



TRAFFIC IMPACT ASSESSMENT

PROPOSED STARBUCKS WITH DRIVE-THROUGH

Proposed Starbucks with Drive-Through
Block 93, Lots 168, 169, & 275
0 & 8 Mitchell Street & 171 Coggeshall Street
City of New Bedford,
Bristol County, Massachusetts

Prepared For:
Alrig USA Development, LLC

Date: July 1, 2021
SE&D Job No. BOS-200026



Jake Modestow, PE
Project Manager
MA P.E. License #6201065336



Charles D. Olivo, PE, PTOE
Principal
MA P.E. License #49094

STONEFIELD

1 Beacon Street, 15 Floor, Boston, MA 02108

TABLE OF CONTENTS

INTRODUCTION..... 1

METHODOLOGY..... 1

2021 EXISTING CONDITION 2

 2021 Existing Roadway Conditions 2

 2021 Existing As-Counted Traffic Volumes..... 3

 2021 Adjusted Existing Traffic Volumes 4

 2021 Existing LOS/Capacity Analysis..... 4

 Motor Vehicle Collision Analysis 4

2023 NO-BUILD CONDITION 6

 Background Growth..... 6

 Other Planned Development Projects..... 6

 2023 No-Build Traffic Volumes 7

 2023 No-Build LOS/Capacity Analysis..... 7

2023 BUILD CONDITION..... 7

 Trip Generation..... 7

 Trip Assignment/Distribution..... 10

 2023 Build Traffic Volumes..... 10

 2023 Build LOS/Capacity Analysis 10

 2023 Build Mitigation..... 11

 Comparative Level of Service (Delay) Tables 12

SITE CIRCULATION/PARKING SUPPLY..... 14

CONCLUSIONS 15

TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

TURNING MOVEMENT COUNT DATA

Intersection of Coggeshall Street and Belleville Avenue

Intersection of Coggeshall Street and Mitchell Street

MASSDOT AUTOMATED TRAFFIC RECORDER DATA

FIGURES

Figure 1 – Site Location Map

Figure 2 – 2021 Existing As-Counted Traffic Volumes

Figure 3 – 2021 Adjusted Existing Traffic Volumes

Figure 4 – 2023 Base Traffic Volumes

Figure 5 – Other Planned Projects Future Traffic Volumes

Figure 6 – 2023 No-Build Traffic Volumes

Figure 7 – “New” Site-Generated Traffic Volumes

Figure 8 – “Pass-By” Site-Generated Traffic Volumes

Figure 9 – 2023 Build Traffic Volumes

HIGHWAY CAPACITY ANALYSIS DETAIL SHEETS

2021 Existing Traffic Conditions

2023 No-Build Traffic Conditions

2023 Build Traffic Conditions

INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed Starbucks with drive-through facilities on the adjacent roadway network. The subject property is located along the northerly side of Coggeshall Street with frontage along Mitchell Street in the City of New Bedford, Bristol County, Massachusetts. The site location is shown on appended **Figure I**.

The subject property is designated as Block 93, Lots 168, 169, and 275 as depicted on the City of New Bedford Tax Map. The site has approximately 91 feet of frontage along Coggeshall Street and approximately 138 feet of frontage along Mitchell Street. The existing site is developed and previously operated as a touchless car wash, “Scott’s Collision Center” autobody shop, and a “Subway” restaurant. Access to the site is presently provided via one (1) full-movement driveway along Coggeshall Street and one (1) full-movement driveway along Mitchell Street. Under the proposed development program, the existing structures would be razed and a 2,280-square-foot Starbucks with drive-through facilities would be constructed. Vehicular access to the site is proposed via one (1) full-movement driveway along Coggeshall Street and one (1) full-movement driveway along Mitchell Street. Please note that cross-access is proposed with the existing gas station and convenience market located westerly adjacent to the subject property.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual (HCM) 2000 and the Synchro 11 Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on timing directives provided by the Massachusetts Department of Transportation (MassDOT).

2021 EXISTING CONDITION

2021 EXISTING ROADWAY CONDITIONS

The proposed Starbucks with drive-through facilities is located along the northerly side of Coggeshall Street with frontage along Mitchell Street in the City of New Bedford, Bristol County, Massachusetts. The subject property is designated as Block 93, Lots 168, 169, and 275 as depicted on the City of New Bedford Tax Map. The site has approximately 91 feet of frontage along Coggeshall Street and approximately 138 feet of frontage along Mitchell Street. Land uses in the area are predominantly residential and commercial.

Coggeshall Street is classified as an urban minor arterial roadway with a general east-west orientation, and is under the jurisdiction of the City of New Bedford. The roadway generally provides one (1) lane in each direction, with additional turning lanes provided at key intersections, and has a posted speed limit of 25 mph. Along the site frontage, curb and sidewalk are provided along both sides of the roadway, shoulders are provided along both sides of the roadway, and on-street parking is not permitted along either side of the roadway. The roadway surface and striping appear to be in good condition. Coggeshall Street connects Shawmut Avenue at its westerly terminus to the Coggeshall Street Bridge at its easterly terminus for predominately residential and commercial uses along its length.

Mitchell Street is a local roadway with a general north-south orientation, and is under the jurisdiction of the City of New Bedford. Along the site frontage, the roadway provides one (1) lane in each direction. A posted speed limit is not provided along the roadway and therefore the City-wide speed limit of 25 mph is assumed. Curb and sidewalk are generally provided along both sides of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is permitted along the westerly side of the roadway. The roadway surface and striping appear to be in fair condition. Mitchell Street connects Sawyer Street at its northerly terminus to Coggeshall Street at its southerly terminus for predominantly residential and commercial uses along its length.

Belleville Avenue is classified as an urban minor arterial roadway with a general north-south orientation, and is under the jurisdiction of the City of New Bedford. The roadway generally provides one (1) lane in each direction with additional turning lanes provided at key intersections. A posted speed limit is not provided along the roadway and therefore the City-wide speed limit of 25 mph is assumed. Curb and sidewalk are generally provided along both sides of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is generally permitted along both sides of the roadway in accordance with posted curbside regulations. The roadway surface and striping appear to be in good condition. Belleville Avenue connects Mill Road at its northerly terminus to Killburn Street at its southerly terminus for predominantly residential and commercial uses along its length.

Coggeshall Street and Mitchell Street intersect to form an unsignalized T-intersection with the southbound approach of Mitchell Street operating under stop control. The eastbound approach of Coggeshall Street provides one (1) shared left-turn/through lane and the westbound approach of Coggeshall Street provides one (1) shared through/right-turn lane. The southbound approach of Mitchell Street provides one (1) shared left-turn/right-turn lane. A crosswalk is provided across the north leg of the intersection.

Coggeshall Street and Belleville Avenue intersect to form a signalized four (4)-leg intersection operating under variable cycle length. The eastbound approach of Coggeshall Street provides one (1) exclusive left-turn lane and one (1) shared through/right-turn lane. The westbound approach of Coggeshall Street provides one (1) exclusive left-turn lane, one (1) exclusive through lane, and one (1) exclusive right-turn lane. The northbound approach of Belleville Avenue provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane and the southbound approach of Belleville Avenue provides one (1) exclusive left-turn lane and one (1) shared through/right-turn lane. Crosswalks and pedestrian signals with pushbuttons are provided across all legs of the intersection.

2021 EXISTING AS-COUNTED TRAFFIC VOLUMES

Manual turning movement counts were collected during the typical weekday morning, midday, and evening and Saturday midday time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the following intersections:

- ◆ Coggeshall Street and Belleville Avenue
- ◆ Coggeshall Street and Mitchell Street

Specifically, manual turning movement counts were conducted on the following dates and during the following times:

- ◆ Thursday, May 20, 2021, from 7:00 a.m. to 9:00 a.m., from 11:00 a.m. to 2:00 p.m., and from 4:00 p.m. to 6:00 p.m.
- ◆ Saturday, May 22, 2021, from 11:00 a.m. to 2:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data the weekday morning peak hour occurred from 7:30 a.m. to 8:30 a.m.; the weekday midday peak hour occurred from 12:00 p.m. to 1:00 p.m.; the weekday evening peak hour occurred from 4:00 p.m. to 5:00 p.m.; and the Saturday midday peak hour occurred from 12:00 p.m. to 1:00 p.m. The Technical Appendix contains a summary of the turning movement count data. The 2021 Existing As-Counted weekday morning, weekday midday, weekday evening, and Saturday midday peak-hour volumes are summarized on appended **Figure 2**.

2021 ADJUSTED EXISTING TRAFFIC VOLUMES

Due to the ongoing COVID-19 pandemic, supplemental traffic data was reviewed to account for any potential variations in traffic patterns. To supplement the as-counted traffic data, available traffic data along Coggeshall Street published by MassDOT from May 2019 was reviewed and are included within the appendix. Based on the data review, the as-counted weekday morning peak hour traffic volumes were determined to be approximately 19% lower than the historical MassDOT volumes. Therefore, the weekday morning peak hour traffic volumes were increased accordingly. The as-counted weekday midday and weekday evening peak hour traffic volumes were determined to be greater than the MassDOT traffic volumes and therefore, no adjustments to the subject peak hour traffic volumes are necessary. Please note that historical roadway data is not available for the Saturday midday peak hour, however the Saturday midday peak hour traffic volumes are anticipated to operate generally consistently with the weekday evening peak hour traffic volumes and therefore no adjustments were applied to the Saturday midday peak hour traffic volumes. Additionally, a review the historical data published by MassDOT indicated negligible growth along the corridor; therefore, additional growth measures were not applied to the traffic volumes. The 2021 Adjusted Existing weekday morning, weekday midday, weekday evening, and Saturday midday peak-hour volumes are summarized on appended **Figure 3**.

2021 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2021 Existing Condition during the weekday morning, weekday midday, weekday evening, and Saturday midday peak hours at the study intersections. Under the 2021 Existing Condition, the signalized intersection of Coggeshall Street and Belleville Avenue is calculated to operate at overall Level of Service C during the study time periods. Please note that the eastbound through/right turning movement is calculated to operate at Level of Service E during the weekday morning and Saturday midday peak hours. The turning movements at the unsignalized intersection of Coggeshall Street and Mitchell Street are calculated to operate at Level of Service C or better during the weekday evening and Saturday midday peak hours and Level of Service B or better during the weekday morning and weekday midday peak hours.

MOTOR VEHICLE COLLISION ANALYSIS

In order to assess the safety of the intersections of Coggeshall Street and Belleville Avenue and Coggeshall Street and Mitchell Street, the three (3) most recent years of available motor vehicle collision data were obtained from the MassDOT Crash Query and Visualization web application. Data for the time period spanning

from March 1, 2017 to March 1, 2020 which is unaffected by COVID-19, was queried. **Table I** provides a summary of the manner and severity of the motor vehicle collisions reported at or near the study intersections.

TABLE I – MOTOR VEHICLE COLLISION ANALYSIS SUMMARY

Location	Collision Type	Number of Collisions	Collisions Resulting in Injury	Collisions resulting in Fatality
Coggeshall Street and Belleville Avenue	Rear End	11	2	0
	Angle	9	2	0
	Single Vehicle Collision	3	1	0
	Sideswipe	3	1	0
	Head-On	2	0	0
	Right Turn	1	0	0
	Collision with Parked Car	1	0	0
	Total	30	6	0
Coggeshall Street and Mitchell Street	Rear End	2	1	0
	Angle	3	0	0
	Backing	3	0	0
	Head-On	1	0	0
	Collision with Pedestrian	1	1	0
	Collision with Parked Car	4	1	0
	Total	14	3	0
Network Total		44	9	0

As shown in **Table I**, a total 44 collisions were reported at the study intersections over the 36-month period; this equates to approximately 1.2 collisions per month. Based on a review of the data, 13 of the 44 reported collisions at the study intersections were rear end collisions, which is a common collision type along a signalized corridor. It is important to note that zero (0) fatalities occurred as a result of the reported motor vehicle collisions in the study network.

Based on historic data published by MassDOT, the intersection of Coggeshall Street and Belleville Avenue experienced approximately 24.7 million entering vehicles over the 3-year study period and has a calculated collision rate of 1.22 collisions per million entering vehicles; the intersection of Coggeshall Street and Mitchell Street experienced approximately 24.7 million entering vehicles over the 3-year study period and has a calculated collision rate of 0.57 collisions per million entering vehicles. According to average accident rate data published by the MassDOT for District 5, where the subject site is located, a typical signalized intersection has an average crash rate of 0.75 per million entering vehicles and a typical unsignalized intersection has an average crash rate of 0.57 per million entering vehicles. Please note that though the crash rate calculated at the signalized intersection of Coggeshall Street and Belleville Avenue is high, the types of collisions are not abnormal for the geometry of the intersection. Also note that the crash rate calculated for the unsignalized intersection of Coggeshall Street and Mitchell Street is generally consistent with the regional average. Crash rates at the study

intersections are not anticipated to be adversely impacted due to the proposed development as detailed further herein.

2023 NO-BUILD CONDITION

BACKGROUND GROWTH

The 2021 Existing Condition traffic volume data was grown to a future horizon year of 2023, which is a conservative estimate for when the proposed Starbucks with drive-through facilities is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.5% annually for two (2) years to generate the 2023 Base Traffic Volumes. These volumes are summarized on appended **Figure 4**. The 1.5% background growth rate is a conservative rate based on the negligible growth in traffic forecasted by MassDOT for the study area.

OTHER PLANNED DEVELOPMENT PROJECTS

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other projects that could influence the traffic volume at the study intersections. Other planned development projects include those that are either in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Stonefield contacted the City of New Bedford Planning Department and as of the date of this report, no planned development projects were explicitly identified. However, research conducted by Stonefield concludes that the following developments are anticipated to impact traffic volumes within the study area:

- ◆ Cannabis Facility: 115 Coggeshall Street – The proposed 5,000-square-foot cannabis facility would be located along Coggeshall Street approximately 500 feet east of the subject site. Based on a review of the Traffic Analysis prepared by Fuss & O’Neil, dated January 11, 2021, the site-generated trips associated with the cannabis facility were routed throughout the study network during the weekday evening and Saturday midday peak hours. Please note that the Traffic Analysis does not provide site-generated traffic volumes during the weekday morning and weekday midday peak hours.
- ◆ New Bedford Waterfront Redevelopment Plan: Focus Area North – The redevelopment area is bounded by Interstate 195 to the north, the Acushnet River to the east, Wamsutta Street to the south, and Acushnet Avenue to the west. According to the New Bedford Waterfront Redevelopment Plan: Focus Area North, prepared for the New Bedford Port Authority and the New Bedford Redevelopment Authority, dated January 2021, the redevelopment area would be improved to provide a mixed-use district consisting of residential, commercial, and water-dependent uses while providing public access to the waterfront and improving the existing circulation patterns. The project redevelopment plan is anticipated to be completed within three (3) phases over a 20-year time period, with Phase I estimated to be completed within the first two (2) to five (5) years of development. Therefore, it is expected that the applied background growth rate is sufficient to account for any increase in traffic volumes associated with the redevelopment plan.

Appended **Figure 5** illustrates the site-generated traffic associated with the other planned development projects assigned to the study area network.

2023 NO-BUILD TRAFFIC VOLUMES

The site-generated trips associated with the other planned developments were added to the 2023 Base Traffic Volumes to calculate the 2023 No-Build Traffic Volumes for the weekday morning, weekday midday, weekday evening, and Saturday midday peak hours. These volumes are summarized on appended **Figure 6**.

2023 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2023 No-Build Condition during the weekday morning, weekday midday, weekday evening, and Saturday midday peak hours at the study intersections.

Under the 2023 No-Build Condition, the signalized intersection of Coggeshall Street and Belleville Avenue is calculated to operate at overall Level of Service C during the weekday morning, midday, and evening peak hours and overall Level of Service D during the Saturday midday peak hour. Please note that the eastbound through/right turning movement is calculated to continue to operate with capacity constraints during the study peak hours. Specifically, the turning movement exceeds the Level of Service D-E threshold during the weekday midday and weekday evening peak hours and exceeds the Level of Service E-F threshold during the Saturday midday peak hour.

Under the 2023 No-Build Condition, the turning movements at the unsignalized intersection of Coggeshall Street and Mitchell Street are calculated to operate generally consistently with the findings of the 2021 Existing Condition during the study peak hours.

2023 BUILD CONDITION

The site-generated traffic volume of the proposed development was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within two (2) years of the preparation of this study.

TRIP GENERATION

Trip generation projections for the proposed Starbucks development were prepared utilizing the ITE’s Trip Generation Manual, 10th Edition. Trip generation rates associated with Land Use 937 “Coffee Shop with Drive-Through Window” were cited for the 2,280-square-foot Starbucks with drive-through. **Table 2** provides

the weekday morning, weekday midday, weekday evening, and Saturday midday peak hour trip generation volumes associated with the proposed development.

TABLE 2 – PROPOSED TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Midday Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
2,280 SF Coffee Shop with Drive-Through Window <i>ITE Land Use 937</i>	104	100	204	110	114	224	49	50	99	100	101	201

It is important to note that cross-access is proposed between the subject site and the existing convenience store with gas station located westerly adjacent to the site. Therefore, it is reasonable to assume that a portion of trips to and from the subject site would originate from or be destined to the adjacent property, thereby reducing vehicular access at the proposed site driveways. However, no reductions to vehicular traffic entering and exiting the subject site were applied to the analysis herein.

It is important to note that the property previously operated with a 2,007-square-foot Subway restaurant, a 2,115-square-foot automobile repair shop, and a 721-square-foot touchless car wash facility, which previously generated vehicular traffic to and from the subject site. Therefore, it is reasonable to analyze the net increase in vehicular trip generation to quantify the impact of the proposed redevelopment. Trip generation rates associated with Land Use 933 “Fast Food Restaurant without Drive-Through Window,” Land Use 942 “Automobile Care Center,” and Land Use 948 “Automated Car Wash” were cited for the existing site uses accordingly. **Table 3** shows the net vehicular trip generation of the existing development and the proposed development during the weekday morning, weekday midday, weekday evening, and Saturday midday peak hours.

TABLE 3 – NET TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Midday Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Existing 2,007 SF Fast Food Restaurant without Drive-Through <i>ITE Land Use 933</i>	30	20	50	51	45	96	28	29	57	54	56	110
Existing 2,115 SF Automobile Care Center <i>ITE Land Use 942</i>	3	2	5	3	3	6	3	4	7	0	0	0
Existing 721 SF Automated Car Wash <i>ITE Land Use 948</i>	0	0	0	0	0	0	5	5	10	11	11	22
Proposed 2,280 SF Coffee Shop with Drive-Through Window <i>ITE Land Use 937</i>	104	100	204	110	114	224	49	50	99	100	101	201
NET	71	78	149	56	66	122	13	12	25	35	34	69

Please note that as the existing Subway restaurant and car wash facility are not currently in operation, net trip generation credits were not applied to the projected site-generated traffic volumes herein in an effort to provide a conservative analysis.

