TRAFFIC IMPACT STUDY

for

Proposed Grocer/Retail at the Promenade Shops at Evergreen Walk (Unit 2)
801 Evergreen Way
South Windsor, Connecticut

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EXECUTIVE SUMMARY

Langan has prepared this traffic impact study to identify the potential impacts of the redevelopment of 800 Evergreen Way in South Windsor, Connecticut (See **Figure 1)**.

The northern portion of the Promenade Shops at Evergreen Walk site is approximately seven acres, which is currently occupied by two retail/commercial buildings, totaling ±53,030 square-feet, housing the Old Navy and Sakura Garden and vacant space, a portion of which was once occupied by the Highland Park grocer.

The project includes the construction of a ±40,000 square-foot grocer and adjacent ±10,000 square-foot retail space. Associated site work will include adjustments to the parking lot, loading area, and the reconfiguration of Evergreen Way (See Site Plan in **Appendix A)**.

The impact to existing internal circulation patterns was evaluated and it is proposed that the East Access Road, the portion of the relocated Evergreen Way, and Evergreen Way from the project site to the intersection with Tamarack Avenue (north of Costco) be renamed to Cottonwood Lane to provide clarity for this north-south connector roadway. New wayfinding signs will be installed to provide guidance for drivers wishing to traverse through Evergreen Walk and the remaining development. These improvements will continue to provide vehicles with multiple north-south circulation options without the need to travel on Buckland Road (See Overall Vehicular Circulation Plan in **Appendix A**).

As part of establishing the background conditions in the roadway network, recently approved projects in the area and the traffic analyses and mitigation were reviewed in evaluating the proposed Evergreen Walk redevelopment. In particular, the Costco at Evergreen Walk proposes modification to the roadway network that were considered in this evaluation.

The "Build Traffic Volumes", Figure 7 as part of BL Companies' Traffic Impact Analysis titled "COSTCO at Evergreen Walk" completed September 2019 and revised July 2020, was used as the basis for this evaluation. The roadway network improvements cited to be completed by Costco in the July 2020 report are considered to be in place and part of the background conditions. Additionally, the re-coordination of the traffic signals along the Buckland Road corridor, as recommended by VHB in the "Buckland Road Traffic Signal Optimization, Coordination, and Future Needs Study", is considered to be in place and part of the background conditions.

The existing public roadway infrastructure appears adequate to support the increase in traffic volume generated by the proposed development. Langan concurs with the following improvements previously recommended to be implemented as part of other developments or by the town to address existing conditions:

- Reestablish the coordinated traffic signal system along Buckland Road.
- Construct southbound right-turn only lane on Buckland Road at the Hemlock Avenue intersection.
- Extension of the northbound Buckland Road left turn lane at Hemlock Avenue by cutting into the median.
- Provide a southbound right turn lane at the Buckland Road and Tamarack Avenue intersection.

As part of the proposed grocer development, Langan recommends minor signal optimization at the intersection of Buckland Road and Hemlock Avenue/Aldi Driveway to accommodate the incremental new trips.

Overall, the analysis of the study intersections reveals that most of the signalized intersections analyzed will maintain overall acceptable or background operating conditions for the 2022 build scenario. Individual movements and lane groups may change slightly in level of service, delay, and queue length; however, overall levels of service at these signalized intersections analyzed remain unchanged at or acceptable levels, with nominal impacts to intersection delays.

1.0 INTRODUCTION

Langan has prepared this traffic impact study to identify the potential impacts of the proposed redevelopment of the northern portion of The Promenade Shops at Evergreen Walk in South Windsor, Connecticut. The Old Navy, Sakura Garden and vacant space, a portion of which was once occupied by Highland Park grocer, will be replaced with a ±40,000 square-foot grocer, and an adjacent ±10,000 square-foot retail space (See **Figure 1** for the Location Map).

The project site is approximately seven acres and is bordered by Panera Bread to the east and Costco (future) and vacant land to the north. Evergreen Crossings Retirement Community is to the west and the Shops at Evergreen Walk to the south.

The project includes a new building with associated parking improvements, loading area, and the reconfiguration of Evergreen Way. Evergreen Way is a north-south internal collector drive for the Evergreen Walk development, paralleling Buckland Road and connecting to Tamarack Avenue to the north and south. The proposed redevelopment is anticipated to be in operation by 2023.

2.0 SITE ACCESS AND STUDY LOCATIONS

Site Access

The project site has primary access from Hemlock Avenue off of Buckland Road. The site can also be accessed by Tamarack Avenue from the north or Evergreen Way to the south.

Study Locations

Six key intersections were evaluated in this study (See **Figure 2**).

- Tamarack Avenue & Buckland Road & Lowe's/Target Driveway
- Hemlock Avenue & Buckland Road & Aldi Site Driveway
- Cedar Avenue & Buckland Road
- Deming Street & Buckland Road
- Tamarack Avenue & Deming Street
- Hemlock Avenue & Cottonwood Lane

This study will evaluate traffic impacts of the new development's peak-hours on these intersections and the area roadway network.

3.0 EXISTING CONDITIONS

Area Roadway Network

Tamarack Avenue is a two lane private road in two locations on the site. The first location is a north-south private road to the north of The Promenade Shops at Evergreen Walk and is a continuation of Evergreen Way. Tamarack Avenue continues north and connects to Deming Street north of the Promenade Shops at Evergreen Walk. At this location, the travel lanes are 12 feet wide and are separated by a 6-foot median. The second location of Tamarack Avenue is an east-west private road that connects Buckland Road to the southern end of Evergreen Way, to the south of the site. In this location, the travel lanes are 12 feet wide and are separated by a 12-foot wide median.

Buckland Road is a four lane, north-south, minor arterial town road, with a posted speed limit of 45 MPH. Buckland Road provides two 12-foot wide travel lanes with a 3 foot shoulder that varies along the length of the road.

Hemlock Avenue is a two lane, east-west private road to The Promenade Shops at Evergreen Walk. The lanes are 15-feet wide and are separated by a 12-foot wide median.

Cedar Avenue is a two lane, east-west private road connecting to Tamarack Avenue and serving the LA Fitness and the future Costco. The lanes are 12-feet wide and are separated by a 12-foot wide median.

Lowes & Target Driveway is a two lane, east-west access road to Lowes and Target. The east and west lanes are 12 feet wide.

Deming Street is a two lane, east-west, minor arterial town road, with a posted speed limit of 25 MPH. Deming Street provides a 12-foot wide travel lane with a 3 foot shoulder that varies along the length of the road.

Aldi Driveway is a two lane, east-west access road to Aldi. This driveway is part of associated proposed site improvements for a separate project previously approved.

Gateway Driveway is a two lane, east-west access road to Gateway. This driveway is part of associated proposed site improvements for a separate project previously approved.

Study Intersections

Tamarack Avenue & Buckland Road & Lowe's/Target Driveway is a signalized four-way intersection with the following approach geometry:

- Northbound Buckland Road – one right-turn lane with approximately 250 feet of storage, two thru lanes, and two left-turn lanes with approximately 300 feet of storage.
- Eastbound Tamarack Avenue – one right-turn lane with approximately 250 feet of storage, one thru lane, and one shared left-turn/thru lane.
- Southbound Buckland Road – one shared right-turn/thru lane, one thru lane and one left-turn lane with approximately 150 feet of storage.
- Westbound Lowes & Target Driveway – one shared left-turn lane with approximately 200 feet of storage, one thru lane, and one right-turn lane with approximately 200 feet of storage.

Hemlock Avenue & Buckland Road & Aldi Driveway is a signalized intersection with the following approach geometry:

- Northbound Buckland Road – one right-turn/thru lane, one thru lane, and one left-turn lane with approximately 215 feet of storage.
- Eastbound Hemlock Avenue – one right-turn lane and one left-turn lane with approximately 100 feet of storage.
- Southbound Buckland Road – one right-turn/thru lane, one thru lane, and one left-turn lane with approximately 75 feet of storage.
- Westbound Aldi Driveway – one left turn lane, and one thru/right-turn lane. This driveway does not currently exist but will be constructed prior to the opening of the new proposed development at Promenade Shops.

Cedar Avenue & Buckland Road & Gateway Driveway is a signalized intersection with the following approach geometry:

- Northbound Buckland Road – two thru lanes and one left-turn lane with approximately 275 feet of storage.
- Eastbound Cedar Avenue – one right-turn lane and one left-turn lane with approximately 200 feet of storage.
- Southbound Buckland Road– two thru lanes and one right-turn lane with approximately 175 feet of storage.
- Westbound Gateway Driveway – one left turn lane, and one shared thru/right-turn lane. This driveway does not currently exist but will be constructed prior to the opening of the Promenade Shops.

Deming Street and Buckland Road is a signalized four-way intersection with the following approach geometry:

- Northbound Buckland Road – one right-turn/thru lane, one thru lane, and one left-turn lane with approximately 150 feet of storage.
- Eastbound Deming Street – one right-turn lane, one thru lane, and one left-turn lane with approximately 150 feet of storage.
- Southbound Buckland Road – one left-turn lane with approximately 200 feet of storage, one thru lane, and one left-turn/thru lane.
- Westbound Deming Street – one left-turn lane with approximately 75 feet of storage and one right-turn/thru lane.

Tamarack Avenue and Deming Street is an un-signalized "T" intersection with the following approach geometry:

- Northbound Tamarack Avenue – one left-turn lane and one right-turn lane, though no pavement markings separate the lanes.
- Eastbound Deming Street – one shared right-turn/thru lane.
- Westbound Deming Street – one left-turn lane with approximately 100 feet of storage and one thru lane.

4.0 INTERSECTION CAPACITY ANALYSIS MEASURES

Langan conducted capacity analyses for the background and build traffic conditions to assess the quality of traffic flow. Capacity analyses provide an indication of the adequacy of the road and intersections to serve traffic demands.

Level of Service Criteria

Level of Service (LOS) is the term used to denote the different operating conditions that occur at an intersection under various traffic volume demands. LOS is a qualitative measure that considers a number of factors including road geometry, speed and travel delay. LOS provides an index to the operational qualities of an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The LOS designation is reported differently for signalized intersections and unsignalized intersections.

For signalized intersections, the analysis considers the operation of all traffic entering the intersection. For unsignalized intersections, however, the analysis considers the operation of all movements that are in conflict with other movements such as mainline left turns and traffic exiting the side street. An overall LOS is given for signalized intersections. For unsignalized intersections, LOS is given for each specific approach.

The evaluation criteria used to analyze the study area intersections are based on the Highway Capacity Manual (HCM) 6th Edition, published by the Transportation Research Board (TRB). SYNCHRO Plus SimTraffic 10 was used to facilitate computer calculation for the capacity analyses at each intersection.

The HCM 6th Edition defines level of service for signalized intersections as follows:

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	>80

The HCM defines level of service for unsignalized intersections as follows:

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	> 50

5.0 METHODOLOGY AND ANALYSIS

To assess the potential traffic impact of the proposed redevelopment/expansion, Langan employed a four-step methodology outlined in the following list and described in detail in subsequent sections 5.1 through 5.4:

Step One: Determine the background peak-hour traffic volumes based on previous traffic reports in the area and evaluate traffic operating conditions for the study intersections.

Step Two: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.

Step Three: Combine the Background traffic volumes (Step One) with the assigned proposed traffic (Step Two) to establish Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts. Evaluate the internal circulation adjustments within Evergreen Walk.

Step Four: Investigate the safety conditions within the area roadway network.

5.1 Step One: Determine the background peak-hour traffic volumes based on previous traffic reports in the area and evaluate traffic operating conditions for the study intersections.

Background Peak-Hour Traffic Volumes

Background peak-hour traffic volumes are based on a recent traffic impact study for the development titled "Traffic Impact Analysis: Costco at Evergreen Walk" by BL Companies dated September 2019 and revised July 2020. After discussion with Connecticut Department of Transportation (CTDOT) Bureau of Policy and Planning, it was determined that the projected build scenario from the Costco study for the weekday evening and Saturday mid-day peak periods would be acceptable for use as background conditions. The build conditions presented on plan titled "FIG. 7" titled "Build Traffic Volumes" of the Costco report include background developments within the study area (see below) along with projected volumes to be generated by the Costco development. The background developments included in Figure 7 of the Costco study include:

- Residences at Oakland Road – 78 units under construction along Route 30, near Felt Road.
- Buckland Commons – a 17,232± square foot mixed use building recently completed along Buckland Road, just south of the Farmington Bank
- Aldi's grocery and a bank – along Buckland Street, opposite Hemlock Avenue
- Gateway – a proposed development of 38,000 square feet of retail space and 85,700 square feet of medical office located along Buckland Street.

To determine the traffic operations internal to the development, Langan conducted manual turning-movement counts on Saturday May 15, 2021 for the mid-day period at the two internal intersections of Hemlock Avenue with Evergreen Way and Hemlock Avenue with East Access Drive. Based on the counts, the existing peak hour of these intersections is 11:45 a.m. to 12:45 p.m., consistent with retail uses. The proposed Costco volumes were added to the internal intersections. The unadjusted and background volumes for these two intersections are provided on **Figure 9**.

Background Traffic Operating Conditions

The traffic operating conditions for the study area intersections were analyzed during the peak-hour periods using the background traffic volumes illustrated in **Figure 3**. A summary of the traffic operating conditions is provided in **Tables 4 and 5**. Detailed reports can be found in **Appendix B**.

Note that the background traffic conditions of this report include the build geometric improvements associated with the above noted projects as described in the report titled "Traffic Impact Analysis: Costco at Evergreen Walk" by BL Companies, dated September 2019 and revised July 2020.

5.2 Step Two: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.

The project includes a new building with associated parking improvements, loading area, and the reconfiguration of Evergreen Way. Evergreen Way is a primary north-south internal drive for the Evergreen Walk development, paralleling Buckland Road and connecting to Tamarack Avenue to the north and south. The Old Navy, Sakura Garden and vacant space, a portion of which was once occupied by Highland Park grocer, will be replaced with a ±40,000 square-foot grocer and an adjacent ±10,000 square-foot retail space (See **Figure 1** for the Location Map).

To determine the traffic volumes that the proposed development will generate, first it was determined how many trips will be removed due to the demolition of the existing buildings (shown in **Figure 5**), then how many trips will be generated from the new proposed redevelopment (shown in **Figure 6**). Then, the difference between these two volumes were taken to determine the total traffic volumes generated by the proposed development (**Figure 7**).

Peak-Hour Trip Generation

The anticipated number of peak-hour trips generated by the existing shopping center is based on rates established in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Land Use Code 820: Shopping Center was selected based on the use of the existing buildings. The estimated amount of trips that the existing buildings are generating is 269 total trips for the evening peak hour, and 299 total trips for the Saturday peak hour. These trip totals take into account an internal capture credit percentage, which, based on previously approved BL Companies report, is 11% of the evening peak hour volumes, and 10% of the Saturday mid-day peak hour volumes. The internal capture credit is intended to anticipate the amount of trips that have both ends, origin and destination, within the site. These trips do not end up impacting the roadway network area, and therefore, are removed from the total trip generation. The data for estimating these existing trips can be seen below in **Table 1**. This data was then distributed and assigned throughout the study area roadway network and is shown below in **Figure 5**.

TABLE 1
EXISTING TRIP GENERATION
THE PROMENADE SHOPS AT EVERGREEN WALK – EXISTING SHOPPING CENTER

USE	LAND USE CODE[1]	WEEKDAY EVENING PEAK HOUR			SATURDAY MID-DAY PEAK HOUR		
		ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Shopping Center (±53,030 Square Feet)	820[2]	163	177	340	195	180	375
Total Existing Trips		**163**	**177**	**340**	**195**	**180**	**375**
Internal Capture Credit (11% % 10%)[3]		-18	-19	-37	-20	-18	-38
Pass-by Credit (10%)[4]		-16	-18	-34	-20	-18	-38
Total Net Existing Trips		**129**	**140**	**269**	**155**	**144**	**299**

[1] Land Use Codes based on ITE Trip Generation Manual 10th Edition
[2] Volume based on ITE Trip Generation Manual 10th Edition: Land Use Code 820: Shopping Center
[3] Internal capture percentages based on approved percentages for Friday and Saturday in the report prepared for Costco by BL Companies.
[4]Pass-by credit is representative of vehicles that are already on the public roadway network driving by the site they divert into the site and then back onto the public roadway, continuing with their same trip.

To compare, **Table 2** below shows the anticipated trips to be generated by the redevelopment. Similarly as before, Langan based the trip generation on ITE data and used a combination of land use codes 820: Shopping Center and 850: Supermarket. At the request of OSTA, the proposed grocer should be dealt with as a separate land use and not as additional area of a shopping center. The redevelopment consists of ±40,000 square-feet of grocer and ±10,000 square-feet of and the resulting trip generation is shown below in **Table 2.** Overall, the expected amount of trips to be generated by the new development is 390 trips for the evening peak hour, and 457 trips for the Saturday peak hour. The expected trips were then distributed and assigned throughout the study area roadway network based on the designated trip distribution percentages, and can be seen below in **Figure 6**.

TABLE 2
ANTICIPATED TRIP GENERATION
THE PROMENADE SHOPS AT EVERGREEN WALK - PROPOSED DEVELOPMENT

USE	LAND USE CODE[1]	WEEKDAY EVENING PEAK HOUR			SATURDAY MID-DAY PEAK HOUR		
		ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Proposed Shopping Center (±10,000 Square Feet)	820[2]	48	51	99	52	48	100
Proposed Supermarket (±40,000 Square Feet)	850[3]	201	193	394	240	231	471
Total Proposed Trips		**249**	**244**	**493**	**292**	**279**	**571**
Internal Capture Credit (11% & 10%)[4]		-28	-26	-54	-29	-28	-57
Pass-by Credit (10%)[5]		-25	-24	-49	-29	-28	-57
Total Net Proposed Trips		**196**	**194**	**390**	**234**	**223**	**457**

[1] Land Use Codes based on ITE Trip Generation Manual 10th Edition
[2] Volume based on ITE Trip Generation Manual 10th Edition: Land Use Code 820: Shopping Center
[3] Volume based on ITE Trip Generation Manual 10th Edition: Land Use Code 850: Supermarket
[4] Internal capture percentages based on approved percentages for Friday and Saturday in the report prepared for Costco by BL Companies.
[5]Pass-by credit is representative of vehicles that are already on the public roadway network driving by the site they divert into the site and then back onto the public roadway, continuing with their same trip.

As shown below, **Table 3** indicates a comparison of the previously approved uses, versus the proposed redevelopment. **Table 3** indicates that the redevelopment can be expected to add 120 net new trips for the evening peak-hour, and 156 net new trips for the Saturday peak-hour. These overall net increase in trips were then distributed and assigned based on our anticipated trip distribution percentages, which can be seen in **Figure 7**.

TABLE 3
ANTICIPATED TRIP GENERATION
THE PROMENADE SHOPS AT EVERGREEN WALK - PROPOSED GROCER NET CHANGE

USE	LAND USE CODE[1]	PM PEAK HOUR			SAT PEAK HOUR		
		ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Shopping Center (±53,030 Square Feet)	820[2]	163	177	340	195	180	375
Total Existing Trips		**163**	**177**	**340**	**195**	**180**	**375**
Proposed Retail (±10000 Square Feet)	820[2]	48	51	99	52	48	100
Proposed Grocer (±40000 Square Feet)	850[3]	201	193	394	240	231	471
Total Proposed Trips		**249**	**244**	**493**	**292**	**279**	**571**
Net Change		**+86**	**+67**	**+153**	**+97**	**+99**	**+196**
Internal Capture Credit (11% & 10%)[4]		-10	-7	-17	-10	-10	-20
Pass-by Credit (10%)[5]		-9	-7	-16	-10	-10	-20
Total Net Change		**+67**	**+53**	**+120**	**+77**	**+79**	**+156**

[1] Land Use Codes based on ITE Trip Generation Manual 10th Edition
[2] Volume based on ITE Trip Generation Manual 10th Edition: Land Use Code 820: Shopping Center
[3] Volume based on ITE Trip Generation Manual 10th Edition: Land Use Code 850: Supermarket
[4] Internal capture percentages based on approved percentages for Friday and Saturday in the report prepared for Costco by BL Companies.
[5]Pass-by credit is representative of vehicles that are already on the public roadway network driving by the site they divert into the site and then back onto the public roadway, continuing with their same trip.

5.3 Step Three: Combine the Background Traffic Volumes (Step One) with the assigned proposed traffic (Step Two) to establish Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts.

Build Traffic Volumes

To evaluate the impacts of the proposed development, the proposed net new trip volumes (**Figure 7**), as distributed on the roadway network, are combined with the background traffic volumes (**Figure 3**). **Figure 8** illustrates the build traffic volumes in the roadway network during the peak-hour periods.

The trip distribution percentages were based on weekday evening and Saturday mid-day peak-hour existing traffic patterns, "Journey to Work" data, and previous traffic studies in the study area. Based on this, it is expected that a majority of the trips will access the redevelopment from Hemlock Avenue, anticipating 75% of the new trips to enter and exit through here. This access is the most efficient route for the majority of traffic with the exception of the internal capture trips. A more detailed breakdown of the trip distribution percentages for the roadway network in the study area can be seen in **Figure 4**.

The two internal intersections of Hemlock Avenue with Evergreen Way and Hemlock Avenue with Cottonwood Lane were also analyzed in the build condition. These two intersections will be re-constructed as follows:

- Southbound approach of Evergreen Way to the roundabout will be removed and reconfigured to an enter-only drive to the proposed site
- Geometric adjustments will be made to the Hemlock Avenue and Cottonwood Lane to accommodate proposed vehicular movements
- East Access Drive and the north portion of Evergreen Way will be renamed Cottonwood Lane

The re-distributed volumes associated with the closure of the northern part of Evergreen Way are shown on **Figure 10**. The build volumes associated with the proposed grocer are shown on **Figure 11**.

Build Traffic Operating Conditions

The resulting traffic volumes illustrated in **Figure 8** were analyzed to determine the effective Build operating conditions of the study area intersections. **Tables 4 and 5** compare the traffic operating conditions for the study area intersections of the Background and the Build peak-hour periods. **Appendix C** provides detailed reports for the build conditions.

Queueing Evaluation

In addition to the traffic operating conditions, we evaluated the resulting vehicular queuing for all conditions to assess the impacts at study intersections. In evaluating queuing length, the industry standard is to utilize the 50th and the 95th percentile queue lengths developed by the analysis. The 50th percentile queue represents the average or typical vehicular queue that can be expected during the peak-hour. The 95th percentile queue length represents the queuing experience during the highest peak periods, which accounts for 5% of the analysis period. Queues are calculated in feet, and approximately 25 feet of queue is equal to a single vehicle.

Tables 4 and 5 provide the expected 50th and 95th percentile queue lengths for the analyzed periods. For most analyzed intersections, queue lengths do not increase more than two car lengths. Other intersections in the analyzed network show minimal changes in 95th percentile queue lengths. Any increase in queuing due to the proposed development is minimal and the existing roadway network can fully accommodate the anticipated queues.

