TRAFFIC IMPACT STUDY

For

Creekside
Thornton, Colorado

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Revised:
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Table of Contents

Appendices

LIST OF FIGURES

LIST OF TABLES

I. Introduction

This study has been reformatted and revised to provide additional information or clarification in response to the City's second review comments.

This study is being prepared to present traffic impacts associated with changes proposed for the single-family residential area of development. The Highlands, Traffic Impact Study, by Krager and Associates Inc., September 2004 and approved by The City of Thornton on September 24, 2004 analyzed single family attached and commercial uses between 127th Avenue and 128th Avenue from Quebec Street to Monaco Street. These approved uses are not changing from the previously approved study.

Anticipated traffic from residential and commercial components of the overall development were previously analyzed in a traffic impact study[1] dated September 2004.

Creekside is a proposed mixed-use development be located in the City of Thornton at the southwest corner of Quebec Street and 128th Avenue. Figure 1 shows the site location and relative major roadways in the area. The development is approximately 155 acres in size and will consist of three areas of overall development and approximate sizes of buildable area are described as single-family detached (123.7 acres), single-family attached (9.1 acres), and commercial (19.4 acres).

Access to the single-family area of development is proposed on Quebec Street and 128th Avenue at the following locations:

<u>128th Avenue</u>

- Full movement access at Monaco Street. Monaco Street is an existing roadway located approximately ½ mile west of Quebec Street. It is unclassified in the 2009 City of Thornton Transportation Plan. By estimated daily traffic and intersection with a major arterial, Monaco Street is a 2-lane collector.
- Full movement access at Oneida Street. The proposed Oneida Street aligns with the street of the same name on the north side of 128th Avenue. This proposed roadway located approximately ¼ mile west of Quebec Street. It is unclassified in the 2009 City of Thornton Transportation Plan. By estimated daily traffic and intersection with a major arterial, Oneida Street is a 2-lane collector.

[1] "The Highlands, Traffic Impact Study", Krager and Associates Inc., September 2004.

Quebec Street

- Full movement access at Quince Street. The proposed Quince Street aligns with the street of the same name on the east side of Quebec Street. This proposed roadway located approximately 1/2 mile south of 128th Avenue. This roadway is unclassified in the 2009 City of Thornton Transportation Plan. By estimated daily traffic and intersection with a major arterial, Quince Street is a 2-lane collector.
- Full movement access at a location between single-family residential and commercial area of development (herein referred to as 127th Avenue). The proposed 127th Avenue is located approximately 650 feet south of 128th Avenue. This roadway is unclassified in the 2009 City of Thornton Transportation Plan. By estimated daily traffic and intersection with a major arterial, 127th Avenue is a 2-lane collector.

A conceptual site plan, as prepared Jansen Strawn Consulting Engineers, is shown on Figure 2 and is provided for illustrative purposes.


Single-Family Residential
Oneida Street
Quebec Street
Single-Family Residential
Commercial
Commercial
Commercial
128th Avenue
Church
Monaco Street
Commercial
Single-Family Residential
Development Site
Single-Family Residential
Single-Family Residential
Quince Street
Single-Family Residential
Single-Family Residential
Single-Family Residential
North
Not to Scale


Oneida Street
128th Avenue
Monaco Street
Quebec Street
127th Avenue
Quince Street
North

Not to Scale

II. Existing Conditions

A. Roadway Network and Land Use

The study area to be examined in this analysis encompasses the 128th Avenue intersections with Quebec Street, Oneida Street, and Monaco Street. Also, included in the study area is the Quebec Street intersection with Quince Street and proposed site development access (127th Avenue). Intersections internal to the overall site were excluded from this analysis since no specific development plans or access locations are known for the single-family attached or commercial areas of overall development.

The proposed site plan includes the following roadways within the study area:

> Quebec Street - a north-south arterial roadway having two through lanes (one lane in each direction) within the study area. The City Transportation Plan defines Quebec Street as a six-lane major arterial roadway with raised median and a future build out traffic volume of 40,000 vehicles by Year 2035. The posted speed limit is 45 MPH.
>
> 128th Avenue - a two-lane, east-west, minor arterial roadway having one through lane in each direction. 128th Avenue has a future build out roadway volume of 13,000 vehicles with a four-lane cross-section and striped median as defined by the City Transportation Plan. A posted speed limit of 45 MPH is provided for study segment of 128th Avenue.
>
> Monaco Street - a two-lane, north-south, collector arterial roadway having one through lane in each direction. Monaco Street has a future build out roadway volume of 6,000 vehicles with a collector cross-section as defined by City Construction Standards. A posted speed limit of 30 MPH is provided for study segment of Monaco Street.

The 128th Avenue intersections with Quebec Street and Oneida Street are signalized. All other study intersections operate under a stop-controlled condition. A stop-controlled intersection is defined as a roadway intersection where vehicle rights-of-way are controlled by one or more "STOP" signs.

Comparison of the existing roadway cross-section of Quebec Street to the City Transportation Plan vision concludes that Quebec Street is not built to its ultimate width for accommodation of future regional transportation demands. It is further concluded that 128th Avenue is also not built to its ultimate cross-section. The northern half of 128th Avenue is existing along site development frontage. Figure 2 from the Thornton Transportation Plan 2009 is provided for reference in Appendix E.

No specific regional improvements for Quebec Street or 128th Avenue are known to be committed by the City at this time. However, improvements to the east half of Quebec Street and the north half of 128th Avenue for completion of ultimate roadway cross-sections are anticipated as adjacent development of this site occurs.

For purposes of this study, it is assumed that the build-out the single family detached residential area would not be phased and be completed by end of Year 2018.

III. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the 128th Avenue Street intersections with Quebec Street, Oneida Street, and Monaco Street and at the Quebec Street intersection with Quince Street. 24-hour volume counts were also collected on Quebec Street and 128th Avenue. These counts along with existing intersection lane geometry are shown on Figure 3. Traffic count data is included for reference in Appendix A. 24-hour volumes shown for other study roadways were derived from standard afternoon peak hour volume relationships.

The Signalized and Unsignalized Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM) by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze study intersections for existing traffic conditions. These nationally accepted techniques allow for the determination of intersection level of service (LOS) based on the congestion and delay of each traffic movement.

The level of service analyses results for existing conditions are summarized in Table 1.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

TABLE 1
INTERSECTION CAPACITY ANALYSIS SUMMARY
EXISTING TRAFFIC

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Quebec Street / 128th Avenue (Signalized)	B (18.5)	C (22.9)
128th Avenue / Oneida Street (Signalized)	A (8.9)	B (13.3)
128th Avenue / Monaco Street (Stop-Controlled) Westbound Left Northbound Left and Right	 A C	 A D
Quebec Street / Quince Street (Stop-Controlled) Westbound Left and Right Southbound Left	 B A	 B A

Key: Stop-Controlled Intersections: Level of Service
Signalized Intersection: Level of Service (Control Delay in sec/veh)

A. Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that the signalized intersection of 128th Avenue and Quebec Street operates overall at LOS C or better during each traffic peak hour.

Operational analysis further shows that the signalized 128th Avenue intersection with Oneida Street has overall LOS B or better during peak traffic hours.

The existing stop-controlled intersection of Quebec Street and Quince Street, including 128th Avenue and Monaco Street, has peak hour turn movement operations at or better than LOS C. It is only the northbound (shared) left and right turn movement on Monaco Street that is shown to have a LOS D operation during the afternoon peak traffic hour.

Table 1A summarizes roadway (arterial) level of service analyses results for existing conditions. Existing condition level of service results are also shown on Figure 3. Analysis worksheets are provided for reference in Appendix C.

TABLE 1A
ROADWAY LEVEL OF SERVICE ANALYSIS SUMMARY
EXISTING TRAFFIC

ROADWAY	LEVEL OF SERVICE*
128th Avenue	D
Quebec Street	A

* Based on Table 4, Roadway Level-of-Service Thresholds by Functional Classification from City of Thornton Transportation Plan 2009

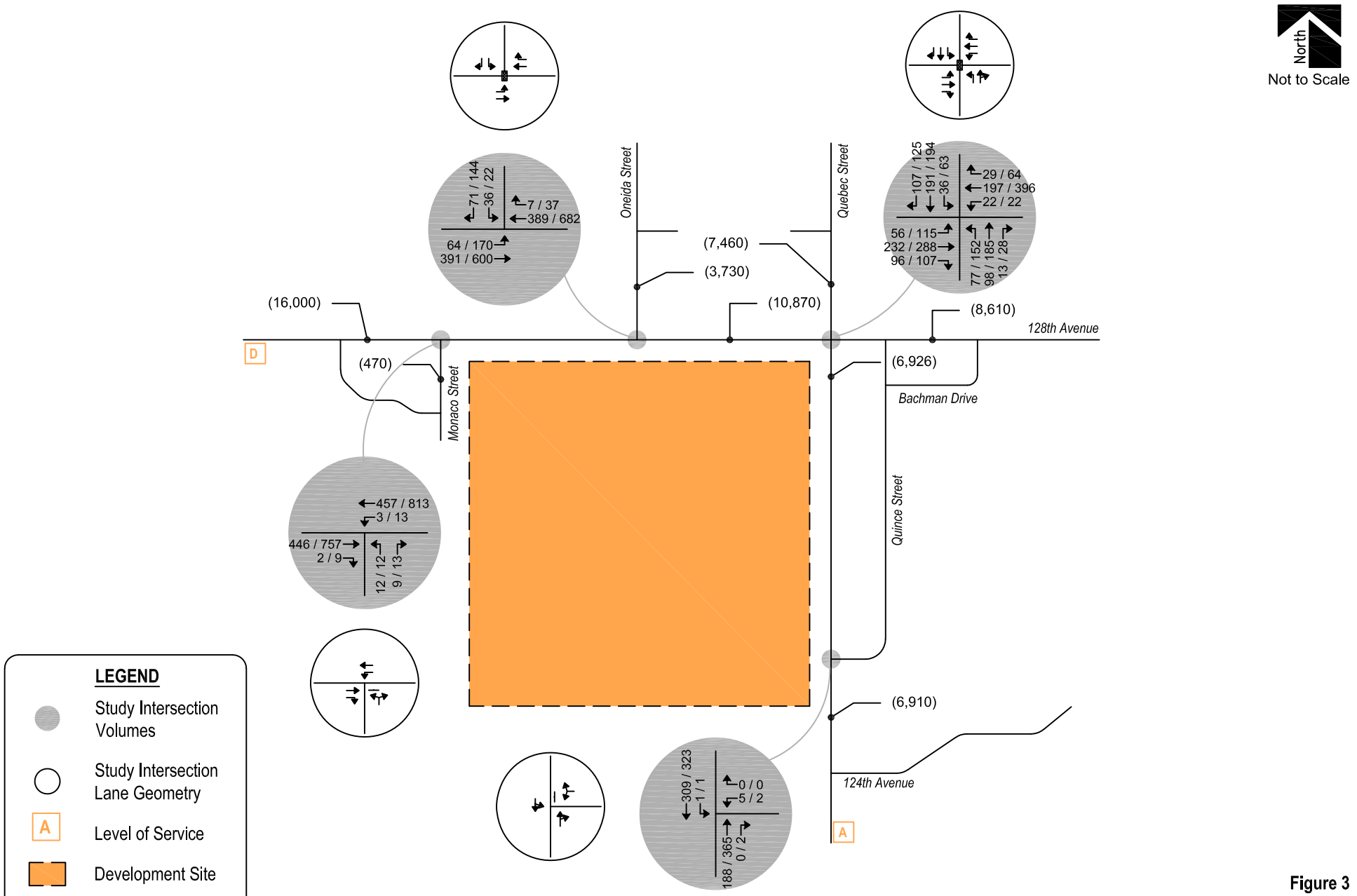

Figure 3
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

IV. Future Traffic Conditions

A. Vehicle Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation, 9th Edition, were applied to the proposed single-family detached area of development in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

It is emphasized that there are no specific development plans are established for the northern area (multi-family or commercial) of Creekside development. A Conceptual Site Plan for the northwestern area of the Creekside development was approved by Thornton City Council in January 2008 for a commercial retail center entitled Creekside Village West Commercial. This area was previously identified as a single family attached land use in The Highlands Traffic Impact Study dated September 4, 2004. Only the construction of single-family detached area is being pursued at this time. As such, trip generation estimates for the northern area of Creekside as described within the previously approved traffic study are reiterated in this study. A copy of previous traffic study trip generation estimates is included for reference in Appendix A.

As actual land uses, densities or site plans within the northern area of Creekside development become defined over time, it is expected that traffic generation characteristics previously analyzed or considered within this study will need to be updated by more specific traffic analyses or studies to help re-evaluate when transportation improvements identified within this overall study are needed, or if additional improvements are needed to mitigate potential traffic impacts.

Trip generation rates used in this study for proposed single-family residential of development area are presented in Table 2.

TABLE 2
TRIP GENERATION RATES

ITE			TRIP GENERATION RATES						
			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	UNIT	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Residential	DU	9.52	0.19	0.56	0.75	0.63	0.37	1.00

Key: DU = Dwelling Units
Note: All data and calculations presented in above table are subject to being rounded to nearest value.

Table 3 illustrates projected average daily traffic (ADT), AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build out or full occupancy.

TABLE 3 TRIP GENERATION SUMMARY									
			TOTAL TRIPS GENERATED						
ITE			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	SIZE	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Residential	263 DU	2,504	49	148	197	166	97	263
	Sub Total:		*2,504*	*49*	*148*	*197*	*166*	*97*	*263*
Future Assumed Development (per September 2004 Traffic Impact Study)									
230	Condominium/Townhous	310 DU	1,817	23	113	136	108	53	161
814	Specialty Retail	40 KSF	1,773	*	*	*	48	61	109
850	Supermarket	60 KSF	6,134	119	76	195	320	307	627
912	Drive-In Bank	3 DIL	1,234	34	24	58	77	77	154
934	Fast Food w/ Drive	4 KSF	1,984	108	104	212	72	67	139
945	Gas / Convenience Store	10 VFP	1,628	50	50	100	67	67	134
	Sub Total:		*14,570*	*334*	*367*	*701*	*692*	*632*	*1,324*
	Total:		*17,074*	*383*	*515*	*898*	*858*	*729*	*1,587*

Note: All data and calculations presented in above table are subject to being rounded to nearest value.
* = ITE does not report significant AM peak hour generation due to the nature of the business (i.e. operating hours typically open after AM peak hour)

As Table 3 illustrates, the single-family residential area of development has the potential to generate approximately 2,504 daily trips with 197 of those occurring during the morning peak hour and 263 during the afternoon peak hour. Upon assumed build out and full occupancy, the Creekside development is projected to generate approximately 17,074 daily trips, 898 morning peak hour trips, and 1,587 afternoon peak hour trips.

B. Comparison of Site Traffic Generation

A traffic generation comparison was performed for the area of site development. The previously approved traffic study dated September 2004 defines the overall development area as a combination of general commercial, retail and residential uses. These uses are further described as a 60,000-square foot (SF) supermarket, 3 -lane drive in bank, 4,000 SF fast food with drive through, gas / convenience store with 10 vehicle fueling positions, 40,000 SF specialty retail and residential consisting of 279 dwelling units of single family detached and 310 dwelling units of townhome / condominium. The trip generation table from the September 2004 traffic study is provided for reference. This traffic study analyzes the proposed development of 263 single family detached dwelling units. This comparison concludes that the total dwelling units of previously approved and the proposed development building area of existing and proposed development is approximately 6 percent (6 %) less overall than that originally anticipated in the September 2004 traffic study. Likewise, site traffic expected from the proposed development remains in compliance to original expectations.

C. Adjustments to Vehicle Trip Generation Rates

As a development with a variety of land uses is likely to attract trips from within the site (internal capture) as well as pass-by or diverted trips from the adjacent roadway system, use of a trip reduction percentage is applicable. However, no adjustments to trip generation were taken in this study in effort to present a conservative analysis and to remain consistent with the previous site traffic study.

As example, ITE published data indicates that trip reduction rates for mixed-use developments of similar size and characteristics vary between twenty-five and fifty-five percent.

V. Future Traffic Conditions without Proposed Development

To account for projected increases in background traffic for Years 2017 and 2035, a compounded annual growth rate was calculated by comparing the existing ADT of 128th Avenue of 10,870 vehicles to the ADT on 128th Avenue of 13,000 vehicles represented in the Thornton Thoroughfare Plan, 2009, Figure 17, 2035 Traffic Volume Forecasts. The compounded annual growth rate is .9%. As a result, a compounded annual growth rate of three percent was applied to existing traffic volumes. This annual growth rate is calculated at the direction of City's staff to estimate the level of long-term development expected within the area. The City's base assumption comments are provided at the end of Appendix E for reference.

Pursuant to the long-term envisioned area roadway improvements discussion provided in Section I, Year 2017 (short-term) background traffic conditions assume no regional roadway improvements (i.e., widening of 128th Avenue or Quebec Street to their ultimate cross-sections) to accommodate regional transportation demands. This assumption provides for a conservative analysis.

Year 2035 background traffic condition assumes 128th Avenue and Quebec Street to be built out to the ultimate roadway section as envisioned by the City of Thornton Transportation Master Plan.

Projected background traffic volumes and intersection geometry for Years 2017 and 2035 are shown on Figure 4 and Figure 5, respectively.

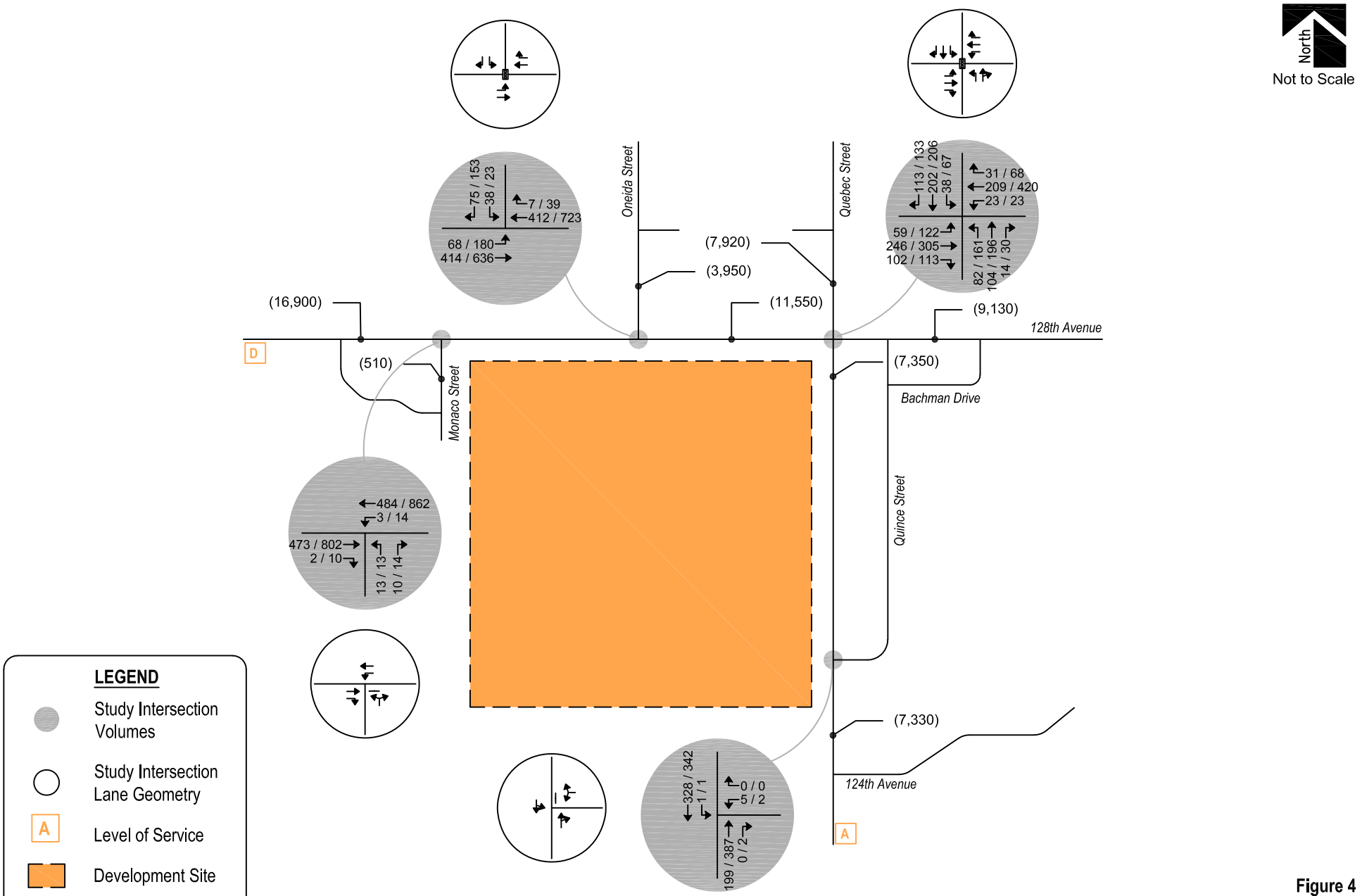

Figure 4
BACKGROUND TRAFFIC - YEAR 2017
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

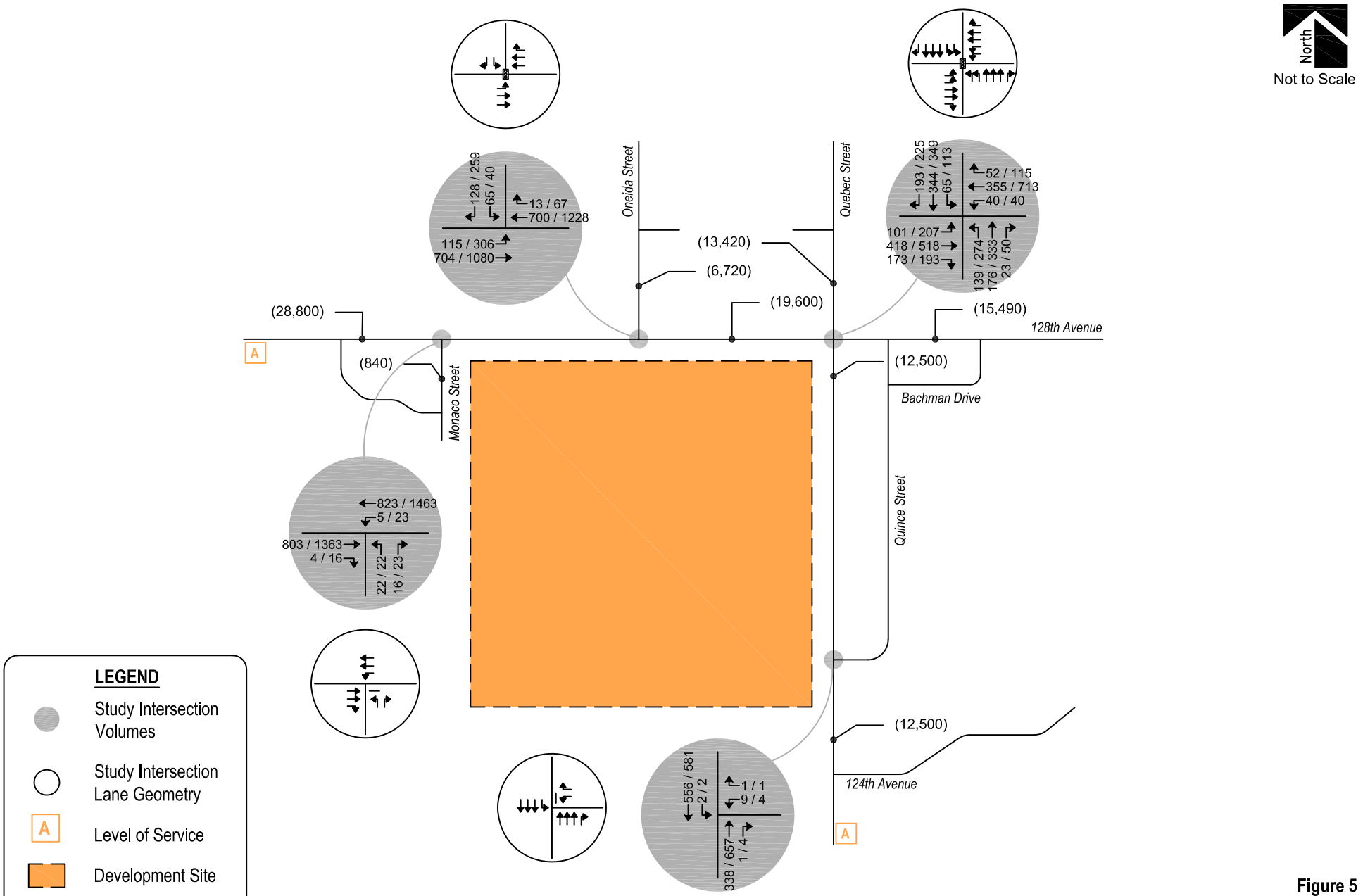

Figure 5
BACKGROUND TRAFFIC - YEAR 2035
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

As with existing traffic conditions, the operations of study intersections were analyzed under background conditions, without the proposed development, using the SYNCHRO computer program.

Background traffic level of service analyses results for Year 2017 is listed in Table 4. Year 2035 operational results are summarized in Table 5.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

TABLE 4
INTERSECTION CAPACITY ANALYSIS SUMMARY
BACKGROUND TRAFFIC - YEAR 2017

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Quebec Street / 128th Avenue (Signalized)	B (18.9)	C (23.5)
128th Avenue / Oneida Street (Signalized)	A (9.1)	B (14.0)
128th Avenue / Monaco Street (Stop-Controlled)		
Westbound Left	A	A
Northbound Left and Right	C	E
Quebec Street / Quince Street (Stop-Controlled)		
Westbound Left and Right	B	C
Southbound Left	A	A

Key: Stop-Controlled Intersections: Level of Service
Signalized Intersection: Level of Service (Control Delay in sec/veh)

A. Background Traffic Analysis Results – Year 2017

Year 2017 background traffic analysis indicates that the 128th Avenue intersection with Quebec Street has an overall operation of LOS C or better during the respective peak traffic hour.

Similar to the existing traffic, Year 2017 background traffic for the signalized intersection of 128th Avenue and Oneida Street has a projected overall peak hour operations of LOS B or better.

The intersection of Quebec Street and Quince Street, and 128th Avenue and Monaco Street has Year 2017 peak hour turn movement operations at or better than LOS C. The northbound (shared) left and right turn movement on Monaco Street is shown to have an afternoon peak traffic hour operational change from LOS C to LOS E. The LOS E operation experienced at Monaco Street is attributed to the volume of through traffic on 128th Avenue and the stop-controlled nature of the intersection. It is to be noted that it is not uncommon for unsignalized movements to or from an arterial roadway, in urban areas, to operate with noticeable delays during peak traffic hours. It is, however, likely that turn movements will operate better than the results obtained with this HCM Two Way Stop Control (TWSC) level of service analysis would indicate, as the HCM analysis may not accurately account for the effect

of vehicle platooning and gaps caused by upstream signals. The upstream signal control on 128th Avenue at Oneida Street and Holly Street will tend to create additional gaps in the traffic stream for turning movements at Monaco Street and will most likely provide mitigation to the LOS E operation projected during the afternoon peak traffic hour.

TABLE 5
INTERSECTION CAPACITY ANALYSIS SUMMARY
BACKGROUND TRAFFIC - YEAR 2035

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Quebec Street / 128th Avenue (Signalized)	B (16.1)	B (19.3)
128th Avenue / Oneida Street (Signalized)	A (7.6)	B (13.2)
128th Avenue / Monaco Street (Stop-Controlled)		
Westbound Left	A	B
Northbound Left	D	F
Northbound Right	B	C
Quebec Street / Quince Street (Stop-Controlled)		
Westbound Left	B	C
Westbound Right	A	A
Southbound Left	A	A

Key: Stop-Controlled Intersections: Level of Service
Signalized Intersection: Level of Service (Control Delay in sec/veh)

B. Background Traffic Analysis Results – Year 2035

By Year 2035 and without the proposed development, the 128th Avenue intersection with Quebec Street is projected to have an overall peak hour operation at LOS B in both morning and afternoon peak hour.

The 128th Avenue intersection with Oneida Street is shown to have overall peak hour operations at or better than LOS B.

The stop-controlled intersection of 128th Avenue and Monaco Street is projected to begin seeing additional vehicular delay for some turn movements with a peak hour operation of LOS D or better. The northbound left turn movement at the intersection has a projected LOS F operation during the PM Peak Hour. As earlier discussed, it is not uncommon for unsignalized turn movements to or from an arterial roadway to operate with noticeable delay during peak traffic hours. The projected northbound left turn movement operations are attributed to the volume of through traffic on 128th Avenue and the stop-controlled nature of the intersection.

Long-term operational analysis shows the Quebec Street and Quince Street intersection having peak hour turn movement operations ranging from LOS A to LOS C.

Table 4A and Table 5A summarizes roadway (arterial) level of service analyses results for background traffic conditions for the respective analysis year and peak traffic hour. Short term and long term background condition level of service results are also shown on Figures 4 and 5 respectively. Synchro analysis worksheets are provided for reference in Appendix C.

TABLE 4A
ROADWAY LEVEL OF SERVICE ANALYSIS SUMMARY
BACKGROUND TRAFFIC - YEAR 2017

ROADWAY	LEVEL OF SERVICE *
128th Avenue	D
Quebec Street	A

* Based on Table 4, Roadway Level-of-Service Thresholds by Functional Classification from City of Thornton Transportation Plan 2009

TABLE 5A
ROADWAY LEVEL OF SERVICE ANALYSIS SUMMARY
BACKGROUND TRAFFIC - YEAR 2035

ROADWAY	LEVEL OF SERVICE *
128th Avenue	A
Quebec Street	A

* Based on Table 4, Roadway Level-of-Service Thresholds by Functional Classification from City of Thornton Transportation Plan 2009

VI. Proposed Project Traffic

A. Vehicle Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of site within the City, allowed turning movements, available roadway network, and surrounding land uses.

Overall trip distribution patterns for the assumed development are shown on Figure 6. These distribution patterns were coordinated with City Staff.

B. Vehicle Trip Assignment

Traffic assignment is how site-generated and distributed vehicle trips are expected to be loaded onto the available roadway network. Trip distribution was estimated by reviewing the neighboring land uses and the general density of the surrounding area Areas with denser development received a higher percentage of distribution. Conversely, undeveloped areas were assigned a lower percentage of distribution. Study intersection turning volumes were calculated by assigning percentages in Figure 6 to the corresponding Total Trips Generated volumes shown in Table 5.

Applying trip distribution patterns to site-generated traffic provides the overall site-generated trip assignments shown on Figure 6.

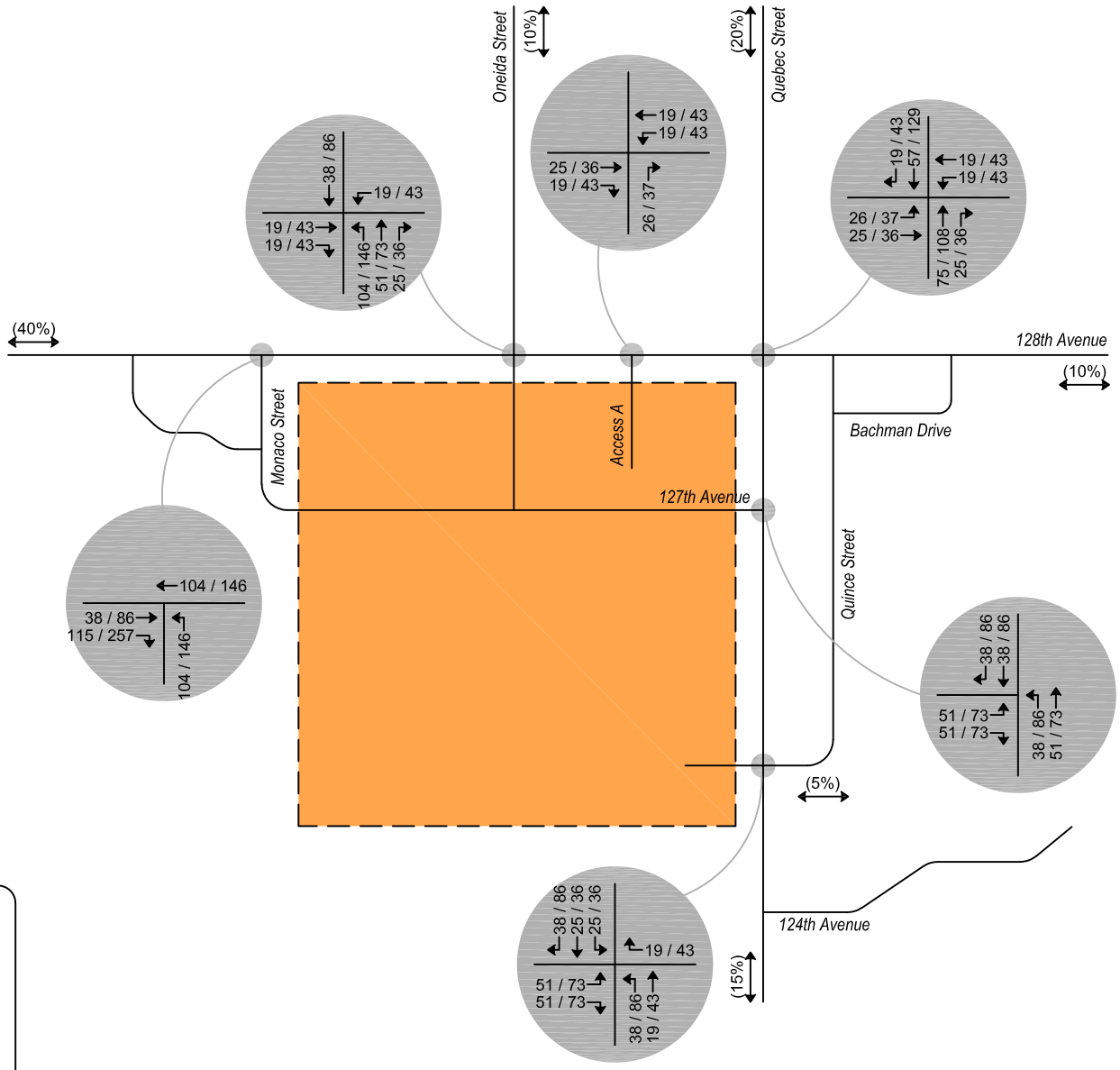

Figure 6
SITE DEVELOPMENT DISTRIBUTION
(%) : Overall
SITE-GENERATED
AM / PM Peak Hour

V. Future Traffic Forecasts with Proposed Development

Site-generated traffic was added to background traffic projections for Years 2017 and 2035 to develop total traffic projections.