As stated within Chapter 10 of ITE's Trip Generation Handbook, 3rd Edition, there are instances when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. Coffee shops with drive-through facilities are specifically located on or adjacent to busy streets to attract motorists already on the roadway. Therefore, the proposed site would be expected to attract a portion of its trips from the traffic passing the site on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as pass-by trips.

Please note that ITE does not publish pass-by rates for Land Use 937 "Coffee Shop with Drive-Through Window," and therefore pass-by rates were cited for similar Land Use 934 "Fast Food Restaurant with Drive-Through Window." Based upon the published ITE data for Land Use 934 "Fast Food Restaurant with Drive-Through Window," 49% of the site-generated traffic during the weekday morning peak period and 50% during the weekday evening peak period is comprised of pass-by traffic. Please note that the ITE does not publish pass-by rates for the weekday midday or Saturday midday peak hours; however, it is reasonable to assume a similar pass-by percentage as the weekday morning peak hour. Accordingly, a 49% pass-by rate has been applied to

the weekday midday and Saturday midday peak hour total trip generation. **Table 4** shows the additional site generated traffic for the proposed development in terms of newly generated traffic and pass-by traffic.

TABLE 4 – PROPOSED TRIP GENERATION – NEW & PASS-BY TRIPS

Land Use	Weekday Morning Peak Hour			Weekday Midday Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
“New” Trips	55	51	106	57	61	118	25	26	51	51	52	103
“Pass-By” Trips	49	49	98	53	53	106	24	24	48	49	49	98
Total	104	100	204	110	114	224	49	50	99	100	101	201

At the site driveways, the calculated number of pass-by trips is shown as a negative number at the through movement as the vehicles are temporarily diverted from the through travel stream into and out of the site access point.

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to the existing travel pattern along the adjacent roadways and the access management plan of the site. The “New” Site-Generated Traffic Volumes are illustrated on **Figure 7** and the “Pass-By” Site-Generated Traffic Volumes expected to access the site are depicted on **Figure 8**.

2023 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2023 No-Build Traffic Volumes to calculate the 2023 Build Traffic Volumes and are shown on appended **Figure 9**.

2023 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2023 Build Condition during the weekday morning, weekday midday, weekday evening, and Saturday midday peak hours at the study intersections and proposed site driveways. **Tables 5** through **14** compare the 2021 Existing, 2023 No-Build, and 2023 Build Conditions Level of Service and delay values.

Under the 2023 Build Condition, the signalized intersection of Coggeshall Street and Belleville Avenue is calculated to operate generally consistently with the findings of the 2023 No-Build Condition during all study peak hours. Please note that the eastbound through/right turning movement is calculated to continue to operate with capacity constraints during all study peak hours.

Under the 2023 Build Condition, turning movements at the unsignalized intersection of Coggeshall Street and Mitchell Street calculated to operate generally consistently with the findings of the 2023 No-Build Condition.

Under the 2023 Build Condition, the turning movements at the proposed site driveway along Coggeshall Street are calculated to operate at Level of Service C or better during the study peak hours and the turning movements at the proposed site driveway along Mitchell Street are calculated to operate at Level of Service A during the study peak hours. The calculated 95th percentile queue lengths would be accommodated in the proposed driveway throat lengths without adversely impacting on-site circulation.

2023 BUILD MITIGATION

Please note that under the 2023 Build Condition, the eastbound through/right turning movement at the signalized intersection of Coggeshall Street and Belleville Avenue is calculated to continue to operate with capacity constraints during the study peak hours. In order to provide a potential mitigation measure, Stonefield recommends minor signal timing modifications for the City of New Bedford's consideration. The following modifications would mitigate the calculated increase in delay and create more favorable operating conditions in the 2023 Build Condition.

- ◆ Weekday Morning Peak Hour: A reallocation of three (3) seconds of green time from the eastbound and westbound left turn phase to the eastbound and westbound through phase
- ◆ Weekday Midday Peak Hour: A reallocation of two (2) seconds of green time from the eastbound and westbound left turn phase
- ◆ Weekday Evening Peak Hour: A reallocation of one (1) second of green time from the eastbound and westbound left turn phases to the eastbound and westbound through phase
- ◆ Saturday Midday Peak Hour: A reallocation of three (3) seconds of green time from the eastbound and westbound left turn phases to the eastbound and westbound through phase

A complete summary of the 2023 Mitigation Build Level of Service and delay values are provided in **Tables 5 through 8**.

COMPARATIVE LEVEL OF SERVICE (DELAY) TABLES**COGGESHALL STREET & BELLEVILLE AVENUE**

EB (Eastbound) and WB (Westbound) approaches are the Coggeshall Street approaches
 NB (Northbound) and SB (Southbound) approaches are the Belleville Avenue approaches
 X (n) = Level of Service (seconds of delay)

TABLE 5 – WEEKDAY MORNING PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build	2023 Mitigation
EB Left	B (18.8)	B (19.0)	B (19.3)	B (18.6)
EB Through/Right	E (68.4)	E (79.3)	F (96.5)	E (63.4)
WB Left	B (18.1)	B (18.5)	B (18.7)	B (19.3)
WB Through	C (24.4)	C (25.1)	C (25.7)	C (24.5)
WB Right	B (14.2)	B (14.5)	B (14.4)	B (14.0)
NB Left/Through	D (37.4)	D (38.2)	D (38.5)	D (41.3)
NB Right	B (19.8)	B (19.9)	C (20.2)	C (21.4)
SB Left	B (17.4)	B (17.6)	B (18.0)	B (19.6)
SB Through/Right	C (21.4)	C (22.0)	C (22.1)	C (24.1)
Intersection	C (31.7)	C (34.1)	D (38.0)	C (32.2)

TABLE 6 – WEEKDAY MIDDAY PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build	2023 Mitigation
EB Left	B (17.3)	B (18.4)	B (18.7)	B (18.3)
EB Through/Right	D (41.5)	E (56.0)	E (69.9)	D (52.1)
WB Left	B (15.6)	B (17.2)	B (17.7)	B (17.8)
WB Through	C (25.0)	C (28.5)	C (30.2)	C (28.1)
WB Right	B (13.4)	B (13.5)	B (13.4)	B (13.1)
NB Left/Through	D (40.0)	D (43.8)	D (44.0)	D (46.9)
NB Right	C (20.1)	C (21.0)	C (21.4)	C (22.2)
SB Left	B (17.9)	B (17.2)	B (17.6)	B (18.6)
SB Through/Right	B (18.8)	B (18.2)	B (18.3)	B (19.3)
Intersection	C (26.0)	C (29.9)	C (33.1)	C (30.0)

TABLE 7 – WEEKDAY EVENING PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build	2023 Mitigation
EB Left	B (18.7)	B (19.6)	B (19.8)	B (19.4)
EB Through/Right	D (45.3)	E (64.7)	E (69.6)	E (58.5)
WB Left	B (16.3)	B (17.5)	B (17.8)	B (18.1)
WB Through	C (30.5)	C (34.8)	D (35.9)	C (33.9)
WB Right	B (13.3)	B (13.5)	B (13.5)	B (13.3)
NB Left/Through	D (46.6)	D (48.2)	D (48.2)	D (50.3)
NB Right	C (21.2)	C (21.9)	C (22.1)	C (22.8)
SB Left	B (19.0)	B (19.3)	B (19.5)	C (20.0)
SB Through/Right	B (18.9)	B (19.2)	B (19.3)	B (19.7)
Intersection	C (28.9)	C (33.7)	C (34.9)	C (33.0)

TABLE 8 – SATURDAY MIDDAY PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build	2023 Mitigation
EB Left	B (18.5)	B (19.5)	B (20.0)	B (19.0)
EB Through/Right	E (57.5)	F (92.0)	F (108.3)	E (69.2)
WB Left	B (17.2)	B (17.9)	B (17.9)	B (19.5)
WB Through	C (32.2)	D (37.2)	D (39.4)	C (33.5)
WB Right	B (13.0)	B (13.0)	B (12.9)	B (12.6)
NB Left/Through	D (39.1)	D (41.4)	D (41.6)	D (44.9)
NB Right	C (21.4)	C (21.9)	C (22.2)	C (24.0)
SB Left	B (17.7)	B (18.4)	B (19.0)	B (20.5)
SB Through/Right	B (17.7)	B (18.4)	B (18.6)	B (19.9)
Intersection	C (30.6)	D (39.2)	D (43.3)	D (35.1)

COGGESHALL STREET & MITCHELL STREET

EB (Eastbound) approach is the Coggeshall Street approach
 SB (Southbound) approach is the Mitchell Street approach
 X (n) = Level of Service (seconds of delay)

TABLE 9 – WEEKDAY MORNING PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build
EB Left/Through	A (1.2)	A (1.3)	A (1.3)
SB Left/Right	B (13.7)	B (14.0)	C (15.2)

TABLE 10 – WEEKDAY MIDDAY PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build
EB Left/Through	A (0.7)	A (0.8)	A (0.8)
SB Left/Right	B (12.9)	B (13.1)	B (14.0)

TABLE 11 – WEEKDAY EVENING PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build
EB Left/Through	A (0.7)	A (1.6)	A (1.7)
SB Left/Right	C (15.7)	C (16.8)	C (17.5)

TABLE 12 – SATURDAY MIDDAY PEAK HOUR

Lane Group	2021 Existing	2023 No-Build	2023 Build
EB Left/Through	A (1.2)	A (1.4)	A (1.5)
SB Left/Right	C (15.8)	C (17.9)	C (19.7)

COGGESHALL STREET & SITE DRIVEWAY

EB (Eastbound) approach is the Coggeshall Street approach
 SB (Southbound) approach is the site driveway approach
 X (n) = Level of Service (seconds of delay)

TABLE 13 – 2023 BUILD CONDITION

Lane Group	Weekday Morning Peak Hour	Weekday Midday Peak Hour	Weekday Evening Peak Hour	Saturday Midday Peak Hour
EB Left	A (8.5)	A (8.7)	A (9.5)	A (9.2)
SB Left/Right	C (16.0)	C (18.3)	C (20.1)	C (22.6)

MITCHELL STREET & SITE DRIVEWAY

WB (Westbound) approach is the site driveway approach
 SB (Southbound) approach is the Mitchell Street approach
 X (n) = Level of Service (seconds of delay)

TABLE 14 – 2023 BUILD CONDITION

Lane Group	Weekday Morning Peak Hour	Weekday Midday Peak Hour	Weekday Evening Peak Hour	Saturday Midday Peak Hour
WB Left/Right	A (9.0)	A (9.0)	A (9.0)	A (9.2)
SB Left	A (0.)	A (0.4)	A (0.2)	A (0.4)

SITE CIRCULATION/PARKING SUPPLY

A review was conducted of the proposed Starbucks with Drive-Through using the Site Plan prepared by Stonefield, dated July 1, 2021. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access is proposed via one (1) full-movement driveway along Coggeshall Street and one (1) full-movement driveway along Mitchell Street. Additionally, cross-access is proposed along the southwest border of the property to the adjacent Petro Mart convenience store with gas station. The 2,280-square-foot Starbucks building will be located on the northern portion of the property and a drive-through window will be located along the northerly building façade. The drive-through would be supported by two (2) 12-foot lanes located along the easterly building façade to provide counterclockwise circulation. A digital ordering kiosk will be provided in each lane; beyond the ordering kiosk, the innermost drive-through lane will provide access to the drive-through window while the outermost drive-through lane will serve as a bypass lane. The proposed drive-through lanes would be sufficient to support approximately 16 vehicles which exceeds the vehicle storage recommendations for coffee establishments provided within the Massachusetts Amendments to the Manual on Uniform Traffic Control Devices. When exiting the drive-through, vehicles may exit the site via the driveway along Mitchell Street or traverse the parking lot to exit the site via the Coggeshall Street driveway. Off-street parking will be provided along the southerly building façade and along the western and southern portions of the property. Vehicular circulation throughout the property will be supported by 24-foot two (2)-way drive aisles.

Regarding the parking requirements for the proposed development, the City of New Bedford requires one (1) space per 100-square-feet of gross floor area plus one (1) space per employee for a fast-food drive-in development. For the proposed 2,280-square-foot Starbucks with a maximum of seven (7) employees, this equates to 30 required spaces. The site would provide 30 total parking spaces, inclusive of two (2) ADA accessible parking spaces, which meets the parking requirement. The spaces would be 9 feet wide by 20 feet deep in accordance with the City of New Bedford Ordinance and industry standards.

The parking supply was evaluated with respect to data published within the ITE's Parking Generation, 5th Edition, for Land Use 937 "Coffee/Donut Shop with Drive-Through." The average parking demand rate for Land Use 937 "Coffee/Donut Shop with Drive-Through is 5.22 vehicles per 1,000-square-foot of gross floor area during the weekday peak period and 8.70 vehicles per 1,000-square-foot of gross floor area during the Saturday peak period. For the 2,280-square-foot Starbucks with drive-through, this equates to 12 parking spaces during the weekday peak period and 20 parking spaces during the Saturday peak period. As such, the proposed parking supply of 30 spaces would be sufficient to support the parking demand of the site.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed Starbucks with drive-through. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property and the parking supply would be sufficient to support this project.

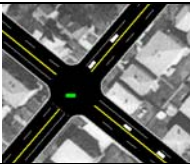
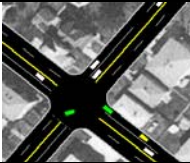


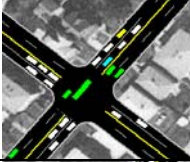
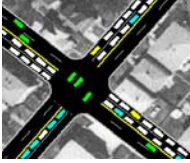
TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual, 6th Edition (HCM), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	<=10	<=10
	B	>10 and <=20	>10 and <=15
	C	>20 and <=35	>15 and <=25
	D	>35 and <=55	>25 and <=35
	E	>55 and <=80	>35 and <=50
	F	>80	>50

Source: Highway Capacity Manual, 6th Edition

TURNING MOVEMENT COUNT DATA

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Coggeshall Street (E/W)
and Belleville Avenue (N/S)
New Bedford, Bristol County Massachusetts
Thursday, May 20, 2021

File Name : BOS-200026
Site Code : 00200026
Start Date : 5/20/2021
Page No : 1

Groups Printed- Auto - HV - B/SB

Start Time	Coggeshall St Eastbound					Coggeshall St Westbound					Belleville Avenue Northbound					Belleville Avenue Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
07:00 AM	10	48	22	4	84	15	46	8	0	69	4	41	44	19	108	29	62	16	4	111	372
07:15 AM	10	56	20	3	89	25	58	7	1	91	5	34	52	11	102	23	47	30	5	105	387
07:30 AM	16	62	28	3	109	26	60	9	5	100	5	38	46	12	101	30	57	35	0	122	432
07:45 AM	24	43	25	0	92	36	41	5	3	85	5	46	57	11	119	25	64	41	2	132	428
Total	60	209	95	10	374	102	205	29	9	345	19	159	199	53	430	107	230	122	11	470	1619
08:00 AM	17	72	26	1	116	26	54	8	3	91	1	43	57	26	127	38	64	25	0	127	461
08:15 AM	19	55	19	3	96	19	52	10	5	86	8	43	51	14	116	23	56	25	1	105	403
08:30 AM	18	67	19	2	106	28	52	8	2	90	4	20	41	11	76	32	38	29	3	102	374
08:45 AM	10	48	15	2	75	27	43	8	0	78	6	34	43	24	107	35	43	15	5	98	358
Total	64	242	79	8	393	100	201	34	10	345	19	140	192	75	426	128	201	94	9	432	1596
*** BREAK ***																					
11:00 AM	16	65	11	2	94	28	61	11	3	103	13	39	56	25	133	35	37	19	2	93	423
11:15 AM	7	87	15	3	112	33	70	10	5	118	2	44	49	8	103	68	43	29	2	142	475
11:30 AM	16	84	16	3	119	19	77	14	0	110	5	34	47	24	110	30	54	31	0	115	454
11:45 AM	29	82	9	3	123	30	63	16	2	111	4	29	53	21	107	28	43	28	3	102	443
Total	68	318	51	11	448	110	271	51	10	442	24	146	205	78	453	161	177	107	7	452	1795
12:00 PM	53	74	7	2	136	35	92	11	1	139	10	40	65	31	146	25	51	33	2	111	532
12:15 PM	9	103	6	3	121	34	76	8	0	118	16	26	70	22	134	35	56	21	1	113	486
12:30 PM	15	79	10	3	107	36	80	13	0	129	8	35	58	38	139	31	37	20	4	92	467
12:45 PM	17	78	3	1	99	29	71	7	4	111	9	44	63	12	128	35	52	24	1	112	450
Total	94	334	26	9	463	134	319	39	5	497	43	145	256	103	547	126	196	98	8	428	1935
*** BREAK ***																					
04:00 PM	21	98	13	0	132	40	102	11	5	158	6	49	105	20	180	35	41	45	6	127	597
04:15 PM	16	92	6	1	115	40	133	13	1	187	10	61	110	6	187	43	49	23	0	115	604
04:30 PM	21	80	15	0	116	54	134	18	0	206	5	51	108	4	168	27	43	30	4	104	594
04:45 PM	24	95	14	0	133	42	92	15	1	150	14	61	128	5	208	21	41	26	0	88	579
Total	82	365	48	1	496	176	461	57	7	701	35	222	451	35	743	126	174	124	10	434	2374
05:00 PM	16	88	8	1	113	28	80	9	1	118	9	37	119	5	170	50	51	29	0	130	531
05:15 PM	16	86	11	2	115	26	103	11	0	140	12	65	120	5	202	45	47	27	1	120	577
05:30 PM	34	74	10	0	118	51	81	13	2	147	9	40	70	15	134	24	37	31	4	96	495
05:45 PM	28	69	14	0	111	32	88	7	0	127	8	40	77	3	128	30	41	30	1	102	468
Total	94	317	43	3	457	137	352	40	3	532	38	182	386	28	634	149	176	117	6	448	2071
Grand Total	462	1785	342	42	2631	759	1809	250	44	2862	178	994	1689	372	3233	797	1154	662	51	2664	11390
Apprch %	17.6	67.8	13	1.6		26.5	63.2	8.7	1.5		5.5	30.7	52.2	11.5		29.9	43.3	24.8	1.9		
Total %	4.1	15.7	3	0.4	23.1	6.7	15.9	2.2	0.4	25.1	1.6	8.7	14.8	3.3	28.4	7	10.1	5.8	0.4	23.4	
Auto	448	1731	324	40	2543	740	1732	242	43	2757	171	948	1623	368	3110	745	1125	634	49	2553	10963
% Auto	97	97	94.7	95.2	96.7	97.5	95.7	96.8	97.7	96.3	96.1	95.4	96.1	98.9	96.2	93.5	97.5	95.8	96.1	95.8	96.3

