6/2014	4:15	1	1	0	0
5/6/2014	4:15	2	0	0	0
5/6/2014	4:30	1	3	0	0
5/6/2014	4:30	2	1	0	0
5/6/2014	4:45	1	3	0	0
5/6/2014	4:45	2	2	0	0
5/6/2014	5:00	1	1	0	0
5/6/2014	5:00	2	1	0	0
5/6/2014	5:15	1	8	0	0
5/6/2014	5:15	2	6	0	0
5/6/2014	5:30	1	3	0	1
5/6/2014	5:30	2	4	0	0
5/6/2014	5:45	1	10	0	1
5/6/2014	5:45	2	4	0	0
5/6/2014	6:00	1	12	0	0
5/6/2014	6:00	2	10	0	0
5/6/2014	6:15	1	13	1	0
5/6/2014	6:15	2	9	0	0
5/6/2014	6:30	1	15	2	1
5/6/2014	6:30	2	14	0	0
5/6/2014	6:45	1	19	1	0
5/6/2014	6:45	2	7	1	0
5/6/2014	7:00	1	24	0	0
5/6/2014	7:00	2	19	0	0
5/6/2014	7:15	1	22	1	0
5/6/2014	7:15	2	17	1	0
5/6/2014	7:30	1	44	6	0
5/6/2014	7:30	2	50	5	0

Date	Time	Lane	1	2	3
5/6/2014	7:45	1	88	14	0
5/6/2014	7:45	2	52	2	0
5/6/2014	8:00	1	92	1	0
5/6/2014	8:00	2	90	2	0
5/6/2014	8:15	1	62	1	0
5/6/2014	8:15	2	41	1	0
5/6/2014	8:30	1	32	1	0
5/6/2014	8:30	2	18	0	0
5/6/2014	8:45	1	40	2	0
5/6/2014	8:45	2	26	0	0
5/6/2014	9:00	1	41	0	0
5/6/2014	9:00	2	36	1	0
5/6/2014	9:15	1	48	3	0
5/6/2014	9:15	2	27	0	0
5/6/2014	9:30	1	37	0	0
5/6/2014	9:30	2	29	0	0
5/6/2014	9:45	1	32	0	0
5/6/2014	9:45	2	36	0	0
5/6/2014	10:00	1	39	0	0
5/6/2014	10:00	2	32	2	0
5/6/2014	10:15	1	23	4	1
5/6/2014	10:15	2	26	0	0
5/6/2014	10:30	1	43	4	1
5/6/2014	10:30	2	21	1	0
5/6/2014	10:45	1	31	1	0
5/6/2014	10:45	2	42	0	0
5/6/2014	11:00	1	33	1	0
5/6/2014	11:00	2	39	1	0
5/6/2014	11:15	1	25	4	0
5/6/2014	11:15	2	36	1	0
5/6/2014	11:30	1	41	1	1
5/6/2014	11:30	2	32	2	1
5/6/2014	11:45	1	46	0	0
5/6/2014	11:45	2	40	0	0
5/6/2014	12:00	1	29	3	0
5/6/2014	12:00	2	32	1	1
5/6/2014	12:15	1	42	3	0
5/6/2014	12:15	2	35	3	0
5/6/2014	12:30	1	33	2	0
5/6/2014	12:30	2	33	2	0
5/6/2014	12:45	1	32	1	0
5/6/2014	12:45	2	47	2	0
5/6/2014	13:00	1	38	4	0
5/6/2014	13:00	2	35	1	0
5/6/2014	13:15	1	44	2	0
5/6/2014	13:15	2	33	2	0
5/6/2014	13:30	1	41	2	1
5/6/2014	13:30	2	43	1	0
5/6/2014	13:45	1	32	0	0
5/6/2014	13:45	2	42	2	0
5/6/2014	14:00	1	33	0	1
5/6/2014	14:00	2	44	1	0
5/6/2014	14:15	1	51	1	0
5/6/2014	14:15	2	36	3	0
5/6/2014	14:30	1	37	0	0
5/6/2014	14:30	2	41	1	1
5/6/2014	14:45	1	29	1	0
5/6/2014	14:45	2	52	1	1
5/6/2014	15:00	1	131	18	0
5/6/2014	15:00	2	59	2	2
5/6/2014	15:15	1	57	1	0
5/6/2014	15:15	2	49	2	0
5/6/2014	15:30	1	39	2	0
5/6/2014	15:30	2	61	4	0
5/6/2014	15:45	1	62	0	1
5/6/2014	15:45	2	57	3	0
5/6/2014	16:00	1	38	0	0
5/6/2014	16:00	2	48	0	0
5/6/2014	16:15	1	53	1	0
5/6/2014	16:15	2	58	3	0
5/6/2014	16:30	1	60	0	0
5/6/2014	16:30	2	75	1	1
5/6/2014	16:45	1	65	2	1
5/6/2014	16:45	2	55	0	0
5/6/2014	17:00	1	56	0	0
5/6/2014	17:00	2	59	0	0
5/6/2014	17:15	1	66	2	0
5/6/2014	17:15	2	80	2	0

Date	Time	Lane	1	2	3
5/6/2014	17:30	1	69	0	0
5/6/2014	17:30	2	55	0	0
5/6/2014	17:45	1	52	0	0
5/6/2014	17:45	2	65	0	1
5/6/2014	18:00	1	59	0	0
5/6/2014	18:00	2	50	1	0
5/6/2014	18:15	1	43	0	0
5/6/2014	18:15	2	49	1	0
5/6/2014	18:30	1	36	0	0
5/6/2014	18:30	2	28	0	0
5/6/2014	18:45	1	60	0	0
5/6/2014	18:45	2	41	0	0
5/6/2014	19:00	1	38	0	1
5/6/2014	19:00	2	40	0	0
5/6/2014	19:15	1	53	1	0
5/6/2014	19:15	2	70	1	0
5/6/2014	19:30	1	23	1	0
5/6/2014	19:30	2	57	0	1
5/6/2014	19:45	1	39	0	1
5/6/2014	19:45	2	37	0	0
5/6/2014	20:00	1	27	0	0
5/6/2014	20:00	2	50	1	1
5/6/2014	20:15	1	38	0	0
5/6/2014	20:15	2	37	0	0
5/6/2014	20:30	1	26	0	0
5/6/2014	20:30	2	32	0	0
5/6/2014	20:45	1	21	0	0
5/6/2014	20:45	2	39	0	0
5/6/2014	21:00	1	35	0	0
5/6/2014	21:00	2	40	0	0
5/6/2014	21:15	1	31	0	0
5/6/2014	21:15	2	29	0	0
5/6/2014	21:30	1	13	0	0
5/6/2014	21:30	2	29	0	0
5/6/2014	21:45	1	11	1	0
5/6/2014	21:45	2	21	0	0
5/6/2014	22:00	1	8	0	0
5/6/2014	22:00	2	9	0	0
5/6/2014	22:15	1	6	0	0
5/6/2014	22:15	2	5	0	0
5/6/2014	22:30	1	7	0	0
5/6/2014	22:30	2	2	0	0
5/6/2014	22:45	1	8	0	0
5/6/2014	22:45	2	8	0	0
5/6/2014	23:00	1	5	0	0
5/6/2014	23:00	2	6	0	0
5/6/2014	23:15	1	6	0	0
5/6/2014	23:15	2	8	0	0
5/6/2014	23:30	1	4	0	0
5/6/2014	23:30	2	7	0	0
5/6/2014	23:45	1	8	0	0
5/6/2014	23:45	2	6	0	0
5/7/2014	0:00	1	7	0	0
5/7/2014	0:00	2	6	0	0
5/7/2014	0:15	1	3	0	0
5/7/2014	0:15	2	10	0	0
5/7/2014	0:30	1	2	0	0
5/7/2014	0:30	2	3	0	0
5/7/2014	0:45	1	3	0	0
5/7/2014	0:45	2	3	0	0
5/7/2014	1:00	1	2	0	0
5/7/2014	1:00	2	2	0	0
5/7/2014	1:15	1	3	0	0
5/7/2014	1:15	2	0	0	0
5/7/2014	1:30	1	0	0	0
5/7/2014	1:30	2	2	0	0
5/7/2014	1:45	1	0	0	0
5/7/2014	1:45	2	1	0	0
5/7/2014	2:00	1	0	0	0
5/7/2014	2:00	2	2	0	0
5/7/2014	2:15	1	0	1	0
5/7/2014	2:15	2	2	0	0
5/7/2014	2:30	1	1	0	0
5/7/2014	2:30	2	1	0	0
5/7/2014	2:45	1	3	0	0
5/7/2014	2:45	2	1	0	0
5/7/2014	3:00	1	3	0	0
5/7/2014	3:00	2	1	0	0

Date	Time	Lane	1	2	3
5/7/2014	3:15	1	0	0	0
5/7/2014	3:15	2	0	0	0
5/7/2014	3:30	1	0	0	0
5/7/2014	3:30	2	0	0	0
5/7/2014	3:45	1	0	0	0
5/7/2014	3:45	2	0	0	0
5/7/2014	4:00	1	1	0	0
5/7/2014	4:00	2	0	0	0
5/7/2014	4:15	1	1	0	0
5/7/2014	4:15	2	1	0	0
5/7/2014	4:30	1	3	0	0
5/7/2014	4:30	2	0	0	0
5/7/2014	4:45	1	4	0	0
5/7/2014	4:45	2	2	0	0
5/7/2014	5:00	1	3	0	0
5/7/2014	5:00	2	1	0	0
5/7/2014	5:15	1	5	0	0
5/7/2014	5:15	2	2	0	0
5/7/2014	5:30	1	4	1	0
5/7/2014	5:30	2	3	0	0
5/7/2014	5:45	1	14	1	0
5/7/2014	5:45	2	2	0	0
5/7/2014	6:00	1	11	1	0
5/7/2014	6:00	2	11	0	0
5/7/2014	6:15	1	8	2	0
5/7/2014	6:15	2	7	0	0
5/7/2014	6:30	1	16	1	0
5/7/2014	6:30	2	10	0	0
5/7/2014	6:45	1	22	1	0
5/7/2014	6:45	2	7	0	0
5/7/2014	7:00	1	26	1	2
5/7/2014	7:00	2	4	0	0
5/7/2014	7:15	1	17	0	0
5/7/2014	7:15	2	22	0	0
5/7/2014	7:30	1	38	6	0
5/7/2014	7:30	2	35	6	0
5/7/2014	7:45	1	71	14	0
5/7/2014	7:45	2	58	1	0
5/7/2014	8:00	1	103	1	0
5/7/2014	8:00	2	95	0	0
5/7/2014	8:15	1	53	2	0
5/7/2014	8:15	2	35	4	0
5/7/2014	8:30	1	37	1	1
5/7/2014	8:30	2	38	3	0
5/7/2014	8:45	1	50	2	0
5/7/2014	8:45	2	21	2	0
5/7/2014	9:00	1	30	0	0
5/7/2014	9:00	2	32	3	0
5/7/2014	9:15	1	40	1	1
5/7/2014	9:15	2	22	0	0
5/7/2014	9:30	1	35	0	0
5/7/2014	9:30	2	25	1	1
5/7/2014	9:45	1	39	1	1
5/7/2014	9:45	2	31	0	0
5/7/2014	10:00	1	38	3	1
5/7/2014	10:00	2	42	1	0
5/7/2014	10:15	1	40	1	0
5/7/2014	10:15	2	36	1	1
5/7/2014	10:30	1	21	1	0
5/7/2014	10:30	2	36	1	0
5/7/2014	10:45	1	28	0	0
5/7/2014	10:45	2	34	0	0
5/7/2014	11:00	1	43	5	0
5/7/2014	11:00	2	34	1	1
5/7/2014	11:15	1	37	2	1
5/7/2014	11:15	2	32	2	0
5/7/2014	11:30	1	37	1	2
5/7/2014	11:30	2	29	0	0
5/7/2014	11:45	1	31	0	1
5/7/2014	11:45	2	30	1	0
5/7/2014	12:00	1	34	2	0
5/7/2014	12:00	2	42	0	0
5/7/2014	12:15	1	45	1	0
5/7/2014	12:15	2	48	1	1
5/7/2014	12:30	1	29	1	0
5/7/2014	12:30	2	41	1	0
5/7/2014	12:45	1	36	2	0
5/7/2014	12:45	2	32	1	0

Date	Time	Lane	1	2	3
5/7/2014	13:00	1	38	0	1
5/7/2014	13:00	2	34	1	0
5/7/2014	13:15	1	37	2	0
5/7/2014	13:15	2	34	2	1
5/7/2014	13:30	1	43	2	1
5/7/2014	13:30	2	35	3	2
5/7/2014	13:45	1	36	0	4
5/7/2014	13:45	2	30	2	0
5/7/2014	14:00	1	41	1	0
5/7/2014	14:00	2	32	1	2
5/7/2014	14:15	1	34	1	0
5/7/2014	14:15	2	34	1	1
5/7/2014	14:30	1	35	0	0
5/7/2014	14:30	2	45	2	0
5/7/2014	14:45	1	40	0	1
5/7/2014	14:45	2	57	1	0
5/7/2014	15:00	1	85	17	2
5/7/2014	15:00	2	60	0	0
5/7/2014	15:15	1	74	2	0
5/7/2014	15:15	2	57	3	1
5/7/2014	15:30	1	50	1	1
5/7/2014	15:30	2	60	3	1
5/7/2014	15:45	1	60	0	0
5/7/2014	15:45	2	72	0	2
5/7/2014	16:00	1	45	2	0
5/7/2014	16:00	2	55	1	1
5/7/2014	16:15	1	83	1	0
5/7/2014	16:15	2	67	3	0
5/7/2014	16:30	1	57	2	1
5/7/2014	16:30	2	79	1	0
5/7/2014	16:45	1	68	1	0
5/7/2014	16:45	2	80	3	0
5/7/2014	17:00	1	64	1	1
5/7/2014	17:00	2	82	1	0
5/7/2014	17:15	1	55	1	0
5/7/2014	17:15	2	71	0	0
5/7/2014	17:30	1	45	0	0
5/7/2014	17:30	2	79	0	1
5/7/2014	17:45	1	56	0	0
5/7/2014	17:45	2	63	1	0
5/7/2014	18:00	1	57	1	0
5/7/2014	18:00	2	61	0	0
5/7/2014	18:15	1	45	0	0
5/7/2014	18:15	2	45	0	0
5/7/2014	18:30	1	57	1	0
5/7/2014	18:30	2	41	0	0
5/7/2014	18:45	1	69	0	0
5/7/2014	18:45	2	44	0	0
5/7/2014	19:00	1	81	1	0
5/7/2014	19:00	2	52	0	0
5/7/2014	19:15	1	49	1	0
5/7/2014	19:15	2	45	1	0
5/7/2014	19:30	1	34	0	0
5/7/2014	19:30	2	47	0	0
5/7/2014	19:45	1	33	0	0
5/7/2014	19:45	2	47	0	2
5/7/2014	20:00	1	58	0	0
5/7/2014	20:00	2	41	0	0
5/7/2014	20:15	1	38	1	0
5/7/2014	20:15	2	34	1	0
5/7/2014	20:30	1	48	1	0
5/7/2014	20:30	2	34	2	0
5/7/2014	20:45	1	28	0	0
5/7/2014	20:45	2	50	0	0
5/7/2014	21:00	1	23	0	0
5/7/2014	21:00	2	33	0	0
5/7/2014	21:15	1	28	0	0
5/7/2014	21:15	2	16	0	0
5/7/2014	21:30	1	15	0	0
5/7/2014	21:30	2	18	0	0
5/7/2014	21:45	1	11	0	0
5/7/2014	21:45	2	13	0	0
5/7/2014	22:00	1	15	0	0
5/7/2014	22:00	2	12	0	0
5/7/2014	22:15	1	12	0	0
5/7/2014	22:15	2	10	0	0
5/7/2014	22:30	1	10	0	0
5/7/2014	22:30	2	6	0	0

Date	Time	Lane	1	2	3
5/7/2014	22:45	1	5	0	0
5/7/2014	22:45	2	6	0	0
5/7/2014	23:00	1	10	0	0
5/7/2014	23:00	2	7	0	0
5/7/2014	23:15	1	5	0	0
5/7/2014	23:15	2	12	0	0
5/7/2014	23:30	1	3	0	0
5/7/2014	23:30	2	6	0	0
5/7/2014	23:45	1	10	0	0
5/7/2014	23:45	2	8	0	0
5/8/2014	0:00	1	9	0	0
5/8/2014	0:00	2	5	0	0

Site ID:	000000003564	Job:	14-089 Rs Min
Site Reference:	Site B-NB	GPS:	37.10756, -79.29252
Location:	Main St., w/o Bedford Ave.		
Start Date:	5/6/2014	Start Time:	12:00:00 AM
End Date:	5/8/2014	End Time:	12:00:00 AM

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Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/6/2014	0:15	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	0:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	0:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:30	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:45	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:00	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:15	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:45	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:15	0	0	11	3	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:30	0	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:45	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:00	0	0	10	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:15	0	0	14	5	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:30	0	0	13	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:45	0	0	14	8	1	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	7:00	0	0	25	10	0	1	0	0	0	1	0	0	0	0	0	0
5/6/2014	7:15	0	0	20	12	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	7:30	0	0	38	9	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	7:45	0	0	56	22	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	8:00	0	0	88	25	0	1	1	0	0	0	0	0	1	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/6/2014	8:15	0	0	46	18	0	0	0	0	0	1	0	0	0	0	0	0
5/6/2014	8:30	0	2	41	11	0	0	1	0	0	2	0	0	0	0	0	0
5/6/2014	8:45	0	0	30	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	9:00	0	0	31	12	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	9:15	0	0	36	9	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	9:30	0	0	34	8	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	9:45	0	1	20	19	0	0	0	0	1	1	0	0	0	0	0	0
5/6/2014	10:00	0	1	39	12	0	2	0	0	0	0	0	0	0	0	0	0
5/6/2014	10:15	0	0	31	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	10:30	0	0	31	9	0	0	0	0	1	0	0	0	0	0	0	0
5/6/2014	10:45	0	0	36	8	0	0	0	0	0	1	0	0	0	0	0	0
5/6/2014	11:00	0	0	34	12	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	11:15	0	0	22	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	11:30	0	1	27	13	0	1	1	0	0	1	0	0	0	0	0	0
5/6/2014	11:45	0	1	26	14	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	12:00	0	1	35	12	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	12:15	0	1	28	16	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	12:30	0	1	30	7	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	12:45	0	0	29	12	0	1	0	0	1	0	0	0	0	0	0	0
5/6/2014	13:00	0	0	28	11	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	13:15	0	0	37	18	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	13:30	0	0	33	6	0	1	1	0	0	0	0	0	0	0	0	0
5/6/2014	13:45	0	0	26	9	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	14:00	0	0	39	14	0	3	1	0	0	1	0	0	0	0	0	0
5/6/2014	14:15	0	0	39	7	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	14:30	0	1	29	9	0	0	0	0	0	0	1	0	0	0	0	0
5/6/2014	14:45	0	0	31	13	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	15:00	0	0	39	6	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	15:15	0	0	39	15	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	15:30	0	0	58	10	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	15:45	0	0	46	15	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	16:00	0	0	39	16	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	16:15	0	0	30	9	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	16:30	0	0	41	13	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	16:45	0	0	27	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	17:00	0	0	48	7	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	17:15	0	1	35	9	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	17:30	0	1	39	6	0	2	1	0	0	1	0	0	0	0	0	0
5/6/2014	17:45	0	0	28	11	0	0	0	0	0	0	0	1	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/6/2014	18:00	0	1	35	9	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	18:15	0	1	29	9	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	18:30	0	0	16	10	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	18:45	0	2	26	6	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	19:00	0	0	35	5	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	19:15	0	0	26	4	0	0	0	0	1	0	0	0	0	0	0	0
5/6/2014	19:30	0	0	19	6	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	19:45	0	0	16	8	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	20:00	0	0	18	6	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	20:15	0	0	17	4	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	20:30	0	0	26	8	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	20:45	0	0	13	3	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:00	0	0	8	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:15	0	0	12	3	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:30	0	0	10	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:45	0	0	13	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:00	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:15	0	0	11	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:30	0	0	4	3	1	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:45	0	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:00	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:15	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:30	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:45	0	0	16	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:00	0	0	13	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:15	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:45	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:15	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:45	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/7/2014	3:45	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:00	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:30	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:45	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:00	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:15	0	0	7	1	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:30	0	0	9	5	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:45	0	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	6:00	0	0	14	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	6:15	0	0	5	7	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	6:30	0	0	7	8	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	6:45	0	0	20	7	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	7:00	0	0	30	10	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	7:15	0	0	25	11	0	0	0	0	0	0	0	0	1	0	0	0
5/7/2014	7:30	0	0	35	9	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	7:45	0	0	54	20	0	0	0	0	0	0	0	0	2	0	0	0
5/7/2014	8:00	0	1	84	20	0	0	1	0	1	0	0	0	1	1	0	0
5/7/2014	8:15	0	0	37	10	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	8:30	0	0	33	13	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	8:45	0	0	25	3	0	1	1	0	0	0	0	0	0	0	0	0
5/7/2014	9:00	0	1	32	10	0	1	1	0	1	0	0	0	0	0	0	0
5/7/2014	9:15	0	0	37	14	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	9:30	0	1	27	18	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	9:45	0	0	28	14	0	2	0	0	0	0	0	0	0	0	0	0
5/7/2014	10:00	0	0	40	11	0	1	2	0	1	0	0	0	0	0	0	0
5/7/2014	10:15	0	0	32	7	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	10:30	0	0	31	12	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	10:45	0	0	27	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	11:00	0	2	34	11	0	1	1	0	0	0	0	0	1	0	0	0
5/7/2014	11:15	0	0	36	10	0	0	1	0	0	1	0	0	0	0	0	0
5/7/2014	11:30	0	0	30	11	0	1	1	0	0	0	0	0	0	0	0	0
5/7/2014	11:45	0	0	29	12	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	12:00	0	0	29	18	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	12:15	0	1	34	13	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	12:30	0	0	36	9	0	0	1	0	0	1	0	0	0	0	0	0
5/7/2014	12:45	0	0	19	12	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	13:00	0	0	37	13	0	1	1	0	0	0	0	0	0	0	0	0
5/7/2014	13:15	0	0	30	9	0	0	1	0	0	1	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/7/2014	13:30	0	2	33	11	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	13:45	0	0	27	11	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	14:00	0	0	25	7	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	14:15	0	0	36	5	0	0	0	0	0	0	0	1	0	0	0	0
5/7/2014	14:30	0	0	36	6	1	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	14:45	0	0	35	13	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	15:00	0	0	32	12	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	15:15	0	0	37	6	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	15:30	0	2	48	9	0	1	1	0	0	0	0	0	0	0	0	0
5/7/2014	15:45	0	0	57	15	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	16:00	0	0	40	12	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	16:15	0	0	41	9	0	1	0	0	0	0	0	0	0	1	0	0
5/7/2014	16:30	0	0	40	17	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	16:45	0	0	37	11	0	0	2	0	0	0	0	0	1	0	0	0
5/7/2014	17:00	0	0	43	8	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	17:15	0	0	33	12	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	17:30	0	0	30	10	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	17:45	0	1	39	12	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	18:00	0	0	29	7	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	18:15	0	0	19	10	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	18:30	0	0	18	10	0	1	0	0	0	0	0	1	0	0	0	0
5/7/2014	18:45	0	0	23	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	19:00	0	0	23	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	19:15	0	0	22	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	19:30	0	0	20	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	19:45	0	0	27	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:00	0	0	20	9	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:15	0	0	22	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:30	0	0	18	7	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:45	0	0	18	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:00	0	0	20	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:15	0	1	5	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:30	0	0	9	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:45	0	0	8	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:00	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:15	0	0	13	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:30	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:45	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	23:00	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/7/2014	23:15	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	23:30	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	23:45	0	0	10	3	0	0	0	0	0	0	0	0	0	0	0	0
5/8/2014	0:00	0	0	17	1	0	0	0	0	0	0	0	0	0	0	0	0