It was assumed, for analysis purposes, that overall development construction (proposed single-family residential with assumed future multi-family and commercial components) would not be phase and occur by end of Year 2017. Roadway improvements beyond that described in background conditions, were assumed as 128th Avenue being a 4-lane minor arterial and Quebec Street as a 6-lane major arterial for analysis in total traffic conditions.

Projected Year 2017 total traffic volumes and intersection geometry are shown on Figure 7.

Figure 8 shows projected total traffic volumes and intersection geometry for Year 2035.

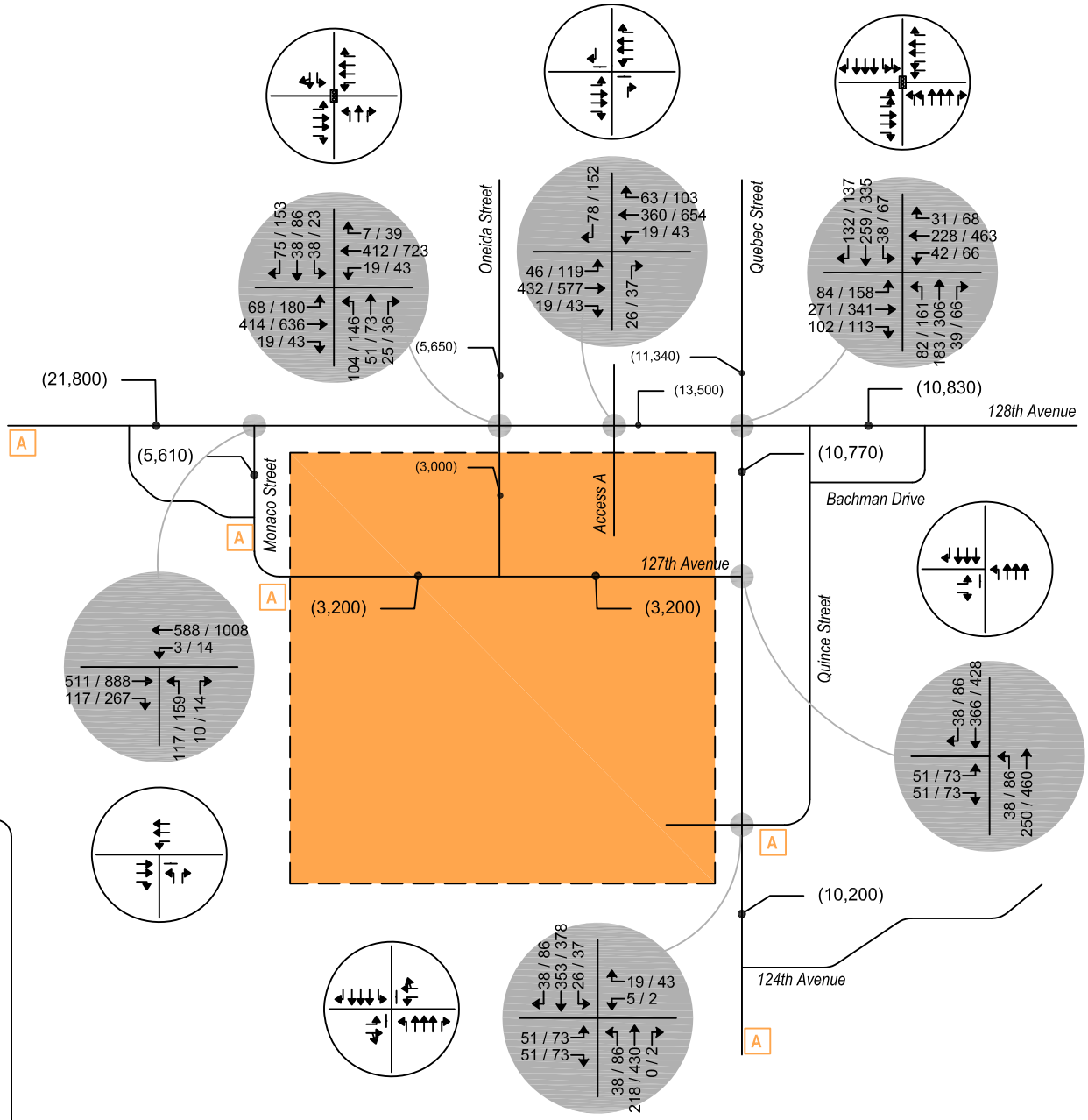

Figure 7
TOTAL TRAFFIC - YEAR 2017
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

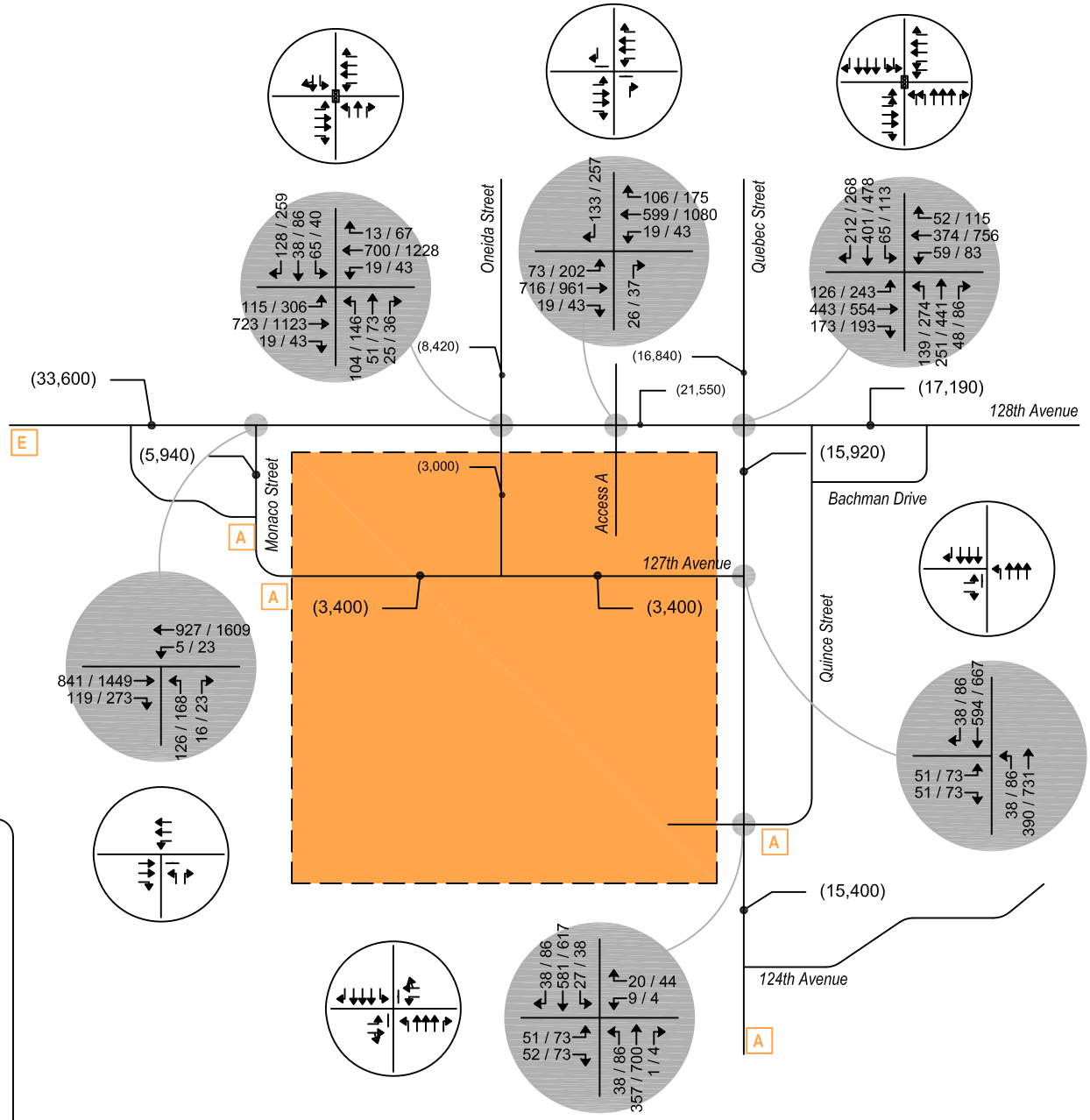

Figure 8
TOTAL TRAFFIC - YEAR 2035
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

VI. Project Impacts

A. Peak Hour Intersection Levels of Service

Operations of study intersections were analyzed under projected total traffic conditions using the SYNCHRO computer program. Total traffic level of service analysis results for Years 2017 and 2035 are summarized in Table 6 and Table 7.

Definitions of levels of service are given in Appendix B, with intersection capacity worksheets are provided in Appendix C.

TABLE 6
INTERSECTION CAPACITY ANALYSIS SUMMARY
TOTAL TRAFFIC - YEAR 2017

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Quebec Street / 128th Avenue (Signalized)	C (21.3)	C (30.4)
128th Avenue / Oneida Street (Signalized)	B (19.2)	D (38.5)
128th Avenue / Monaco Street (Stop-Controlled)		
Westbound Left	A	B
Northbound Left	E	F
Northbound Right	B	C
128th Avenue / Access A		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Right	B	B
Southbound Right	B	C
Quebec Street / Quince Street (Stop-Controlled)		
Eastbound Left	C	F
Eastbound Through and Right	B	B
Westbound Left	C	D
Westbound Through and Right	A	B
Northbound Left	A	A
Southbound Left	A	A
Quebec Street / 127th Avenue (Stop-Controlled)		
Eastbound Left	C	D
Eastbound Right	B	B
Nortbound Left	A	A

Key: Stop-Controlled Intersections: Level of Service
Signalized Intersection: Level of Service (Control Delay in sec/veh)

TABLE 7 INTERSECTION CAPACITY ANALYSIS SUMMARY TOTAL TRAFFIC - YEAR 2035		
INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Quebec Street / 128th Avenue (Signalized)	B (16.7)	C (20.4)
128th Avenue / Oneida Street (Signalized)	B (16.4)	D (40.6)
128th Avenue / Monaco Street (Stop-Controlled)		
Westbound Left	A	B
Northbound Left	F	F
Northbound Right	B	C
128th Avenue / Access A		
Eastbound Left	A	B
Westbound Left	A	B
Northbound Right	B	B
Southbound Right	B	C
Quebec Street / Quince Street (Stop-Controlled)		
Eastbound Left	D	F
Eastbound Through and Right	B	B
Westbound Left	C	F
Westbound Through and Right	A	B
Northbound Left	A	A
Southbound Left	A	A
Quebec Street / 127th Avenue (Stop-Controlled)		
Eastbound Left	C	E
Eastbound Right	B	B
Nortbound Left	A	B

Key: Stop-Controlled Intersections: Level of Service
Signalized Intersection: Level of Service (Control Delay in sec/veh)

B. Total Traffic Analysis Results upon Development Build-Out

Table 7 illustrates how, by Year 2035, the signalized 128th Avenue intersections of Quebec Street and Oneida Street, upon development build out with all conservative assumptions defined in this study, have projected overall operations at LOS D or better during peak traffic hours.

The stop-controlled intersection of 128th Avenue and Monaco Street continues to see additional vehicular delay for some turn movements with peak hour operations at LOS C or better. The northbound left turn movement at the intersection continues to have an operation of LOS F during each traffic peak, similar to background traffic analysis results. As earlier discussed, the projected northbound left turn movement operation is attributed to the volume of through traffic on 128th Avenue and the stop-controlled nature of the intersection. Future signalization of this intersection, pursuant to stipulation of annexation agreement, will mitigate the projected LOS F operation for the northbound left turn movement.

The three quarter access on 128th Avenue at Access A is projected to have peak hour turn movement operations of LOS C or better.

The 127th Avenue and Quince Street intersections on Quebec Street are projected to have peak hour turn movement operations of LOS D or better. These intersections too have unsignalized left turn movements that are expected to experience some additional vehicular delay (ranging from LOS D to LOS F) during peak traffic hours. However, these additional delays are not expected to be detrimental to the intersection or the overall roadway network.

A signal warrant analysis, using Year 2017 and 2035 total traffic volumes, was conducted for the Monaco Street intersection of 128th Avenue, the 127th Avenue intersection of Quebec Street and the Quince Street intersection of Quebec Street in order to review potential for traffic signal control. Analysis results conclude that the intersections of 127th Avenue intersection of Quebec Street and the Quince Street intersection of Quebec Street were found to have the less than minimum vehicle volumes required to meet Warrant 3 – Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD), for the installation of a traffic signal. Therefore, signalization of those intersections is not warranted. Analysis results conclude that the Monaco Street intersection of 128th Avenue was found to have the minimum vehicle volumes required during build out condition of the entire development but not the residential portion of the development to meet Warrant 3 – Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD) for the installation of a traffic signal. As such, the Monaco Street intersection of 128th Avenue was analyzed under as a stop-controlled condition. Warrant study forms are provided in Appendix D.

Warrant 3 is intended for use at locations where traffic conditions are such that for a minimum of one hour on an average day, the minor-streets (Monaco Street, 127th Avenue or Quince Street) traffic suffer undue delay when entering or crossing the major street (128th Avenue of Quebec Street). This assumption provides for a conservative analysis. The intersection of Monaco and 128th Avenue should be monitored further by City Staff as buildout of the area occurs to determine when signalization should occur.

Table 6A and Table 7A summarizes roadway (arterial) level of service analyses results for total traffic conditions for the respective analysis year and peak traffic hour. Analysis worksheets are provided for reference in Appendix C.

TABLE 6A
ROADWAY LEVEL OF SERVICE ANALYSIS SUMMARY
TOTAL TRAFFIC - YEAR 2017

ROADWAY	LEVEL OF SERVICE*
128th Avenue	A
Quebec Street	A
Monaco Street	A
127th Avenue	A
Oneida Street	A

* Based on Table 4, Roadway Level-of-Service Thresholds by Functional Classification from City of Thornton Transportation Plan 2009

TABLE 7A ROADWAY LEVEL OF SERVICE ANALYSIS SUMMARY TOTAL TRAFFIC - YEAR 2035	
ROADWAY	LEVEL OF SERVICE*
128th Avenue	E
Quebec Street	A
Monaco Street	A
127th Avenue	A
Oneida Street	A

* Based on Table 4, Roadway Level-of-Service Thresholds by Functional Classification from City of Thornton Transportation Plan 2009

C. Queuing and Storage Requirements

The long term total traffic analyses include calculations of the 95 percent maximum probable queues at study area intersections and accesses. The queue computations are included in the LOS output for unsignalized intersections; signalized intersections have a separate calculation. SYNCHRO signalized intersection queue data are included in Appendix C. Storage requirements were estimated based on the critical peak hour turning movement volumes. An average vehicle length of 25 feet was assumed. A minimum storage requirement of 50 feet (two vehicles) was also assumed. Table 8 summarizes the queue results in comparison to the projected storage requirements for left-turn movements in the study area.

TABLE 8
LEFT TURN QUEUES AND STORAGE REQUIREMENTS
TOTAL TRAFFIC - YEAR 2035

INTERSECTION LANE GROUPS	Projected Traffic Queue			
	AM Peak Hour		PM Peak Hour	
	95th	VE	95th	VE
128th Avenue / Quebec Street (Signalized)				
Eastbound Left	29	2	61	3
Eastbound Right	39	2	42	2
Westbound Left	17	1	24	1
Westbound Right	4	1	34	2
Northbound Left	42	2	96	4
Northbound Right	2	1	26	2
Southbound Left	23	1	44	2
Southbound Right	55	3	118	5
128th Avenue / Oneida Street (Signalized)				
Eastbound Left	55	3	329	14
Eastbound Right	0	0	17	1
Westbound Left	23	1	42	2
Westbound Right	0	0	0	0
Northbound Left	91	4	170	7
Northbound Right	1	1	0	0
Southbound Left / Through	61	3	46	2
128th Avenue / Monaco Street (Stop-Controlled)				
Eastbound Through	0	0	0	0
Eastbound Right	0	0	0	0
Westbound Left	1	1	6	1
Westbound Through	0	0	6	1
Northbound Left	199	8	575	23
Northbound Right	2	1	6	1
Quebec Street / Quince Street (Stop-Controlled)				
Eastbound Left	29	2	125	5
Eastbound Through / Right	4	1	10	1
Westbound Left	2	1	6	1
Westbound Right	4	1	9	1
Northbound Left	4	1	0	0
Northbound Right	0	0	0	0
Southbound Left	2	1	4	1
Southbound Right	0	0	0	0
Quebec Street / 127th Avenue (Stop-Controlled)				
Eastbound Left	18	1	45	2
Eastbound Right	5	1	7	1
Northbound Left	4	1	9	1
Northbound Through	0	0	0	0
Southbound Through	0	0	0	0
Southbound Right	0	0	0	0

Key:
VE: Approximate Vehicle Equivalent
95th: 95th Percentile Queue Length (ft)

Right and left turn lanes are required at all accesses along arterials. The minimum dimension as specified by the City of Thornton Standards and Specifications are 150' of storage and 100 feet of taper. Arterial to arterial intersections shall be design to accommodate 200' storage and 100' taper.

Turn lane queues referenced in Table 8 indicate that all queues are within the City Standard lengths with the exception the queue length during the PM Peak Hour at the north bound left turn lane of Monaco Street at 128th Avenue. This long term total traffic volume queue length is attributed to the stop-controlled nature of the intersection. Further, the queue length does not negatively impact the arterial roadway of 128th Avenue. We concur with the construction plan proposal of a 175-foot long left turn lane on northbound Monaco Street at 128th Avenue is sufficient for storage in the short term total traffic volume condition. Future signalization of this intersection, pursuant to stipulation of annexation agreement, will shorten the projected queue length.

D. Pedestrian and Bicycle Accommodation

Creekside would accommodate pedestrians and bicyclists with the following improvements:

- Sidewalks and bike lanes along 128th Avenue, Monaco Street and Quebec Street adjacent to the site per City of Thornton standards.
- Sidewalks along all internal local roadways per City of Thornton standards.
- A pedestrian/bike trail along the Brantner Gulch drainage way bordering the south side of the site and the park through the site.
- A pedestrian/bike trail within the park through the site.

VII. Conclusion

This traffic impact study addressed the capacity, geometric, and control requirements associated with the proposed single-family residential area of overall development entitled Creekside. The proposed single-family development is part of a planned mixed-use development that is approximately 155 acres in size and located in the City of Thornton at the southwest corner of Quebec Street and 128th Avenue.

This study is prepared to present traffic impacts associated with changes proposed for the single-family residential area of development with general consideration given for the multi-family and commercial areas of overall development site that were previously analyzed in a traffic study dated September 2004. The three areas of overall development and approximate sizes of buildable area are described as single-family detached (123.7 acres), single-family attached (9.1 acres), and commercial (19.4 acres). The proposed single-family residential development is understood to entail the construction of approximately 263 new dwelling units and represents an approximate 5.7 percent reduction in units from that previously analyzed (279 dwelling units).

The study area examined in this analysis encompasses the 128th Avenue intersections with Quebec Street, Oneida Street, and Monaco Street. Also, included in the study area is the Quebec Street intersection with Quince Street and proposed site development access (127th Avenue) on Quebec Street.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2017 and Year 2035 background traffic conditions, and Year 2017 and Year 2035 total traffic conditions.

Existing and background traffic analyses for study years, without the proposed development, indicates that the 128th Avenue intersections of Oneida Street and Monaco Street operate at LOS D or better during both traffic peak hours, with only the northbound left turn movement at Monaco Street operating at LOS F during the afternoon peak hour. This LOS F operation at Monaco Street is attributed to the through traffic volume on 128th Avenue and the stop-controlled nature of the intersection. Moreover, it is not uncommon for unsignalized movements to or from an arterial roadway, in urban areas, to operate with noticeable delay during peak traffic hours. It is, however, expected that turn movements may operate better than the results presented in this analysis since the upstream signal control on 128th Avenue will tend to create additional gaps in the traffic stream for turn movements at the existing Monaco Street intersection. This LOS F operation at Monaco Street is mitigated with future intersection signalization as described by annexation agreement stipulation.

Turn lane queues referenced in Table 8 indicate that all queues are within the City Standard lengths with the exception the queue length during the PM Peak Hour at the north bound left turn lane of Monaco Street at 128th Avenue. This long term total traffic queue length is attributed to the stop-controlled nature of the intersection. We concur with the construction plan proposal of a 175-foot long left turn lane on northbound Monaco Street at 128th Avenue is sufficient for storage in the short term total traffic volume condition. Future signalization of this intersection, pursuant to stipulation of annexation agreement, will shorten the projected queue length.

A signal warrant analysis, using Year 2017 and 2035 total traffic volumes, was conducted for the Monaco Street intersection of 128th Avenue, the 127th Avenue intersection of Quebec Street and the Quince Street intersection of Quebec Street in order to review potential for traffic signal control. Analysis results conclude that the intersections of 127th Avenue intersection of Quebec Street and the Quince Street intersection of Quebec Street were found to have the less than minimum vehicle volumes required to meet Warrant 3 – Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD), for the installation of a traffic signal. Therefore, signalization of those intersections is not warranted. Analysis results conclude that the Monaco Street intersection of 128th Avenue was found to have the minimum vehicle volumes required during build out condition of the entire development but not the residential portion of the development to meet Warrant 3 – Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD) for the installation of a traffic signal. As such, the Monaco Street intersection of 128th Avenue was analyzed under as a stop-controlled condition.

Warrant 3 is intended for use at locations where traffic conditions are such that for a minimum of one hour on an average day, the minor-street (Monaco Street, 127th Avenue or Quince Street) traffic suffers undue delay when entering or crossing the major street (128th Avenue of Quebec Street). This assumption provides for a conservative analysis. As buildout of the area occurs, the intersection of Monaco Street and 128th Avenue should be monitored by City Staff to determine when signalization should occur.

Analysis of future traffic conditions indicate that the addition of proposed site-generated traffic is expected to create no discernable impact to traffic operations for the existing surrounding roadway system. With all conservative assumptions defined in this analysis, intersections are projected to operate at future levels of service comparable to background traffic conditions.

APPENDIX A

Traffic Count Data

TABLE 3
TRIP GENERATION SUMMARY

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Residential	DU	9.57	0.1875	0.5625	0.75	0.6363	0.3737	1.01
230	Residential Condo/Townhouse	DU	5.86	0.0748	0.3652	0.44	0.3484	0.1716	0.52
814	Specialty Retail	KSF	44.32	*	*	*	1.1924	1.5176	2.71
850	Supermarket	KSF	102.24	1.9825	1.2675	3.25	5.3295	5.1205	10.45
912	Drive-In Bank	DIL	411.17	11.2404	8.1396	19.38	25.5400	25.5400	51.08
934	Fast Food with Drive Through	KSF	496.12	27.0861	26.0239	53.11	18.0128	16.6272	34.64
945	Gas / Convenience Store	VFP	162.78	5.0300	5.0300	10.06	6.6900	6.6900	13.38

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Phase One - Residential									
210	Single-Family Residential	279 DU	2,670	52	157	209	178	104	282
230	Residential Condo/Townhouse	310 DU	1,817	23	113	136	108	53	161
	Phase One Subtotal:		4,487	75	270	345	286	157	443
Phase Two - Neighborhood Commercial									
814	Specialty Retail	40 KSF	1,773	*	*	*	48	61	109
850	Supermarket	60 KSF	6,134	119	76	195	320	307	627
912	Drive-In Bank	3 DIL	1,234	34	24	58	77	77	154
934	Fast Food with Drive Through	4 KSF	1,984	108	104	212	72	67	139
945	Gas / Convenience Store	10 VFP	1,628	50	50	100	67	67	134
	Phase Two Subtotal:		12,753	311	254	565	584	579	1,163
	Phase One + Phase Two Subtotal:		17,240	386	524	910	870	736	1,606

Key: KSF = Thousand Square Feet Gross Floor Area
VFP = Vehicle Fueling Positions
DIL = Drive-In Lanes
DU = Dwelling Units

All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #1 MONACO&128THAM
Site Code :
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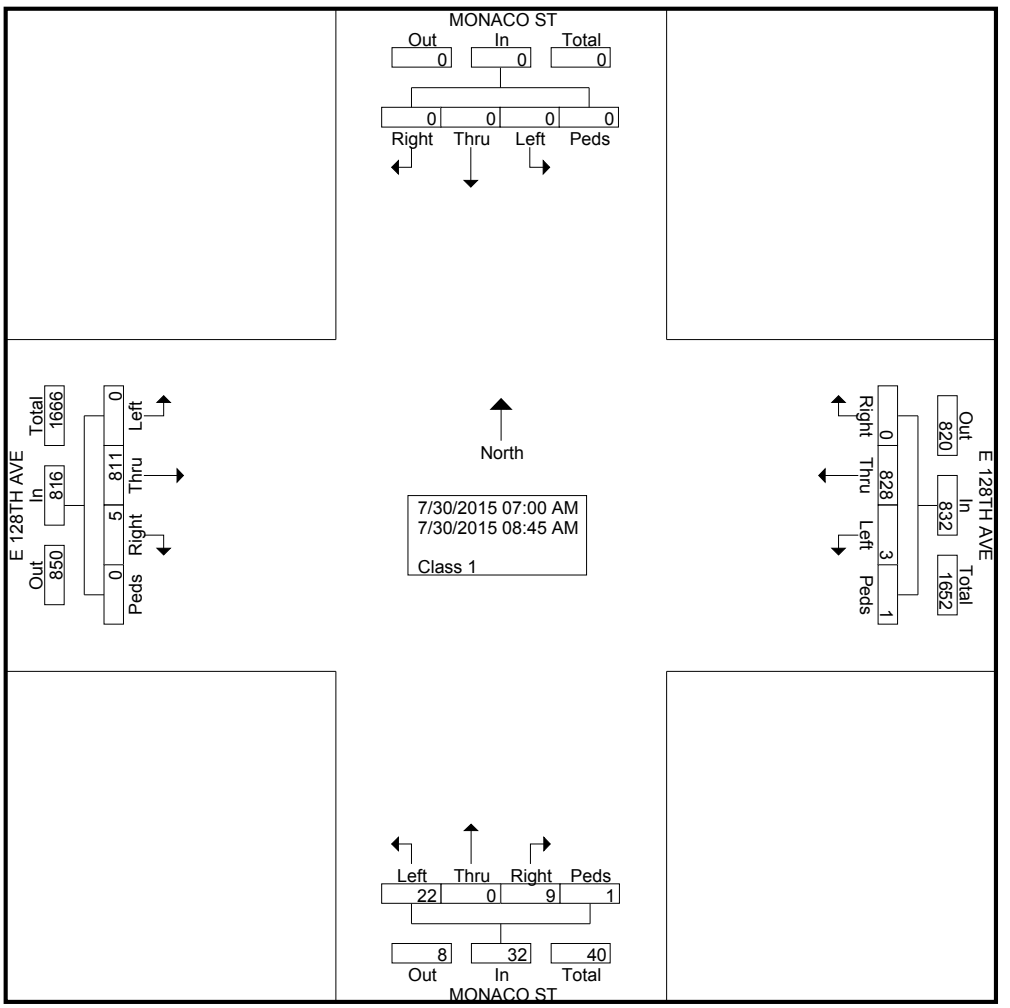
Page No : 1

Groups Printed- Class 1

	MONACO ST Southbound				E 128TH AVE Westbound				MONACO ST Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
07:00 AM	0	0	0	0	0	107	0	0	2	0	3	0	2	98	0	0	212
07:15 AM	0	0	0	0	0	114	2	0	5	0	4	0	0	114	0	0	239
07:30 AM	0	0	0	0	0	105	0	0	2	0	3	0	0	101	0	0	211
07:45 AM	0	0	0	0	0	131	1	0	0	0	2	0	0	121	0	0	255
Total	0	0	0	0	0	457	3	0	9	0	12	0	2	434	0	0	917
08:00 AM	0	0	0	0	0	96	0	1	0	0	2	1	0	102	0	0	202
08:15 AM	0	0	0	0	0	91	0	0	0	0	4	0	0	89	0	0	184
08:30 AM	0	0	0	0	0	90	0	0	0	0	2	0	1	92	0	0	185
08:45 AM	0	0	0	0	0	94	0	0	0	0	2	0	2	94	0	0	192
Total	0	0	0	0	0	371	0	1	0	0	10	1	3	377	0	0	763
Grand Total	0	0	0	0	0	828	3	1	9	0	22	1	5	811	0	0	1680
Apprch %	0	0	0	0	0	99.5	0.4	0.1	28.1	0	68.8	3.1	0.6	99.4	0	0	
Total %	0	0	0	0	0	49.3	0.2	0.1	0.5	0	1.3	0.1	0.3	48.3	0	0	



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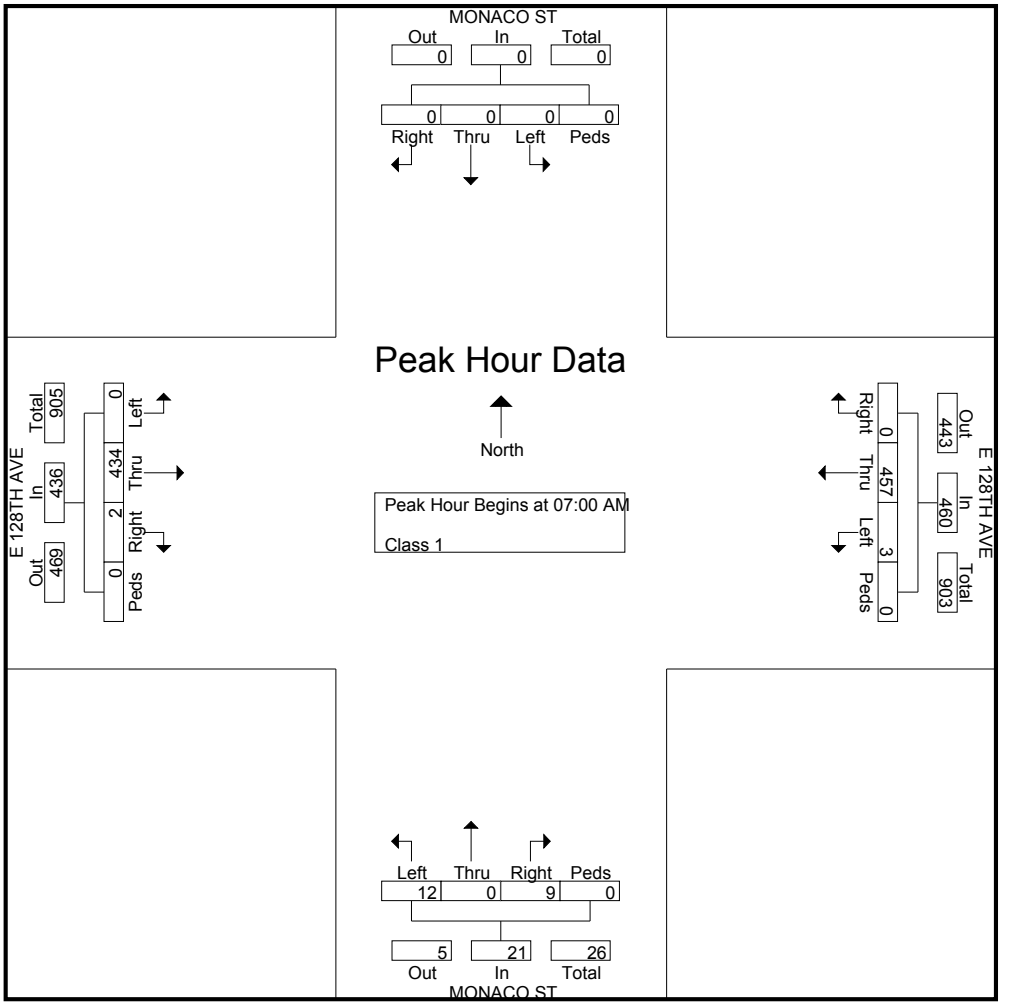
Start Date : 7/30/2015
Page No : 2