Internal Circulation & Wayfinding

A basic operational element of the Evergreen Walk master plan is to provide internal circulation opportunities to relieve traffic pressures on Buckland Street. The internal private roadway network has been design to allow vehicles to travel between the various areas of the development without the need to exit out to Buckland Street. The configuration of the proposed project will necessitate the relocation on a small segment of one of the north-south circulation roadways, a portion of Evergreen Way. This adjustment to the circulation patterns will be accompanied with installation of wayfinding signage to provide clarity of circulation options available to the drivers.

The existing East Access Drive, located to the east of the Promenade Shops and running from Tamarack Avenue to the south, to Hemlock Avenue to the north, as well as the relocated and existing Evergreen Way, from Hemlock Avenue north to the connection to Tamarack Avenue, will be renamed to Cottonwood Lane. This will provide consistently named and uninterrupted north-south route from the southern portion of the development through to north of Costco. This route also provide a safer travel pattern for the vehicles traveling through this portion of the development, as there is no parking along this roadway.

New wayfinding signs will be installed to provide guidance for drivers wishing to traverse through Evergreen Walk and the remaining development. These improvements will continue to provide vehicles with multiple north-south circulation options without the need to travel on Buckland Road (See Overall Vehicular Circulation Plan in **Appendix A**).

TABLE 4
CAPACITY ANALYSIS SUMMARY - WEEKDAY P.M. PEAK-HOUR

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	BACKGROUND CONDITIONS					BUILD CONDITION					BUILD WITH IMPROVEMENTS CONDITIONS				
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%
Tamarack Avenue & Deming Street	**UNSIGNALIZED**	EB-TR	>1000'	A	0	0		0'	A	0	0		0'					
		WB-L	±200'	A	7.9	0.074		5'	A	7.9	0.075		5'					
		WB-T	±400'	A	0	0		0'	A	0	0		0'					
		NE-L	±600'	B	14.4	0.116		10'	B	14.7	0.13		10'					
		NE-R	±200'	B	14.4	0.116		10'	B	14.7	0.13		10'					
Buckland Road & Deming Street	**ACTUATED-COORDINATED**	**Overall**		**B**	**19**	**0.58**			**B**	**19**	**0.58**							
		EB-L	150'	D	53.9	0.36	28'	60'	D	53.9	0.36	28'	60'					
		EB-T	±490'	D	54.3	0.49	73'	121'	D	54.3	0.49	73'	121'					
		EB-R	±490'	B	12.5	0.57	0'	65'	B	12.5	0.57	0'	65'					
		WB-L	110'	E	60.5	0.52	50'	92'	E	60.5	0.52	50'	92'					
		WB-TR	±690'	D	44.5	0.51	72'	126'	D	44.5	0.51	72'	126'					
		NB-L	195'	B	10.2	0.41	17'	98'	B	10.3	0.41	17'	98'					
		NB-TTR	±820'	B	15.7	0.58	214'	705'	B	15.8	0.58	217'	716'					
		SB-L	340'	A	9.4	0.19	5'	39'	A	9.4	0.19	5'	39'					
		SB-TTR	>1000'	B	15.5	0.48	156'	471'	B	15.6	0.48	159'	490'					
Buckland Road & Cedar Avenue/ Gateway Driveway	**ACTUATED-COORDINATED**	**Overall**		**C**	**24.7**	**0.84**			**C**	**25.1**	**0.88**							
		EB-L	265'	F	88.8	0.84	125'	200'	F	94.5	0.88	136'	213'					
		EB-TR	±480'	C	20.8	0.7	6'	82'	C	20.8	0.71	6'	82'					
		WB-L	±290'	F	92.2	0.83	88'	138'	F	92.2	0.83	88'	138'					
		WB-TR	±290'	C	27.3	0.37	11'	53'	C	27.3	0.37	11'	53'					
		NB-L	285'	B	19.2	0.62	34'	214'	B	20	0.63	35'	222'					
		NB-TTR	±1060'	B	17.1	0.55	210'	720'	B	17.1	0.55	211'	724'					
		SB-L	75'	B	11.9	0.17	6'	44'	B	12	0.17	6'	44'					
		SB-TT	±730'	C	22.9	0.6	271'	753'	C	23	0.6	275'	760'					
		SB-R	235'	A	8.5	0.18	17'	96'	A	8.7	0.19	19'	101'					

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TABLE 4
CAPACITY ANALYSIS SUMMARY - WEEKDAY P.M. PEAK-HOUR

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	BACKGROUND CONDITIONS					BUILD CONDITION					BUILD WITH IMPROVEMENTS CONDITIONS				
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%
Buckland Road & Hemlock Avenue/ Aldi Driveway	**ACTUATED-COORDINATED**	**Overall**		**E**	**55.5**	**1.11**			**F**	**85**	**1.28**			**D**	**49.1**	**1.16**		
		EB-L	100'	F	109.3	1.03	172'	257'	F	114.9	1.05	180'	263'	F	151.5	1.16	160'	264'
		EB-TR	±330'	C	20.4	0.76	6'	106'	C	20.8	0.79	6'	119'	C	22.4	0.8	6'	129'
		WB-L	±310'	F	84.8	0.75	56'	136'	F	84.8	0.75	56'	136'	E	72.8	0.68	55'	125'
		WB-TR	±310'	C	22.5	0.38	6'	47'	C	22.5	0.38	6'	47'	C	24	0.4	6'	47'
		NB-L	225'	C	30.5	0.64	72'	341'	C	28.1	0.61	91'	412'	D	42.3	0.81	112'	354'
		NB-TTR	±1260'	C	21.7	0.69	274'	862'	C	21.7	0.69	275'	865'	C	21	0.67	284'	857'
		SB-L	65'	B	15.6	0.23	7'	44'	B	16	0.23	7'	44'	B	15.5	0.22	7'	43'
		SB-TTR	±1060'	F	86.6	1.11	524'	1065'	F	159.6	1.28	631'	1072'	E	65	1.05	548'	1140'
Buckland Road & Tamarack Avenue/ Lowe's& Target Driveway	**ACTUATED-COORDINATED**	**Overall**		**E**	**61.9**	**1.13**			**E**	**65.9**	**1.16**							
		EB-LTT	±710'	F	80.7	0.7	118'	162'	F	80.7	0.7	118'	162'					
		EB-R	250'	A	5	0.52	6'	64'	A	5	0.52	6'	64'					
		WB-L	200'	F	89.2	0.68	110'	173'	F	89.2	0.68	110'	173'					
		WB-T	±540'	F	81.3	0.58	98'	157'	F	81.3	0.58	98'	157'					
		WB-R	200'	A	5.5	0.32	0'	29'	A	5.5	0.32	0'	29'					
		NB-LL	300'	D	53.6	0.61	269'	544'	D	53.6	0.61	269'	544'					
		NB-TT	±1060'	C	31.3	0.72	478'	1047'	C	32	0.75	509'	1104'					
		NB-R	250'	A	6	0.08	7'	47'	A	6.2	0.08	8'	49'					
		SB-L	150'	F	86.9	0.75	156'	287'	F	86.9	0.75	156'	287'					
		SB-TTR	±1260'	F	109.8	1.13	778'	1238'	F	121.2	1.16	816'	1283'					

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TABLE 5
CAPACITY ANALYSIS SUMMARY - SATURDAY MID-DAY PEAK-HOUR

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	BACKGROUND CONDITIONS					BUILD CONDITIONS					BUILD WITH IMPROVEMENTS CONDITIONS				
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%
Tamarack Avenue & Deming Street	**UNSIGNALIZED**	EB-TR	>1000'	A	0	0		0'	A	0	0		0'					
		WB-L	±200'	A	7.9	0.089		8'	A	7.9	0.089		8'					
		WB-T	±400'	A	0	0		0'	A	0	0		0'					
		NE-L	±600'	B	13.6	0.085		8'	B	13.8	0.105		8'					
		NE-R	±200'	B	13.6	0.085		8'	B	13.8	0.105		8'					
Buckland Road & Deming Street	**ACTUATED-COORDINATED**	**Overall**		**B**	**17.9**	**0.61**			**B**	**18**	**0.61**							
		EB-L	150'	E	63.5	0.51	42'	81'	E	63.5	0.51	42'	81'					
		EB-T	±490'	D	50.8	0.32	43'	81'	D	51.1	0.33	44'	82'					
		EB-R	±490'	B	13.4	0.51	0'	58'	B	13.4	0.51	0'	58'					
		WB-L	110'	E	56.9	0.43	43'	82'	E	56.9	0.43	43'	82'					
		WB-TR	±690'	D	42.3	0.48	58'	109'	D	42.3	0.48	58'	109'					
		NB-L	195'	B	11.3	0.45	12'	76'	B	11.6	0.46	12'	76'					
		NB-TTR	±820'	B	13.3	0.51	166'	507'	B	13.4	0.51	170'	517'					
		SB-L	340'	A	7.8	0.17	5'	38'	A	7.8	0.17	5'	38'					
		SB-TTR	>1000'	B	16.5	0.61	212'	733'	B	16.6	0.61	216'	746'					
Buckland Road & Cedar Avenue/ Gateway Driveway	**ACTUATED-COORDINATED**	**Overall**		**C**	**28**	**1.04**			**C**	**29.8**	**1.13**							
		EB-L	265'	F	132.4	1.04	160'	259'	F	158.9	1.13	173'	275'					
		EB-TR	±480'	C	26.2	0.82	8'	138'	C	26.2	0.82	7'	141'					
		WB-L	±290'	F	81.5	0.77	84'	171'	F	87	0.81	84'	171'					
		WB-TR	±290'	C	29.8	0.35	7'	46'	C	29.8	0.35	7'	46'					
		NB-L	285'	C	26.1	0.6	81'	305'	C	27.2	0.6	88'	319'					
		NB-TTR	±1060'	B	14.4	0.49	175'	494'	B	14.3	0.49	177'	500'					
		SB-L	75'	B	10	0.21	9'	52'	B	10.1	0.22	9'	52'					
		SB-TT	±730'	C	26.2	0.71	331'	674'	C	26.5	0.71	340'	682'					
		SB-R	235'	A	6.6	0.22	17'	78'	A	6.7	0.23	18'	82'					

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TABLE 5
CAPACITY ANALYSIS SUMMARY - SATURDAY MID-DAY PEAK-HOUR

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	BACKGROUND CONDITIONS					BUILD CONDITIONS					BUILD WITH IMPROVEMENTS CONDITIONS				
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%
Buckland Road & Hemlock Avenue/ Aldi Driveway	**ACTUATED-COORDINATED**	**Overall**		**F**	**102.3**	**1.39**			**F**	**126.9**	**1.54**			**F**	**100.4**	**1.39**		
		EB-L	100'	F	93.5	0.96	153'	237'	F	102.2	1	165'	250'	F	96.1	0.98	148'	261'
		EB-TR	±330'	C	21.4	0.82	6'	138'	C	21.8	0.85	6'	152'	C	23.1	0.86	6'	160'
		WB-L	±310'	F	92	0.81	61'	150'	F	92	0.81	61'	150'	E	78.7	0.73	60'	139'
		WB-TR	±310'	C	22	0.4	6'	49'	C	22	0.4	6'	49'	C	23.5	0.42	6'	50'
		NB-L	225'	C	26.9	0.59	103'	429'	C	27.3	0.62	127'	510'	C	31.2	0.7	144'	449'
		NB-TTR	±1260'	C	22.6	0.7	268'	841'	C	22.7	0.7	270'	844'	C	22.8	0.71	281'	836'
		SB-L	65'	B	15.8	0.24	8'	46'	B	16.5	0.24	8'	46'	B	16.2	0.24	8'	46'
		SB-TTR	±1060'	F	209.3	1.39	646'	1051'	F	275.9	1.54	715'	1061'	F	207.8	1.39	687'	1130'
Buckland Road & Tamarack Avenue/ Lowe's& Target Driveway	**ACTUATED-COORDINATED**	**Overall**		**F**	**96.3**	**1.34**			**F**	**104.3**	**1.39**							
		EB-LTT	±710'	F	93	0.72	141'	188'	F	93	0.72	141'	188'					
		EB-R	250'	A	8.4	0.59	60'	150'	A	8.4	0.59	60'	150'					
		WB-L	200'	F	100.8	0.77	186'	263'	F	100.8	0.77	186'	263'					
		WB-T	±540'	F	82.4	0.5	124'	187'	F	82.4	0.5	124'	187'					
		WB-R	200'	A	5.2	0.09	0'	15'	A	5.2	0.09	0'	15'					
		NB-LL	300'	E	56.6	0.62	365'	617'	E	56.6	0.62	365'	617'					
		NB-TT	±1060'	D	47.4	0.88	727'	1431'	D	50.6	0.92	780'	1506'					
		NB-R	250'	A	7.8	0.09	12'	60'	A	8.1	0.09	13'	61'					
		SB-L	150'	E	79.3	0.61	213'	305'	E	79.3	0.61	213'	305'					
		SB-TTR	±1260'	F	203.2	1.34	1135'	1556'	F	224.2	1.39	1213'	1632'					

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TABLE 6
CAPACITY ANALYSIS SUMMARY - INTERNAL INTERSECTIONS - SATURDAY MID-DAY PEAK-HOUR

Intersection	CONTROL TYPE	LANE USE	BACKGROUND CONDITIONS					BUILD CONDITIONS				
			LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft) 50th%	QUEUES (ft) 95th%
Cottonwood Lane & Hemlock Avenue	**UNSIGNALIZED**	EB	A	7.7	0.008		0'	A	7.9	0.02		3'
		WB	A	7.6	0.009		0'	A	7.5	0.009		0'
		NB	B	10.4	0.062		5'	B	11.1	0.07		5'
		SB	B	12.9	0.168		15'	C	16.7	0.425		53'
Evergreen Way & Hemlock Avenue	**ROUNDABOUT**	EB	A	3.7	0.053		0'	A	3.7	0.082		0'
		WB	A	4	0.155		25'	A	4.1	0.167		25'
		NB	A	4	0.119		0'	A	3.9	0.119		0'
		SB	A	3.7	0.084		0'	-	-	-		-

TABLE 7
ACCIDENT DATA SUMMARY (2018 - 2020)

INTERSECTION	NUMBER OF ACCIDENTS		SEVERITY			MANNER OF CRASH						CONDITIONS			
	Total	Average Per Year	Property Damage Only	Personal Injury	Fatality	Angle	Rear End	Head On	Sideswipe	Fixed Object	Not Reported	Clear (Dry)	Rain/ Snow	Day	Night
Buckland Road & Tamarack Avenue	41	13.7	31 (76%)	10 (24%)	0 (0%)	2 (5%)	35 (85%)	0 (0%)	3 (7%)	0 (0%)	1 (2%)	33 (80%)	8 (20%)	34 (83%)	7 (17%)
Buckland Road & Hemlock Avenue	24	8.0	20 (83%)	4 (17%)	0 (0%)	3 (13%)	17 (71%)	0 (0%)	3 (13%)	0 (0%)	1 (4%)	18 (75%)	6 (25%)	19 (79%)	5 (21%)
Buckland Road & Cedar Avenue	9	3.0	7 (78%)	2 (22%)	0 (0%)	1 (11%)	4 (44%)	0 (0%)	3 (33%)	0 (0%)	1 (11%)	8 (89%)	1 (11%)	7 (78%)	2 (22%)
Buckland Road & Deming Street	16	5.3	10 (63%)	6 (38%)	0 (0%)	5 (31%)	5 (31%)	2 (13%)	1 (6%)	0 (0%)	3 (19%)	11 (69%)	5 (31%)	14 (88%)	2 (13%)
Deming Street & Tamarack Avenue	2	0.7	2 (100%)	0 (0%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (50%)	2 (100%)	0 (0%)	1 (50%)	1 (50%)
Total	**92**	**30.67**	**70 (76%)**	**22 (24%)**	**0 (0%)**	**12 (13%)**	**61 (66%)**	**2 (2%)**	**10 (11%)**	**0 (0%)**	**7 (8%)**	**72 (78%)**	**20 (22%)**	**75 (82%)**	**17 (18%)**

Source: UConn Crash Data Repository (2018 - 2020)

Analysis Results

The analysis of the study intersections reveals that most of the signalized intersections analyzed will maintain overall acceptable or background operating conditions for the build scenario. Individual movements and lane groups may change slightly in level of service, delay, and queue length; however, overall levels of service at these signalized intersections analyzed remain unchanged or acceptable, with nominal impacts to intersection delays. The analyses show that any capacity deficiencies or queueing issues at intersections in the study roadway network are present in the background scenarios and are not impacted by the development's anticipated traffic. However, Langan has provided some recommendations to help improve traffic operating conditions at several of these intersections.

Buckland Road & Hemlock Avenue/Aldi Driveway

Overall, this intersection operates unsatisfactorily in the weekday PM and the Saturday mid-day peak hour periods in both the background and the build scenarios. This intersection operates at an overall LOS F in both peak hour periods for the background scenario, and continues to operate at an overall LOS of F in the build scenario. During the weekday evening peak hour and Saturday mid-day periods, the northbound left turn lane maintains from LOS C from background to build. The 95th percentile queues for this lane increase by less than four car lengths in both the weekday PM and Saturday mid-day peak hours. The southbound through through-right movement maintains an LOS F for both the weekday peak hour and Saturday mid-day peak hour while the 95th percentile queues increase by less than one car length in both peak hour scenarios.

Buckland Road & Tamarack Avenue/Lowe's & Target Driveway

Overall in the background and build scenarios, this intersection operates and maintains LOS E during the weekday PM peak hours For the background Saturday mid-day peak hour periods, this intersection operates at an overall LOS F and maintains this operation through the build scenario at LOS F. In weekday PM peak hour, the southbound through through-right movement maintains operating at LOS D in the background to build scenario. The 95th percentile queues for this movement increase by less than two car lengths in the weekday PM peak hour, and increase by four car lengths in the Saturday mid-day peak hour. In the Saturday mid-day peak hour, the northbound through movements maintain LOS D and the 95th percentile queue lengths increase by less than three car lengths. Also, during the Saturday mid-day peak hour, the southbound through through-right movements maintain an LOS F and the 95th percentile queues increase by three car lengths.

Hemlock Avenue & Cottonwood Lane

With the removal of the north leg of the intersection of Hemlock Avenue & Evergreen Way, most of the existing and proposed internal trips are re-routed to the intersection of Hemlock Avenue & Cottonwood Lane. The background conditions shown in **Table 6** show the operating conditions of the existing geometry with the addition of the Costco volumes, as shown on **Figure 9**. The build conditions shown in **Table 6** show the operating conditions of the proposed geometry with all volumes re-routed, as shown on **Figure 11**.

Based on the results presented in **Table 6**, the southbound approach is anticipated to change from LOS B to LOS C from background to build conditions. The other movements each maintain the background LOS in the build conditions. 95th percentile queues for the southbound approach increase by less than two car lengths from background to build conditions.

Recommended Improvements

Overall, as shown through the analysis, the traffic to be generated by the new development is anticipated to minimally impact the level of service and queue lengths throughout the study area roadway network. In most cases, the signalized intersections analyzed will maintain overall acceptable or background operating conditions for the build scenario.

Langan concurs with the following improvements previously recommended to be implemented as part of other developments or by the town to address existing conditions:

- Reestablish the coordinated traffic signal system along Buckland Road.
- Construct southbound right-turn only lane on Buckland Road at the Hemlock Avenue intersection.
- Extension of the northbound Buckland Road left turn lane at Hemlock Avenue by cutting into the median.
- Provide a southbound right turn lane at the Buckland Road and Tamarack Avenue intersection.

As part of the proposed grocer development, Langan recommends minor signal optimization at the intersection of Buckland Road and Hemlock Avenue/Aldi Driveway to accommodate the incremental new trips.

5.4 Step Four: Investigate the safety conditions within the area roadway network.

Intersection Sight Distance

All intersections within the study area road network are to remain unchanged. Therefore no intersection sight distance evaluation due to there being no proposed changes to the intersections in the study area network.

Accidents

The most recent three years of accident data were requested via the online UConn Crash Data Repository website in order to conduct an accident analysis in the project vicinity. From January 2018 to December 2020, a total of 92 accidents occurred in the vicinity of the site and the surrounding study intersection locations. This includes intersections on Buckland Road, Tamarack Avenue, Hemlock Avenue, Cedar Avenue, and Deming Street in the vicinity of the project area. **Table 7** provides a summary of the accident history.

Accidents included rear-ends, sideswipe (same direction), head-on collisions, angle collisions, and single vehicle crashes, which are behaviors typical at signalized intersections. No fatalities were reported and only 22 (24%) of the reported accidents resulted in injuries. The majority of accidents occurred during dry weather conditions (78%) and during daylight hours (82%).

6.0 SUMMARY AND RECOMMENDATIONS

This evaluation identifies the potential traffic impacts generated by the proposed development on the surrounding area road network. Langan performed a capacity analysis for the background and build scenarios for six intersections.

Langan concurs with the following improvements previously recommended to be implemented as part of other developments or by the town to address existing conditions:

- Reestablish the coordinated traffic signal system along Buckland Road.
- Construct southbound right-turn only lane on Buckland Road at the Hemlock Avenue intersection.
- Extension of the northbound Buckland Road left turn lane at Hemlock Avenue by cutting into the median.
- Provide a southbound right turn lane at the Buckland Road and Tamarack Avenue intersection.

As part of the proposed grocer development, Langan recommends minor signal optimization at the intersection of Buckland Road and Hemlock Avenue/Aldi Driveway to accommodate the incremental new trips.

Overall, the analysis of the study intersections reveals that most of the signalized intersections analyzed will maintain overall acceptable or background operating conditions for the build scenario. Individual movements and lane groups may change slightly in level of service, delay, and queue length; however, overall levels of service at these signalized intersections analyzed remain unchanged or acceptable, with nominal impacts to intersection delays.