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Coggeshall Street (E/W)
and Belleville Avenue (N/S)
New Bedford, Bristol County Massachusetts
Thursday, May 20, 2021

File Name : BOS-200026
Site Code : 00200026
Start Date : 5/20/2021
Page No : 2

Groups Printed- Auto - HV - B/SB

	Coggeshall St Eastbound					Coggeshall St Westbound					Belleville Avenue Northbound					Belleville Avenue Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
HV	11	35	16	2	64	19	40	7	1	67	5	40	59	4	108	45	25	14	1	85	324
% HV	2.4	2	4.7	4.8	2.4	2.5	2.2	2.8	2.3	2.3	2.8	4	3.5	1.1	3.3	5.6	2.2	2.1	2	3.2	2.8
B/SB	3	19	2	0	24	0	37	1	0	38	2	6	7	0	15	7	4	14	1	26	103
% B/SB	0.6	1.1	0.6	0	0.9	0	2	0.4	0	1.3	1.1	0.6	0.4	0	0.5	0.9	0.3	2.1	2	1	0.9

Start Time	Coggeshall St Eastbound					Coggeshall St Westbound					Belleville Avenue Northbound					Belleville Avenue Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

07:30 AM	16	62	28	3	109	26	60	9	5	100	5	38	46	12	101	30	57	35	0	122	432
07:45 AM	24	43	25	0	92	36	41	5	3	85	5	46	57	11	119	25	64	41	2	132	428
08:00 AM	17	72	26	1	116	26	54	8	3	91	1	43	57	26	127	38	64	25	0	127	461
08:15 AM	19	55	19	3	96	19	52	10	5	86	8	43	51	14	116	23	56	25	1	105	403
Total Volume	76	232	98	7	413	107	207	32	16	362	19	170	211	63	463	116	241	126	3	486	1724
% App. Total	18.4	56.2	23.7	1.7		29.6	57.2	8.8	4.4		4.1	36.7	45.6	13.6		23.9	49.6	25.9	0.6		
PHF	.792	.806	.875	.583	.890	.743	.863	.800	.800	.905	.594	.924	.925	.606	.911	.763	.941	.768	.375	.920	.935
Auto	73	218	94	7	392	99	195	29	16	339	19	158	190	62	429	103	229	117	3	452	1612
% Auto	96.1	94.0	95.9	100	94.9	92.5	94.2	90.6	100	93.6	100	92.9	90.0	98.4	92.7	88.8	95.0	92.9	100	93.0	93.5
HV	2	9	3	0	14	8	7	2	0	17	0	9	19	1	29	10	11	1	0	22	82
% HV	2.6	3.9	3.1	0	3.4	7.5	3.4	6.3	0	4.7	0	5.3	9.0	1.6	6.3	8.6	4.6	0.8	0	4.5	4.8
B/SB	1	5	1	0	7	0	5	1	0	6	0	3	2	0	5	3	1	8	0	12	30
% B/SB	1.3	2.2	1.0	0	1.7	0	2.4	3.1	0	1.7	0	1.8	0.9	0	1.1	2.6	0.4	6.3	0	2.5	1.7

Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 12:00 PM

12:00 PM	53	74	7	2	136	35	92	11	1	139	10	40	65	31	146	25	51	33	2	111	532
12:15 PM	9	103	6	3	121	34	76	8	0	118	16	26	70	22	134	35	56	21	1	113	486
12:30 PM	15	79	10	3	107	36	80	13	0	129	8	35	58	38	139	31	37	20	4	92	467
12:45 PM	17	78	3	1	99	29	71	7	4	111	9	44	63	12	128	35	52	24	1	112	450
Total Volume	94	334	26	9	463	134	319	39	5	497	43	145	256	103	547	126	196	98	8	428	1935
% App. Total	20.3	72.1	5.6	1.9		27	64.2	7.8	1		7.9	26.5	46.8	18.8		29.4	45.8	22.9	1.9		
PHF	.443	.811	.650	.750	.851	.931	.867	.750	.313	.894	.672	.824	.914	.678	.937	.900	.875	.742	.500	.947	.909
Auto	94	318	26	7	445	131	304	39	5	479	41	136	236	102	515	119	193	92	8	412	1851
% Auto	100	95.2	100	77.8	96.1	97.8	95.3	100	100	96.4	95.3	93.8	92.2	99.0	94.1	94.4	98.5	93.9	100	96.3	95.7
HV	0	12	0	2	14	3	9	0	0	12	2	8	17	1	28	6	3	5	0	14	68
% HV	0	3.6	0	22.2	3.0	2.2	2.8	0	0	2.4	4.7	5.5	6.6	1.0	5.1	4.8	1.5	5.1	0	3.3	3.5
B/SB	0	4	0	0	4	0	6	0	0	6	0	1	3	0	4	1	0	1	0	2	16
% B/SB	0	1.2	0	0	0.9	0	1.9	0	0	1.2	0	0.7	1.2	0	0.7	0.8	0	1.0	0	0.5	0.8

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Coggeshall Street (E/W)
and Belleville Avenue (N/S)
New Bedford, Bristol County Massachusetts
Thursday, May 20, 2021

File Name : BOS-200026
Site Code : 00200026
Start Date : 5/20/2021
Page No : 3

Start Time	Coggeshall St Eastbound					Coggeshall St Westbound					Belleville Avenue Northbound					Belleville Avenue Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	21	98	13	0	132	40	102	11	5	158	6	49	105	20	180	35	41	45	6	127	597
04:15 PM	16	92	6	1	115	40	133	13	1	187	10	61	110	6	187	43	49	23	0	115	604
04:30 PM	21	80	15	0	116	54	134	18	0	206	5	51	108	4	168	27	43	30	4	104	594
04:45 PM	24	95	14	0	133	42	92	15	1	150	14	61	128	5	208	21	41	26	0	88	579
Total Volume	82	365	48	1	496	176	461	57	7	701	35	222	451	35	743	126	174	124	10	434	2374
% App. Total	16.5	73.6	9.7	0.2		25.1	65.8	8.1	1		4.7	29.9	60.7	4.7		29	40.1	28.6	2.3		
PHF	.854	.931	.800	.250	.932	.815	.860	.792	.350	.851	.625	.910	.881	.438	.893	.733	.888	.689	.417	.854	.983
Auto	80	361	46	1	488	175	450	54	7	686	35	218	442	35	730	121	171	122	10	424	2328
% Auto	97.6	98.9	95.8	100	98.4	99.4	97.6	94.7	100	97.9	100	98.2	98.0	98.3	96.0	98.3	98.4	100	97.7	98.1	
HV	0	2	1	0	3	1	5	3	0	9	0	4	9	0	13	4	3	1	0	8	33
% HV	0	0.5	2.1	0	0.6	0.6	1.1	5.3	0	1.3	0	1.8	2.0	0	1.7	3.2	1.7	0.8	0	1.8	1.4
B/SB	2	2	1	0	5	0	6	0	0	6	0	0	0	0	0	1	0	1	0	2	13
% B/SB	2.4	0.5	2.1	0	1.0	0	1.3	0	0	0.9	0	0	0	0	0	0.8	0	0.8	0	0.5	0.5

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Coggeshall Street (E/W)
and Mitchell Street (N/S)
New Bedford, Bristol County, Massachusetts
Thursday, May 20, 2021

File Name : BOS-200026.2
Site Code : 00200026
Start Date : 5/20/2021
Page No : 1

Groups Printed- Auto - HV - B/SB

Start Time	Coggeshall St Eastbound				Coggeshall St Westbound				Mitchell St Southbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	9	133	0	142	0	56	3	59	3	0	11	14	215
07:15 AM	8	134	0	142	0	78	2	80	4	0	9	13	235
07:30 AM	11	143	0	154	0	84	3	87	4	0	8	12	253
07:45 AM	6	130	0	136	0	84	5	89	2	0	5	7	232
Total	34	540	0	574	0	302	13	315	13	0	33	46	935
08:00 AM	12	189	0	201	0	81	1	82	3	0	6	9	292
08:15 AM	8	135	0	143	0	72	2	74	1	0	11	12	229
08:30 AM	9	142	1	152	0	82	3	85	7	0	12	19	256
08:45 AM	9	136	0	145	0	72	4	76	3	0	6	9	230
Total	38	602	1	641	0	307	10	317	14	0	35	49	1007
*** BREAK ***													
11:00 AM	5	174	0	179	0	101	3	104	4	0	17	21	304
11:15 AM	2	198	0	200	0	101	3	104	4	0	20	24	328
11:30 AM	8	172	0	180	0	106	4	110	5	0	12	17	307
11:45 AM	12	176	0	188	0	106	3	109	1	0	6	7	304
Total	27	720	0	747	0	414	13	427	14	0	55	69	1243
12:00 PM	7	197	0	204	0	117	2	119	2	0	19	21	344
12:15 PM	7	204	0	211	0	101	2	103	4	0	15	19	333
12:30 PM	7	187	0	194	0	106	3	109	3	0	18	21	324
12:45 PM	8	174	0	182	0	105	1	106	2	0	19	21	309
Total	29	762	0	791	0	429	8	437	11	0	71	82	1310
*** BREAK ***													
04:00 PM	5	250	0	255	0	139	2	141	4	0	16	20	416
04:15 PM	8	237	0	245	0	153	9	162	3	0	14	17	424
04:30 PM	13	205	0	218	0	172	4	176	1	0	13	14	408
04:45 PM	16	216	0	232	0	137	2	139	1	0	15	16	387
Total	42	908	0	950	0	601	17	618	9	0	58	67	1635
05:00 PM	10	257	0	267	0	117	4	121	2	0	13	15	403
05:15 PM	14	239	0	253	0	136	4	140	3	0	13	16	409
05:30 PM	12	166	0	178	0	125	3	128	4	0	28	32	338
05:45 PM	10	168	0	178	0	106	3	109	5	0	15	20	307
Total	46	830	0	876	0	484	14	498	14	0	69	83	1457
Grand Total	216	4362	1	4579	0	2537	75	2612	75	0	321	396	7587
Apprch %	4.7	95.3	0		0	97.1	2.9		18.9	0	81.1		
Total %	2.8	57.5	0	60.4	0	33.4	1	34.4	1	0	4.2	5.2	
Auto	203	4202	0	4405	0	2450	61	2511	70	0	316	386	7302
% Auto	94	96.3	0	96.2	0	96.6	81.3	96.1	93.3	0	98.4	97.5	96.2
HV	8	132	1	141	0	54	2	56	5	0	5	10	207
% HV	3.7	3	100	3.1	0	2.1	2.7	2.1	6.7	0	1.6	2.5	2.7
B/SB	5	28	0	33	0	33	12	45	0	0	0	0	78
% B/SB	2.3	0.6	0	0.7	0	1.3	16	1.7	0	0	0	0	1

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Start Time	Coggeshall St Eastbound				Coggeshall St Westbound				Mitchell St Southbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

07:30 AM	11	143	0	154	0	84	3	87	4	0	8	12	253
07:45 AM	6	130	0	136	0	84	5	89	2	0	5	7	232
08:00 AM	12	189	0	201	0	81	1	82	3	0	6	9	292
08:15 AM	8	135	0	143	0	72	2	74	1	0	11	12	229
Total Volume	37	597	0	634	0	321	11	332	10	0	30	40	1006
% App. Total	5.8	94.2	0		0	96.7	3.3		25	0	75		
PHF	.771	.790	.000	.789	.000	.955	.550	.933	.625	.000	.682	.833	.861
Auto	35	551	0	586	0	305	9	314	9	0	26	35	935
% Auto	94.6	92.3	0	92.4	0	95.0	81.8	94.6	90.0	0	86.7	87.5	92.9
HV	2	38	0	40	0	9	0	9	1	0	4	5	54
% HV	5.4	6.4	0	6.3	0	2.8	0	2.7	10.0	0	13.3	12.5	5.4
B/SB	0	8	0	8	0	7	2	9	0	0	0	0	17
% B/SB	0	1.3	0	1.3	0	2.2	18.2	2.7	0	0	0	0	1.7

Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 12:00 PM

12:00 PM	7	197	0	204	0	117	2	119	2	0	19	21	344
12:15 PM	7	204	0	211	0	101	2	103	4	0	15	19	333
12:30 PM	7	187	0	194	0	106	3	109	3	0	18	21	324
12:45 PM	8	174	0	182	0	105	1	106	2	0	19	21	309
Total Volume	29	762	0	791	0	429	8	437	11	0	71	82	1310
% App. Total	3.7	96.3	0		0	98.2	1.8		13.4	0	86.6		
PHF	.906	.934	.000	.937	.000	.917	.667	.918	.688	.000	.934	.976	.952
Auto	28	723	0	751	0	411	5	416	11	0	71	82	1249
% Auto	96.6	94.9	0	94.9	0	95.8	62.5	95.2	100	0	100	100	95.3
HV	1	31	0	32	0	11	1	12	0	0	0	0	44
% HV	3.4	4.1	0	4.0	0	2.6	12.5	2.7	0	0	0	0	3.4
B/SB	0	8	0	8	0	7	2	9	0	0	0	0	17
% B/SB	0	1.0	0	1.0	0	1.6	25.0	2.1	0	0	0	0	1.3

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

04:00 PM	5	250	0	255	0	139	2	141	4	0	16	20	416
04:15 PM	8	237	0	245	0	153	9	162	3	0	14	17	424
04:30 PM	13	205	0	218	0	172	4	176	1	0	13	14	408
04:45 PM	16	216	0	232	0	137	2	139	1	0	15	16	387
Total Volume	42	908	0	950	0	601	17	618	9	0	58	67	1635
% App. Total	4.4	95.6	0		0	97.2	2.8		13.4	0	86.6		
PHF	.656	.908	.000	.931	.000	.874	.472	.878	.563	.000	.906	.838	.964
Auto	39	889	0	928	0	589	16	605	8	0	58	66	1599
% Auto	92.9	97.9	0	97.7	0	98.0	94.1	97.9	88.9	0	100	98.5	97.8
HV	1	16	0	17	0	7	0	7	1	0	0	1	25
% HV	2.4	1.8	0	1.8	0	1.2	0	1.1	11.1	0	0	1.5	1.5
B/SB	2	3	0	5	0	5	1	6	0	0	0	0	11
% B/SB	4.8	0.3	0	0.5	0	0.8	5.9	1.0	0	0	0	0	0.7

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Coggeshall Street (E/W)
and Belleville Avenue (N/S)
New Bedford, Bristol County, Massachusetts
Saturday, May 22, 2021

File Name : BOS-200026_SAT
Site Code : 00200026
Start Date : 5/22/2021
Page No : 1

Groups Printed- Auto - HV - B/SB

Start Time	Coggeshall Street Eastbound					Coggeshall Street Westbound					Belleville Avenue Northbound					Belleville Avenue Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
11:00 AM	11	90	12	4	117	32	84	17	3	136	12	40	75	21	148	33	43	9	1	86	487
11:15 AM	18	85	13	1	117	38	87	10	2	137	8	36	69	21	134	29	46	22	5	102	490
11:30 AM	20	78	21	3	122	20	60	8	3	91	6	41	81	14	142	28	45	30	2	105	460
11:45 AM	23	100	7	0	130	36	74	9	3	122	8	26	86	6	126	42	42	27	3	114	492
Total	72	353	53	8	486	126	305	44	11	486	34	143	311	62	550	132	176	88	11	407	1929
12:00 PM	27	92	12	0	131	41	98	7	2	148	9	37	107	5	158	45	57	30	2	134	571
12:15 PM	25	83	11	0	119	24	77	10	3	114	8	39	73	9	129	46	49	27	4	126	488
12:30 PM	20	85	14	2	121	37	115	8	3	163	13	36	84	6	139	35	30	32	6	103	526
12:45 PM	20	101	18	0	139	39	110	11	8	168	6	43	86	5	140	41	28	30	8	107	554
Total	92	361	55	2	510	141	400	36	16	593	36	155	350	25	566	167	164	119	20	470	2139
Grand Total	164	714	108	10	996	267	705	80	27	1079	70	298	661	87	1116	299	340	207	31	877	4068
Apprch %	16.5	71.7	10.8	1		24.7	65.3	7.4	2.5		6.3	26.7	59.2	7.8		34.1	38.8	23.6	3.5		
Total %	4	17.6	2.7	0.2	24.5	6.6	17.3	2	0.7	26.5	1.7	7.3	16.2	2.1	27.4	7.4	8.4	5.1	0.8	21.6	
Auto	161	704	107	10	982	266	691	79	27	1063	67	292	655	87	1101	298	336	204	31	869	4015
% Auto	98.2	98.6	99.1	100	98.6	99.6	98	98.8	100	98.5	95.7	98	99.1	100	98.7	99.7	98.8	98.6	100	99.1	98.7
HV	3	7	0	0	10	1	7	1	0	9	3	6	5	0	14	1	4	3	0	8	41
% HV	1.8	1	0	0	1	0.4	1	1.2	0	0.8	4.3	2	0.8	0	1.3	0.3	1.2	1.4	0	0.9	1
B/SB	0	3	1	0	4	0	7	0	0	7	0	0	1	0	1	0	0	0	0	0	12
% B/SB	0	0.4	0.9	0	0.4	0	1	0	0	0.6	0	0	0.2	0	0.1	0	0	0	0	0	0.3

Start Time	Coggeshall Street Eastbound					Coggeshall Street Westbound					Belleville Avenue Northbound					Belleville Avenue Southbound					Int. Total
	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	27	92	12	0	131	41	98	7	2	148	9	37	107	5	158	45	57	30	2	134	571
12:15 PM	25	83	11	0	119	24	77	10	3	114	8	39	73	9	129	46	49	27	4	126	488
12:30 PM	20	85	14	2	121	37	115	8	3	163	13	36	84	6	139	35	30	32	6	103	526
12:45 PM	20	101	18	0	139	39	110	11	8	168	6	43	86	5	140	41	28	30	8	107	554
Total Volume	92	361	55	2	510	141	400	36	16	593	36	155	350	25	566	167	164	119	20	470	2139
% App. Total	18	70.8	10.8	0.4		23.8	67.5	6.1	2.7		6.4	27.4	61.8	4.4		35.5	34.9	25.3	4.3		
PHF	.852	.894	.764	.250	.917	.860	.870	.818	.500	.882	.692	.901	.818	.694	.896	.908	.719	.930	.625	.877	.937
Auto	91	356	55	2	504	141	392	35	16	584	33	153	347	25	558	167	162	118	20	467	2113
% Auto	98.9	98.6	100	100	98.8	100	98.0	97.2	100	98.5	91.7	98.7	99.1	100	98.6	100	98.8	99.2	100	99.4	98.8
HV	1	3	0	0	4	0	5	1	0	6	3	2	3	0	8	0	2	1	0	3	21
% HV	1.1	0.8	0	0	0.8	0	1.3	2.8	0	1.0	8.3	1.3	0.9	0	1.4	0	1.2	0.8	0	0.6	1.0
B/SB	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	5
% B/SB	0	0.6	0	0	0.4	0	0.8	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0.2