	MONACO ST Southbound					E 128TH AVE Westbound					MONACO ST Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	107	0	0	107	2	0	3	0	5	**2**	98	0	0	100	212
07:15 AM	0	0	0	0	0	0	114	**2**	0	116	**5**	0	**4**	0	**9**	0	114	0	0	114	239
07:30 AM	0	0	0	0	0	0	105	0	0	105	2	0	3	0	5	0	101	0	0	101	211
07:45 AM	0	0	0	0	0	0	**131**	1	0	**132**	0	0	2	0	2	0	**121**	0	0	**121**	**255**
Total Volume	0	0	0	0	0	0	457	3	0	460	9	0	12	0	21	2	434	0	0	436	917
% App. Total	0	0	0	0		0	99.3	0.7	0		42.9	0	57.1	0		0.5	99.5	0	0		
PHF	.000	.000	.000	.000	.000	.000	.872	.375	.000	.871	.450	.000	.750	.000	.583	.250	.897	.000	.000	.901	.899



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File Name : #1 MONACO&128THPM
Site Code :
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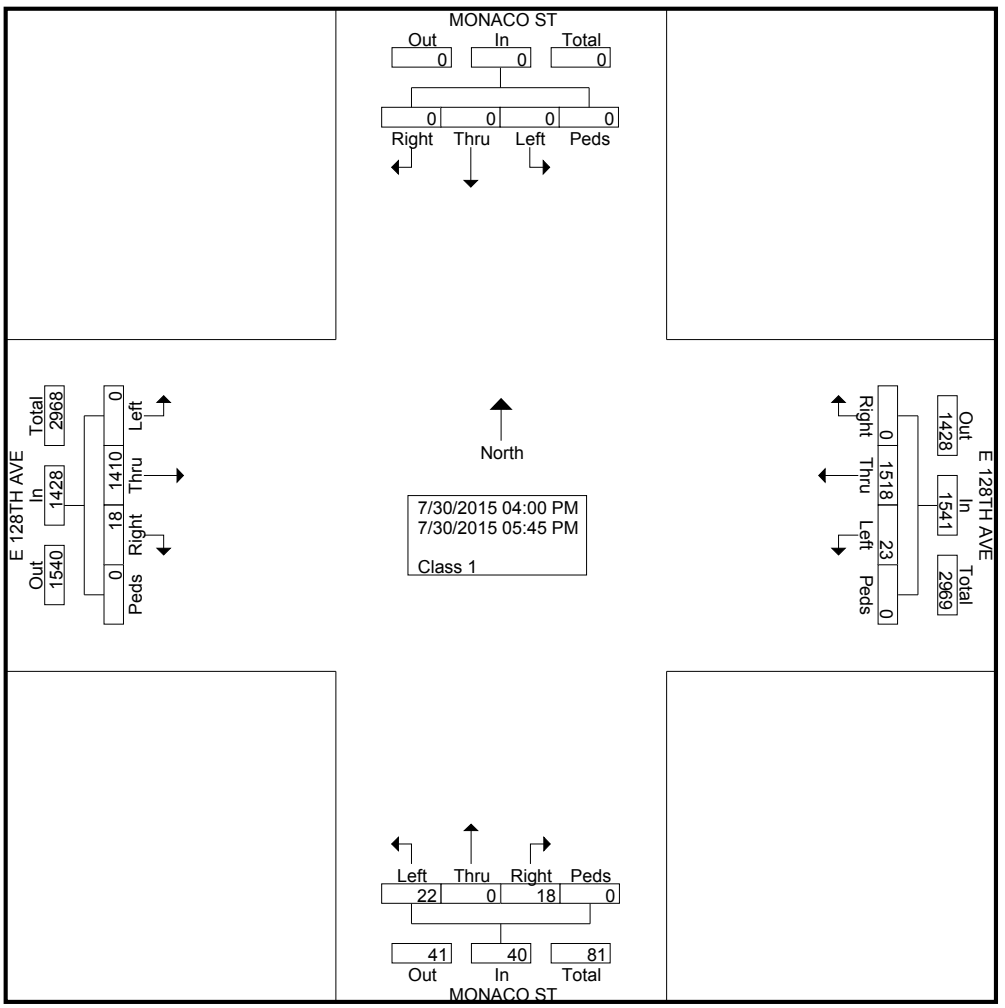
Groups Printed- Class 1

	MONACO ST Southbound				E 128TH AVE Westbound				MONACO ST Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
04:00 PM	0	0	0	0	0	147	4	0	0	0	1	0	2	169	0	0	323
04:15 PM	0	0	0	0	0	157	2	0	1	0	3	0	0	167	0	0	330
04:30 PM	0	0	0	0	0	213	2	0	3	0	1	0	4	158	0	0	381
04:45 PM	0	0	0	0	0	187	6	0	4	0	5	0	6	181	0	0	389
Total	0	0	0	0	0	704	14	0	8	0	10	0	12	675	0	0	1423
05:00 PM	0	0	0	0	0	208	4	0	3	0	2	0	2	201	0	0	420
05:15 PM	0	0	0	0	0	196	1	0	4	0	1	0	1	191	0	0	394
05:30 PM	0	0	0	0	0	214	2	0	2	0	4	0	0	184	0	0	406
05:45 PM	0	0	0	0	0	196	2	0	1	0	5	0	3	159	0	0	366
Total	0	0	0	0	0	814	9	0	10	0	12	0	6	735	0	0	1586
Grand Total	0	0	0	0	0	1518	23	0	18	0	22	0	18	1410	0	0	3009
Apprch %	0	0	0	0	0	98.5	1.5	0	45	0	55	0	1.3	98.7	0	0	
Total %	0	0	0	0	0	50.4	0.8	0	0.6	0	0.7	0	0.6	46.9	0	0	



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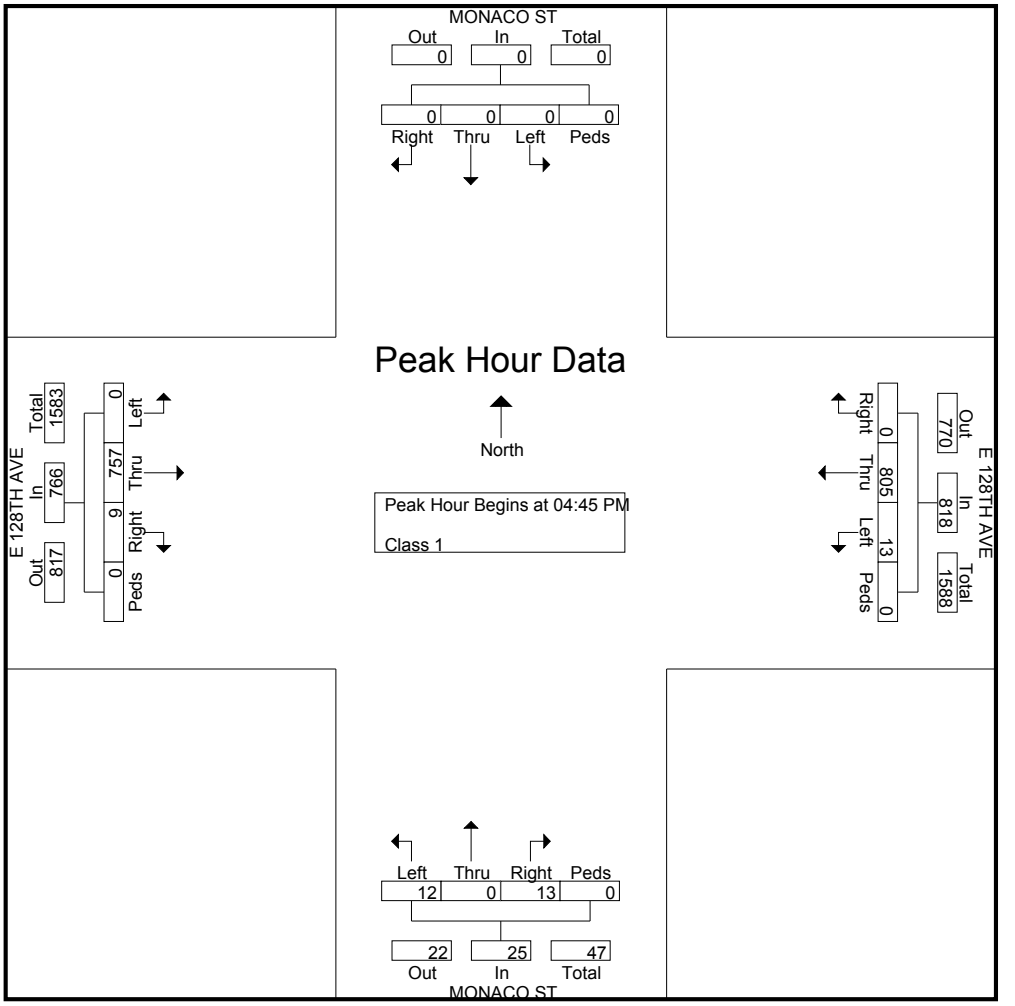
File Name : #1 MONACO&128THPM
Site Code :
Start Date : 7/30/2015
Page No : 2

	MONACO ST Southbound					E 128TH AVE Westbound					MONACO ST Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	187	**6**	0	193	**4**	0	**5**	0	**9**	**6**	181	0	0	187	389
05:00 PM	0	0	0	0	0	0	208	4	0	212	3	0	2	0	5	2	**201**	0	0	**203**	**420**
05:15 PM	0	0	0	0	0	0	196	1	0	197	4	0	1	0	5	1	191	0	0	192	394
05:30 PM	0	0	0	0	0	0	**214**	2	0	**216**	2	0	4	0	6	0	184	0	0	184	406
Total Volume	0	0	0	0	0	0	805	13	0	818	13	0	12	0	25	9	757	0	0	766	1609
% App. Total	0	0	0	0		0	98.4	1.6	0		52	0	48	0		1.2	98.8	0	0		
PHF	.000	.000	.000	.000	.000	.000	.940	.542	.000	.947	.813	.000	.600	.000	.694	.375	.942	.000	.000	.943	.958



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File Name : #2 ONEIDA&128AM
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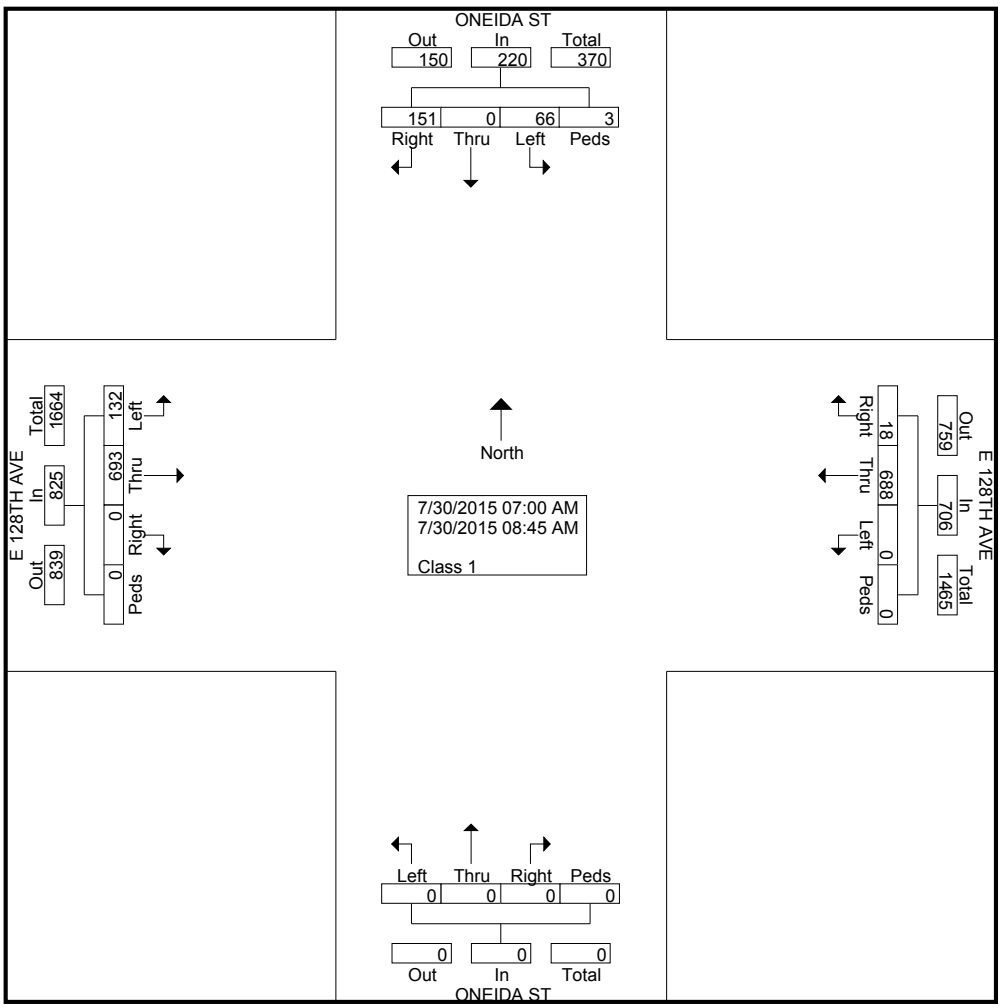
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

	ONEIDA ST Southbound				E 128TH AVE Westbound				ONEIDA ST Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
07:00 AM	23	0	7	0	1	88	0	0	0	0	0	0	0	84	5	0	208
07:15 AM	19	0	13	0	1	96	0	0	0	0	0	0	0	112	14	0	255
07:30 AM	15	0	10	1	3	81	0	0	0	0	0	0	0	87	12	0	209
07:45 AM	20	0	8	0	0	116	0	0	0	0	0	0	0	104	21	0	269
Total	77	0	38	1	5	381	0	0	0	0	0	0	0	387	52	0	941
08:00 AM	17	0	5	0	3	86	0	0	0	0	0	0	0	81	17	0	209
08:15 AM	18	0	12	1	4	76	0	0	0	0	0	0	0	72	21	0	204
08:30 AM	19	0	9	0	3	73	0	0	0	0	0	0	0	80	9	0	193
08:45 AM	20	0	2	1	3	72	0	0	0	0	0	0	0	73	33	0	204
Total	74	0	28	2	13	307	0	0	0	0	0	0	0	306	80	0	810
Grand Total	151	0	66	3	18	688	0	0	0	0	0	0	0	693	132	0	1751
Apprch %	68.6	0	30	1.4	2.5	97.5	0	0	0	0	0	0	0	84	16	0	
Total %	8.6	0	3.8	0.2	1	39.3	0	0	0	0	0	0	0	39.6	7.5	0	



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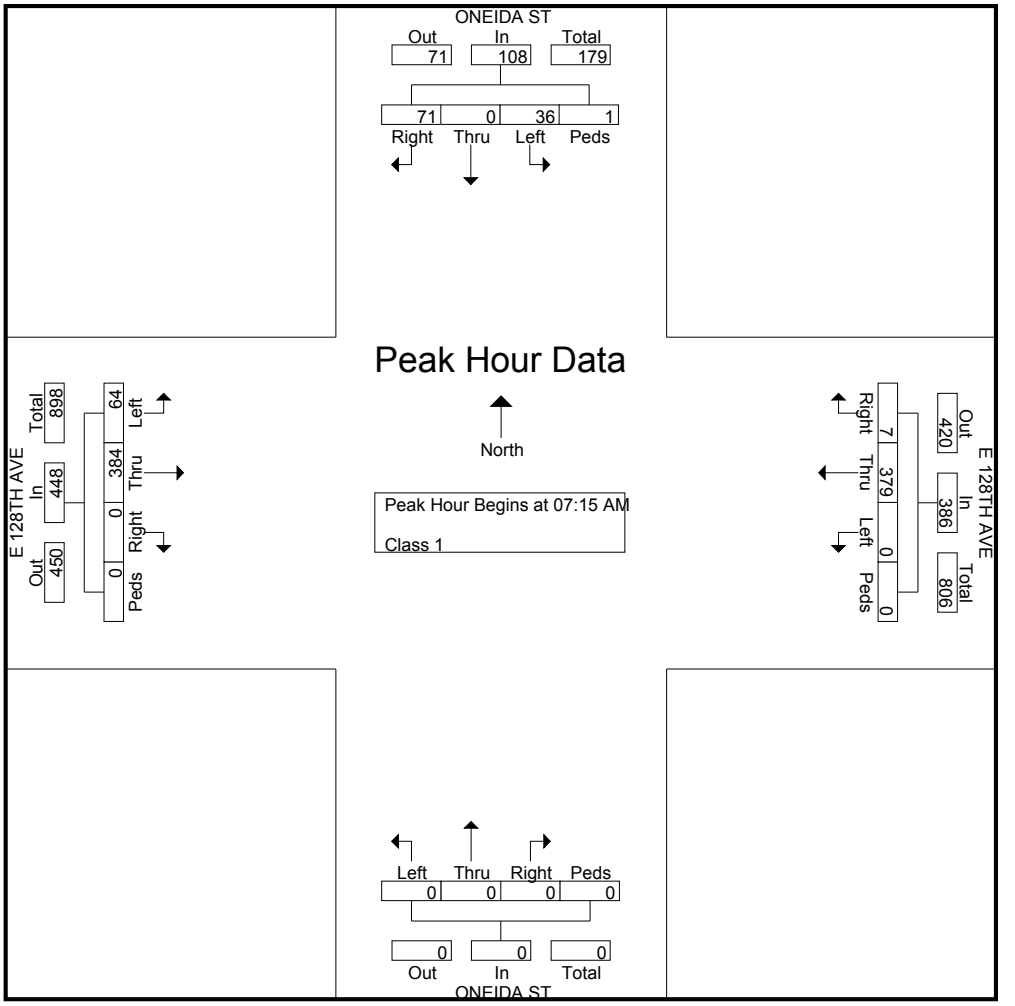
File Name : #2 ONEIDA&128AM
Site Code :
Start Date : 7/30/2015
Page No : 2

	ONEIDA ST Southbound					E 128TH AVE Westbound					ONEIDA ST Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	19	0	**13**	0	**32**	1	96	0	0	97	0	0	0	0	0	0	**112**	14	0	**126**	255
07:30 AM	15	0	10	**1**	26	**3**	81	0	0	84	0	0	0	0	0	0	87	12	0	99	209
07:45 AM	**20**	0	8	0	28	0	**116**	0	0	**116**	0	0	0	0	0	0	104	**21**	0	125	**269**
08:00 AM	17	0	5	0	22	3	86	0	0	89	0	0	0	0	0	0	81	17	0	98	209
Total Volume	71	0	36	1	108	7	379	0	0	386	0	0	0	0	0	0	384	64	0	448	942
% App. Total	65.7	0	33.3	0.9		1.8	98.2	0	0		0	0	0	0		0	85.7	14.3	0		
PHF	.888	.000	.692	.250	.844	.583	.817	.000	.000	.832	.000	.000	.000	.000	.000	.000	.857	.762	.000	.889	.875



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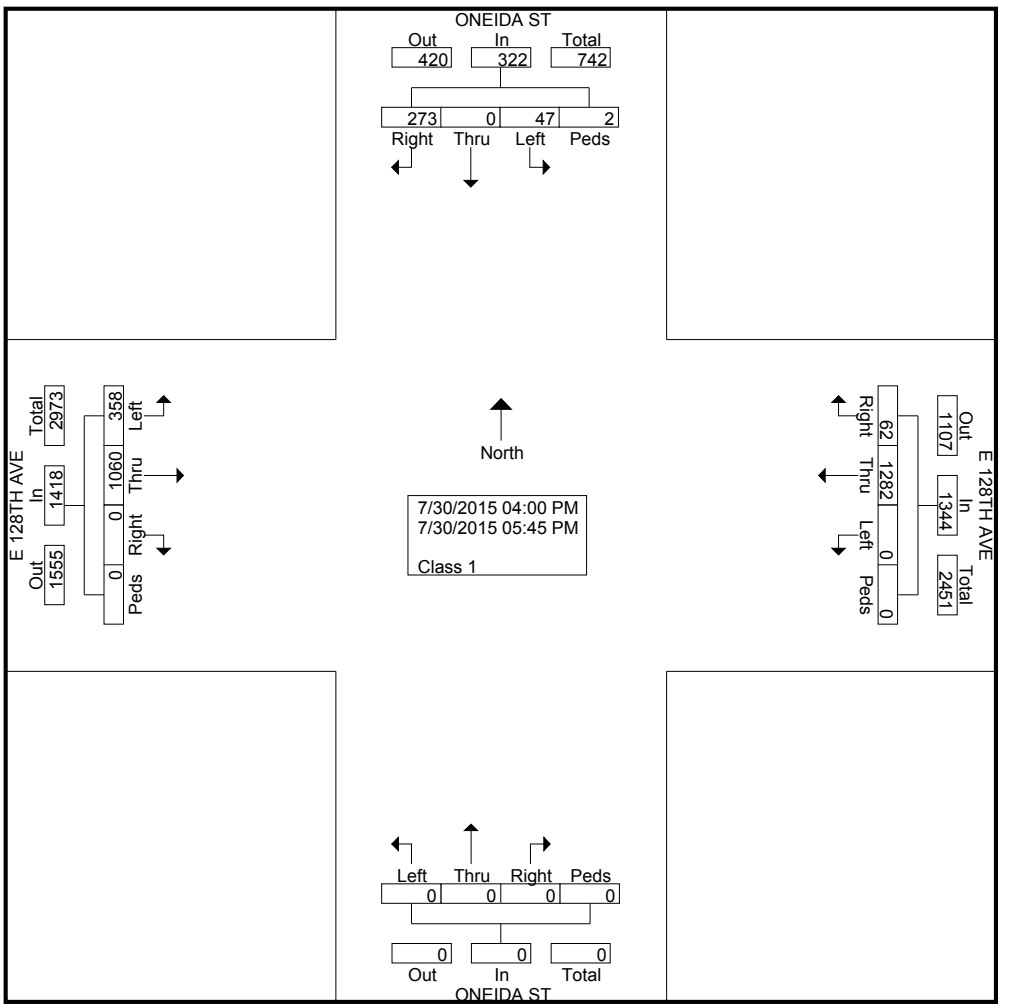
303-216-2439

File Name : #2 ONEIDA&128PM
Site Code :
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

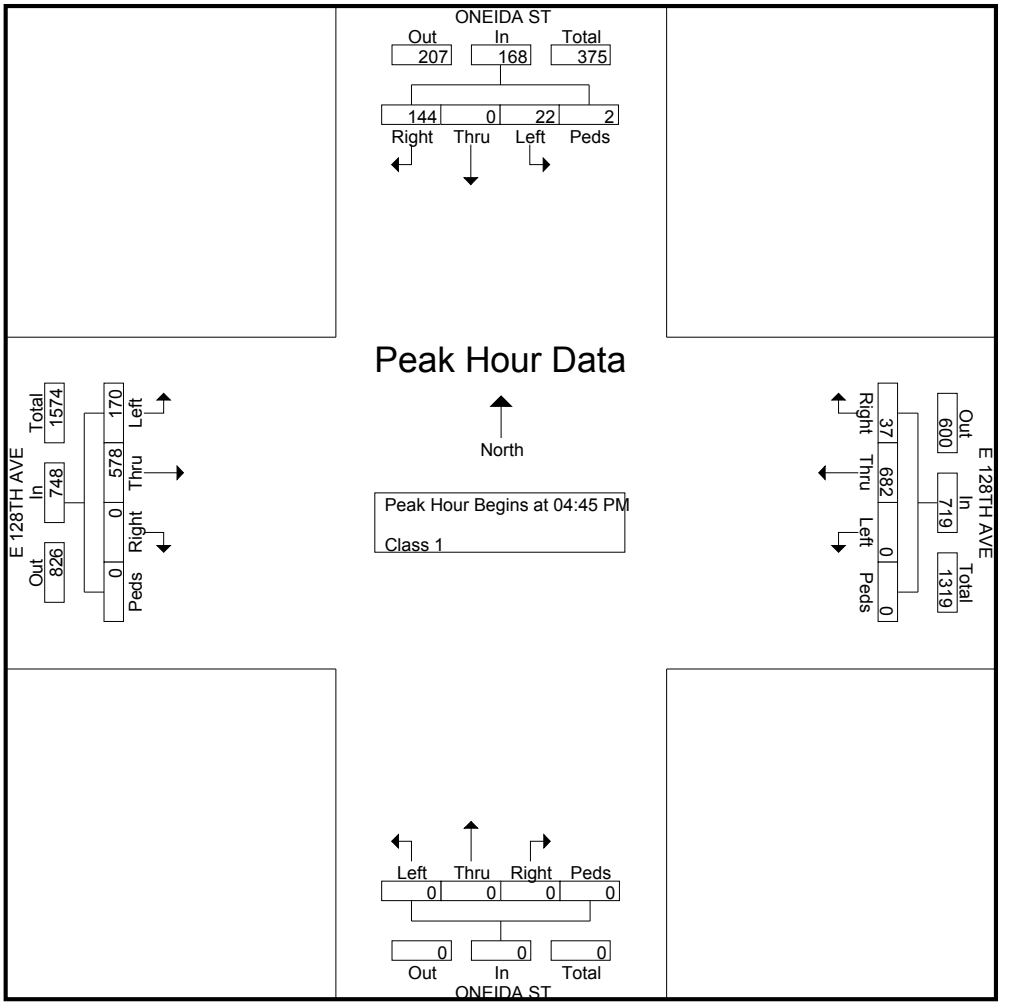
	ONEIDA ST Southbound				E 128TH AVE Westbound				ONEIDA ST Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
04:00 PM	24	0	5	0	6	130	0	0	0	0	0	0	0	121	48	0	334
04:15 PM	30	0	7	0	5	140	0	0	0	0	0	0	0	124	43	0	349
04:30 PM	38	0	4	0	9	166	0	0	0	0	0	0	0	122	43	0	382
04:45 PM	33	0	2	2	10	170	0	0	0	0	0	0	0	142	34	0	393
Total	125	0	18	2	30	606	0	0	0	0	0	0	0	509	168	0	1458
05:00 PM	35	0	9	0	12	176	0	0	0	0	0	0	0	158	43	0	433
05:15 PM	36	0	3	0	9	153	0	0	0	0	0	0	0	147	42	0	390
05:30 PM	40	0	8	0	6	183	0	0	0	0	0	0	0	131	51	0	419
05:45 PM	37	0	9	0	5	164	0	0	0	0	0	0	0	115	54	0	384
Total	148	0	29	0	32	676	0	0	0	0	0	0	0	551	190	0	1626
Grand Total	273	0	47	2	62	1282	0	0	0	0	0	0	0	1060	358	0	3084
Apprch %	84.8	0	14.6	0.6	4.6	95.4	0	0	0	0	0	0	0	74.8	25.2	0	
Total %	8.9	0	1.5	0.1	2	41.6	0	0	0	0	0	0	0	34.4	11.6	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #2 ONEIDA&128PM
Site Code :
Start Date : 7/30/2015
Page No : 2

	ONEIDA ST Southbound					E 128TH AVE Westbound					ONEIDA ST Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	33	0	2	**2**	37	10	170	0	0	180	0	0	0	0	0	0	142	34	0	176	393
05:00 PM	35	0	**9**	0	44	**12**	176	0	0	188	0	0	0	0	0	0	**158**	43	0	**201**	**433**
05:15 PM	36	0	3	0	39	9	153	0	0	162	0	0	0	0	0	0	147	42	0	189	390
05:30 PM	**40**	0	8	0	**48**	6	**183**	0	0	**189**	0	0	0	0	0	0	131	**51**	0	182	419
Total Volume	144	0	22	2	168	37	682	0	0	719	0	0	0	0	0	0	578	170	0	748	1635
% App. Total	85.7	0	13.1	1.2		5.1	94.9	0	0		0	0	0	0		0	77.3	22.7	0		
PHF	.900	.000	.611	.250	.875	.771	.932	.000	.000	.951	.000	.000	.000	.000	.000	.000	.915	.833	.000	.930	.944

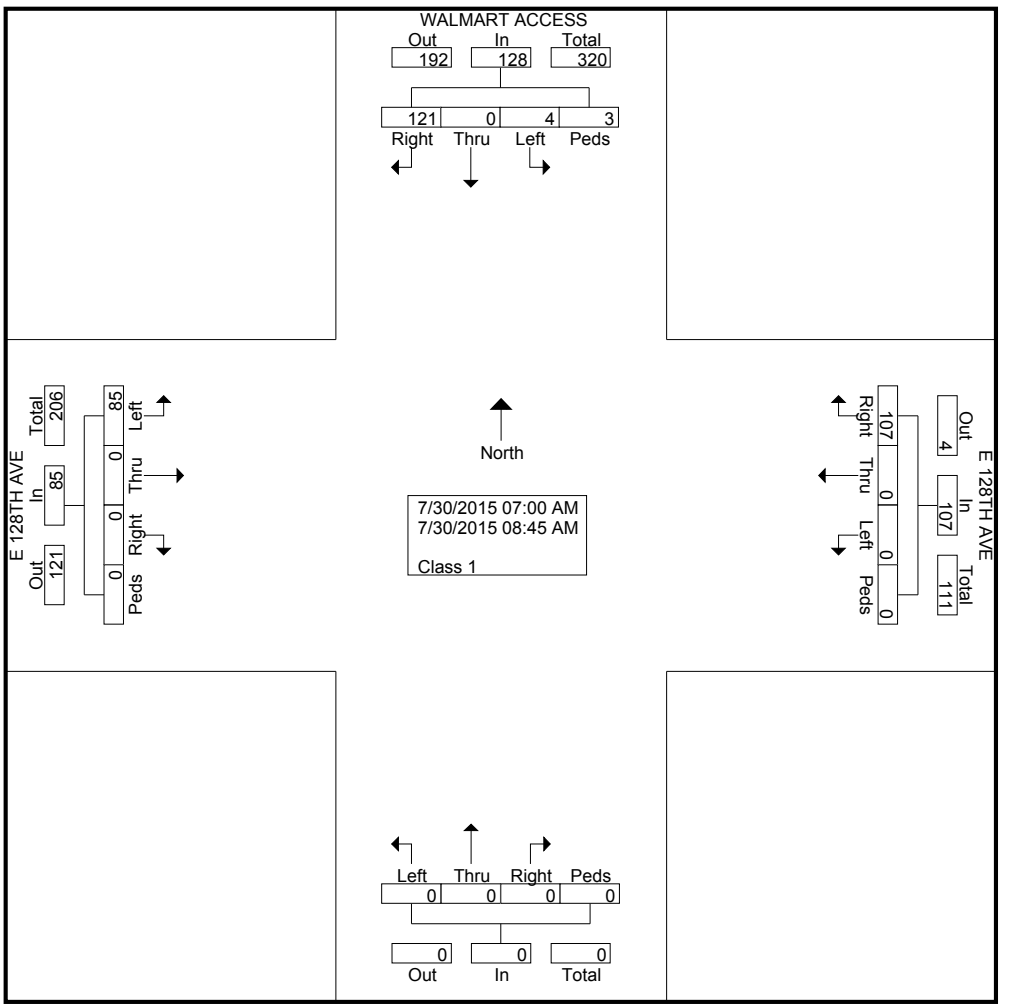


All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #5 WALMART&E128THAM
Site Code :
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