Figures

SCALE: 1 INCH = 1000 FEET

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Project	EVERGREEN WALK
	SOUTH WINDSOR CONNECTICUT
Drawing Title	SITE LOCATION MAP
Project No.	140222801
Date	1/6/2021
Drawn By	BTW
Checked By	CJM

FIG. 1

1

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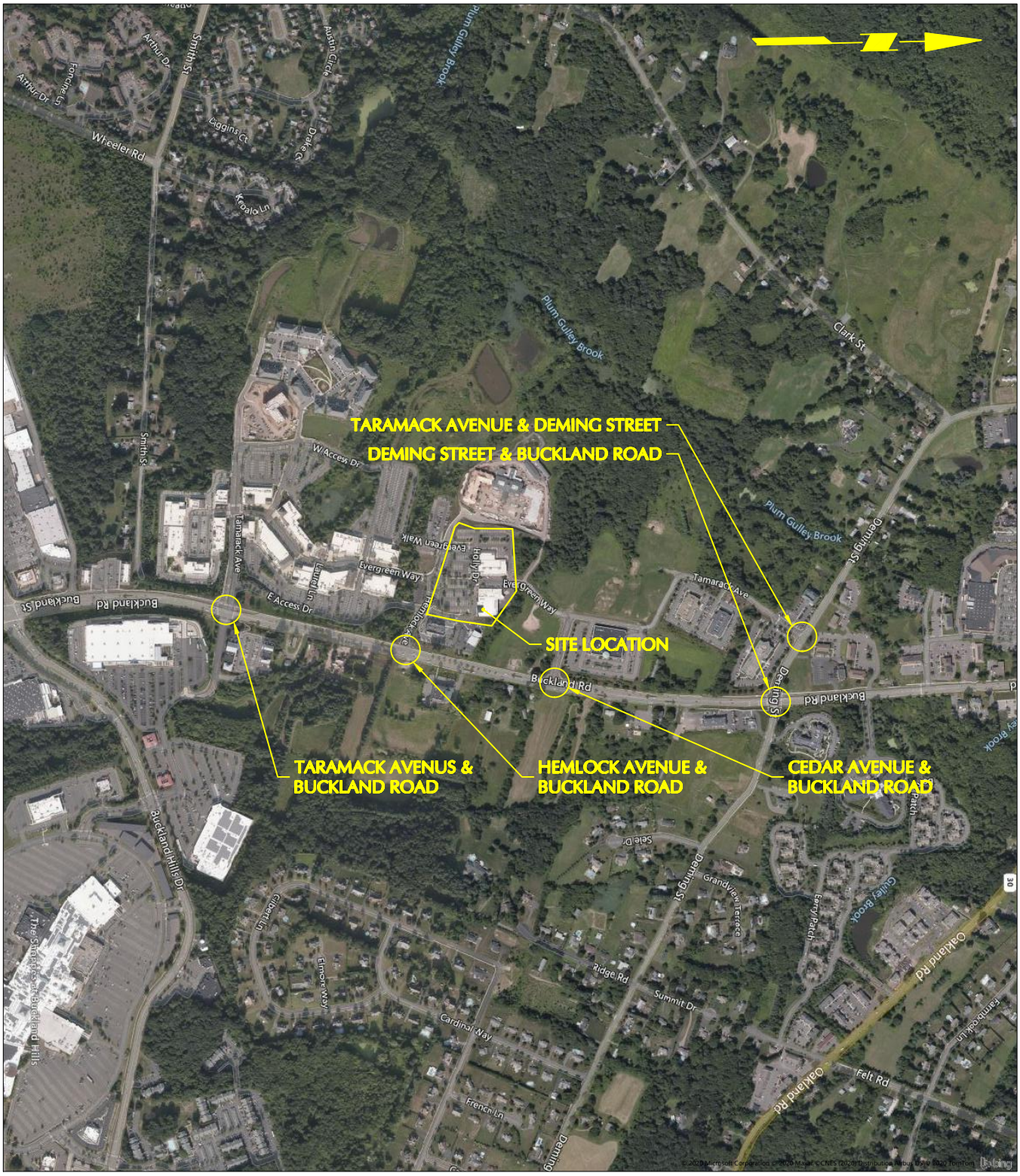

LANGAN Langan CT, Inc. 555 Long Wharf Drive New Haven, CT 06511 T: 203.562.5771 F: 203.789.6142 www.langan.com	Project **EVERGREEN WALK** SOUTH WINDSOR CONNECTICUT	Drawing Title **STUDY INTERSECTION MAP**	Project No. 140222801 Date 1/6/2021 Drawn By BTW Checked By CJM	**FIG. 2** 2

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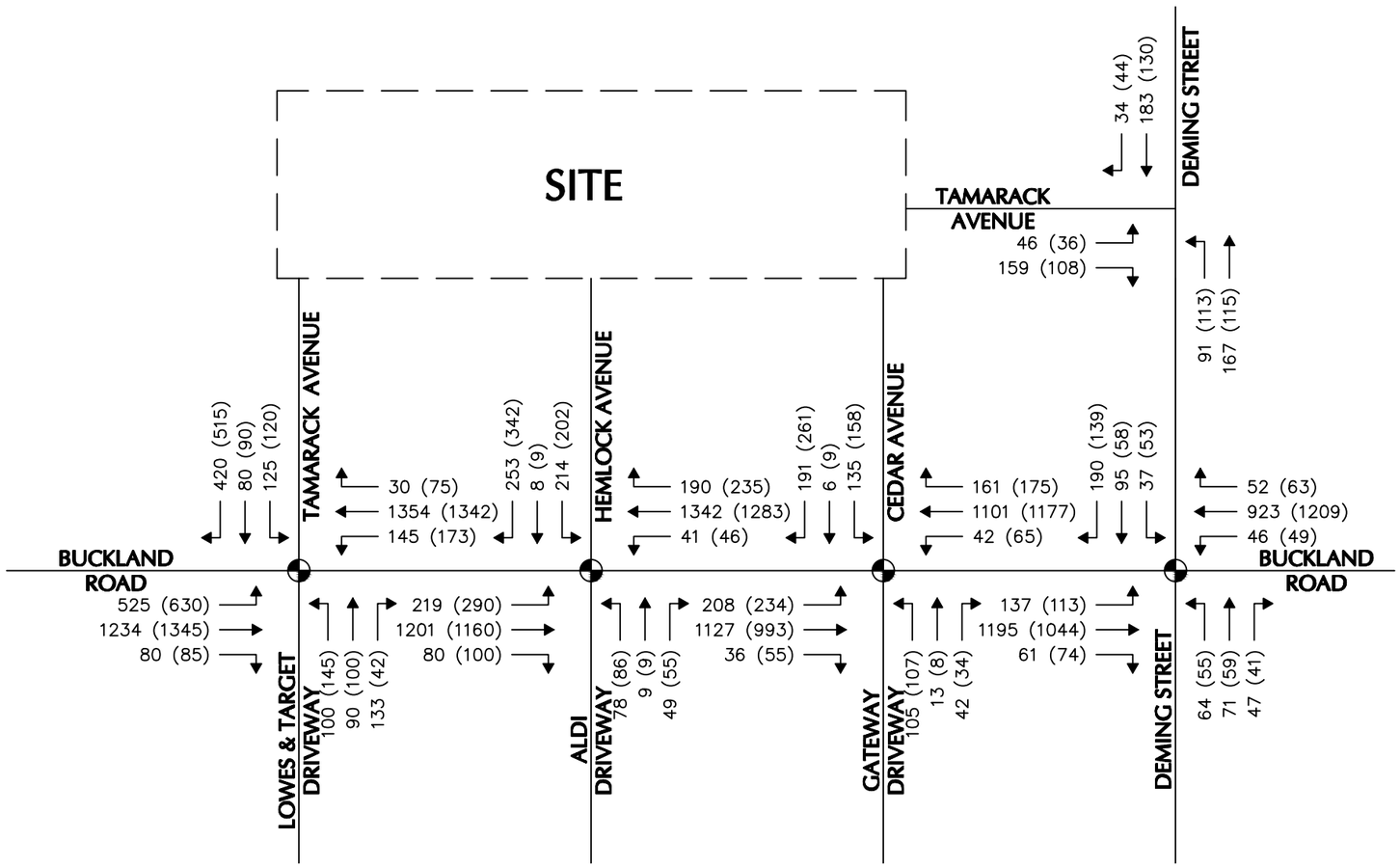

NOTES:

1. WEEKDAY EVENING AND SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON TRAFFIC VOLUMES FROM FIGURE 7 "BUILD TRAFFIC VOLUMES" FROM REPORT TITLED "TRAFFIC IMPACT ANALYSIS: COSTCO AT EVERGREEN WALK" COMPLETED SEPTEMBER 2019, AND REVISED JULY 2020 BY BL COMPANIES.

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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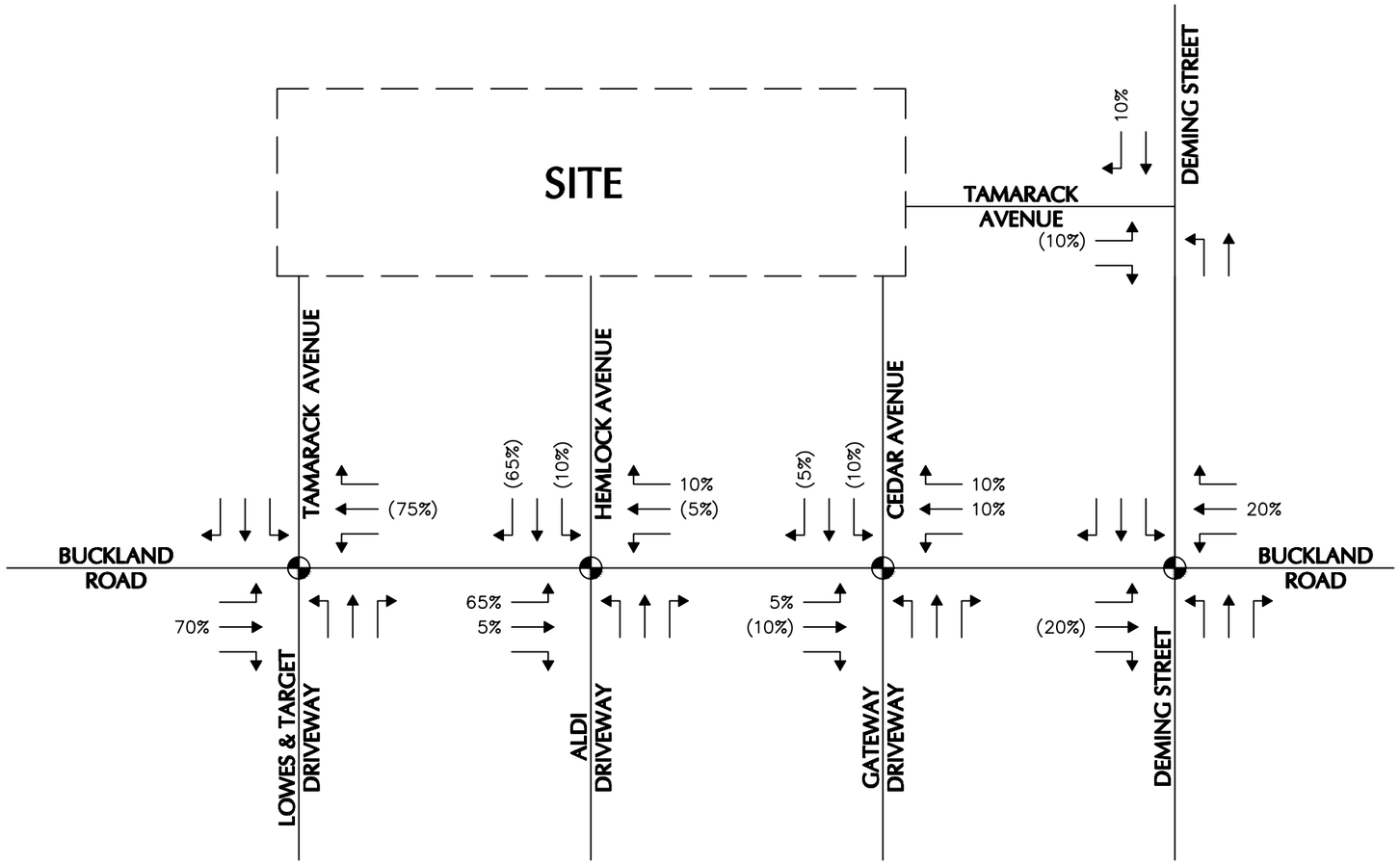
Project: EVERGREEN WALK
SOUTH WINDSOR CONNECTICUT

Drawing Title: BACKGROUND PEAK-HOUR TRAFFIC VOLUMES

Project No. 140222801
Date 2/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 3
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-KT001-0101.DWG Date: 6/10/2021 Time: 23:24 User: cmclean Style Table: Langan.stb Layout: Fig. 3



NOTES:

1. WEEKDAY EVENING AND SATURDAY MID–DAY TRIP DISTRIBUTIONS ARE BASED ON EXISTING TRAFFIC PATTERNS, JOURNEY TO WORK DATA, AND PREVIOUS TRAFFIC STUDIES IN THE STUDY AREA.

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	ENTER (EXIT)
DIRECTION OF TRAFFIC	

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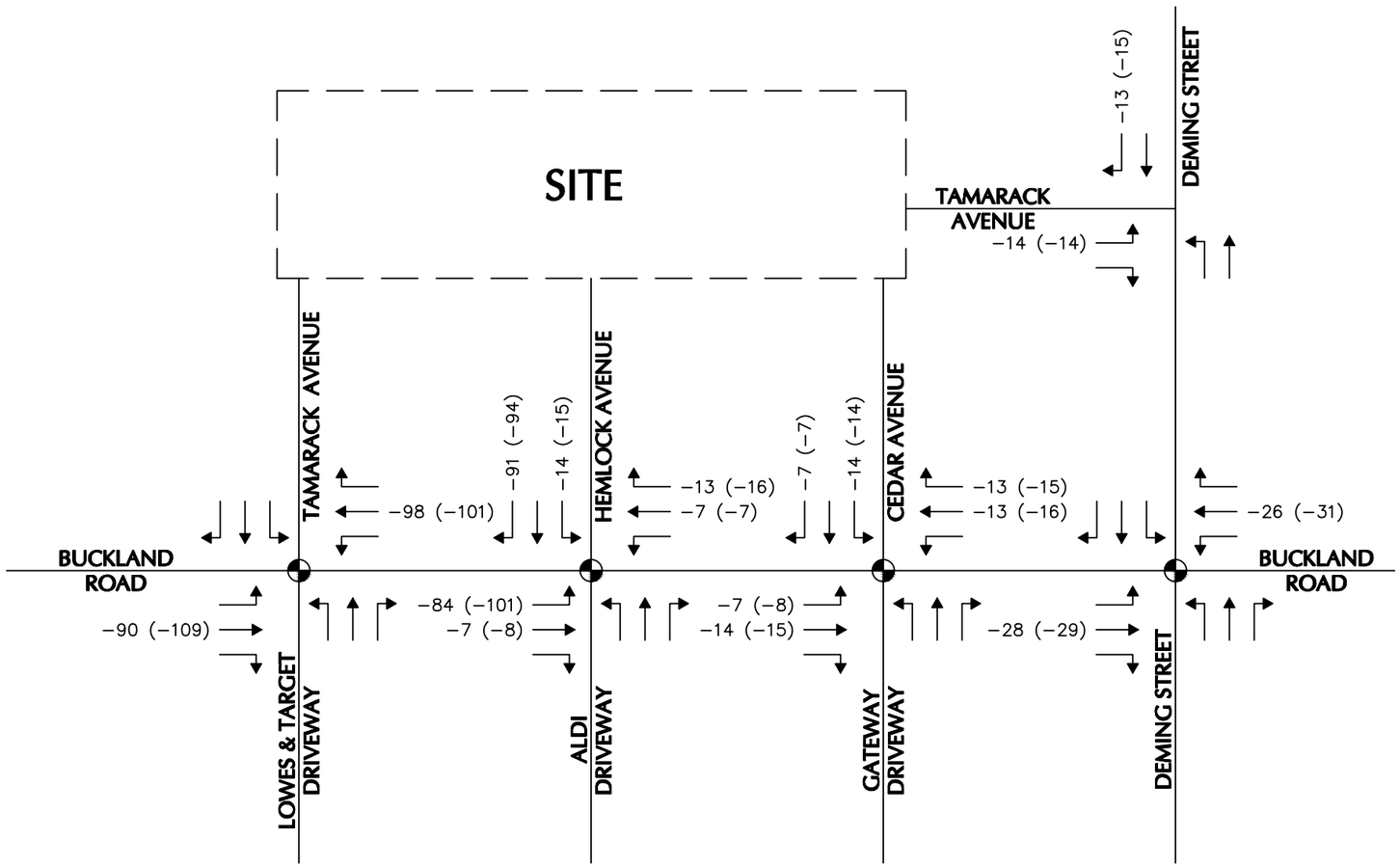
SOUTH WINDSOR CONNECTICUT

Drawing Title: TRIP DISTRIBUTION

Project No. 140222801
Date 2/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 4
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0106.dwg Date: 6/10/2021 Time: 23:25 User: cmclean Style Table: Langan.stb Layout: Fig. 4



NOTES:

1. WEEKDAY EVENING AND SATURDAY MID-DAY PEAK-HOUR TRAFFIC VOLUMES ARE BASED ON EXISTING TRIP GENERATION VOLUMES APPLIED TO THE PERCENTAGES IN FIGURE 4 OF THIS REPORT.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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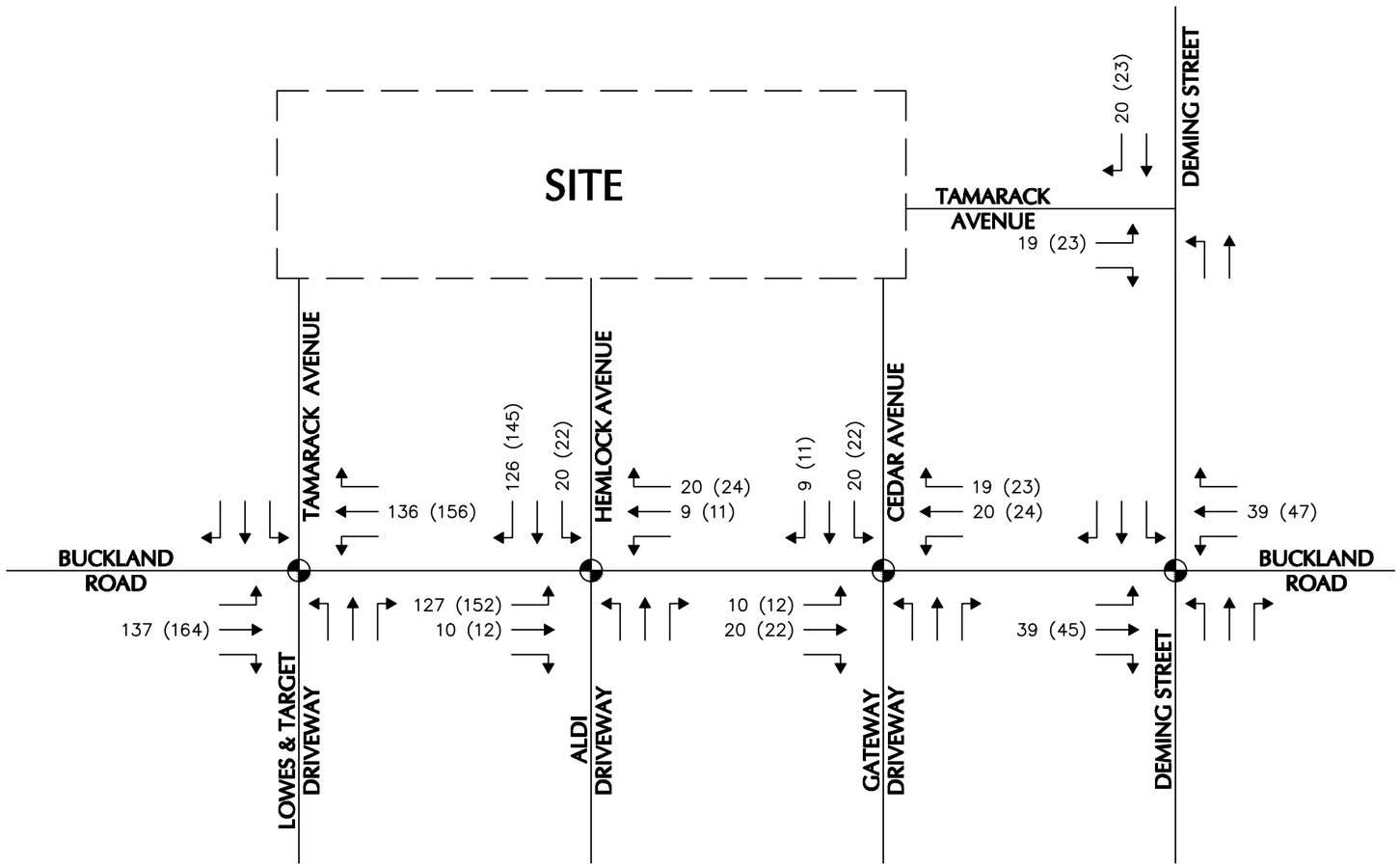
Project	EVERGREEN WALK
	SOUTH WINDSOR CONNECTICUT
Drawing Title	REMOVAL OF EXISTING TRIPS
Project No.	140222801
Date	2/23/2021
Drawn By	CWA
Checked By	CJM
Drawing No.	FIG. 5
Sheet	3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0105.dwg Date: 6/10/2021 Time: 23:25 User: cmclean Style Table: Langan.stb Layout: Fig. 5



NOTES:

1. WEEKDAY EVENING AND SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON PROPOSED TRIP GENERATION VOLUMES APPLIED TO THE PERCENTAGES IN FIGURE 4 OF THIS REPORT.

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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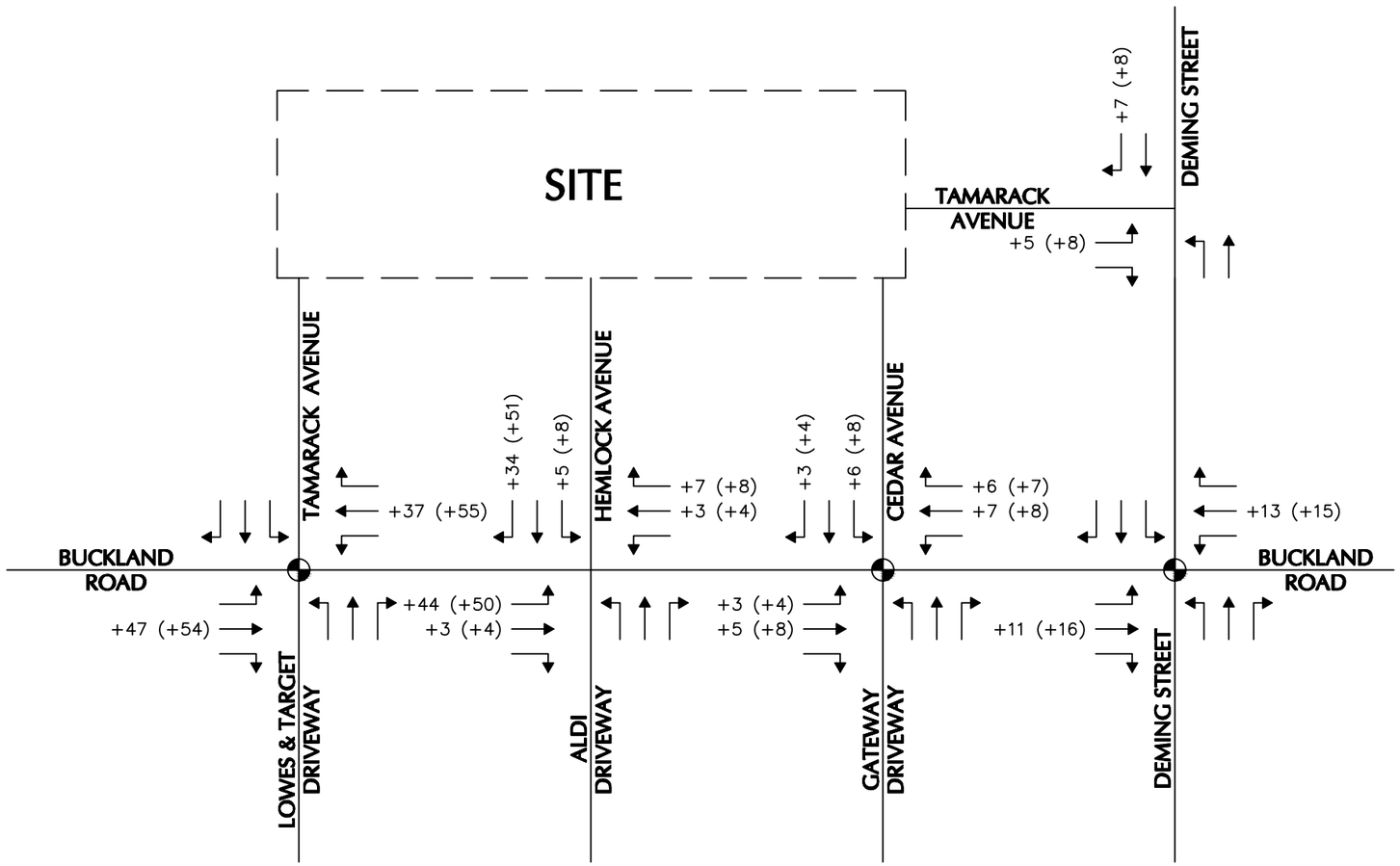
Project: EVERGREEN WALK
SOUTH WINDSOR CONNECTICUT

Drawing Title: TRIP ASSIGNMENT

Project No. 140222801
Date 2/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 6
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0107.dwg Date: 6/10/2021 Time: 23:25 User: cmclean Style Table: Langan.stb Layout: Fig. 6



NOTES:

1. WEEKDAY EVENING AND SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON THE COMBINATION OF VOLUMES FROM FIGURES 5 AND 6 OF THIS REPORT.