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Coggeshall Street (E/W)
and Mitchell St (N/S)
New Bedford, Bristol County, Massachusetts
Saturday, May 22, 2021

File Name : BOS-200026.2_SAT
Site Code : 00200026
Start Date : 5/22/2021
Page No : 1

Groups Printed- Auto - HV - B/SB

Start Time	Coggeshall Street Eastbound				Coggeshall Street Westbound				Mitchell Street Southbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
11:00 AM	15	190	0	205	0	105	4	109	6	0	19	25	339
11:15 AM	18	187	0	205	0	116	3	119	1	0	20	21	345
11:30 AM	12	193	0	205	0	89	3	92	1	0	11	12	309
11:45 AM	15	210	0	225	0	113	2	115	1	0	18	19	359
Total	60	780	0	840	0	423	12	435	9	0	68	77	1352
12:00 PM	10	196	0	206	1	98	0	99	8	0	21	29	334
12:15 PM	9	197	0	206	0	97	6	103	2	0	12	14	323
12:30 PM	11	192	0	203	0	131	7	138	3	0	19	22	363
12:45 PM	7	219	0	226	1	126	2	129	5	0	25	30	385
Total	37	804	0	841	2	452	15	469	18	0	77	95	1405
Grand Total	97	1584	0	1681	2	875	27	904	27	0	145	172	2757
Apprch %	5.8	94.2	0		0.2	96.8	3		15.7	0	84.3		
Total %	3.5	57.5	0	61	0.1	31.7	1	32.8	1	0	5.3	6.2	
Auto	95	1566	0	1661	2	859	23	884	27	0	145	172	2717
% Auto	97.9	98.9	0	98.8	100	98.2	85.2	97.8	100	0	100	100	98.5
HV	1	14	0	15	0	9	0	9	0	0	0	0	24
% HV	1	0.9	0	0.9	0	1	0	1	0	0	0	0	0.9
B/SB	1	4	0	5	0	7	4	11	0	0	0	0	16
% B/SB	1	0.3	0	0.3	0	0.8	14.8	1.2	0	0	0	0	0.6

Start Time	Coggeshall Street Eastbound				Coggeshall Street Westbound				Mitchell Street Southbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 12:00 PM													
12:00 PM	10	196	0	206	1	98	0	99	8	0	21	29	334
12:15 PM	9	197	0	206	0	97	6	103	2	0	12	14	323
12:30 PM	11	192	0	203	0	131	7	138	3	0	19	22	363
12:45 PM	7	219	0	226	1	126	2	129	5	0	25	30	385
Total Volume	37	804	0	841	2	452	15	469	18	0	77	95	1405
% App. Total	4.4	95.6	0		0.4	96.4	3.2		18.9	0	81.1		
PHF	.841	.918	.000	.930	.500	.863	.536	.850	.563	.000	.770	.792	.912
Auto	35	795	0	830	2	444	13	459	18	0	77	95	1384
% Auto	94.6	98.9	0	98.7	100	98.2	86.7	97.9	100	0	100	100	98.5
HV	1	8	0	9	0	4	0	4	0	0	0	0	13
% HV	2.7	1.0	0	1.1	0	0.9	0	0.9	0	0	0	0	0.9
B/SB	1	1	0	2	0	4	2	6	0	0	0	0	8
% B/SB	2.7	0.1	0	0.2	0	0.9	13.3	1.3	0	0	0	0	0.6

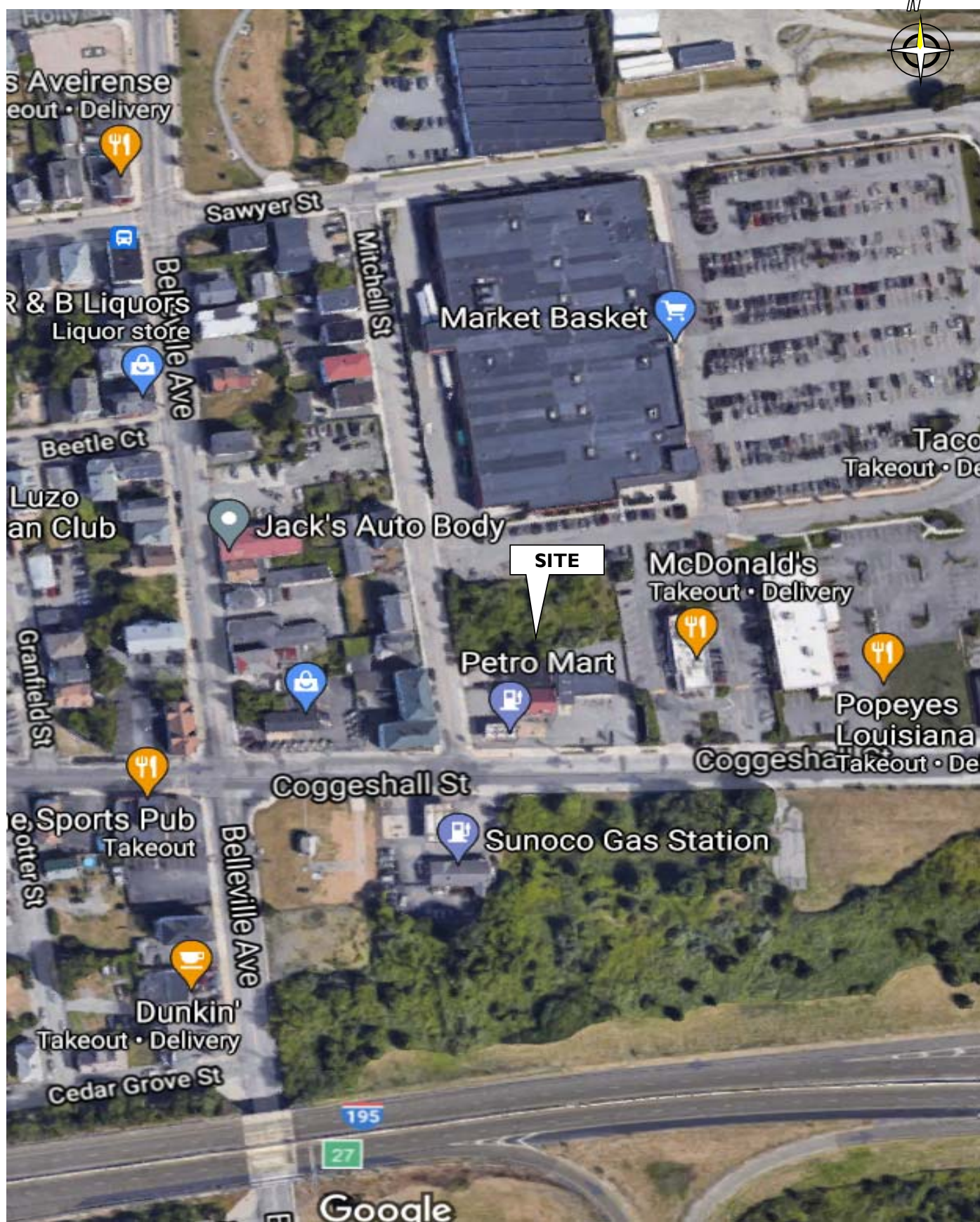
MASSDOT AUTOMATIC TRAFFIC RECORDER DATA

Location Info		Count Data Info	
Location ID	RPA10-094-00016_WB	Start Date	5/15/2019
Type	I-SECTION	End Date	5/16/2019
Class	4	Start Time	10:45 AM
Located On	HOWLAND ROAD	End Time	10:45 AM
AT	NEW BEDFORD	Direction	
Direction	WB	Notes	
Community	Fairhaven	Source	253244
MPO_ID		File Name	253244.txt
HPMS ID		Weather	
Agency	Massachusetts Highway Department	Study	
		Owner	rpa10
		QC Status	Accepted

Interval: 15 mins					
Time	15 Min				Hourly Count
	1st	2nd	3rd	4th	
01:00	16	14	19	12	61
02:00	10	4	5	8	27
03:00	11	8	7	11	37
04:00	8	9	6	10	33
05:00	13	22	21	40	96
06:00	40	50	67	84	241
07:00	73	105	124	159	461
08:00	172	201	210	178	761
09:00	192	197	183	152	724
10:00	144	155	145	145	589
11:00	144	11	0	132	287
12:00	113	143	135	130	521
13:00	124	174	116	128	542
14:00	125	131	162	111	529
15:00	123	141	165	172	601
16:00	130	180	189	153	652
17:00	145	171	154	170	640
18:00	171	159	135	143	608
19:00	135	145	144	130	554
20:00	127	103	89	93	412
21:00	82	96	88	97	363
22:00	56	67	53	52	228
23:00	43	26	27	21	117
24:00	22	17	23	18	80
TOTAL					9164

Location Info					Count Data Info	
Location ID	RPA10-094-00016_EB				Start Date	5/15/2019
Type	I-SECTION				End Date	5/16/2019
Class					Start Time	10:45 AM
Located On	HOWLAND ROAD				End Time	10:45 AM
AT	NEW BEDFORD				Direction	
Direction	EB				Notes	
Community	Fairhaven				Source	253244
MPO_ID					File Name	253244.txt
HPMS ID					Weather	
Agency	Massachusetts Highway Department				Study	
					Owner	rpa10
					QC Status	Accepted
Interval: 15 mins						
Time	15 Min				Hourly Count	
	1st	2nd	3rd	4th		
01:00	17	11	13	9	50	
02:00	5	11	10	10	36	
03:00	4	11	4	4	23	
04:00	4	4	5	5	18	
05:00	7	13	10	19	49	
06:00	10	14	26	33	83	
07:00	50	47	75	84	256	
08:00	125	99	77	101	402	
09:00	118	107	108	103	436	
10:00	105	100	89	103	397	
11:00	129	12	0	109	250	
12:00	96	121	109	118	444	
13:00	106	123	111	112	452	
14:00	128	110	119	110	467	
15:00	142	117	133	114	506	
16:00	153	140	145	165	603	
17:00	145	166	170	179	660	
18:00	166	157	170	149	642	
19:00	140	156	118	125	539	
20:00	110	94	94	96	394	
21:00	75	89	98	76	338	
22:00	68	61	47	49	225	
23:00	40	36	27	41	144	
24:00	30	30	19	14	93	
TOTAL					7507	

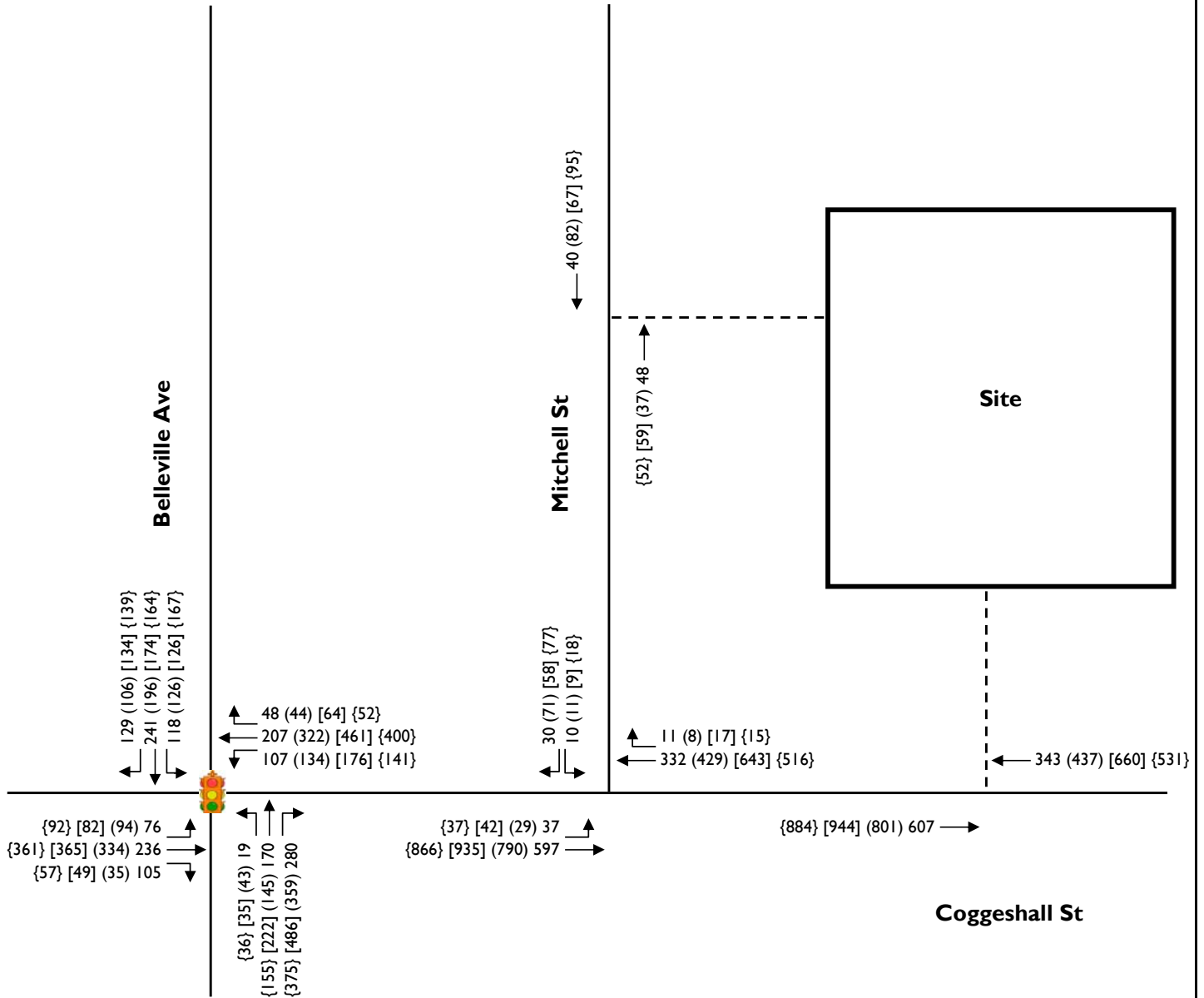
FIGURES



STONEFIELD

Proposed Starbucks with Drive-Through Facilities
 NEC Coggeshall Street & Mitchell Street
 City of New Bedford, Bristol County, Massachusetts
 Traffic Impact Study

FIGURE I
 Site Location Map



LEGEND

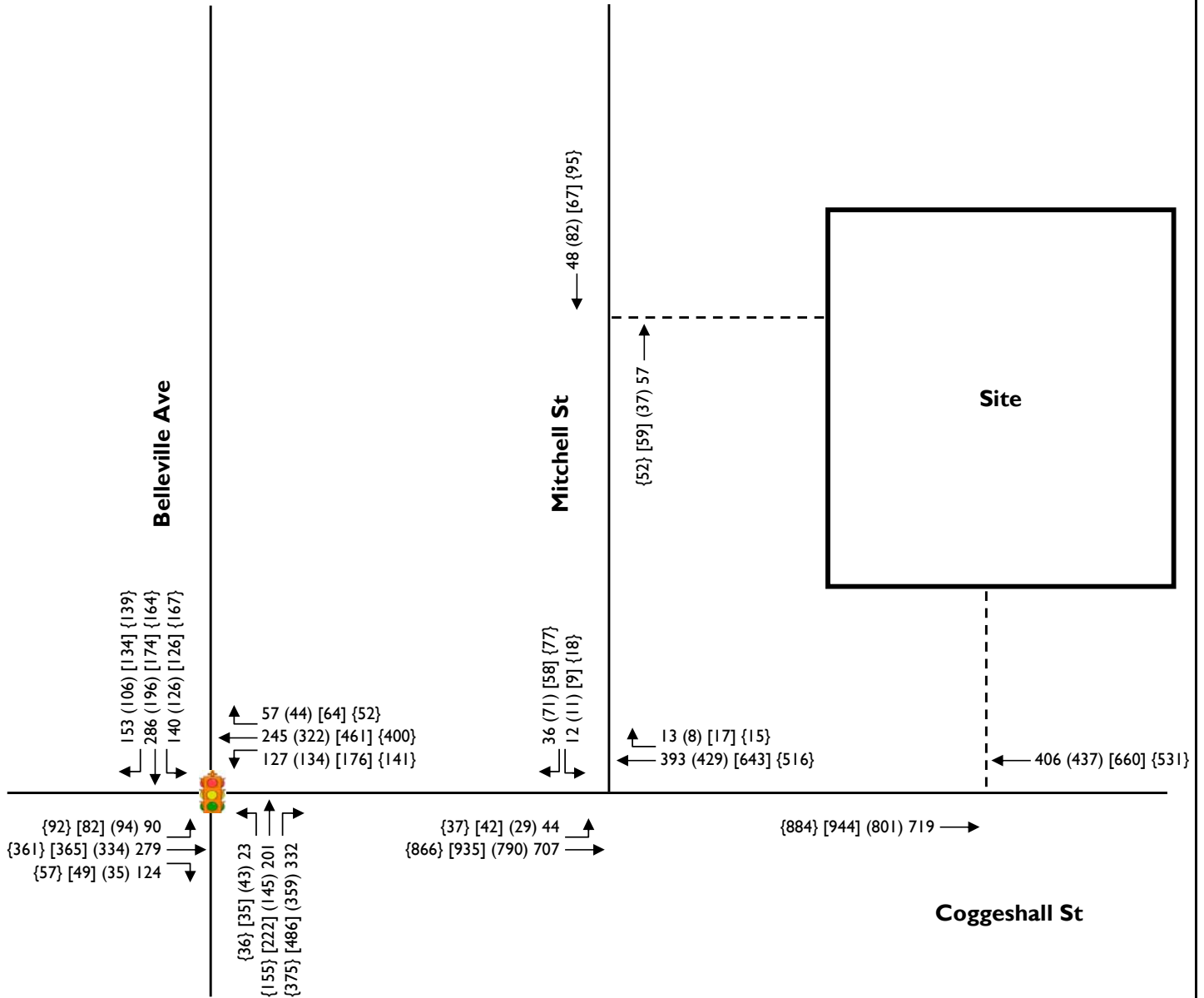
- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (MID) [PM] {SAT} Peak Hour
- Signalized Intersection