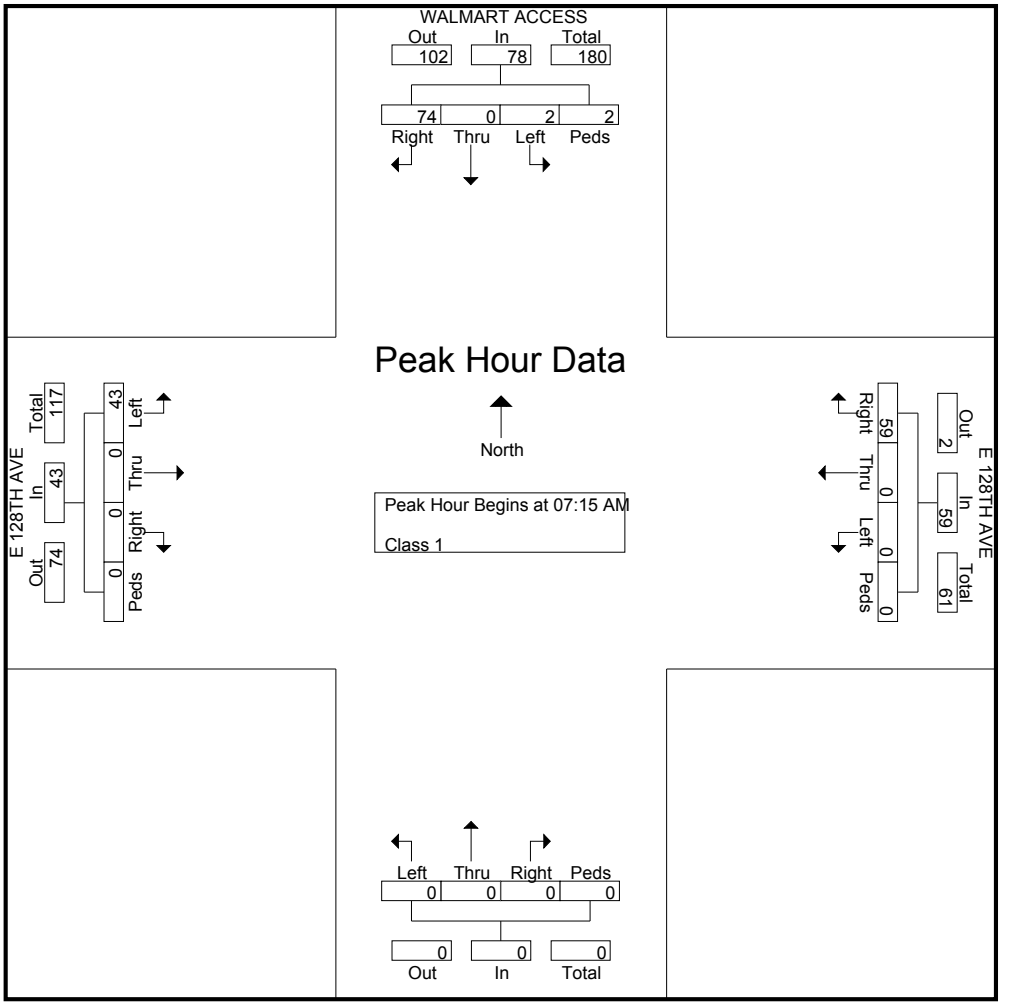
	WALMART ACCESS Southbound				E 128TH AVE Westbound				Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
07:00 AM	15	0	0	0	11	0	0	0	0	0	0	0	0	0	12	0	38
07:15 AM	21	0	1	0	16	0	0	0	0	0	0	0	0	0	10	0	48
07:30 AM	17	0	0	1	15	0	0	0	0	0	0	0	0	0	9	0	42
07:45 AM	17	0	0	1	16	0	0	0	0	0	0	0	0	0	12	0	46
Total	70	0	1	2	58	0	0	0	0	0	0	0	0	0	43	0	174
08:00 AM	19	0	1	0	12	0	0	0	0	0	0	0	0	0	12	0	44
08:15 AM	6	0	0	0	10	0	0	0	0	0	0	0	0	0	9	0	25
08:30 AM	10	0	0	0	13	0	0	0	0	0	0	0	0	0	10	0	33
08:45 AM	16	0	2	1	14	0	0	0	0	0	0	0	0	0	11	0	44
Total	51	0	3	1	49	0	0	0	0	0	0	0	0	0	42	0	146
Grand Total	121	0	4	3	107	0	0	0	0	0	0	0	0	0	85	0	320
Apprch %	94.5	0	3.1	2.3	100	0	0	0	0	0	0	0	0	0	100	0	
Total %	37.8	0	1.2	0.9	33.4	0	0	0	0	0	0	0	0	0	26.6	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #5 WALMART&E128THAM
Site Code :
Start Date : 7/30/2015
Page No : 2

	WALMART ACCESS Southbound					E 128TH AVE Westbound					Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**21**	0	**1**	0	**22**	**16**	0	0	0	**16**	0	0	0	0	0	0	0	10	0	10	**48**
07:30 AM	17	0	0	**1**	18	15	0	0	0	15	0	0	0	0	0	0	0	9	0	9	42
07:45 AM	17	0	0	1	18	16	0	0	0	16	0	0	0	0	0	0	0	**12**	0	**12**	46
08:00 AM	19	0	1	0	20	12	0	0	0	12	0	0	0	0	0	0	0	12	0	12	44
Total Volume	74	0	2	2	78	59	0	0	0	59	0	0	0	0	0	0	0	43	0	43	180
% App. Total	94.9	0	2.6	2.6		100	0	0	0		0	0	0	0		0	0	100	0		
PHF	.881	.000	.500	.500	.886	.922	.000	.000	.000	.922	.000	.000	.000	.000	.000	.000	.000	.896	.000	.896	.938

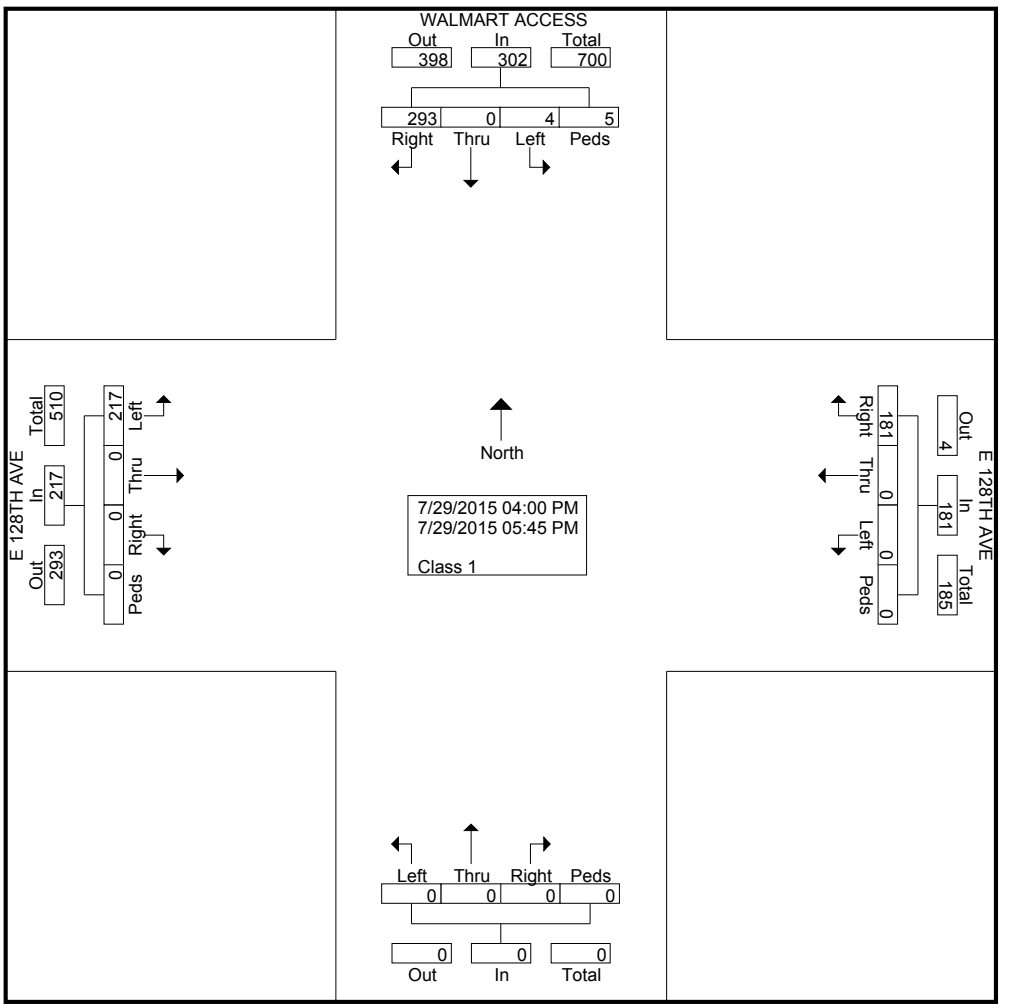


All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #5 WALMART&E128THPM
Site Code :
Start Date : 7/29/2015
Page No : 1

Groups Printed- Class 1

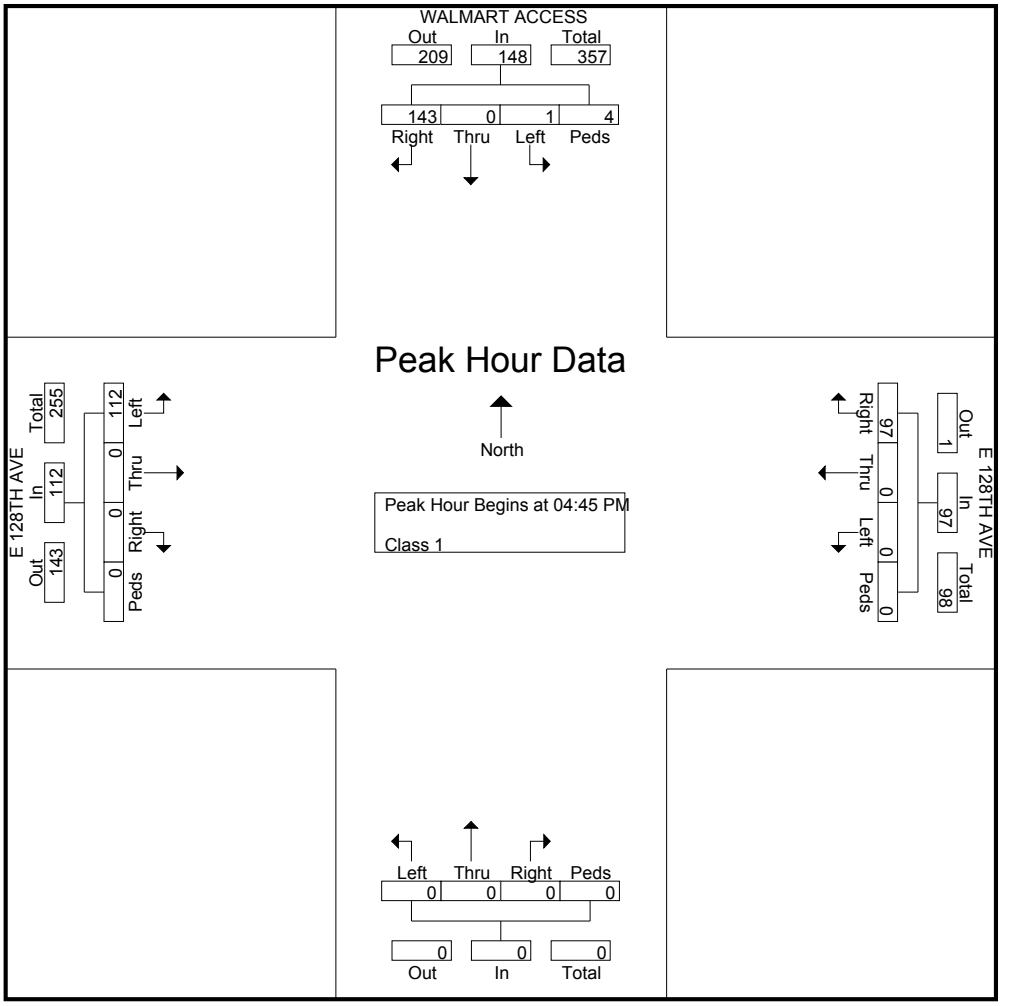
	WALMART ACCESS Southbound				E 128TH AVE Westbound				Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
04:00 PM	35	0	0	0	23	0	0	0	0	0	0	0	0	0	27	0	85
04:15 PM	40	0	2	0	18	0	0	0	0	0	0	0	0	0	29	0	89
04:30 PM	39	0	1	0	22	0	0	0	0	0	0	0	0	0	26	0	88
04:45 PM	34	0	0	2	22	0	0	0	0	0	0	0	0	0	26	0	84
Total	148	0	3	2	85	0	0	0	0	0	0	0	0	0	108	0	346
05:00 PM	35	0	0	0	17	0	0	0	0	0	0	0	0	0	28	0	80
05:15 PM	30	0	1	0	30	0	0	0	0	0	0	0	0	0	27	0	88
05:30 PM	44	0	0	2	28	0	0	0	0	0	0	0	0	0	31	0	105
05:45 PM	36	0	0	1	21	0	0	0	0	0	0	0	0	0	23	0	81
Total	145	0	1	3	96	0	0	0	0	0	0	0	0	0	109	0	354
Grand Total	293	0	4	5	181	0	0	0	0	0	0	0	0	0	217	0	700
Apprch %	97	0	1.3	1.7	100	0	0	0	0	0	0	0	0	0	100	0	
Total %	41.9	0	0.6	0.7	25.9	0	0	0	0	0	0	0	0	0	31	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #5 WALMART&E128THPM
Site Code :
Start Date : 7/29/2015
Page No : 2

	WALMART ACCESS Southbound					E 128TH AVE Westbound					Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	34	0	0	**2**	36	22	0	0	0	22	0	0	0	0	0	0	0	26	0	26	84
05:00 PM	35	0	0	0	35	17	0	0	0	17	0	0	0	0	0	0	0	28	0	28	80
05:15 PM	30	0	**1**	0	31	**30**	0	0	0	**30**	0	0	0	0	0	0	0	27	0	27	88
05:30 PM	**44**	0	0	2	**46**	28	0	0	0	28	0	0	0	0	0	0	0	**31**	0	**31**	**105**
Total Volume	143	0	1	4	148	97	0	0	0	97	0	0	0	0	0	0	0	112	0	112	357
% App. Total	96.6	0	0.7	2.7		100	0	0	0		0	0	0	0		0	0	100	0		
PHF	.813	.000	.250	.500	.804	.808	.000	.000	.000	.808	.000	.000	.000	.000	.000	.000	.000	.903	.000	.903	.850

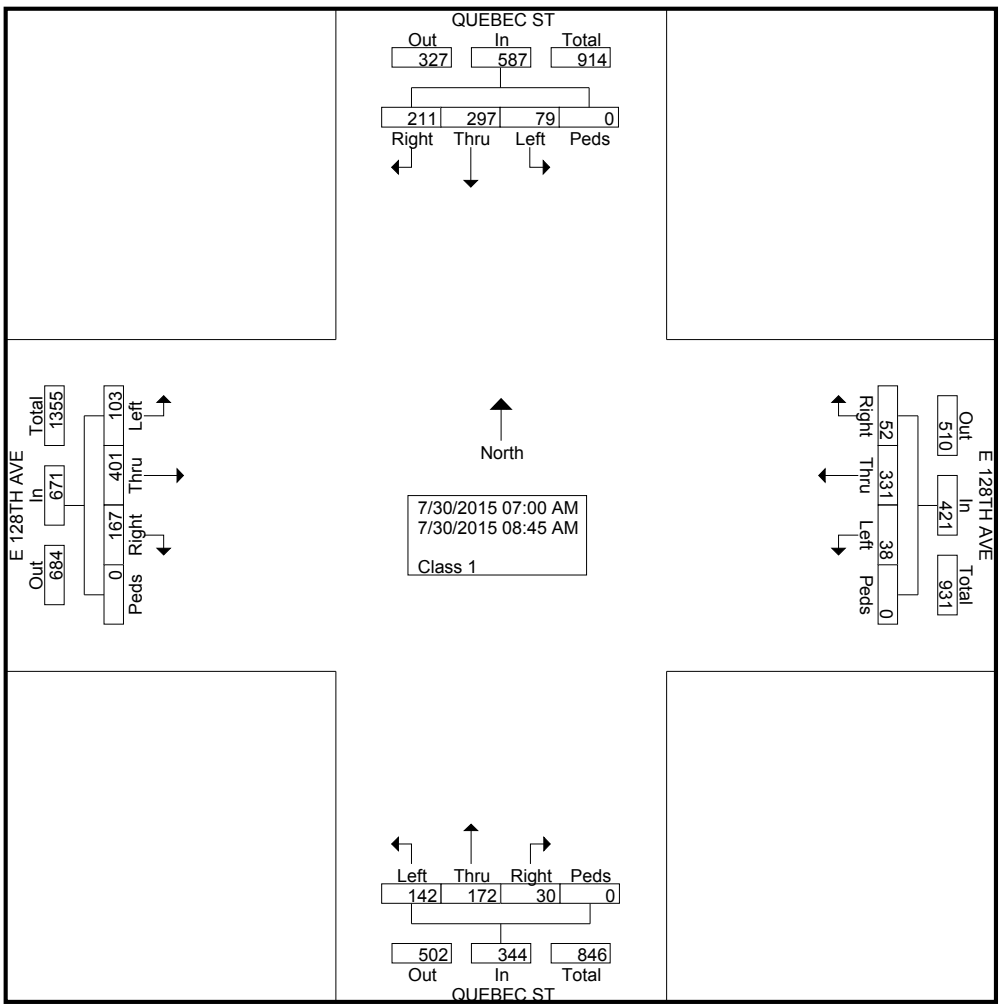


All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #3 QUEBEC&128THAM
Site Code :
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

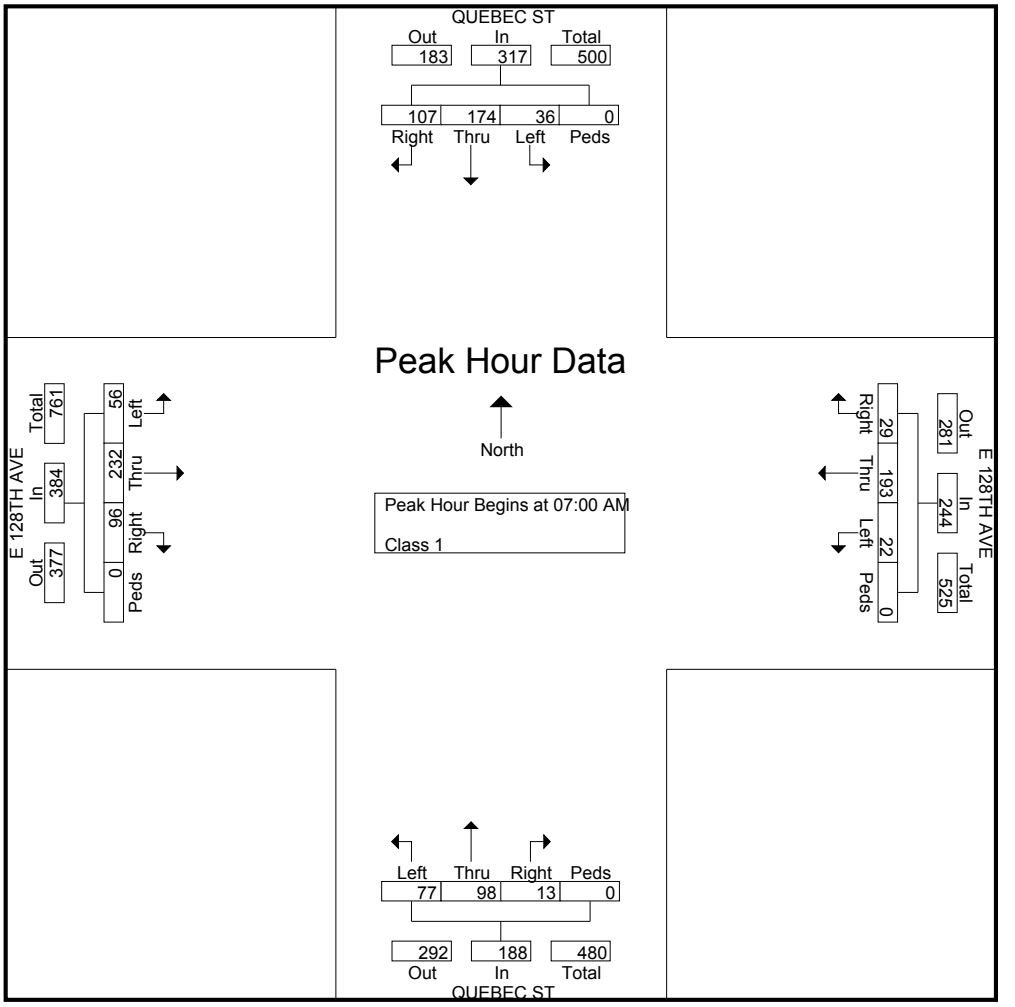
	QUEBEC ST Southbound				E 128TH AVE Westbound				QUEBEC ST Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
07:00 AM	20	34	7	0	2	44	6	0	2	27	23	0	22	55	8	0	250
07:15 AM	27	61	8	0	8	45	1	0	1	22	16	0	35	62	15	0	301
07:30 AM	31	47	11	0	9	44	6	0	2	26	20	0	18	65	11	0	290
07:45 AM	29	32	10	0	10	60	9	0	8	23	18	0	21	50	22	0	292
Total	107	174	36	0	29	193	22	0	13	98	77	0	96	232	56	0	1133
08:00 AM	20	40	15	0	5	38	3	0	4	17	13	0	16	51	8	0	230
08:15 AM	35	22	11	0	7	39	2	0	2	21	17	0	19	43	14	0	232
08:30 AM	30	36	11	0	6	32	6	0	7	13	19	0	18	45	11	0	234
08:45 AM	19	25	6	0	5	29	5	0	4	23	16	0	18	30	14	0	194
Total	104	123	43	0	23	138	16	0	17	74	65	0	71	169	47	0	890
Grand Total	211	297	79	0	52	331	38	0	30	172	142	0	167	401	103	0	2023
Apprch %	35.9	50.6	13.5	0	12.4	78.6	9	0	8.7	50	41.3	0	24.9	59.8	15.4	0	
Total %	10.4	14.7	3.9	0	2.6	16.4	1.9	0	1.5	8.5	7	0	8.3	19.8	5.1	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #3 QUEBEC&128THAM
Site Code :
Start Date : 7/30/2015
Page No : 2

	QUEBEC ST Southbound					E 128TH AVE Westbound					QUEBEC ST Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	20	34	7	0	61	2	44	6	0	52	2	**27**	**23**	0	**52**	22	55	8	0	85	250
07:15 AM	27	**61**	8	0	**96**	8	45	1	0	54	1	22	16	0	39	**35**	62	15	0	**112**	**301**
07:30 AM	**31**	47	**11**	0	89	9	44	6	0	59	2	26	20	0	48	18	**65**	11	0	94	290
07:45 AM	29	32	10	0	71	**10**	**60**	**9**	0	**79**	**8**	23	18	0	49	21	50	**22**	0	93	292
Total Volume	107	174	36	0	317	29	193	22	0	244	13	98	77	0	188	96	232	56	0	384	1133
% App. Total	33.8	54.9	11.4	0		11.9	79.1	9	0		6.9	52.1	41	0		25	60.4	14.6	0		
PHF	.863	.713	.818	.000	.826	.725	.804	.611	.000	.772	.406	.907	.837	.000	.904	.686	.892	.636	.000	.857	.941

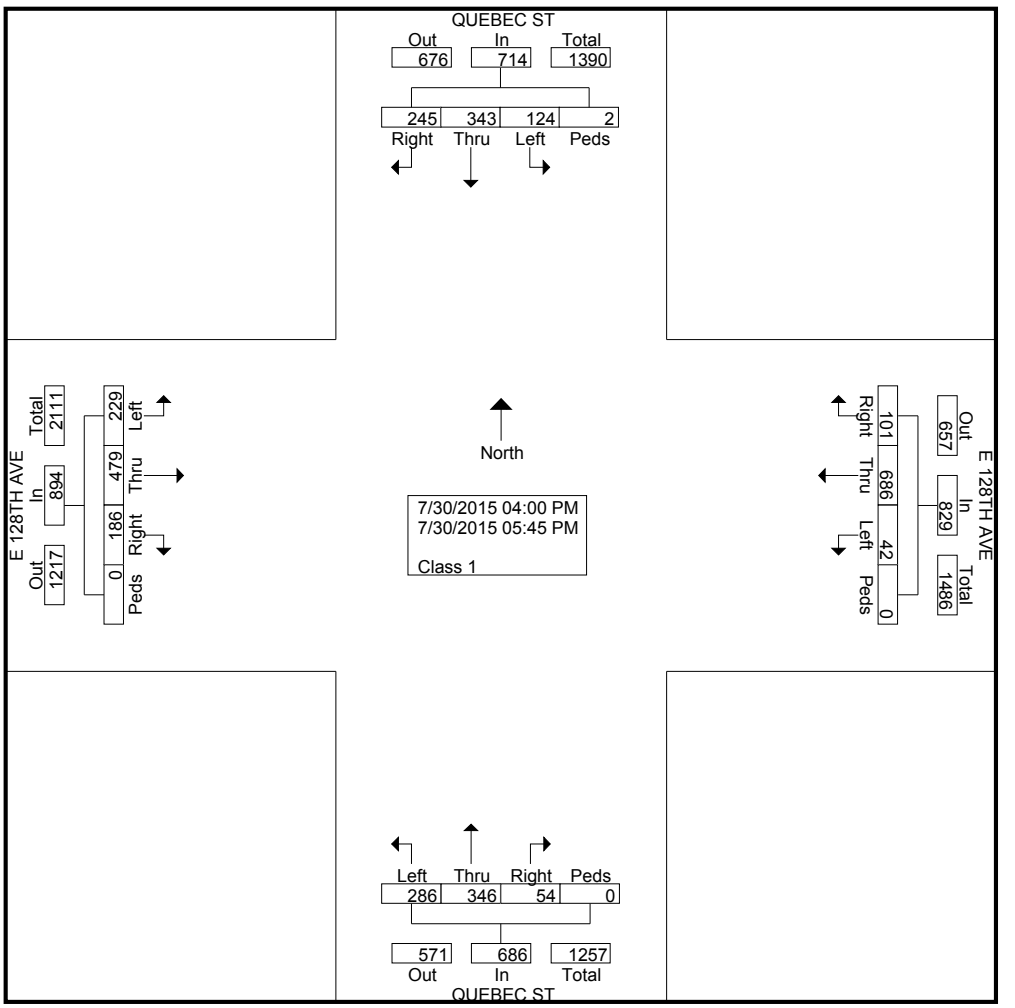


All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #3 QUEBEC&128THPM
Site Code :
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

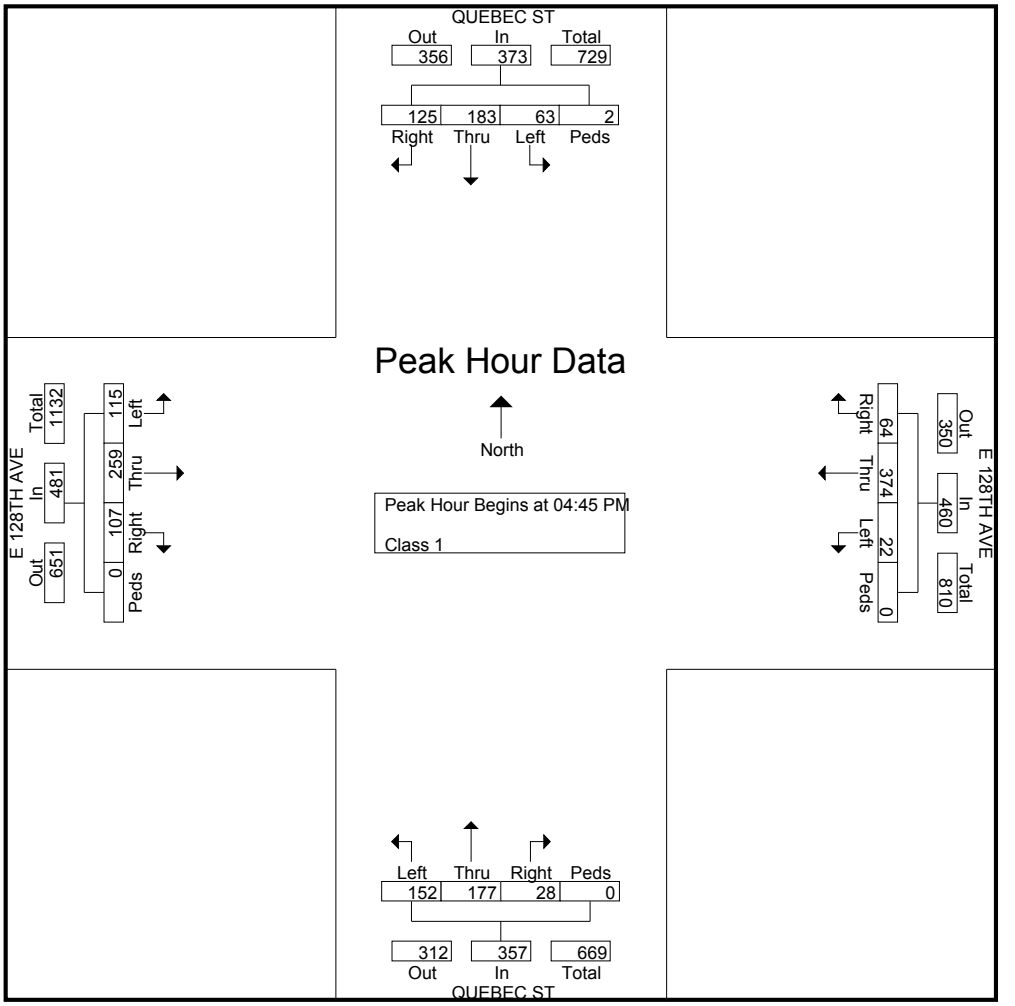
	QUEBEC ST Southbound				E 128TH AVE Westbound				QUEBEC ST Northbound				E 128TH AVE Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
04:00 PM	33	42	15	0	11	59	5	0	5	42	35	0	13	55	32	0	347
04:15 PM	20	35	14	0	8	77	4	0	6	45	34	0	25	55	32	0	355
04:30 PM	38	43	18	0	9	88	5	0	7	37	36	0	20	56	25	0	382
04:45 PM	24	40	10	2	11	84	6	0	5	36	32	0	22	70	29	0	371
Total	115	160	57	2	39	308	20	0	23	160	137	0	80	236	118	0	1455
05:00 PM	42	45	20	0	17	99	4	0	5	50	35	0	32	69	28	0	446
05:15 PM	29	44	17	0	21	106	9	0	7	48	34	0	26	62	37	0	440
05:30 PM	30	54	16	0	15	85	3	0	11	43	51	0	27	58	21	0	414
05:45 PM	29	40	14	0	9	88	6	0	8	45	29	0	21	54	25	0	368
Total	130	183	67	0	62	378	22	0	31	186	149	0	106	243	111	0	1668
Grand Total	245	343	124	2	101	686	42	0	54	346	286	0	186	479	229	0	3123
Apprch %	34.3	48	17.4	0.3	12.2	82.8	5.1	0	7.9	50.4	41.7	0	20.8	53.6	25.6	0	
Total %	7.8	11	4	0.1	3.2	22	1.3	0	1.7	11.1	9.2	0	6	15.3	7.3	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #3 QUEBEC&128THPM
Site Code :
Start Date : 7/30/2015
Page No : 2

	QUEBEC ST Southbound					E 128TH AVE Westbound					QUEBEC ST Northbound					E 128TH AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	24	40	10	**2**	76	11	84	6	0	101	5	36	32	0	73	22	**70**	29	0	121	371
05:00 PM	**42**	45	**20**	0	**107**	17	99	4	0	120	5	**50**	35	0	90	**32**	69	28	0	**129**	**446**
05:15 PM	29	44	17	0	90	**21**	**106**	**9**	0	**136**	7	48	34	0	89	26	62	**37**	0	125	440
05:30 PM	30	**54**	16	0	100	15	85	3	0	103	**11**	43	**51**	0	**105**	27	58	21	0	106	414
Total Volume	125	183	63	2	373	64	374	22	0	460	28	177	152	0	357	107	259	115	0	481	1671
% App. Total	33.5	49.1	16.9	0.5		13.9	81.3	4.8	0		7.8	49.6	42.6	0		22.2	53.8	23.9	0		
PHF	.744	.847	.788	.250	.871	.762	.882	.611	.000	.846	.636	.885	.745	.000	.850	.836	.925	.777	.000	.932	.937

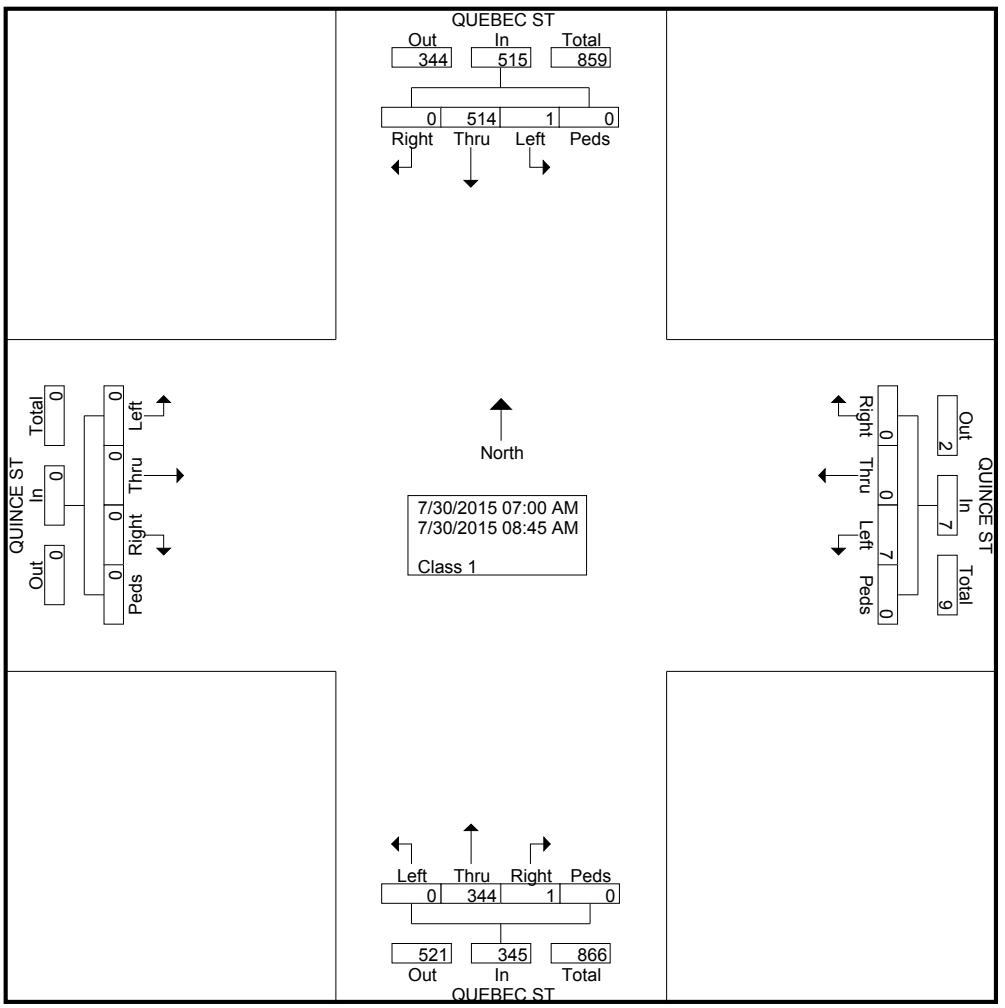


All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #4 QUEBEC&QUINCEAM
Site Code :
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

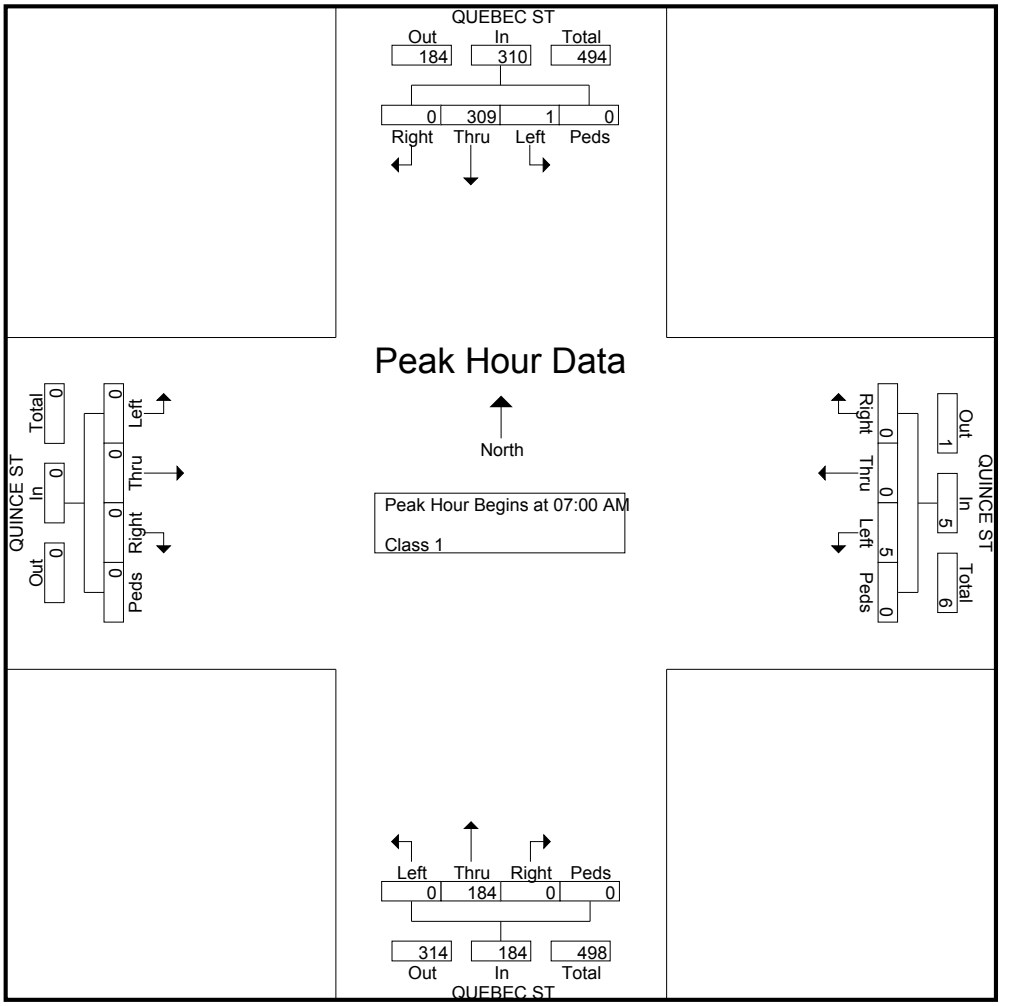
	QUEBEC ST Southbound				QUINCE ST Westbound				QUEBEC ST Northbound				QUINCE ST Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
07:00 AM	0	72	0	0	0	0	1	0	0	48	0	0	0	0	0	0	121
07:15 AM	0	87	0	0	0	0	2	0	0	41	0	0	0	0	0	0	130
07:30 AM	0	76	0	0	0	0	2	0	0	45	0	0	0	0	0	0	123
07:45 AM	0	74	1	0	0	0	0	0	0	50	0	0	0	0	0	0	125
Total	0	309	1	0	0	0	5	0	0	184	0	0	0	0	0	0	499
08:00 AM	0	48	0	0	0	0	1	0	0	41	0	0	0	0	0	0	90
08:15 AM	0	46	0	0	0	0	1	0	0	38	0	0	0	0	0	0	85
08:30 AM	0	61	0	0	0	0	0	0	1	34	0	0	0	0	0	0	96
08:45 AM	0	50	0	0	0	0	0	0	0	47	0	0	0	0	0	0	97
Total	0	205	0	0	0	0	2	0	1	160	0	0	0	0	0	0	368
Grand Total	0	514	1	0	0	0	7	0	1	344	0	0	0	0	0	0	867
Apprch %	0	99.8	0.2	0	0	0	100	0	0.3	99.7	0	0	0	0	0	0	
Total %	0	59.3	0.1	0	0	0	0.8	0	0.1	39.7	0	0	0	0	0	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #4 QUEBEC&QUINCEAM
Site Code :
Start Date : 7/30/2015
Page No : 2

	QUEBEC ST Southbound					QUINCE ST Westbound					QUEBEC ST Northbound					QUINCE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	72	0	0	72	0	0	1	0	1	0	48	0	0	48	0	0	0	0	0	121
07:15 AM	0	**87**	0	0	**87**	0	0	**2**	0	**2**	0	41	0	0	41	0	0	0	0	0	**130**
07:30 AM	0	76	0	0	76	0	0	2	0	2	0	45	0	0	45	0	0	0	0	0	123
07:45 AM	0	74	**1**	0	75	0	0	0	0	0	0	**50**	0	0	**50**	0	0	0	0	0	125
Total Volume	0	309	1	0	310	0	0	5	0	5	0	184	0	0	184	0	0	0	0	0	499
% App. Total	0	99.7	0.3	0		0	0	100	0		0	100	0	0		0	0	0	0		
PHF	.000	.888	.250	.000	.891	.000	.000	.625	.000	.625	.000	.920	.000	.000	.920	.000	.000	.000	.000	.000	.960



All Traffic Data Services, Inc
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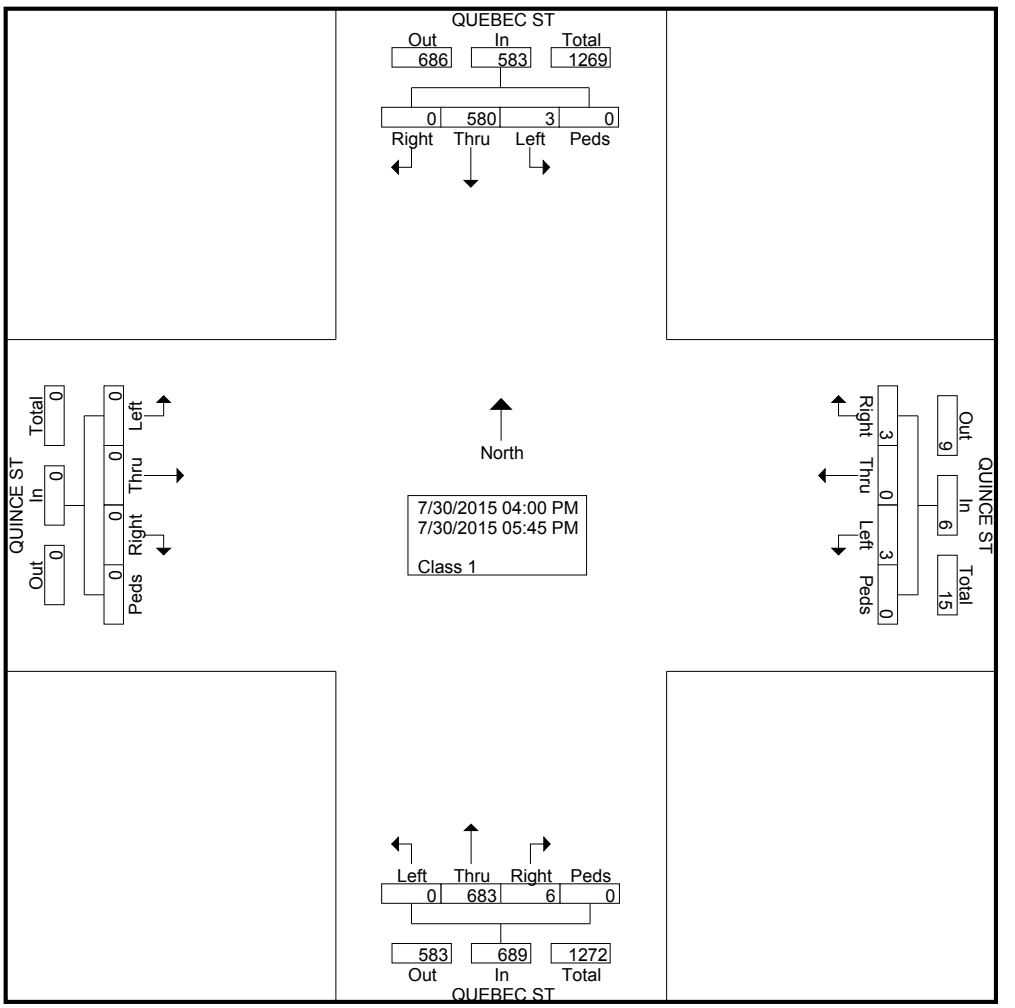
Wheat Ridge,CO 80033
303-216-2439

File Name : #4 QUEBEC&QUINCEPM
Site Code :
Start Date : 7/30/2015
Page No : 1

Groups Printed- Class 1

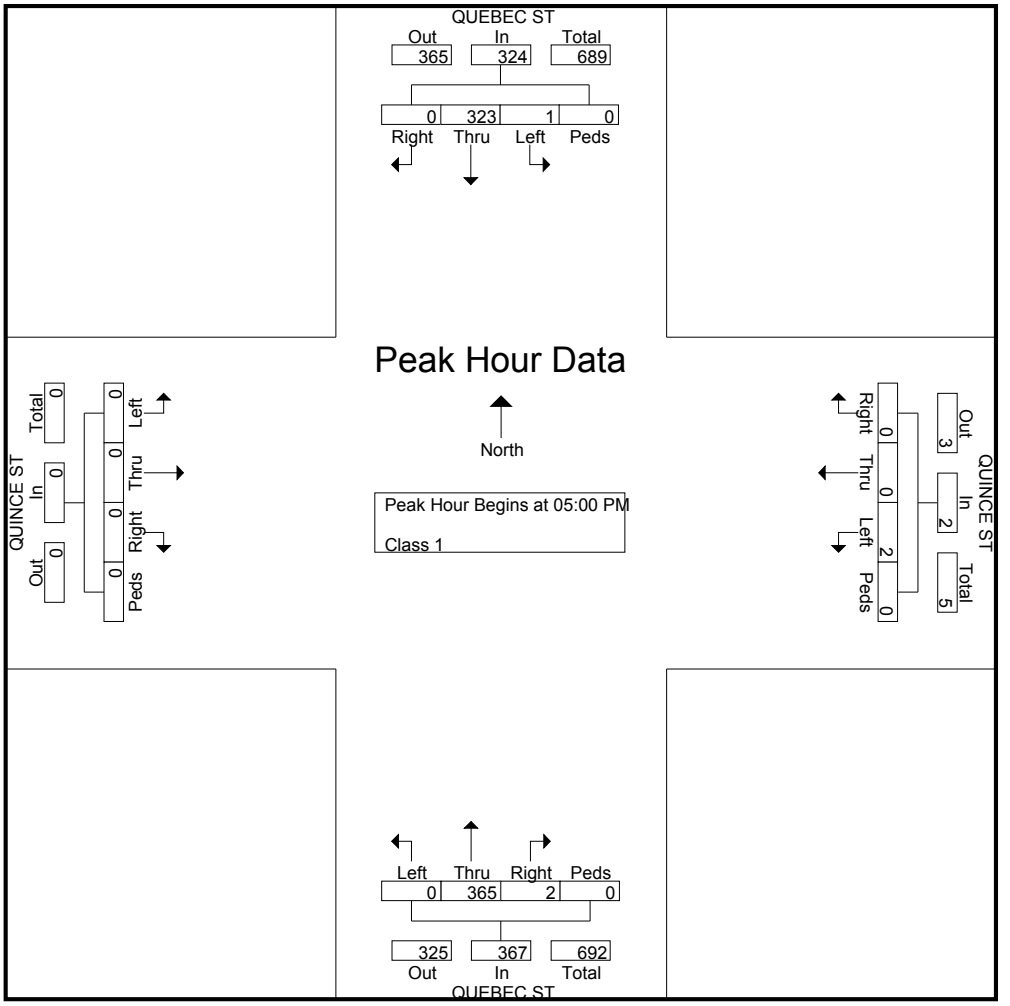
	QUEBEC ST Southbound				QUINCE ST Westbound				QUEBEC ST Northbound				QUINCE ST Eastbound				
Start Time	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Right**	**Thru**	**Left**	**Peds**	**Int. Total**
04:00 PM	0	60	0	0	1	0	1	0	0	80	0	0	0	0	0	0	142
04:15 PM	0	63	0	0	1	0	0	0	1	72	0	0	0	0	0	0	137
04:30 PM	0	67	1	0	1	0	0	0	2	90	0	0	0	0	0	0	161
04:45 PM	0	67	1	0	0	0	0	0	1	76	0	0	0	0	0	0	145
Total	0	257	2	0	3	0	1	0	4	318	0	0	0	0	0	0	585
05:00 PM	0	79	0	0	0	0	1	0	1	92	0	0	0	0	0	0	173
05:15 PM	0	75	0	0	0	0	0	0	0	84	0	0	0	0	0	0	159
05:30 PM	0	82	1	0	0	0	1	0	0	100	0	0	0	0	0	0	184
05:45 PM	0	87	0	0	0	0	0	0	1	89	0	0	0	0	0	0	177
Total	0	323	1	0	0	0	2	0	2	365	0	0	0	0	0	0	693
Grand Total	0	580	3	0	3	0	3	0	6	683	0	0	0	0	0	0	1278
Apprch %	0	99.5	0.5	0	50	0	50	0	0.9	99.1	0	0	0	0	0	0	
Total %	0	45.4	0.2	0	0.2	0	0.2	0	0.5	53.4	0	0	0	0	0	0	



All Traffic Data Services, Inc
9660 W 44th Ave
Wheat Ridge,CO 80033
303-216-2439

File Name : #4 QUEBEC&QUINCEPM
Site Code :
Start Date : 7/30/2015
Page No : 2

	QUEBEC ST Southbound					QUINCE ST Westbound					QUEBEC ST Northbound					QUINCE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	79	0	0	79	0	0	**1**	0	**1**	**1**	92	0	0	93	0	0	0	0	0	173
05:15 PM	0	75	0	0	75	0	0	0	0	0	0	84	0	0	84	0	0	0	0	0	159
05:30 PM	0	82	**1**	0	83	0	0	1	0	1	0	**100**	0	0	**100**	0	0	0	0	0	**184**
05:45 PM	0	**87**	0	0	**87**	0	0	0	0	0	1	89	0	0	90	0	0	0	0	0	177
Total Volume	0	323	1	0	324	0	0	2	0	2	2	365	0	0	367	0	0	0	0	0	693
% App. Total	0	99.7	0.3	0		0	0	100	0		0.5	99.5	0	0		0	0	0	0		
PHF	.000	.928	.250	.000	.931	.000	.000	.500	.000	.500	.500	.913	.000	.000	.918	.000	.000	.000	.000	.000	.942



All Traffic Data Services, Inc
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Site Code: 6
Station ID: 6
128TH AVE W/O QUEBEC ST
128TH AVE W/O QUEBEC ST

Start Time	30-Jul-15 Thu	EB	WB							Total
12:00 AM		18	29							47
01:00		18	21							39
02:00		21	15							36
03:00		21	14							35
04:00		41	30							71
05:00		151	89							240
06:00		256	217							473
07:00		**367**	**350**							**717**
08:00		298	316							614
09:00		231	290							521
10:00		188	281							469
11:00		228	296							524
12:00 PM		250	344							594
01:00		241	314							555
02:00		247	391							638
03:00		340	427							767
04:00		389	548							937
05:00		**434**	**602**							**1036**
06:00		322	470							792
07:00		299	309							608
08:00		225	270							495
09:00		149	210							359
10:00		87	101							188
11:00		54	61							115
Total		4875	5995							10870
Percent		44.8%	55.2%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	367	350	-	-	-	-	-	-	717
PM Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	434	602	-	-	-	-	-	-	1036
Grand Total		4875	5995							10870
Percent		44.8%	55.2%							
ADT		ADT 10,870		AADT 10,870						

All Traffic Data Services, Inc
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Wheat Ridge,CO 80033
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Site Code: 7
Station ID: 7
QUEBEC ST S/O 128TH AVE
QUEBEC ST S/O 128TH AVE

Start Time	30-Jul-15 Thu	NB	SB							Total
12:00 AM		24	14							38
01:00		13	15							28
02:00		14	13							27
03:00		9	11							20
04:00		17	45							62
05:00		49	136							185
06:00		142	239							381
07:00		**187**	**309**							**496**
08:00		164	205							369
09:00		159	171							330
10:00		151	132							283
11:00		161	151							312
12:00 PM		169	172							341
01:00		175	163							338
02:00		200	176							376
03:00		245	208							453
04:00		322	259							581
05:00		**357**	**330**							**687**
06:00		299	212							511
07:00		198	186							384
08:00		159	146							305
09:00		120	108							228
10:00		73	49							122
11:00		35	34							69
Total		3442	3484							6926
Percent		49.7%	50.3%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	187	309	-	-	-	-	-	-	496
PM Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	357	330	-	-	-	-	-	-	687
Grand Total		3442	3484							6926
Percent		49.7%	50.3%							
ADT		ADT 6,926		AADT 6,926						

APPENDIX B

Level of Service Definitions

The following information can be found in the Highway Capacity Manual, Transportation Research Board, 2010: Chapter 18 – Signalized Intersections and Chapter 19 – Two-Way Stop Controlled Intersections.

Automobile Level of Service (LOS) for Signalized Intersections

Levels of service are defined to represent reasonable ranges in control delay.

LOS A

Describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B

Describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C

Describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is .significant, although many vehicles still pass through the intersection without stopping.

LOS D

Describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0.This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E

Describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F

Describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Level of Service (LOS) for Unsignalized TWSC Intersections

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

APPENDIX C

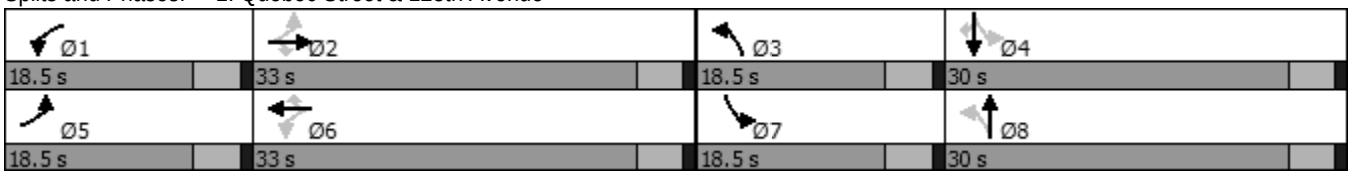
Capacity Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	232	96	22	197	29	77	98	13	36	191	107
Future Volume (vph)	56	232	96	22	197	29	77	98	13	36	191	107
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1831	0	1770	1863	1583
Flt Permitted	0.563			0.556			0.400			0.679		
Satd. Flow (perm)	1049	1863	1583	1036	1863	1583	745	1831	0	1265	1863	1583
Satd. Flow (RTOR)			115			115		6				116
Lane Group Flow (vph)	61	252	104	24	214	32	84	121	0	39	208	116
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	18.5	33.0	33.0	18.5	33.0	33.0	18.5	30.0		18.5	30.0	30.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Act Effct Green (s)	37.9	30.4	30.4	36.3	29.6	29.6	22.4	17.2		19.6	13.9	13.9
Actuated g/C Ratio	0.52	0.42	0.42	0.50	0.40	0.40	0.31	0.24		0.27	0.19	0.19
v/c Ratio	0.10	0.33	0.14	0.04	0.28	0.05	0.24	0.28		0.10	0.59	0.29
Control Delay	10.2	18.3	3.9	10.2	18.7	0.1	18.1	24.9		16.5	35.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	10.2	18.3	3.9	10.2	18.7	0.1	18.1	24.9		16.5	35.2	7.9
LOS	B	B	A	B	B	A	B	C		B	D	A
Approach Delay		13.5			15.7			22.1			24.4	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	13	79	0	5	67	0	26	46		12	89	0
Queue Length 95th (ft)	36	161	27	18	142	0	56	94		31	162	40
Internal Link Dist (ft)		1247			2042			2134			1072	
Turn Bay Length (ft)	200		75	365		260	30			220		280
Base Capacity (vph)	736	775	726	732	754	709	465	668		538	676	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.08	0.33	0.14	0.03	0.28	0.05	0.18	0.18		0.07	0.31	0.18

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 73.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 18.5 — Intersection LOS: B
Intersection Capacity Utilization 43.2% — ICU Level of Service A
Analysis Period (min) 15

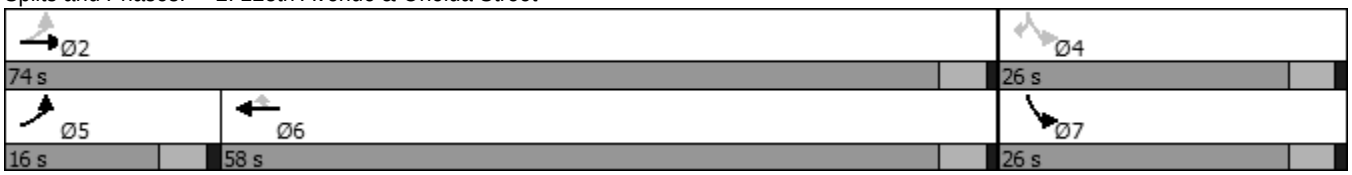
Splits and Phases: 1: Quebec Street & 128th Avenue



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	64	391	389	7	36	71
Future Volume (vph)	64	391	389	7	36	71
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.314				0.950	
Satd. Flow (perm)	585	1863	1863	1583	1770	1583
Satd. Flow (RTOR)				8		77
Lane Group Flow (vph)	70	425	423	8	39	77
Turn Type	pm+pt	NA	NA	Perm	pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2			6	4	4
Total Split (s)	16.0	74.0	58.0	58.0	26.0	26.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	26.6	29.3	14.3	14.3	6.9	6.8
Actuated g/C Ratio	0.71	0.79	0.38	0.38	0.18	0.18
v/c Ratio	0.11	0.29	0.59	0.01	0.12	0.22
Control Delay	3.2	3.6	14.6	6.0	17.9	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	3.6	14.6	6.0	17.9	7.6
LOS	A	A	B	A	B	A
Approach Delay		3.6	14.4		11.1	
Approach LOS		A	B		B	
Queue Length 50th (ft)	5	36	79	0	8	0
Queue Length 95th (ft)	14	75	165	6	31	28
Internal Link Dist (ft)		1249	1247		1008	
Turn Bay Length (ft)	240			290	66	80
Base Capacity (vph)	817	1863	1863	1583	1118	1028
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.23	0.23	0.01	0.03	0.07

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 37.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 38.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: 128th Avenue & Oneida Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	446	2	3	457	12	9
Future Volume (Veh/h)	446	2	3	457	12	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	485	2	3	497	13	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			487		988	485
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			487		988	485
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	98
cM capacity (veh/h)			1076		273	582

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	485	2	3	497	23
Volume Left	0	0	3	0	13
Volume Right	0	2	0	0	10
cSH	1700	1700	1076	1700	355
Volume to Capacity	0.29	0.00	0.00	0.29	0.06
Queue Length 95th (ft)	0	0	0	0	5
Control Delay (s)	0.0	0.0	8.4	0.0	15.8
Lane LOS			A		C
Approach Delay (s)	0.0		0.1		15.8
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	0	188	0	1	309
Future Volume (Veh/h)	5	0	188	0	1	309
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	204	0	1	336
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	542	204			204	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	204			204	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	501	837			1368	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	5	204	337
Volume Left	5	0	1
Volume Right	0	0	0
cSH	501	1700	1368
Volume to Capacity	0.01	0.12	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	12.3	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	12.3	0.0	0.0
Approach LOS	B		

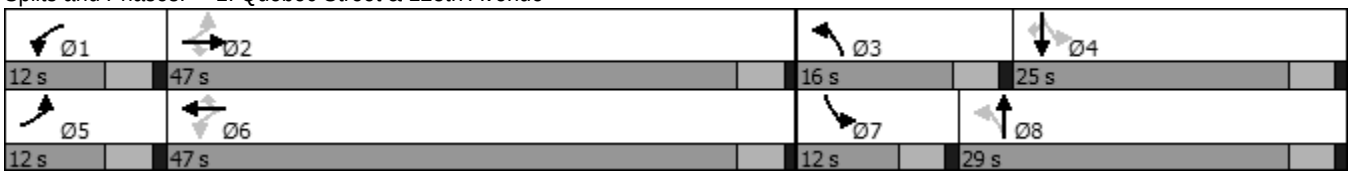
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

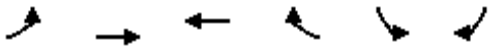
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	288	107	22	396	64	152	185	28	63	194	125
Future Volume (vph)	115	288	107	22	396	64	152	185	28	63	194	125
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1827	0	1770	1863	1583
Flt Permitted	0.358			0.497			0.316			0.539		
Satd. Flow (perm)	667	1863	1583	926	1863	1583	589	1827	0	1004	1863	1583
Satd. Flow (RTOR)			115			115		7				136
Lane Group Flow (vph)	125	313	116	24	430	70	165	231	0	68	211	136
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0		11.5	20.0	20.0
Total Split (s)	12.0	47.0	47.0	12.0	47.0	47.0	16.0	29.0		12.0	25.0	25.0
Total Split (%)	12.0%	47.0%	47.0%	12.0%	47.0%	47.0%	16.0%	29.0%		12.0%	25.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None		None	None	None
Act Effct Green (s)	52.0	44.3	44.3	49.8	43.2	43.2	30.8	21.7		23.5	16.0	16.0
Actuated g/C Ratio	0.55	0.47	0.47	0.53	0.46	0.46	0.33	0.23		0.25	0.17	0.17
v/c Ratio	0.27	0.36	0.14	0.04	0.50	0.09	0.50	0.54		0.22	0.67	0.36
Control Delay	11.4	18.3	3.8	10.0	21.4	1.1	28.4	36.9		23.5	47.5	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	11.4	18.3	3.8	10.0	21.4	1.1	28.4	36.9		23.5	47.5	8.9
LOS	B	B	A	A	C	A	C	D		C	D	A
Approach Delay		13.7			18.2			33.4			30.9	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	32	117	0	6	180	0	72	123		28	121	0
Queue Length 95th (ft)	65	202	32	18	293	8	122	198		57	195	48
Internal Link Dist (ft)		1247			2042			2134			1072	
Turn Bay Length (ft)	200		75	365		260	30			220		280
Base Capacity (vph)	466	879	807	577	856	789	345	493		322	418	460
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.27	0.36	0.14	0.04	0.50	0.09	0.48	0.47		0.21	0.50	0.30

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 93.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 22.9 Intersection LOS: C
Intersection Capacity Utilization 59.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue



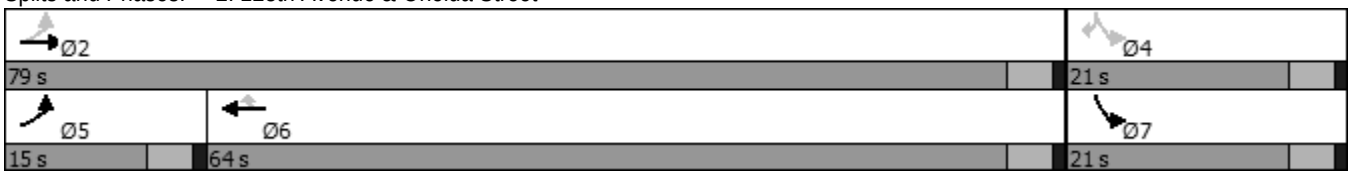


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	170	600	682	37	22	144
Future Volume (vph)	170	600	682	37	22	144
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.137				0.950	
Satd. Flow (perm)	255	1863	1863	1583	1770	1583
Satd. Flow (RTOR)				40		157
Lane Group Flow (vph)	185	652	741	40	24	157
Turn Type	pm+pt	NA	NA	Perm	pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2			6	4	4
Detector Phase	5	2	6	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	15.0	79.0	64.0	64.0	21.0	21.0
Total Split (%)	15.0%	79.0%	64.0%	64.0%	21.0%	21.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	Min	None	None	None	None	None
Act Effct Green (s)	42.9	42.9	28.3	28.3	7.1	7.1
Actuated g/C Ratio	0.72	0.72	0.48	0.48	0.12	0.12
v/c Ratio	0.43	0.49	0.83	0.05	0.11	0.48
Control Delay	7.2	4.8	22.6	3.0	29.3	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	4.8	22.6	3.0	29.3	11.5
LOS	A	A	C	A	C	B
Approach Delay		5.4	21.6		13.8	
Approach LOS		A	C		B	
Queue Length 50th (ft)	13	64	207	0	8	0
Queue Length 95th (ft)	55	149	378	12	32	52
Internal Link Dist (ft)		1249	1247		1008	
Turn Bay Length (ft)	240			290	66	80
Base Capacity (vph)	464	1828	1733	1475	515	572
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.36	0.43	0.03	0.05	0.27

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 59.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83

Intersection Signal Delay: 13.3 Intersection LOS: B
Intersection Capacity Utilization 59.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: 128th Avenue & Oneida Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	757	9	13	813	12	13
Future Volume (Veh/h)	757	9	13	813	12	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	823	10	14	884	13	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			833		1735	823
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			833		1735	823
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		86	96
cM capacity (veh/h)			800		95	373

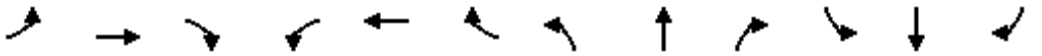
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	823	10	14	884	27
Volume Left	0	0	14	0	13
Volume Right	0	10	0	0	14
cSH	1700	1700	800	1700	154
Volume to Capacity	0.48	0.01	0.02	0.52	0.17
Queue Length 95th (ft)	0	0	1	0	15
Control Delay (s)	0.0	0.0	9.6	0.0	33.2
Lane LOS			A		D
Approach Delay (s)	0.0		0.1		33.2
Approach LOS					D

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	365	2	1	323
Future Volume (Veh/h)	2	0	365	2	1	323
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	397	2	1	351
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	751	398			399	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	751	398			399	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	378	652			1160	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	399	352
Volume Left	2	0	1
Volume Right	0	2	0
cSH	378	1700	1160
Volume to Capacity	0.01	0.23	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	14.6	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	14.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

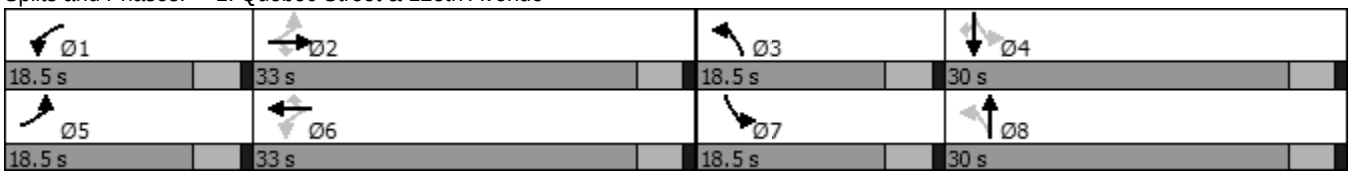


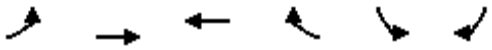
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	246	102	23	209	31	82	104	14	38	202	113
Future Volume (vph)	59	246	102	23	209	31	82	104	14	38	202	113
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1829	0	1770	1863	1583
Flt Permitted	0.545			0.535			0.386			0.675		
Satd. Flow (perm)	1015	1863	1583	997	1863	1583	719	1829	0	1257	1863	1583
Satd. Flow (RTOR)			115			115		6				123
Lane Group Flow (vph)	64	267	111	25	227	34	89	128	0	41	220	123
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0		11.5	20.0	20.0
Total Split (s)	18.5	33.0	33.0	18.5	33.0	33.0	18.5	30.0		18.5	30.0	30.0
Total Split (%)	18.5%	33.0%	33.0%	18.5%	33.0%	33.0%	18.5%	30.0%		18.5%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None		None	None	None
Act Effct Green (s)	38.1	30.5	30.5	36.3	29.6	29.6	23.2	17.9		20.2	14.5	14.5
Actuated g/C Ratio	0.52	0.41	0.41	0.49	0.40	0.40	0.31	0.24		0.27	0.20	0.20
v/c Ratio	0.11	0.35	0.15	0.04	0.30	0.05	0.26	0.29		0.10	0.60	0.30
Control Delay	10.6	19.0	4.4	10.5	19.4	0.1	18.1	24.9		16.5	35.5	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	10.6	19.0	4.4	10.5	19.4	0.1	18.1	24.9		16.5	35.5	7.7
LOS	B	B	A	B	B	A	B	C		B	D	A
Approach Delay		14.1			16.3			22.1			24.6	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	13	86	0	5	73	0	28	49		12	95	0
Queue Length 95th (ft)	38	174	31	19	154	0	58	98		32	172	41
Internal Link Dist (ft)		1247			2042			2134			1072	
Turn Bay Length (ft)	200		75	365		260	30			220		280
Base Capacity (vph)	718	769	721	712	746	703	462	661		541	669	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.09	0.35	0.15	0.04	0.30	0.05	0.19	0.19		0.08	0.33	0.19

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 73.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60

Intersection Signal Delay: 18.9 Intersection LOS: B
Intersection Capacity Utilization 44.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue



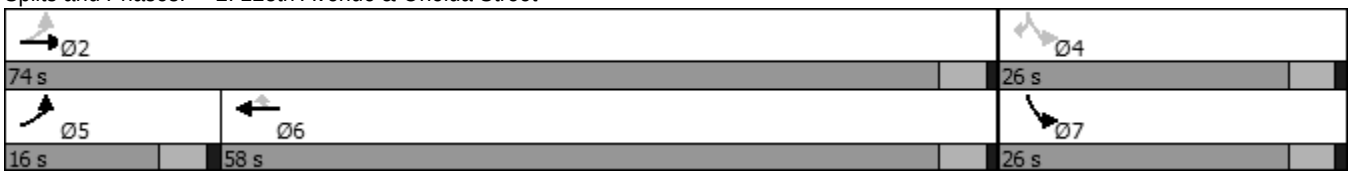


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	68	414	412	7	38	75
Future Volume (vph)	68	414	412	7	38	75
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.298				0.950	
Satd. Flow (perm)	555	1863	1863	1583	1770	1583
Satd. Flow (RTOR)				8		82
Lane Group Flow (vph)	74	450	448	8	41	82
Turn Type	pm+pt	NA	NA	Perm	pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2			6	4	4
Detector Phase	5	2	6	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	21.5	21.5	21.5	21.5	21.5
Total Split (s)	16.0	74.0	58.0	58.0	26.0	26.0
Total Split (%)	16.0%	74.0%	58.0%	58.0%	26.0%	26.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	Min	None	None	None	None	None
Act Effct Green (s)	27.5	30.2	15.0	15.0	7.0	6.9
Actuated g/C Ratio	0.72	0.79	0.39	0.39	0.18	0.18
v/c Ratio	0.12	0.31	0.61	0.01	0.13	0.23
Control Delay	3.2	3.7	14.9	6.0	18.6	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	3.7	14.9	6.0	18.6	7.8
LOS	A	A	B	A	B	A
Approach Delay		3.6	14.7		11.4	
Approach LOS		A	B		B	
Queue Length 50th (ft)	5	39	86	0	9	0
Queue Length 95th (ft)	15	81	179	6	33	30
Internal Link Dist (ft)		1249	1247		1008	
Turn Bay Length (ft)	240			290	66	80
Base Capacity (vph)	800	1863	1863	1583	1094	1009
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.24	0.24	0.01	0.04	0.08

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 38.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61

Intersection Signal Delay: 9.1 Intersection LOS: A
Intersection Capacity Utilization 40.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: 128th Avenue & Oneida Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	473	2	3	484	13	10
Future Volume (Veh/h)	473	2	3	484	13	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	514	2	3	526	14	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			516		1046	514
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			516		1046	514
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		94	98
cM capacity (veh/h)			1050		252	560

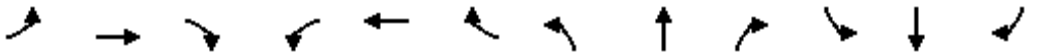
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	514	2	3	526	25
Volume Left	0	0	3	0	14
Volume Right	0	2	0	0	11
cSH	1700	1700	1050	1700	333
Volume to Capacity	0.30	0.00	0.00	0.31	0.08
Queue Length 95th (ft)	0	0	0	0	6
Control Delay (s)	0.0	0.0	8.4	0.0	16.7
Lane LOS			A		C
Approach Delay (s)	0.0		0.0		16.7
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	0	199	0	1	328
Future Volume (Veh/h)	5	0	199	0	1	328
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	216	0	1	357
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	575	216			216	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	575	216			216	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	479	824			1354	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	5	216	358
Volume Left	5	0	1
Volume Right	0	0	0
cSH	479	1700	1354
Volume to Capacity	0.01	0.13	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	12.6	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	12.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

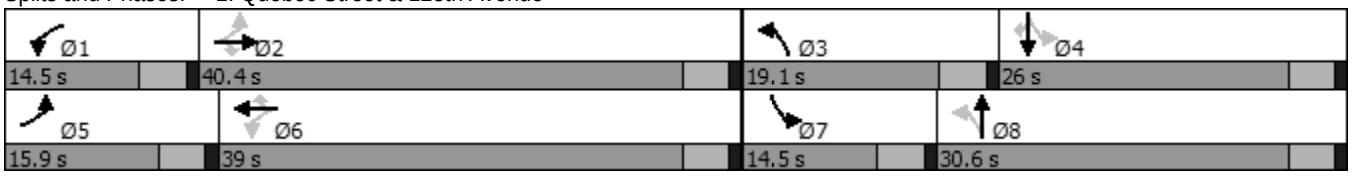


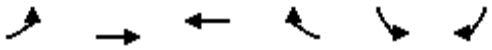
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	305	113	23	420	68	161	196	30	67	206	133
Future Volume (vph)	122	305	113	23	420	68	161	196	30	67	206	133
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1825	0	1770	1863	1583
Flt Permitted	0.274			0.482			0.315			0.541		
Satd. Flow (perm)	510	1863	1583	898	1863	1583	587	1825	0	1008	1863	1583
Satd. Flow (RTOR)			164			164		8				164
Lane Group Flow (vph)	133	332	123	25	457	74	175	246	0	73	224	145
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0		11.5	20.0	20.0
Total Split (s)	15.9	40.4	40.4	14.5	39.0	39.0	19.1	30.6		14.5	26.0	26.0
Total Split (%)	15.9%	40.4%	40.4%	14.5%	39.0%	39.0%	19.1%	30.6%		14.5%	26.0%	26.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None		None	None	None
Act Effct Green (s)	47.5	38.2	38.2	42.2	35.5	35.5	31.7	22.0		24.4	16.1	16.1
Actuated g/C Ratio	0.53	0.43	0.43	0.47	0.40	0.40	0.36	0.25		0.27	0.18	0.18
v/c Ratio	0.33	0.42	0.16	0.05	0.62	0.10	0.48	0.54		0.21	0.66	0.35
Control Delay	13.5	21.1	1.8	11.7	27.7	0.3	24.5	34.3		20.5	44.7	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	13.5	21.1	1.8	11.7	27.7	0.3	24.5	34.3		20.5	44.7	6.5
LOS	B	C	A	B	C	A	C	C		C	D	A
Approach Delay		15.4			23.3			30.2			28.1	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	34	126	0	6	202	0	68	120		27	118	0
Queue Length 95th (ft)	76	234	18	21	364	0	120	205		56	204	39
Internal Link Dist (ft)		1247			2042			2134			1072	
Turn Bay Length (ft)	200		75	365		260	30			220		280
Base Capacity (vph)	450	799	772	568	742	729	413	556		393	464	518
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.30	0.42	0.16	0.04	0.62	0.10	0.42	0.44		0.19	0.48	0.28

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 89
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66

Intersection Signal Delay: 23.5 Intersection LOS: C
Intersection Capacity Utilization 62.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue



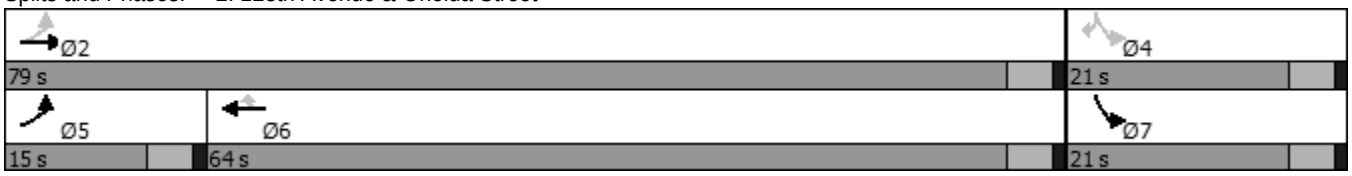


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	180	636	723	39	23	153
Future Volume (vph)	180	636	723	39	23	153
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.123				0.950	
Satd. Flow (perm)	229	1863	1863	1583	1770	1583
Satd. Flow (RTOR)				42		166
Lane Group Flow (vph)	196	691	786	42	25	166
Turn Type	pm+pt	NA	NA	Perm	pm+pt	Perm
Protected Phases	5	2	6		7	
Permitted Phases	2			6	4	4
Detector Phase	5	2	6	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	15.0	79.0	64.0	64.0	21.0	21.0
Total Split (%)	15.0%	79.0%	64.0%	64.0%	21.0%	21.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	Min	None	None	None	None	None
Act Effct Green (s)	45.9	45.9	31.1	31.1	7.3	7.3
Actuated g/C Ratio	0.73	0.73	0.50	0.50	0.12	0.12
v/c Ratio	0.47	0.51	0.85	0.05	0.12	0.50
Control Delay	10.0	5.0	23.4	2.8	31.3	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	5.0	23.4	2.8	31.3	12.0
LOS	B	A	C	A	C	B
Approach Delay		6.1	22.3		14.5	
Approach LOS		A	C		B	
Queue Length 50th (ft)	14	71	230	0	8	0
Queue Length 95th (ft)	77	168	422	12	36	55
Internal Link Dist (ft)		1249	1247		1008	
Turn Bay Length (ft)	240			290	66	80
Base Capacity (vph)	439	1806	1693	1442	491	559
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.38	0.46	0.03	0.05	0.30

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 62.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85

Intersection Signal Delay: 14.0 Intersection LOS: B
Intersection Capacity Utilization 62.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: 128th Avenue & Oneida Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	802	10	14	862	13	14
Future Volume (Veh/h)	802	10	14	862	13	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	872	11	15	937	14	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			883		1839	872
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			883		1839	872
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		83	96
cM capacity (veh/h)			766		81	350

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	872	11	15	937	29
Volume Left	0	0	15	0	14
Volume Right	0	11	0	0	15
cSH	1700	1700	766	1700	135
Volume to Capacity	0.51	0.01	0.02	0.55	0.21
Queue Length 95th (ft)	0	0	1	0	19
Control Delay (s)	0.0	0.0	9.8	0.0	38.8
Lane LOS			A		E
Approach Delay (s)	0.0		0.2		38.8
Approach LOS					E

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	387	2	1	342
Future Volume (Veh/h)	2	0	387	2	1	342
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	421	2	1	372
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	796	422			423	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	422			423	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	356	632			1136	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	423	373
Volume Left	2	0	1
Volume Right	0	2	0
cSH	356	1700	1136
Volume to Capacity	0.01	0.25	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	15.2	0.0	0.0
Lane LOS	C		A
Approach Delay (s)	15.2	0.0	0.0
Approach LOS	C		

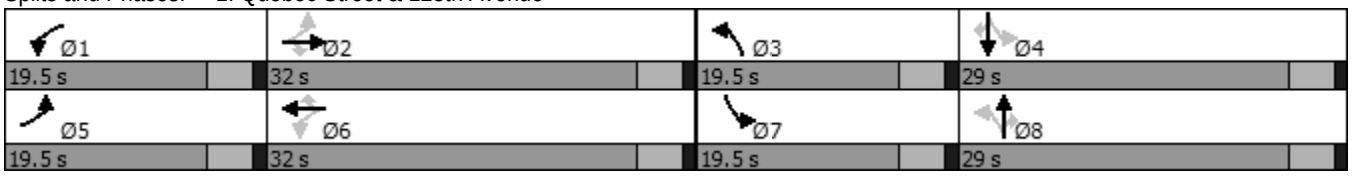
Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		30.5%	ICU Level of Service
Analysis Period (min)		15	

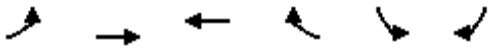
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	418	173	40	355	52	139	176	23	65	344	193
Future Volume (vph)	101	418	173	40	355	52	139	176	23	65	344	193
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.483			0.458			0.407			0.627		
Satd. Flow (perm)	1745	3539	1583	1655	3539	1583	1471	5085	1583	2266	5085	1583
Satd. Flow (RTOR)			188			115			115			210
Lane Group Flow (vph)	110	454	188	43	386	57	151	191	25	71	374	210
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0
Total Split (s)	19.5	32.0	32.0	19.5	32.0	32.0	19.5	29.0	29.0	19.5	29.0	29.0
Total Split (%)	19.5%	32.0%	32.0%	19.5%	32.0%	32.0%	19.5%	29.0%	29.0%	19.5%	29.0%	29.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	35.9	28.8	28.8	34.5	28.1	28.1	21.3	14.6	14.6	18.3	11.3	11.3
Actuated g/C Ratio	0.51	0.41	0.41	0.49	0.40	0.40	0.30	0.21	0.21	0.26	0.16	0.16
v/c Ratio	0.10	0.32	0.25	0.04	0.27	0.08	0.23	0.18	0.06	0.10	0.46	0.49
Control Delay	8.3	15.6	3.6	8.2	15.8	0.7	17.3	24.9	0.3	16.5	29.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	15.6	3.6	8.2	15.8	0.7	17.3	24.9	0.3	16.5	29.0	8.6
LOS	A	B	A	A	B	A	B	C	A	B	C	A
Approach Delay		11.5			13.3			20.1			21.1	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	10	67	0	4	57	0	23	26	0	10	54	0
Queue Length 95th (ft)	23	114	38	11	100	4	42	45	0	23	84	54
Internal Link Dist (ft)		1247			2042			2134			1072	
Turn Bay Length (ft)	200		150	365		260	200		150	220		280
Base Capacity (vph)	1339	1441	756	1309	1405	698	919	1803	635	1007	1803	696
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.32	0.25	0.03	0.27	0.08	0.16	0.11	0.04	0.07	0.21	0.30

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 70.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.49

Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 38.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue



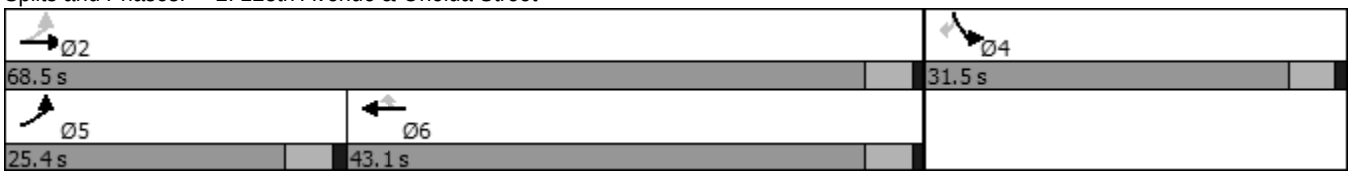


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	115	704	700	13	65	128
Future Volume (vph)	115	704	700	13	65	128
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.289				0.950	
Satd. Flow (perm)	538	3539	3539	1583	1770	1583
Satd. Flow (RTOR)				14		139
Lane Group Flow (vph)	125	765	761	14	71	139
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	25.4	68.5	43.1	43.1	31.5	31.5
Total Split (%)	25.4%	68.5%	43.1%	43.1%	31.5%	31.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	Min	None	Max	Max	None	None
Act Effct Green (s)	53.5	53.5	39.2	39.2	8.6	8.6
Actuated g/C Ratio	0.76	0.76	0.56	0.56	0.12	0.12
v/c Ratio	0.21	0.28	0.38	0.02	0.33	0.44
Control Delay	3.2	3.0	10.0	4.7	32.9	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	3.0	10.0	4.7	32.9	10.7
LOS	A	A	A	A	C	B
Approach Delay		3.0	9.9		18.2	
Approach LOS		A	A		B	
Queue Length 50th (ft)	10	37	87	0	28	0
Queue Length 95th (ft)	24	65	151	8	66	46
Internal Link Dist (ft)		1249	1247		1008	
Turn Bay Length (ft)	240			290	66	80
Base Capacity (vph)	787	3266	1980	892	696	707
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.23	0.38	0.02	0.10	0.20

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 70.1
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.44

Intersection Signal Delay: 7.6 Intersection LOS: A
Intersection Capacity Utilization 39.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: 128th Avenue & Oneida Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	803	4	5	823	22	16
Future Volume (Veh/h)	803	4	5	823	22	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	873	4	5	895	24	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			877		1330	436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			877		1330	436
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		83	97
cM capacity (veh/h)			766		145	568

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	436	436	4	5	448	448	24	17
Volume Left	0	0	0	5	0	0	24	0
Volume Right	0	0	4	0	0	0	0	17
cSH	1700	1700	1700	766	1700	1700	145	568
Volume to Capacity	0.26	0.26	0.00	0.01	0.26	0.26	0.17	0.03
Queue Length 95th (ft)	0	0	0	0	0	0	14	2
Control Delay (s)	0.0	0.0	0.0	9.7	0.0	0.0	34.7	11.5
Lane LOS				A			D	B
Approach Delay (s)	0.0			0.1			25.1	
Approach LOS							D	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	1	338	1	2	556
Future Volume (Veh/h)	9	1	338	1	2	556
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	1	367	1	2	604
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	572	122			368	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	572	122			368	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	449	906			1187	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	10	1	122	122	122	1	2	201	201	201
Volume Left	10	0	0	0	0	0	2	0	0	0
Volume Right	0	1	0	0	0	1	0	0	0	0
cSH	449	906	1700	1700	1700	1700	1187	1700	1700	1700
Volume to Capacity	0.02	0.00	0.07	0.07	0.07	0.00	0.00	0.12	0.12	0.12
Queue Length 95th (ft)	2	0	0	0	0	0	0	0	0	0
Control Delay (s)	13.2	9.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0
Lane LOS	B	A					A			
Approach Delay (s)	12.8		0.0				0.0			
Approach LOS	B									

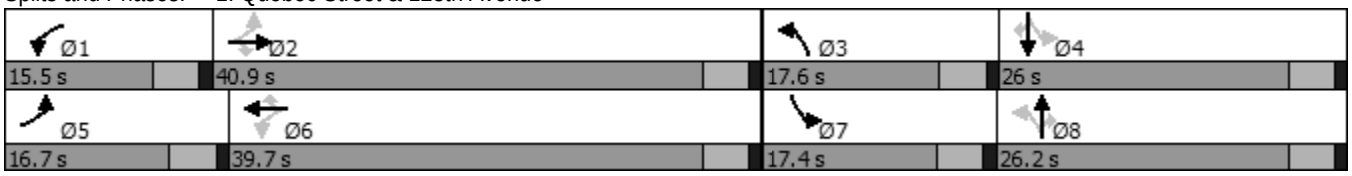
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

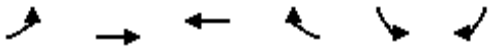
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	518	193	40	713	115	274	333	50	113	349	225
Future Volume (vph)	207	518	193	40	713	115	274	333	50	113	349	225
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.240			0.406			0.352			0.528		
Satd. Flow (perm)	867	3539	1583	1467	3539	1583	1272	5085	1583	1908	5085	1583
Satd. Flow (RTOR)			210			125			115			245
Lane Group Flow (vph)	225	563	210	43	775	125	298	362	54	123	379	245
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0
Total Split (s)	16.7	40.9	40.9	15.5	39.7	39.7	17.6	26.2	26.2	17.4	26.0	26.0
Total Split (%)	16.7%	40.9%	40.9%	15.5%	39.7%	39.7%	17.6%	26.2%	26.2%	17.4%	26.0%	26.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	47.0	38.2	38.2	42.4	35.9	35.9	27.1	15.9	15.9	20.9	12.8	12.8
Actuated g/C Ratio	0.55	0.45	0.45	0.50	0.42	0.42	0.32	0.19	0.19	0.25	0.15	0.15
v/c Ratio	0.30	0.35	0.25	0.05	0.52	0.17	0.43	0.38	0.14	0.20	0.49	0.55
Control Delay	10.0	16.7	3.3	9.3	20.5	4.2	22.7	31.3	0.7	20.6	35.5	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	16.7	3.3	9.3	20.5	4.2	22.7	31.3	0.7	20.6	35.5	9.7
LOS	B	B	A	A	C	A	C	C	A	C	D	A
Approach Delay		12.4			17.8			25.4			24.6	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	26	99	0	4	155	0	58	61	0	23	68	0
Queue Length 95th (ft)	49	159	40	13	247	34	92	93	0	42	103	63
Internal Link Dist (ft)		1247			2042			2134			1072	
Turn Bay Length (ft)	200		150	365		260	200		150	220		280
Base Capacity (vph)	884	1594	828	1087	1499	742	768	1337	501	829	1325	593
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.35	0.25	0.04	0.52	0.17	0.39	0.27	0.11	0.15	0.29	0.41

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 84.8
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.55

Intersection Signal Delay: 19.3 | Intersection LOS: B
Intersection Capacity Utilization 53.5% | ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue



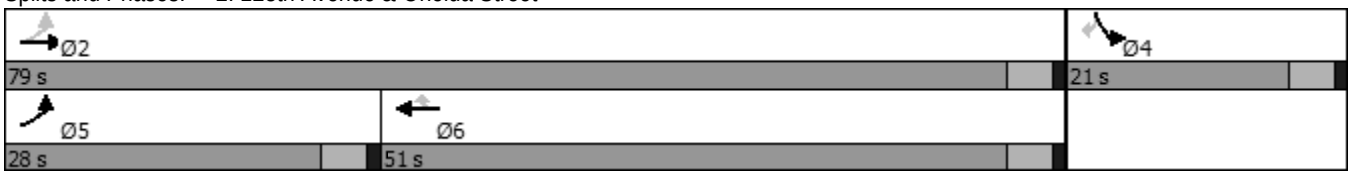


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	306	1080	1228	67	40	259
Future Volume (vph)	306	1080	1228	67	40	259
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.100				0.950	
Satd. Flow (perm)	186	3539	3539	1583	1770	1583
Satd. Flow (RTOR)				73		282
Lane Group Flow (vph)	333	1174	1335	73	43	282
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	28.0	79.0	51.0	51.0	21.0	21.0
Total Split (%)	28.0%	79.0%	51.0%	51.0%	21.0%	21.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	Min	None	Max	Max	None	None
Act Effct Green (s)	71.6	71.6	47.3	47.3	9.0	9.0
Actuated g/C Ratio	0.81	0.81	0.53	0.53	0.10	0.10
v/c Ratio	0.65	0.41	0.71	0.08	0.24	0.68
Control Delay	21.8	3.2	19.3	3.7	40.6	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	3.2	19.3	3.7	40.6	14.0
LOS	C	A	B	A	D	B
Approach Delay		7.3	18.5		17.5	
Approach LOS		A	B		B	
Queue Length 50th (ft)	93	64	281	0	23	0
Queue Length 95th (ft)	209	141	446	23	55	72
Internal Link Dist (ft)		1249	1247		1008	
Turn Bay Length (ft)	240			290	660	80
Base Capacity (vph)	582	3014	1889	879	341	533
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.39	0.71	0.08	0.13	0.53

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 88.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71

Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 64.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: 128th Avenue & Oneida Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1363	16	23	1463	22	23
Future Volume (Veh/h)	1363	16	23	1463	22	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1482	17	25	1590	24	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1499		2327	741
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1499		2327	741
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		18	93
cM capacity (veh/h)			443		29	359

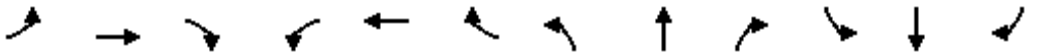
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	741	741	17	25	795	795	24	25
Volume Left	0	0	0	25	0	0	24	0
Volume Right	0	0	17	0	0	0	0	25
cSH	1700	1700	1700	443	1700	1700	29	359
Volume to Capacity	0.44	0.44	0.01	0.06	0.47	0.47	0.82	0.07
Queue Length 95th (ft)	0	0	0	4	0	0	67	6
Control Delay (s)	0.0	0.0	0.0	13.6	0.0	0.0	302.0	15.8
Lane LOS				B			F	C
Approach Delay (s)	0.0			0.2			156.0	
Approach LOS							F	

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	1	657	4	2	581
Future Volume (Veh/h)	4	1	657	4	2	581
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1	714	4	2	632
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	929	238			718	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	929	238			718	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	266	763			879	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	4	1	238	238	238	4	2	211	211	211
Volume Left	4	0	0	0	0	0	2	0	0	0
Volume Right	0	1	0	0	0	4	0	0	0	0
cSH	266	763	1700	1700	1700	1700	879	1700	1700	1700
Volume to Capacity	0.02	0.00	0.14	0.14	0.14	0.00	0.00	0.12	0.12	0.12
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	0	0
Control Delay (s)	18.7	9.7	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0
Lane LOS	C	A					A			
Approach Delay (s)	16.9		0.0				0.0			
Approach LOS	C									

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	22.7%	ICU Level of Service	A	
Analysis Period (min)	15			

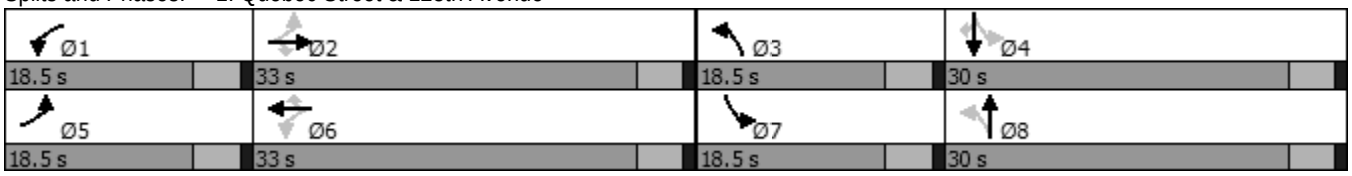


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	271	102	42	228	31	82	179	39	38	259	132
Future Volume (vph)	84	271	102	42	228	31	82	179	39	38	259	132
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1812	0	1770	1863	1583
Flt Permitted	0.504			0.496			0.310			0.531		
Satd. Flow (perm)	939	1863	1583	924	1863	1583	577	1812	0	989	1863	1583
Satd. Flow (RTOR)			115			115		10				143
Lane Group Flow (vph)	91	295	111	46	248	34	89	237	0	41	282	143
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0		11.5	20.0	20.0
Total Split (s)	18.5	33.0	33.0	18.5	33.0	33.0	18.5	30.0		18.5	30.0	30.0
Total Split (%)	18.5%	33.0%	33.0%	18.5%	33.0%	33.0%	18.5%	30.0%		18.5%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None		None	None	None
Act Effct Green (s)	39.4	31.0	31.0	37.0	29.8	29.8	26.3	21.0		23.2	17.5	17.5
Actuated g/C Ratio	0.51	0.40	0.40	0.47	0.38	0.38	0.34	0.27		0.30	0.22	0.22
v/c Ratio	0.16	0.40	0.16	0.09	0.35	0.05	0.27	0.48		0.11	0.67	0.31
Control Delay	12.4	21.7	4.8	12.1	22.2	0.1	18.2	27.5		16.3	37.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.4	21.7	4.8	12.1	22.2	0.1	18.2	27.5		16.3	37.1	6.8
LOS	B	C	A	B	C	A	B	C		B	D	A
Approach Delay		16.2			18.5			24.9			26.0	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	22	105	0	11	88	0	28	98		13	129	0
Queue Length 95th (ft)	56	213	34	33	186	0	59	175		32	223	44
Internal Link Dist (ft)		568			2042			581			1072	
Turn Bay Length (ft)	200		75	365		260	30			220		280
Base Capacity (vph)	667	739	697	661	711	675	438	637		509	637	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.14	0.40	0.16	0.07	0.35	0.05	0.20	0.37		0.08	0.44	0.22

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 78
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 21.3 Intersection LOS: C
Intersection Capacity Utilization 49.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue

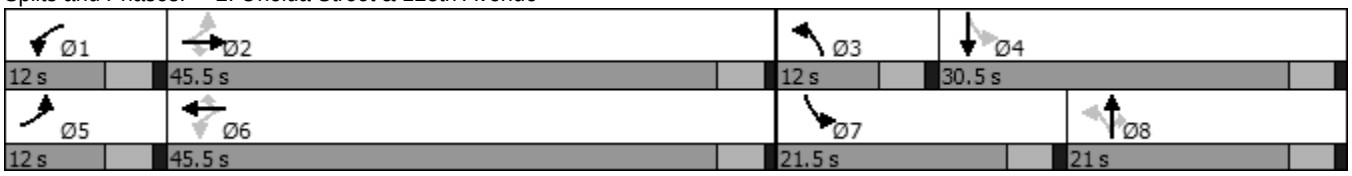


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	433	19	19	412	7	104	51	25	38	38	75
Future Volume (vph)	68	433	19	19	412	7	104	51	25	38	38	75
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1676	0
Flt Permitted	0.292			0.302			0.495			0.721		
Satd. Flow (perm)	544	1863	1583	563	1863	1583	922	1863	1583	1343	1676	0
Satd. Flow (RTOR)			164			164			164		82	
Lane Group Flow (vph)	74	471	21	21	448	8	113	55	27	41	123	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.5	21.5	21.5	11.5	21.5	21.5	11.5	20.5	20.5	21.5	21.5	
Total Split (s)	12.0	45.5	45.5	12.0	45.5	45.5	12.0	21.0	21.0	21.5	30.5	
Total Split (%)	12.0%	45.5%	45.5%	12.0%	45.5%	45.5%	12.0%	21.0%	21.0%	21.5%	30.5%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	Min	None	None	Min	None	None	None	None	None	None	None	
Act Effct Green (s)	28.6	21.3	21.3	27.0	20.5	20.5	15.2	12.6	12.6	13.1	8.0	
Actuated g/C Ratio	0.51	0.38	0.38	0.49	0.37	0.37	0.27	0.23	0.23	0.24	0.14	
v/c Ratio	0.17	0.66	0.03	0.05	0.65	0.01	0.30	0.13	0.06	0.11	0.39	
Control Delay	8.3	21.4	0.1	7.7	22.1	0.0	18.9	24.3	0.2	16.9	15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.3	21.4	0.1	7.7	22.1	0.0	18.9	24.3	0.2	16.9	15.9	
LOS	A	C	A	A	C	A	B	C	A	B	B	
Approach Delay		18.9			21.1			17.8			16.2	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)	12	141	0	3	137	0	28	13	0	10	13	
Queue Length 95th (ft)	32	260	0	13	251	0	75	55	0	34	62	
Internal Link Dist (ft)		1249			599			492			1008	
Turn Bay Length (ft)	240		75			290				66		
Base Capacity (vph)	477	1363	1202	477	1363	1202	391	645	656	661	923	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.16	0.35	0.02	0.04	0.33	0.01	0.29	0.09	0.04	0.06	0.13	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 55.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.2 Intersection LOS: B
Intersection Capacity Utilization 49.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Oneida Street & 128th Avenue



Intersection	
Int Delay, s/veh	4.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰	↱
Traffic Vol, veh/h	511	117	3	588	117	10
Future Vol, veh/h	511	117	3	588	117	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	132	90	-	0	0
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	555	127	3	639	127	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	555	0	1201	555
Stage 1	-	-	-	-	555	-
Stage 2	-	-	-	-	646	-
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	-	-	1015	-	204	531
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	522	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1015	-	203	531
Mov Cap-2 Maneuver	-	-	-	-	203	-
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	45.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	203	531	-	-	1015	-
HCM Lane V/C Ratio	0.626	0.02	-	-	0.003	-
HCM Control Delay (s)	48.5	11.9	-	-	8.6	-
HCM Lane LOS	E	B	-	-	A	-
HCM 95th %tile Q(veh)	3.6	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	51	0	51	5	0	19	38	218	0	26	353	38
Future Vol, veh/h	51	0	51	5	0	19	38	218	0	26	353	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	0	55	5	0	21	41	237	0	28	384	41