Site ID:	000000003730	Job:	14-089 Rs Min
Site Reference:	Site B-SB	GPS:	37.10756, -79.29252
Location:	Main St., w/o Bedford Ave.		
Start Date:	5/6/2014	Start Time:	12:00:00 AM
End Date:	5/8/2014	End Time:	12:00:00 AM

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/6/2014	0:15	0	0	34	8	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	0:30	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	0:45	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	1:45	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:00	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	3:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:15	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	0
5/6/2014	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	4:45	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:30	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	5:45	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:00	0	0	3	3	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:15	0	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:30	0	0	6	1	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	6:45	0	0	9	5	0	0	0	0	1	0	0	0	0	0	0	0
5/6/2014	7:00	0	0	12	1	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	7:15	0	0	12	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	7:30	0	0	17	5	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	7:45	0	0	34	7	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	8:00	0	0	42	5	1	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	8:15	0	0	36	10	0	0	0	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/6/2014	8:30	0	0	30	7	0	0	1	0	0	1	0	0	0	0	0	0
5/6/2014	8:45	0	0	17	10	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	9:00	0	0	22	5	0	0	1	0	0	1	0	0	0	0	0	0
5/6/2014	9:15	0	0	23	7	0	0	0	0	1	0	0	1	0	0	0	0
5/6/2014	9:30	0	0	29	7	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	9:45	0	0	26	7	0	0	1	0	0	1	0	0	0	0	0	0
5/6/2014	10:00	0	0	23	8	0	0	2	0	0	0	0	0	0	0	0	0
5/6/2014	10:15	0	0	31	5	0	1	0	0	1	0	0	0	0	0	0	0
5/6/2014	10:30	0	0	31	7	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	10:45	0	1	22	6	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	11:00	0	0	34	9	0	0	2	0	0	0	0	0	0	0	0	0
5/6/2014	11:15	0	0	28	9	0	1	1	0	0	0	0	0	0	0	0	0
5/6/2014	11:30	0	1	40	9	0	0	0	0	1	0	0	0	0	0	0	0
5/6/2014	11:45	0	0	26	6	0	0	0	0	0	1	0	0	0	0	0	0
5/6/2014	12:00	0	0	37	9	0	1	3	0	0	0	0	0	0	0	0	0
5/6/2014	12:15	0	0	48	9	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	12:30	0	0	27	13	0	0	0	0	0	1	0	0	0	0	0	0
5/6/2014	12:45	0	1	33	8	0	1	1	0	1	0	0	0	0	0	0	0
5/6/2014	13:00	0	0	38	7	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	13:15	0	0	36	9	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	13:30	0	0	41	8	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	13:45	0	0	25	6	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	14:00	0	0	37	4	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	14:15	0	0	42	4	0	0	0	0	1	0	0	0	0	0	0	0
5/6/2014	14:30	0	1	30	12	0	0	3	0	0	0	0	0	0	0	0	0
5/6/2014	14:45	0	0	34	8	0	0	0	0	0	0	0	0	0	1	0	0
5/6/2014	15:00	0	0	48	8	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	15:15	0	0	38	10	0	1	1	0	0	1	0	0	0	0	0	0
5/6/2014	15:30	0	0	43	15	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	15:45	0	0	43	9	0	0	1	0	0	0	0	0	0	0	0	0
5/6/2014	16:00	0	0	43	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	16:15	0	0	65	16	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	16:30	0	0	47	13	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	16:45	0	0	45	17	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	17:00	0	0	64	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	17:15	0	0	64	13	0	1	1	0	0	0	0	0	0	0	0	0
5/6/2014	17:30	0	0	56	14	0	2	0	0	0	0	0	0	0	0	0	0
5/6/2014	17:45	0	0	58	12	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	18:00	0	0	50	7	0	0	0	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/6/2014	18:15	0	0	48	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	18:30	0	0	47	5	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	18:45	0	0	34	4	0	0	0	0	1	2	0	0	0	0	0	0
5/6/2014	19:00	0	0	52	3	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	19:15	0	0	35	6	0	0	0	0	0	0	0	1	0	0	0	0
5/6/2014	19:30	0	0	29	6	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	19:45	0	0	30	6	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	20:00	0	0	28	6	0	0	0	0	1	0	0	0	0	0	0	0
5/6/2014	20:15	0	0	30	5	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	20:30	0	0	28	5	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	20:45	0	0	25	6	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:00	0	0	19	4	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:15	0	0	15	11	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:30	0	0	17	2	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	21:45	0	0	16	5	0	1	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:00	0	0	12	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:15	0	0	8	1	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:30	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	22:45	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:00	0	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:15	0	0	9	4	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:30	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2014	23:45	0	0	10	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:00	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:15	0	0	38	5	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:30	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	0:45	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:15	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:15	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	2:45	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/7/2014	4:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:15	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	4:45	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:15	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	5:30	0	0	2	1	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	5:45	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	6:00	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	6:15	0	0	5	1	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	6:30	0	0	10	4	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	6:45	0	0	11	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	7:00	0	0	14	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	7:15	0	1	14	7	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	7:30	0	0	10	1	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	7:45	0	0	26	6	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	8:00	0	0	33	6	0	0	1	0	0	1	0	0	0	0	0	0
5/7/2014	8:15	0	0	35	9	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	8:30	0	0	26	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	8:45	0	0	26	5	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	9:00	0	0	26	7	0	1	2	0	1	0	0	0	0	0	0	0
5/7/2014	9:15	0	0	25	8	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	9:30	0	0	18	13	0	1	2	0	0	1	0	0	0	0	0	0
5/7/2014	9:45	0	0	21	9	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	10:00	0	0	20	9	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	10:15	0	1	35	9	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	10:30	0	0	23	7	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	10:45	0	0	36	6	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	11:00	0	0	38	15	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	11:15	0	0	37	7	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	11:30	0	0	34	6	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	11:45	0	0	37	7	0	0	1	0	0	1	0	0	0	0	0	0
5/7/2014	12:00	0	0	32	9	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	12:15	0	0	39	16	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	12:30	0	0	38	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	12:45	0	0	20	8	0	1	1	0	0	0	0	0	0	0	0	0
5/7/2014	13:00	0	0	35	5	0	2	1	0	0	0	0	0	0	0	0	0
5/7/2014	13:15	0	0	42	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	13:30	0	0	38	5	0	0	2	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/7/2014	13:45	0	0	28	10	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	14:00	0	0	30	7	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	14:15	0	0	33	6	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	14:30	0	1	38	5	1	0	0	0	1	1	0	0	0	0	0	0
5/7/2014	14:45	0	0	39	6	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	15:00	0	0	39	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	15:15	0	0	42	8	0	2	0	0	0	0	0	0	0	0	0	0
5/7/2014	15:30	0	0	37	8	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	15:45	0	0	45	19	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	16:00	0	1	47	5	0	0	1	0	0	0	0	0	0	0	0	0
5/7/2014	16:15	0	0	84	8	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	16:30	0	0	65	10	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	16:45	0	0	62	16	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	17:00	0	0	65	16	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	17:15	0	0	74	7	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	17:30	0	0	54	17	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	17:45	0	2	50	11	0	0	0	0	0	1	0	0	0	0	0	0
5/7/2014	18:00	0	0	49	5	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	18:15	0	0	47	12	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	18:30	0	0	34	8	0	1	0	0	0	1	0	0	0	0	0	0
5/7/2014	18:45	0	0	37	10	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	19:00	0	0	49	4	0	1	0	0	0	1	0	0	0	0	0	0
5/7/2014	19:15	0	0	37	3	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	19:30	0	0	31	4	0	1	0	0	0	1	0	0	0	0	0	0
5/7/2014	19:45	0	0	37	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:00	0	1	29	5	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:15	0	0	48	7	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:30	0	0	31	4	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	20:45	0	0	36	6	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:00	0	0	17	6	0	0	0	0	1	0	0	0	0	0	0	0
5/7/2014	21:15	0	0	26	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:30	0	0	18	2	0	1	0	0	0	0	0	0	0	0	0	0
5/7/2014	21:45	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:00	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:15	0	0	15	2	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:30	0	0	8	3	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	22:45	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	23:00	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	23:15	0	0	11	2	0	0	1	0	0	0	0	0	0	0	0	0

Date	Time	Lane	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/7/2014	23:30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2014	23:45	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0
5/8/2014	0:00	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0

12-Hour Turning Movement Counts

Main Street at Bedford Avenue

File Name: X:\Jobs 2014\14-089.va_Bedford Ave. - Altavista TMs\Processed Data\TM1-Main St. and Bedford Ave.ppd
Start Date: 5/1/2014
Start Time: 7:00:00 AM

CARS	Main St. Southbound				Main St. Northbound			Bedford Ave. Eastbound		
Start Time	Right	Thru	Left	Peds	Thru	Left	Peds	Right	Left	Peds
07:00 AM	7	16	0	0	26	7	0	7	7	0
07:15 AM	16	10	0	0	37	13	0	8	8	0
07:30 AM	25	28	0	0	64	26	0	21	33	0
07:45 AM	30	20	0	0	65	29	0	18	49	0
08:00 AM	13	40	0	0	47	21	0	12	39	0
08:15 AM	17	26	0	0	37	14	0	12	19	0
08:30 AM	20	22	0	0	32	10	0	9	12	0
08:45 AM	18	29	0	1	35	13	0	8	22	0
09:00 AM	7	26	0	1	36	15	0	9	21	0
09:15 AM	8	21	0	0	37	9	0	8	18	0
09:30 AM	24	27	0	0	35	7	0	4	15	0
09:45 AM	18	33	0	0	45	10	0	12	23	0
10:00 AM	11	34	0	0	26	14	0	11	16	0
10:15 AM	15	34	0	0	36	8	0	6	22	0
10:30 AM	10	36	0	0	39	9	0	11	13	0
10:45 AM	16	28	0	0	30	15	0	17	17	0
11:00 AM	15	32	0	0	37	9	0	12	16	0
11:15 AM	18	41	0	0	40	8	0	11	20	0
11:30 AM	26	42	0	0	40	9	0	14	18	0
11:45 AM	19	48	0	0	32	13	0	12	22	0
12:00 PM	27	44	0	0	40	9	0	11	16	0
12:15 PM	23	26	1	0	35	6	0	14	26	0
12:30 PM	25	33	0	0	40	9	0	8	18	0
12:45 PM	21	40	0	0	49	9	0	10	15	0
01:00 PM	18	42	0	0	42	9	0	8	20	0
01:15 PM	13	31	0	0	40	9	0	9	18	1
01:30 PM	19	34	0	0	32	6	0	8	9	0
01:45 PM	20	44	0	0	45	14	0	7	16	0
02:00 PM	23	50	0	0	46	4	0	8	25	0
02:15 PM	27	43	0	0	32	14	0	10	16	0
02:30 PM	21	45	0	0	37	16	0	14	13	0
02:45 PM	19	30	0	0	42	16	0	15	35	0
03:00 PM	31	26	0	0	47	11	0	15	24	0

CARS	Main St. Southbound				Main St. Northbound			Bedford Ave. Eastbound		
Start Time	Right	Thru	Left	Peds	Thru	Left	Peds	Right	Left	Peds
03:15 PM	28	34	0	0	54	14	0	13	20	0
03:30 PM	22	37	0	0	47	15	0	24	19	0
03:45 PM	24	37	0	0	49	16	0	15	18	0
04:00 PM	34	83	0	0	43	8	0	12	24	0
04:15 PM	36	57	0	0	42	18	0	25	29	0
04:30 PM	20	50	0	0	48	17	0	24	26	0
04:45 PM	27	73	0	0	36	12	0	24	32	0
05:00 PM	31	59	0	0	28	13	0	25	32	0
05:15 PM	28	45	0	0	22	9	0	10	27	0
05:30 PM	26	53	0	0	34	17	0	15	17	0
05:45 PM	27	30	0	0	25	14	0	13	16	0
06:00 PM	24	49	1	0	20	8	0	11	24	0
06:15 PM	35	33	0	0	21	10	0	18	21	0
06:30 PM	24	32	0	0	26	6	0	17	18	0
06:45 PM	20	32	0	0	22	9	0	13	15	0

Trucks	Main St. Southbound				Main St. Northbound			Bedford Ave. Eastbound		
Start Time	Right	Thru	Left	Peds	Thru	Left	Peds	Right	Left	Peds
07:00 AM	0	0	0	0	0	0	0	0	1	0
07:15 AM	2	0	0	0	0	0	0	1	1	0
07:30 AM	3	1	0	0	1	0	0	0	11	0
07:45 AM	0	0	0	0	1	0	0	1	2	0
08:00 AM	0	0	0	0	2	0	0	0	1	0
08:15 AM	1	0	0	0	1	0	0	1	0	0
08:30 AM	0	2	0	0	1	0	0	0	1	0
08:45 AM	0	2	0	0	1	1	0	0	1	0
09:00 AM	3	3	0	0	1	0	0	0	1	0
09:15 AM	0	1	0	0	1	0	0	0	0	0
09:30 AM	0	0	0	0	1	0	0	0	0	0
09:45 AM	0	1	0	0	1	0	0	0	0	0
10:00 AM	2	0	0	0	0	1	0	0	1	0
10:15 AM	1	0	0	0	1	0	0	1	0	0
10:30 AM	0	0	0	0	0	0	0	0	2	0
10:45 AM	0	0	0	0	0	0	0	0	2	0
11:00 AM	2	0	0	0	1	0	0	0	1	0
11:15 AM	4	1	0	0	0	0	0	0	3	0
11:30 AM	2	1	0	0	2	0	0	0	1	0
11:45 AM	0	0	0	0	0	0	0	0	1	0
12:00 PM	0	2	0	0	1	0	0	0	0	0
12:15 PM	0	1	0	0	1	0	0	0	1	0
12:30 PM	1	2	0	0	1	0	0	0	1	0
12:45 PM	3	0	0	0	2	0	0	0	0	0
01:00 PM	2	1	0	0	0	0	0	0	0	0
01:15 PM	1	3	0	0	1	0	0	0	1	0
01:30 PM	3	1	0	0	0	0	0	0	1	0
01:45 PM	2	0	0	0	1	0	0	0	0	0
02:00 PM	1	1	0	0	3	0	0	0	2	0
02:15 PM	1	2	0	0	1	1	0	0	0	0
02:30 PM	0	2	0	0	1	0	0	0	0	0
02:45 PM	0	4	0	0	0	1	0	0	12	0
03:00 PM	0	0	0	0	1	0	0	0	2	0
03:15 PM	0	1	0	0	0	1	0	0	0	0
03:30 PM	1	1	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	1	0	0	0	1	0
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	2	0	0	0	1	0	0	0	0	0
04:30 PM	1	1	0	0	0	0	0	0	0	0
04:45 PM	0	1	0	0	2	0	0	0	2	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	1	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0

Trucks	Main St. Southbound				Main St. Northbound			Bedford Ave. Eastbound		
Start Time	Right	Thru	Left	Peds	Thru	Left	Peds	Right	Left	Peds
06:00 PM	0	1	0	0	0	1	0	1	0	0
06:15 PM	1	0	0	0	1	0	0	0	0	0
06:30 PM	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0

Combined	Main St. Southbound				Main St. Northbound			Bedford Ave. Eastbound		
Start Time	Right	Thru	Left	Peds	Thru	Left	Peds	Right	Left	Peds
07:00 AM	7	16	0	0	26	7	0	7	8	0
07:15 AM	18	10	0	0	37	13	0	9	9	0
07:30 AM	28	29	0	0	65	26	0	21	44	0
07:45 AM	30	20	0	0	66	29	0	19	51	0
08:00 AM	13	40	0	0	49	21	0	12	40	0
08:15 AM	18	26	0	0	38	14	0	13	19	0
08:30 AM	20	24	0	0	33	10	0	9	13	0
08:45 AM	18	31	0	1	36	14	0	8	23	0
09:00 AM	10	29	0	1	37	15	0	9	22	0
09:15 AM	8	22	0	0	38	9	0	8	18	0
09:30 AM	24	27	0	0	36	7	0	4	15	0
09:45 AM	18	34	0	0	46	10	0	12	23	0
10:00 AM	13	34	0	0	26	15	0	11	17	0
10:15 AM	16	34	0	0	37	8	0	7	22	0
10:30 AM	10	36	0	0	39	9	0	11	15	0
10:45 AM	16	28	0	0	30	15	0	17	19	0
11:00 AM	17	32	0	0	38	9	0	12	17	0
11:15 AM	22	42	0	0	40	8	0	11	23	0
11:30 AM	28	43	0	0	42	9	0	14	19	0
11:45 AM	19	48	0	0	32	13	0	12	23	0
12:00 PM	27	46	0	0	41	9	0	11	16	0
12:15 PM	23	27	1	0	36	6	0	14	27	0
12:30 PM	26	35	0	0	41	9	0	8	19	0
12:45 PM	24	40	0	0	51	9	0	10	15	0
01:00 PM	20	43	0	0	42	9	0	8	20	0
01:15 PM	14	34	0	0	41	9	0	9	19	1
01:30 PM	22	35	0	0	32	6	0	8	10	0
01:45 PM	22	44	0	0	46	14	0	7	16	0
02:00 PM	24	51	0	0	49	4	0	8	27	0
02:15 PM	28	45	0	0	33	15	0	10	16	0
02:30 PM	21	47	0	0	38	16	0	14	13	0
02:45 PM	19	34	0	0	42	17	0	15	47	0
03:00 PM	31	26	0	0	48	11	0	15	26	0
03:15 PM	28	35	0	0	54	15	0	13	20	0
03:30 PM	23	38	0	0	47	15	0	24	19	0
03:45 PM	24	37	0	0	50	16	0	15	19	0
04:00 PM	34	83	0	0	43	8	0	12	24	0
04:15 PM	38	57	0	0	43	18	0	25	29	0
04:30 PM	21	51	0	0	48	17	0	24	26	0
04:45 PM	27	74	0	0	38	12	0	24	34	0
05:00 PM	31	59	0	0	28	13	0	25	32	0
05:15 PM	28	45	0	0	22	9	0	10	27	0
05:30 PM	26	53	0	0	35	17	0	15	17	0
05:45 PM	27	30	0	0	25	14	0	13	16	0

06:00 PM	24	50	1	0	20	9	0	12	24	0
06:15 PM	36	33	0	0	22	10	0	18	21	0
06:30 PM	24	32	0	0	26	6	0	17	18	0
06:45 PM	20	32	0	0	22	9	0	13	15	0

Bedford Avenue at 7th Street

File Name: X:\Jobs 2014\14-089.va_Bedford Ave. - Altavista TMs\Processed Data\TM2-7th Ave. and Bedford Ave.ppd
Start Date: 5/1/2014
Start Time: 7:00:00 AM