not to scale

STONEFIELD

Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study

FIGURE 2
2021 Existing As-Counted
Traffic Volumes



LEGEND

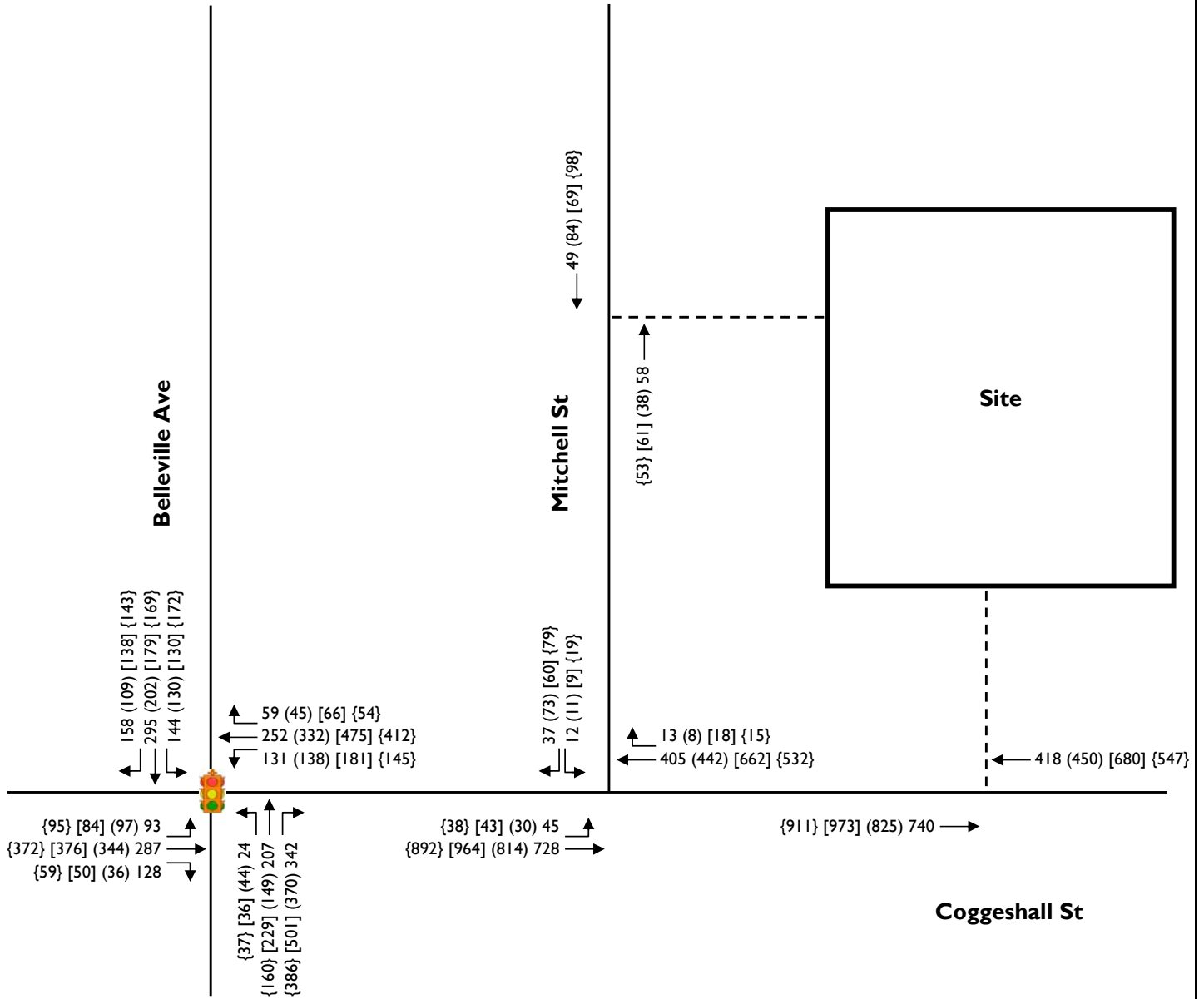
- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (MID) [PM] {SAT} Peak Hour
- Signalized Intersection

not to scale

STONEFIELD

**Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study**

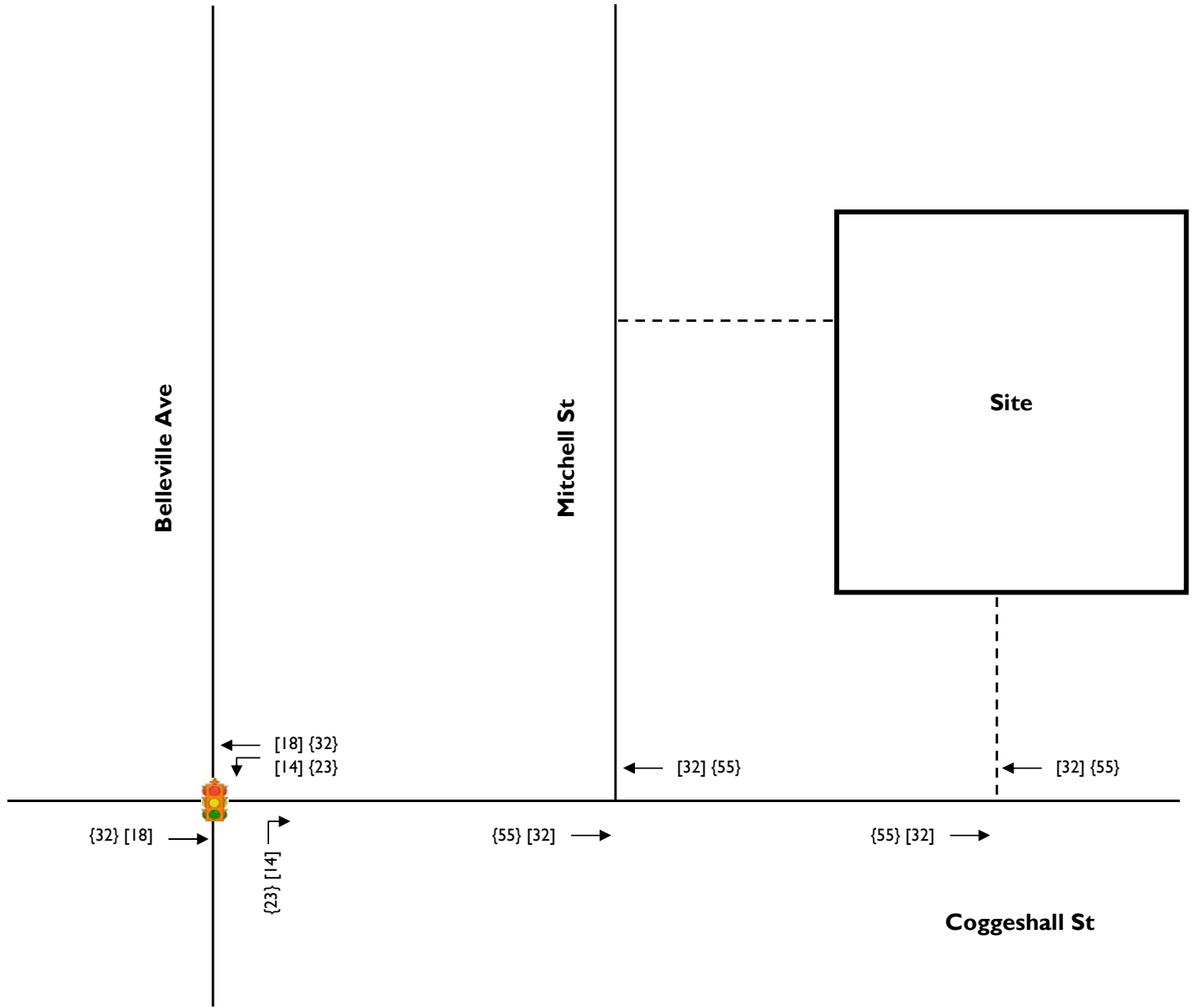
**FIGURE 3
2021 Adjusted Existing
Traffic Volumes**




STONEFIELD

**Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study**

**FIGURE 4
2023 Base Traffic Volumes**



LEGEND

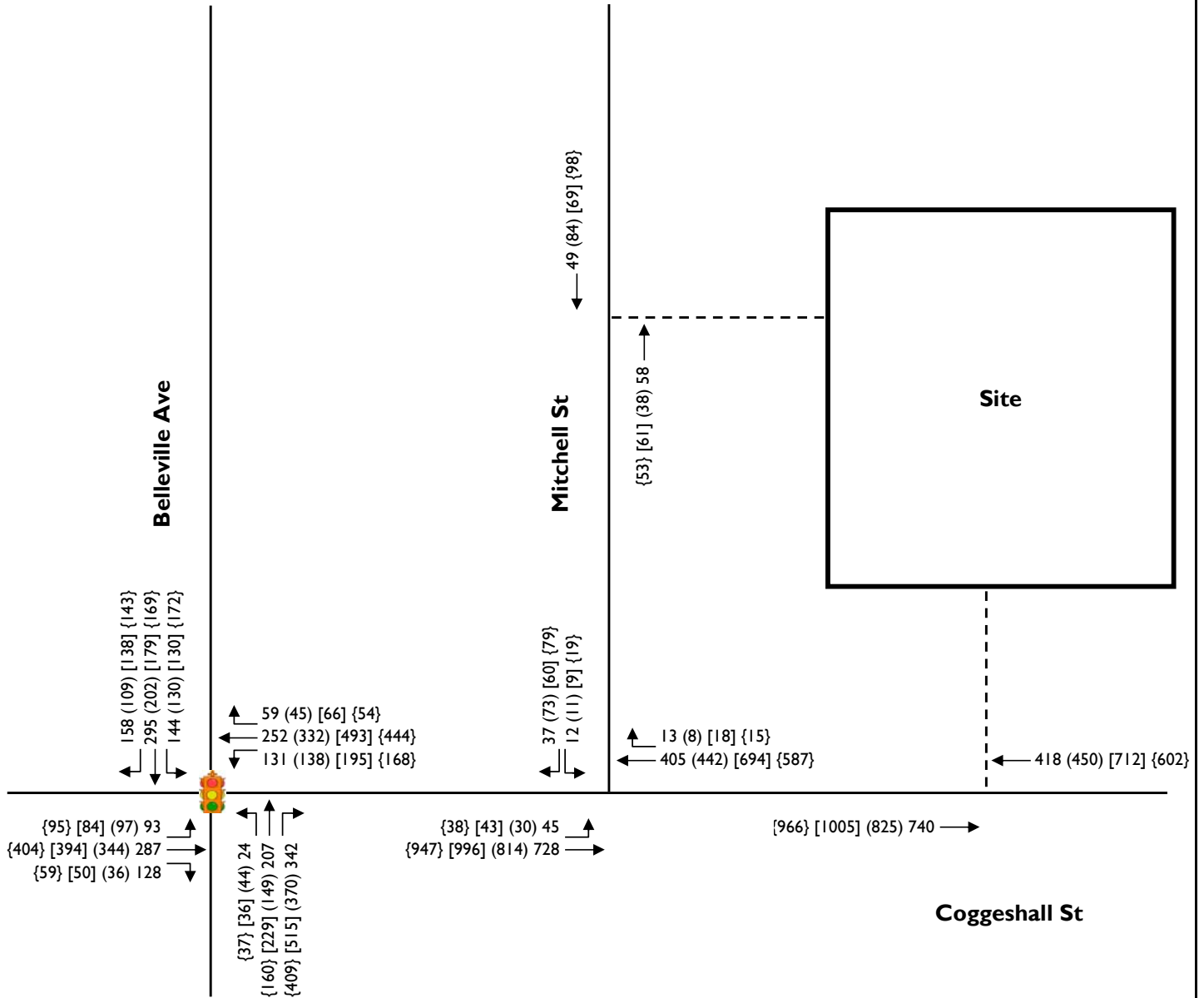
- Existing Roadway
- - - Proposed Driveway
- · - Existing Private Driveway
- ← AM MID [PM] {SAT} Peak Hour
-  Signalized Intersection

not to scale

STONEFIELD

Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study

FIGURE 5
Other Planned Projects
Future Traffic Volumes

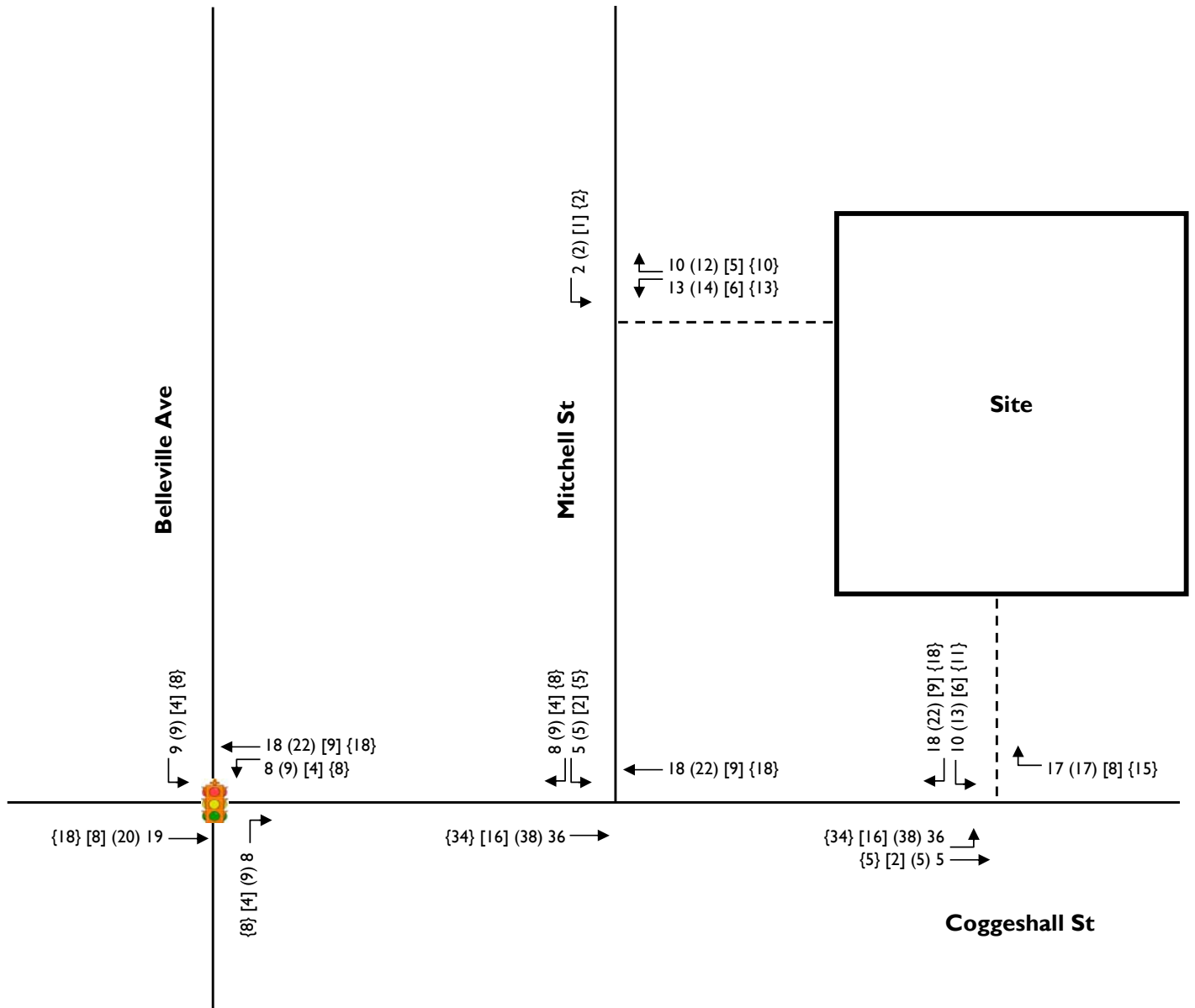


not to scale

STONEFIELD

**Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study**

**FIGURE 6
2023 No-Build Traffic
Volumes**



LEGEND

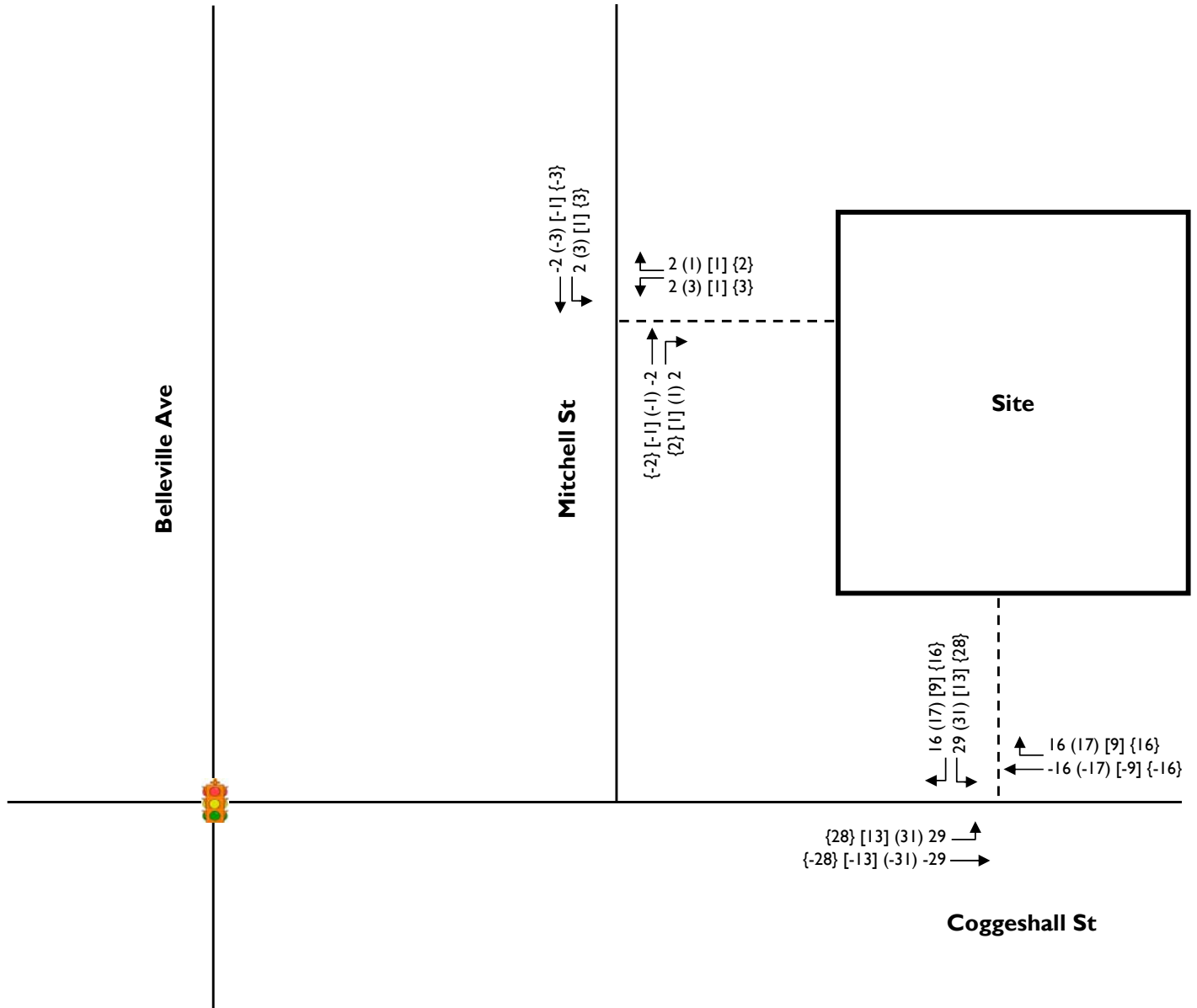
- Existing Roadway
- - - Proposed Driveway
- · - Existing Private Driveway
- ← AM (MID) [PM] {SAT} Peak Hour
- Signalized Intersection