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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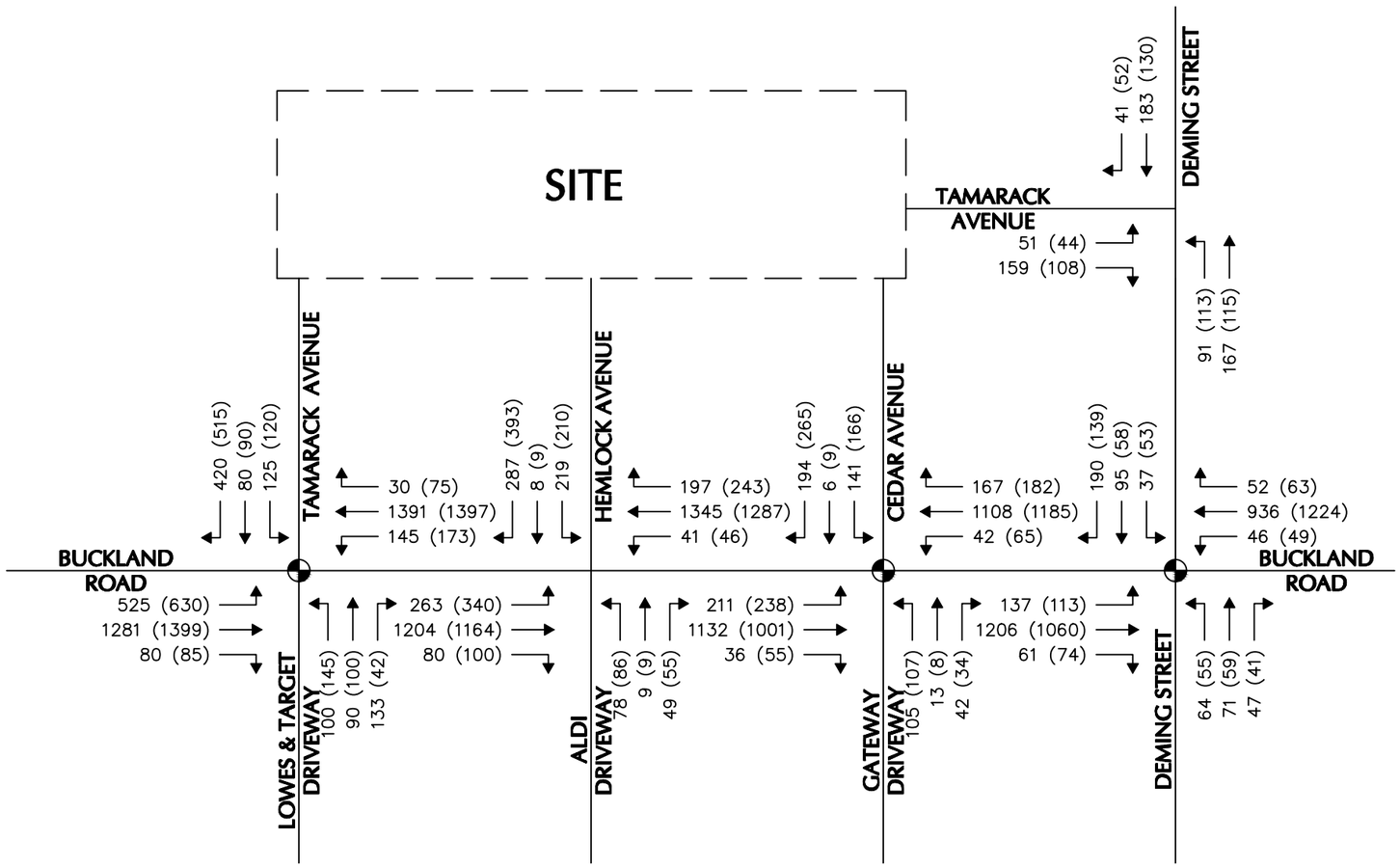
Project: EVERGREEN WALK
SOUTH WINDSOR CONNECTICUT

Drawing Title: NET NEW TRIPS

Project No. 140222801
Date 2/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 7
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0109.dwg Date: 6/10/2021 Time: 23:25 User: cmclean Style Table: Langan.stb Layout: Fig. 7



NOTES:

1. WEEKDAY EVENING AND SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON THE COMBINATION OF TRAFFIC VOLUMES FROM FIGURE 3 AND FIGURE 7 OF THIS REPORT.

LEGEND	
TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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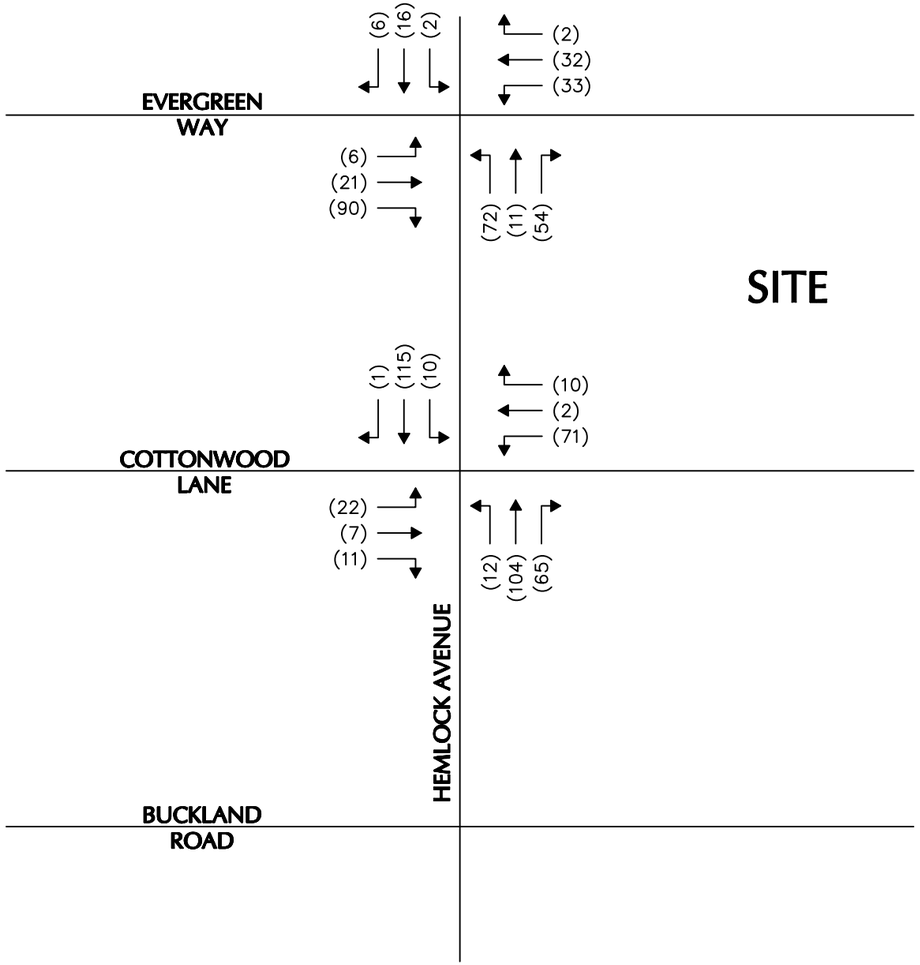
Project: EVERGREEN WALK
SOUTH WINDSOR CONNECTICUT

Drawing Title: BUILD PEAK-HOUR TRAFFIC VOLUMES

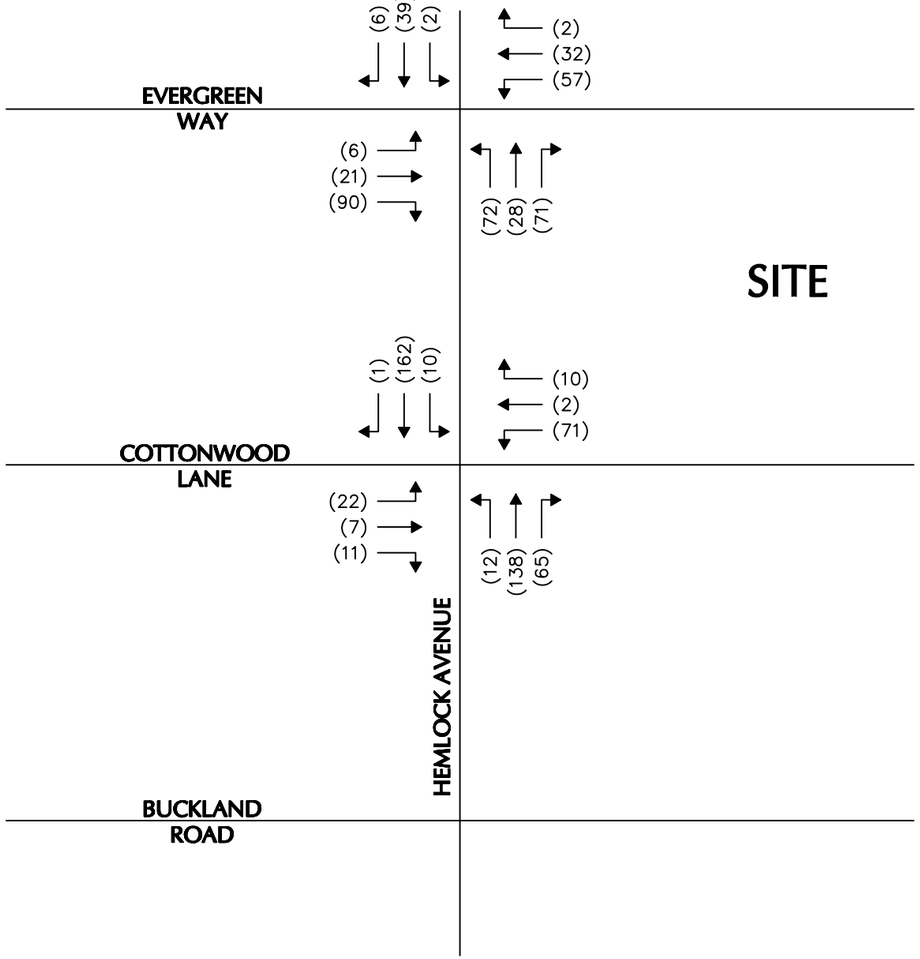
Project No. 140222801
Date 2/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 8
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0108.dwg Date: 6/10/2021 Time: 23:25 User: cmclean Style Table: Langan.stb Layout: Fig. 8



LANGAN OBSERVED PEAK-HOUR TURNING MOVEMENT COUNTS



TURNING MOVEMENT COUNTS WITH COSTCO PEAK-HOUR VOLUMES

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

NOTES:

1. SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON TRAFFIC VOLUMES OBSERVED MAY 15, 2021
2. SATURDAY PEAK–HOUR: 11:45AM–12:45PM

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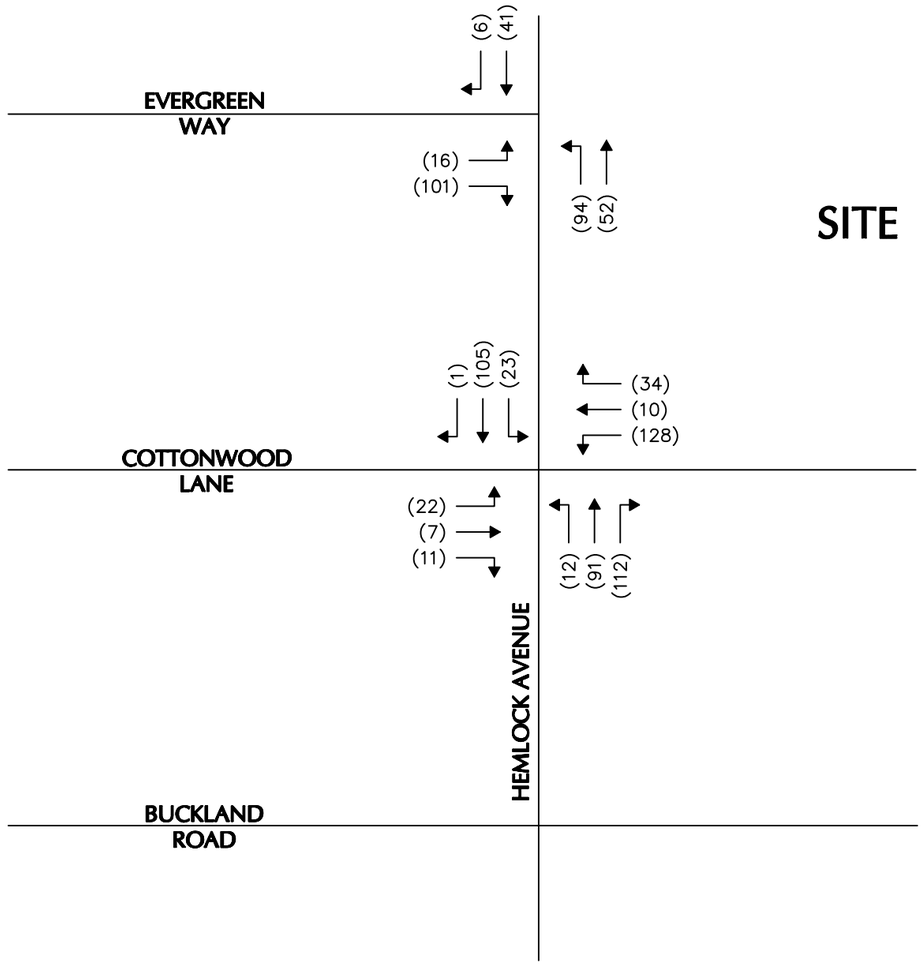
Project	EVERGREEN WALK SOUTH WINDSOR CONNECTICUT
Drawing Title	TURNING MOVEMENT COUNTS
Project No.	140222801
Date	5/23/2021
Drawn By	CWA
Checked By	CJM
Drawing No.	FIG. 9
Sheet	3 of 1

Filename: C:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0110.dwg Date: 6/10/2021 Time: 23:44 User: cmclean Style Table: Langan.stb Layout: Fig. 9



NOTES:

1. SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON TRAFFIC VOLUMES OBSERVED MAY 15, 2021
2. SATURDAY PEAK–HOUR: 11:45AM–12:45PM

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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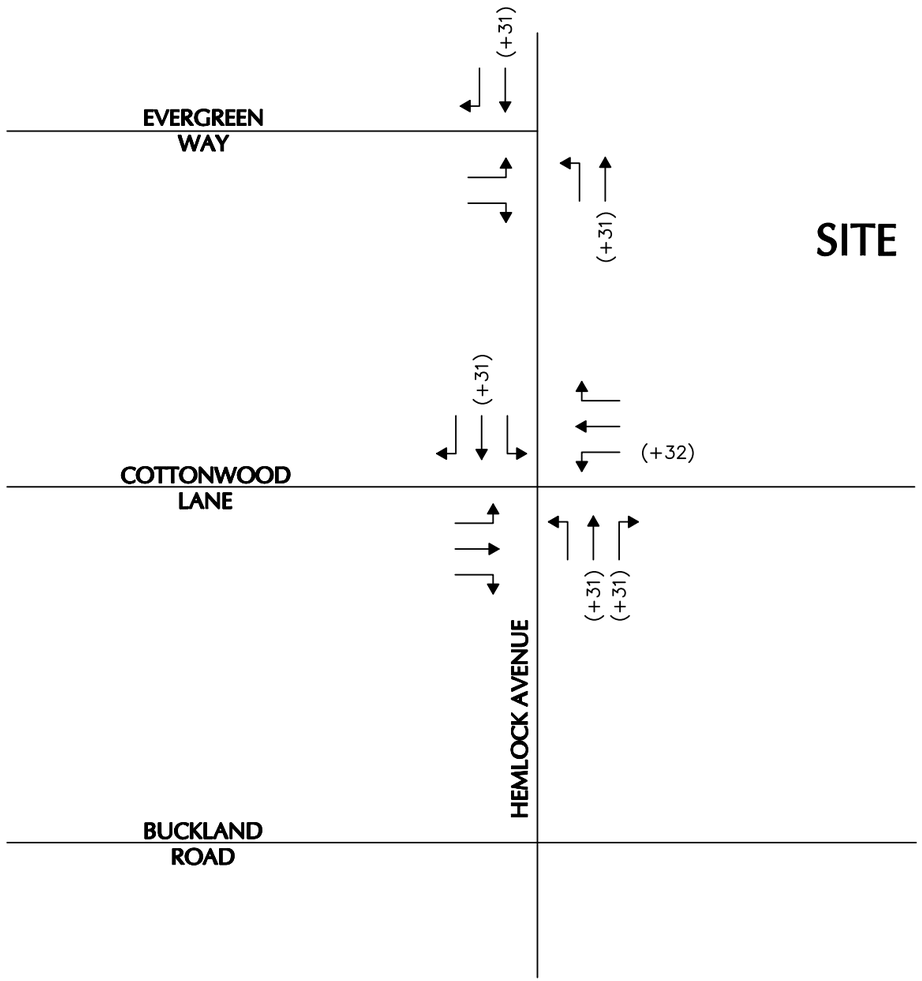
Project: EVERGREEN WALK
SOUTH WINDSOR CONNECTICUT

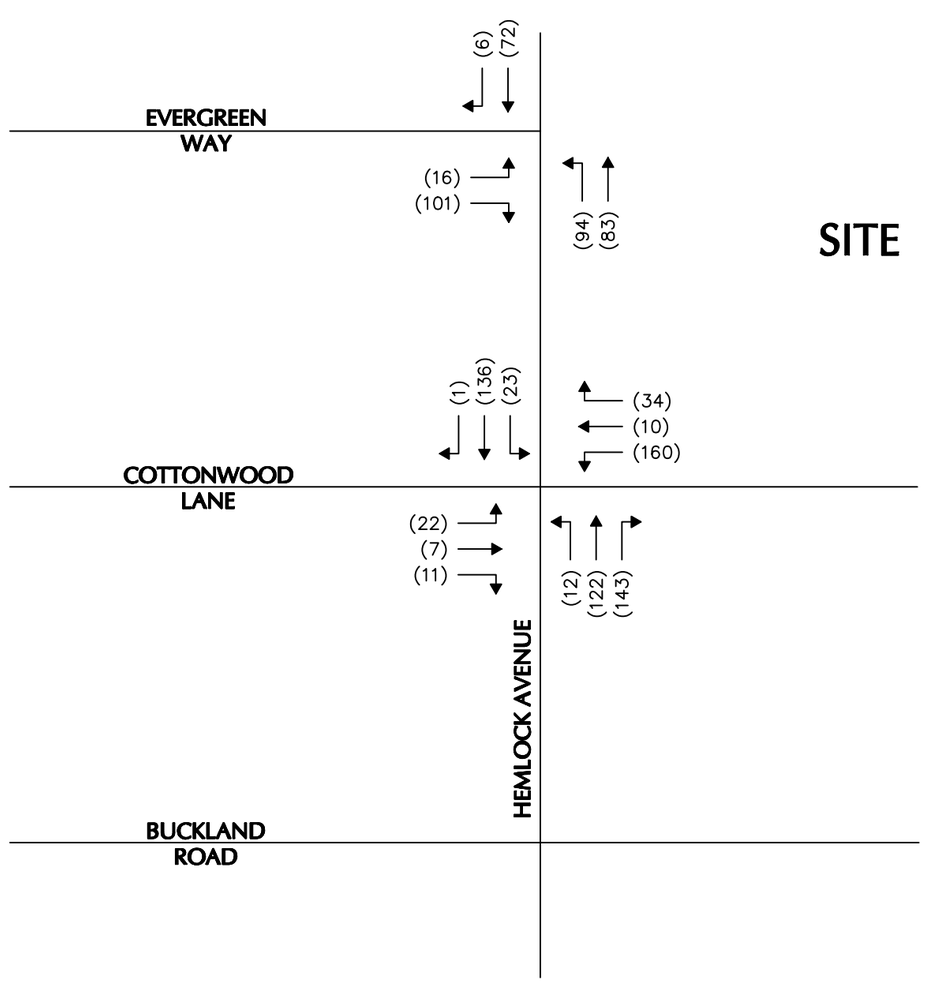
Drawing Title: RE-ROUTED TURNING MOVEMENT COUNTS

Project No. 140222801
Date 5/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 10
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0111.dwg Date: 6/10/2021 Time: 23:25 User: cmclean Style Table: Langan.stb Layout: Fig. 9





NOTES:

1. SATURDAY MID–DAY PEAK–HOUR TRAFFIC VOLUMES ARE BASED ON TRAFFIC VOLUMES OBSERVED MAY 15, 2021
2. SATURDAY PEAK–HOUR: 11:45AM–12:45PM

LEGEND

TRAFFIC SIGNAL	
PEAK–HOUR VOLUMES	PM (SAT)
DIRECTION OF TRAFFIC	

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Project: EVERGREEN WALK
SOUTH WINDSOR CONNECTICUT

Drawing Title: INTERNAL INTERSECTIONS BUILD VOLUMES

Project No. 140222801
Date 5/23/2021
Drawn By CWA
Checked By CJM

Drawing No. FIG. 11
Sheet 3 of 1

Filename: c:\bms\langan-pw-01\dms58671\140222801-0502-KT001-0112.dwg Date: 6/10/2021 Time: 23:26 User: cmclean Style Table: Langan.stb Layout: Fig. 9B