Cars	7th Ave. Southbound				Bedford Ave. Westbound				Business Driveway Northbound				Bedford Ave. Eastbound			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	5	1	3	0	2	13	0	0	1	1	2	0	1	11	9	0
07:15 AM	9	1	2	0	5	26	1	0	1	2	1	0	4	14	19	0
07:30 AM	19	3	2	0	6	44	1	0	3	0	5	0	5	50	24	0
07:45 AM	41	2	7	0	7	52	0	0	4	1	9	0	8	55	43	0
08:00 AM	17	1	3	0	13	20	0	0	4	5	5	0	8	42	28	0
08:15 AM	9	1	2	0	11	18	1	0	1	3	2	0	3	25	21	0
08:30 AM	11	0	6	2	7	24	0	1	2	2	4	0	0	13	15	1
08:45 AM	18	3	4	0	7	23	0	0	1	2	2	0	3	26	17	0
09:00 AM	5	0	1	0	6	16	0	0	0	1	3	0	3	28	20	0
09:15 AM	8	0	4	1	6	12	0	1	2	2	0	1	2	19	13	0
09:30 AM	10	2	4	0	7	23	0	0	1	0	2	0	1	15	19	0
09:45 AM	11	4	9	0	8	21	0	0	3	4	1	0	4	23	24	0
10:00 AM	14	4	6	0	11	13	0	0	2	3	3	0	3	19	12	0
10:15 AM	19	3	4	0	8	14	0	0	4	1	3	0	4	23	12	0
10:30 AM	16	3	4	0	9	10	0	0	2	1	3	0	3	15	17	0
10:45 AM	16	2	6	0	9	23	0	0	0	6	4	0	5	27	22	0
11:00 AM	16	1	6	0	9	14	0	2	4	2	1	0	1	19	18	0
11:15 AM	19	2	8	0	7	20	0	0	3	1	2	0	2	20	18	0
11:30 AM	10	4	8	0	9	25	1	2	1	1	3	0	3	21	18	0
11:45 AM	18	0	6	0	13	20	1	0	1	3	2	0	2	30	9	0
12:00 PM	15	1	4	0	8	28	0	0	1	2	4	0	2	21	13	0
12:15 PM	16	3	7	0	5	21	1	0	2	2	3	0	4	32	18	0
12:30 PM	10	2	5	0	11	24	0	0	0	3	2	0	3	19	11	0
12:45 PM	29	0	5	0	8	23	2	0	2	2	7	0	2	19	18	1
01:00 PM	15	4	6	0	5	21	0	0	2	3	2	0	6	20	21	0
01:15 PM	12	2	6	0	6	17	0	0	2	3	3	0	2	19	17	2
01:30 PM	13	1	4	0	8	15	0	0	1	2	1	0	6	14	19	0
01:45 PM	16	0	4	0	5	28	3	0	1	0	4	0	3	17	9	0
02:00 PM	19	1	6	0	6	22	0	0	2	3	0	0	1	25	17	0
02:15 PM	12	1	6	0	8	35	0	0	2	2	2	0	5	18	10	0
02:30 PM	20	2	9	0	7	26	2	0	1	4	8	0	4	16	22	0
02:45 PM	18	3	5	2	6	31	0	0	1	2	3	0	7	49	49	0
03:00 PM	13	1	10	0	11	30	0	0	1	3	4	0	6	28	21	1
03:15 PM	29	4	11	0	8	33	1	0	2	4	5	0	4	21	33	0
03:30 PM	20	1	18	0	10	28	0	0	2	1	5	0	4	24	26	1
03:45 PM	19	2	8	0	13	28	0	0	0	2	4	0	5	26	19	0

04:00 PM	24	2	9	0	8	34	0	0	2	1	8	0	8	28	24	1
04:15 PM	23	2	17	0	12	40	1	0	1	1	2	0	3	35	24	1
04:30 PM	26	3	10	0	7	27	1	0	1	2	6	0	4	38	19	0
04:45 PM	25	3	8	0	6	36	0	1	3	2	2	0	4	45	38	1
05:00 PM	34	3	13	0	8	34	0	0	0	0	3	0	6	39	26	0
05:15 PM	24	4	4	0	8	28	0	0	0	2	4	0	8	29	23	0
05:30 PM	18	2	9	0	7	35	0	0	0	0	9	0	4	21	15	1
05:45 PM	24	6	1	0	9	31	0	0	0	0	5	0	1	22	18	0
06:00 PM	24	2	7	0	4	28	0	0	1	2	1	0	0	27	10	0
06:15 PM	10	2	8	3	3	39	0	0	0	1	1	0	0	33	22	0
06:30 PM	23	1	7	0	4	27	1	0	1	0	7	0	3	26	8	1
06:45 PM	12	1	5	0	4	25	0	0	2	1	2	0	5	21	9	2

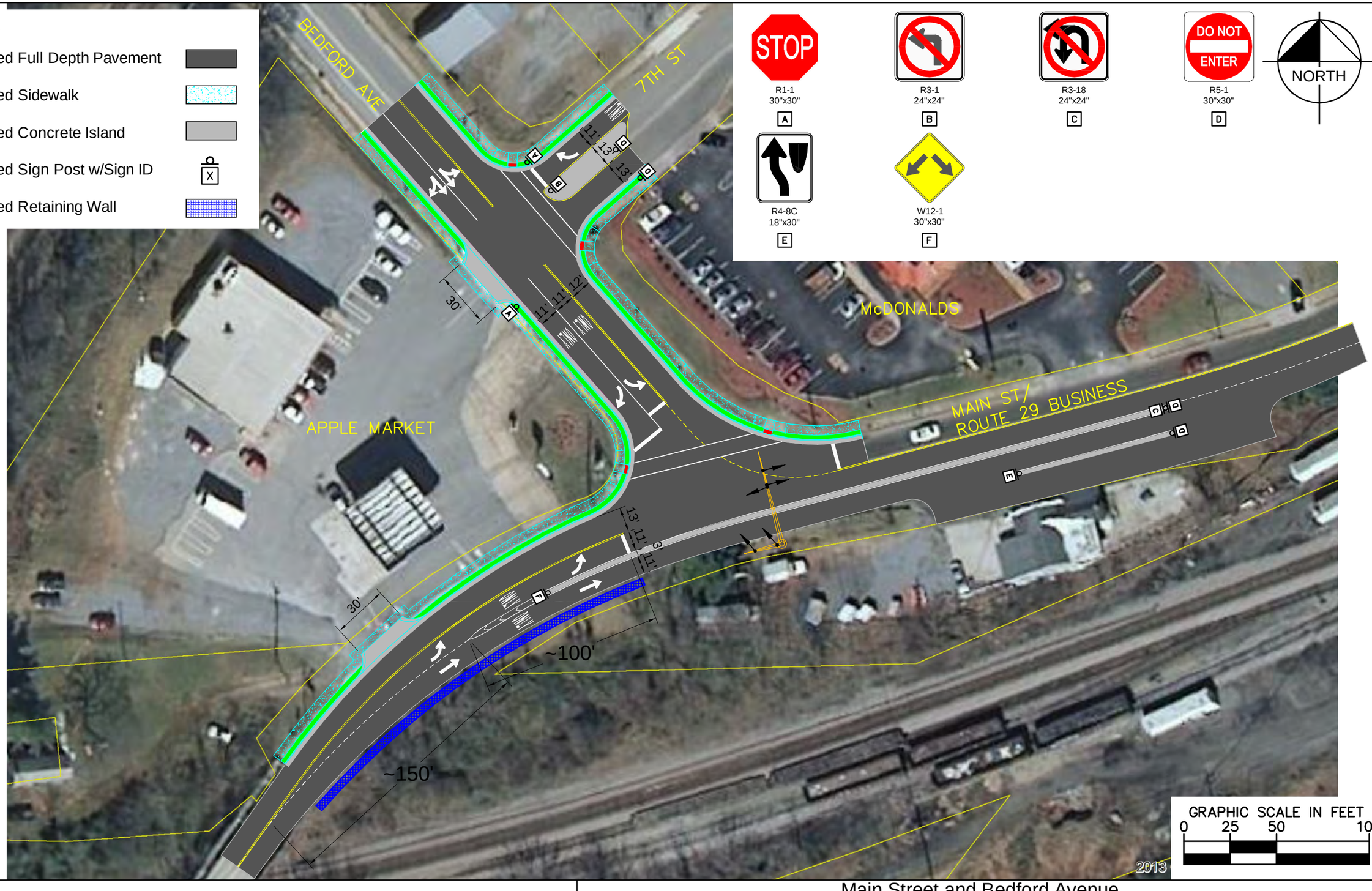
Trucks	7th Ave. Southbound				Bedford Ave. Westbound				Business Driveway Northbound				Bedford Ave. Eastbound			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
07:15 AM	2	0	0	0	0	1	0	0	0	0	0	0	0	2	4	0
07:30 AM	1	0	0	0	0	3	0	0	0	0	0	0	0	12	2	0
07:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
08:00 AM	0	1	0	0	0	0	0	0	0	0	1	0	2	1	1	0
08:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
08:45 AM	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
09:00 AM	0	0	1	0	1	2	0	0	0	0	0	0	0	1	1	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
09:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
10:00 AM	0	0	0	0	1	2	0	0	0	0	0	0	0	1	1	0
10:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
10:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0
11:00 AM	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0
11:15 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0
11:30 AM	0	0	1	0	2	0	0	0	0	1	0	0	0	1	0	0
11:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
12:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
12:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
12:45 PM	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0
01:00 PM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0
01:15 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0
01:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
02:15 PM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
02:45 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	14	2	0
03:00 PM	0	1	0	0	0	0	0	0	1	0	1	0	0	0	1	0
03:15 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
03:30 PM	3	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
03:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
04:15 PM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	3	0
04:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0
04:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
05:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

06:00 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
06:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Combined	7th Ave. Southbound				Bedford Ave. Westbound				Business Driveway Northbound				Bedford Ave. Eastbound			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	5	1	3	0	2	13	0	0	1	1	2	0	1	12	9	0
07:15 AM	11	1	2	0	5	27	1	0	1	2	1	0	4	16	23	0
07:30 AM	20	3	2	0	6	47	1	0	3	0	5	0	5	62	26	0
07:45 AM	42	2	7	0	7	52	0	0	4	1	9	0	8	57	43	0
08:00 AM	17	2	3	0	13	20	0	0	4	5	6	0	10	43	29	0
08:15 AM	9	1	2	0	11	19	1	0	1	3	2	0	3	25	22	0
08:30 AM	11	0	6	2	7	24	0	1	2	2	4	0	1	13	15	1
08:45 AM	19	3	4	0	8	23	0	0	2	2	2	0	3	26	17	0
09:00 AM	5	0	2	0	7	18	0	0	0	1	3	0	3	29	21	0
09:15 AM	8	0	4	1	6	12	0	1	2	2	0	1	2	19	13	0
09:30 AM	10	2	4	0	7	24	0	0	1	0	2	0	1	15	19	0
09:45 AM	12	4	9	0	8	21	0	0	3	4	1	0	4	23	26	0
10:00 AM	14	4	6	0	12	15	0	0	2	3	3	0	3	20	13	0
10:15 AM	19	3	4	0	8	15	0	0	4	1	3	0	4	24	12	0
10:30 AM	16	3	4	0	9	10	0	0	2	1	3	0	3	17	17	0
10:45 AM	17	2	6	0	9	23	0	0	0	6	4	0	5	29	23	0
11:00 AM	16	1	6	0	9	15	1	2	4	2	1	0	1	20	19	0
11:15 AM	19	2	8	0	7	23	0	0	3	1	2	0	2	23	18	0
11:30 AM	10	4	9	0	11	25	1	2	1	2	3	0	3	22	18	0
11:45 AM	19	0	6	0	13	20	1	0	1	3	2	0	2	31	10	0
12:00 PM	16	1	4	0	8	28	0	0	1	2	4	0	2	21	14	0
12:15 PM	16	3	7	0	5	21	1	0	2	2	3	0	4	33	18	0
12:30 PM	10	2	6	0	11	25	0	0	0	3	2	0	3	19	11	0
12:45 PM	30	0	5	0	8	25	2	0	2	2	8	0	2	19	18	1
01:00 PM	17	4	6	0	5	23	0	0	2	3	2	0	6	20	23	0
01:15 PM	12	2	6	0	6	20	0	0	2	3	3	0	2	19	17	2
01:30 PM	13	1	4	0	8	18	0	0	1	2	1	0	6	14	20	0
01:45 PM	17	0	4	0	5	28	3	0	1	0	4	0	3	17	9	0
02:00 PM	19	1	6	0	6	22	0	0	3	3	0	0	1	26	17	0
02:15 PM	14	1	6	0	8	37	0	0	2	2	2	0	5	18	10	0
02:30 PM	20	2	9	0	7	26	2	0	1	4	8	0	4	17	23	0
02:45 PM	19	3	5	2	6	32	0	0	1	2	3	0	7	63	51	0
03:00 PM	13	2	10	0	11	30	0	0	2	3	5	0	6	28	22	1
03:15 PM	31	4	11	0	8	33	1	0	2	4	5	0	4	21	34	0
03:30 PM	23	1	18	0	10	29	0	0	2	1	5	0	5	24	26	1
03:45 PM	20	2	8	0	13	28	0	0	0	2	4	0	5	27	19	0
04:00 PM	24	2	9	0	8	34	0	0	2	1	8	0	8	28	25	1
04:15 PM	25	2	17	0	12	42	1	0	1	1	2	0	3	35	27	1
04:30 PM	26	3	10	0	7	28	1	0	1	2	6	0	4	39	20	0
04:45 PM	26	3	8	0	6	36	0	1	3	2	2	0	4	46	38	1
05:00 PM	34	3	13	0	8	34	0	0	0	0	3	0	6	39	27	0
05:15 PM	24	4	4	0	9	28	0	0	0	2	4	0	8	29	23	0
05:30 PM	18	2	9	0	7	35	0	0	0	0	9	0	4	21	15	1
05:45 PM	25	6	1	0	9	32	0	0	0	0	5	0	1	22	18	0

06:00 PM	24	2	7	0	4	29	0	0	1	2	2	0	0	27	10	0
06:15 PM	10	2	8	3	3	40	0	0	0	1	1	0	0	33	22	0
06:30 PM	23	1	7	0	4	27	1	0	1	0	7	0	3	26	8	1
06:45 PM	12	1	5	0	4	25	0	0	2	1	2	0	5	22	9	2

Appendix B: Alternative Configuration Planning Level Sketches



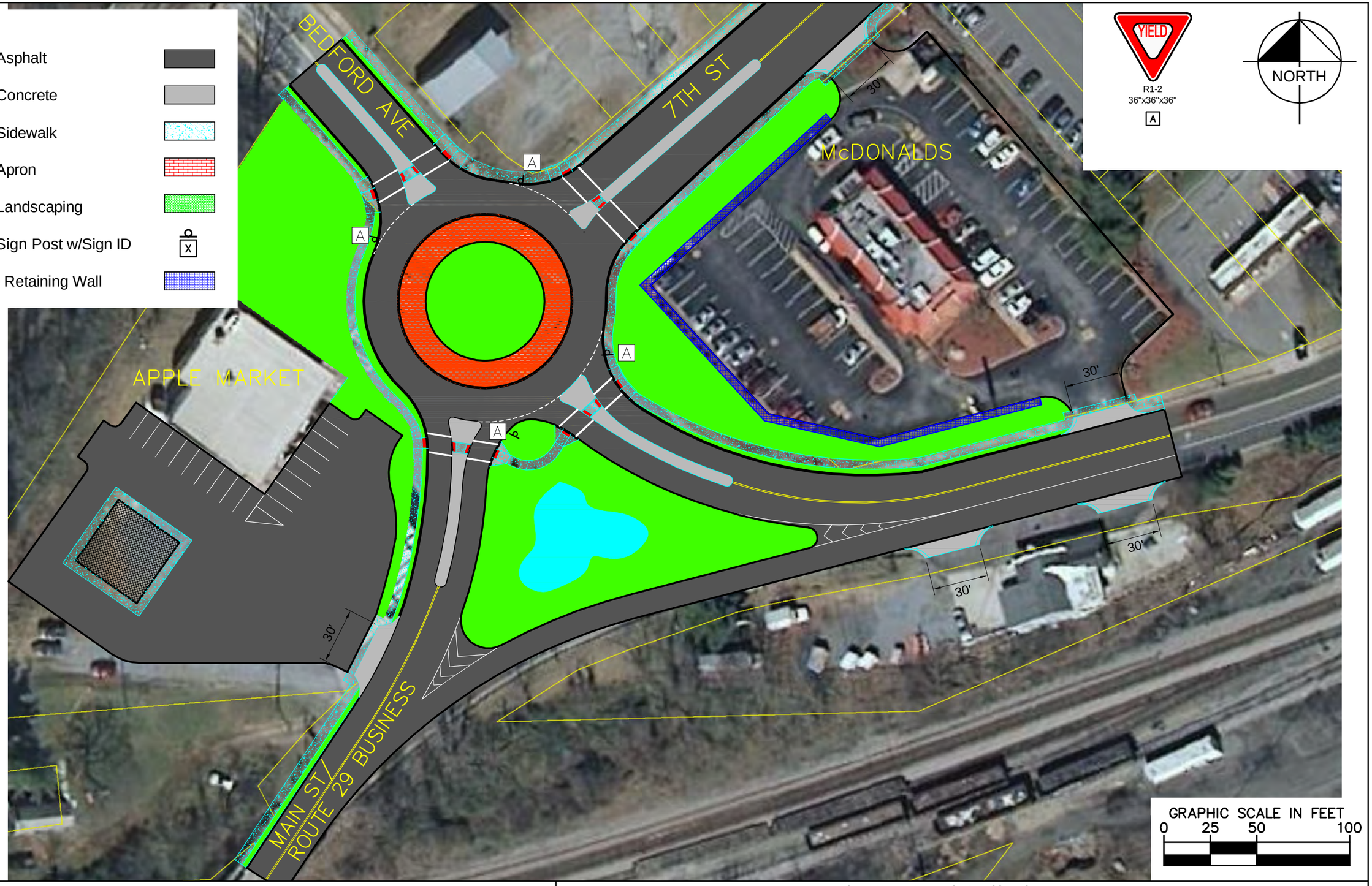
VDOT Virginia Department of Transportation

STARS STRATEGICALLY TARGETED AND AFFORDABLE ROADWAY SOLUTIONS

Kimley»Horn

Main Street and Bedford Avenue
Operational Analysis and Alternative Considerations
Town of Altavista, VA
Alternative 1 - Slip-Lane and Restricted 7th Street Access

Appendix
B1



VDOT Virginia Department of Transportation

STARS STRATEGICALLY TARGETED AND AFFORDABLE ROADWAY SOLUTIONS

Kimley»Horn

Main Street and Bedford Avenue
Operational Analysis and Alternative Considerations
Town of Altavista, VA
Alternative 2 - Roundabout

Appendix
B2

Legend

- Proposed Asphalt
- Proposed Concrete
- Proposed Sidewalk
- Proposed Apron
- Proposed Landscaping
- Proposed Sign Post w/Sign ID (X)
- Decorative Retaining Wall

YIELD
R1-2
36"x36"x36"
A

NORTH

BEDFORD AVE

7TH ST

McDONALDS

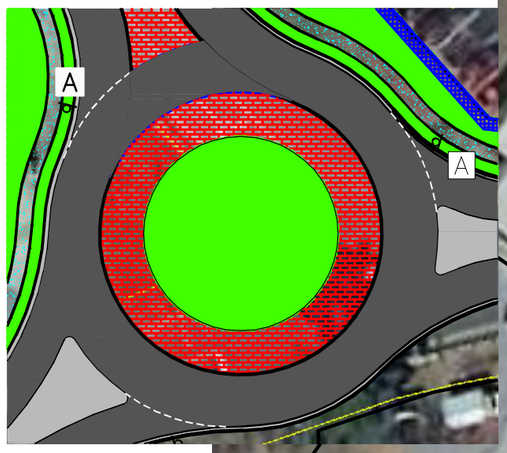
APPLE MARKET

MAIN ST/
ROUTE 29 BUSINESS

MAIN ST/ROUTE 29 BUSINESS

A

ALTERNATIVE CONFIGURATION OF EASTERN ROUNDABOUT



GRAPHIC SCALE IN FEET
0 25 50 100

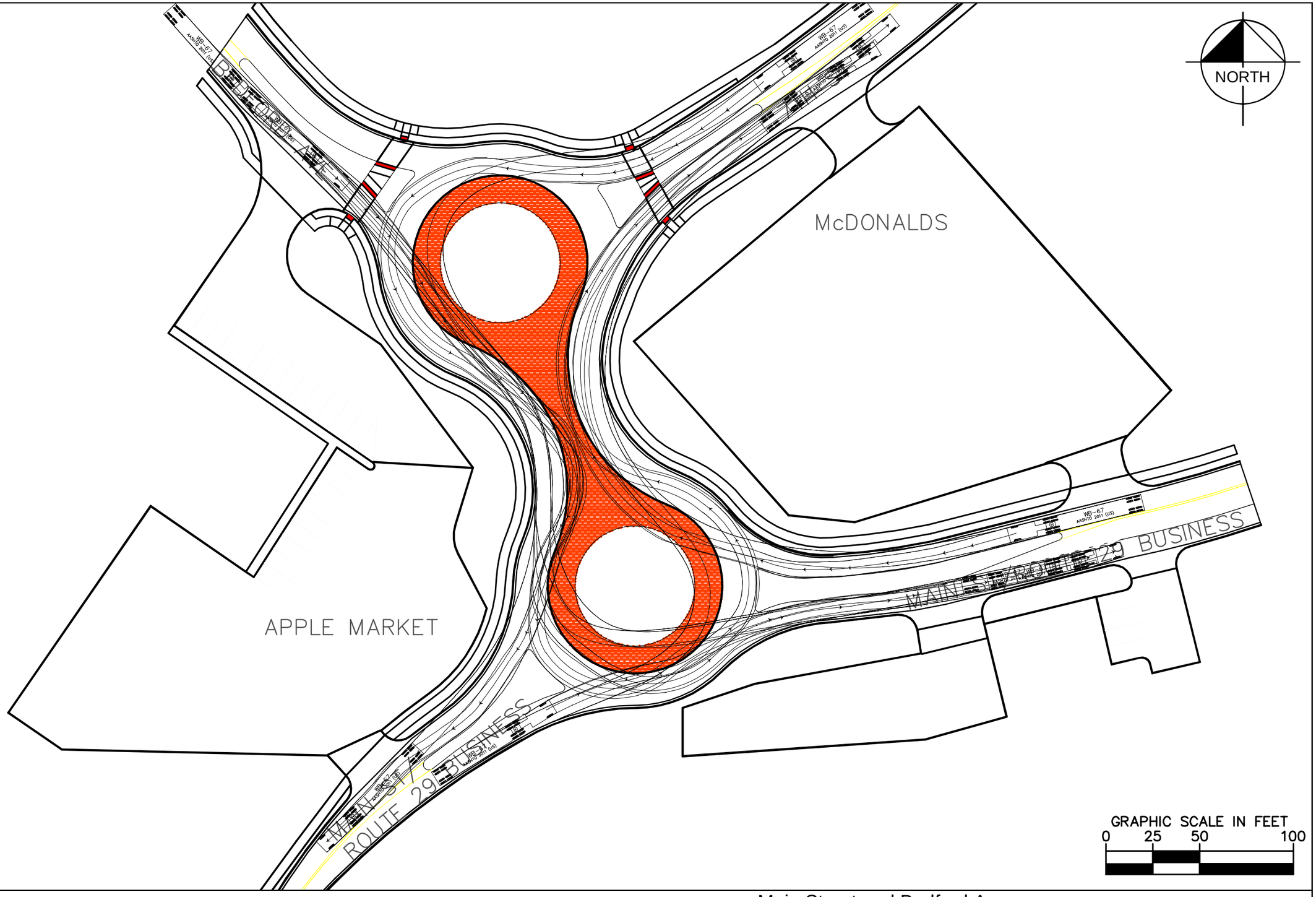
VDOT Virginia Department of Transportation