not to scale


STONEFIELD

**Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study**

**FIGURE 7
"New" Site-Generated
Traffic Volumes**



LEGEND

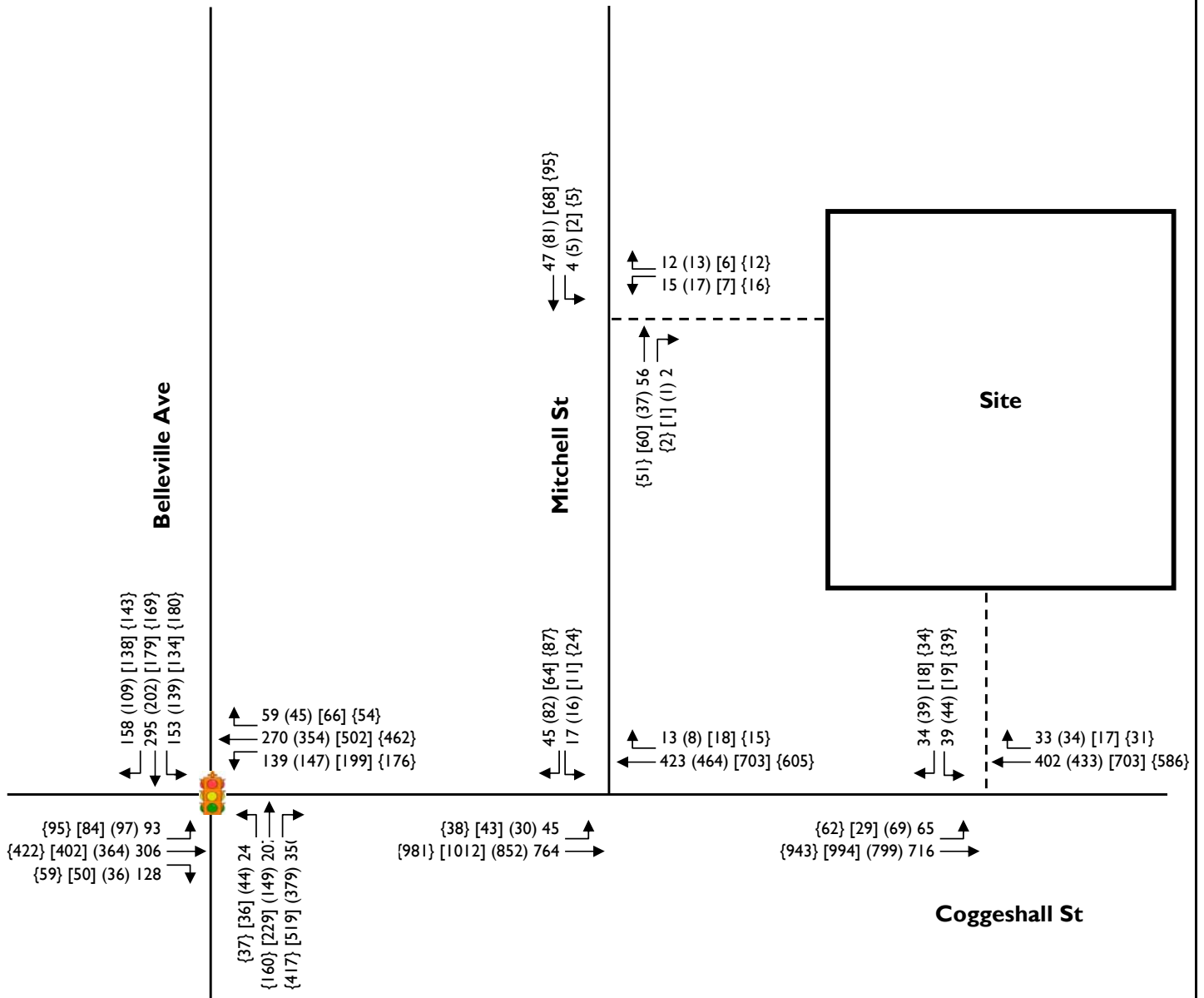
- Existing Roadway
- - - Proposed Driveway
- · - Existing Private Driveway
- ← AM (MID) [PM] {SAT} Peak Hour
-  Signalized Intersection

not to scale

STONEFIELD

**Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study**

**FIGURE 8
"Pass-By" Site-Generated
Traffic Volumes**



STONEFIELD






















**Proposed Starbucks with Drive-Through Facilities
NEC Coggeshall Street & Mitchell Street
City of New Bedford, Bristol County, Massachusetts
Traffic Impact Study**

**FIGURE 9
2023 Build Traffic Volumes**

CAPACITY ANALYSIS DETAIL SHEETS

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2021 Existing Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	279	124	127	245	57	23	201	332	140	286	153
Future Volume (vph)	90	279	124	127	245	57	23	201	332	140	286	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1620	1720		1574	1792	1422		1779	1495	1518	1703	
Flt Permitted	0.60	1.00		0.18	1.00	1.00		0.91	1.00	0.33	1.00	
Satd. Flow (perm)	1020	1720		301	1792	1422		1627	1495	524	1703	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	96	297	132	135	261	61	24	214	353	149	304	163
RTOR Reduction (vph)	0	17	0	0	0	36	0	0	175	0	22	0
Lane Group Flow (vph)	96	412	0	135	261	25	0	238	178	149	445	0
Heavy Vehicles (%)	4%	6%	4%	7%	6%	6%	0%	7%	8%	11%	5%	7%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.9	19.0		31.9	22.0	31.4		15.6	25.5	31.0	31.0	
Effective Green, g (s)	25.9	19.0		31.9	22.0	31.4		15.6	25.5	31.0	31.0	
Actuated g/C Ratio	0.33	0.24		0.41	0.28	0.40		0.20	0.33	0.40	0.40	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	392	419		285	506	573		325	604	328	677	
v/s Ratio Prot	0.02	c0.24		c0.06	c0.15	0.01			0.04	0.05	c0.26	
v/s Ratio Perm	0.06			0.13		0.01		0.15	0.08	0.13		
v/c Ratio	0.24	0.98		0.47	0.52	0.04		0.73	0.29	0.45	0.66	
Uniform Delay, d1	18.4	29.3		16.8	23.5	14.1		29.2	19.5	16.4	19.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	39.1		1.2	0.9	0.0		8.3	0.3	1.0	2.3	
Delay (s)	18.8	68.4		18.1	24.4	14.2		37.4	19.8	17.4	21.4	
Level of Service	B	E		B	C	B		D	B	B	C	
Approach Delay (s)		59.3			21.1			26.9			20.5	
Approach LOS		E			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.7	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			77.9	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			85.5%	ICU Level of Service				E				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street























2021 Existing Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	44	707	393	13	12	36
Future Volume (Veh/h)	44	707	393	13	12	36
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	51	822	457	15	14	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.76	
vC, conflicting volume	472				1388	464
vC1, stage 1 conf vol					464	
vC2, stage 2 conf vol					924	
vCu, unblocked vol	472				1354	464
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)	2.2				3.6	3.4
p0 queue free %	95				95	93
cM capacity (veh/h)	1074				299	576
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	873	472	56			
Volume Left	51	0	14			
Volume Right	0	15	42			
cSH	1074	1700	467			
Volume to Capacity	0.05	0.28	0.12			
Queue Length 95th (ft)	4	0	10			
Control Delay (s)	1.2	0.0	13.7			
Lane LOS	A		B			
Approach Delay (s)	1.2	0.0	13.7			
Approach LOS			B			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			74.4%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2021 Existing Condition
Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	334	35	134	322	44	43	145	359	126	196	106
Future Volume (vph)	94	334	35	134	322	44	43	145	359	126	196	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1685	1782		1652	1810	1507		1776	1524	1589	1752	
Flt Permitted	0.47	1.00		0.19	1.00	1.00		0.82	1.00	0.36	1.00	
Satd. Flow (perm)	829	1782		337	1810	1507		1479	1524	609	1752	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	103	367	38	147	354	48	47	159	395	138	215	116
RTOR Reduction (vph)	0	4	0	0	0	29	0	0	167	0	23	0
Lane Group Flow (vph)	103	401	0	147	354	19	0	206	228	138	308	0
Heavy Vehicles (%)	0%	5%	6%	2%	5%	0%	5%	6%	6%	6%	1%	6%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	26.0	19.4		32.6	22.7	30.1		13.8	23.7	27.2	27.2	
Effective Green, g (s)	26.0	19.4		32.6	22.7	30.1		13.8	23.7	27.2	27.2	
Actuated g/C Ratio	0.35	0.26		0.44	0.30	0.40		0.19	0.32	0.37	0.37	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	365	464		322	551	608		273	607	319	639	
v/s Ratio Prot	0.02	c0.22		0.06	c0.20	0.00			c0.05	0.04	c0.18	
v/s Ratio Perm	0.07			0.14		0.01		c0.14	0.10	0.11		
v/c Ratio	0.28	0.86		0.46	0.64	0.03		0.75	0.38	0.43	0.48	
Uniform Delay, d1	16.9	26.3		14.6	22.4	13.4		28.7	19.7	17.0	18.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	15.2		1.0	2.6	0.0		11.2	0.4	0.9	0.6	
Delay (s)	17.3	41.5		15.6	25.0	13.4		40.0	20.1	17.9	18.8	
Level of Service	B	D		B	C	B		D	C	B	B	
Approach Delay (s)		36.6			21.4			26.9			18.5	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			26.0	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			74.5	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			73.9%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Coggeshall Street & Mitchell Street






















2021 Existing Condition
Weekday Midday Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Volume (veh/h)	29	790	429	8	11	71
Future Volume (Veh/h)	29	790	429	8	11	71
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	31	832	452	8	12	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.76	
vC, conflicting volume	460				1350	456
vC1, stage 1 conf vol					456	
vC2, stage 2 conf vol					894	
vCu, unblocked vol	460				1303	456
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	88
cM capacity (veh/h)	1096				328	609
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	863	460	87			
Volume Left	31	0	12			
Volume Right	0	8	75			
cSH	1096	1700	545			
Volume to Capacity	0.03	0.27	0.16			
Queue Length 95th (ft)	2	0	14			
Control Delay (s)	0.7	0.0	12.9			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			76.7%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2021 Existing Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	365	49	176	461	64	35	222	486	126	174	134
Future Volume (vph)	82	365	49	176	461	64	35	222	486	126	174	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1652	1841		1668	1863	1436		1855	1583	1620	1749	
Flt Permitted	0.32	1.00		0.16	1.00	1.00		0.90	1.00	0.27	1.00	
Satd. Flow (perm)	553	1841		288	1863	1436		1675	1583	464	1749	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	84	372	50	180	470	65	36	227	496	129	178	137
RTOR Reduction (vph)	0	5	0	0	0	38	0	0	156	0	34	0
Lane Group Flow (vph)	84	417	0	180	470	27	0	263	340	129	281	0
Heavy Vehicles (%)	2%	1%	4%	1%	2%	5%	0%	2%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.7	19.5		35.5	24.4	31.7		14.4	25.5	27.7	27.7	
Effective Green, g (s)	25.7	19.5		35.5	24.4	31.7		14.4	25.5	27.7	27.7	
Actuated g/C Ratio	0.34	0.26		0.47	0.32	0.42		0.19	0.33	0.36	0.36	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	275	470		334	595	596		316	653	279	634	
v/s Ratio Prot	0.02	c0.23		0.08	c0.25	0.00			c0.08	0.04	c0.16	
v/s Ratio Perm	0.08			0.17		0.01		c0.16	0.14	0.12		
v/c Ratio	0.31	0.89		0.54	0.79	0.05		0.83	0.52	0.46	0.44	
Uniform Delay, d1	18.0	27.3		14.6	23.6	13.3		29.8	20.5	17.7	18.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	17.9		1.7	6.9	0.0		16.8	0.7	1.2	0.5	
Delay (s)	18.7	45.3		16.3	30.5	13.3		46.6	21.2	19.0	18.9	
Level of Service	B	D		B	C	B		D	C	B	B	
Approach Delay (s)		40.8			25.4			30.0			18.9	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			28.9	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			76.3	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			84.6%	ICU Level of Service				E				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 2: Coggeshall Street & Mitchell Street






















2021 Existing Condition
 Weekday Evening Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	42	935	643	17	9	58
Future Volume (Veh/h)	42	935	643	17	9	58
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	44	974	670	18	9	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.75	
vC, conflicting volume	688				1741	679
vC1, stage 1 conf vol					679	
vC2, stage 2 conf vol					1062	
vCu, unblocked vol	688				1820	679
tC, single (s)	4.2				6.5	6.2
tC, 2 stage (s)					5.5	
tF (s)	2.3				3.6	3.3
p0 queue free %	95				96	87
cM capacity (veh/h)	883				233	455
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	1018	688	69			
Volume Left	44	0	9			
Volume Right	0	18	60			
cSH	883	1700	405			
Volume to Capacity	0.05	0.40	0.17			
Queue Length 95th (ft)	4	0	15			
Control Delay (s)	1.4	0.0	15.7			
Lane LOS	A		C			
Approach Delay (s)	1.4	0.0	15.7			
Approach LOS			C			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			94.1%	ICU Level of Service		F
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

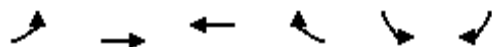
2021 Existing Condition
Saturday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	361	57	141	400	52	36	155	375	167	164	139
Future Volume (vph)	92	361	57	141	400	52	36	155	375	167	164	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1668	1845		1685	1863	1478		1840	1599	1685	1751	
Flt Permitted	0.32	1.00		0.18	1.00	1.00		0.86	1.00	0.35	1.00	
Satd. Flow (perm)	563	1845		324	1863	1478		1589	1599	628	1751	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	384	61	150	426	55	38	165	399	178	174	148
RTOR Reduction (vph)	0	7	0	0	0	32	0	0	138	0	36	0
Lane Group Flow (vph)	98	438	0	150	426	23	0	203	261	178	286	0
Heavy Vehicles (%)	1%	1%	0%	0%	2%	2%	8%	1%	1%	0%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.7	18.9		31.7	21.9	31.5		13.2	23.0	28.8	28.8	
Effective Green, g (s)	25.7	18.9		31.7	21.9	31.5		13.2	23.0	28.8	28.8	
Actuated g/C Ratio	0.34	0.25		0.42	0.29	0.42		0.17	0.30	0.38	0.38	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	291	461		312	540	616		277	614	373	667	
v/s Ratio Prot	0.03	c0.24		0.06	c0.23	0.00			c0.06	0.06	c0.16	
v/s Ratio Perm	0.08			0.14		0.01		c0.13	0.11	0.12		
v/c Ratio	0.34	0.95		0.48	0.79	0.04		0.73	0.43	0.48	0.43	
Uniform Delay, d1	17.8	27.8		16.0	24.7	13.0		29.5	21.0	16.7	17.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	29.6		1.2	7.5	0.0		9.6	0.5	1.0	0.4	
Delay (s)	18.5	57.5		17.2	32.2	13.0		39.1	21.4	17.7	17.7	
Level of Service	B	E		B	C	B		D	C	B	B	
Approach Delay (s)		50.4			27.0			27.4			17.7	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			30.6	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			75.5	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			77.8%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Coggeshall Street & Mitchell Street























2021 Existing Condition
Saturday Midday Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	37	866	516	15	18	77
Future Volume (Veh/h)	37	866	516	15	18	77
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	41	952	567	16	20	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.72	
vC, conflicting volume	583				1609	575
vC1, stage 1 conf vol					575	
vC2, stage 2 conf vol					1034	
vCu, unblocked vol	583				1652	575
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				92	84
cM capacity (veh/h)	977				259	521
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	993	583	105			
Volume Left	41	0	20			
Volume Right	0	16	85			
cSH	977	1700	437			
Volume to Capacity	0.04	0.34	0.24			
Queue Length 95th (ft)	3	0	23			
Control Delay (s)	1.2	0.0	15.8			
Lane LOS	A		C			
Approach Delay (s)	1.2	0.0	15.8			
Approach LOS			C			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			88.0%	ICU Level of Service		E
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 No-Build Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	287	128	131	252	59	24	207	342	144	295	158
Future Volume (vph)	93	287	128	131	252	59	24	207	342	144	295	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1620	1720		1574	1792	1422		1779	1495	1518	1704	
Flt Permitted	0.58	1.00		0.18	1.00	1.00		0.90	1.00	0.32	1.00	
Satd. Flow (perm)	992	1720		301	1792	1422		1615	1495	513	1704	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	99	305	136	139	268	63	26	220	364	153	314	168
RTOR Reduction (vph)	0	17	0	0	0	38	0	0	167	0	22	0
Lane Group Flow (vph)	99	424	0	139	268	25	0	246	197	153	460	0
Heavy Vehicles (%)	4%	6%	4%	7%	6%	6%	0%	7%	8%	11%	5%	7%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	26.1	19.0		32.1	22.0	31.4		16.1	26.2	31.5	31.5	
Effective Green, g (s)	26.1	19.0		32.1	22.0	31.4		16.1	26.2	31.5	31.5	
Actuated g/C Ratio	0.33	0.24		0.41	0.28	0.40		0.20	0.33	0.40	0.40	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	386	415		286	501	568		330	612	325	682	
v/s Ratio Prot	0.02	c0.25		c0.06	c0.15	0.01			0.04	0.06	c0.27	
v/s Ratio Perm	0.06			0.14		0.01		0.15	0.09	0.13		
v/c Ratio	0.26	1.02		0.49	0.53	0.04		0.75	0.32	0.47	0.67	
Uniform Delay, d1	18.7	29.8		17.2	24.0	14.4		29.3	19.6	16.5	19.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	49.5		1.3	1.1	0.0		8.8	0.3	1.1	2.6	
Delay (s)	19.0	79.3		18.5	25.1	14.5		38.2	19.9	17.6	22.0	
Level of Service	B	E		B	C	B		D	B	B	C	
Approach Delay (s)		68.3			21.7			27.3			20.9	
Approach LOS		E			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			78.6				Sum of lost time (s)		24.0			
Intersection Capacity Utilization			87.5%				ICU Level of Service		E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 2: Coggeshall Street & Mitchell Street