Appendix A

Overall Site Plan

EVERGREEN WALL LLC
UNIT 8

EVERGREEN WALL LLC
UNIT 3

INDEPENDENT LIVING
APARTMENT COMPLEX

EVERGREEN WALL LLC
UNIT 5

VIP NAILS & SPA,
CMA PRIMARY CARE & MEDSPA,
KUMON MATH AND READING
CENTER

ANTHONY VINCE
NAIL SPA,
PANERA BREAD

PROPOSED GROCER
± 40,000 SF

RETAIL
10,000 SF

23 PARKING SPACES

74 PARKING SPACES

217 PARKING SPACES

TAMARACK AVENUE

HEMLOCK AVENUE

EVERGREEN WAY

COTTONWOOD LANE

BUCKLAND ROAD

SAWCUT, FINISH WITH HOT POURED BITUMINOUS SEALANT (TYP.)
PERMEABLE PAVEMENT (±4,167 SF)
DUMPSTER PAD AND ENCLOSURE
MATCH EXISTING CURB
CROSSWALK (TYP.)
PORTION OF EXISTING WALL TO REMAIN
PORTION OF EXISTING WALL TO BE REMOVED
DYL (TYP.)
HEAVY DUTY ASPHALT PAVEMENT (TYP.)
PROPERTY UNIT LINE (TYP.)
POINT OF CURVATURE
12" WIDE STOP BAR & STOP SIGN (TYP.)
TRUCK TURNING CIRCLE R=55'
DOOR (TYP.)
RETAINING WALL #3
LOADING AREA (SEE ARCHITECTURAL PLANS)
COMPACTOR PAD
TRANSFORMER (TYP.)
BOLLARD, COORDINATE LOCATION WITH UTILITY COMPANY (TYP.)
CONCRETE LANDING AND STAIRS
DUMPSTER PAD AND ENCLOSURE
CONCRETE RAMP WITH HANDRAILS, COORDINATE WITH ARCHITECTURAL PLANS
INTERIOR BUILDING WALL
RETAIL LOADING AREA
PERMEABLE PAVERS ±3,000 SF
MAIN ENTRANCE
BUILDING CANOPY, COORDINATE WITH ARCHITECTURAL PLANS (TYP.)
SEASONAL MARKETING
LANDSCAPED AREA
COTTONWOOD LANE
WETLAND BOUNDARY (TYP.)
80' WETLAND UPLAND REVIEW
6" CONCRETE CURB (TYP.)
CONCRETE SIDEWALK (TYP.)
BOLLARD (TYP.)
SPEED TABLE WITH ASPHALT RAMPS
SCREENING LANDSCAPED AREA
EXISTING GUIDE RAIL TO REMAIN
LIGHT FIXTURE, REFER TO LIGHTING SITE PLAN (TYP.)
RETAINING WALL #2
FUTURE ACCESS ROADWAY LOCATION TO BE CONSTRUCTED BY OTHERS
CROSSWALK (TYP.)
FLUSH CONCRETE CURB (TYP.)
ADA PARKING AND LOADING (TYP.)
CART CORRAL (TYP.)
DOUBLE SIDED ADA SIGN (TYP.)
RAIN GARDEN (TYP.)
CURB RAMP (TYP.)
6" CONCRETE CURB (TYP.)
12" WIDE STOP BAR
CROSSWALK (TYP.)
STANDARD DUTY ASPHALT PAVEMENT (TYP.)
RETAINING WALL #1 AND TIMBER GUIDE RAIL
SAWCUT, FINISH WITH HOT POURED BITUMINOUS SEALANT (TYP.)
RIGHT IN ONLY ACCESS DRIVE
RELOCATE EXISTING LIGHT POLE
ERADICATE CONFLICTING PAVEMENT MARKINGS (TYP.)
RELOCATE EXISTING SIGN
WHITE PAINTED DIRECTIONAL ARROW (TYP.)
REMOVE CROSSWALK AND ADA RAMP
RELOCATE EXISTING SIGN
4" SYL
6" CONCRETE CURB
REBUILD CONCRETE SIDEWALK
SAWCUT, FINISH WITH HOT POURED BITUMINOUS SEALANT (TYP.)
EV CHARGING STATION (TYP.)
5' CONCRETE WALK (TYP.)
4' WIDE LEAK OFF AT RAIN GARDENS (TYP.)
REPLACE AND EXTEND EXISTING CROSSWALK, MATCH EXISTING MATERIALS
MODIFY CURB RAMP
4" SYL SPACED @ 2' O.C. @ 45°
SEE LP101 AND LL101 FOR LIGHTING AND LANDSCAPE IMPROVEMENTS AT ENTRANCE
2' HIGH STONE VENEER WALL. SEE LP101

NOW OR FORMERLY EVERGREEN WALL LLC UNIT 3
NOW OR FORMERLY EVERGREEN WALL LLC UNIT 5
80' UPLAND REVIEW NOW OR FORMERLY KRISHREL TIC LLC 205 HEMLOCK AVENUE VOLUME 2583 PAGE 3

SCALE: 1 INCH = 40 FEET

ZONING TABLE

EXISTING ZONE: BUCKLAND ROAD GATEWAY DEVELOPMENT ZONE (GD)
EXISTING USE: COMMERCIAL RETAIL
PROJECT SITE AREA: ±7.3 ACRES

ITEM	REQUIRED	EXISTING	PROPOSED	SECTION
BUILDING SIZE	--	47,730 SF TOTAL	50,000 SF	--
MAXIMUM BUILDING HEIGHT	60 FT / 4 STORIES	±24 FT, ±32 FT	45 FT	4.2.8F
MINIMUM INTERIOR LANDSCAPING	10% OF INTERIOR PARKING AREAS	--	17.6%	TABLE 6.4.6A
MAXIMUM IMPERVIOUS COVERAGE	60%	77.9%*	77.2%*	4.2.8E

PARKING TABLE

ITEM	REQUIRED	EXISTING	PROPOSED	SECTION
MINIMUM STALL SIZE	9 FT WIDE x 18 FT LONG	9 FT WIDE x 18 FT LONG	9 FT WIDE x 20 FT LONG	6.4.5F.1
MINIMUM DRIVE AISLE	24 FT – 2 WAY 16 FT – 1 WAY	24 FT – 2 WAY 16 FT – 1 WAY	24 FT – 2 WAY 16 FT – 1 WAY	TABLE 6.4.5A
MINIMUM NUMBER OF SPACES	GROCER: 40,000 SF * (1 STALL/200 SF) = 200 STALLS RETAIL: 10,000 SF * (1 STALL/200 SF) = 50 STALLS TOTAL REQUIRED = 250 STALLS	321 SPACES	314 SPACES	TABLE 6.4.3B
ADA SPACES REQUIRED	8 SPACES	9 SPACES	10 SPACES	ADA REQUIREMENTS

NOTES:

1. LIMITS OF WETLANDS WERE DELINEATED BY ALL POINTS TECHNOLOGIES CORPORATION IN FEBRUARY 2021.
2. IMPERVIOUS COVERAGE WAS CALCULATED ONLY FOR THE PROJECT SITE AREA OF ±7.31 ACRES AS DEFINED IN THE WATERSHED ANALYSIS. IMPERVIOUS COVERAGE WAS NOT CALCULATED FOR THE ENTIRE PARCEL.
   EXISTING IMPERVIOUS COVERAGE = ±5.70 ACRES / ±7.31 ACRES = ±77.9%
   PROPOSED IMPERVIOUS COVERAGE = ±5.64 ACRES / ±7.31 ACRES = ±77.2%

Date	Description	No.
06/10/2021	PLANNING DEPARTMENT SUBMISSION	1

Revisions

STATE OF CONNECTICUT
TIMOTHY S. CROSS
No. 25760
LICENSED
PROFESSIONAL ENGINEER

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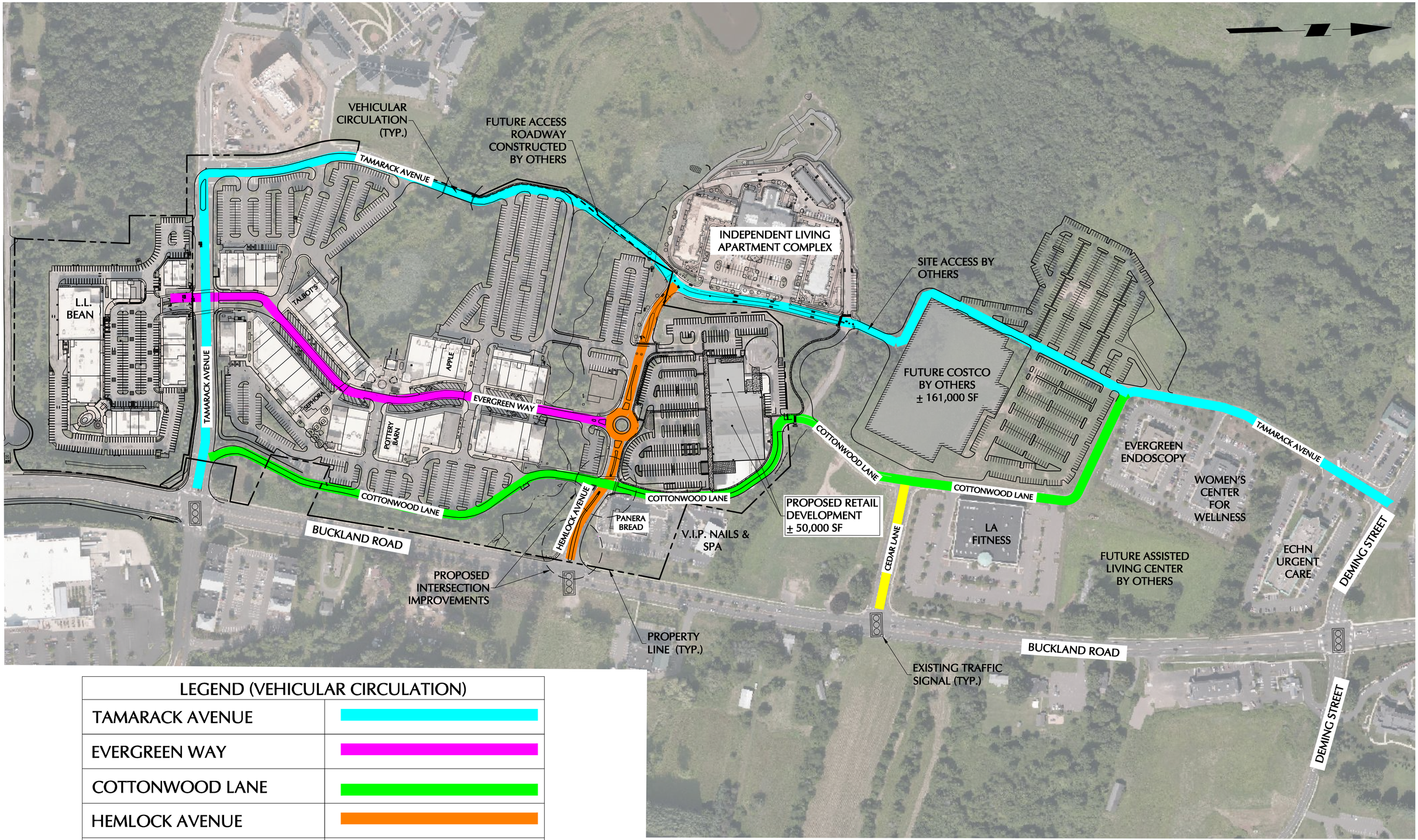
Project
DEVELOPMENT AT EVERGREEN WALK
MAP NO. 27, BLOCK No. 15, UNIT No. 2
801 EVERGREEN WAY
SOUTH WINDSOR
HARTFORD COUNTY CONNECTICUT

Drawing Title
SITE PLAN

Project No.	140222801
Date	04/06/2021
Drawn By	HES
Checked By	JEL

CS101

LANGAN
Project No. 140222801



LEGEND (VEHICULAR CIRCULATION)	
TAMARACK AVENUE	
EVERGREEN WAY	
COTTONWOOD LANE	
HEMLOCK AVENUE	
CEDAR LANE	

60 0 20 40 60
SCALE IN FEET

Date	Description	No.
REVISIONS		

CHARTER REALTY & DEVELOPMENT
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Greenwich, CT 06830

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Project
THE PROMENADE SHOPS AT EVERGREEN WALK
801 EVERGREEN WAY
SOUTH WINDSOR CONNECTICUT

Drawing Title
OVERALL VEHICULAR CIRCULATION

Project No.	Drawing No.
140222801	FIG. 200
Date: 05/14/2021	
Drawn By: IJAB	
Checked By: DTG	Sheet of

Filename: C:\bms\langan-pw-01\dms58671\FG01-140222801-0502-KT100-0207.dwg Date: 5/24/2021 Time: 11:32 User: cadams Style Table: Langan.stb Layout: FIG 200

LANGAN PROJECT NO. ####

Appendix B

Capacity Analysis – Background Traffic Conditions

Background Weekday P.M. Traffic Conditions

LANGAN

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	183	34	91	167	46	159
Future Volume (vph)	183	34	91	167	46	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	235		0	200
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.979					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2067	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2067	0	1770	1863	1770	1583
Link Speed (mph)	25			25	15	
Link Distance (ft)	697			488	504	
Travel Time (s)	19.0			13.3	22.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	199	37	99	182	50	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	236	0	99	182	50	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.1%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	183	34	91	167	46	159
Future Vol, veh/h	183	34	91	167	46	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	199	37	99	182	50	173

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	236	0	598	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1331	-	465	822
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1331	-	431	822
Mov Cap-2 Maneuver	-	-	-	-	431	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	640	-

Approach	EB	WB	NE
HCM Control Delay, s	0	2.8	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	431	822	-	-	1331	-
HCM Lane V/C Ratio	0.116	0.21	-	-	0.074	-
HCM Control Delay (s)	14.4	10.5	-	-	7.9	-
HCM Lane LOS	B	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.8	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	95	190	64	71	47	137	1195	61	46	923	52
Future Volume (vph)	37	95	190	64	71	47	137	1195	61	46	923	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	11	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.940			0.993			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1984	0	1719	3532	0	1752	3476	0
Flt Permitted	0.534			0.631			0.208			0.144		
Satd. Flow (perm)	985	1844	1567	1175	1984	0	376	3532	0	266	3476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207		25			5			6	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		488			688			818			1063	
Travel Time (s)		13.3			18.8			12.4			16.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	103	207	70	77	51	149	1299	66	50	1003	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	103	207	70	128	0	149	1365	0	50	1060	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			20			20	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	1.04	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%

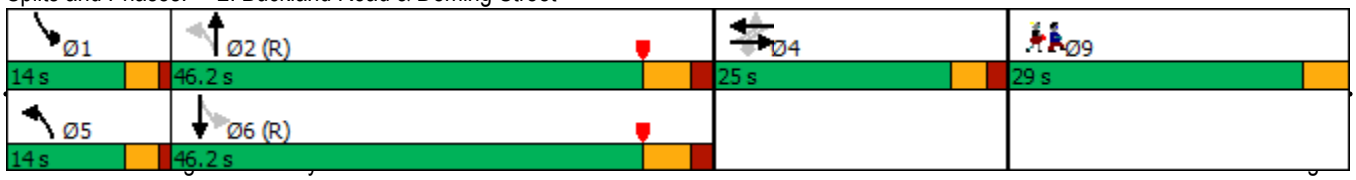
2: Buckland Road & Deming Street
Lanes, Volumes, Timings

Background PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	13.1	13.1	13.1	13.1	13.1		84.8	76.3		80.5	72.7	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.74	0.67		0.70	0.64	
v/c Ratio	0.36	0.49	0.57	0.52	0.51		0.41	0.58		0.19	0.48	
Control Delay	53.9	54.3	12.5	60.5	44.5		10.2	15.7		9.4	15.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	53.9	54.3	12.5	60.5	44.5		10.2	15.7		9.4	15.5	
LOS	D	D	B	E	D		B	B		A	B	
Approach Delay		29.5			50.2			15.2			15.2	
Approach LOS		C			D			B			B	
Stops (vph)	34	86	27	59	87		40	602		16	497	
Fuel Used(gal)	1	2	1	1	2		2	24		1	16	
CO Emissions (g/hr)	48	124	96	97	146		151	1686		42	1117	
NOx Emissions (g/hr)	9	24	19	19	28		29	328		8	217	
VOC Emissions (g/hr)	11	29	22	23	34		35	391		10	259	
Dilemma Vehicles (#)	0	0	0	0	0		0	53		0	42	
Queue Length 50th (ft)	28	73	0	50	72		17	214		5	156	
Queue Length 95th (ft)	60	121	65	92	126		98	#705		39	#471	
Internal Link Dist (ft)		408			608			738			983	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	172	322	445	205	368		402	2360		327	2215	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.32	0.47	0.34	0.35		0.37	0.58		0.15	0.48	

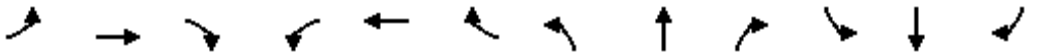
Intersection Summary			
Area Type:	Other		
Cycle Length: 114.2			
Actuated Cycle Length: 114.2			
Offset: 76 (67%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 61.2%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Buckland Road & Deming Street



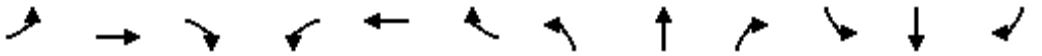
Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	6	191	105	13	42	208	1127	36	42	1101	161
Future Volume (vph)	135	6	191	105	13	42	208	1127	36	42	1101	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Grade (%)		1%			0%			0%			1%	
Storage Length (ft)	265		0	0		0	285		0	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.855			0.885			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1770	1649	0	1770	3522	0	1761	3522	1575
Flt Permitted	0.549			0.513			0.137			0.179		
Satd. Flow (perm)	1018	1585	0	956	1649	0	255	3522	0	332	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		208			46			2				117
Link Speed (mph)		15			30			45			45	
Link Distance (ft)		484			286			1056			728	
Travel Time (s)		22.0			6.5			16.0			11.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	147	7	208	114	14	46	226	1225	39	46	1197	175
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	215	0	114	60	0	226	1264	0	46	1197	175
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			35	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.5	12.0		9.5	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	10.0	20.0		10.0	20.0		19.1	42.0		19.1	42.0	42.0
Total Split (%)	7.9%	15.7%		7.9%	15.7%		15.0%	33.0%		15.0%	33.0%	33.0%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	36.0
Total Split (s)	36.0
Total Split (%)	28%



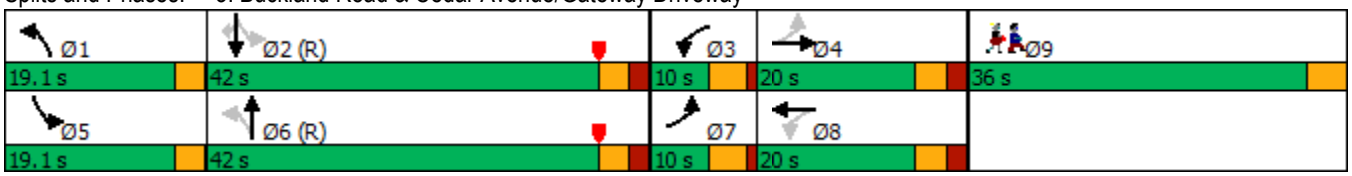
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.5	3.0		3.5	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0		4.5	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	16.1	9.2		13.7	9.2		92.6	83.5		80.0	72.4	72.4
Actuated g/C Ratio	0.13	0.07		0.11	0.07		0.73	0.66		0.63	0.57	0.57
v/c Ratio	0.84	0.70		0.83	0.37		0.62	0.55		0.17	0.60	0.18
Control Delay	88.8	20.8		92.2	27.3		19.2	17.1		11.9	22.9	8.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	88.8	20.8		92.2	27.3		19.2	17.1		11.9	22.9	8.5
LOS	F	C		F	C		B	B		B	C	A
Approach Delay		48.4			69.8			17.4			20.7	
Approach LOS		D			E			B			C	
Stops (vph)	134	30		111	20		73	556		17	611	34
Fuel Used(gal)	3	2		3	1		3	19		1	24	2
CO Emissions (g/hr)	231	131		197	38		220	1323		51	1662	162
NOx Emissions (g/hr)	45	26		38	7		43	257		10	323	32
VOC Emissions (g/hr)	54	30		46	9		51	307		12	385	38
Dilemma Vehicles (#)	0	0		0	0		0	44		0	40	0
Queue Length 50th (ft)	~125	6		88	11		34	210		6	271	17
Queue Length 95th (ft)	#200	82		138	53		#214	#720		44	#753	96
Internal Link Dist (ft)		404			206			976			648	
Turn Bay Length (ft)	265						285			75		235
Base Capacity (vph)	174	370		138	235		387	2315		414	2007	947
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.84	0.58		0.83	0.26		0.58	0.55		0.11	0.60	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 127.1			
Actuated Cycle Length: 127.1			
Offset: 48 (38%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 24.7		Intersection LOS: C	
Intersection Capacity Utilization 75.3%		ICU Level of Service D	
Analysis Period (min) 15			

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

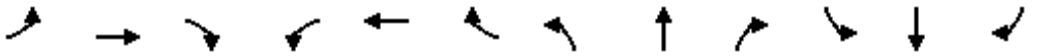
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Buckland Road & Cedar Avenue/Gateway Driveway



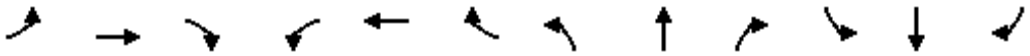
Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	8	253	78	9	49	219	1201	80	41	1342	190
Future Volume (vph)	214	8	253	78	9	49	219	1201	80	41	1342	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.855			0.874			0.991			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1711	1574	0	1770	3507	0	1711	3472	0
Flt Permitted	0.521			0.950			0.091			0.124		
Satd. Flow (perm)	966	1585	0	1711	1574	0	170	3507	0	223	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		275			53			6			14	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		327			307			1260			1056	
Travel Time (s)		8.9			8.4			19.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	233	9	275	85	10	53	238	1305	87	45	1459	207
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	284	0	85	63	0	238	1392	0	45	1666	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4						6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	24.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	

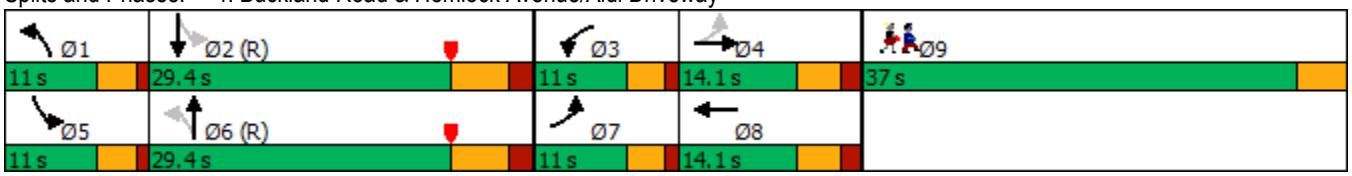
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	16.5	7.8		6.8	7.8		66.6	59.0		52.2	44.2	
Actuated g/C Ratio	0.16	0.08		0.07	0.08		0.65	0.58		0.51	0.43	
v/c Ratio	1.03	0.76		0.75	0.38		0.64	0.69		0.23	1.11	
Control Delay	109.3	20.4		84.8	22.5		30.5	21.7		15.6	86.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	109.3	20.4		84.8	22.5		30.5	21.7		15.6	86.6	
LOS	F	C		F	C		C	C		B	F	
Approach Delay		60.4			58.3			23.0			84.7	
Approach LOS		E			E			C			F	
Stops (vph)	177	38		69	19		90	639		21	1193	
Fuel Used(gal)	6	2		2	0		4	24		1	52	
CO Emissions (g/hr)	422	137		127	34		298	1683		47	3661	
NOx Emissions (g/hr)	82	27		25	7		58	328		9	712	
VOC Emissions (g/hr)	98	32		29	8		69	390		11	848	
Dilemma Vehicles (#)	0	0		0	0		0	55		0	63	
Queue Length 50th (ft)	~172	6		56	6		72	274		7	524	
Queue Length 95th (ft)	#257	#106		#136	47		#341	#862		44	#1065	
Internal Link Dist (ft)		247			227			1180			976	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	227	390		116	186		371	2022		218	1506	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.03	0.73		0.73	0.34		0.64	0.69		0.21	1.11	