STARS STRATEGICALLY TARGETED AND AFFORDABLE ROADWAY SOLUTIONS

Kimley»Horn

Main Street and Bedford Avenue
Operational Analysis and Alternative Considerations
Town of Altavista, VA
Alternative 3 - Peanut Roundabout

Appendix
B3



VDOT Virginia Department of Transportation

STARS STRATEGICALLY TARGETED AND AFFORDABLE ROADWAY SOLUTIONS

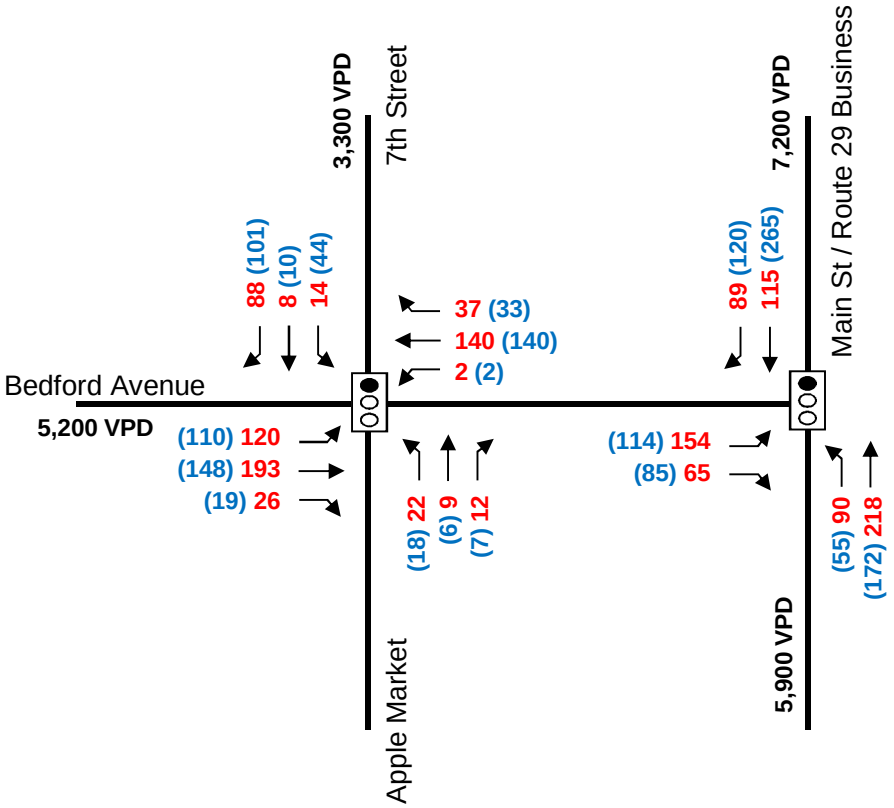
Kimley»Horn

Main Street and Bedford Avenue
Operational Analysis and Alternative Considerations
Town of Altavista, VA
Alternative 3 - Peanut Roundabout (AutoTurn)

Appendix
B4

Appendix C: Volume Figures (Including Alternatives)

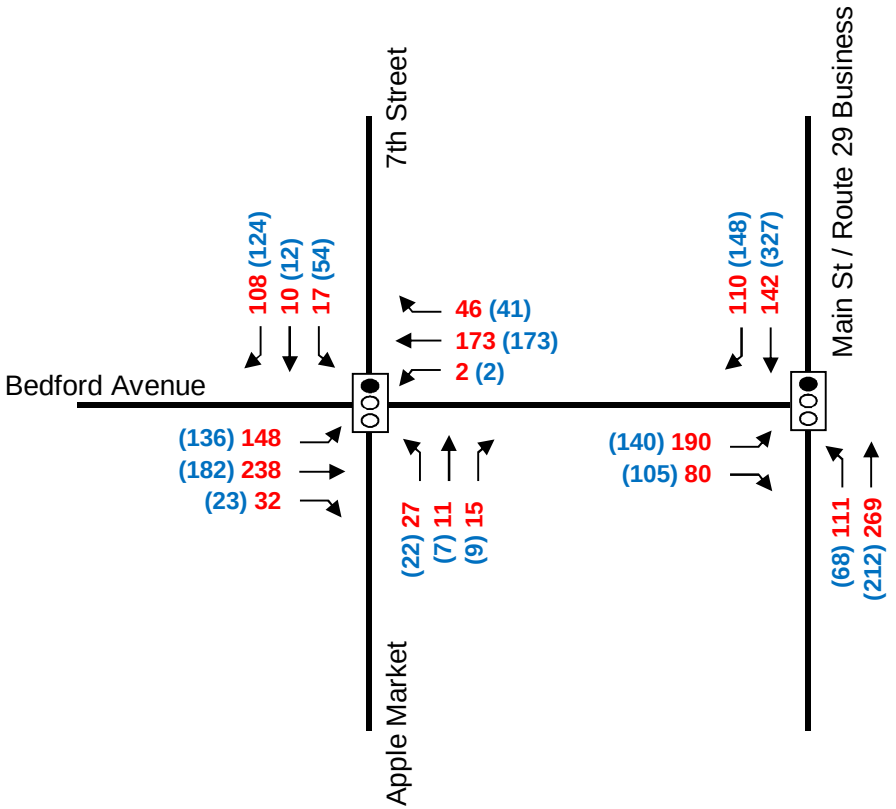
2014



Projected 2035

(1% Annualized Growth Rate)

Not To Scale



Legend

XX (XX) - Weekday AM (PM) Peak Hour Traffic Volumes

→ - Turning Movement

Kimley»Horn

EXISTING AND PROJECT (2035) TURNING MOVEMENT VOLUMES

Main Street and Bedford Avenue Operational Analysis and Alternative Considerations

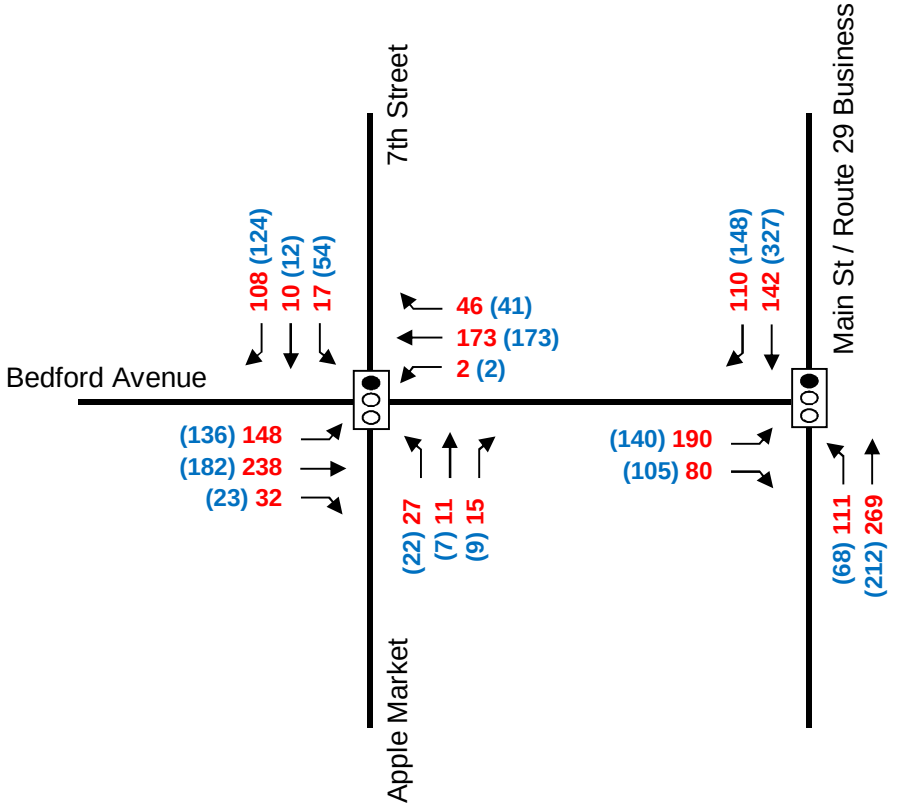
Town of Altavista, Virginia

Appendix C1

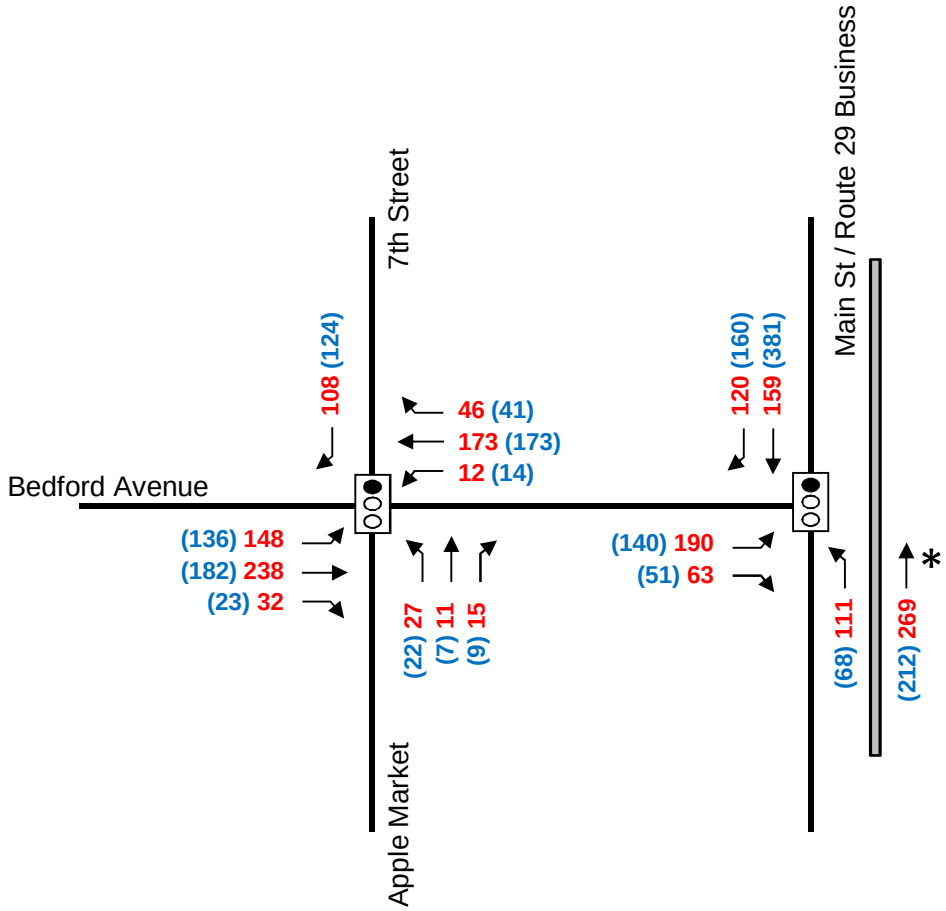
Not To Scale

Projected 2035

(1% Annualized Growth Rate)



Alternative 1 (Slip Lane) - 2035



Legend

XX (XX) - Weekday AM (PM) Peak Hour Traffic Volumes

→ - Turning Movement

* - Slip Lane Continuous Movement

Kimley»Horn

TURNING MOVEMENT VOLUMES

Main Street and Bedford Avenue Operational Analysis and Alternative Considerations

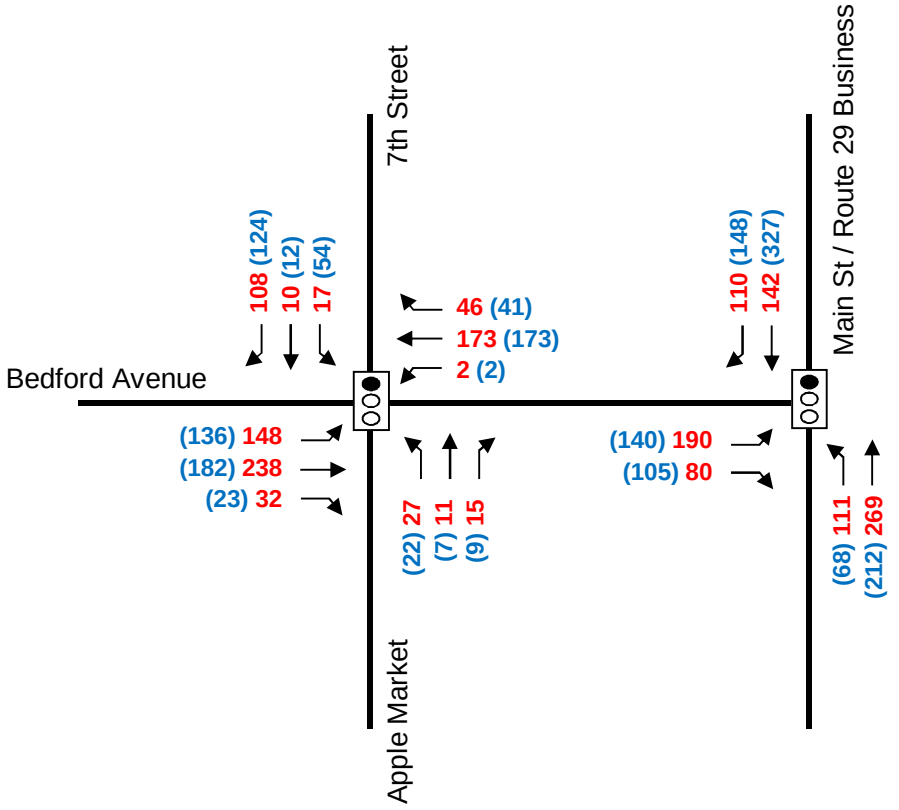
Town of Altavista, Virginia

Appendix C2

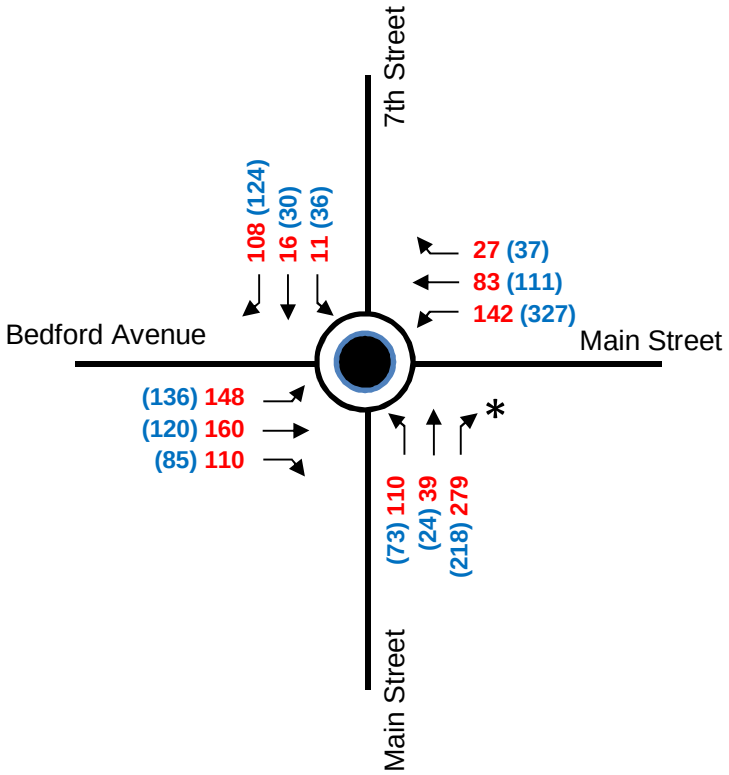
Not To Scale

Projected 2035

(1% Annualized Growth Rate)



Alternative 2 (Single Roundabout) - 2035



Legend

XX (XX) - Weekday AM (PM) Peak Hour Traffic Volumes

→ - Turning Movement

* - Slip Lane Continuous Movement

Kimley»Horn

TURNING MOVEMENT VOLUMES

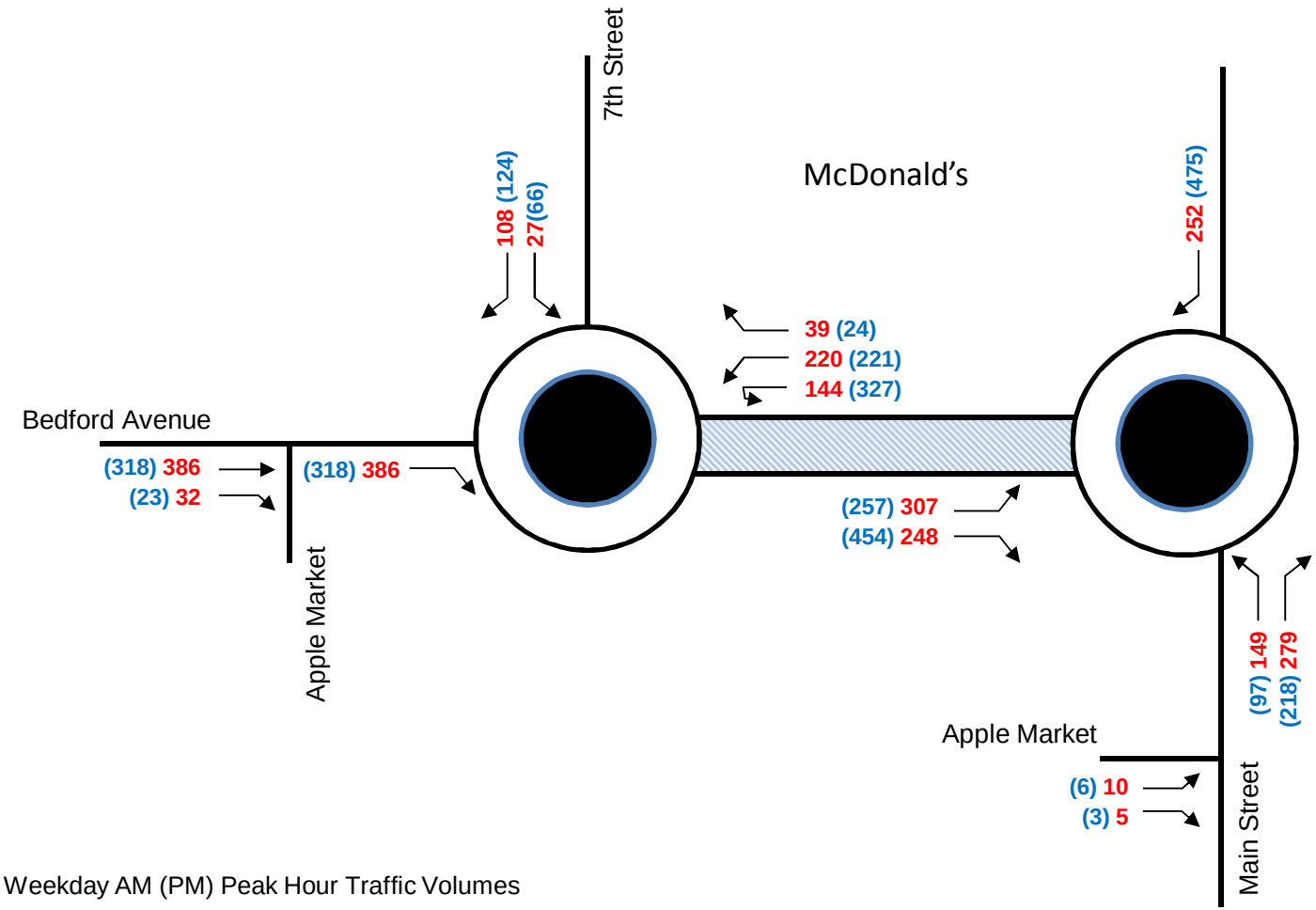
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations

Town of Altavista, Virginia

Appendix C3

Not To Scale

Alternative 3 (Peanut Roundabout) - 2035



Legend

XX (XX) - Weekday AM (PM) Peak Hour Traffic Volumes

→ - Turning Movement

Kimley»Horn

TURNING MOVEMENT VOLUMES

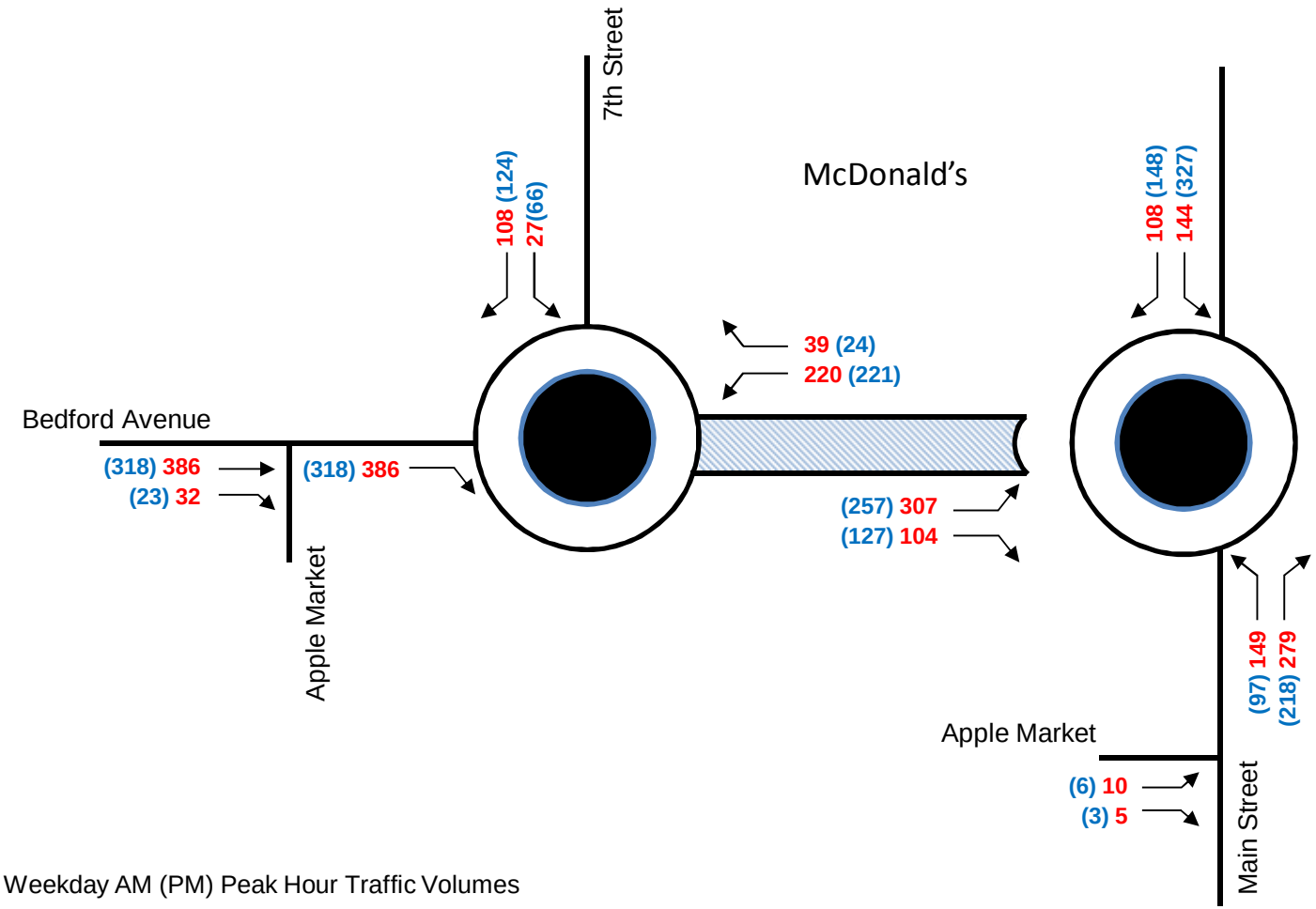
Main Street and Bedford Avenue Operational Analysis and Alternative Considerations

Town of Altavista, Virginia

Appendix C4

Not To Scale

Alternative 3B (Peanut Roundabout) - 2035



Legend

XX (XX) - Weekday AM (PM) Peak Hour Traffic Volumes

→ - Turning Movement

Kimley»Horn

TURNING MOVEMENT VOLUMES

Main Street and Bedford Avenue Operational Analysis and Alternative Considerations

Town of Altavista, Virginia

Appendix C5

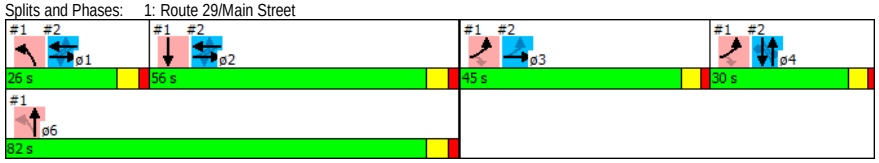
Appendix D: Analysis Results

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø3	ø4
Lane Configurations								
Volume (vph)	154	65	90	218	115	89		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Frt		0.850			0.941			
Flt Protected	0.950		0.950					
Satd. Flow (prot)	1652	1425	1593	1739	1753	0		
Flt Permitted	0.950		0.409					
Satd. Flow (perm)	1652	1425	686	1739	1753	0		
Satd. Flow (RTOR)		76			26			
Adj. Flow (vph)	186	76	118	242	144	113		
Lane Group Flow (vph)	186	76	118	242	257	0		
Turn Type	NA	Perm	pm+pt	NA	NA			
Protected Phases	3 4		1	6	2		3	4
Permitted Phases		3 4	6					
Total Split (s)			26.0	82.0	56.0		45.0	30.0
Total Lost Time (s)			6.0	6.0	6.0			
Act Effct Green (s)	31.6	31.6	49.2	49.2	27.2			
Actuated g/C Ratio	0.34	0.34	0.53	0.53	0.29			
v/c Ratio	0.33	0.14	0.23	0.26	0.48			
Control Delay	28.6	12.3	12.8	13.1	28.3			
Queue Delay	0.4	0.2	0.0	0.0	0.0			
Total Delay	29.1	12.4	12.8	13.1	28.3			
LOS	C	B	B	B	C			
Approach Delay	24.2			13.0	28.3			
Approach LOS	C			B	C			

Intersection Summary

Cycle Length: 157
Actuated Cycle Length: 92.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 20.8 — Intersection LOS: C
Intersection Capacity Utilization 40.9% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Route 29/Main Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	154	65	90	218	115	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	9	9	10	12	12
Total Lost time (s)	5.0	5.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1425	1593	1739	1752	
Flt Permitted	0.95	1.00	0.41	1.00	1.00	
Satd. Flow (perm)	1652	1425	686	1739	1752	
Peak-hour factor, PHF	0.83	0.85	0.76	0.90	0.80	0.79
Adj. Flow (vph)	186	76	118	242	144	113
RTOR Reduction (vph)	0	50	0	0	18	0
Lane Group Flow (vph)	186	26	118	242	239	0
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	3 4		1	6	2	
Permitted Phases		3 4	6			
Actuated Green, G (s)	31.3	31.3	49.2	49.2	27.5	
Effective Green, g (s)	31.3	31.3	49.2	49.2	27.5	
Actuated g/C Ratio	0.34	0.34	0.54	0.54	0.30	
Clearance Time (s)			6.0	6.0	6.0	
Vehicle Extension (s)			3.5	5.0	5.0	
Lane Grp Cap (vph)	565	487	524	935	526	
v/s Ratio Prot	c0.11		0.04	c0.14	c0.14	
v/s Ratio Perm		0.02	0.08			
v/c Ratio	0.33	0.05	0.23	0.26	0.45	
Uniform Delay, d1	22.3	20.2	11.3	11.4	25.9	
Progression Factor	1.10	1.96	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.1	0.3	0.3	1.3	
Delay (s)	24.9	39.5	11.5	11.7	27.2	
Level of Service	C	D	B	B	C	
Approach Delay (s)	29.1			11.6	27.2	
Approach LOS	C			B	C	

Intersection Summary

HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	91.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

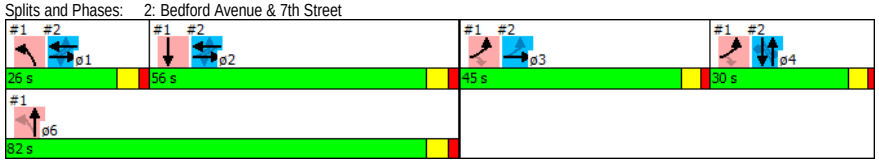
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	193	26	2	140	37	22	9	12	14	8	88
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.968			0.961				0.850
Flt Protected		0.982			0.999			0.974			0.967	
Satd. Flow (prot)	0	3313	0	0	2042	0	0	1744	0	0	1801	1583
Flt Permitted		0.750			0.995			0.815			0.830	
Satd. Flow (perm)	0	2530	0	0	2033	0	0	1459	0	0	1546	1583
Satd. Flow (RTOR)		22			14			11				97
Adj. Flow (vph)	167	241	43	3	169	54	37	12	20	22	10	91
Lane Group Flow (vph)	0	451	0	0	226	0	0	69	0	0	32	91
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1 2 3			1 2			4			4	
Permitted Phases	1 2 3			1 2			4			4		4
Total Split (s)							30.0	30.0		30.0	30.0	30.0
Total Lost Time (s)								5.0			5.0	5.0
Act Effct Green (s)		70.3			49.2			10.4			10.4	10.4
Actuated g/C Ratio		0.76			0.53			0.11			0.11	0.11
v/c Ratio		0.23			0.21			0.40			0.18	0.34
Control Delay		3.2			2.4			44.8			45.7	12.8
Queue Delay		0.0			0.1			0.0			0.0	0.0
Total Delay		3.2			2.5			44.8			45.7	12.8
LOS		A			A			D			D	B
Approach Delay		3.2			2.5			44.8			21.3	
Approach LOS		A			A			D			C	

Intersection Summary

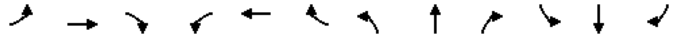
Cycle Length: 157
Actuated Cycle Length: 92.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 8.9 — Intersection LOS: A
Intersection Capacity Utilization 42.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Bedford Avenue & 7th Street



Lane Group	ø1	ø2	ø3	ø6
Lane Configurations				
Volume (vph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	6
Permitted Phases				
Total Split (s)	26.0	56.0	45.0	82.0
Total Lost Time (s)				
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	193	26	2	140	37	22	9	12	14	8	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			5.0			5.0	5.0
Lane Util. Factor		0.95			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.96			1.00	0.85
Flt Protected		0.98			1.00			0.97			0.97	1.00
Satd. Flow (prot)		3311			2042			1743			1801	1583
Flt Permitted		0.75			1.00			0.82			0.83	1.00
Satd. Flow (perm)		2529			2034			1459			1546	1583
Peak-hour factor, PHF	0.72	0.80	0.60	0.60	0.83	0.69	0.60	0.75	0.60	0.65	0.83	0.97
Adj. Flow (vph)	167	241	43	3	169	54	37	12	20	22	10	91
RTOR Reduction (vph)	0	5	0	0	6	0	0	10	0	0	0	81
Lane Group Flow (vph)	0	446	0	0	220	0	0	59	0	0	32	10
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1 2 3			1 2			4			4	
Permitted Phases	1 2 3			1 2			4			4		4
Actuated Green, G (s)		71.1			49.2			10.4			10.4	10.4
Effective Green, g (s)		71.1			49.2			10.4			10.4	10.4
Actuated g/C Ratio		0.78			0.54			0.11			0.11	0.11
Clearance Time (s)								5.0			5.0	5.0
Vehicle Extension (s)								3.5			3.5	3.5
Lane Grp Cap (vph)		1965			1093			165			175	179
v/s Ratio Prot												
v/s Ratio Perm		c0.18			0.11			c0.04			0.02	0.01
v/c Ratio		0.23			0.20			0.36			0.18	0.06
Uniform Delay, d1		2.8			11.0			37.5			36.7	36.2
Progression Factor		1.00			0.18			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.1			1.6			0.6	0.2
Delay (s)		2.8			2.0			39.1			37.3	36.3
Level of Service		A			A			D			D	D
Approach Delay (s)		2.8			2.0			39.1			36.6	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	91.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Route 29/Main Street

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	150	55	69	188	218
Average Queue (ft)	75	23	38	80	88
95th Queue (ft)	140	49	75	159	173
Link Distance (ft)	99	99		670	602
Upstream Blk Time (%)	7				
Queuing Penalty (veh)	8				
Storage Bay Dist (ft)			45		
Storage Blk Time (%)			6	14	
Queuing Penalty (veh)			13	13	

Intersection: 2: Bedford Avenue & 7th Street

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	TR	LTR	LTR	LT	R
Maximum Queue (ft)	115	38	73	107	61	68
Average Queue (ft)	37	6	21	33	17	31
95th Queue (ft)	87	24	58	77	47	53
Link Distance (ft)	458	458	99	171	610	
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						150
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

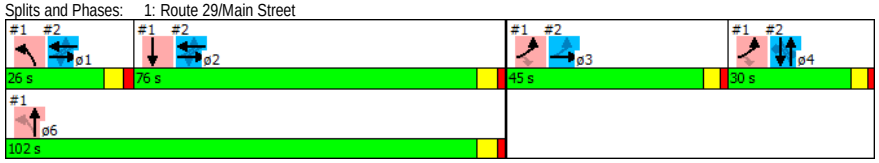
Network wide Queuing Penalty: 34

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø3	ø4
Lane Configurations								
Volume (vph)	114	85	55	172	265	120		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Frt		0.850			0.958			
Flt Protected	0.950		0.950					
Satd. Flow (prot)	1652	1425	1593	1739	1785	0		
Flt Permitted	0.950		0.258					
Satd. Flow (perm)	1652	1425	433	1739	1785	0		
Satd. Flow (RTOR)		100			15			
Adj. Flow (vph)	137	100	72	191	331	152		
Lane Group Flow (vph)	137	100	72	191	483	0		
Turn Type	NA	Perm	pm+pt	NA	NA			
Protected Phases	3 4		1	6	2		3	4
Permitted Phases		3 4	6					
Total Split (s)			26.0	102.0	76.0		45.0	30.0
Total Lost Time (s)			6.0	6.0	6.0			
Act Effct Green (s)	34.0	34.0	65.3	65.3	44.4			
Actuated g/C Ratio	0.31	0.31	0.59	0.59	0.40			
v/c Ratio	0.27	0.20	0.18	0.19	0.67			
Control Delay	31.9	9.7	11.7	11.5	32.0			
Queue Delay	0.5	0.3	0.0	0.0	0.0			
Total Delay	32.5	10.0	11.7	11.5	32.0			
LOS	C	A	B	B	C			
Approach Delay	23.0			11.6	32.0			
Approach LOS	C			B	C			

Intersection Summary

Cycle Length: 177
Actuated Cycle Length: 111.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 24.4 — Intersection LOS: C
Intersection Capacity Utilization 50.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Route 29/Main Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	114	85	55	172	265	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	9	9	10	12	12
Total Lost time (s)	5.0	5.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1425	1593	1739	1784	
Flt Permitted	0.95	1.00	0.26	1.00	1.00	
Satd. Flow (perm)	1652	1425	433	1739	1784	
Peak-hour factor, PHF	0.83	0.85	0.76	0.90	0.80	0.79
Adj. Flow (vph)	137	100	72	191	331	152
RTOR Reduction (vph)	0	69	0	0	9	0
Lane Group Flow (vph)	137	31	72	191	474	0
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	3 4		1	6	2	
Permitted Phases		3 4	6			
Actuated Green, G (s)	33.7	33.7	65.3	65.3	44.8	
Effective Green, g (s)	33.7	33.7	65.3	65.3	44.8	
Actuated g/C Ratio	0.31	0.31	0.59	0.59	0.41	
Clearance Time (s)			6.0	6.0	6.0	
Vehicle Extension (s)			3.5	5.0	5.0	
Lane Grp Cap (vph)	506	436	409	1032	726	
v/s Ratio Prot	c0.08		0.02	c0.11	c0.27	
v/s Ratio Perm		0.02	0.08			
v/c Ratio	0.27	0.07	0.18	0.19	0.65	
Uniform Delay, d1	28.9	27.0	12.4	10.2	26.3	
Progression Factor	0.93	1.29	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1	0.2	0.2	2.8	
Delay (s)	27.1	34.9	12.6	10.4	29.2	
Level of Service	C	C	B	B	C	
Approach Delay (s)	30.4			11.0	29.2	
Approach LOS	C			B	C	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

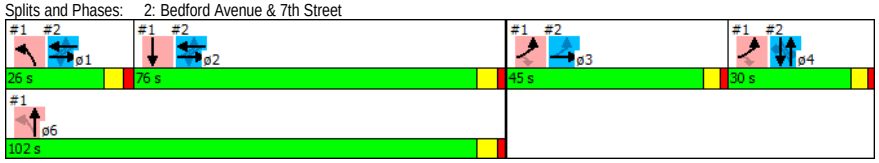
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	148	19	2	140	33	18	6	7	44	10	101
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.971			0.968				0.850
Flt Protected		0.980			0.999			0.971			0.959	
Satd. Flow (prot)	0	3309	0	0	2048	0	0	1751	0	0	1786	1583
Flt Permitted		0.738			0.996			0.787			0.780	
Satd. Flow (perm)	0	2492	0	0	2042	0	0	1419	0	0	1453	1583
Satd. Flow (RTOR)		20			12			7				104
Adj. Flow (vph)	153	185	32	3	169	48	30	8	12	68	12	104
Lane Group Flow (vph)	0	370	0	0	220	0	0	50	0	0	80	104
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1 2 3			1 2			4			4	
Permitted Phases	1 2 3			1 2			4			4		4
Total Split (s)							30.0	30.0		30.0	30.0	30.0
Total Lost Time (s)								5.0			5.0	5.0
Act Effct Green (s)		85.9			65.3			13.5			13.5	13.5
Actuated g/C Ratio		0.77			0.59			0.12			0.12	0.12
v/c Ratio		0.19			0.18			0.28			0.45	0.37
Control Delay		3.4			2.1			50.3			61.1	14.5
Queue Delay		0.0			0.1			0.0			0.0	0.0
Total Delay		3.4			2.2			50.3			61.1	14.5
LOS		A			A			D			E	B
Approach Delay		3.4			2.2			50.3			34.7	
Approach LOS		A			A			D			C	

Intersection Summary

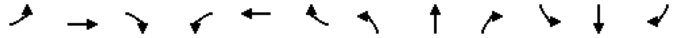
Cycle Length: 177
Actuated Cycle Length: 111.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 12.9 — Intersection LOS: B
Intersection Capacity Utilization 40.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Bedford Avenue & 7th Street



Lane Group	ø1	ø2	ø3	ø6
Lane Configurations				
Volume (vph)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Adj. Flow (vph)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	6
Permitted Phases				
Total Split (s)	26.0	76.0	45.0	102.0
Total Lost Time (s)				
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	148	19	2	140	33	18	6	7	44	10	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			5.0			5.0	5.0
Lane Util. Factor		0.95			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.97			1.00	0.85
Flt Protected		0.98			1.00			0.97			0.96	1.00
Satd. Flow (prot)		3308			2048			1750			1787	1583
Flt Permitted		0.74			1.00			0.79			0.78	1.00
Satd. Flow (perm)		2491			2041			1418			1454	1583
Peak-hour factor, PHF	0.72	0.80	0.60	0.60	0.83	0.69	0.60	0.75	0.60	0.65	0.83	0.97
Adj. Flow (vph)	153	185	32	3	169	48	30	8	12	68	12	104
RTOR Reduction (vph)	0	4	0	0	5	0	0	6	0	0	0	91
Lane Group Flow (vph)	0	366	0	0	215	0	0	44	0	0	80	13
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1 2 3			1 2			4			4	
Permitted Phases	1 2 3			1 2			4			4		4
Actuated Green, G (s)		86.5			65.3			13.5			13.5	13.5
Effective Green, g (s)		86.5			65.3			13.5			13.5	13.5
Actuated g/C Ratio		0.79			0.59			0.12			0.12	0.12
Clearance Time (s)								5.0			5.0	5.0
Vehicle Extension (s)								3.5			3.5	3.5
Lane Grp Cap (vph)		1958			1211			174			178	194
v/s Ratio Prot												
v/s Ratio Perm		c0.15			0.11			0.03			c0.06	0.01
v/c Ratio		0.19			0.18			0.25			0.45	0.07
Uniform Delay, d1		2.9			10.2			43.7			44.8	42.7
Progression Factor		1.00			0.17			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.1			0.9			2.1	0.2
Delay (s)		3.0			1.8			44.6			46.9	42.8
Level of Service		A			A			D			D	D
Approach Delay (s)		3.0			1.8			44.6			44.6	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Route 29/Main Street

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	111	75	69	157	346
Average Queue (ft)	55	29	30	55	165
95th Queue (ft)	107	58	64	119	295
Link Distance (ft)	99	99		670	602
Upstream Blk Time (%)	4	0			
Queuing Penalty (veh)	5	0			
Storage Bay Dist (ft)			45		
Storage Blk Time (%)			4	11	
Queuing Penalty (veh)			6	6	

Intersection: 2: Bedford Avenue & 7th Street

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	TR	LTR	LTR	LT	R
Maximum Queue (ft)	107	53	70	82	119	77
Average Queue (ft)	33	7	18	27	44	34
95th Queue (ft)	79	30	52	67	96	59
Link Distance (ft)	458	458	99	171	610	
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			1			
Storage Bay Dist (ft)						150
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Network Summary

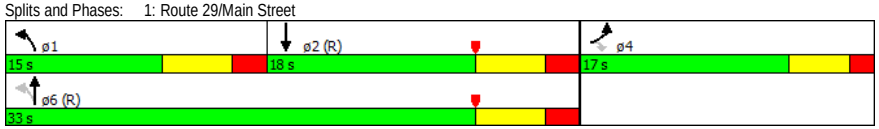
Network wide Queuing Penalty: 17

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	190	80	111	269	142	110
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.941	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1652	1425	1593	1739	1753	0
Flt Permitted	0.950		0.437			
Satd. Flow (perm)	1652	1425	733	1739	1753	0
Satd. Flow (RTOR)		87			74	
Adj. Flow (vph)	207	87	121	292	154	120
Lane Group Flow (vph)	207	87	121	292	274	0
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4	6			
Total Split (s)	17.0	17.0	15.0	33.0	18.0	
Total Lost Time (s)	5.0	5.0	6.0	6.0	6.0	
Act Effct Green (s)	10.8	10.8	30.8	32.0	20.5	
Actuated g/C Ratio	0.22	0.22	0.62	0.64	0.41	
v/c Ratio	0.58	0.23	0.20	0.26	0.36	
Control Delay	28.4	12.1	6.6	6.6	13.3	
Queue Delay	2.4	0.0	0.0	0.0	0.0	
Total Delay	30.7	12.1	6.6	6.6	13.3	
LOS	C	B	A	A	B	
Approach Delay	25.2			6.6	13.3	
Approach LOS	C			A	B	