2023 No-Build Condition
 Weekday Morning Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	45	728	405	13	12	37
Future Volume (Veh/h)	45	728	405	13	12	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	52	847	471	15	14	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.76	
vC, conflicting volume	486				1430	478
vC1, stage 1 conf vol					478	
vC2, stage 2 conf vol					951	
vCu, unblocked vol	486				1407	478
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)	2.2				3.6	3.4
p0 queue free %	95				95	92
cM capacity (veh/h)	1062				287	565
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	899	486	57			
Volume Left	52	0	14			
Volume Right	0	15	43			
cSH	1062	1700	456			
Volume to Capacity	0.05	0.29	0.12			
Queue Length 95th (ft)	4	0	11			
Control Delay (s)	1.3	0.0	14.0			
Lane LOS	A		B			
Approach Delay (s)	1.3	0.0	14.0			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			76.2%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 No-Build Condition
Weekday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	344	36	138	332	45	44	149	370	130	202	109
Future Volume (vph)	97	344	36	138	332	45	44	149	370	130	202	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1685	1782		1652	1810	1507		1776	1524	1589	1752	
Flt Permitted	0.42	1.00		0.18	1.00	1.00		0.82	1.00	0.35	1.00	
Satd. Flow (perm)	744	1782		319	1810	1507		1475	1524	584	1752	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	107	378	40	152	365	49	48	164	407	143	222	120
RTOR Reduction (vph)	0	5	0	0	0	29	0	0	159	0	23	0
Lane Group Flow (vph)	107	413	0	152	365	20	0	212	248	143	319	0
Heavy Vehicles (%)	0%	5%	6%	2%	5%	0%	5%	6%	6%	6%	1%	6%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.8	18.8		31.8	21.8	31.1		13.9	23.9	29.2	29.2	
Effective Green, g (s)	25.8	18.8		31.8	21.8	31.1		13.9	23.9	29.2	29.2	
Actuated g/C Ratio	0.34	0.25		0.42	0.29	0.41		0.18	0.31	0.38	0.38	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	339	440		308	519	616		269	599	347	673	
v/s Ratio Prot	0.03	c0.23		0.06	c0.20	0.00			c0.05	0.05	c0.18	
v/s Ratio Perm	0.08			0.14		0.01		c0.14	0.11	0.11		
v/c Ratio	0.32	0.94		0.49	0.70	0.03		0.79	0.41	0.41	0.47	
Uniform Delay, d1	17.8	28.0		16.0	24.2	13.4		29.6	20.5	16.4	17.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	27.9		1.2	4.3	0.0		14.1	0.5	0.8	0.5	
Delay (s)	18.4	56.0		17.2	28.5	13.5		43.8	21.0	17.2	18.2	
Level of Service	B	E		B	C	B		D	C	B	B	
Approach Delay (s)		48.3			24.2			28.8			17.9	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay	29.9			HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	76.0			Sum of lost time (s)				24.0				
Intersection Capacity Utilization	75.5%			ICU Level of Service				D				
Analysis Period (min)	15											

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street






















2023 No-Build Condition
Weekday Midday Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	30	814	442	18	11	73
Future Volume (Veh/h)	30	814	442	18	11	73
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	857	465	19	12	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.75	
vC, conflicting volume	484				1396	474
vC1, stage 1 conf vol					474	
vC2, stage 2 conf vol					921	
vCu, unblocked vol	484				1361	474
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	87
cM capacity (veh/h)	1074				314	594
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	889	484	89			
Volume Left	32	0	12			
Volume Right	0	19	77			
cSH	1074	1700	531			
Volume to Capacity	0.03	0.28	0.17			
Queue Length 95th (ft)	2	0	15			
Control Delay (s)	0.8	0.0	13.1			
Lane LOS	A		B			
Approach Delay (s)	0.8	0.0	13.1			
Approach LOS			B			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			78.9%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 No-Build Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	394	50	195	493	66	36	229	515	130	179	138
Future Volume (vph)	84	394	50	195	493	66	36	229	515	130	179	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1652	1843		1668	1863	1436		1855	1583	1620	1749	
Flt Permitted	0.27	1.00		0.16	1.00	1.00		0.90	1.00	0.26	1.00	
Satd. Flow (perm)	475	1843		283	1863	1436		1673	1583	450	1749	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	86	402	51	199	503	67	37	234	526	133	183	141
RTOR Reduction (vph)	0	5	0	0	0	39	0	0	142	0	34	0
Lane Group Flow (vph)	86	448	0	199	503	28	0	271	384	133	290	0
Heavy Vehicles (%)	2%	1%	4%	1%	2%	5%	0%	2%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.6	19.3		36.7	24.9	32.3		14.9	26.8	28.3	28.3	
Effective Green, g (s)	25.6	19.3		36.7	24.9	32.3		14.9	26.8	28.3	28.3	
Actuated g/C Ratio	0.33	0.25		0.47	0.32	0.42		0.19	0.35	0.37	0.37	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	252	458		346	598	598		321	669	276	638	
v/s Ratio Prot	0.03	c0.24		0.09	c0.27	0.00			c0.09	0.05	c0.17	
v/s Ratio Perm	0.08			0.18		0.01		c0.16	0.15	0.13		
v/c Ratio	0.34	0.98		0.58	0.84	0.05		0.84	0.57	0.48	0.46	
Uniform Delay, d1	18.8	28.9		15.2	24.5	13.4		30.2	20.7	18.0	18.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	35.8		2.3	10.4	0.0		18.0	1.2	1.3	0.5	
Delay (s)	19.6	64.7		17.5	34.8	13.5		48.2	21.9	19.3	19.2	
Level of Service	B	E		B	C	B		D	C	B	B	
Approach Delay (s)		57.5			28.5			30.8			19.3	
Approach LOS		E			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			33.7	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			77.5	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			88.5%	ICU Level of Service				E				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street























2023 No-Build Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Volume (veh/h)	43	996	694	18	9	60
Future Volume (Veh/h)	43	996	694	18	9	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	45	1038	723	19	9	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.73	
vC, conflicting volume	742				1860	732
vC1, stage 1 conf vol					732	
vC2, stage 2 conf vol					1128	
vCu, unblocked vol	742				1992	732
tC, single (s)	4.2				6.5	6.2
tC, 2 stage (s)					5.5	
tF (s)	2.3				3.6	3.3
p0 queue free %	95				96	85
cM capacity (veh/h)	843				209	424
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	1083	742	71			
Volume Left	45	0	9			
Volume Right	0	19	62			
cSH	843	1700	375			
Volume to Capacity	0.05	0.44	0.19			
Queue Length 95th (ft)	4	0	17			
Control Delay (s)	1.6	0.0	16.8			
Lane LOS	A		C			
Approach Delay (s)	1.6	0.0	16.8			
Approach LOS			C			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			98.2%	ICU Level of Service		F
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 No-Build Condition
Saturday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	404	59	168	444	54	37	160	409	172	169	143
Future Volume (vph)	95	404	59	168	444	54	37	160	409	172	169	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1668	1847		1685	1863	1478		1840	1599	1685	1752	
Flt Permitted	0.27	1.00		0.17	1.00	1.00		0.85	1.00	0.34	1.00	
Satd. Flow (perm)	469	1847		310	1863	1478		1584	1599	606	1752	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	101	430	63	179	472	57	39	170	435	183	180	152
RTOR Reduction (vph)	0	6	0	0	0	33	0	0	120	0	36	0
Lane Group Flow (vph)	101	487	0	179	472	24	0	209	315	183	296	0
Heavy Vehicles (%)	1%	1%	0%	0%	2%	2%	8%	1%	1%	0%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.8	18.9		33.8	22.9	32.5		13.4	24.3	29.0	29.0	
Effective Green, g (s)	25.8	18.9		33.8	22.9	32.5		13.4	24.3	29.0	29.0	
Actuated g/C Ratio	0.34	0.25		0.44	0.30	0.42		0.17	0.32	0.38	0.38	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	265	454		331	555	625		276	630	363	661	
v/s Ratio Prot	0.03	c0.26		0.08	c0.25	0.00			c0.07	0.06	c0.17	
v/s Ratio Perm	0.09			0.16		0.01		c0.13	0.13	0.13		
v/c Ratio	0.38	1.07		0.54	0.85	0.04		0.76	0.50	0.50	0.45	
Uniform Delay, d1	18.6	28.9		16.1	25.3	13.0		30.2	21.3	17.3	17.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	63.0		1.8	11.9	0.0		11.3	0.6	1.1	0.5	
Delay (s)	19.5	92.0		17.9	37.2	13.0		41.4	21.9	18.4	18.4	
Level of Service	B	F		B	D	B		D	C	B	B	
Approach Delay (s)		79.7			30.4			28.3			18.4	
Approach LOS		E			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			39.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			76.8				Sum of lost time (s)		24.0			
Intersection Capacity Utilization			82.8%				ICU Level of Service		E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street























2023 No-Build Condition
Saturday Midday Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	947	587	15	19	79
Future Volume (Veh/h)	38	947	587	15	19	79
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	42	1041	645	16	21	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.70	
vC, conflicting volume	661				1778	653
vC1, stage 1 conf vol					653	
vC2, stage 2 conf vol					1125	
vCu, unblocked vol	661				1897	653
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	95				91	82
cM capacity (veh/h)	913				222	471
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	1083	661	108			
Volume Left	42	0	21			
Volume Right	0	16	87			
cSH	913	1700	387			
Volume to Capacity	0.05	0.39	0.28			
Queue Length 95th (ft)	4	0	28			
Control Delay (s)	1.4	0.0	17.9			
Lane LOS	A		C			
Approach Delay (s)	1.4	0.0	17.9			
Approach LOS			C			
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			93.2%		ICU Level of Service	F
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 Build Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	306	128	139	270	59	24	207	350	153	295	158
Future Volume (vph)	93	306	128	139	270	59	24	207	350	153	295	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1620	1723		1574	1792	1422		1779	1495	1518	1704	
Flt Permitted	0.55	1.00		0.18	1.00	1.00		0.90	1.00	0.32	1.00	
Satd. Flow (perm)	946	1723		297	1792	1422		1615	1495	510	1704	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	99	326	136	148	287	63	26	220	372	163	314	168
RTOR Reduction (vph)	0	16	0	0	0	38	0	0	151	0	22	0
Lane Group Flow (vph)	99	446	0	148	287	25	0	246	221	163	460	0
Heavy Vehicles (%)	4%	6%	4%	7%	6%	6%	0%	7%	8%	11%	5%	7%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	26.1	19.0		32.7	22.3	31.8		16.1	26.5	31.6	31.6	
Effective Green, g (s)	26.1	19.0		32.7	22.3	31.8		16.1	26.5	31.6	31.6	
Actuated g/C Ratio	0.33	0.24		0.41	0.28	0.40		0.20	0.34	0.40	0.40	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	373	414		291	505	572		329	615	325	681	
v/s Ratio Prot	0.02	c0.26		c0.07	c0.16	0.01			0.05	0.06	c0.27	
v/s Ratio Perm	0.06			0.14		0.01		0.15	0.10	0.14		
v/c Ratio	0.27	1.08		0.51	0.57	0.04		0.75	0.36	0.50	0.68	
Uniform Delay, d1	18.9	30.0		17.3	24.2	14.4		29.5	19.8	16.8	19.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	66.5		1.4	1.5	0.0		9.0	0.4	1.2	2.7	
Delay (s)	19.3	96.5		18.7	25.7	14.4		38.5	20.2	18.0	22.1	
Level of Service	B	F		B	C	B		D	C	B	C	
Approach Delay (s)		82.9			22.2			27.5			21.1	
Approach LOS		F			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.0	HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			79.0	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			89.0%	ICU Level of Service				E				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street

2023 Build Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	764	423	13	17	45
Future Volume (Veh/h)	45	764	423	13	17	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	52	888	492	15	20	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		TWLTL			
Median storage (veh)	2					
Upstream signal (ft)	262					
pX, platoon unblocked					0.74	
vC, conflicting volume	507				1492	500
vC1, stage 1 conf vol					500	
vC2, stage 2 conf vol					992	
vCu, unblocked vol	507				1489	500
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)	2.2				3.6	3.4
p0 queue free %	95				93	91
cM capacity (veh/h)	1043				269	550
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	940	507	72			
Volume Left	52	0	20			
Volume Right	0	15	52			
cSH	1043	1700	426			
Volume to Capacity	0.05	0.30	0.17			
Queue Length 95th (ft)	4	0	15			
Control Delay (s)	1.3	0.0	15.2			
Lane LOS	A		C			
Approach Delay (s)	1.3	0.0	15.2			
Approach LOS			C			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			79.5%	ICU Level of Service		D
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

3: Coggeshall Street & Site Driveway










2023 Build Condition
Weekday Morning Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	716	402	33	39	34
Future Volume (Veh/h)	65	716	402	33	39	34
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)	71	778	437	36	42	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage (veh)		2				
Upstream signal (ft)		447				
pX, platoon unblocked					0.88	
vC, conflicting volume	473				1375	455
vC1, stage 1 conf vol					455	
vC2, stage 2 conf vol					920	
vCu, unblocked vol	473				1357	455
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	93				87	94
cM capacity (veh/h)	1089				316	605
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	71	778	473	79		
Volume Left	71	0	0	42		
Volume Right	0	0	36	37		
cSH	1089	1700	1700	407		
Volume to Capacity	0.07	0.46	0.28	0.19		
Queue Length 95th (ft)	5	0	0	18		
Control Delay (s)	8.5	0.0	0.0	16.0		
Lane LOS	A			C		
Approach Delay (s)	0.7		0.0	16.0		
Approach LOS				C		
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			48.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Mitchell Street & Site Driveway

2023 Build Condition
Weekday Morning Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	12	56	2	4	47
Future Volume (Veh/h)	15	12	56	2	4	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	13	61	2	4	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121	62			63	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121	62			63	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	872	1003			1540	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	29	63	55			
Volume Left	16	0	4			
Volume Right	13	2	0			
cSH	926	1700	1540			
Volume to Capacity	0.03	0.04	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	9.0	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.6			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		15.8%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Belleville Avenue & Coggeshall Street

2023 Build Condition
Weekday Midday Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	364	36	147	354	45	44	149	379	139	202	109
Future Volume (vph)	97	364	36	147	354	45	44	149	379	139	202	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1685	1783		1652	1810	1507		1776	1524	1589	1752	
Flt Permitted	0.39	1.00		0.18	1.00	1.00		0.82	1.00	0.35	1.00	
Satd. Flow (perm)	684	1783		313	1810	1507		1475	1524	583	1752	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	107	400	40	162	389	49	48	164	416	153	222	120
RTOR Reduction (vph)	0	4	0	0	0	29	0	0	145	0	23	0
Lane Group Flow (vph)	107	436	0	162	389	20	0	212	271	153	319	0
Heavy Vehicles (%)	0%	5%	6%	2%	5%	0%	5%	6%	6%	6%	1%	6%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.9	18.9		32.5	22.2	31.6		14.0	24.3	29.4	29.4	
Effective Green, g (s)	25.9	18.9		32.5	22.2	31.6		14.0	24.3	29.4	29.4	
Actuated g/C Ratio	0.34	0.25		0.42	0.29	0.41		0.18	0.32	0.38	0.38	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	322	439		312	524	621		269	602	347	672	
v/s Ratio Prot	0.03	c0.24		0.07	c0.21	0.00			c0.06	0.05	c0.18	
v/s Ratio Perm	0.08			0.15		0.01		c0.14	0.12	0.12		
v/c Ratio	0.33	0.99		0.52	0.74	0.03		0.79	0.45	0.44	0.48	
Uniform Delay, d1	18.1	28.8		16.2	24.6	13.4		29.9	20.8	16.7	17.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	41.1		1.5	5.6	0.0		14.1	0.5	0.9	0.5	
Delay (s)	18.7	69.9		17.7	30.2	13.4		44.0	21.4	17.6	18.3	
Level of Service	B	E		B	C	B		D	C	B	B	
Approach Delay (s)		59.9			25.5			29.0			18.1	
Approach LOS		E			C			C			B	

Intersection Summary		
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.81	C
Actuated Cycle Length (s)	76.6	Sum of lost time (s)
Intersection Capacity Utilization	77.1%	24.0
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street

2023 Build Condition
Weekday Midday Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Volume (veh/h)	30	852	464	8	16	82
Future Volume (Veh/h)	30	852	464	8	16	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	897	488	8	17	86
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.73	
vC, conflicting volume	496				1453	492
vC1, stage 1 conf vol					492	
vC2, stage 2 conf vol					961	
vCu, unblocked vol	496				1436	492
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				94	85
cM capacity (veh/h)	1063				296	581
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	929	496	103			
Volume Left	32	0	17			
Volume Right	0	8	86			
cSH	1063	1700	501			
Volume to Capacity	0.03	0.29	0.21			
Queue Length 95th (ft)	2	0	19			
Control Delay (s)	0.8	0.0	14.0			
Lane LOS	A		B			
Approach Delay (s)	0.8	0.0	14.0			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			81.7%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3: Coggeshall Street & Site Driveway

2023 Build Condition
 Weekday Midday Peak Hour












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	69	799	433	34	44	39
Future Volume (Veh/h)	69	799	433	34	44	39
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)	75	868	471	37	48	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage (veh)		2				
Upstream signal (ft)		447				
pX, platoon unblocked					0.80	
vC, conflicting volume	508				1508	490
vC1, stage 1 conf vol					490	
vC2, stage 2 conf vol					1018	
vCu, unblocked vol	508				1509	490
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	93				82	93
cM capacity (veh/h)	1057				270	579
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	75	868	508	90		
Volume Left	75	0	0	48		
Volume Right	0	0	37	42		
cSH	1057	1700	1700	360		
Volume to Capacity	0.07	0.51	0.30	0.25		
Queue Length 95th (ft)	6	0	0	24		
Control Delay (s)	8.7	0.0	0.0	18.3		
Lane LOS	A			C		
Approach Delay (s)	0.7		0.0	18.3		
Approach LOS				C		
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			53.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis






