Intersection Summary			
Area Type:	Other		
Cycle Length: 102.5			
Actuated Cycle Length: 102.5			
Offset: 22 (21%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 55.5		Intersection LOS: E	
Intersection Capacity Utilization 91.9%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Buckland Road & Hemlock Avenue/Aldi Driveway



Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	80	420	100	90	133	525	1234	80	145	1354	30
Future Volume (vph)	125	80	420	100	90	133	525	1234	80	145	1354	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	11	12	11	12
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	200		200	300		250	150		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.997	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Flt Permitted		0.970		0.950			0.950			0.950		
Satd. Flow (perm)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			447			145			62		1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		709			541			1056			1260	
Travel Time (s)		16.1			12.3			16.0			19.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	136	87	457	109	98	145	571	1341	87	158	1472	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	457	109	98	145	571	1341	87	158	1505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			20			25			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.04	1.04	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	4	4	5	3	3	1	5	2	3	1	6	
Permitted Phases			4			3			2			
Detector Phase	4	4	5	3	3	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	6.0	9.0	9.0	6.0	6.0	15.0	9.0	6.0	15.0	
Minimum Split (s)	13.0	13.0	10.5	13.0	13.0	10.5	10.5	20.0	13.0	10.5	20.0	
Total Split (s)	19.0	19.0	18.1	29.0	29.0	18.1	18.1	53.0	29.0	18.1	53.0	
Total Split (%)	12.2%	12.2%	11.6%	18.6%	18.6%	11.6%	11.6%	33.9%	18.6%	11.6%	33.9%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	24%

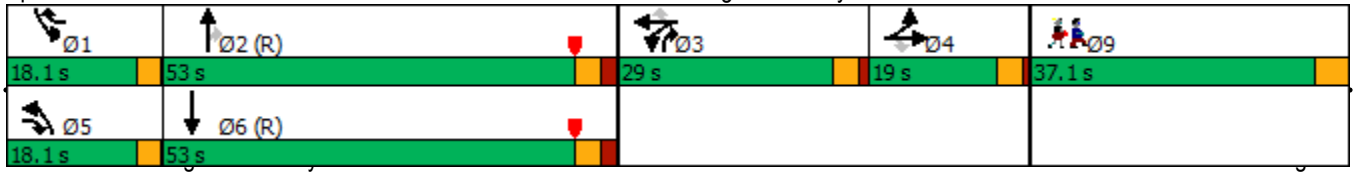
5: Buckland Road & Tamarack Avenue/Lowe's& Target Driveway
Lanes, Volumes, Timings

Background PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	0.1	1.0	1.0	0.1	0.1	2.0	1.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	3.1	4.0	4.0	3.1	3.1	5.0	4.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		14.6	60.8	14.1	14.1	33.7	42.9	85.3	104.4	18.7	61.1	
Actuated g/C Ratio		0.09	0.39	0.09	0.09	0.22	0.27	0.55	0.67	0.12	0.39	
v/c Ratio		0.70	0.52	0.68	0.58	0.32	0.61	0.72	0.08	0.75	1.13	
Control Delay		80.7	5.0	89.2	81.3	5.5	53.6	31.3	6.0	86.9	109.8	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		80.7	5.0	89.2	81.3	5.5	53.6	31.3	6.0	86.9	109.8	
LOS		F	A	F	F	A	D	C	A	F	F	
Approach Delay		29.8			52.5			36.5			107.6	
Approach LOS		C			D			D			F	
Stops (vph)		196	37	97	84	15	384	774	12	129	1179	
Fuel Used(gal)		6	3	3	2	1	14	26	1	5	57	
CO Emissions (g/hr)		390	207	194	163	55	986	1813	56	374	3980	
NOx Emissions (g/hr)		76	40	38	32	11	192	353	11	73	774	
VOC Emissions (g/hr)		90	48	45	38	13	228	420	13	87	922	
Dilemma Vehicles (#)		0	0	0	0	0	0	37	0	0	39	
Queue Length 50th (ft)		118	6	110	98	0	269	478	7	156	778	
Queue Length 95th (ft)		162	64	173	157	29	#544	#1047	47	#287	#1238	
Internal Link Dist (ft)		629			461			976			1180	
Turn Bay Length (ft)			250	200		200	300		250	150		
Base Capacity (vph)		348	883	284	299	457	942	1868	1146	212	1335	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.64	0.52	0.38	0.33	0.32	0.61	0.72	0.08	0.75	1.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 156.2			
Actuated Cycle Length: 156.2			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.13			
Intersection Signal Delay: 61.9		Intersection LOS: E	
Intersection Capacity Utilization 82.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Buckland Road & Tamarack Avenue/Lowe's& Target Driveway



Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.1
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Background Saturday Mid-Day Traffic Conditions

LANGAN

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	130	44	113	115	36	108
Future Volume (vph)	130	44	113	115	36	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	235		0	200
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.966					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2039	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2039	0	1770	1863	1770	1583
Link Speed (mph)	25			25	15	
Link Distance (ft)	697			488	504	
Travel Time (s)	19.0			13.3	22.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	141	48	123	125	39	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	123	125	39	117
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.1%		ICU Level of Service A	
Analysis Period (min) 15			

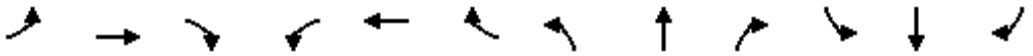
Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	130	44	113	115	36	108
Future Vol, veh/h	130	44	113	115	36	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	141	48	123	125	39	117

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	189	0	536	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1385	-	505	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	698	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1385	-	460	879
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	636	-

Approach	EB	WB	NE
HCM Control Delay, s	0	3.9	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	460	879	-	-	1385	-
HCM Lane V/C Ratio	0.085	0.134	-	-	0.089	-
HCM Control Delay (s)	13.6	9.7	-	-	7.9	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0.5	-	-	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	56	139	55	59	41	113	1044	74	49	1209	63
Future Volume (vph)	53	56	139	55	59	41	113	1044	74	49	1209	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	11	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.938			0.990			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1980	0	1719	3521	0	1752	3479	0
Flt Permitted	0.594			0.717			0.133			0.191		
Satd. Flow (perm)	1095	1844	1567	1336	1980	0	241	3521	0	352	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151		27			7			5	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		488			688			818			1063	
Travel Time (s)		13.3			18.8			12.4			16.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	58	61	151	60	64	45	123	1135	80	53	1314	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	61	151	60	109	0	123	1215	0	53	1382	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			20			20	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	1.04	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%

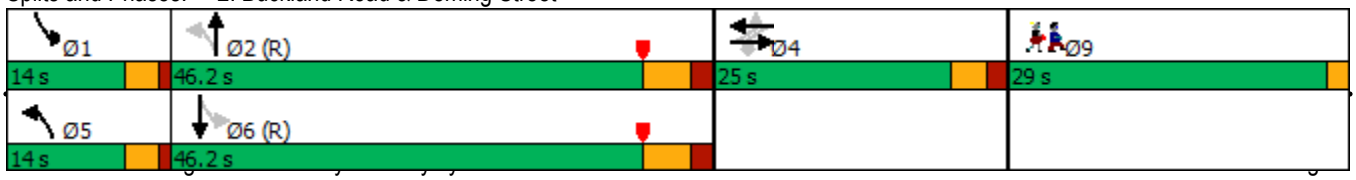
2: Buckland Road & Deming Street
Lanes, Volumes, Timings

Background SAT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	11.8	11.8	11.8	11.8	11.8		86.1	78.0		82.4	74.7	
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.75	0.68		0.72	0.65	
v/c Ratio	0.51	0.32	0.51	0.43	0.48		0.45	0.51		0.17	0.61	
Control Delay	63.5	50.8	13.4	56.9	42.3		11.3	13.3		7.8	16.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	63.5	50.8	13.4	56.9	42.3		11.3	13.3		7.8	16.5	
LOS	E	D	B	E	D		B	B		A	B	
Approach Delay		32.6			47.5			13.1			16.2	
Approach LOS		C			D			B			B	
Stops (vph)	50	50	20	50	68		31	547		16	624	
Fuel Used(gal)	1	1	1	1	2		2	21		1	21	
CO Emissions (g/hr)	77	70	72	80	119		124	1471		43	1454	
NOx Emissions (g/hr)	15	14	14	16	23		24	286		8	283	
VOC Emissions (g/hr)	18	16	17	19	28		29	341		10	337	
Dilemma Vehicles (#)	0	0	0	0	0		0	49		0	53	
Queue Length 50th (ft)	42	43	0	43	58		12	166		5	212	
Queue Length 95th (ft)	81	81	58	82	109		76	507		38	#733	
Internal Link Dist (ft)		408			608			738			983	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	191	322	398	233	369		321	2405		389	2277	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.19	0.38	0.26	0.30		0.38	0.51		0.14	0.61	

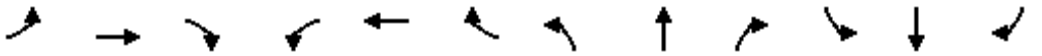
Intersection Summary			
Area Type:	Other		
Cycle Length: 114.2			
Actuated Cycle Length: 114.2			
Offset: 98 (86%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 65.0%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Buckland Road & Deming Street



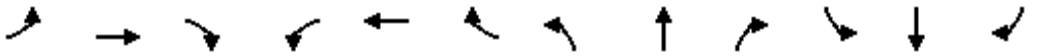
Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	9	261	107	8	34	234	993	55	65	1177	175
Future Volume (vph)	158	9	261	107	8	34	234	993	55	65	1177	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Grade (%)		1%			0%			0%			1%	
Storage Length (ft)	265		0	0		0	285		0	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.855			0.879			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1770	1637	0	1770	3511	0	1761	3522	1575
Flt Permitted	0.509			0.714			0.097			0.249		
Satd. Flow (perm)	943	1585	0	1330	1637	0	181	3511	0	462	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		284			37			6				139
Link Speed (mph)		15			30			45			45	
Link Distance (ft)		484			286			1056			728	
Travel Time (s)		22.0			6.5			16.0			11.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	172	10	284	116	9	37	254	1079	60	71	1279	190
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	294	0	116	46	0	254	1139	0	71	1279	190
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			35	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.0	12.0		9.0	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	9.0	12.0		9.0	12.0		13.0	53.0		9.0	49.0	49.0
Total Split (%)	7.5%	10.0%		7.5%	10.0%		10.8%	44.2%		7.5%	40.8%	40.8%

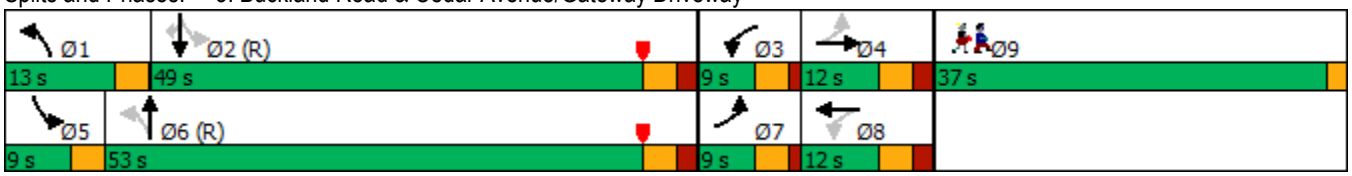
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	31%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	14.2	7.0		11.8	7.0		88.7	79.2		69.6	61.8	61.8
Actuated g/C Ratio	0.12	0.06		0.10	0.06		0.74	0.66		0.58	0.52	0.52
v/c Ratio	1.04	0.82		0.77	0.35		0.60	0.49		0.21	0.71	0.22
Control Delay	132.4	26.2		81.5	29.8		26.1	14.4		10.0	26.2	6.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	132.4	26.2		81.5	29.8		26.1	14.4		10.0	26.2	6.6
LOS	F	C		F	C		C	B		B	C	A
Approach Delay		65.4			66.8			16.5			23.0	
Approach LOS		E			E			B			C	
Stops (vph)	124	29		108	16		99	531		27	810	31
Fuel Used(gal)	5	3		3	0		4	17		1	28	2
CO Emissions (g/hr)	365	198		182	31		285	1178		78	1968	166
NOx Emissions (g/hr)	71	39		36	6		55	229		15	383	32
VOC Emissions (g/hr)	85	46		42	7		66	273		18	456	39
Dilemma Vehicles (#)	0	0		0	0		0	44		0	47	0
Queue Length 50th (ft)	~160	8		84	7		81	175		9	331	17
Queue Length 95th (ft)	#259	#138		#171	46		#305	494		52	#674	78
Internal Link Dist (ft)		404			206			976			648	
Turn Bay Length (ft)	265						285			75		235
Base Capacity (vph)	165	359		150	130		424	2320		340	1812	878
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.04	0.82		0.77	0.35		0.60	0.49		0.21	0.71	0.22

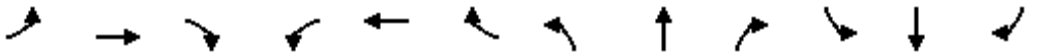
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 37 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 28.0		Intersection LOS: C	
Intersection Capacity Utilization 83.0%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Buckland Road & Cedar Avenue/Gateway Driveway



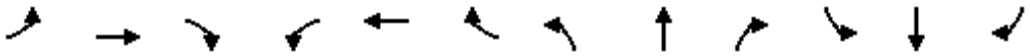
Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	9	342	86	9	55	290	1160	100	46	1283	235
Future Volume (vph)	202	9	342	86	9	55	290	1160	100	46	1283	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.854			0.871			0.988			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1583	0	1711	1568	0	1770	3497	0	1711	3458	0
Flt Permitted	0.517			0.950			0.110			0.169		
Satd. Flow (perm)	958	1583	0	1711	1568	0	205	3497	0	304	3458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		372			60			8			19	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		327			307			1260			1056	
Travel Time (s)		8.9			8.4			19.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	220	10	372	93	10	60	315	1261	109	50	1395	255
Shared Lane Traffic (%)												
Lane Group Flow (vph)	220	382	0	93	70	0	315	1370	0	50	1650	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4						6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	

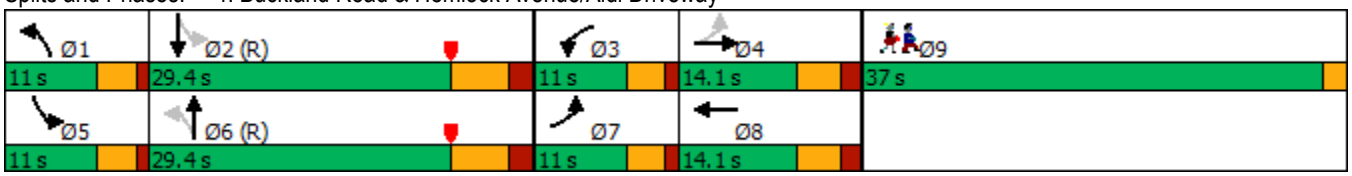
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	16.7	7.8		7.0	7.8		66.9	57.1		43.2	34.8	
Actuated g/C Ratio	0.16	0.08		0.07	0.08		0.65	0.56		0.42	0.34	
v/c Ratio	0.96	0.82		0.81	0.40		0.59	0.70		0.24	1.39	
Control Delay	93.5	21.4		92.0	22.0		26.9	22.6		15.8	209.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	93.5	21.4		92.0	22.0		26.9	22.6		15.8	209.3	
LOS	F	C		F	C		C	C		B	F	
Approach Delay		47.7			62.0			23.4			203.6	
Approach LOS		D			E			C			F	
Stops (vph)	170	40		75	21		124	663		27	1155	
Fuel Used(gal)	5	3		2	1		6	24		1	89	
CO Emissions (g/hr)	354	186		148	37		385	1703		56	6253	
NOx Emissions (g/hr)	69	36		29	7		75	331		11	1217	
VOC Emissions (g/hr)	82	43		34	9		89	395		13	1449	
Dilemma Vehicles (#)	0	0		0	0		0	54		0	54	
Queue Length 50th (ft)	~153	6		61	6		103	268		8	~646	
Queue Length 95th (ft)	#237	#138		#150	49		#429	#841		46	#1051	
Internal Link Dist (ft)		247			227			1180			976	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	228	478		116	192		537	1952		232	1187	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.96	0.80		0.80	0.36		0.59	0.70		0.22	1.39	

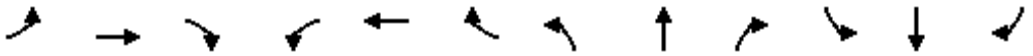
Intersection Summary			
Area Type:	Other		
Cycle Length: 102.5			
Actuated Cycle Length: 102.5			
Offset: 2 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 102.3		Intersection LOS: F	
Intersection Capacity Utilization 101.7%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Buckland Road & Hemlock Avenue/Aldi Driveway



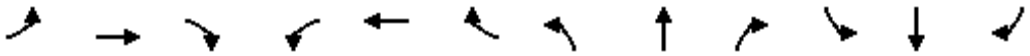
Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	90	515	145	100	42	630	1345	85	173	1342	75
Future Volume (vph)	120	90	515	145	100	42	630	1345	85	173	1342	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	11	12	11	12
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	200		200	300		250	150		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.992	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	3406	1567	1778	1872	1591	3433	3421	1531	1770	3394	0
Flt Permitted		0.972		0.950			0.950			0.950		
Satd. Flow (perm)	0	3406	1567	1778	1872	1591	3433	3421	1531	1770	3394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			477			49			59		3	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		709			541			1056			1260	
Travel Time (s)		16.1			12.3			16.0			19.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	130	98	560	158	109	46	685	1462	92	188	1459	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	560	158	109	46	685	1462	92	188	1541	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			20			25			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.04	1.04	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	4	4	5	3	3	1	5	2	3	1	6	
Permitted Phases			4			3			2			
Detector Phase	4	4	5	3	3	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	6.0	15.0	15.0	5.1	6.0	15.0	15.0	5.1	15.0	
Minimum Split (s)	13.0	13.0	12.1	20.0	20.0	9.1	12.1	20.0	20.0	9.1	20.0	
Total Split (s)	19.0	19.0	19.0	53.0	53.0	19.0	19.0	53.0	53.0	19.0	53.0	
Total Split (%)	10.5%	10.5%	10.5%	29.3%	29.3%	10.5%	10.5%	29.3%	29.3%	10.5%	29.3%	

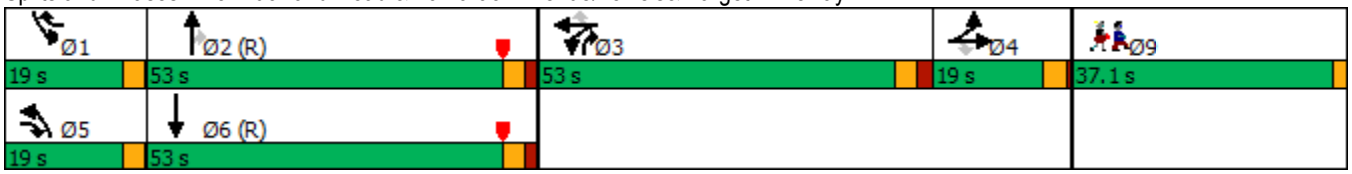
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	20%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	0.1	2.0	2.0	0.1	0.1	2.0	2.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	3.1	5.0	5.0	3.1	3.1	5.0	5.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	Min	None	C-Min	Min	Min	C-Min	
Act Effct Green (s)		16.8	78.1	21.0	21.0	54.3	57.9	87.8	113.7	31.5	61.3	
Actuated g/C Ratio		0.09	0.43	0.12	0.12	0.30	0.32	0.48	0.63	0.17	0.34	
v/c Ratio		0.72	0.59	0.77	0.50	0.09	0.62	0.88	0.09	0.61	1.34	
Control Delay		93.0	8.4	100.8	82.4	5.2	56.6	47.4	7.8	79.3	203.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		93.0	8.4	100.8	82.4	5.2	56.6	47.4	7.8	79.3	203.2	
LOS		F	A	F	F	A	E	D	A	E	F	
Approach Delay		32.8			80.3			48.6			189.8	
Approach LOS		C			F			D			F	
Stops (vph)		202	80	139	92	6	487	963	16	159	1088	
Fuel Used(gal)		6	4	4	3	0	18	34	1	6	84	
CO Emissions (g/hr)		437	291	304	182	18	1233	2390	64	432	5858	
NOx Emissions (g/hr)		85	57	59	35	3	240	465	12	84	1140	
VOC Emissions (g/hr)		101	67	71	42	4	286	554	15	100	1358	
Dilemma Vehicles (#)		0	0	0	0	0	0	33	0	0	29	
Queue Length 50th (ft)		141	60	186	124	0	365	727	12	213	~1135	
Queue Length 95th (ft)		188	150	263	187	15	#617	#1431	60	305	#1556	
Internal Link Dist (ft)		629			461			976			1180	
Turn Bay Length (ft)			250	200		200	300		250	150		
Base Capacity (vph)		325	947	471	496	511	1098	1657	1203	307	1150	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.70	0.59	0.34	0.22	0.09	0.62	0.88	0.08	0.61	1.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 181.1			
Actuated Cycle Length: 181.1			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.34			
Intersection Signal Delay: 96.3		Intersection LOS: F	
Intersection Capacity Utilization 95.5%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Buckland Road & Tamarack Avenue/Lowe's& Target Driveway



Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.1
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Appendix C

Capacity Analysis – Build Traffic Conditions

Build Weekday P.M. Traffic Conditions

LANGAN

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	183	41	91	167	51	159
Future Volume (vph)	183	41	91	167	51	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	235		0	200
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.975					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2058	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2058	0	1770	1863	1770	1583
Link Speed (mph)	25			25	15	
Link Distance (ft)	697			488	504	
Travel Time (s)	19.0			13.3	22.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	199	45	99	182	55	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	244	0	99	182	55	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.5%		ICU Level of Service A	
Analysis Period (min) 15			

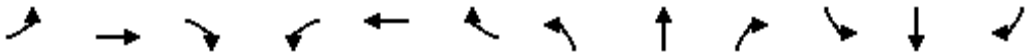
Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	183	41	91	167	51	159
Future Vol, veh/h	183	41	91	167	51	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	199	45	99	182	55	173

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	244	0	602	222
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1322	-	463	818
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1322	-	428	818
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	691	-