Intersection Summary

Cycle Length: 50
Actuated Cycle Length: 50
Offset: 33 (66%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 14.1 — Intersection LOS: B
Intersection Capacity Utilization 45.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Route 29/Main Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	190	80	111	269	142	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	9	9	10	12	12
Total Lost time (s)	5.0	5.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1425	1593	1739	1753	
Flt Permitted	0.95	1.00	0.44	1.00	1.00	
Satd. Flow (perm)	1652	1425	733	1739	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	87	121	292	154	120
RTOR Reduction (vph)	0	71	0	0	49	0
Lane Group Flow (vph)	207	16	121	292	225	0
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4	6			
Actuated Green, G (s)	9.2	9.2	29.8	29.8	17.1	
Effective Green, g (s)	9.2	9.2	29.8	29.8	17.1	
Actuated g/C Ratio	0.18	0.18	0.60	0.60	0.34	
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.5	3.5	3.5	5.0	5.0	
Lane Grp Cap (vph)	303	262	552	1036	599	
v/s Ratio Prot	c0.13		0.03	c0.17	c0.13	
v/s Ratio Perm		0.01	0.10			
v/c Ratio	0.68	0.06	0.22	0.28	0.38	
Uniform Delay, d1	19.0	16.8	4.8	4.9	12.4	
Progression Factor	1.23	2.17	1.00	1.00	1.00	
Incremental Delay, d2	6.4	0.1	0.2	0.7	1.8	
Delay (s)	29.7	36.7	5.1	5.6	14.2	
Level of Service	C	D	A	A	B	
Approach Delay (s)	31.8			5.4	14.2	
Approach LOS	C			A	B	

Intersection Summary

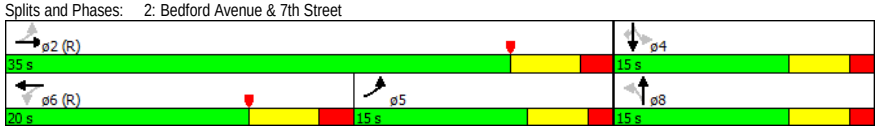
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	238	32	2	173	46	27	11	15	17	10	108
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.972			0.962				0.850
Flt Protected		0.983						0.975			0.970	
Satd. Flow (prot)	0	3323	0	0	2052	0	0	1747	0	0	1807	1583
Flt Permitted		0.761			0.997			0.824			0.777	
Satd. Flow (perm)	0	2572	0	0	2046	0	0	1477	0	0	1447	1583
Satd. Flow (RTOR)		29			26			16				196
Adj. Flow (vph)	161	259	35	2	188	50	29	12	16	18	11	117
Lane Group Flow (vph)	0	455	0	0	240	0	0	57	0	0	29	117
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		4
Total Split (s)	15.0	35.0		20.0	20.0		15.0	15.0		15.0	15.0	15.0
Total Lost Time (s)		6.0			6.0			5.0			5.0	5.0
Act Effct Green (s)		34.4			34.4			8.4			8.4	8.4
Actuated g/C Ratio		0.69			0.69			0.17			0.17	0.17
v/c Ratio		0.26			0.17			0.22			0.12	0.27
Control Delay		4.5			2.1			16.1			18.6	2.7
Queue Delay		0.0			0.2			0.0			0.0	0.0
Total Delay		4.5			2.3			16.1			18.6	2.7
LOS		A			A			B			B	A
Approach Delay		4.5			2.3			16.1			5.8	
Approach LOS		A			A			B			A	

Intersection Summary			
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 31 (62%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 4.9		Intersection LOS: A	
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Bedford Avenue & 7th Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	238	32	2	173	46	27	11	15	17	10	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			5.0			5.0	5.0
Lane Util. Factor		0.95			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.96			1.00	0.85
Flt Protected		0.98			1.00			0.98			0.97	1.00
Satd. Flow (prot)		3323			2051			1748			1807	1583
Flt Permitted		0.76			1.00			0.82			0.78	1.00
Satd. Flow (perm)		2573			2046			1478			1448	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	161	259	35	2	188	50	29	12	16	18	11	117
RTOR Reduction (vph)	0	10	0	0	9	0	0	14	0	0	0	101
Lane Group Flow (vph)	0	445	0	0	231	0	0	43	0	0	29	16
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		32.2			32.2			6.8			6.8	6.8
Effective Green, g (s)		32.2			32.2			6.8			6.8	6.8
Actuated g/C Ratio		0.64			0.64			0.14			0.14	0.14
Clearance Time (s)		6.0			6.0			5.0			5.0	5.0
Vehicle Extension (s)		5.0			3.5			3.5			3.5	3.5
Lane Grp Cap (vph)		1657			1317			201			196	215
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.11			c0.03			0.02	0.01
v/c Ratio		0.27			0.18			0.21			0.15	0.07
Uniform Delay, d1		3.8			3.6			19.2			19.0	18.9
Progression Factor		1.00			0.48			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.3			0.6			0.4	0.2
Delay (s)		3.9			2.0			19.9			19.5	19.0
Level of Service		A			A			B			B	B
Approach Delay (s)		3.9			2.0			19.9			19.1	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.30				
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Intersection: 1: Route 29/Main Street

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	148	74	70	144	148
Average Queue (ft)	74	29	38	57	62
95th Queue (ft)	126	57	71	112	115
Link Distance (ft)	99	99		670	602
Upstream Blk Time (%)	4	0			
Queuing Penalty (veh)	5	0			
Storage Bay Dist (ft)			45		
Storage Blk Time (%)			4	7	
Queuing Penalty (veh)			10	8	

Intersection: 2: Bedford Avenue & 7th Street

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	TR	LTR	LTR	LT	R
Maximum Queue (ft)	136	59	104	89	56	67
Average Queue (ft)	52	11	30	36	18	34
95th Queue (ft)	102	38	74	70	46	55
Link Distance (ft)	458	458	99	171	610	
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						150
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 23

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	105	68	212	327	148
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.958	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1652	1425	1593	1739	1785	0
Flt Permitted	0.950		0.307			
Satd. Flow (perm)	1652	1425	515	1739	1785	0
Satd. Flow (RTOR)		114			43	
Adj. Flow (vph)	152	114	74	230	355	161
Lane Group Flow (vph)	152	114	74	230	516	0
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4	6			
Total Split (s)	17.0	17.0	15.0	43.0	28.0	
Total Lost Time (s)	5.0	5.0	6.0	6.0	6.0	
Act Effct Green (s)	10.5	10.5	41.1	42.3	33.8	
Actuated g/C Ratio	0.18	0.18	0.68	0.70	0.56	
v/c Ratio	0.52	0.33	0.15	0.19	0.50	
Control Delay	29.8	11.6	5.2	5.1	14.7	
Queue Delay	1.1	0.2	0.0	0.0	0.0	
Total Delay	30.9	11.8	5.2	5.1	14.7	
LOS	C	B	A	A	B	
Approach Delay	22.7			5.1	14.7	
Approach LOS	C			A	B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 14.0 — Intersection LOS: B
Intersection Capacity Utilization 54.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Route 29/Main Street

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	105	68	212	327	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	9	9	10	12	12
Total Lost time (s)	5.0	5.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1652	1425	1593	1739	1784	
Flt Permitted	0.95	1.00	0.31	1.00	1.00	
Satd. Flow (perm)	1652	1425	514	1739	1784	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	114	74	230	355	161
RTOR Reduction (vph)	0	97	0	0	22	0
Lane Group Flow (vph)	152	17	74	230	494	0
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4	6			
Actuated Green, G (s)	8.9	8.9	40.1	40.1	29.2	
Effective Green, g (s)	8.9	8.9	40.1	40.1	29.2	
Actuated g/C Ratio	0.15	0.15	0.67	0.67	0.49	
Clearance Time (s)	5.0	5.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.5	3.5	3.5	5.0	5.0	
Lane Grp Cap (vph)	245	211	431	1162	868	
v/s Ratio Prot	c0.09		0.01	c0.13	c0.28	
v/s Ratio Perm		0.01	0.10			
v/c Ratio	0.62	0.08	0.17	0.20	0.57	
Uniform Delay, d1	24.0	22.0	4.9	3.8	10.9	
Progression Factor	1.04	1.69	1.00	1.00	1.00	
Incremental Delay, d2	5.0	0.2	0.2	0.4	2.7	
Delay (s)	29.9	37.4	5.1	4.2	13.6	
Level of Service	C	D	A	A	B	
Approach Delay (s)	33.1			4.4	13.6	
Approach LOS	C			A	B	

Intersection Summary

HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

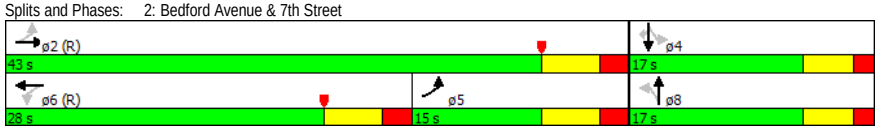
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	182	23	2	173	41	22	7	9	54	12	124
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.974			0.968				0.850
Flt Protected		0.980						0.972			0.961	
Satd. Flow (prot)	0	3319	0	0	2056	0	0	1753	0	0	1790	1583
Flt Permitted		0.750			0.998			0.783			0.736	
Satd. Flow (perm)	0	2540	0	0	2052	0	0	1412	0	0	1371	1583
Satd. Flow (RTOR)		23			22			10				164
Adj. Flow (vph)	148	198	25	2	188	45	24	8	10	59	13	135
Lane Group Flow (vph)	0	371	0	0	235	0	0	42	0	0	72	135
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		4
Total Split (s)	15.0	43.0		28.0	28.0		17.0	17.0		17.0	17.0	17.0
Total Lost Time (s)		6.0			6.0			5.0			5.0	5.0
Act Effct Green (s)		43.3			43.3			9.4			9.5	9.5
Actuated g/C Ratio		0.72			0.72			0.16			0.16	0.16
v/c Ratio		0.20			0.16			0.18			0.33	0.35
Control Delay		4.2			2.1			19.3			26.1	5.5
Queue Delay		0.0			0.3			0.0			0.0	0.0
Total Delay		4.2			2.4			19.3			26.1	5.5
LOS		A			A			B			C	A
Approach Delay		4.2			2.4			19.3			12.7	
Approach LOS		A			A			B			B	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 6.5 — Intersection LOS: A
Intersection Capacity Utilization 44.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Bedford Avenue & 7th Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	182	23	2	173	41	22	7	9	54	12	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)		6.0			6.0			5.0			5.0	5.0
Lane Util. Factor		0.95			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.97			1.00	0.85
Flt Protected		0.98			1.00			0.97			0.96	1.00
Satd. Flow (prot)		3320			2056			1753			1789	1583
Flt Permitted		0.75			1.00			0.78			0.74	1.00
Satd. Flow (perm)		2540			2052			1412			1370	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	198	25	2	188	45	24	8	10	59	13	135
RTOR Reduction (vph)	0	7	0	0	7	0	0	9	0	0	0	117
Lane Group Flow (vph)	0	364	0	0	228	0	0	33	0	0	72	18
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		41.1			41.1			7.9			7.9	7.9
Effective Green, g (s)		41.1			41.1			7.9			7.9	7.9
Actuated g/C Ratio		0.69			0.69			0.13			0.13	0.13
Clearance Time (s)		6.0			6.0			5.0			5.0	5.0
Vehicle Extension (s)		5.0			3.5			3.5			3.5	3.5
Lane Grp Cap (vph)		1739			1405			185			180	208
v/s Ratio Prot												
v/s Ratio Perm		c0.14			0.11			0.02			c0.05	0.01
v/c Ratio		0.21			0.16			0.18			0.40	0.09
Uniform Delay, d1		3.5			3.3			23.2			23.9	22.9
Progression Factor		1.00			0.48			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.2			0.6			1.7	0.2
Delay (s)		3.5			1.8			23.7			25.6	23.1
Level of Service		A			A			C			C	C
Approach Delay (s)		3.5			1.8			23.7			24.0	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Route 29/Main Street

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	108	75	68	141	218
Average Queue (ft)	62	37	32	43	99
95th Queue (ft)	106	67	60	102	189
Link Distance (ft)	99	99		670	602
Upstream Blk Time (%)	2	0			
Queuing Penalty (veh)	3	0			
Storage Bay Dist (ft)			45		
Storage Blk Time (%)			3	5	
Queuing Penalty (veh)			6	3	

Intersection: 2: Bedford Avenue & 7th Street

Movement	EB	EB	WB	NB	SB	SB
Directions Served	LT	TR	LTR	LTR	LT	R
Maximum Queue (ft)	121	51	87	83	93	73
Average Queue (ft)	44	12	28	31	40	36
95th Queue (ft)	89	35	67	65	77	61
Link Distance (ft)	458	458	99	171	610	
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)						150
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

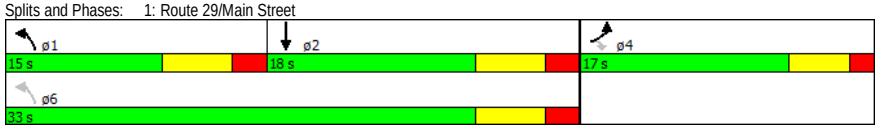
Network wide Queuing Penalty: 12

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations							
Volume (vph)	190	63	111	0	159	120	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.942		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1711	1531	1711	0	1755	0	
Flt Permitted	0.950		0.411				
Satd. Flow (perm)	1711	1531	740	0	1755	0	
Satd. Flow (RTOR)		68			71		
Adj. Flow (vph)	207	68	121	0	173	130	
Lane Group Flow (vph)	207	68	121	0	303	0	
Turn Type	NA	Perm	custom		NA		
Protected Phases	4		1		2		6
Permitted Phases		4	6				
Total Split (s)	17.0	17.0	15.0		18.0		33.0
Total Lost Time (s)	5.0	5.0	6.0		6.0		
Act Effct Green (s)	10.6	10.6	27.2		18.1		
Actuated g/C Ratio	0.23	0.23	0.60		0.40		
v/c Ratio	0.52	0.17	0.19		0.41		
Control Delay	21.6	6.2	6.5		15.0		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	21.6	6.2	6.5		15.0		
LOS	C	A	A		B		
Approach Delay	17.8				15.0		
Approach LOS	B				B		

Intersection Summary

Cycle Length: 50
Actuated Cycle Length: 45.5
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 14.7 — Intersection LOS: B
Intersection Capacity Utilization 44.9% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Route 29/Main Street



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	190	63	111	0	159	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	12
Total Lost time (s)	5.0	5.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	1.00		0.94	
Flt Protected	0.95	1.00	0.95		1.00	
Satd. Flow (prot)	1711	1531	1711		1755	
Flt Permitted	0.95	1.00	0.41		1.00	
Satd. Flow (perm)	1711	1531	739		1755	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	68	121	0	173	130
RTOR Reduction (vph)	0	56	0	0	47	0
Lane Group Flow (vph)	207	12	121	0	256	0
Turn Type	NA	Perm	custom		NA	
Protected Phases	4		1		2	
Permitted Phases		4	6			
Actuated Green, G (s)	8.4	8.4	28.7		16.4	
Effective Green, g (s)	8.4	8.4	28.7		16.4	
Actuated g/C Ratio	0.17	0.17	0.60		0.34	
Clearance Time (s)	5.0	5.0	6.0		6.0	
Vehicle Extension (s)	3.5	3.5	3.5		5.0	
Lane Grp Cap (vph)	298	267	568		598	
v/s Ratio Prot	c0.12		c0.03		c0.15	
v/s Ratio Perm		0.01	0.10			
v/c Ratio	0.69	0.04	0.21		0.43	
Uniform Delay, d1	18.6	16.5	4.7		12.2	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	7.1	0.1	0.2		1.0	
Delay (s)	25.8	16.6	4.9		13.3	
Level of Service	C	B	A		B	
Approach Delay (s)	23.5			4.9	13.3	
Approach LOS	C			A	B	

Intersection Summary

HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	17.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

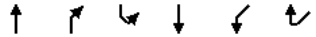
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	238	32	12	173	46	27	11	15	0	0	108
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.973			0.962				0.865
Flt Protected		0.983			0.997			0.975				
Satd. Flow (prot)	0	3323	0	0	1807	0	0	1747	0	0	0	1558
Flt Permitted		0.983			0.997			0.975				
Satd. Flow (perm)	0	3323	0	0	1807	0	0	1747	0	0	0	1558
Adj. Flow (vph)	161	259	35	13	188	50	29	12	16	0	0	117
Lane Group Flow (vph)	0	455	0	0	251	0	0	57	0	0	0	117
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 37.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	148	238	32	12	173	46	27	11	15	0	0	108
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	259	35	13	188	50	29	12	16	0	0	117
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					188							
pX, platoon unblocked												
vC, conflicting volume	238			293			954	862	147	712	854	213
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238			293			954	862	147	712	854	213
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			99			82	95	98	100	100	85
cM capacity (veh/h)	1326			1265			163	253	874	272	256	792

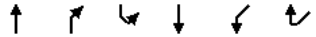
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	290	164	251	58	117
Volume Left	161	0	13	29	0
Volume Right	0	35	50	16	117
cSH	1326	1700	1265	235	792
Volume to Capacity	0.12	0.10	0.01	0.25	0.15
Queue Length 95th (ft)	10	0	1	23	13
Control Delay (s)	5.0	0.0	0.5	25.3	10.3
Lane LOS	A		A	D	B
Approach Delay (s)	3.2		0.5	25.3	10.3
Approach LOS				D	B

Intersection Summary					
Average Delay		4.8			
Intersection Capacity Utilization		37.8%	ICU Level of Service		A
Analysis Period (min)		15			



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (vph)	111	269	0	222	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905					
Flt Protected						
Satd. Flow (prot)	1686	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1686	0	0	1863	0	0
Adj. Flow (vph)	121	292	0	241	0	0
Lane Group Flow (vph)	413	0	0	241	0	0
Sign Control	Free			Free	Stop	

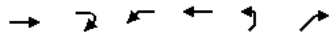
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	111	269	0	222	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	121	292	0	241	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				275		
pX, platoon unblocked						
vC, conflicting volume			413		508	267
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			413		508	267
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1146		525	772

Direction, Lane #	NB 1	SB 1
Volume Total	413	241
Volume Left	0	0
Volume Right	292	0
cSH	1700	1700
Volume to Capacity	0.24	0.14
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		
Approach Delay (s)	0.0	0.0
Approach LOS		

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	25.7%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	190	0	0	279	0	269
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Adj. Flow (vph)	207	0	0	303	0	292
Lane Group Flow (vph)	207	0	0	303	0	292
Sign Control	Free			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Intersection: 1: Route 29/Main Street

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	103	52	80	122
Average Queue (ft)	55	21	39	73
95th Queue (ft)	95	42	68	119
Link Distance (ft)	98	98	111	101
Upstream Blk Time (%)	1		0	4
Queuing Penalty (veh)	1		0	10
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bedford Avenue & 7th Street

Movement	EB	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LTR	R
Maximum Queue (ft)	87	2	59	64	78
Average Queue (ft)	28	0	6	29	37
95th Queue (ft)	68	2	32	54	60
Link Distance (ft)	473	473	98	168	614
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Route 29/Main Street

Movement	NB
Directions Served	TR
Maximum Queue (ft)	40
Average Queue (ft)	2
95th Queue (ft)	19
Link Distance (ft)	279
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Route 29/Main Street

Movement	WB	NE
Directions Served	T	R
Maximum Queue (ft)	119	50
Average Queue (ft)	15	5
95th Queue (ft)	69	28
Link Distance (ft)	323	286
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 12

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø6
Lane Configurations							
Volume (vph)	140	51	68	0	381	160	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.960		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1711	1531	1711	0	1788	0	
Flt Permitted	0.950		0.237				
Satd. Flow (perm)	1711	1531	427	0	1788	0	
Satd. Flow (RTOR)		55			40		
Adj. Flow (vph)	152	55	74	0	414	174	
Lane Group Flow (vph)	152	55	74	0	588	0	
Turn Type	NA	Perm	custom		NA		
Protected Phases	4		1		2		6
Permitted Phases		4	6				
Total Split (s)	17.0	17.0	15.0		28.0		43.0
Total Lost Time (s)	5.0	5.0	6.0		6.0		
Act Effct Green (s)	10.4	10.4	31.5		26.2		
Actuated g/C Ratio	0.21	0.21	0.63		0.53		
v/c Ratio	0.43	0.15	0.15		0.61		
Control Delay	24.3	8.0	5.4		18.3		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	24.3	8.0	5.4		18.3		
LOS	C	A	A		B		
Approach Delay	19.9				18.3		
Approach LOS	B				B		

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 49.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 17.6 — Intersection LOS: B
Intersection Capacity Utilization 53.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Route 29/Main Street