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	770	760	384	788	760	237	384	0	0	237	0	0
Stage 1	440	440	-	320	320	-	-	-	-	-	-	-
Stage 2	330	320	-	468	440	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	318	336	664	309	336	802	1174	-	-	1330	-	-
Stage 1	596	578	-	692	652	-	-	-	-	-	-	-
Stage 2	683	652	-	575	578	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	297	317	664	271	317	802	1174	-	-	1330	-	-
Mov Cap-2 Maneuver	297	317	-	271	317	-	-	-	-	-	-	-
Stage 1	575	566	-	668	629	-	-	-	-	-	-	-
Stage 2	642	629	-	516	566	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	11.5	1.2	0.5
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1174	-	-	297	664	271	802	1330	-	-
HCM Lane V/C Ratio	0.035	-	-	0.187	0.083	0.02	0.026	0.021	-	-
HCM Control Delay (s)	8.2	-	-	19.9	10.9	18.6	9.6	7.8	-	-
HCM Lane LOS	A	-	-	C	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.3	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	51	38	250	366	38
Future Vol, veh/h	51	51	38	250	366	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	0
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	55	55	41	272	398	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	752	398	398	0	-	0
Stage 1	398	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	378	652	1161	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	365	652	1161	-	-	-
Mov Cap-2 Maneuver	365	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1161	-	365	652	-	-
HCM Lane V/C Ratio	0.036	-	0.152	0.085	-	-
HCM Control Delay (s)	8.2	-	16.6	11	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	0.3	-	-

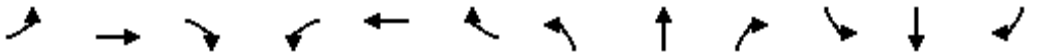
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	46	432	19	19	360	63	0	0	26	0	0	78
Future Vol, veh/h	46	432	19	19	360	63	0	0	26	0	0	78
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	-	-	None	-	-	None
Storage Length	200	-	150	200	-	125	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	470	21	21	391	68	0	0	28	0	0	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	391	0	0	470	0	0	-	-	470	-	-	391
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	-	6.22	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	-	-	3.318	-	-	3.318
Pot Cap-1 Maneuver	1168	-	-	1092	-	-	0	0	594	0	0	658
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1168	-	-	1092	-	-	-	-	594	-	-	658
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.4	11.4	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	594	1168	-	-	1092	-	-	658
HCM Lane V/C Ratio	0.048	0.043	-	-	0.019	-	-	0.129
HCM Control Delay (s)	11.4	8.2	-	-	8.4	-	-	11.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-	-	0.4



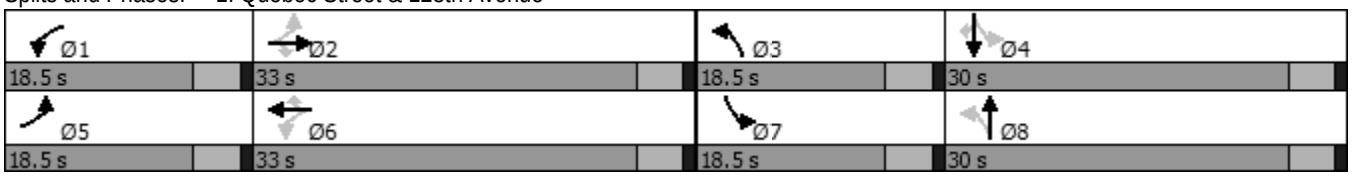
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	341	113	66	463	68	161	304	66	67	335	176
Future Volume (vph)	149	341	113	66	463	68	161	304	66	67	335	176
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1812	0	1770	1863	1583
Flt Permitted	0.142			0.389			0.196			0.303		
Satd. Flow (perm)	265	1863	1583	725	1863	1583	365	1812	0	564	1863	1583
Satd. Flow (RTOR)			115			115		11				191
Lane Group Flow (vph)	162	371	123	72	503	74	175	402	0	73	364	191
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0		11.5	20.0	20.0
Total Split (s)	18.5	33.0	33.0	18.5	33.0	33.0	18.5	30.0		18.5	30.0	30.0
Total Split (%)	18.5%	33.0%	33.0%	18.5%	33.0%	33.0%	18.5%	30.0%		18.5%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None		None	None	None
Act Effct Green (s)	43.2	32.2	32.2	37.4	29.3	29.3	36.8	27.3		30.1	21.8	21.8
Actuated g/C Ratio	0.48	0.36	0.36	0.42	0.33	0.33	0.41	0.30		0.34	0.24	0.24
v/c Ratio	0.52	0.55	0.19	0.18	0.83	0.12	0.53	0.72		0.24	0.81	0.36
Control Delay	20.2	28.5	6.2	15.2	43.3	2.2	23.2	36.7		18.4	47.3	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	20.2	28.5	6.2	15.2	43.3	2.2	23.2	36.7		18.4	47.3	6.5
LOS	C	C	A	B	D	A	C	D		B	D	A
Approach Delay		22.3			35.5			32.6			31.5	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	51	171	3	22	271	0	62	204		25	195	0
Queue Length 95th (ft)	98	293	42	49	#509	13	112	335		53	#340	52
Internal Link Dist (ft)		568			2042			581			1072	
Turn Bay Length (ft)	200		75	365		260	30			220		280
Base Capacity (vph)	377	669	642	518	609	595	381	576		421	546	598
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.43	0.55	0.19	0.14	0.83	0.12	0.46	0.70		0.17	0.67	0.32

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 89.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.4	Intersection LOS: C
Intersection Capacity Utilization 72.5%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 1: Quebec Street & 128th Avenue

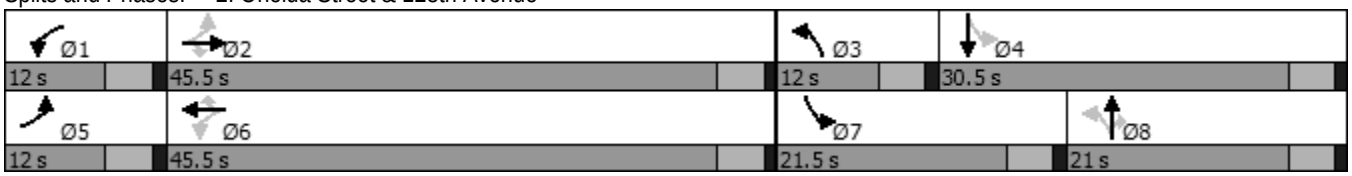


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	679	43	43	773	39	146	73	36	23	86	153
Future Volume (vph)	180	679	43	43	773	39	146	73	36	23	86	153
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1684	0
Flt Permitted	0.095			0.115			0.261			0.706		
Satd. Flow (perm)	177	1863	1583	214	1863	1583	486	1863	1583	1315	1684	0
Satd. Flow (RTOR)			164			164			164		87	
Lane Group Flow (vph)	196	738	47	47	840	42	159	79	39	25	259	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.5	21.5	21.5	11.5	21.5	21.5	11.5	20.5	20.5	21.5	21.5	
Total Split (s)	12.0	45.5	45.5	12.0	45.5	45.5	12.0	21.0	21.0	21.5	30.5	
Total Split (%)	12.0%	45.5%	45.5%	12.0%	45.5%	45.5%	12.0%	21.0%	21.0%	21.5%	30.5%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	Min	None	None	Min	None	None	None	None	None	None	None	
Act Effct Green (s)	49.7	42.2	42.2	47.6	41.1	41.1	25.2	22.3	22.3	21.2	14.8	
Actuated g/C Ratio	0.56	0.47	0.47	0.53	0.46	0.46	0.28	0.25	0.25	0.24	0.17	
v/c Ratio	0.84	0.83	0.06	0.21	0.98	0.05	0.65	0.17	0.07	0.07	0.74	
Control Delay	49.4	32.2	0.1	11.2	51.4	0.1	37.5	29.0	0.3	21.7	35.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	49.4	32.2	0.1	11.2	51.4	0.1	37.5	29.0	0.3	21.7	35.8	
LOS	D	C	A	B	D	A	D	C	A	C	D	
Approach Delay		34.1			47.1			29.9			34.6	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	57	345	0	10	443	0	68	32	0	10	92	
Queue Length 95th (ft)	#205	#665	0	29	#805	0	#121	78	0	28	173	
Internal Link Dist (ft)		1249			599			492			1008	
Turn Bay Length (ft)	240		75			290				66		
Base Capacity (vph)	233	884	837	248	861	819	245	467	520	483	555	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.84	0.83	0.06	0.19	0.98	0.05	0.65	0.17	0.07	0.05	0.47	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 89
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98

Intersection Signal Delay: 38.5 Intersection LOS: D
Intersection Capacity Utilization 87.7% 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: 2: Oneida Street & 128th Avenue



Intersection	
Int Delay, s/veh	72.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰	↱
Traffic Vol, veh/h	888	266	14	1008	159	14
Future Vol, veh/h	888	266	14	1008	159	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	132	90	-	0	0
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	965	289	15	1096	173	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	965	0	2091	965
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	1126	-
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	-	-	714	-	~ 58	309
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	310	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	714	-	~ 57	309
Mov Cap-2 Maneuver	-	-	-	-	~ 57	-
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	303	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	$ 983.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	57	309	-	-	714	-
HCM Lane V/C Ratio	3.032	0.049	-	-	0.021	-
HCM Control Delay (s)	$ 1068.7	17.3	-	-	10.2	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	18.1	0.2	-	-	0.1	-

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

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	73	0	73	2	0	43	86	473	2	37	378	86
Future Vol, veh/h	73	0	73	2	0	43	86	473	2	37	378	86
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	0	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	0	79	2	0	47	93	514	2	40	411	93

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1217	1194	411	1233	1193	515	411	0	0	516	0	0
Stage 1	491	491	-	702	702	-	-	-	-	-	-	-
Stage 2	726	703	-	531	491	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	158	187	641	154	187	560	1148	-	-	1050	-	-
Stage 1	559	548	-	429	440	-	-	-	-	-	-	-
Stage 2	416	440	-	532	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	132	165	641	123	165	560	1148	-	-	1050	-	-
Mov Cap-2 Maneuver	132	165	-	123	165	-	-	-	-	-	-	-
Stage 1	514	527	-	394	404	-	-	-	-	-	-	-
Stage 2	350	404	-	448	527	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	39.1	13	1.3	0.6
HCM LOS	E	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1148	-	-	132	641	123	560	1050	-	-
HCM Lane V/C Ratio	0.081	-	-	0.601	0.124	0.018	0.083	0.038	-	-
HCM Control Delay (s)	8.4	-	-	66.8	11.4	34.8	12	8.6	-	-
HCM Lane LOS	A	-	-	F	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	3.1	0.4	0.1	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	73	86	460	428	86
Future Vol, veh/h	73	73	86	460	428	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	0
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	79	79	93	500	465	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1152	465	465	0	-	0
Stage 1	465	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	219	597	1096	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	200	597	1096	-	-	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	457	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.2	1.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1096	-	200	597	-	-
HCM Lane V/C Ratio	0.085	-	0.397	0.133	-	-
HCM Control Delay (s)	8.6	-	34.4	12	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.8	0.5	-	-

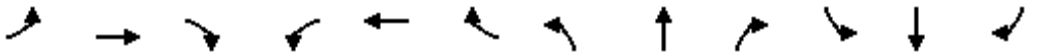
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	119	577	43	43	654	103	0	0	37	0	0	152
Future Vol, veh/h	119	577	43	43	654	103	0	0	37	0	0	152
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	-	-	None	-	-	None
Storage Length	200	-	150	200	-	125	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	129	627	47	47	711	112	0	0	40	0	0	165

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	711	0	0	627	0	0	-	-	627	-	-	711
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	-	6.22	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	-	-	3.318	-	-	3.318
Pot Cap-1 Maneuver	888	-	-	955	-	-	0	0	484	0	0	433
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	888	-	-	955	-	-	-	-	484	-	-	433
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0.5	13.1	18.4
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	484	888	-	-	955	-	-	433
HCM Lane V/C Ratio	0.083	0.146	-	-	0.049	-	-	0.382
HCM Control Delay (s)	13.1	9.7	-	-	9	-	-	18.4
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.5	-	-	0.2	-	-	1.8

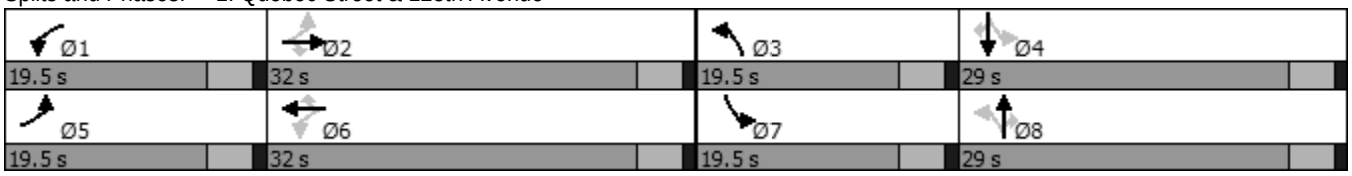


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	443	173	59	374	52	139	251	48	65	401	212
Future Volume (vph)	126	443	173	59	374	52	139	251	48	65	401	212
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.461			0.434			0.364			0.577		
Satd. Flow (perm)	1666	3539	1583	1568	3539	1583	1315	5085	1583	2085	5085	1583
Satd. Flow (RTOR)			188			115			115			230
Lane Group Flow (vph)	137	482	188	64	407	57	151	273	52	71	436	230
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0
Total Split (s)	19.5	32.0	32.0	19.5	32.0	32.0	19.5	29.0	29.0	19.5	29.0	29.0
Total Split (%)	19.5%	32.0%	32.0%	19.5%	32.0%	32.0%	19.5%	29.0%	29.0%	19.5%	29.0%	29.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	36.5	29.0	29.0	34.8	28.1	28.1	22.7	16.0	16.0	19.7	12.7	12.7
Actuated g/C Ratio	0.50	0.40	0.40	0.48	0.39	0.39	0.31	0.22	0.22	0.27	0.18	0.18
v/c Ratio	0.13	0.34	0.25	0.07	0.30	0.08	0.23	0.24	0.12	0.10	0.49	0.49
Control Delay	8.9	16.7	3.8	8.9	16.9	0.6	17.2	25.0	0.6	16.3	29.1	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	16.7	3.8	8.9	16.9	0.6	17.2	25.0	0.6	16.3	29.1	8.1
LOS	A	B	A	A	B	A	B	C	A	B	C	A
Approach Delay		12.4			14.2			19.8			21.3	
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	13	76	0	6	64	0	23	38	0	10	64	0
Queue Length 95th (ft)	29	128	39	17	112	4	42	62	2	23	97	55
Internal Link Dist (ft)		562			2042			906			1072	
Turn Bay Length (ft)	200		150	260		150	200		150	220		280
Base Capacity (vph)	1290	1413	745	1257	1372	684	905	1761	623	1003	1761	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.34	0.25	0.05	0.30	0.08	0.17	0.16	0.08	0.07	0.25	0.33

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 72.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.49

Intersection Signal Delay: 16.7 Intersection LOS: B
Intersection Capacity Utilization 40.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue

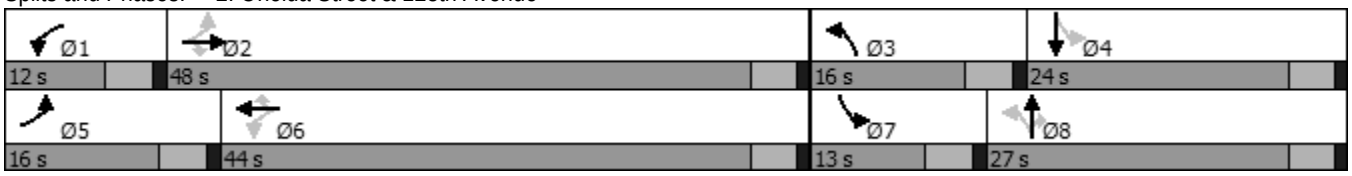


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	704	19	19	700	13	104	51	25	65	38	128
Future Volume (vph)	115	704	19	19	700	13	104	51	25	65	38	128
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1647	0
Flt Permitted	0.268			0.325			0.400			0.721		
Satd. Flow (perm)	499	3539	1583	605	3539	1583	745	1863	1583	1343	1647	0
Satd. Flow (RTOR)			115			115			115		139	
Lane Group Flow (vph)	125	765	21	21	761	14	113	55	27	71	180	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.5	20.5	20.5	11.5	20.5	20.5	11.5	20.5	20.5	11.5	20.5	
Total Split (s)	16.0	48.0	48.0	12.0	44.0	44.0	16.0	27.0	27.0	13.0	24.0	
Total Split (%)	16.0%	48.0%	48.0%	12.0%	44.0%	44.0%	16.0%	27.0%	27.0%	13.0%	24.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0	0.0	-0.5	0.0	
Total Lost Time (s)	4.0	4.0	4.5	4.5	4.0	4.0	4.5	4.5	4.5	4.0	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	Min	None	None	Min	Max	Max	None	None	None	None	None	
Act Effct Green (s)	53.6	44.0	43.5	46.2	40.7	40.7	18.0	10.0	10.0	15.4	8.4	
Actuated g/C Ratio	0.65	0.53	0.53	0.56	0.49	0.49	0.22	0.12	0.12	0.19	0.10	
v/c Ratio	0.26	0.41	0.02	0.05	0.44	0.02	0.41	0.24	0.09	0.24	0.62	
Control Delay	8.4	13.9	0.1	8.0	16.5	0.0	29.2	36.6	0.6	25.9	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.4	13.9	0.1	8.0	16.5	0.0	29.2	36.6	0.6	25.9	21.2	
LOS	A	B	A	A	B	A	C	D	A	C	C	
Approach Delay		12.8			16.0			27.3			22.5	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	23	123	0	4	136	0	47	27	0	29	21	
Queue Length 95th (ft)	55	205	0	14	226	0	91	62	0	61	84	
Internal Link Dist (ft)		1249			605			768			1008	
Turn Bay Length (ft)	200		150	200		290	200		150	66		
Base Capacity (vph)	516	1925	904	456	1739	836	327	514	520	315	500	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.24	0.40	0.02	0.05	0.44	0.02	0.35	0.11	0.05	0.23	0.36	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 82.8
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62

Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 55.5% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Oneida Street & 128th Avenue



Intersection	
Int Delay, s/veh	11.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰	↱
Traffic Vol, veh/h	841	119	5	927	126	16
Future Vol, veh/h	841	119	5	927	126	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	200	-	150	0
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	914	129	5	1008	137	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	914	0	1429	457
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	515	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	742	-	~ 126	551
Stage 1	-	-	-	-	351	-
Stage 2	-	-	-	-	565	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	742	-	~ 125	551
Mov Cap-2 Maneuver	-	-	-	-	~ 125	-
Stage 1	-	-	-	-	351	-
Stage 2	-	-	-	-	561	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	157.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	125	551	-	-	742	-
HCM Lane V/C Ratio	1.096	0.032	-	-	0.007	-
HCM Control Delay (s)	176.4	11.7	-	-	9.9	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	8	0.1	-	-	0	-

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

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	51	0	52	9	0	20	38	357	1	27	581	38
Future Vol, veh/h	51	0	52	9	0	20	38	357	1	27	581	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	0	-	-	200	-	0	200	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	0	57	10	0	22	41	388	1	29	632	41

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	967	1161	316	845	1161	194	632	0	0	388	0	0
Stage 1	690	690	-	471	471	-	-	-	-	-	-	-
Stage 2	277	471	-	374	690	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	209	194	680	256	194	815	947	-	-	1167	-	-
Stage 1	401	444	-	542	558	-	-	-	-	-	-	-
Stage 2	706	558	-	619	444	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	193	181	680	223	181	815	947	-	-	1167	-	-
Mov Cap-2 Maneuver	193	181	-	223	181	-	-	-	-	-	-	-
Stage 1	384	433	-	519	534	-	-	-	-	-	-	-
Stage 2	657	534	-	553	433	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.8	13.3	0.9	0.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	947	-	-	193	680	223	815	1167	-	-
HCM Lane V/C Ratio	0.044	-	-	0.287	0.083	0.044	0.027	0.025	-	-
HCM Control Delay (s)	9	-	-	31	10.8	21.9	9.5	8.2	-	-
HCM Lane LOS	A	-	-	D	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.3	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	51	38	390	594	38
Future Vol, veh/h	51	51	38	390	594	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	200	-	-	150
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	55	55	41	424	646	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	898	323	646	0	-	0
Stage 1	646	-	-	-	-	-
Stage 2	252	-	-	-	-	-
Critical Hdwy	5.74	7.14	5.34	-	-	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	3.12	-	-	-
Pot Cap-1 Maneuver	349	574	578	-	-	-
Stage 1	396	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	324	574	578	-	-	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	396	-	-	-	-	-
Stage 2	654	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	578	-	324	574	-	-
HCM Lane V/C Ratio	0.071	-	0.171	0.097	-	-
HCM Control Delay (s)	11.7	-	18.4	11.9	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.6	0.3	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	77	716	19	19	599	106	0	0	26	0	0	133
Future Vol, veh/h	77	716	19	19	599	106	0	0	26	0	0	133
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	-	-	None	-	-	None
Storage Length	200	-	150	200	-	125	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	84	778	21	21	651	115	0	0	28	0	0	145

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	651	0	0	778	0	0	-	-	389	-	-	326
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	931	-	-	834	-	-	0	0	610	0	0	670
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	931	-	-	834	-	-	-	-	610	-	-	670
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.2	11.2	11.8
HCM LOS			B	B

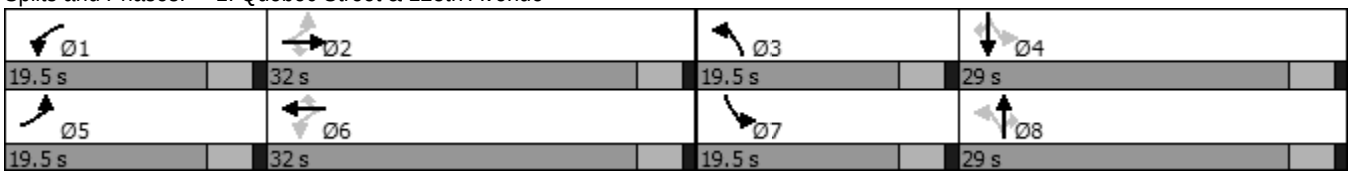
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	610	931	-	-	834	-	-	670
HCM Lane V/C Ratio	0.046	0.09	-	-	0.025	-	-	0.216
HCM Control Delay (s)	11.2	9.2	-	-	9.4	-	-	11.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.3	-	-	0.1	-	-	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	554	193	83	756	115	274	441	86	113	478	268
Future Volume (vph)	244	554	193	83	756	115	274	441	86	113	478	268
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.177			0.365			0.288			0.469		
Satd. Flow (perm)	640	3539	1583	1319	3539	1583	1041	5085	1583	1695	5085	1583
Satd. Flow (RTOR)			210			115			115			291
Lane Group Flow (vph)	265	602	210	90	822	125	298	479	93	123	520	291
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0	11.5	20.0	20.0
Total Split (s)	19.5	32.0	32.0	19.5	32.0	32.0	19.5	29.0	29.0	19.5	29.0	29.0
Total Split (%)	19.5%	32.0%	32.0%	19.5%	32.0%	32.0%	19.5%	29.0%	29.0%	19.5%	29.0%	29.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	Max	Max	Min	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	40.3	30.7	30.7	35.3	28.2	28.2	28.5	17.9	17.9	23.0	15.1	15.1
Actuated g/C Ratio	0.51	0.39	0.39	0.44	0.35	0.35	0.36	0.22	0.22	0.29	0.19	0.19
v/c Ratio	0.40	0.44	0.28	0.12	0.66	0.20	0.43	0.42	0.21	0.19	0.54	0.54
Control Delay	12.5	20.3	4.1	11.2	25.9	6.3	19.0	27.7	4.7	17.1	31.6	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	20.3	4.1	11.2	25.9	6.3	19.0	27.7	4.7	17.1	31.6	8.0
LOS	B	C	A	B	C	A	B	C	A	B	C	A
Approach Delay		15.2			22.3			22.2			22.3	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	32	112	0	10	175	3	50	74	0	20	85	0
Queue Length 95th (ft)	63	188	45	25	290	43	81	110	26	38	128	63
Internal Link Dist (ft)		562			2042			906			1072	
Turn Bay Length (ft)	200		150	260		150	200		150	220		280
Base Capacity (vph)	883	1364	739	1103	1252	634	857	1606	579	965	1606	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.44	0.28	0.08	0.66	0.20	0.35	0.30	0.16	0.13	0.32	0.42

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 79.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66

Intersection Signal Delay: 20.4 Intersection LOS: C
Intersection Capacity Utilization 58.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Quebec Street & 128th Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	306	1123	43	43	1228	67	146	73	36	40	86	259
Future Volume (vph)	306	1123	43	43	1228	67	146	73	36	40	86	259
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1652	0
Flt Permitted	0.091			0.106			0.165			0.706		
Satd. Flow (perm)	170	3539	1583	197	3539	1583	307	1863	1583	1315	1652	0
Satd. Flow (RTOR)			115			115			115		136	
Lane Group Flow (vph)	333	1221	47	47	1335	73	159	79	39	43	375	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.5	20.5	20.5	11.5	20.5	20.5	11.5	20.5	20.5	11.5	20.5	
Total Split (s)	16.0	48.0	48.0	12.0	44.0	44.0	16.0	27.0	27.0	13.0	24.0	
Total Split (%)	16.0%	48.0%	48.0%	12.0%	44.0%	44.0%	16.0%	27.0%	27.0%	13.0%	24.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0	0.0	-0.5	0.0	
Total Lost Time (s)	4.0	4.0	4.5	4.5	4.0	4.0	4.5	4.5	4.5	4.0	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	Min	None	None	Min	Max	Max	None	None	None	None	None	
Act Effct Green (s)	56.1	45.0	44.5	46.2	40.1	40.1	32.4	25.7	25.7	25.9	17.9	
Actuated g/C Ratio	0.58	0.46	0.46	0.47	0.41	0.41	0.33	0.26	0.26	0.27	0.18	
v/c Ratio	1.13	0.75	0.06	0.24	0.92	0.10	0.62	0.16	0.08	0.11	0.91	
Control Delay	118.7	25.9	0.1	13.7	39.2	1.5	34.1	30.9	0.3	22.2	51.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	118.7	25.9	0.1	13.7	39.2	1.5	34.1	30.9	0.3	22.2	51.8	
LOS	F	C	A	B	D	A	C	C	A	C	D	
Approach Delay		44.4			36.4			28.4			48.7	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	~202	335	0	13	423	0	71	40	0	18	153	
Queue Length 95th (ft)	#378	427	0	29	#574	10	121	81	0	41	#317	
Internal Link Dist (ft)		1249			605			768			1008	
Turn Bay Length (ft)	200		150	200		290	200		150	66		
Base Capacity (vph)	295	1633	785	216	1455	718	274	490	501	412	439	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.13	0.75	0.06	0.22	0.92	0.10	0.58	0.16	0.08	0.10	0.85	

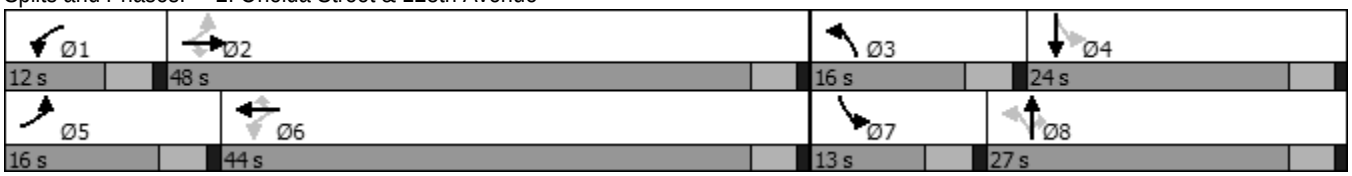
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 97.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.13

Intersection Signal Delay: 40.6	Intersection LOS: D
Intersection Capacity Utilization 93.6%	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: 2: Oneida Street & 128th Avenue



Intersection	
Int Delay, s/veh	163.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰	↱
Traffic Vol, veh/h	1449	272	23	1609	168	23
Future Vol, veh/h	1449	272	23	1609	168	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	200	-	150	0
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	1575	296	25	1749	183	25

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1575	0	2499	788
Stage 1	-	-	-	-	1575	-
Stage 2	-	-	-	-	924	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	414	-	~ 24	334
Stage 1	-	-	-	-	~ 156	-
Stage 2	-	-	-	-	347	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	414	-	~ 23	334
Mov Cap-2 Maneuver	-	-	-	-	~ 23	-
Stage 1	-	-	-	-	~ 156	-
Stage 2	-	-	-	-	326	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	$ 3040.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	23	334	-	-	414	-
HCM Lane V/C Ratio	7.94	0.075	-	-	0.06	-
HCM Control Delay (s)	$ 3454.1	16.6	-	-	14.3	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	22.9	0.2	-	-	0.2	-

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

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	73	0	73	4	0	44	86	700	4	38	617	86
Future Vol, veh/h	73	0	73	4	0	44	86	700	4	38	617	86
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	0	-	-	200	-	0	200	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	0	79	4	0	48	93	761	4	41	671	93

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1320	1701	335	1366	1701	380	671	0	0	761	0	0
Stage 1	753	753	-	948	948	-	-	-	-	-	-	-
Stage 2	567	948	-	418	753	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	115	91	661	106	91	618	915	-	-	847	-	-
Stage 1	368	416	-	280	338	-	-	-	-	-	-	-
Stage 2	476	338	-	583	416	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	94	78	661	83	78	618	915	-	-	847	-	-
Mov Cap-2 Maneuver	94	78	-	83	78	-	-	-	-	-	-	-
Stage 1	331	396	-	252	304	-	-	-	-	-	-	-
Stage 2	395	304	-	488	396	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	72.5	14.6	1	0.5
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	915	-	-	94	661	83	618	847	-	-
HCM Lane V/C Ratio	0.102	-	-	0.844	0.12	0.052	0.077	0.049	-	-
HCM Control Delay (s)	9.4	-	-	133.8	11.2	50.8	11.3	9.5	-	-
HCM Lane LOS	A	-	-	F	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	4.6	0.4	0.2	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	73	86	731	668	86
Future Vol, veh/h	73	73	86	731	668	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	200	-	-	150
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	79	79	93	795	726	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1231	363	726	0	-	0
Stage 1	726	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Critical Hdwy	5.74	7.14	5.34	-	-	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	3.12	-	-	-
Pot Cap-1 Maneuver	237	541	530	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	522	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	195	541	530	-	-	-
Mov Cap-2 Maneuver	195	-	-	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	430	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.2	1.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	530	-	195	541	-	-
HCM Lane V/C Ratio	0.176	-	0.407	0.147	-	-
HCM Control Delay (s)	13.2	-	35.6	12.8	-	-
HCM Lane LOS	B	-	E	B	-	-
HCM 95th %tile Q(veh)	0.6	-	1.8	0.5	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	202	961	43	43	1080	175	0	0	37	0	0	257
Future Vol, veh/h	202	961	43	43	1080	175	0	0	37	0	0	257
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	-	-	None	-	-	None
Storage Length	200	-	150	200	-	125	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	220	1045	47	47	1174	190	0	0	40	0	0	279

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1174	0	0	1045	0	0	-	-	522	-	-	587
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	591	-	-	661	-	-	0	0	499	0	0	453
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	591	-	-	661	-	-	-	-	499	-	-	453
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.4	12.8	24.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	499	591	-	-	661	-	-	453
HCM Lane V/C Ratio	0.081	0.372	-	-	0.071	-	-	0.617
HCM Control Delay (s)	12.8	14.6	-	-	10.9	-	-	24.9
HCM Lane LOS	B	B	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.3	1.7	-	-	0.2	-	-	4.1

APPENDIX D

Warrant Analysis Forms

Project: Creekside

Background Traffic - Year 2017 - PM Peak Hour

Traffic Signal Warrants Analysis Form

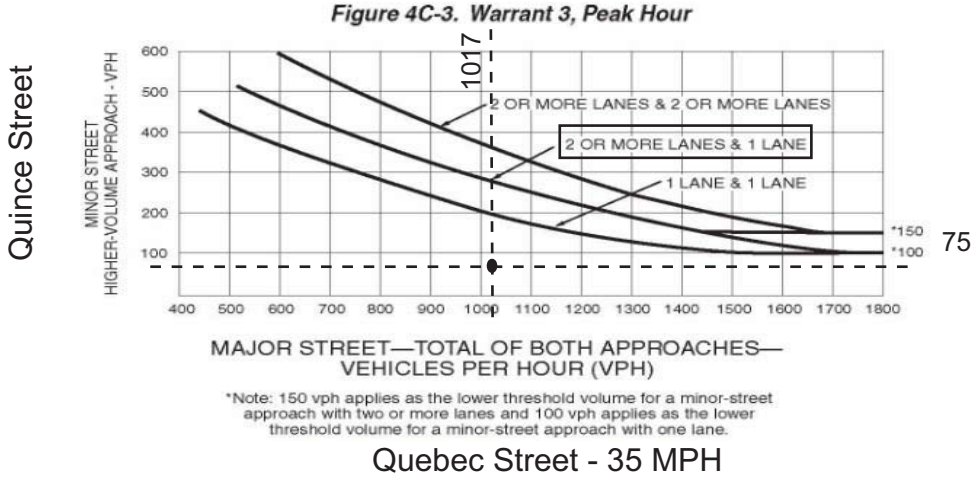
Warrant 3 – Peak Hour Satisfied: ☐ **Yes** ☒ **No**

Unusual condition justifying use of warrant: Minor street suffers undue delay when entering major street.

Record hour where criteria are fulfilled and the corresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

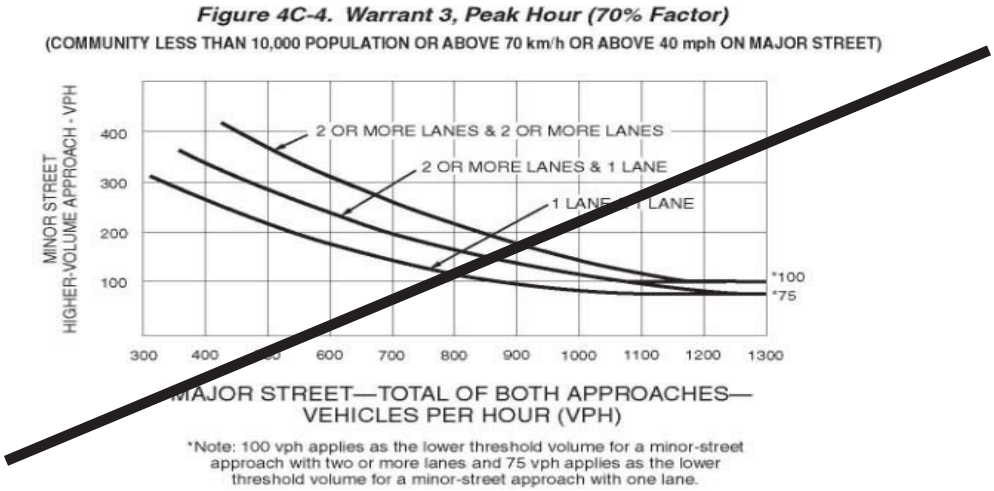
Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1. Delay on Minor Approach (veh-h)	4	5					
2. Volume on Minor Approach (veh/h)	100	150					
3. Total entering volume (veh/h)			650	800			

Figure A – Criteria for "100%" volume level.



Quebec Street - 35 MPH

Figure B – Criteria for "70%" volume level.



Project: Creekside

Background Traffic - Year 2017 - PM Peak Hour

Traffic Signal Warrants Analysis Form

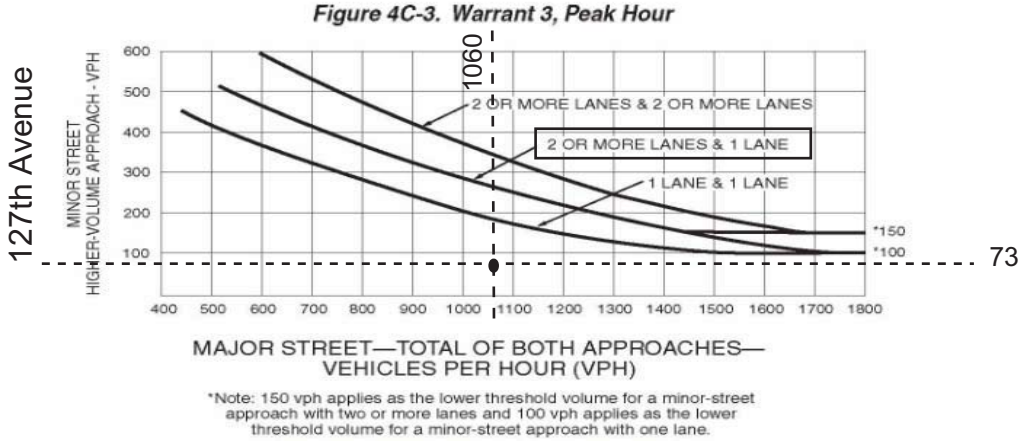
Warrant 3 – Peak Hour Satisfied: ☐ **Yes** ☒ **No**

Unusual condition justifying use of warrant: Minor street suffers undue delay when entering major street.

Record hour where criteria are fulfilled and the corresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

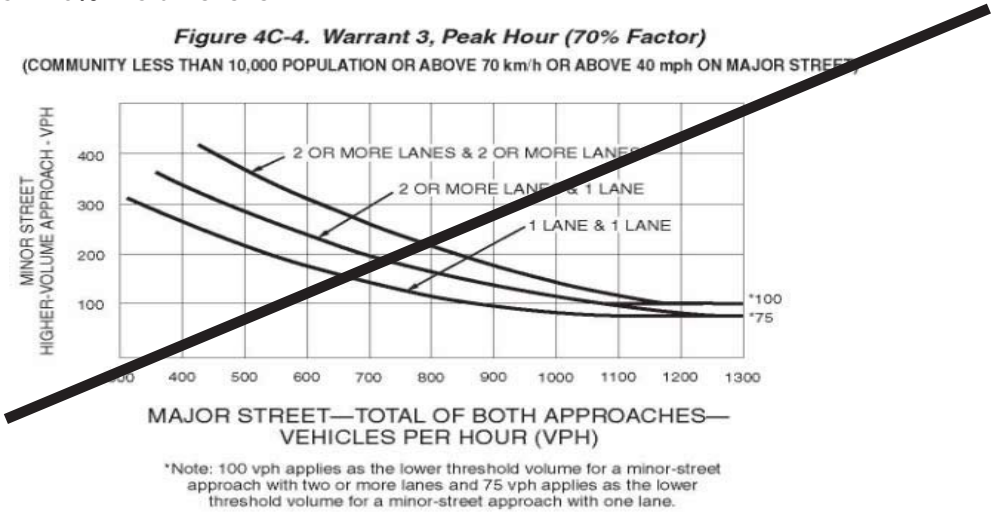
Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1. Delay on Minor Approach (veh-h)	4	5					
2. Volume on Minor Approach (veh/h)	100	150					
3. Total entering volume (veh/h)			650	800			

Figure A – Criteria for "100%" volume level.



Quebec Street - 35 MPH

Figure B – Criteria for "70%" volume level.



Project: Creekside

Background Traffic - Year 2017 - PM Peak Hour

Traffic Signal Warrants Analysis Form

Warrant 3 – Peak Hour Satisfied: ☒ **Yes** ☐ **No**

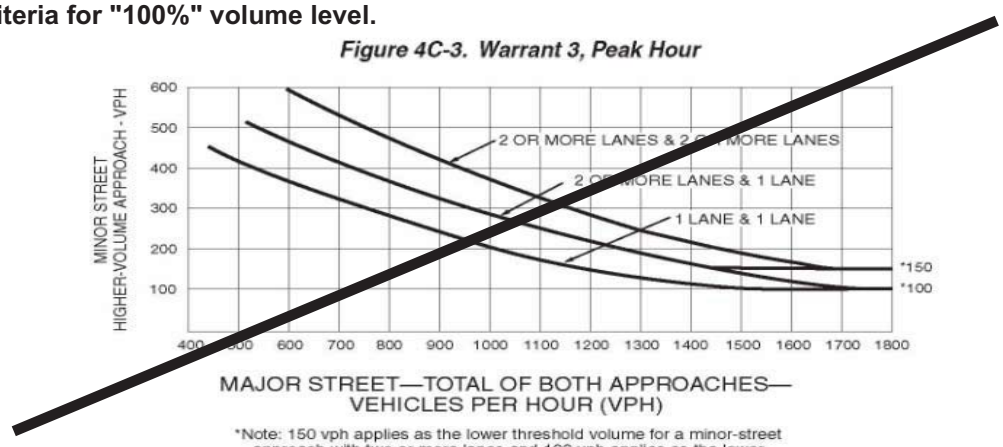
Unusual condition justifying use of warrant: Minor street suffers undue delay when entering major street.

Record hour where criteria are fulfilled and the corresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1. Delay on Minor Approach (veh-h)	4	5					
2. Volume on Minor Approach (veh/h)	100	150					
3. Total entering volume (veh/h)			650	800			

Figure A – Criteria for "100%" volume level.

Figure 4C-3. Warrant 3, Peak Hour

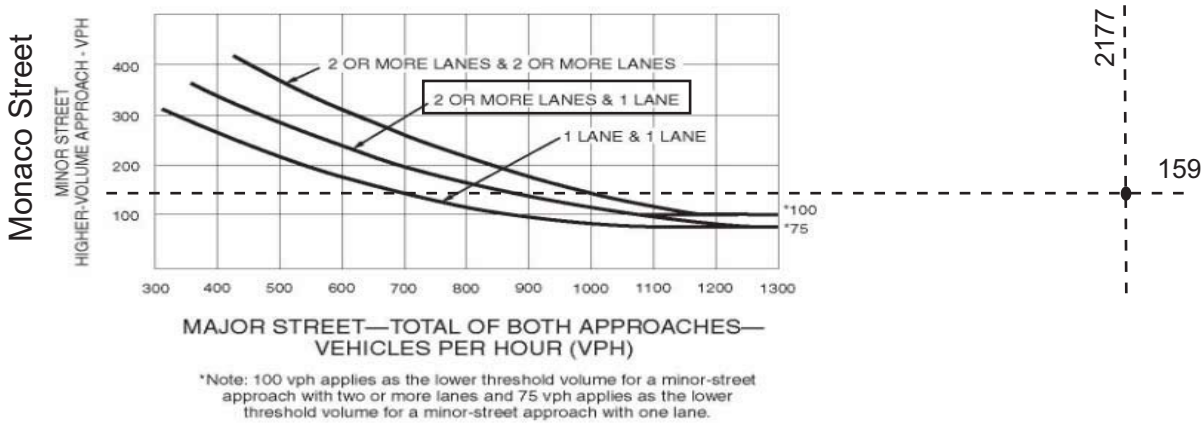


*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure B – Criteria for "70%" volume level.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

128th Avenue - 45 MPH

Project: Creekside

Background Traffic - Year 2035 - PM Peak Hour

Traffic Signal Warrants Analysis Form

Warrant 3 – Peak Hour Satisfied: ☐ **Yes** ☒ **No**

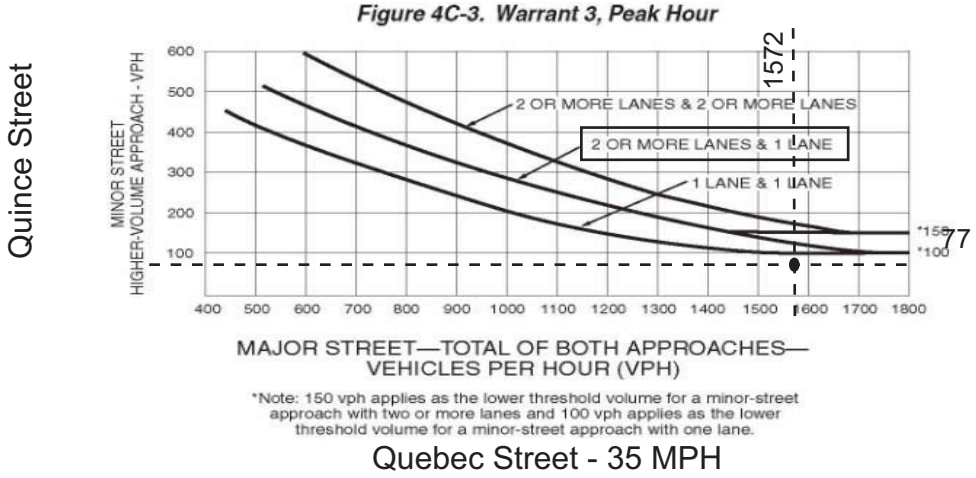
Unusual condition justifying use of warrant: Minor street suffers undue delay when entering major street.

Record hour where criteria are fulfilled and the corresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1. Delay on Minor Approach (veh-h)	4	5					
2. Volume on Minor Approach (veh/h)	100	150					
3. Total entering volume (veh/h)			650	800			

Figure A – Criteria for "100%" volume level.

Figure 4C-3. Warrant 3, Peak Hour

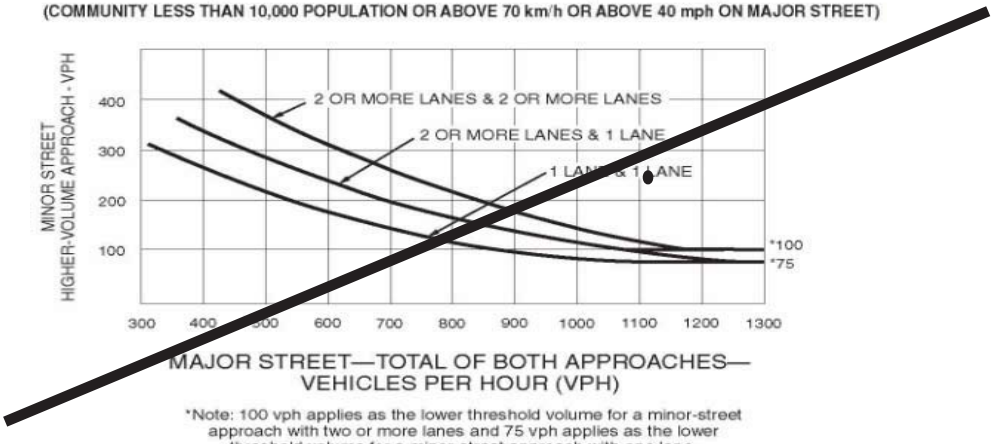


Quebec Street - 35 MPH

Figure B – Criteria for "70%" volume level.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



Project: Creekside

Background Traffic - Year 2035 - PM Peak Hour

Traffic Signal Warrants Analysis Form

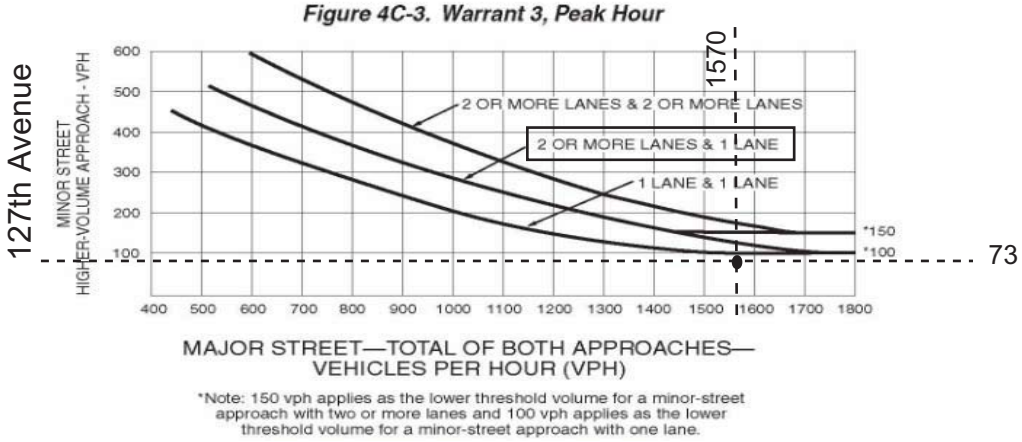
Warrant 3 – Peak Hour Satisfied: ☐ **Yes** ☒ **No**

Unusual condition justifying use of warrant: Minor street suffers undue delay when entering major street.

Record hour where criteria are fulfilled and the corresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

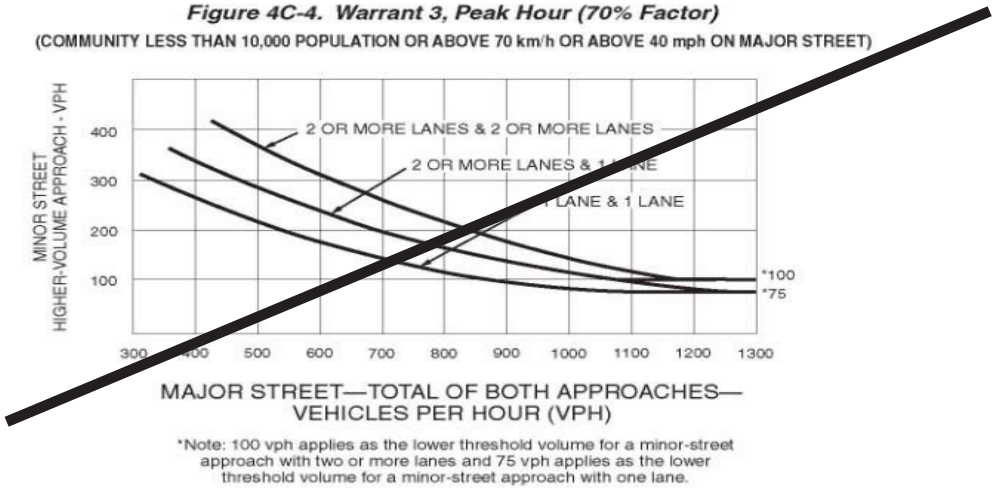
Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1. Delay on Minor Approach (veh-h)	4	5					
2. Volume on Minor Approach (veh/h)	100	150					
3. Total entering volume (veh/h)			650	800			

Figure A – Criteria for "100%" volume level.



Quebec Street - 35 MPH

Figure B – Criteria for "70%" volume level.



Project: Creekside

Background Traffic - Year 2035 - PM Peak Hour

Traffic Signal Warrants Analysis Form

Warrant 3 – Peak Hour Satisfied: ☒ **Yes** ☐ **No**

Unusual condition justifying use of warrant: Minor street suffers undue delay when entering major street.

Record hour where criteria are fulfilled and the corresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1. Delay on Minor Approach (veh-h)	4	5					
2. Volume on Minor Approach (veh/h)	100	150					
3. Total entering volume (veh/h)			650	800			

Figure A – Criteria for "100%" volume level.

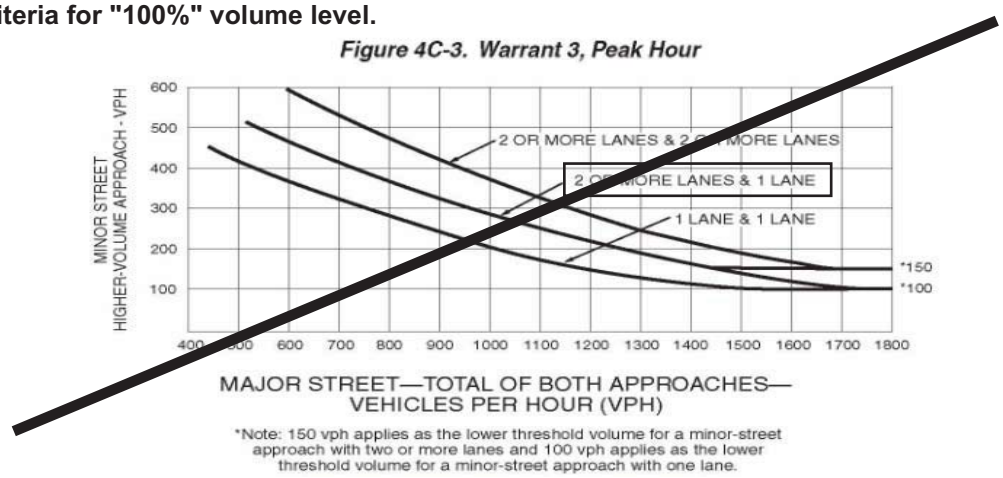
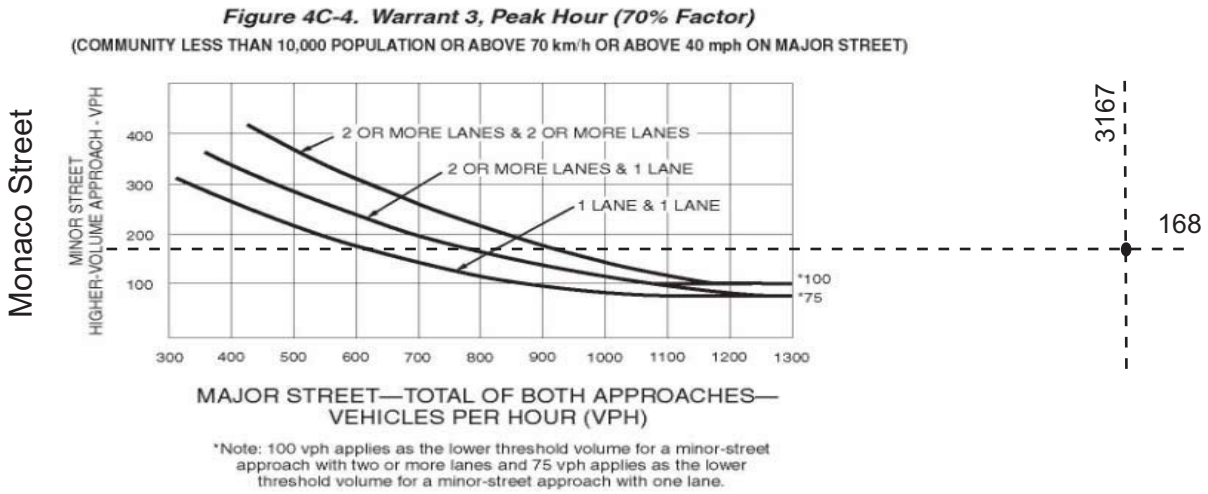


Figure B – Criteria for "70%" volume level.

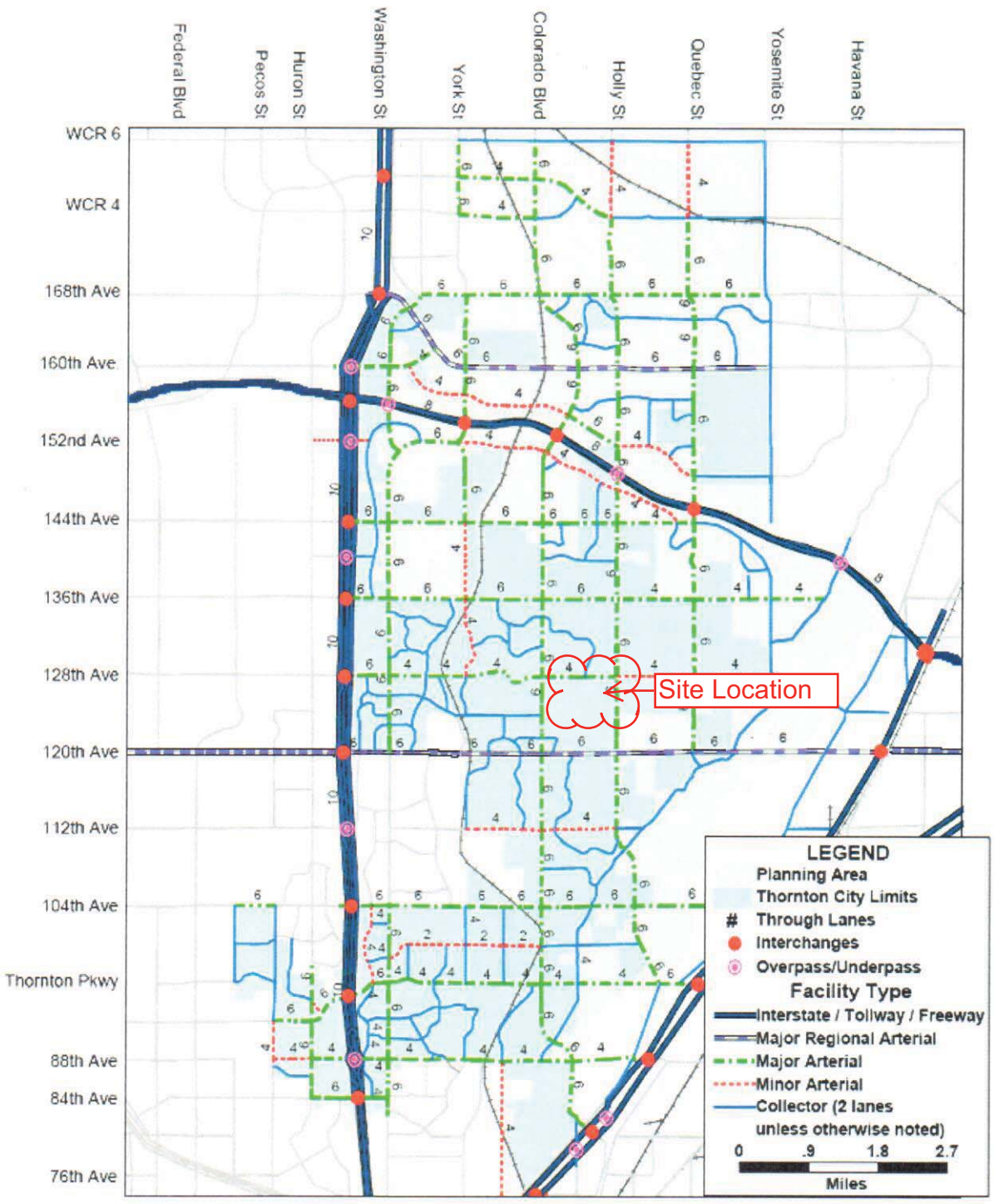


128th Avenue - 45 MPH

APPENDIX E

Transportation Plan Reference

Figure 2
City of Thornton Buildout Roadway Plan



15-06441
COMMENTS FROM CITY

Transportation Impact Study
Base Assumptions

Project Information			
Project Name	CREEKSIDE		
Project Location	SWC OF 128th AVE & QUEBEC ST		
TIS Assumptions			
Type of Study	Full: YES		Intermediate: No
Study Area Boundaries	North: 128th AVE		South: QUINCE ST
	East: QUEBEC ST		West: MONACO ST
Study Years	Short Range: 2017		Long Range: 2035
Future Traffic Growth Rate	COMPOUNDED ANNUAL 2%		3% to account for north and east future growth/development
Study Intersections	1. All access drives		5. QUEBEC ST / QUINCE ST
	2. 128th / MONACO ST		6. Walmart access on Quebec
	3. 128th / ONEIDA ST		7. 130th & Quebec
	4. 128th / QUEBEC ST		8. Other anticipated signalized intersections between 130th and 136th?
Time Period for Study	AM: 7:00-9:00	PM: 4:00-6:00	Sat Noon: N/A
Trip Generation Rates	ITE 9th EDITION		
Trip Adjustment Factors	Passby: NONE		Captive Market: NONE
Overall Trip Distribution	SEE ATTACHED SKETCH		
Mode Split Assumptions	NONE TO BE CONSERVATIVE		
Committed Roadway Improvements	LIMITED TO SITE ACCESS IMPROVEMENTS 128th AVE & QUEBEC ST IMPROVEMENTS TO BE COORDINATED WITH CITY STAFF		
Other Traffic Studies	Consider other traffic studies in the area...Walmart, Crestview, etc. Include discussion about any discrepancies, consistencies, assumptions, etc. between this report and the adj reports, even the Transportation Plan		
Areas Requiring Special Study	N/A		

Date: 7/3/2015

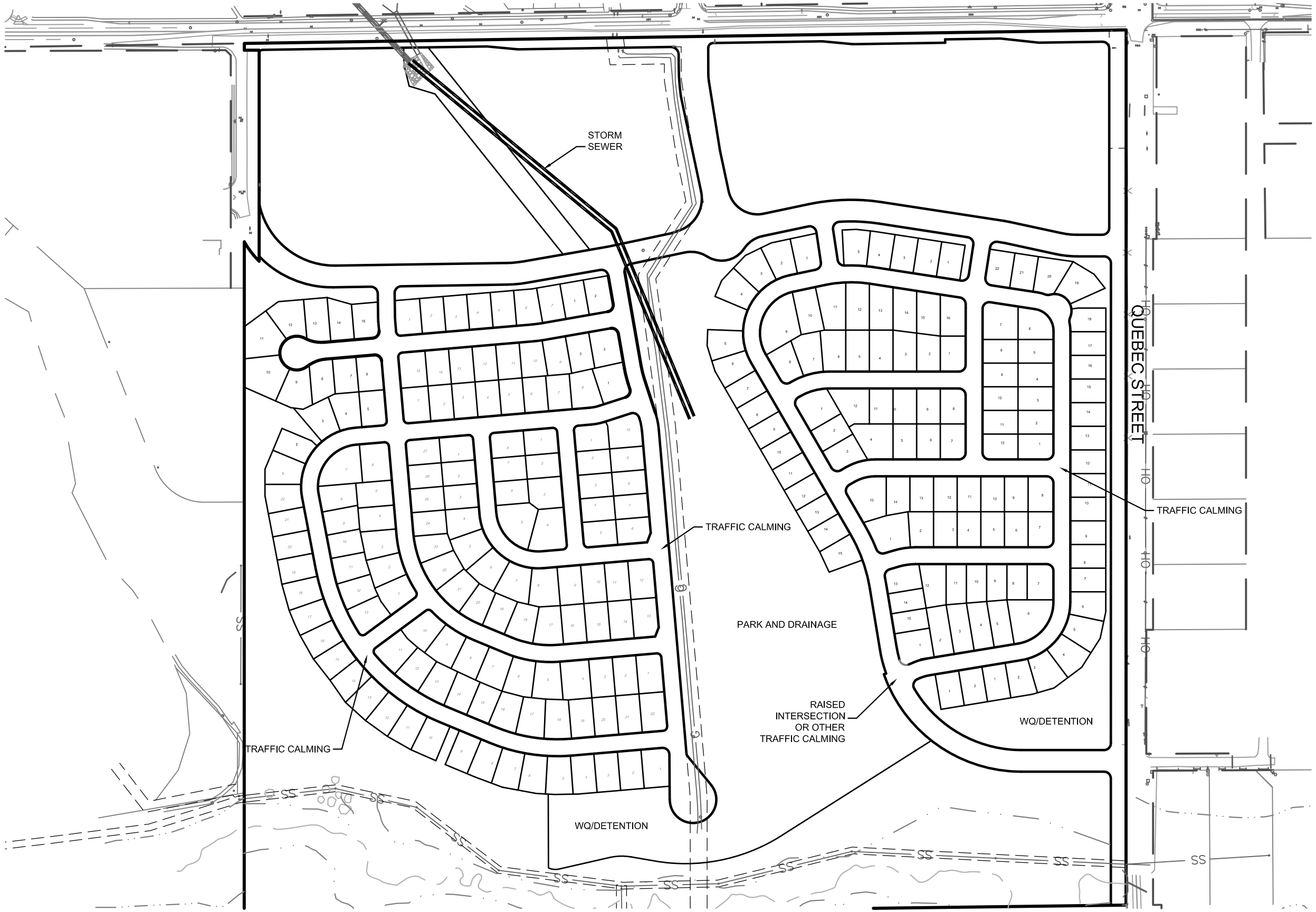
Traffic Engineer: SM ROCHA, LLC - MIKE ROCHA

Local Entity Engineer: _____

*Use Synchro for both intersection and queuing analysis

Include discussion in the report regarding roadways in the vicinity (vicinity is the next closest arterial in each direction, not counting the arterial that may front the property) that the proposed development may negatively impact the LOS, and if they may warrant signalization or other traffic

Progression Analysis, with ultimate cycle length, for all warrants met (See below for requirements) (in the form of a time-space diagram) in the long term condition for existing/future signals within a mile. See attached for some counts the City already has that you may use. You may also use the counts from the Crestview report for your signal progression.



WEST
144 LOTS (70'X105')
144 TOTAL LOTS

EAST
99 LOTS (70'X105')
15 LOTS (60'X105')
114 TOTAL LOTS

TOTAL
243 LOTS (70'X105')
15 LOTS (60'X105')
258 TOTAL LOTS

0 150 300

SCALE: 1" = 300'

DATE:	SCALE:
6/17/15	1=300'
JOB NUMBER:	
15039	

CREEKSIDE
LOTTING STUDY

JANSEN STRAWN
CONSULTING ENGINEERS
45 WEST 2ND AVENUE
DENVER, CO 80223
P.303.561.3333
F.303.561.3339

SHEET
SP1.4

OVERALL SITE TRAFFIC DISTRIBUTION AND GENERAL LOCATION EXHIBIT

Creekside Development
Base Assumption
Site Trip Generation

TABLE 1
TRIP GENERATION RATES

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Residential	DU	9.52	0.19	0.56	0.75	0.63	0.37	1.00
220	Apartment	DU	6.65	0.10	0.41	0.51	0.40	0.22	0.62
820	Shopping Center	KSF	42.7	0.60	0.36	0.96	1.78	1.93	3.71

Key: KSF = Thousand Square Feet Gross Floor Area DU = Dwelling Units
Note: All data and calculations presented in above table are subject to being rounded to nearest value.

TABLE 2
TRIP GENERATION SUMMARY

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Residential	258 DU	2,456	48	145	194	163	95	258
220	Apartment	360 DU	2,394	37	147	184	145	78	223
820	Shopping Center	174 KSF	7,430	104	63	167	310	336	646
		Total:	*12,280*	*189*	*355*	*544*	*617*	*509*	*1,127*

Note: All data and calculations presented in above table are subject to being rounded to nearest value.

This information will be verified with the submittal to the City