Approach	EB	WB	NE
HCM Control Delay, s	0	2.8	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	428	818	-	-	1322	-
HCM Lane V/C Ratio	0.13	0.211	-	-	0.075	-
HCM Control Delay (s)	14.7	10.6	-	-	7.9	-
HCM Lane LOS	B	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.8	-	-	0.2	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	95	190	64	71	47	137	1206	61	46	936	52
Future Volume (vph)	37	95	190	64	71	47	137	1206	61	46	936	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	11	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.940			0.993			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1984	0	1719	3532	0	1752	3476	0
Flt Permitted	0.534			0.631			0.204			0.142		
Satd. Flow (perm)	985	1844	1567	1175	1984	0	369	3532	0	262	3476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207		25			5			5	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		488			688			818			1063	
Travel Time (s)		13.3			18.8			12.4			16.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	103	207	70	77	51	149	1311	66	50	1017	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	103	207	70	128	0	149	1377	0	50	1074	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			20			20	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	1.04	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%

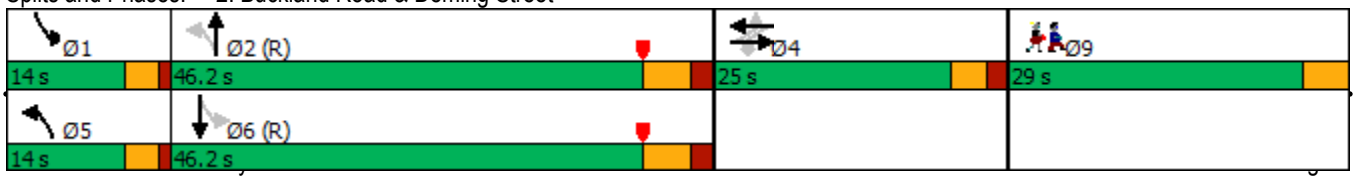
2: Buckland Road & Deming Street
Lanes, Volumes, Timings

Build PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	13.1	13.1	13.1	13.1	13.1		84.8	76.3		80.5	72.7	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.74	0.67		0.70	0.64	
v/c Ratio	0.36	0.49	0.57	0.52	0.51		0.41	0.58		0.19	0.48	
Control Delay	53.9	54.3	12.5	60.5	44.5		10.3	15.8		9.4	15.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	53.9	54.3	12.5	60.5	44.5		10.3	15.8		9.4	15.6	
LOS	D	D	B	E	D		B	B		A	B	
Approach Delay		29.5			50.2			15.3			15.3	
Approach LOS		C			D			B			B	
Stops (vph)	34	86	27	59	87		40	607		16	502	
Fuel Used(gal)	1	2	1	1	2		2	24		1	16	
CO Emissions (g/hr)	48	124	96	97	146		151	1702		42	1132	
NOx Emissions (g/hr)	9	24	19	19	28		29	331		8	220	
VOC Emissions (g/hr)	11	29	22	23	34		35	394		10	262	
Dilemma Vehicles (#)	0	0	0	0	0		0	53		0	43	
Queue Length 50th (ft)	28	73	0	50	72		17	217		5	159	
Queue Length 95th (ft)	60	121	65	92	126		98	#716		39	#490	
Internal Link Dist (ft)		408			608			738			983	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	172	322	445	205	368		398	2360		325	2215	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.32	0.47	0.34	0.35		0.37	0.58		0.15	0.48	

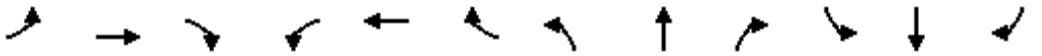
Intersection Summary			
Area Type:	Other		
Cycle Length: 114.2			
Actuated Cycle Length: 114.2			
Offset: 76 (67%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 61.5%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Buckland Road & Deming Street



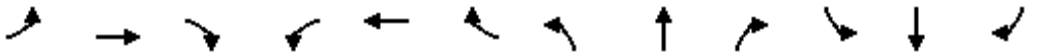
Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	6	194	105	13	42	211	1132	36	42	1108	167
Future Volume (vph)	141	6	194	105	13	42	211	1132	36	42	1108	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Grade (%)		1%			0%			0%			1%	
Storage Length (ft)	265		0	0		0	285		0	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.855			0.885			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1770	1649	0	1770	3522	0	1761	3522	1575
Flt Permitted	0.549			0.513			0.134			0.178		
Satd. Flow (perm)	1018	1585	0	956	1649	0	250	3522	0	330	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		211			46			2				119
Link Speed (mph)		15			30			45			45	
Link Distance (ft)		484			286			1056			728	
Travel Time (s)		22.0			6.5			16.0			11.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	153	7	211	114	14	46	229	1230	39	46	1204	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	218	0	114	60	0	229	1269	0	46	1204	182
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			35	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.5	12.0		9.5	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	10.0	20.0		10.0	20.0		19.1	42.0		19.1	42.0	42.0
Total Split (%)	7.9%	15.7%		7.9%	15.7%		15.0%	33.0%		15.0%	33.0%	33.0%

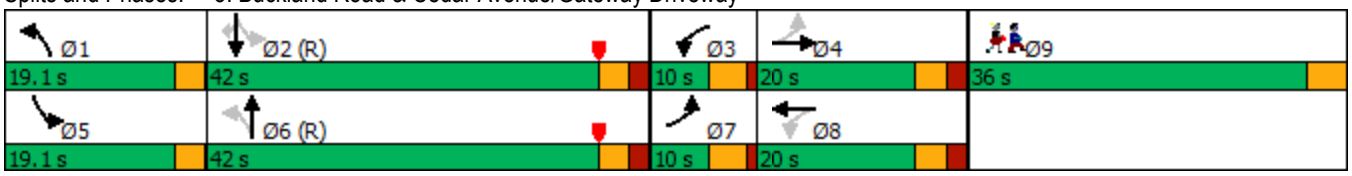
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	36.0
Total Split (s)	36.0
Total Split (%)	28%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.5	3.0		3.5	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0		4.5	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	16.1	9.2		13.7	9.2		92.6	83.5		79.8	72.3	72.3
Actuated g/C Ratio	0.13	0.07		0.11	0.07		0.73	0.66		0.63	0.57	0.57
v/c Ratio	0.88	0.71		0.83	0.37		0.63	0.55		0.17	0.60	0.19
Control Delay	94.5	20.8		92.2	27.3		20.0	17.1		12.0	23.0	8.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	94.5	20.8		92.2	27.3		20.0	17.1		12.0	23.0	8.7
LOS	F	C		F	C		B	B		B	C	A
Approach Delay		51.2			69.8			17.5			20.8	
Approach LOS		D			E			B			C	
Stops (vph)	137	30		111	20		75	558		17	619	38
Fuel Used(gal)	4	2		3	1		3	19		1	24	2
CO Emissions (g/hr)	252	133		197	38		226	1328		51	1678	171
NOx Emissions (g/hr)	49	26		38	7		44	258		10	327	33
VOC Emissions (g/hr)	58	31		46	9		52	308		12	389	40
Dilemma Vehicles (#)	0	0		0	0		0	44		0	40	0
Queue Length 50th (ft)	~136	6		88	11		35	211		6	275	19
Queue Length 95th (ft)	#213	82		138	53		#222	#724		44	#760	101
Internal Link Dist (ft)		404			206			976			648	
Turn Bay Length (ft)	265						285			75		235
Base Capacity (vph)	174	373		138	235		385	2315		412	2002	946
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.88	0.58		0.83	0.26		0.59	0.55		0.11	0.60	0.19

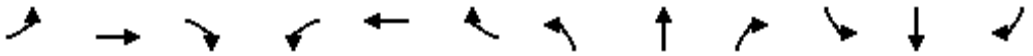
Intersection Summary			
Area Type:	Other		
Cycle Length: 127.1			
Actuated Cycle Length: 127.1			
Offset: 48 (38%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 25.1		Intersection LOS: C	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Buckland Road & Cedar Avenue/Gateway Driveway



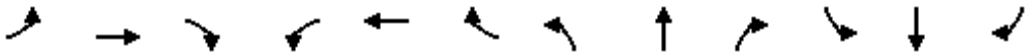
Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	8	287	78	9	49	263	1204	80	41	1345	197
Future Volume (vph)	219	8	287	78	9	49	263	1204	80	41	1345	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.854			0.874			0.991			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1583	0	1711	1574	0	1770	3507	0	1711	3472	0
Flt Permitted	0.521			0.950			0.104			0.144		
Satd. Flow (perm)	966	1583	0	1711	1574	0	194	3507	0	259	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		312			53			6			15	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		327			307			1260			1056	
Travel Time (s)		8.9			8.4			19.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	238	9	312	85	10	53	286	1309	87	45	1462	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	321	0	85	63	0	286	1396	0	45	1676	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4						6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	24.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%



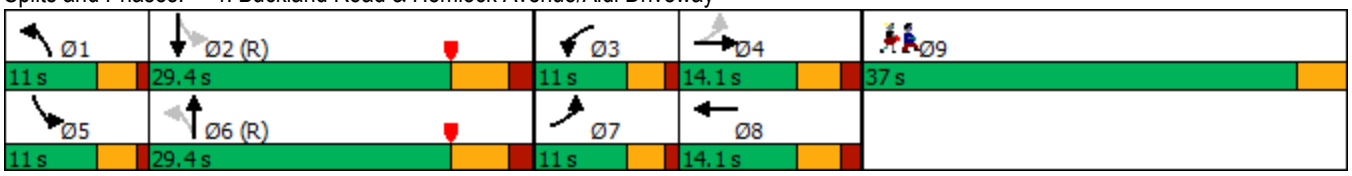
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	16.5	7.8		6.8	7.8		66.6	59.0		46.4	38.5	
Actuated g/C Ratio	0.16	0.08		0.07	0.08		0.65	0.58		0.45	0.38	
v/c Ratio	1.05	0.79		0.75	0.38		0.61	0.69		0.23	1.28	
Control Delay	114.9	20.8		84.8	22.5		28.1	21.7		16.0	159.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	114.9	20.8		84.8	22.5		28.1	21.7		16.0	159.6	
LOS	F	C		F	C		C	C		B	F	
Approach Delay		60.8			58.3			22.8			155.9	
Approach LOS		E			E			C			F	
Stops (vph)	180	39		69	19		108	641		23	1232	
Fuel Used(gal)	6	2		2	0		5	24		1	76	
CO Emissions (g/hr)	449	155		127	34		349	1689		49	5312	
NOx Emissions (g/hr)	87	30		25	7		68	329		10	1034	
VOC Emissions (g/hr)	104	36		29	8		81	391		11	1231	
Dilemma Vehicles (#)	0	0		0	0		0	55		0	59	
Queue Length 50th (ft)	~180	6		56	6		91	275		7	~631	
Queue Length 95th (ft)	#263	#119		#136	47		#412	#865		44	#1072	
Internal Link Dist (ft)		247			227			1180			976	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	227	423		116	186		472	2022		220	1312	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.05	0.76		0.73	0.34		0.61	0.69		0.20	1.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 102.5			
Actuated Cycle Length: 102.5			
Offset: 22 (21%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.28			
Intersection Signal Delay: 85.0		Intersection LOS: F	
Intersection Capacity Utilization 96.8%		ICU Level of Service F	
Analysis Period (min) 15			

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

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

Splits and Phases: 4: Buckland Road & Hemlock Avenue/Aldi Driveway



Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

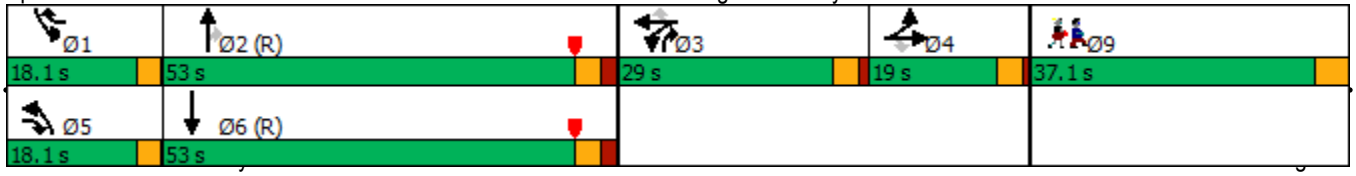
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	80	420	100	90	133	525	1281	80	145	1391	30
Future Volume (vph)	125	80	420	100	90	133	525	1281	80	145	1391	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	11	12	11	12
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	200		200	300		250	150		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.997	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Flt Permitted		0.970		0.950			0.950			0.950		
Satd. Flow (perm)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			447			145			60		1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		709			541			1056			1260	
Travel Time (s)		16.1			12.3			16.0			19.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	136	87	457	109	98	145	571	1392	87	158	1512	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	457	109	98	145	571	1392	87	158	1545	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			20			25			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.04	1.04	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	4	4	5	3	3	1	5	2	3	1	6	
Permitted Phases			4			3			2			
Detector Phase	4	4	5	3	3	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	6.0	9.0	9.0	6.0	6.0	15.0	9.0	6.0	15.0	
Minimum Split (s)	13.0	13.0	10.5	13.0	13.0	10.5	10.5	20.0	13.0	10.5	20.0	
Total Split (s)	19.0	19.0	18.1	29.0	29.0	18.1	18.1	53.0	29.0	18.1	53.0	
Total Split (%)	12.2%	12.2%	11.6%	18.6%	18.6%	11.6%	11.6%	33.9%	18.6%	11.6%	33.9%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	24%

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	0.1	1.0	1.0	0.1	0.1	2.0	1.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	3.1	4.0	4.0	3.1	3.1	5.0	4.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		14.6	60.8	14.1	14.1	33.7	42.9	85.3	104.4	18.7	61.1	
Actuated g/C Ratio		0.09	0.39	0.09	0.09	0.22	0.27	0.55	0.67	0.12	0.39	
v/c Ratio		0.70	0.52	0.68	0.58	0.32	0.61	0.75	0.08	0.75	1.16	
Control Delay		80.7	5.0	89.2	81.3	5.5	53.6	32.0	6.2	86.9	121.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		80.7	5.0	89.2	81.3	5.5	53.6	32.0	6.2	86.9	121.2	
LOS		F	A	F	F	A	D	C	A	F	F	
Approach Delay		29.8			52.5			36.9			118.0	
Approach LOS		C			D			D			F	
Stops (vph)		196	37	97	84	15	384	811	13	129	1208	
Fuel Used(gal)		6	3	3	2	1	14	27	1	5	62	
CO Emissions (g/hr)		390	207	194	163	55	986	1902	57	374	4314	
NOx Emissions (g/hr)		76	40	38	32	11	192	370	11	73	839	
VOC Emissions (g/hr)		90	48	45	38	13	228	441	13	87	1000	
Dilemma Vehicles (#)		0	0	0	0	0	0	38	0	0	39	
Queue Length 50th (ft)		118	6	110	98	0	269	509	8	156	816	
Queue Length 95th (ft)		162	64	173	157	29	#544	#1104	49	#287	#1283	
Internal Link Dist (ft)		629			461			976			1180	
Turn Bay Length (ft)			250	200		200	300		250	150		
Base Capacity (vph)		348	883	284	299	457	942	1868	1145	212	1335	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.64	0.52	0.38	0.33	0.32	0.61	0.75	0.08	0.75	1.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 156.2			
Actuated Cycle Length: 156.2			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.16			
Intersection Signal Delay: 65.9		Intersection LOS: E	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Buckland Road & Tamarack Avenue/Lowe's& Target Driveway



Lane Group	Ø9
Yellow Time (s)	4.0
All-Red Time (s)	0.1
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Build Saturday Mid-Day Traffic Conditions

LANGAN

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	130	52	113	115	44	108
Future Volume (vph)	130	52	113	115	44	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	235		0	200
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.961					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2029	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2029	0	1770	1863	1770	1583
Link Speed (mph)	25			25	15	
Link Distance (ft)	697			488	504	
Travel Time (s)	19.0			13.3	22.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	141	57	123	125	48	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	198	0	123	125	48	117
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	130	52	113	115	44	108
Future Vol, veh/h	130	52	113	115	44	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	141	57	123	125	48	117

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	198	0	541	170
Stage 1	-	-	-	-	170	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1375	-	502	874
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	698	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1375	-	457	874
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	698	-

Approach	EB	WB	NE
HCM Control Delay, s	0	3.9	11
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	457	874	-	-	1375	-
HCM Lane V/C Ratio	0.105	0.134	-	-	0.089	-
HCM Control Delay (s)	13.8	9.8	-	-	7.9	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0.5	-	-	0.3	-

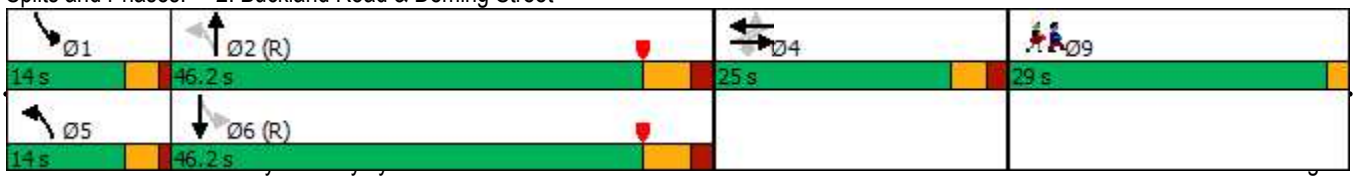
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	58	139	55	59	41	113	1060	74	49	1224	63
Future Volume (vph)	53	58	139	55	59	41	113	1060	74	49	1224	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	11	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850		0.938			0.990			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1980	0	1719	3521	0	1752	3479	0
Flt Permitted	0.594			0.716			0.129			0.187		
Satd. Flow (perm)	1095	1844	1567	1334	1980	0	233	3521	0	345	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151		27			7			5	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		488			688			818			1063	
Travel Time (s)		13.3			18.8			12.4			16.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	58	63	151	60	64	45	123	1152	80	53	1330	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	63	151	60	109	0	123	1232	0	53	1398	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			20			20	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	1.04	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	11.8	11.8	11.8	11.8	11.8		86.1	78.0		82.4	74.7	
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.10		0.75	0.68		0.72	0.65	
v/c Ratio	0.51	0.33	0.51	0.43	0.48		0.46	0.51		0.17	0.61	
Control Delay	63.5	51.1	13.4	56.9	42.3		11.6	13.4		7.8	16.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	63.5	51.1	13.4	56.9	42.3		11.6	13.4		7.8	16.6	
LOS	E	D	B	E	D		B	B		A	B	
Approach Delay		32.8			47.5			13.2			16.3	
Approach LOS		C			D			B			B	
Stops (vph)	50	52	20	50	68		31	552		16	631	
Fuel Used(gal)	1	1	1	1	2		2	21		1	21	
CO Emissions (g/hr)	77	73	72	80	119		125	1491		43	1472	
NOx Emissions (g/hr)	15	14	14	16	23		24	290		8	286	
VOC Emissions (g/hr)	18	17	17	19	28		29	345		10	341	
Dilemma Vehicles (#)	0	0	0	0	0		0	49		0	53	
Queue Length 50th (ft)	42	44	0	43	58		12	170		5	216	
Queue Length 95th (ft)	81	82	58	82	109		76	517		38	#746	
Internal Link Dist (ft)		408			608			738			983	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	191	322	398	233	369		315	2405		384	2277	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.20	0.38	0.26	0.30		0.39	0.51		0.14	0.61	

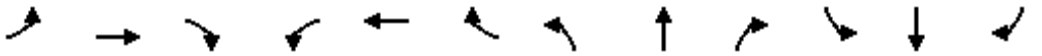
Intersection Summary			
Area Type:	Other		
Cycle Length: 114.2			
Actuated Cycle Length: 114.2			
Offset: 98 (86%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 65.4%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Buckland Road & Deming Street



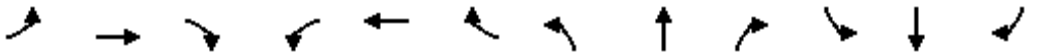
Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	9	265	107	8	34	238	1001	55	65	1185	182
Future Volume (vph)	166	9	265	107	8	34	238	1001	55	65	1185	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Grade (%)		1%			0%			0%			1%	
Storage Length (ft)	265		0	0		0	285		0	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.855			0.879			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1770	1637	0	1770	3511	0	1761	3522	1575
Flt Permitted	0.509			0.714			0.094			0.247		
Satd. Flow (perm)	943	1585	0	1330	1637	0	175	3511	0	458	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		288			37			6				144
Link Speed (mph)		15			30			45			45	
Link Distance (ft)		484			286			1056			728	
Travel Time (s)		22.0			6.5			16.0			11.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	180	10	288	116	9	37	259	1088	60	71	1288	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	298	0	116	46	0	259	1148	0	71	1288	198
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			35	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.0	12.0		9.0	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	9.0	12.0		9.0	12.0		13.0	53.0		9.0	49.0	49.0
Total Split (%)	7.5%	10.0%		7.5%	10.0%		10.8%	44.2%		7.5%	40.8%	40.8%

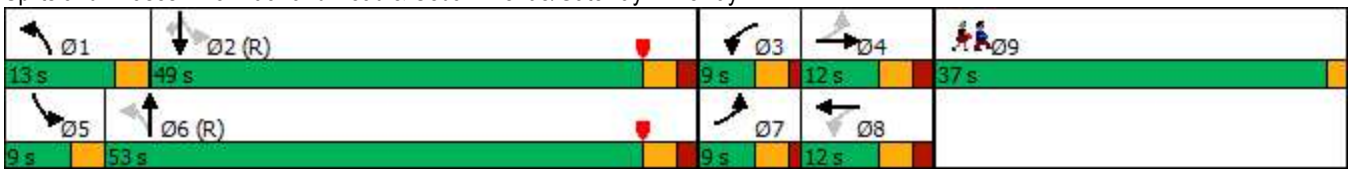
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	31%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	13.8	7.0		11.4	7.0		89.1	79.7		69.4	61.5	61.5
Actuated g/C Ratio	0.12	0.06		0.10	0.06		0.74	0.66		0.58	0.51	0.51
v/c Ratio	1.13	0.82		0.81	0.35		0.60	0.49		0.22	0.71	0.23
Control Delay	158.9	26.2		87.0	29.8		27.2	14.3		10.1	26.5	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	158.9	26.2		87.0	29.8		27.2	14.3		10.1	26.5	6.7
LOS	F	C		F	C		C	B		B	C	A
Approach Delay		76.2			70.7			16.7			23.2	
Approach LOS		E			E			B			C	
Stops (vph)	128	30		109	16		104	533		27	819	33
Fuel Used(gal)	6	3		3	0		4	17		1	28	2
CO Emissions (g/hr)	446	201		191	31		297	1185		78	1990	174
NOx Emissions (g/hr)	87	39		37	6		58	230		15	387	34
VOC Emissions (g/hr)	103	47		44	7		69	275		18	461	40
Dilemma Vehicles (#)	0	0		0	0		0	44		0	47	0
Queue Length 50th (ft)	~173	7		84	7		88	177		9	340	18
Queue Length 95th (ft)	#275	#141		#171	46		#319	500		52	#682	82
Internal Link Dist (ft)		404			206			976			648	
Turn Bay Length (ft)	265						285			75		235
Base Capacity (vph)	159	363		144	130		429	2332		337	1805	877
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.13	0.82		0.81	0.35		0.60	0.49		0.21	0.71	0.23