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	51	68	0	381	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	12
Total Lost time (s)	5.0	5.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	0.85	1.00		0.96	
Flt Protected	0.95	1.00	0.95		1.00	
Satd. Flow (prot)	1711	1531	1711		1788	
Flt Permitted	0.95	1.00	0.24		1.00	
Satd. Flow (perm)	1711	1531	427		1788	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	55	74	0	414	174
RTOR Reduction (vph)	0	47	0	0	22	0
Lane Group Flow (vph)	152	8	74	0	566	0
Turn Type	NA	Perm	custom		NA	
Protected Phases	4		1		2	
Permitted Phases		4	6			
Actuated Green, G (s)	8.0	8.0	34.5		24.4	
Effective Green, g (s)	8.0	8.0	34.5		24.4	
Actuated g/C Ratio	0.15	0.15	0.64		0.46	
Clearance Time (s)	5.0	5.0	6.0		6.0	
Vehicle Extension (s)	3.5	3.5	3.5		5.0	
Lane Grp Cap (vph)	255	228	373		815	
v/s Ratio Prot	c0.09		c0.02		c0.32	
v/s Ratio Perm		0.01	0.11			
v/c Ratio	0.60	0.04	0.20		0.69	
Uniform Delay, d1	21.2	19.5	5.6		11.6	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	3.9	0.1	0.3		3.3	
Delay (s)	25.2	19.5	5.9		14.9	
Level of Service	C	B	A		B	
Approach Delay (s)	23.7			5.9	14.9	
Approach LOS	C			A	B	

Intersection Summary

HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	17.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

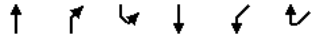
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	182	23	14	173	41	22	7	9	0	0	124
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.976			0.968				0.865
Flt Protected		0.980			0.997			0.972				
Satd. Flow (prot)	0	3319	0	0	1813	0	0	1753	0	0	0	1558
Flt Permitted		0.980			0.997			0.972				
Satd. Flow (perm)	0	3319	0	0	1813	0	0	1753	0	0	0	1558
Adj. Flow (vph)	148	198	25	15	188	45	24	8	10	0	0	135
Lane Group Flow (vph)	0	371	0	0	248	0	0	42	0	0	0	135
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 35.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	136	182	23	14	173	41	22	7	9	0	0	124
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	148	198	25	15	188	45	24	8	10	0	0	135
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					188							
pX, platoon unblocked												
vC, conflicting volume	233			223			882	769	111	649	759	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	233			223			882	769	111	649	759	210
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			99			87	97	99	100	100	83
cM capacity (veh/h)	1332			1343			181	290	920	312	294	795

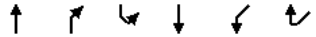
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	247	124	248	41	135
Volume Left	148	0	15	24	0
Volume Right	0	25	45	10	135
cSH	1332	1700	1343	245	795
Volume to Capacity	0.11	0.07	0.01	0.17	0.17
Queue Length 95th (ft)	9	0	1	15	15
Control Delay (s)	5.2	0.0	0.6	22.7	10.4
Lane LOS	A		A	C	B
Approach Delay (s)	3.5		0.6	22.7	10.4
Approach LOS				C	B

Intersection Summary					
Average Delay		4.7			
Intersection Capacity Utilization		35.4%	ICU Level of Service		A
Analysis Period (min)		15			



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (vph)	68	212	0	432	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.898					
Flt Protected						
Satd. Flow (prot)	1673	0	0	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1673	0	0	1863	0	0
Adj. Flow (vph)	74	230	0	470	0	0
Lane Group Flow (vph)	304	0	0	470	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	68	212	0	432	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	230	0	470	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				275		
pX, platoon unblocked					0.79	
vC, conflicting volume			304		659	189
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			304		432	189
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1256		457	853

Direction, Lane #	NB 1	SB 1
Volume Total	304	470
Volume Left	0	0
Volume Right	230	0
cSH	1700	1700
Volume to Capacity	0.18	0.28
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		
Approach Delay (s)	0.0	0.0
Approach LOS		

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	26.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	140	0	0	541	0	212
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	0	1611
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	0	1611
Adj. Flow (vph)	152	0	0	588	0	230
Lane Group Flow (vph)	152	0	0	588	0	230
Sign Control	Free			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 31.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection Sign configuration not allowed in HCM analysis.

Intersection: 1: Route 29/Main Street

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	102	59	69	166
Average Queue (ft)	47	22	32	106
95th Queue (ft)	90	48	63	153
Link Distance (ft)	95	95	111	101
Upstream Blk Time (%)	1	0		14
Queuing Penalty (veh)	1	0		77
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Bedford Avenue & 7th Street

Movement	EB	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LTR	R
Maximum Queue (ft)	73	2	44	55	72
Average Queue (ft)	23	0	5	22	39
95th Queue (ft)	56	3	27	47	61
Link Distance (ft)	466	466	95	168	614
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Route 29/Main Street

Movement	NB
Directions Served	TR
Maximum Queue (ft)	9
Average Queue (ft)	1
95th Queue (ft)	7
Link Distance (ft)	279
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Route 29/Main Street

Movement	EB	WB	NE
Directions Served	T	T	R
Maximum Queue (ft)	5	267	32
Average Queue (ft)	0	77	2
95th Queue (ft)	5	191	16
Link Distance (ft)	101	323	286
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 78

MOVEMENT SUMMARY

Site: Alternative 2 2035 AM

Roundabout with 1-lane approaches and circulating road, and an extra turn lane
MUTCD (FHWA 2009) example number: 3C-3
Roundabout Guide (TRB 2010) example number: A-2
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: Main Street											
3x	L2	154	2.0	0.338	8.4	LOS A	2.0	51.5	0.60	0.67	23.8
8x	T1	90	2.0	0.338	4.3	LOS A	2.0	51.5	0.60	0.67	23.6
18x	R2	29	2.0	0.338	4.6	LOS A	2.0	51.5	0.60	0.67	22.8
Approach		274	2.0	0.338	6.7	LOS A	2.0	51.5	0.60	0.67	23.6
NorthEast: 7 th Street											
1x	L2	12	2.0	0.195	8.5	LOS A	1.1	27.0	0.58	0.60	24.3
4x	T1	17	2.0	0.195	4.3	LOS A	1.1	27.0	0.58	0.60	23.5
16x	R2	117	2.0	0.195	4.7	LOS A	1.1	27.0	0.58	0.60	22.6
Approach		147	2.0	0.195	5.0	LOS A	1.1	27.0	0.58	0.60	22.9
NorthWest: Bedford Avenue											
7x	L2	161	2.0	0.504	7.7	LOS A	3.9	98.1	0.59	0.58	23.7
4x	T1	174	2.0	0.504	3.6	LOS A	3.9	98.1	0.59	0.58	23.9
14x	R2	120	2.0	0.504	3.9	LOS A	3.9	98.1	0.59	0.58	22.5
Approach		454	2.0	0.504	5.1	LOS A	3.9	98.1	0.59	0.58	23.5
SouthWest: Main Street											
5x	L2	120	2.0	0.174	7.6	LOS A	1.0	25.7	0.56	0.62	23.2
8x	T1	42	2.0	0.174	3.5	LOS A	1.0	25.7	0.56	0.62	22.7
12x	R2	303	2.0	0.185	1.4	LOS A	0.0	0.0	0.00	0.25	24.8
Approach		465	2.0	0.185	3.2	LOS A	1.0	25.7	0.19	0.38	24.3
All Vehicles		1340	2.0	0.504	4.7	LOS A	3.9	98.1	0.45	0.53	23.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 2 2035 PM

Roundabout with 1-lane approaches and circulating road, and an extra turn lane
MUTCD (FHWA 2009) example number: 3C-3
Roundabout Guide (TRB 2010) example number: A-2
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: Main Street											
3x	L2	355	2.0	0.602	9.4	LOS A	5.5	138.5	0.73	0.75	23.3
8x	T1	121	2.0	0.602	5.3	LOS A	5.5	138.5	0.73	0.75	23.2
18x	R2	40	2.0	0.602	5.6	LOS A	5.5	138.5	0.73	0.75	22.4
Approach		516	2.0	0.602	8.1	LOS A	5.5	138.5	0.73	0.75	23.2
NorthEast: 7 th Street											
1x	L2	39	2.0	0.346	10.7	LOS B	2.1	54.2	0.76	0.80	23.4
4x	T1	33	2.0	0.346	6.6	LOS A	2.1	54.2	0.76	0.80	22.1
16x	R2	135	2.0	0.346	6.9	LOS A	2.1	54.2	0.76	0.80	21.4
Approach		207	2.0	0.346	7.6	LOS A	2.1	54.2	0.76	0.80	22.0
NorthWest: Bedford Avenue											
7x	L2	148	2.0	0.537	11.4	LOS B	4.3	110.3	0.80	0.88	22.0
4x	T1	130	2.0	0.537	7.3	LOS A	4.3	110.3	0.80	0.88	22.9
14x	R2	92	2.0	0.537	7.6	LOS A	4.3	110.3	0.80	0.88	21.0
Approach		371	2.0	0.537	9.0	LOS A	4.3	110.3	0.80	0.88	22.2
SouthWest: Main Street											
5x	L2	79	2.0	0.111	7.3	LOS A	0.6	16.1	0.52	0.59	23.3
8x	T1	26	2.0	0.111	3.2	LOS A	0.6	16.1	0.52	0.59	22.7
12x	R2	237	2.0	0.144	1.4	LOS A	0.0	0.0	0.00	0.25	24.8
Approach		342	2.0	0.144	2.9	LOS A	0.6	16.1	0.16	0.36	24.4
All Vehicles		1436	2.0	0.602	7.0	LOS A	5.5	138.5	0.62	0.70	23.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3 - Main St - 2035 AM

Network: Alternative 3 2035 AM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: Main Street													
18ax	R1	274	2.0	274	2.0	0.300	2.7	LOS A	1.9	49.3	0.48	0.42	23.1
Approach		274	2.0	274	2.0	0.300	2.7	LOS A	1.9	49.3	0.48	0.42	23.1
North: Connector													
7u	U	1	0.0	1	0.0	0.535	6.3	LOS A	0.0	0.0	0.00	0.41	16.8
7a	L1	334	2.0	334	2.0	0.535	4.2	LOS A	0.0	0.0	0.00	0.41	24.9
14a	R1	270	2.0	270	2.0	0.535	1.0	LOS A	0.0	0.0	0.00	0.41	24.6
Approach		604	2.0	604	2.0	0.535	2.7	LOS A	0.0	0.0	0.00	0.41	24.7
SouthWest: Main Street													
5ax	L1	162	2.0	162	2.0	0.579	10.0	LOS B	4.8	122.3	0.72	0.81	21.3
12x	R2	303	2.0	303	2.0	0.579	7.0	LOS A	4.8	122.3	0.72	0.81	23.1
Approach		465	2.0	465	2.0	0.579	8.0	LOS A	4.8	122.3	0.72	0.81	22.7
All Vehicles		1343	2.0	1343	2.0	0.579	4.6	LOS A	4.8	122.3	0.35	0.55	23.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3 - Bedford & 7th 2035 AM

Network: Alternative 3 2035 AM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Connector													
3u	U	157	0.0	157	0.0	0.276	7.4	LOS A	0.0	0.0	0.00	0.62	15.6
3a	L1	239	2.0	239	2.0	0.276	4.8	LOS A	0.0	0.0	0.00	0.62	24.2
18a	R1	42	2.0	42	2.0	0.276	1.6	LOS A	0.0	0.0	0.00	0.62	23.9
Approach		438	1.3	438	1.3	0.276	5.4	LOS A	0.0	0.0	0.00	0.62	23.2
NorthEast: 7th Street													
1ax	L1	29	2.0	29	2.0	0.192	8.0	LOS A	1.0	24.9	0.56	0.61	22.3
16x	R2	117	2.0	117	2.0	0.192	5.0	LOS A	1.0	24.9	0.56	0.61	23.7
Approach		147	2.0	147	2.0	0.192	5.6	LOS A	1.0	24.9	0.56	0.61	23.5
NorthWest: Bedford													
14ax	R1	420	2.0	420	2.0	0.455	3.3	LOS A	3.1	78.5	0.53	0.47	23.0
Approach		420	2.0	420	2.0	0.455	3.3	LOS A	3.1	78.5	0.53	0.47	23.0
All Vehicles		1004	1.7	1004	1.7	0.455	4.5	LOS A	3.1	78.5	0.30	0.56	23.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3 - Main St - 2035 PM

Network: Alternative 3 2035 PM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: Main Street													
18ax	R1	516	2.0	516	2.0	0.526	2.6	LOS A	4.5	114.6	0.50	0.40	23.1
Approach		516	2.0	516	2.0	0.526	2.6	LOS A	4.5	114.6	0.50	0.40	23.1
North: Connector													
7u	U	1	0.0	1	0.0	0.686	6.3	LOS A	0.0	0.0	0.00	0.34	17.8
7a	L1	279	2.0	279	2.0	0.686	4.2	LOS A	0.0	0.0	0.00	0.34	25.2
14a	R1	493	2.0	493	2.0	0.686	1.0	LOS A	0.0	0.0	0.00	0.34	24.9
Approach		774	2.0	774	2.0	0.686	2.1	LOS A	0.0	0.0	0.00	0.34	25.0
SouthWest: Main Street													
5ax	L1	105	2.0	105	2.0	0.406	7.6	LOS A	2.5	63.0	0.58	0.63	22.3
12x	R2	237	2.0	237	2.0	0.406	4.6	LOS A	2.5	63.0	0.58	0.63	23.7
Approach		342	2.0	342	2.0	0.406	5.5	LOS A	2.5	63.0	0.58	0.63	23.4
All Vehicles		1633	2.0	1633	2.0	0.686	3.0	LOS A	4.5	114.6	0.28	0.42	24.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3 - Bedford & 7th 2035 PM

Network: Alternative 3 2035 PM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Connector													
3u	U	355	0.0	355	0.0	0.391	7.9	LOS A	0.0	0.0	0.00	0.68	15.6
3a	L1	240	2.0	240	2.0	0.391	5.0	LOS A	0.0	0.0	0.00	0.68	24.0
18a	R1	26	2.0	26	2.0	0.391	1.8	LOS A	0.0	0.0	0.00	0.68	23.8
Approach		622	0.9	622	0.9	0.391	6.5	LOS A	0.0	0.0	0.00	0.68	22.0
NorthEast: 7th Street													
1ax	L1	72	2.0	72	2.0	0.320	10.3	LOS B	1.8	44.8	0.70	0.78	21.1
16x	R2	135	2.0	135	2.0	0.320	7.3	LOS A	1.8	44.8	0.70	0.78	23.0
Approach		207	2.0	207	2.0	0.320	8.4	LOS A	1.8	44.8	0.70	0.78	22.6
NorthWest: Bedford													
14ax	R1	346	2.0	346	2.0	0.470	6.1	LOS A	3.2	80.8	0.71	0.73	22.1
Approach		346	2.0	346	2.0	0.470	6.1	LOS A	3.2	80.8	0.71	0.73	22.1
All Vehicles		1174	1.4	1174	1.4	0.470	6.7	LOS A	3.2	80.8	0.33	0.71	22.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3B - Main St - 2035 AM

Network: Alternative 3B 2035 AM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: Main Street													
3x	L2	157	2.0	157	2.0	0.301	7.0	LOS A	2.0	50.1	0.48	0.54	24.4
18ax	R1	117	2.0	117	2.0	0.301	2.7	LOS A	2.0	50.1	0.48	0.54	22.3
Approach		274	2.0	274	2.0	0.301	5.2	LOS A	2.0	50.1	0.48	0.54	23.8
North: Connector													
7u	U	1	0.0	1	0.0	0.481	8.2	LOS A	3.7	92.9	0.54	0.59	13.1
7a	L1	334	2.0	334	2.0	0.481	6.0	LOS A	3.7	92.9	0.54	0.59	23.7
14a	R1	113	2.0	113	2.0	0.481	2.8	LOS A	3.7	92.9	0.54	0.59	23.4
Approach		448	2.0	448	2.0	0.481	5.2	LOS A	3.7	92.9	0.54	0.59	23.6
SouthWest: Main Street													
5ax	L1	162	2.0	162	2.0	0.607	10.4	LOS B	5.6	142.9	0.79	0.86	21.1
12x	R2	303	2.0	303	2.0	0.607	7.3	LOS A	5.6	142.9	0.79	0.86	23.0
Approach		465	2.0	465	2.0	0.607	8.4	LOS A	5.6	142.9	0.79	0.86	22.6
All Vehicles		1187	2.0	1187	2.0	0.607	6.4	LOS A	5.6	142.9	0.63	0.68	23.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3B - Bedford & 7th 2035 AM

Network: Alternative 3B 2035 AM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Connector													
3a	L1	239	2.0	239	2.0	0.179	4.2	LOS A	0.0	0.0	0.00	0.50	24.4
18a	R1	42	2.0	42	2.0	0.179	1.0	LOS A	0.0	0.0	0.00	0.50	24.1
Approach		282	2.0	282	2.0	0.179	3.7	LOS A	0.0	0.0	0.00	0.50	24.4
NorthEast: 7th Street													
1ax	L1	29	2.0	29	2.0	0.167	6.7	LOS A	0.8	21.3	0.44	0.51	22.9
16x	R2	117	2.0	117	2.0	0.167	3.7	LOS A	0.8	21.3	0.44	0.51	24.0
Approach		147	2.0	147	2.0	0.167	4.3	LOS A	0.8	21.3	0.44	0.51	23.9
NorthWest: Bedford													
14ax	R1	420	2.0	420	2.0	0.387	1.6	LOS A	2.9	73.6	0.21	0.23	23.8
Approach		420	2.0	420	2.0	0.387	1.6	LOS A	2.9	73.6	0.21	0.23	23.8
All Vehicles		848	2.0	848	2.0	0.387	2.7	LOS A	2.9	73.6	0.18	0.37	24.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3B - Main St - 2035 PM

Network: Alternative 3B 2035 PM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: Main Street													
3x	L2	355	2.0	355	2.0	0.527	6.9	LOS A	4.6	116.7	0.51	0.54	24.2
18ax	R1	161	2.0	161	2.0	0.527	2.6	LOS A	4.6	116.7	0.51	0.54	22.1
Approach		516	2.0	516	2.0	0.527	5.6	LOS A	4.6	116.7	0.51	0.54	23.8
North: Connector													
7u	U	1	0.0	1	0.0	0.556	11.4	LOS B	4.6	117.6	0.76	0.84	10.3
7a	L1	279	2.0	279	2.0	0.556	9.2	LOS A	4.6	117.6	0.76	0.84	22.4
14a	R1	138	2.0	138	2.0	0.556	6.1	LOS A	4.6	117.6	0.76	0.84	22.2
Approach		418	2.0	418	2.0	0.556	8.2	LOS A	4.6	117.6	0.76	0.84	22.3
SouthWest: Main Street													
5ax	L1	105	2.0	105	2.0	0.429	7.6	LOS A	3.0	76.0	0.66	0.66	22.3
12x	R2	237	2.0	237	2.0	0.429	4.6	LOS A	3.0	76.0	0.66	0.66	23.7
Approach		342	2.0	342	2.0	0.429	5.5	LOS A	3.0	76.0	0.66	0.66	23.4
All Vehicles		1277	2.0	1277	2.0	0.556	6.4	LOS A	4.6	117.6	0.63	0.67	23.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Alternative 3B - Bedford & 7th 2035 PM

Network: Alternative 3B 2035 PM

Roundabout with 1-lane approaches and circulating road
MUTCD (FHWA 2009) example number: 2B-22
Roundabout Guide (TRB 2010) example number: A-1
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Connector													
3a	L1	240	2.0	240	2.0	0.169	4.2	LOS A	0.0	0.0	0.00	0.51	24.3
18a	R1	26	2.0	26	2.0	0.169	1.0	LOS A	0.0	0.0	0.00	0.51	24.1
Approach		266	2.0	266	2.0	0.169	3.8	LOS A	0.0	0.0	0.00	0.51	24.3
NorthEast: 7th Street													
1ax	L1	72	2.0	72	2.0	0.240	7.5	LOS A	1.3	34.1	0.50	0.56	22.3
16x	R2	135	2.0	135	2.0	0.240	4.5	LOS A	1.3	34.1	0.50	0.56	23.7
Approach		207	2.0	207	2.0	0.240	5.5	LOS A	1.3	34.1	0.50	0.56	23.4
NorthWest: Bedford													
14ax	R1	346	2.0	346	2.0	0.354	7.4	LOS A	3.5	89.9	0.48	0.34	21.5
Approach		346	2.0	346	2.0	0.354	7.4	LOS A	3.5	89.9	0.48	0.34	21.5
All Vehicles		818	2.0	818	2.0	0.354	5.8	LOS A	3.5	89.9	0.33	0.45	22.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E: Warrant Analysis

Projected 2035 12-Hour Counts

Note: Main Street NBT movement is free, not included in this analysis.
7th Street SBT and SBL re-routed to Main Street SBT

	Main St. Southbound			Main St. Northbound		Bedford Ave. Eastbound		**15-Minute**		**Hourly**	
Start Time	Right	Thru	Left	Thru	Left	Right	Left	**Major (both approaches)**	**Minor (highest approach)**	**Major (both approaches)**	**Minor (highest approach)**
07:00 AM	9	25	0	0	9	9	10	42	18		
07:15 AM	22	17	0	0	16	11	11	55	22		
07:30 AM	35	42	0	0	32	26	54	109	80		
07:45 AM	37	35	0	0	36	23	63	108	86	313	207
08:00 AM	16	56	0	0	26	15	49	97	64		
08:15 AM	22	36	0	0	17	16	23	76	39		
08:30 AM	25	37	0	0	12	11	16	74	27		
08:45 AM	22	46	0	0	17	10	28	86	38	333	169
09:00 AM	12	39	0	0	18	11	27	70	38		
09:15 AM	10	32	0	0	11	10	22	53	32		
09:30 AM	30	41	0	0	9	5	18	79	23		
09:45 AM	22	56	0	0	12	15	28	91	43	292	137
10:00 AM	16	53	0	0	18	14	21	88	35		
10:15 AM	20	50	0	0	10	9	27	80	36		
10:30 AM	12	53	0	0	11	14	18	76	32		
10:45 AM	20	44	0	0	18	21	23	82	44	325	147
11:00 AM	21	48	0	0	11	15	21	80	36		
11:15 AM	27	63	0	0	10	14	28	100	42		
11:30 AM	35	67	0	0	11	17	23	113	41		
11:45 AM	23	66	0	0	16	15	28	106	43	398	161
12:00 PM	33	63	0	0	11	14	20	107	33		
12:15 PM	28	45	1	0	7	17	33	81	51		
12:30 PM	32	52	0	0	11	10	23	95	33		
12:45 PM	30	56	0	0	11	12	18	96	31	380	148
01:00 PM	25	64	0	0	11	10	25	100	35		
01:15 PM	17	51	0	0	11	11	23	79	35		
01:30 PM	27	49	0	0	7	10	12	84	22		
01:45 PM	27	59	0	0	17	9	20	104	28	367	120
02:00 PM	30	71	0	0	5	10	33	106	43		
02:15 PM	35	64	0	0	18	12	20	117	32		
02:30 PM	26	70	0	0	20	17	16	116	33		
02:45 PM	23	51	0	0	21	18	58	95	76	434	185
03:00 PM	38	45	0	0	14	18	32	97	51		
03:15 PM	35	59	0	0	18	16	25	112	41		
03:30 PM	28	67	0	0	18	30	23	114	53		
03:45 PM	30	57	0	0	20	18	23	106	42	429	186

	Main St. Southbound			Main St. Northbound		Bedford Ave. Eastbound		15-Minute		Hourly	
Start Time	Right	Thru	Left	Thru	Left	Right	Left	Major (both approaches)	Minor (highest approach)	Major (both approaches)	Minor (highest approach)
04:00 PM	42	115	0	0	10	15	30	166	44		
04:15 PM	47	90	0	0	22	31	36	159	67		
04:30 PM	26	77	0	0	21	30	32	124	62		
04:45 PM	33	103	0	0	15	30	42	151	71	601	244
05:00 PM	38	90	0	0	16	31	39	144	70		
05:15 PM	35	65	0	0	11	12	33	110	46		
05:30 PM	32	78	0	0	21	18	21	131	39		
05:45 PM	33	45	0	0	17	16	20	96	36	481	191
06:00 PM	30	72	1	0	11	15	30	114	44		
06:15 PM	44	52	0	0	12	22	26	109	48		
06:30 PM	30	49	0	0	7	21	22	86	43		
06:45 PM	25	47	0	0	11	16	18	82	35	390	170

Note: Main Street NBT movement is free, not included in this analysis.
7th Street SBT and SBL re-routed to Main Street SBT

	7th Ave. Southbound			Bedford Ave. Westbound			Business Driveway Northbound			Bedford Ave. Eastbound			15-Minute		Hourly	
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Major (both appr)	Minor (highest appr)	Major (both appr)	Minor (highest appr)
07:00 AM	6	0	0	2	16	0	1	1	2	1	15	11	46	6		
07:15 AM	14	0	0	6	33	1	1	2	1	5	20	28	94	14		
07:30 AM	25	0	0	7	58	1	4	0	6	6	76	32	181	25		
07:45 AM	52	0	0	9	64	0	5	1	11	10	70	53	206	52	526	96
08:00 AM	21	0	0	16	25	0	5	6	7	12	53	36	142	21		
08:15 AM	11	0	0	14	23	1	1	4	2	4	31	27	100	11		
08:30 AM	14	0	0	9	30	0	2	2	5	1	16	18	74	14		
08:45 AM	23	0	0	10	28	0	2	2	2	4	32	21	95	23	410	69
09:00 AM	6	0	0	9	22	0	0	1	4	4	36	26	96	6		
09:15 AM	10	0	0	7	15	0	2	2	0	2	23	16	64	10		
09:30 AM	12	0	0	9	30	0	1	0	2	1	18	23	81	12		
09:45 AM	15	0	0	10	26	0	4	5	1	5	28	32	101	15	343	43
10:00 AM	17	0	0	15	18	0	2	4	4	4	25	16	78	17		
10:15 AM	23	0	0	10	18	0	5	1	4	5	30	15	78	23		
10:30 AM	20	0	0	11	12	0	2	1	4	4	21	21	69	20		
10:45 AM	21	0	0	11	28	0	0	7	5	6	36	28	110	21	334	81
11:00 AM	20	0	0	11	18	1	5	2	1	1	25	23	80	20		
11:15 AM	23	0	0	9	28	0	4	1	2	2	28	22	90	23		
11:30 AM	12	0	0	14	31	1	1	2	4	4	27	22	99	12		
11:45 AM	23	0	0	16	25	1	1	4	2	2	38	12	95	23	364	79
12:00 PM	20	0	0	10	35	0	1	2	5	2	26	17	90	20		
12:15 PM	20	0	0	6	26	1	2	2	4	5	41	22	101	20		
12:30 PM	12	0	0	14	31	0	0	4	2	4	23	14	85	12		
12:45 PM	37	0	0	10	31	2	2	2	10	2	23	22	91	37	367	89
01:00 PM	21	0	0	6	28	0	2	4	2	7	25	28	95	21		
01:15 PM	15	0	0	7	25	0	2	4	4	2	23	21	79	15		
01:30 PM	16	0	0	10	22	0	1	2	1	7	17	25	81	16		
01:45 PM	21	0	0	6	35	4	1	0	5	4	21	11	80	21	335	73
02:00 PM	23	0	0	7	27	0	4	4	0	1	32	21	89	23		
02:15 PM	17	0	0	10	46	0	2	2	2	6	22	12	96	17		
02:30 PM	25	0	0	9	32	2	1	5	10	5	21	28	97	25		
02:45 PM	23	0	0	7	39	0	1	2	4	9	78	63	196	23	478	89
03:00 PM	16	0	0	14	37	0	2	4	6	7	35	27	120	16		
03:15 PM	38	0	0	10	41	1	2	5	6	5	26	42	124	38		
03:30 PM	28	0	0	12	36	0	2	1	6	6	30	32	116	28		
03:45 PM	25	0	0	16	35	0	0	2	5	6	33	23	113	25	473	107
04:00 PM	30	0	0	10	42	0	2	1	10	10	35	31	127	30		
04:15 PM	31	0	0	15	52	1	1	1	2	4	43	33	148	31		

04:30 PM	32	0	0	9	35	1	1	2	7	5	48	25	122	32		
04:45 PM	32	0	0	7	44	0	4	2	2	5	57	47	160	32	557	124
05:00 PM	42	0	0	10	42	0	0	0	4	7	48	33	140	42		
05:15 PM	30	0	0	11	35	0	0	2	5	10	36	28	120	30		
05:30 PM	22	0	0	9	43	0	0	0	11	5	26	18	101	22		
05:45 PM	31	0	0	11	39	0	0	0	6	1	27	22	101	31	462	124
06:00 PM	30	0	0	5	36	0	1	2	2	0	33	12	86	30		
06:15 PM	12	0	0	4	49	0	0	1	1	0	41	27	121	12		
06:30 PM	28	0	0	5	33	1	1	0	9	4	32	10	85	28		
06:45 PM	15	0	0	5	31	0	2	1	2	6	27	11	80	15	372	85

Traffic Signal Volume Warrant Analysis

Design Year (2035) Alternative 1
(All minor street movements included in approach)

INTERSECTION NAME: Main Street at Bedford Avenue
MAJOR STREET: Main Street # OF APPROACH LANES: 1 POSTED SPEED (MPH): 25 COUNT DATE: 5/1/2014
MINOR STREET: Bedford Avenue # OF APPROACH LANES: 2 COUNT DATE: 5/1/2014

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST * HIGHEST APPROACH	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
									CONDITION A			CONDITION B				
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	200		750	100		400	160		600	80			
07:00 AM TO 08:00 AM	313	207		Y			Y			Y			Y			
08:00 AM TO 09:00 AM	333	169					Y			Y			Y			
09:00 AM TO 10:00 AM	292	137					Y						Y			
10:00 AM TO 11:00 AM	325	147					Y						Y			
11:00 AM TO 12:00 PM	398	161					Y			Y			Y			
12:00 PM TO 01:00 PM	380	148					Y						Y			
01:00 PM TO 02:00 PM	367	120					Y						Y			
02:00 PM TO 03:00 PM	434	185					Y		Y	Y	**Y**		Y			
03:00 PM TO 04:00 PM	429	186					Y		Y	Y	**Y**		Y			
04:00 PM TO 05:00 PM	601	244	Y	Y	**Y**		Y		Y	Y	**Y**	Y	Y	**Y**		
05:00 PM TO 06:00 PM	481	191					Y		Y	Y	**Y**		Y			
06:00 PM TO 07:00 PM	390	170					Y			Y			Y			
	4,745	2,064			**1**			**0**			**4**			**1**	**0**	**0**
			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **NOT SATISFIED**						4 HRS NEEDED **NOT SATISFIED**	1 HR NEEDED **NOT SATISFIED**

WARRANT 1 – Eight-Hour Vehicular Volume Warrant
Condition A : Minimum Vehicular Volume
Condition B : Interruption of Continuous Traffic
Combination : Combination of Condition A and Condition B
WARRANT 2 -- Four-Hour Vehicular Volume Warrant
WARRANT 3 -- Peak Hour Warrant

*The volumes from all minor street movements have been included in approach analysis.

Traffic Signal Volume Warrant Analysis

Design Year (2035) Alternative 1
(All minor street movements included in approach)

INTERSECTION NAME: Bedford Avenue at 7th Street
MAJOR STREET: Bedford Avenue # OF APPROACH LANES: 1 POSTED SPEED (MPH): 25 COUNT DATE: 5/1/2014
MINOR STREET: 7th Street # OF APPROACH LANES: 1 COUNT DATE: 5/1/2014

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

			MAJOR ST	MINOR ST	WARRANT 1, Condition A			WARRANT 1, Condition B			WARRANT 1, Combination Warrant						WARRANT 2	WARRANT 3
											CONDITION A			CONDITION B				
			BOTH APPROACHES	* HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES					500	150		750	75		400	120		600	60			
07:00 AM	TO	08:00 AM	526	96	Y				Y		Y				Y			
08:00 AM	TO	09:00 AM	410	69							Y				Y			
09:00 AM	TO	10:00 AM	343	43														
10:00 AM	TO	11:00 AM	334	61					Y						Y			
11:00 AM	TO	12:00 PM	364	79					Y						Y			
12:00 PM	TO	01:00 PM	367	89					Y						Y			
01:00 PM	TO	02:00 PM	335	73											Y			
02:00 PM	TO	03:00 PM	478	89					Y		Y				Y			
03:00 PM	TO	04:00 PM	473	107					Y		Y				Y			
04:00 PM	TO	05:00 PM	557	124	Y				Y		Y	Y	Y		Y			
05:00 PM	TO	06:00 PM	462	124					Y		Y	Y	Y		Y			
06:00 PM	TO	07:00 PM	372	85					Y						Y			
			5,022	1,060			0			0			2			0	0	0
					8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS OF BOTH COND. A AND COND. B NEEDED **NOT SATISFIED**						4 HRS NEEDED **NOT SATISFIED**	1 HR NEEDED **NOT SATISFIED**

WARRANT 1 -- Eight-Hour Vehicular Volume Warrant
Condition A : Minimum Vehicular Volume
Condition B : Interruption of Continuous Traffic
Combination : Combination of Condition A and Condition B
WARRANT 2 -- Four-Hour Vehicular Volume Warrant
WARRANT 3 -- Peak Hour Warrant

*The volumes from all minor street movements have been included in approach analysis.

Appendix F: Environmental

Kimley-Horn conducted a desktop analysis consisting of database searches and mapping review on the project intersection ("study area"). The purpose of the desktop analysis is to evaluate certain environmental circumstances that may affect improvements or require further evaluation. The following was reviewed:

- **Wetlands and streams** – Topographic and National Wetland Inventory (NWI) mapping and aerial photography were reviewed to identify potential wetland areas. Wetlands or streams are not depicted on the topographic and NWI mapping. The properties adjacent to the intersection right-of-way are depicted in the 2010 aerial photograph as primarily developed. A small wooded area exists to the southwest of the intersection. Based on the mapping reviewed, it is not anticipated that wetlands or streams are located within the study area. However, a wetland delineation should be conducted if encroachment within the wooded area is required.

- **Floodplains** – According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Campbell County, Virginia, Community Panel Number 51031C0356D, dated August 28, 2008, the study area is not located within a floodplain.

- **Threatened and endangered species** – A review of the Virginia Department of Game and Inland Fisheries (DGIF), Virginia Fish and Wild Information Service (VAFWIS), Center for Conservation Biology (CCB) Eagle Nest Locator, and U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation (IPaC) system was conducted to determine whether known or suspected federal and state threatened or endangered (T&E) species, wildlife or plant resources have been documented within the subject property limits or a two-mile radius of the study area.

  The DGIF VAFWIS Project Review Report, dated May 19, 2014 did not reveal documentation of threatened or endangered species within the study area. However, state endangered spirit supercoil (*Paravitrea hera*) and state threatened orangefin madtom (*Noturus gilbert*) were identified within a 2-mile radius of the study area.

  - Spirit supercoil (*Paravitrea hera*) – The shells of this snail are about 3.0 to 5.0 mm high and 5.8 to 7.5 mm wide. This species has been reported to occur in Pittsylvania County and is found in leaf litter on stream banks. Based on the Species Observation Report, this occurrence is located on the bluff across from Altavista on the Staunton River. Given the location of the occurrence and proposed activity, it is not anticipated that the proposed improvements would have an adverse impact on this species.
  - Orangefin madtom (*Noturus gilbert*) – This species is a freshwater fish found in the upper Roanoke drainage of Virginia and lives beneath shelter or larger gravel, rubble, and boulders. Given the proposed improvements, it is not anticipated that the proposed project would have an adverse impact in this species.

  The CCB was reviewed for the presence of known bald eagles' nests. No bald eagle nests were identified within 750-feet of the subject property.

  According to the Official Species List from the USFWS, dated May 19, 2014, there are two federal endangered species that may occur within the vicinity of the study area. No critical habitat, wildlife refuges or wetlands were identified within the study area. The following species were identified as potentially occurring within the vicinity of the study area:
  - Roanoke logperch *(Percina rex)* – This species presently occurs in five populations in widely separated segments of the upper Roanoke, Pigg, Smith, Nottoway, and Meherrin Rivers. Based

on the project activity it is not anticipated that the proposed improvements would have an adverse impact on this species.

- Smooth coneflower *(Echinacea laevigata)* – This species primarily occurs in openings in woods, along roadsides and utility line rights-of-way, and on dry limestone bluffs. Although it is not anticipated, additional coordination on this species may be required depending upon the nature of the proposed activity and encroachment into undeveloped areas.

- **Historic resources** – A review of the Virginia Department of Historic Resources (VDHR) Cultural Resources Information System (VCRIS) database was conducted to identify known or suspected historic or archaeological sites within the study area that are eligible or potentially eligible for the National Register of Historic Places (NRHP). The Geographic Information System (GIS) map, generated May 19, 2014, did not depict archaeological or architectural resources within the immediate study area. The following were identified within the vicinity of the study area:

  - DHR ID 162-5001, Main Street Bridge #1981 – based on the architectural survey form, this bridge has been recommended not eligible for listing on the NRHP but may be recommended as a contributing resource to the expanded Altavista Historic District.
  - DHR ID 162-5014, 308 Main Street House – this house is located southwest of the intersection of US 29 and Route 43. Based on the architectural survey form, this house has been recommended not eligible for listing on the NRHP and as a non-contributing resource to the expanded Altavista Historic District.

  Consultation with the VDHR and an architectural and/or archeological survey may be required for proposed improvements. Compliance with Section 106 of the National Historic Preservation Act will be required if federal funds are utilized on the project

- **Publicly-owned and conservation lands** – Based on a review of the Virginia Department of Conservation and Recreation (DCR) GIS coverage of Conservation Lands in Virginia (http://www.dcr.virginia.gov/natural_heritage/cldownload.shtml, 03-17-14), no conservation lands are identified within the study corridor. The closest conservation lands identified are English Park and Staunton Riverfront Park located to the south of Broad Street.

  Based on a review of DCR GIS data, no public or private conservation lands, National Forests, National Park Proclamation boundaries, National Wildlife Refuges or State or local parks are located within the study area.

  A review of the US Department of Interior, National Park Service Land and Water Conservation Fund Detailed Listing of Grants did not identify properties protected by Section 6(f) located within the study area.

- **Minority/low-income populations** – the properties adjacent to the intersection are developed and commercial in use. Specifically, McDonalds is located in the northwest quadrant, a U-haul rental facility is located to the east, and a gas station is located in the southwest quadrant. Two of the alternatives may result in right-of-way acquisition from these properties. In addition, the fuel pumps located at the gas station may be relocated. No full relocations are proposed with any of the alternatives. There will be no right-of-way acquisition or relocations to residential homes. For the purposes of identifying adjacent land uses, Main Street is considered to run in a north-south orientation.
  - ***Additional review may be warranted should federal funds be acquired.***

- **Hazardous materials** – The following sites were identified within the immediate vicinity of the study area in the Virginia Department of Environmental Quality (VDEQ) GIS data for petroleum releases and registered petroleum facilities (http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS/VEGISDatasets.aspx , 2/11/14):

    - Gateway Minute Market/ AppleMarket #3223, 310 Main Street – this site is identified on the petroleum release and petroleum facility databases, is located at the northwest quadrant of the intersection of Main Street and Bedford Avenue, and is identified with PC #s 2011-2241 and 2002-7052.
    - Former J.H. Cothran Co – this site is identified as a petroleum facility and is located at the intersection of 7th Street and Bedford Avenue

  Prior to property acquisition, a Phase I Environmental Site Assessment conducted in accordance with ASTM standards should be performed for due diligence purposes. A Phase I ESA is designed to address the "innocent landowner defense" provision of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980.

Appendix G: Benefit-Cost Analysis

	No-Build	Alternative 1	Alternative 2	Alternative 3
Total Capital Costs (estimate)	$ 230,000	$ 2,590,000	$ 3,140,000	$ 2,390,000
Annual Operating and Maintenance Costs	$ 2,548	$ 3,184	$ 598	$ 482
Operations and Maintenance Costs over 20 years	$ 139,125	$ 109,755	$ 31,620	$ 28,991
Total Costs	**$ 369,125**	**$ 2,699,755**	**$ 3,171,620**	**$ 2,418,991**

No-Build

Item	(A) Qty	(B) Capital Unit Cost	(C) Expected Life Span (yrs)	Cycles per Analysis Period	(D)* Annual Cost (per unit)	(E)=A*D*20 Life Cycle Cost (20 yrs)
Detection (Preemption, Video)	1	$40,000	15	1	$0.00	$40,000.00
Pavement Markings	1	$970	10	1	$97.00	$2,910.00
Pedestrian Heads	6	$500	10	1	$50.00	$6,500.00
Pedestrian Pole/Button	3	$900	20	0	$90.00	$5,400.00
Sign Panel	15	$35	10	1	$3.50	$1,085.00
Signal Cabinet	1	$14,300	15	1	$0.00	$14,300.00
Signal Controller	1	$3,800	15	1	$380.00	$11,400.00
Signal Heads	15	$250	10	1	$25.00	$7,750.00
Signal Pole	1	$16,000	20	0	$1,600.00	$32,000.00
Signal Timing	1	$3,000	5	3	$300.00	$15,000.00
Staffing	60	$20	1	19	$2.00	$2,780.00
Total					**$2,547.50**	**$139,125.00**

* Maintenance has been estimated at 10% of initial capital cost to cover repair/replace

Alternative 1

Item	(A) Qty	(B) Capital Unit Cost	(C) Expected Life Span (yrs)	Cycles per Analysis Period	(D)* Annual Cost (per unit)	(E)=A*D*20 Life Cycle Cost (20 yrs)
Detection (Preemption, Video)	1	$40,000	21	0	$0.00	$0.00
Lighting	10	$500	5	3	$50.00	$11,500.00
Pavement Markings	1	$7,010	10	1	$701.00	$21,030.00
Pedestrian Heads	2	$500	10	1	$50.00	$2,500.00
Pedestrian Pole/Button	2	$725	20	0	$72.50	$2,900.00
Sign Panel	88	$35	10	1	$3.50	$6,195.00
Signal Cabinet	1	$14,300	21	0	$0.00	$0.00
Signal Controller	1	$3,800	21	0	$380.00	$7,600.00
Signal Heads	16	$250	10	1	$25.00	$8,250.00
Signal Pole	1	$16,000	20	0	$1,600.00	$32,000.00
Signal Timing	1	$3,000	5	3	$300.00	$15,000.00
Staffing	60	$20	1	19	$2.00	$2,780.00
Total					**$3,184.00**	**$109,755.00**

* Maintenance has been estimated at 10% of initial capital cost to cover repair/replace

Alternative 2

Item	(A) Qty	(B) Capital Unit Cost	(C) Expected Life Span (yrs)	Cycles per Analysis Period	(D)* Annual Cost (per unit)	(E)=A*D*20 Life Cycle Cost (20 yrs)
Lighting	10	$500	5	3	$50.00	$10,000.00
Sign Panel	109	$35	10	1	$3.50	$7,630.00
Pavement Markings	1	$5,435	10	1	$543.50	$10,870.00
Landscaping	120	$13	1	19	$1.30	$3,120.00
Total					**$598.30**	**$31,620.00**

* Maintenance has been estimated at 10% of initial capital cost to cover repair/replace

Alternative 3

Item	(A) Qty	(B) Capital Unit Cost	(C) Expected Life Span (yrs)	Cycles per Analysis Period	(D)* Annual Cost (per unit)	(E)=A*D*20 Life Cycle Cost (20 yrs)
Lighting	10	$500	5	4	$50.00	$10,500.00
Sign Panel	85	$35	10	2	$3.50	$6,247.50
Pavement Markings	1	$4,270	10	2	$427.00	$8,967.00
Landscaping	120	$13	1	20	$1.30	$3,276.00
Total					**$481.80**	**$28,990.50**

* Maintenance has been estimated at 10% of initial capital cost to cover repair/replace