4: Mitchell Street & Site Driveway

2023 Build Condition
Weekday Midday Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	17	13	37	1	5	81
Future Volume (Veh/h)	17	13	37	1	5	81
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	14	40	1	5	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	138	40			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	138	40			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	852	1031			1568	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	32	41	93			
Volume Left	18	0	5			
Volume Right	14	1	0			
cSH	922	1700	1568			
Volume to Capacity	0.03	0.02	0.00			
Queue Length 95th (ft)	3	0	0			
Control Delay (s)	9.0	0.0	0.4			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.4			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			18.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 Build Condition
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	402	50	199	502	66	36	229	519	134	179	138
Future Volume (vph)	84	402	50	199	502	66	36	229	519	134	179	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1652	1844		1668	1863	1436		1855	1583	1620	1749	
Flt Permitted	0.26	1.00		0.16	1.00	1.00		0.90	1.00	0.26	1.00	
Satd. Flow (perm)	453	1844		283	1863	1436		1673	1583	449	1749	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	86	410	51	203	512	67	37	234	530	137	183	141
RTOR Reduction (vph)	0	5	0	0	0	39	0	0	137	0	34	0
Lane Group Flow (vph)	86	456	0	203	512	28	0	271	393	137	290	0
Heavy Vehicles (%)	2%	1%	4%	1%	2%	5%	0%	2%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.6	19.3		36.8	25.0	32.4		14.9	26.9	28.3	28.3	
Effective Green, g (s)	25.6	19.3		36.8	25.0	32.4		14.9	26.9	28.3	28.3	
Actuated g/C Ratio	0.33	0.25		0.47	0.32	0.42		0.19	0.35	0.36	0.36	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	246	458		348	600	599		321	671	275	637	
v/s Ratio Prot	0.03	c0.25		0.09	c0.27	0.00			c0.09	0.05	c0.17	
v/s Ratio Perm	0.09			0.19		0.02		c0.16	0.16	0.13		
v/c Ratio	0.35	1.00		0.58	0.85	0.05		0.84	0.59	0.50	0.46	
Uniform Delay, d1	18.9	29.1		15.3	24.6	13.4		30.2	20.8	18.1	18.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	40.5		2.5	11.3	0.0		18.0	1.3	1.4	0.5	
Delay (s)	19.8	69.6		17.8	35.9	13.5		48.2	22.1	19.5	19.3	
Level of Service	B	E		B	D	B		D	C	B	B	
Approach Delay (s)		61.8			29.3			30.9			19.4	
Approach LOS		E			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			34.9	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			77.6	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			89.2%	ICU Level of Service				E				
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street

2023 Build Condition
Weekday Evening Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	43	1012	703	18	11	64
Future Volume (Veh/h)	43	1012	703	18	11	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	45	1054	732	19	11	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.73	
vC, conflicting volume	751				1886	742
vC1, stage 1 conf vol					742	
vC2, stage 2 conf vol					1144	
vCu, unblocked vol	751				2031	742
tC, single (s)	4.2				6.5	6.2
tC, 2 stage (s)					5.5	
tF (s)	2.3				3.6	3.3
p0 queue free %	95				95	84
cM capacity (veh/h)	836				203	419
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	1099	751	78			
Volume Left	45	0	11			
Volume Right	0	19	67			
cSH	836	1700	365			
Volume to Capacity	0.05	0.44	0.21			
Queue Length 95th (ft)	4	0	20			
Control Delay (s)	1.7	0.0	17.5			
Lane LOS	A		C			
Approach Delay (s)	1.7	0.0	17.5			
Approach LOS			C			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			99.4%	ICU Level of Service		F
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3: Coggeshall Street & Site Driveway










2023 Build Condition
 Weekday Evening Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	994	703	17	19	18
Future Volume (Veh/h)	29	994	703	17	19	18
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)	32	1080	764	18	21	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage (veh)		2				
Upstream signal (ft)		447				
pX, platoon unblocked					0.77	
vC, conflicting volume	782				1917	773
vC1, stage 1 conf vol					773	
vC2, stage 2 conf vol					1144	
vCu, unblocked vol	782				2041	773
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				90	95
cM capacity (veh/h)	836				218	399
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	32	1080	782	41		
Volume Left	32	0	0	21		
Volume Right	0	0	18	20		
cSH	836	1700	1700	280		
Volume to Capacity	0.04	0.64	0.46	0.15		
Queue Length 95th (ft)	3	0	0	13		
Control Delay (s)	9.5	0.0	0.0	20.1		
Lane LOS	A			C		
Approach Delay (s)	0.3		0.0	20.1		
Approach LOS				C		
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			62.3%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Mitchell Street & Site Driveway

2023 Build Condition
Weekday Evening Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	6	60	1	2	68
Future Volume (Veh/h)	7	6	60	1	2	68
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	7	65	1	2	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	144	66			66	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	144	66			66	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	848	998			1536	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	66	76			
Volume Left	8	0	2			
Volume Right	7	1	0			
cSH	912	1700	1536			
Volume to Capacity	0.02	0.04	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.0	0.0	0.2			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	0.2			
Approach LOS	A					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization		15.2%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 Build Condition
Saturday Midday Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	422	59	176	462	54	37	160	417	180	169	143
Future Volume (vph)	95	422	59	176	462	54	37	160	417	180	169	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1668	1849		1685	1863	1478		1840	1599	1685	1752	
Flt Permitted	0.25	1.00		0.17	1.00	1.00		0.85	1.00	0.34	1.00	
Satd. Flow (perm)	435	1849		303	1863	1478		1584	1599	606	1752	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	101	449	63	187	491	57	39	170	444	191	180	152
RTOR Reduction (vph)	0	6	0	0	0	33	0	0	111	0	36	0
Lane Group Flow (vph)	101	506	0	187	491	24	0	209	333	191	296	0
Heavy Vehicles (%)	1%	1%	0%	0%	2%	2%	8%	1%	1%	0%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	25.7	18.9		34.7	23.4	33.0		13.5	24.8	29.1	29.1	
Effective Green, g (s)	25.7	18.9		34.7	23.4	33.0		13.5	24.8	29.1	29.1	
Actuated g/C Ratio	0.33	0.24		0.45	0.30	0.43		0.17	0.32	0.38	0.38	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	253	452		338	563	630		276	637	362	659	
v/s Ratio Prot	0.04	c0.27		0.08	c0.26	0.00			c0.08	0.07	c0.17	
v/s Ratio Perm	0.10			0.17		0.01		c0.13	0.13	0.13		
v/c Ratio	0.40	1.12		0.55	0.87	0.04		0.76	0.52	0.53	0.45	
Uniform Delay, d1	19.0	29.2		15.9	25.5	12.9		30.3	21.4	17.6	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	79.1		2.0	13.9	0.0		11.3	0.8	1.4	0.5	
Delay (s)	20.0	108.3		17.9	39.4	12.9		41.6	22.2	19.0	18.6	
Level of Service	B	F		B	D	B		D	C	B	B	
Approach Delay (s)		93.7			31.9			28.4			18.7	
Approach LOS		F			C			C			B	

Intersection Summary

HCM 2000 Control Delay	43.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Coggeshall Street & Mitchell Street

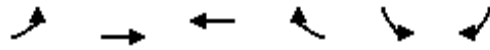
2023 Build Condition
Saturday Midday Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	38	981	605	15	24	87
Future Volume (Veh/h)	38	981	605	15	24	87
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	42	1078	665	16	26	96
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage (veh)			2			
Upstream signal (ft)		262				
pX, platoon unblocked					0.69	
vC, conflicting volume	681				1835	673
vC1, stage 1 conf vol					673	
vC2, stage 2 conf vol					1162	
vCu, unblocked vol	681				1983	673
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	95				88	79
cM capacity (veh/h)	898				209	459
Direction, Lane #						
	EB 1	WB 1	SB 1			
Volume Total	1120	681	122			
Volume Left	42	0	26			
Volume Right	0	16	96			
cSH	898	1700	366			
Volume to Capacity	0.05	0.40	0.33			
Queue Length 95th (ft)	4	0	36			
Control Delay (s)	1.5	0.0	19.7			
Lane LOS	A		C			
Approach Delay (s)	1.5	0.0	19.7			
Approach LOS			C			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			95.8%		ICU Level of Service	F
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
3: Coggeshall Street & Site Driveway

2023 Build Condition
Saturday Midday Peak Hour












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	943	586	31	39	34
Future Volume (Veh/h)	62	943	586	31	39	34
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)	67	1025	637	34	42	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage (veh)		2				
Upstream signal (ft)		447				
pX, platoon unblocked					0.74	
vC, conflicting volume	671				1813	654
vC1, stage 1 conf vol					654	
vC2, stage 2 conf vol					1159	
vCu, unblocked vol	671				1924	654
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	93				80	92
cM capacity (veh/h)	919				210	467
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	67	1025	671	79		
Volume Left	67	0	0	42		
Volume Right	0	0	34	37		
cSH	919	1700	1700	283		
Volume to Capacity	0.07	0.60	0.39	0.28		
Queue Length 95th (ft)	6	0	0	28		
Control Delay (s)	9.2	0.0	0.0	22.6		
Lane LOS	A			C		
Approach Delay (s)	0.6		0.0	22.6		
Approach LOS				C		
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			60.5%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis























4: Mitchell Street & Site Driveway

2023 Build Condition
Saturday Midday Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	12	51	2	5	95
Future Volume (Veh/h)	16	12	51	2	5	95
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	13	55	2	5	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	169	56			57	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	169	56			57	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	819	1011			1547	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	30	57	108			
Volume Left	17	0	5			
Volume Right	13	2	0			
cSH	892	1700	1547			
Volume to Capacity	0.03	0.03	0.00			
Queue Length 95th (ft)	3	0	0			
Control Delay (s)	9.2	0.0	0.4			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	0.4			
Approach LOS	A					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)			15			






















HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 Mitigation Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	306	128	139	270	59	24	207	350	153	295	158
Future Volume (vph)	93	306	128	139	270	59	24	207	350	153	295	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1620	1723		1574	1792	1422		1779	1495	1518	1704	
Flt Permitted	0.55	1.00		0.16	1.00	1.00		0.90	1.00	0.31	1.00	
Satd. Flow (perm)	941	1723		265	1792	1422		1614	1495	498	1704	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	99	326	136	148	287	63	26	220	372	163	314	168
RTOR Reduction (vph)	0	16	0	0	0	36	0	0	167	0	23	0
Lane Group Flow (vph)	99	446	0	148	287	27	0	246	205	163	459	0
Heavy Vehicles (%)	4%	6%	4%	7%	6%	6%	0%	7%	8%	11%	5%	7%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	29.0	21.9		35.2	25.0	34.5		16.4	26.6	31.9	31.9	
Effective Green, g (s)	29.0	21.9		35.2	25.0	34.5		16.4	26.6	31.9	31.9	
Actuated g/C Ratio	0.35	0.27		0.43	0.30	0.42		0.20	0.32	0.39	0.39	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	391	460		276	546	598		322	594	311	662	
v/s Ratio Prot	0.02	c0.26		c0.07	c0.16	0.01			0.04	0.06	c0.27	
v/s Ratio Perm	0.07			0.16		0.01		0.15	0.09	0.14		
v/c Ratio	0.25	0.97		0.54	0.53	0.04		0.76	0.35	0.52	0.69	
Uniform Delay, d1	18.3	29.7		17.3	23.6	14.0		31.0	21.1	18.0	21.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	33.7		2.0	0.9	0.0		10.3	0.4	1.6	3.2	
Delay (s)	18.6	63.4		19.3	24.5	14.0		41.3	21.4	19.6	24.1	
Level of Service	B	E		B	C	B		D	C	B	C	
Approach Delay (s)		55.5			21.6			29.3			23.0	
Approach LOS		E			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.2	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			82.0	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			89.0%	ICU Level of Service				E				
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
1: Belleville Avenue & Coggeshall Street

2023 Mitigation Condition
Weekday Midday Peak Hour























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	364	36	147	354	45	44	149	379	139	202	109
Future Volume (vph)	97	364	36	147	354	45	44	149	379	139	202	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1685	1783		1652	1810	1507		1776	1524	1589	1752	
Flt Permitted	0.40	1.00		0.17	1.00	1.00		0.82	1.00	0.34	1.00	
Satd. Flow (perm)	706	1783		289	1810	1507		1475	1524	572	1752	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	107	400	40	162	389	49	48	164	416	153	222	120
RTOR Reduction (vph)	0	4	0	0	0	28	0	0	152	0	23	0
Lane Group Flow (vph)	107	436	0	162	389	21	0	212	264	153	319	0
Heavy Vehicles (%)	0%	5%	6%	2%	5%	0%	5%	6%	6%	6%	1%	6%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	27.8	20.8		34.4	24.1	33.5		14.1	24.4	29.5	29.5	
Effective Green, g (s)	27.8	20.8		34.4	24.1	33.5		14.1	24.4	29.5	29.5	
Actuated g/C Ratio	0.35	0.26		0.44	0.31	0.43		0.18	0.31	0.38	0.38	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	336	471		305	554	642		264	589	336	657	
v/s Ratio Prot	0.03	c0.24		0.07	c0.21	0.00			c0.06	0.05	c0.18	
v/s Ratio Perm	0.08			0.16		0.01		c0.14	0.11	0.12		
v/c Ratio	0.32	0.92		0.53	0.70	0.03		0.80	0.45	0.46	0.49	
Uniform Delay, d1	17.7	28.1		16.0	24.1	13.1		30.9	21.7	17.6	18.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	24.0		1.8	4.0	0.0		16.0	0.5	1.0	0.6	
Delay (s)	18.3	52.1		17.8	28.1	13.1		46.9	22.2	18.6	19.3	
Level of Service	B	D		B	C	B		D	C	B	B	
Approach Delay (s)		45.5			24.1			30.6			19.1	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			30.0	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			78.6	Sum of lost time (s)				24.0				
Intersection Capacity Utilization			77.1%	ICU Level of Service				D				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Belleville Avenue & Coggeshall Street

2023 Mitigation Condition
Weekday Evening Peak Hour























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	402	50	199	502	66	36	229	519	134	179	138
Future Volume (vph)	84	402	50	199	502	66	36	229	519	134	179	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1652	1844		1668	1863	1436		1855	1583	1620	1749	
Flt Permitted	0.27	1.00		0.16	1.00	1.00		0.90	1.00	0.26	1.00	
Satd. Flow (perm)	463	1844		272	1863	1436		1672	1583	442	1749	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	86	410	51	203	512	67	37	234	530	137	183	141
RTOR Reduction (vph)	0	5	0	0	0	39	0	0	140	0	34	0
Lane Group Flow (vph)	86	456	0	203	512	28	0	271	390	137	290	0
Heavy Vehicles (%)	2%	1%	4%	1%	2%	5%	0%	2%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	26.6	20.3		37.6	25.8	33.2		14.9	26.7	28.3	28.3	
Effective Green, g (s)	26.6	20.3		37.6	25.8	33.2		14.9	26.7	28.3	28.3	
Actuated g/C Ratio	0.34	0.26		0.48	0.33	0.42		0.19	0.34	0.36	0.36	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	252	477		340	613	608		317	660	270	631	
v/s Ratio Prot	0.03	c0.25		0.09	c0.27	0.00			c0.09	0.05	c0.17	
v/s Ratio Perm	0.09			0.20		0.02		c0.16	0.16	0.13		
v/c Ratio	0.34	0.96		0.60	0.84	0.05		0.85	0.59	0.51	0.46	
Uniform Delay, d1	18.6	28.6		15.3	24.3	13.3		30.7	21.3	18.5	19.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	29.9		2.8	9.6	0.0		19.6	1.4	1.5	0.5	
Delay (s)	19.4	58.5		18.1	33.9	13.3		50.3	22.8	20.0	19.7	
Level of Service	B	E		B	C	B		D	C	C	B	
Approach Delay (s)		52.4			28.0			32.1			19.8	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			33.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			78.4				Sum of lost time (s)		24.0			
Intersection Capacity Utilization			89.2%				ICU Level of Service		E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Belleville Avenue & Coggeshall Street

2023 Mitigation Condition
Saturday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	422	59	176	462	54	37	160	417	180	169	143
Future Volume (vph)	95	422	59	176	462	54	37	160	417	180	169	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	10	12	12	12	10	12	12
Total Lost time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1668	1849		1685	1863	1478		1840	1599	1685	1752	
Flt Permitted	0.26	1.00		0.16	1.00	1.00		0.85	1.00	0.33	1.00	
Satd. Flow (perm)	465	1849		275	1863	1478		1583	1599	589	1752	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	101	449	63	187	491	57	39	170	444	191	180	152
RTOR Reduction (vph)	0	6	0	0	0	32	0	0	121	0	37	0
Lane Group Flow (vph)	101	506	0	187	491	25	0	209	323	191	295	0
Heavy Vehicles (%)	1%	1%	0%	0%	2%	2%	8%	1%	1%	0%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6	8		13	1	8	4	
Permitted Phases	2			6		6	13		13	4		
Actuated Green, G (s)	28.8	21.9		36.6	25.8	35.5		13.6	24.4	29.3	29.3	
Effective Green, g (s)	28.8	21.9		36.6	25.8	35.5		13.6	24.4	29.3	29.3	
Actuated g/C Ratio	0.36	0.27		0.46	0.32	0.44		0.17	0.30	0.37	0.37	
Clearance Time (s)	5.5	5.5		6.0	6.0	6.5		6.0	6.0	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	271	506		316	600	655		269	607	348	641	
v/s Ratio Prot	0.03	c0.27		0.08	c0.26	0.00			c0.07	0.07	c0.17	
v/s Ratio Perm	0.10			0.19		0.01		c0.13	0.13	0.13		
v/c Ratio	0.37	1.00		0.59	0.82	0.04		0.78	0.53	0.55	0.46	
Uniform Delay, d1	18.1	29.1		16.6	24.9	12.6		31.7	23.1	18.8	19.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	40.1		3.0	8.5	0.0		13.1	0.9	1.8	0.5	
Delay (s)	19.0	69.2		19.5	33.5	12.6		44.9	24.0	20.5	19.9	
Level of Service	B	E		B	C	B		D	C	C	B	
Approach Delay (s)		60.9			28.3			30.7			20.1	
Approach LOS		E			C			C			C	
Intersection Summary												
HCM 2000 Control Delay	35.1			HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)				24.0				
Intersection Capacity Utilization	84.2%			ICU Level of Service				E				
Analysis Period (min)	15											

c Critical Lane Group