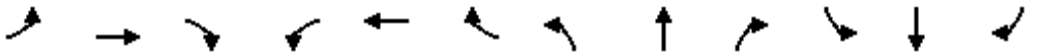
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 37 (31%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 135			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.13			
Intersection Signal Delay: 29.8		Intersection LOS: C	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Buckland Road & Cedar Avenue/Gateway Driveway



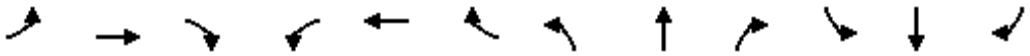
Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	9	393	86	9	55	340	1164	100	46	1287	243
Future Volume (vph)	210	9	393	86	9	55	340	1164	100	46	1287	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.853			0.871			0.988			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1581	0	1711	1568	0	1770	3497	0	1711	3454	0
Flt Permitted	0.517			0.950			0.121			0.186		
Satd. Flow (perm)	958	1581	0	1711	1568	0	225	3497	0	335	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		427			60			8			20	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		327			307			1260			1056	
Travel Time (s)		8.9			8.4			19.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	228	10	427	93	10	60	370	1265	109	50	1399	264
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	437	0	93	70	0	370	1374	0	50	1663	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4						6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%



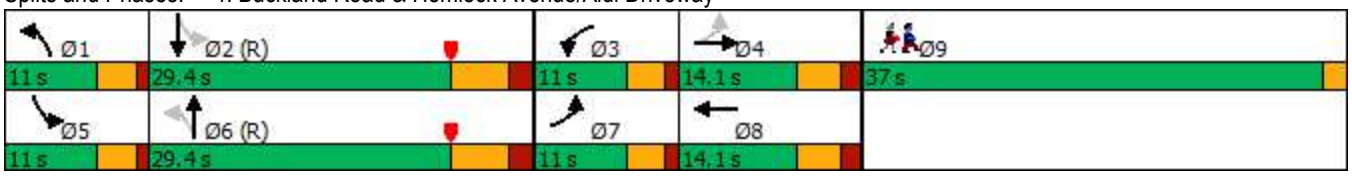
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	16.7	7.8		7.0	7.8		66.9	57.1		40.0	31.6	
Actuated g/C Ratio	0.16	0.08		0.07	0.08		0.65	0.56		0.39	0.31	
v/c Ratio	1.00	0.85		0.81	0.40		0.62	0.70		0.24	1.54	
Control Delay	102.2	21.8		92.0	22.0		27.3	22.7		16.5	275.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	102.2	21.8		92.0	22.0		27.3	22.7		16.5	275.9	
LOS	F	C		F	C		C	C		B	F	
Approach Delay		49.4			62.0			23.7			268.3	
Approach LOS		D			E			C			F	
Stops (vph)	174	41		75	21		149	664		27	1108	
Fuel Used(gal)	6	3		2	1		7	24		1	110	
CO Emissions (g/hr)	393	214		148	37		456	1708		56	7703	
NOx Emissions (g/hr)	76	42		29	7		89	332		11	1499	
VOC Emissions (g/hr)	91	50		34	9		106	396		13	1785	
Dilemma Vehicles (#)	0	0		0	0		0	54		0	49	
Queue Length 50th (ft)	~165	6		61	6		127	270		8	~715	
Queue Length 95th (ft)	#250	#152		#150	49		#510	#844		46	#1061	
Internal Link Dist (ft)		247			227			1180			976	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	228	528		116	192		593	1952		233	1079	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.00	0.83		0.80	0.36		0.62	0.70		0.21	1.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 102.5			
Actuated Cycle Length: 102.5			
Offset: 2 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.54			
Intersection Signal Delay: 126.9		Intersection LOS: F	
Intersection Capacity Utilization 108.0%		ICU Level of Service G	
Analysis Period (min) 15			

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

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

Splits and Phases: 4: Buckland Road & Hemlock Avenue/Aldi Driveway

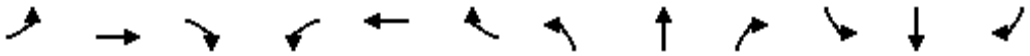


Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	90	515	145	100	42	630	1399	85	173	1397	75
Future Volume (vph)	120	90	515	145	100	42	630	1399	85	173	1397	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	11	12	11	12
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	200		200	300		250	150		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.992	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	3406	1567	1778	1872	1591	3433	3421	1531	1770	3394	0
Flt Permitted		0.972		0.950			0.950			0.950		
Satd. Flow (perm)	0	3406	1567	1778	1872	1591	3433	3421	1531	1770	3394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			477			49			57		3	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		709			541			1056			1260	
Travel Time (s)		16.1			12.3			16.0			19.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	130	98	560	158	109	46	685	1521	92	188	1518	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	560	158	109	46	685	1521	92	188	1600	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			20			25			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.04	1.04	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	4	4	5	3	3	1	5	2	3	1	6	
Permitted Phases			4			3			2			
Detector Phase	4	4	5	3	3	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	6.0	15.0	15.0	5.1	6.0	15.0	15.0	5.1	15.0	
Minimum Split (s)	13.0	13.0	12.1	20.0	20.0	9.1	12.1	20.0	20.0	9.1	20.0	
Total Split (s)	19.0	19.0	19.0	53.0	53.0	19.0	19.0	53.0	53.0	19.0	53.0	
Total Split (%)	10.5%	10.5%	10.5%	29.3%	29.3%	10.5%	10.5%	29.3%	29.3%	10.5%	29.3%	

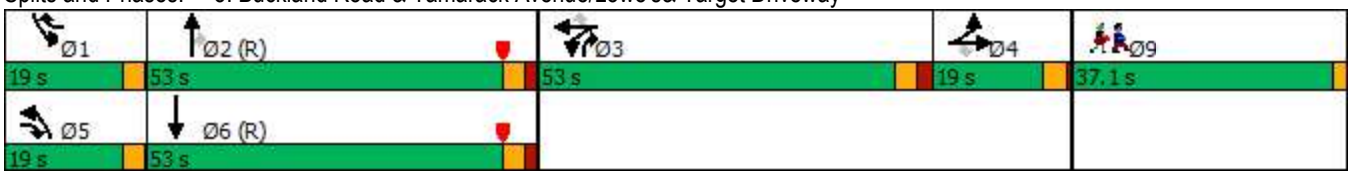
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	20%



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	0.1	2.0	2.0	0.1	0.1	2.0	2.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	3.1	5.0	5.0	3.1	3.1	5.0	5.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	Min	None	C-Min	Min	Min	C-Min	
Act Effct Green (s)		16.8	78.1	21.0	21.0	54.3	57.9	87.8	113.7	31.5	61.3	
Actuated g/C Ratio		0.09	0.43	0.12	0.12	0.30	0.32	0.48	0.63	0.17	0.34	
v/c Ratio		0.72	0.59	0.77	0.50	0.09	0.62	0.92	0.09	0.61	1.39	
Control Delay		93.0	8.4	100.8	82.4	5.2	56.6	50.6	8.1	79.3	224.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		93.0	8.4	100.8	82.4	5.2	56.6	50.6	8.1	79.3	224.2	
LOS		F	A	F	F	A	E	D	A	E	F	
Approach Delay		32.8			80.3			50.7			208.9	
Approach LOS		C			F			D			F	
Stops (vph)		202	80	139	92	6	487	1024	16	159	1098	
Fuel Used(gal)		6	4	4	3	0	18	37	1	6	93	
CO Emissions (g/hr)		437	291	304	182	18	1233	2568	64	432	6492	
NOx Emissions (g/hr)		85	57	59	35	3	240	500	13	84	1263	
VOC Emissions (g/hr)		101	67	71	42	4	286	595	15	100	1505	
Dilemma Vehicles (#)		0	0	0	0	0	0	35	0	0	29	
Queue Length 50th (ft)		141	60	186	124	0	365	780	13	213	~1213	
Queue Length 95th (ft)		188	150	263	187	15	#617	#1506	61	305	#1632	
Internal Link Dist (ft)		629			461			976			1180	
Turn Bay Length (ft)			250	200		200	300		250	150		
Base Capacity (vph)		325	947	471	496	511	1098	1657	1202	307	1150	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.70	0.59	0.34	0.22	0.09	0.62	0.92	0.08	0.61	1.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 181.1			
Actuated Cycle Length: 181.1			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 104.3		Intersection LOS: F	
Intersection Capacity Utilization 97.1%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Buckland Road & Tamarack Avenue/Lowe's& Target Driveway



Lane Group	Ø9
Yellow Time (s)	2.0
All-Red Time (s)	0.1
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Stops (vph)	
Fuel Used(gal)	
CO Emissions (g/hr)	
NOx Emissions (g/hr)	
VOC Emissions (g/hr)	
Dilemma Vehicles (#)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

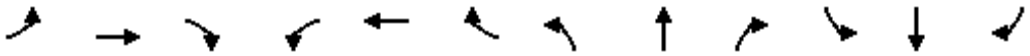
Intersection Summary

Appendix D

Capacity Analysis – Background and Build Traffic Conditions Internal Intersections

Background Weekday P.M. Traffic Conditions Internal Intersections

LANGAN



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	162	1	12	138	65	22	7	11	71	2	10
Future Volume (vph)	10	162	1	12	138	65	22	7	11	71	2	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.952			0.963			0.984	
Flt Protected	0.950			0.950				0.973			0.959	
Satd. Flow (prot)	1805	1898	0	1805	1809	0	0	1780	0	0	1789	0
Flt Permitted	0.950			0.950				0.973			0.959	
Satd. Flow (perm)	1805	1898	0	1805	1809	0	0	1780	0	0	1789	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		208			321			225			241	
Travel Time (s)		4.7			7.3			5.1			5.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	11	180	1	13	153	72	24	8	12	79	2	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	181	0	13	225	0	0	44	0	0	92	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.8%		ICU Level of Service A	
Analysis Period (min) 15			

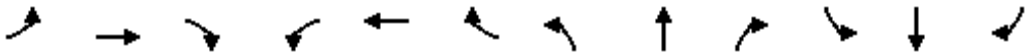
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	162	1	12	138	65	22	7	11	71	2	10
Future Vol, veh/h	10	162	1	12	138	65	22	7	11	71	2	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	2
Mvmt Flow	11	180	1	13	153	72	24	8	12	79	2	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	225	0	0	181	0	0	425	454	181	422	418	189
Stage 1	-	-	-	-	-	-	203	203	-	215	215	-
Stage 2	-	-	-	-	-	-	222	251	-	207	203	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.318
Pot Cap-1 Maneuver	1356	-	-	1407	-	-	543	505	867	546	529	853
Stage 1	-	-	-	-	-	-	804	737	-	792	729	-
Stage 2	-	-	-	-	-	-	785	703	-	800	737	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1356	-	-	1407	-	-	527	496	867	525	520	853
Mov Cap-2 Maneuver	-	-	-	-	-	-	527	496	-	525	520	-
Stage 1	-	-	-	-	-	-	798	731	-	786	722	-
Stage 2	-	-	-	-	-	-	765	697	-	774	731	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	10.4	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	716	1356	-	-	1407	-	-	550
HCM Lane V/C Ratio	0.062	0.008	-	-	0.009	-	-	0.168
HCM Control Delay (s)	10.4	7.7	-	-	7.6	-	-	12.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	39	6	72	28	71	6	21	90	57	32	2
Future Volume (vph)	2	39	6	72	28	71	6	21	90	57	32	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	14	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.949			0.894			0.997	
Flt Protected		0.998			0.978			0.997			0.970	
Satd. Flow (prot)	0	1947	0	0	1844	0	0	1660	0	0	1801	0
Flt Permitted		0.998			0.978			0.997			0.970	
Satd. Flow (perm)	0	1947	0	0	1844	0	0	1660	0	0	1801	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		226			208			282			222	
Travel Time (s)		5.1			4.7			6.4			5.0	
Peak Hour Factor	0.92	0.80	0.80	0.80	0.80	0.92	0.80	0.92	0.80	0.92	0.92	0.92
Adj. Flow (vph)	2	49	8	90	35	77	8	23	113	62	35	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	202	0	0	144	0	0	99	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.92	1.00	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 34.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	3.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	59	202	144	99
Demand Flow Rate, veh/h	60	207	146	101
Vehicles Circulating, veh/h	191	33	115	136
Vehicles Exiting, veh/h	46	228	136	104
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.7	4.0	4.0	3.7
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	60	207	146	101
Cap Entry Lane, veh/h	1136	1334	1227	1201
Entry HV Adj Factor	0.984	0.977	0.983	0.983
Flow Entry, veh/h	59	202	144	99
Cap Entry, veh/h	1117	1304	1207	1181
V/C Ratio	0.053	0.155	0.119	0.084
Control Delay, s/veh	3.7	4.0	4.0	3.7
LOS	A	A	A	A
95th %tile Queue, veh	0	1	0	0

Build Saturday Mid-Day Traffic Conditions Internal Intersections

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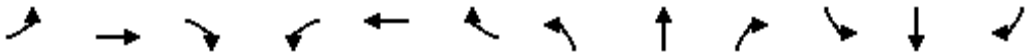

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	136	1	12	122	143	22	7	11	160	10	34
Future Volume (vph)	23	136	1	12	122	143	22	7	11	160	10	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.919			0.963			0.977	
Flt Protected	0.950			0.950				0.973			0.962	
Satd. Flow (prot)	1805	1898	0	1805	1746	0	0	1780	0	0	1780	0
Flt Permitted	0.950			0.950				0.973			0.962	
Satd. Flow (perm)	1805	1898	0	1805	1746	0	0	1780	0	0	1780	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		208			321			225			241	
Travel Time (s)		4.7			7.3			5.1			5.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	26	151	1	13	136	159	24	8	12	178	11	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	152	0	13	295	0	0	44	0	0	227	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	136	1	12	122	143	22	7	11	160	10	34
Future Vol, veh/h	23	136	1	12	122	143	22	7	11	160	10	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	2
Mvmt Flow	26	151	1	13	136	159	24	8	12	178	11	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	295	0	0	152	0	0	470	525	152	450	446	216
Stage 1	-	-	-	-	-	-	204	204	-	242	242	-
Stage 2	-	-	-	-	-	-	266	321	-	208	204	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.318
Pot Cap-1 Maneuver	1278	-	-	1441	-	-	507	460	900	523	510	824
Stage 1	-	-	-	-	-	-	803	737	-	766	709	-
Stage 2	-	-	-	-	-	-	744	655	-	799	737	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1278	-	-	1441	-	-	465	447	900	498	495	824
Mov Cap-2 Maneuver	-	-	-	-	-	-	465	447	-	498	495	-
Stage 1	-	-	-	-	-	-	787	722	-	751	703	-
Stage 2	-	-	-	-	-	-	692	649	-	764	722	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.3	11.1	16.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	635	1278	-	-	1441	-	-	533
HCM Lane V/C Ratio	0.07	0.02	-	-	0.009	-	-	0.425
HCM Control Delay (s)	11.1	7.9	-	-	7.5	-	-	16.7
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	2.1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	72	6	94	83	16	101
Future Volume (vph)	72	6	94	83	16	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	14	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989				0.883	
Flt Protected				0.974	0.993	
Satd. Flow (prot)	1965	0	0	1935	1633	0
Flt Permitted				0.974	0.993	
Satd. Flow (perm)	1965	0	0	1935	1633	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	226			208	282	
Travel Time (s)	5.1			4.7	6.4	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	90	8	118	104	20	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	0	222	146	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.92	1.00	1.00	0.92	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Yield			Yield	Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 30.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	3.9
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	98	222	146
Demand Flow Rate, veh/h	100	226	149
Vehicles Circulating, veh/h	120	20	92
Vehicles Exiting, veh/h	126	221	128
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.7	4.1	3.9
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	100	226	149
Cap Entry Lane, veh/h	1221	1352	1256
Entry HV Adj Factor	0.982	0.982	0.980
Flow Entry, veh/h	98	222	146
Cap Entry, veh/h	1199	1328	1231
V/C Ratio	0.082	0.167	0.119
Control Delay, s/veh	3.7	4.1	3.9
LOS	A	A	A
95th %tile Queue, veh	0	1	0

Appendix E

Capacity Analysis – Build With Improvements Traffic Conditions

Build With Improvements Weekday P.M. Traffic Conditions

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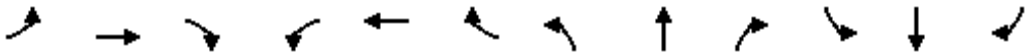


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	8	287	78	9	49	263	1204	80	41	1345	197
Future Volume (vph)	219	8	287	78	9	49	263	1204	80	41	1345	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.854			0.874			0.991			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1583	0	1711	1574	0	1770	3507	0	1711	3472	0
Flt Permitted	0.561			0.950			0.085			0.129		
Satd. Flow (perm)	1040	1583	0	1711	1574	0	158	3507	0	232	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		312			53			6			14	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		327			307			1260			1056	
Travel Time (s)		8.9			8.4			19.1			16.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	9	312	85	10	53	286	1309	87	45	1462	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	321	0	85	63	0	286	1396	0	45	1676	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4						6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	24.4		9.0	21.4	
Total Split (s)	12.0	12.5		12.0	12.5		17.0	30.0		11.0	24.0	
Total Split (%)	11.7%	12.2%		11.7%	12.2%		16.6%	29.3%		10.7%	23.4%	
Maximum Green (s)	8.0	7.4		8.0	7.4		13.0	23.6		7.0	17.6	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	3.0		2.0	2.0		2.0	2.0	

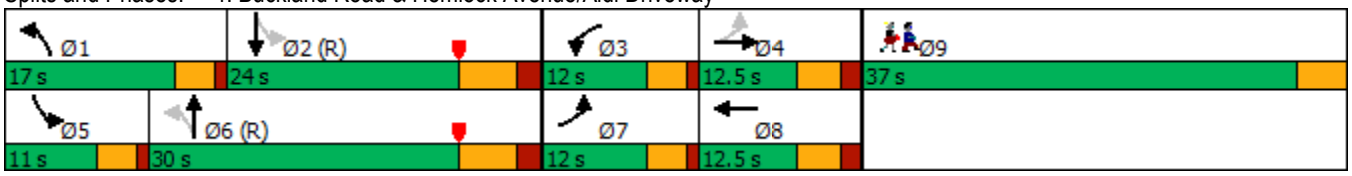
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%
Maximum Green (s)	33.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	14.7	7.2		7.5	7.2		69.2	60.9		55.0	47.0	
Actuated g/C Ratio	0.14	0.07		0.07	0.07		0.68	0.59		0.54	0.46	
v/c Ratio	1.16	0.80		0.68	0.40		0.81	0.67		0.22	1.05	
Control Delay	151.5	22.4		72.8	24.0		42.3	21.0		15.5	65.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	151.5	22.4		72.8	24.0		42.3	21.0		15.5	65.0	
LOS	F	C		E	C		D	C		B	E	
Approach Delay		77.4			52.0			24.6			63.7	
Approach LOS		E			D			C			E	
Queue Length 50th (ft)	~160	6		55	6		112	284		7	548	
Queue Length 95th (ft)	#264	#129		#125	47		#354	#857		43	#1140	
Internal Link Dist (ft)		247			227			1180			976	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	205	403		133	162		358	2085		228	1600	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.16	0.80		0.64	0.39		0.80	0.67		0.20	1.05	

Intersection Summary

Area Type: Other
Cycle Length: 102.5
Actuated Cycle Length: 102.5
Offset: 22 (21%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 49.1 Intersection LOS: D
Intersection Capacity Utilization 96.8% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Buckland Road & Hemlock Avenue/Aldi Driveway



Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	26.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Build With Improvements Saturday Mid-Day Traffic Conditions

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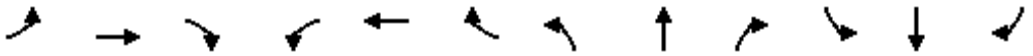


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	9	393	86	9	55	340	1164	100	46	1287	243
Future Volume (vph)	210	9	393	86	9	55	340	1164	100	46	1287	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.853			0.871			0.988			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1581	0	1711	1568	0	1770	3497	0	1711	3454	0
Flt Permitted	0.503			0.950			0.109			0.165		
Satd. Flow (perm)	932	1581	0	1711	1568	0	203	3497	0	297	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		427			60			8			18	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		327			307			1260			1056	
Travel Time (s)		8.9			8.4			19.1			16.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	10	427	93	10	60	370	1265	109	50	1399	264
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	437	0	93	70	0	370	1374	0	50	1663	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4						6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	12.0	12.5		12.0	12.5		17.0	30.0		11.0	24.0	
Total Split (%)	11.7%	12.2%		11.7%	12.2%		16.6%	29.3%		10.7%	23.4%	
Maximum Green (s)	8.0	7.4		8.0	7.4		13.0	23.6		7.0	17.6	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	3.0		2.0	2.0		2.0	2.0	

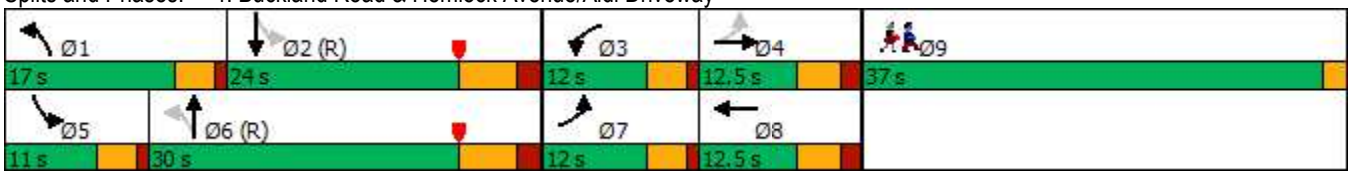
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%
Maximum Green (s)	35.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	16.8	7.2		7.6	7.2		67.5	57.0		43.6	35.3	
Actuated g/C Ratio	0.16	0.07		0.07	0.07		0.66	0.56		0.43	0.34	
v/c Ratio	0.98	0.86		0.73	0.42		0.70	0.71		0.24	1.39	
Control Delay	96.1	23.1		78.7	23.5		31.2	22.8		16.2	207.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	96.1	23.1		78.7	23.5		31.2	22.8		16.2	207.8	
LOS	F	C		E	C		C	C		B	F	
Approach Delay		48.1			55.0			24.5			202.2	
Approach LOS		D			D			C			F	
Queue Length 50th (ft)	~148	6		60	6		144	281		8	~687	
Queue Length 95th (ft)	#261	#160		#139	50		#449	#836		46	#1130	
Internal Link Dist (ft)		247			227			1180			976	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	233	510		133	168		529	1948		231	1199	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.98	0.86		0.70	0.42		0.70	0.71		0.22	1.39	

Intersection Summary

Area Type: Other
Cycle Length: 102.5
Actuated Cycle Length: 102.5
Offset: 2 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.39
Intersection Signal Delay: 100.4 Intersection LOS: F
Intersection Capacity Utilization 108.0% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Buckland Road & Hemlock Avenue/Aldi Driveway



Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	26.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary