



1454 Oxford Street

Transportation Impact Assessment

Version 1

Prepared for

Isle of Mann Property Group

Date

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Project No.

04-22-0175

CORPORATE AUTHORIZATION

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1. INTRODUCTION

1.1 Study Purpose & Objectives

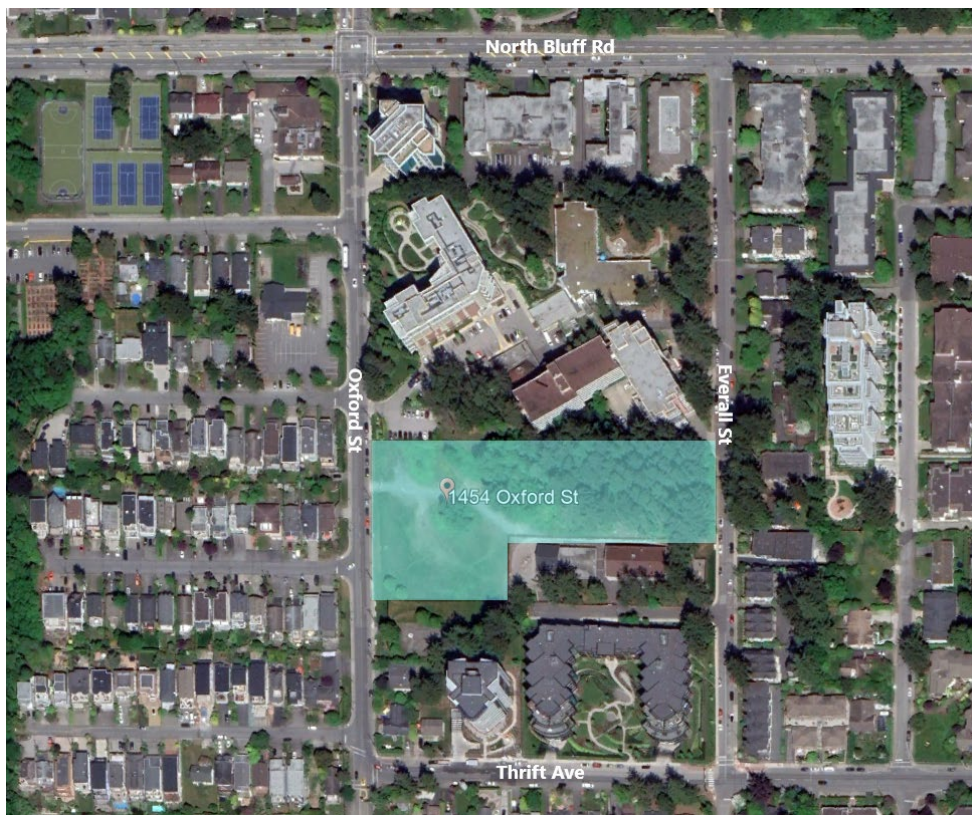
Bunt & Associates prepared the previous 1454 Oxford Street Transportation Impact Assessment (TIA), Final Report in March 2014 to support the development of two residential towers with up to 124 high-end residential units. A copy of the 2014 TIA is included in **Appendix A** for reference. Since completion of the 2014 TIA, ownership of the property has changed, and the Isle of Mann Property Group (IOM) is interested in amending the development to increase the total number of residential units to 203.

A TIA update was requested to assess the impact of the proposed development on the transportation network and determine appropriate mitigation measures, if any, to support the development.

1.2 Study Area and Scope

The proposed site is located at 1454 Oxford Street in White Rock, BC as illustrated in **Figure 1.1**.

Figure 1.1: Site Location



This study builds upon the 2014 TIA and includes the following tasks:

- Trip generation update and comparison to the 2014 TIA.
- Confirmation of the Zoning Bylaw supply requirements for vehicle parking, bicycle parking, and loading.

1.3 Organization of Report

The report is organized into the following sections:

- Section 2 – Future Traffic Conditions
- Section 3 – Parking & Loading Supply
- Section 4 – Conclusions

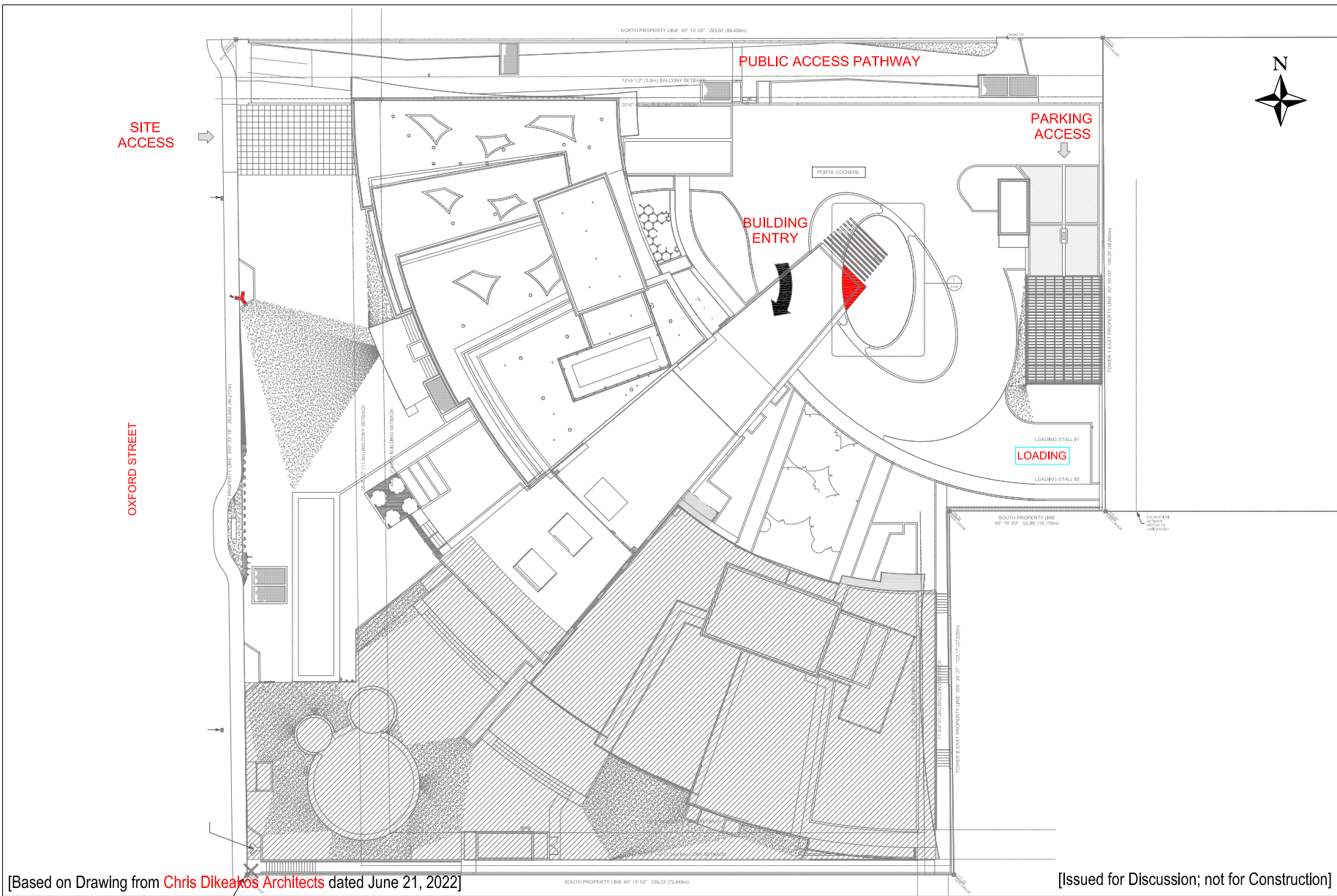
1.4 Proposed Development

The development is proposed to include two residential towers (Tower A and Tower B) accommodating 203 high-end units. Tower A is proposed as a 21-storey building accommodating 78 residential units, and Tower B is proposed as a 24-storey building accommodating 125 residential units.

The site is proposed to be accessed via a single access to Oxford Street between Goggs Avenue and Russell Avenue. Vehicles will enter the site via Oxford Street and will travel east to the rear of the building to access the port cochere for drop-off/pick-up activity or to access the underground parking access. The site is proposed to provide 409 parking stalls for residents and visitors.

Exhibit 1.1 illustrates the proposed site plan.

M:\Operations\Dept BC\Projects\2022\04-22-0175 1454 Oxford TIA Update\4.0 Analysis & Design\CAD\Swept Path\220805 Site Plan.dwg
 2022/08/23 13:00, Plotted by Janelle Willis



[Based on Drawing from Chris Dikeakos Architects dated June 21, 2022]

[Issued for Discussion; not for Construction]

Exhibit 1.1 Site Plan

04-22-0175 July 2022

Scale NTS on Letter

Oxford TIA Update
 Prepared by BT



2. FUTURE TRAFFIC CONDITIONS

2.1 Trip Generation Comparison

The 2014 TIA used trip generation rates derived from empirical data measured at 3315 Cypress Place in West Vancouver due to its similar residential structure with relatively large units (see Appendix A, p.11). The empirical data is anticipated to provide a slightly more conservative estimate of trips as compared to the use of Land Use Code 222 – Multifamily Housing (High-Rise) from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, as shown in **Table 2.1**. Therefore, to be conservative and consistent with the 2014 TIA, the empirical rates were used in the assessment.

Table 2.1: Trip Generation Rates

LAND USE	AM PEAK HOUR	PM PEAK HOUR
ITE (222) High-rise Apartment	0.27 trips/du (34% in/66% out)	0.32 trips/du (56% in/44% out)
Empirical Data Counts	0.38 trips/du (28% in/72% out)	0.38 trips/du (49% in/51% out)

Table 2.2 summarizes the gross AM and PM peak hour vehicle trips assumed in the 2014 TIA and the trip estimates based on the proposed amendment.

Table 2.2: Gross Trip Generation Estimates

LAND USE	UNITS	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
2014 TIA Total	124	13	34	47	23	24	47
Proposed Total	203	21	56	77	38	39	77
DIFFERENCE PROPOSED – 2014 TIA	79	8	22	30	15	15	30

As shown in Table 2.2, the proposed development is projected to result in an increase of about 30 two-way trips during the AM and PM peak hours as compared to the 2014 TIA. This magnitude of traffic is not anticipated to have a significant impact on the roadway network, and the results of the operational analysis provided in the 2014 TIA are anticipated to continue to be applicable.

As per the 2014 TIA, the North Bluff Road/Oxford Street and Thrift Avenue/Oxford Street intersections have adequate capacity to accommodate existing and future traffic volumes at satisfactory levels. No changes to the existing geometry or traffic control are required to accommodate the proposed development.

3. PARKING & LOADING SUPPLY

3.1 Vehicle Parking

Table 3.1 summarizes the vehicle parking requirements based on *Section 4.14 – Off-Street Parking Requirements* of Zoning Bylaw 2000 for ‘Apartment’.

Table 3.1: Vehicle Parking Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	DIFFERENCE
Apartment – Resident	203 du	1.2 stalls per du	244	360	116
Apartment – Visitor	203 du	0.3 stalls per du	61	49	-12
TOTAL			305	409	104

As shown in Table 3.1, a minimum parking supply of 305 stalls (244 resident & 61 visitor) is required based on Bylaw. With the provision of 360 resident parking spaces, a 116-stall surplus is projected based on Bylaw. Visitor parking is proposed to be provided at a rate of 0.24 stalls per du, resulting in the provision of 49 visitor stalls. This represents a 12-stall deficiency as compared to the Bylaw requirement.

A reduced visitor parking ratio is in line with studies completed in the Metropolitan Vancouver area. Visitor parking ratios are found to be in the order of 0.10 stalls/du as noted within the *Metro Vancouver Apartment Parking Study*. With this information and Bunt’s in-house experience, best practices for provision of visitor parking would be in the order of 0.10 stalls/du. A provision of 0.24 stalls/du far exceeds the best practices rate. Along with a good provision of residential stalls, the overall parking provision is anticipated to adequately serve the development. A TDM plan is not anticipated to be required to justify the parking variance.

3.2 Bicycle Parking

Table 3.2 summarizes the bicycle parking requirements based on *Section 4.16.1 – Bicycle Parking* of Zoning Bylaw 2000. Class I spaces are long-term secured bicycle parking spaces and are typically provided for residents, while Class II spaces are short-term bicycle parking spaces typically provided for visitors.

Table 3.2: Bicycle Parking Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	DIFFERENCE
Apartment – Class I	203 du	1 space per du	203	357*	154
Apartment – Class II	203 du	0.2 spaces per du	41	26	-15
TOTAL			244	383	139

*Note: Includes 28 visitor and 329 residential spaces

As noted in Table 3.2, 357 Class I bicycle parking spaces are proposed, which represents a surplus of 154 spaces based on Bylaw. Of the 357 Class I spaces, 28 are proposed to be provided for visitors within a bike room on Level 1, with the remaining 329 provided for residents within bike rooms on Levels P1, P2, and P3. The provision of 28 Class I visitor bicycle spaces represents an enhancement to typical visitor bicycle parking. Although the site is proposed to be deficient by 15 Class II bicycle spaces, the overall visitor supply is 54 spaces (28 Class I & 26 Class II); therefore, the Class II deficiency is made up for with the provision of 28 Class I visitor spaces.

The Class II bicycle parking should be provided in a publicly accessible area near the principal building entrances in a well lit and highly visible area.

3.3 Off-Street Loading

Based on *Section 4.15 – Off-Street Loading Requirements* of Zoning Bylaw 2000, a minimum of one off-street loading space shall be provided for every apartment complex containing more than 10 dwelling units. Where the apartment complex is provided in more than one principal building with separate elevators for each building, one off-street loading space shall be provided for each principal building containing more than 10 dwelling units. Based on Bylaw, the loading spaces shall have a minimum width of 3.0m, a minimum length of 9.0m, and a minimum clearance height of 3.7m.

The proposed development consists of two residential towers containing more than 10 dwelling units; therefore, two off-street loading spaces are required. Based on the current site plan, two loading spaces are provided off the port cohere.

4. CONCLUSIONS

The proposed development includes two residential towers accommodating 203 high-end units located on the east side of Oxford Street, south of North Bluff Road in the City of White Rock, BC. The proposal represents a 79-unit increase as compared to the previously approved plan.

The development is projected to generate a total of 77 two-way trips during the AM peak hour and 77 two-way trips during the PM peak hour. Overall, this represents an increase of about 30 two-way trips as compared to the 2014 TIA. This magnitude of traffic is not anticipated to have a significant impact on the roadway network, and the operational analyses provided in the 2014 TIA are anticipated to continue to be applicable. As per the 2014 TIA, the North Bluff Road/Oxford Street and Thrift Avenue/Oxford Street intersections have adequate capacity to accommodate existing and future traffic volumes at satisfactory levels. No changes to the existing geometry or traffic control are required to accommodate the proposed development.

All vehicle access for the site will be taken from a single driveway to Oxford Street. Vehicles will enter the site via Oxford Street and will travel east to the rear of the building to access the port cochere for drop-off/pick-up activity or to access the underground parking access. The site is proposed to provide 409 parking stalls for residents and visitors.

A minimum vehicle parking supply of 305 stalls (244 resident & 61 visitor) is required based on Bylaw. With the provision of 360 resident parking spaces, a 116-stall surplus is projected based on Bylaw. Visitor parking is proposed to be provided at a rate of 0.24 stalls per du, resulting in the provision of 49 visitor stalls. This represents a 12-stall deficiency as compared to the Bylaw requirement. A reduced visitor parking ratio is in line with studies completed in the Metropolitan Vancouver area, and the proposed visitor parking supply of 49 stalls is projected to adequately accommodate visitor parking demands.

A minimum bicycle parking supply of 203 Class I and 31 Class II stalls is required based on Bylaw. 357 Class I and 26 Class II bicycle parking spaces are proposed. The provision of 357 Class I stalls represents a surplus of 154 spaces based on Bylaw. Of the 357 Class I spaces, 28 are proposed to be provided for visitors and 329 are proposed to be provided for residents. The provision of 28 Class I visitor bicycle spaces represents an enhancement to typical visitor bicycle parking. Although the site is proposed to be deficient by 15 Class II bicycle spaces, the overall visitor supply is 54 spaces (28 Class I & 26 Class II); therefore, the Class II deficiency is made up for with the provision of 28 Class I visitor spaces.

Two off-street loading spaces are required based on Bylaw. Based on the current site plan, two loading spaces are provided off the port cochere, which meets the minimum Bylaw requirement.

APPENDIX A

2014 TIA



1454 Oxford Street Transportation Impact Assessment Final Report

Prepared for
Elegant Development Inc.

Date
March 28, 2014

Prepared by
Bunt & Associates

Project No.
4862.03



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EXECUTIVE SUMMARY

Proposed Development

Elegant Development Inc. is planning to develop a 116, 584 ft² site located at 1454 Oxford Street in White Rock, BC, into two residential towers. The proposed development will include a total of 124 high-end residential units with a mix of 2-bedroom, 2-bedroom and den and 3-bedroom and den condominiums. The construction is planned for completion by 2016. The proposed development will have a single access point via Oxford Street between Goggs and Russell Avenues. Oxford Street intersections with North Bluff Road and Thrift Avenue were analyzed as a part of this transportation impact analysis.

Traffic Operations Analysis and Results

The proposed development will generate 47 and 47 vehicles per hour during the AM and PM peak hours, respectively. These figures were obtained by conducting empirical data collection for a similar high-end condominium complex located at 3315 Cypress Place in West Vancouver, BC. The nature of the planned units, size and the single access point configuration provided reasonable similarities for the level of this study. The anticipated site traffic volumes were compared to those driven from the ITE-Trip Generation Manual (*ITE-9th Edition*) which resulted in 37 and 43 vehicles per hour for the AM and PM peak hours. The more conservative empirical rates were used for this study. The Future Background (2026) conditions assumed a continuous annual growth rate of 2% for the general traffic. The Total Future (2026) included the anticipated traffic generated to/from the proposed development as well as the Future Background demand.

The traffic analysis showed that the existing street network configuration will handle all future time horizons' traffic volumes (Existing Conditions (2014), Opening Day (2016), Future Background (2026) and Total Future (2026) without any major issues. All laning groups provide adequate capacity for the future traffic volumes.

Parking Review

The proposed development will provide 286 off-street parking spaces. It exceeds the 187 total spaces required by the City of White Rock's By-law.

Recommendations

The above analysis and its conclusions are based on available information for the proposed development project. During the detailed design stage, the parking plans may be reviewed to ensure efficient circulation and that they do not conflict with the structural elements.

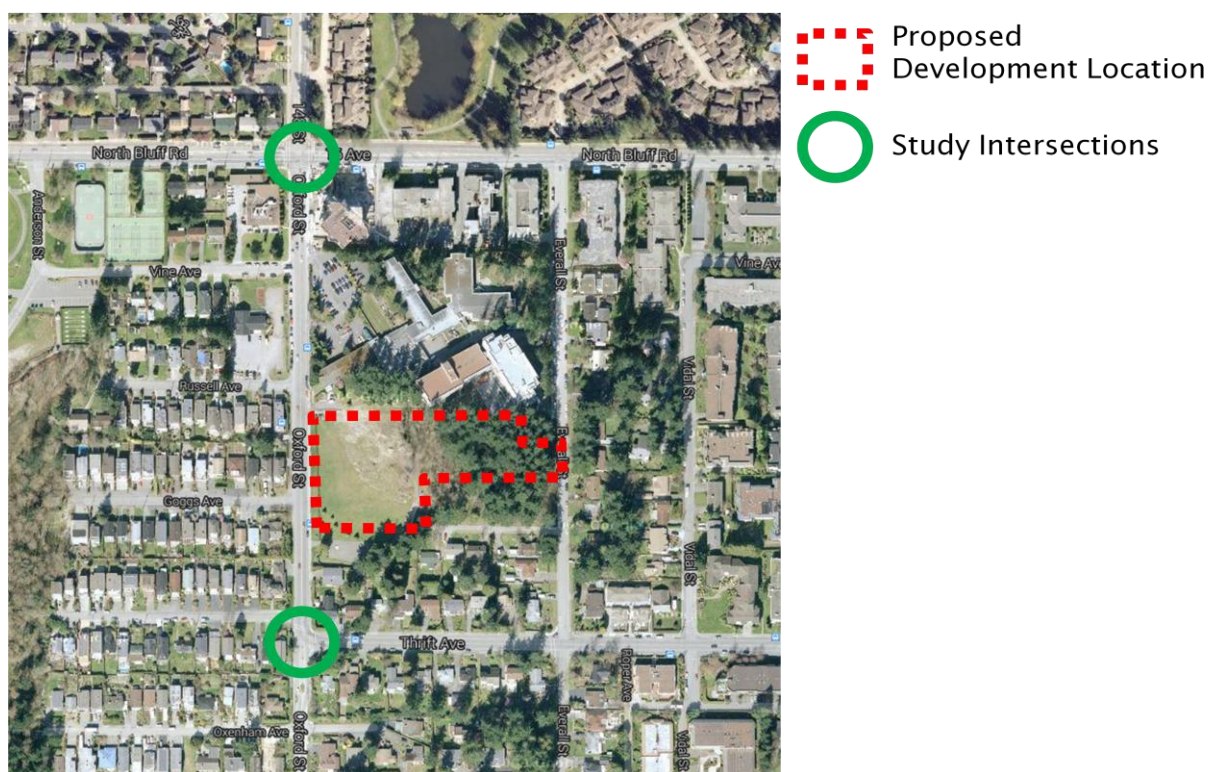
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1. INTRODUCTION

1.1 Background

Elegant Development Inc. is planning to develop a 116, 584 sq-foot site into two residential towers, which will include a total of 124 high-end residential units with a mix of 2-bedroom, 2-bedroom and den and 3-bedroom condominiums. The proposed site is located at 1454 Oxford Street in White Rock, BC. **Figure 1.1** shows the location of the proposed development.

Figure 1.1: Proposed Development Location



The City of White Rock (City) requires a transportation impact assessment study to be conducted for the proposed development. This study is an integral part of the upcoming rezoning application. The main objective of the study is to determine the impact of the additional traffic volume generated to/from the proposed development on the surrounding road network. Bunt & Associates was retained by Elegant Development Inc. to perform the study and recommend any mitigation(s) that might be necessary to accommodate the estimated traffic increase.

1.2 Study Area Context

At present, the site is located in the P1 (Civic / Institutional) zone in White Rock¹. The study area is bounded by Oxford Street to the west, Everall Street to the east, single-family detached housing units to the south and Evergreen Baptist Care Home to the north. The site's single access point will be via Oxford Street between Goggs and Russell Avenues. Major vehicular traffic routes close to the site include Marine Drive to the south and King George Boulevard to the east. Future site traffic can access Marine Drive and King George Boulevard via Oxford Street and 16th Avenue (North Bluff Road), respectively. The adjacent network elements are discussed in more detail later in this document.

1.3 Methodology

In order to effectively conduct the study, Bunt planned and conducted the following tasks.

Task 1: Project Start-Up and Data Collection

- Reviewed current site plans;
- Reviewed applicable policies from the City of White Rock including the Zoning Bylaw 2000;
- Identified a similar development with similar traffic patterns to document trip generation rates that reflected the high-end nature of the proposed development. Once the study team identified the similar building, the data collection team conducted traffic counts for weekday AM and PM peak hour periods; and,
- Conducted traffic counts at two intersections shown in **Figure 1.1** at a weekday AM and PM peak hour periods. **Appendix A** includes the summarized traffic data collection sheets.

Task 2: Site Plan Review

- Reviewed the proposed development site plan and provided input to the project design team on the transportation elements including driveway access, internal traffic circulation, parking layout, and loading access.

Task 3: Transportation Assessment

- Evaluated the observed traffic data to document existing conditions;
- Identified the future base network assumptions, background growth methodology, and study horizon years for future conditions, for i.e. Opening Day and Opening Day+10 Years;

¹ Zoning Bylaw No. 2000, Schedule "C" – Zone Maps (*City of White Rock, April 2013*)

- Estimated the anticipated peak hour trip generation and distribution patterns for the proposed development;
- Prepared Synchro traffic models for each time period and horizon year, both with and without the site redeveloped;
- Determined the potential traffic impacts of the proposed new development on the adjacent network intersections; and,
- Identified what, if any, improvements may be required on the area road network elements to mitigate the traffic impact of the proposed new development.

1.4 Traffic Analysis Preamble

The traffic impact analysis was carried out using Synchro Software version 8 and the HCM 2000 methodology, and the results are summarized in the tables later in this report.

The summary tables report the calculated Measures of Effectiveness (MoE) including Volume to Capacity (V/C) ratios and a corresponding delay-based traffic Level of Service (LOS) indicator. LOS indicators range from the ideal LOS A with minimal delay through to LOS E 'near capacity' conditions and LOS F 'over-saturated' conditions when drivers may have to wait through several cycles to proceed through the intersection. The 95th percentile queue length for each lane group is presented in metres.

Summary tables have assumed the following performance thresholds:

- V/C = 0.90 or greater for the overall intersection operations and individual movements;
- Levels of Service at E or worse;
- 95th percentile queue lengths longer than the available storage length.

All situations where these performance thresholds were exceeded have been identified by **bold** text in the summary tables.

The Oxford Street intersection with Thrift Avenue was modeled as a normal four-legged intersection.

Details of all results can be found at **Appendix B**, which contains Synchro report printouts.

1.5 Report Structure

This report is set out in 5 sections. A summary for each section is provided below.

Section 1 – Introduction

Section 1 provides an overview of the site location, proposed development and the study area.

Section 2 – Existing Conditions

Section 2 provides a summary of the existing road network, traffic operations, and existing transit services.

Section 3 – Proposed Development

Section 3 includes an overview of the development plan and the site's anticipated future trip generation.

Section 4 – Future Traffic Operations

Section 4 presents an overview of the background traffic, and total future traffic, and potential impacts that they may have on the adjacent intersections.

Section 5 – Conclusions and Recommendations

Section 5 summarizes the study's conclusions and recommendations.

Exhibits are included at the end of each section.

2. EXISTING CONDITIONS

2.1 Existing Road Network

The study area road network, including road classification, laning for the major intersections and traffic control devices are shown in **Exhibit 2.1**. The key streets included in the study area include Oxford Street, North Bluff Road and Thrift Avenue.

Oxford Street

Oxford Street is currently classified as an arterial with a two-lane/two-way cross-section. It provides sidewalks on the east side, while the west side is currently under construction. Oxford Street is extended in the north-south directions, and provides access to area's residential sites as well as some of the institutional traffic generators including Treehouse Child Development Centre and White Rock Come Share Centre to the west and Evergreen Baptist Care Home to the east. Oxford Street connects the Marine Drive corridor (south White Rock) to 148th Street corridor in Surrey (north). Adjacent to the proposed development, it does not have a posted speed, and therefore is assumed to be 50 km/hr. Oxford Street forms a signalized intersection with the North Bluff Road and provides exclusive left-turn bays on both approaches. There are no parking lanes on either side.

North Bluff Road (16th Avenue)

North Bluff Road functions as an east-west arterial road, extending from Ocean Park Road to the west and ending at King George Boulevard to the east. North Bluff Road transitions into 16 Avenue and continues towards Langley east of King George Boulevard. It provides access to residential homes and local and collector roads. North Bluff Road has a four-lane cross section with sidewalks on both sides, and exclusive left-turn bays at its signalized intersection with Oxford Street. It is also a planned cycling route and provides some parking spaces on the south side.

Thrift Avenue

Thrift Avenue is an east-west two-lane arterial, providing access to adjacent residential areas, and forming a stop sign controlled intersection with the Oxford Street. Thrift Avenue has parking lanes on both sides, and is assumed to have a 50 km/hr posted speed. It is also a planned cycling route.

2.2 Existing Traffic Volumes

Bunt's data collection team conducted a traffic count on Monday February 24 at AM and PM peak hour(s). Due to the unexpected weather conditions as well as Monday's typically lower traffic demand, the traffic counts were increased by 5% to compensate for these factors. **Exhibit 2.2** presents the existing traffic volumes.

2.3 Existing Traffic Operations

The study team modeled the existing road network configurations and populated them with the existing traffic volume shown in **Exhibit 2.2**. The network was modeled using the Synchro 8 software package, with the existing signal timing phasing plan(s). **Table 2.1** summarizes the existing conditions measures of effectiveness (MoEs).

Table 2.1: Existing Conditions Traffic Conditions

Intersection/Movement	AM Peak Hour			PM Peak Hour		
	V/C	LOS	95 th Queue (m)	V/C	LOS	95 th Queue (m)
Signalized Intersections						
Oxford Street / North Bluff Road	0.28	B	-	0.29	B	-
EBL	0.25	B	13	0.33	C	13
EB TR	0.58	C	37	0.58	C	36
WBL	0.14	B	7	0.15	B	7
WBTR	0.29	B	19	0.55	C	3
NBL	0.06	A	6	0.11	A	9
NBTR	0.09	A	10	0.10	A	10
SBL	0.17	A	14	0.19	A	15
SBTR	0.12	A	11	0.16	A	14
Unsignalized Intersections						
Oxford Street / Thrift Avenue N	-	A	-	-	A	-
Oxford Street / Thrift Avenue S	-	A	-	-	A	-

Key Findings:

All approaches and laning groups have adequate capacity to accommodate the existing traffic volume (AM and PM peak hour) at satisfactory levels.

2.4 Existing Transit Services

Table 2.2 summarizes the existing transit routes within walking distance to the proposed development.

Table 2.2: Existing Transit Routes

Route		Weekday Service Headways at Stop (minutes)			
No.	Name	AM Period	Mid-day Period	PM Period	Evening Period
321	Surrey Central Station / White Rock	15	15	15	60
345	King George Station / White Rock Centre	20	30	30	30
351	Crescent Beach / Bridgeport Station	7-15	15	15	30
354	White Rock Centre / Bridgeport Station	15	-	20	-
855 ¹	Elgin Park School Special	-	-	-	-
C50	Ocean park / Peace Arch Hospital	30	30	30	-

¹ This bus service runs for Elgin Park School, for pick-up and drop-off prior to school start and after school

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Exhibit 2.1 The Study Area Street Network

3. PROPOSED DEVELOPMENT

This section provides information about the proposed development.

3.1 Development Plan

Exhibit 2.1 presents the proposed development location at 1454 Oxford Street in White Rock, BC. The site has a single access point along Oxford Street between Goggs and Russell Avenues. The proposed site will consist of two residential towers of 24 (Tower A) and 21 stories (Tower B). The proposed statistics are summarized in **Table 3.1**.

Table 3.1: Proposed Development Statistics

Site	2 Bed	2 Bed + Den	3 Bed + Den	Size (sq ft)
Residential Units				
Tower A	22	2	43	196,042
Tower B	19	1	37	166,520
<i>Sub-Total</i>	<i>41</i>	<i>3</i>	<i>80</i>	
Level 1 Shared Common Area	-	-	-	1,233
Level 1 Shared Amenity	-	-	-	1,175
Total	124 Units			364,970

3.2 Site Trip Generation

The proposed development will consist of high-end condominiums including mostly two bedroom and three bedroom plus den units. Therefore, it is anticipated that it will generate traffic volume at a higher rate than a typical high-rises. In order to conservatively capture a realistic trip generation rate, the study team identified a building with similar condominium plans.

Stonecliff residential complex at 3315 Cypress Place in West Vancouver, BC, has similar residential structure with relatively large units. It consists of three buildings totaling 111 residential units of two and three bedrooms. The data collection team conducted traffic counts during a weekday AM and PM peak hour. The trip generation rate derived from this empirical data was used to calculate the anticipated traffic volume for the proposed development. In addition, the anticipate site traffic volume was also calculated using the Institute of Transportation Engineers Trip Generation Manual (*ITE-9th Edition*). **Table 3.2** summarizes the results of the two calculation methods.

Table 3.2: Proposed Development's Trip Generation

Trip Generation Rate Source	AM			PM		
	In	Out	Total	In	Out	Total
ITE (222) High-rise Apartment	9	28	37	26	17	43
Empirical Data Counts	13	34	47	23	24	47

While the two numbers are close, for the purposes of this study and in order to take a conservative approach, the empirical data count was used. The anticipated site traffic volume was distributed using the existing directional splits on the adjacent street network. **Exhibit 3.1** shows the site traffic volumes.

3.3 Parking Review

The City of White Rock By-law requires a total of 187 spaces to be provided. The proposed development will provide 286 off-street parking spaces which will exceed the minimum requirements of the Bylaw.

Table 3.3 summarizes the parking calculations.

Table 3.3: Parking Requirement Review

Parking	Residential Visitor Parking			Residential Market Units			Total
	Gross	H/C	Small	Gross	H/C	Small	
City of White Rock By-law Parking Requirements¹							
	38	0	15	148	3	60	187
Proposed Parking Spaces							
	38	0	0	248	4	0	286

¹ Based on 1.2 per dwelling unit, plus 0.3 per dwelling unit for visitor parking for a total of 1.5 spaces per dwelling unit. Zoning Bylaw No. 2000, Section 4.15 Off-street Parking Requirements (*City of White Rock, April 2015*)

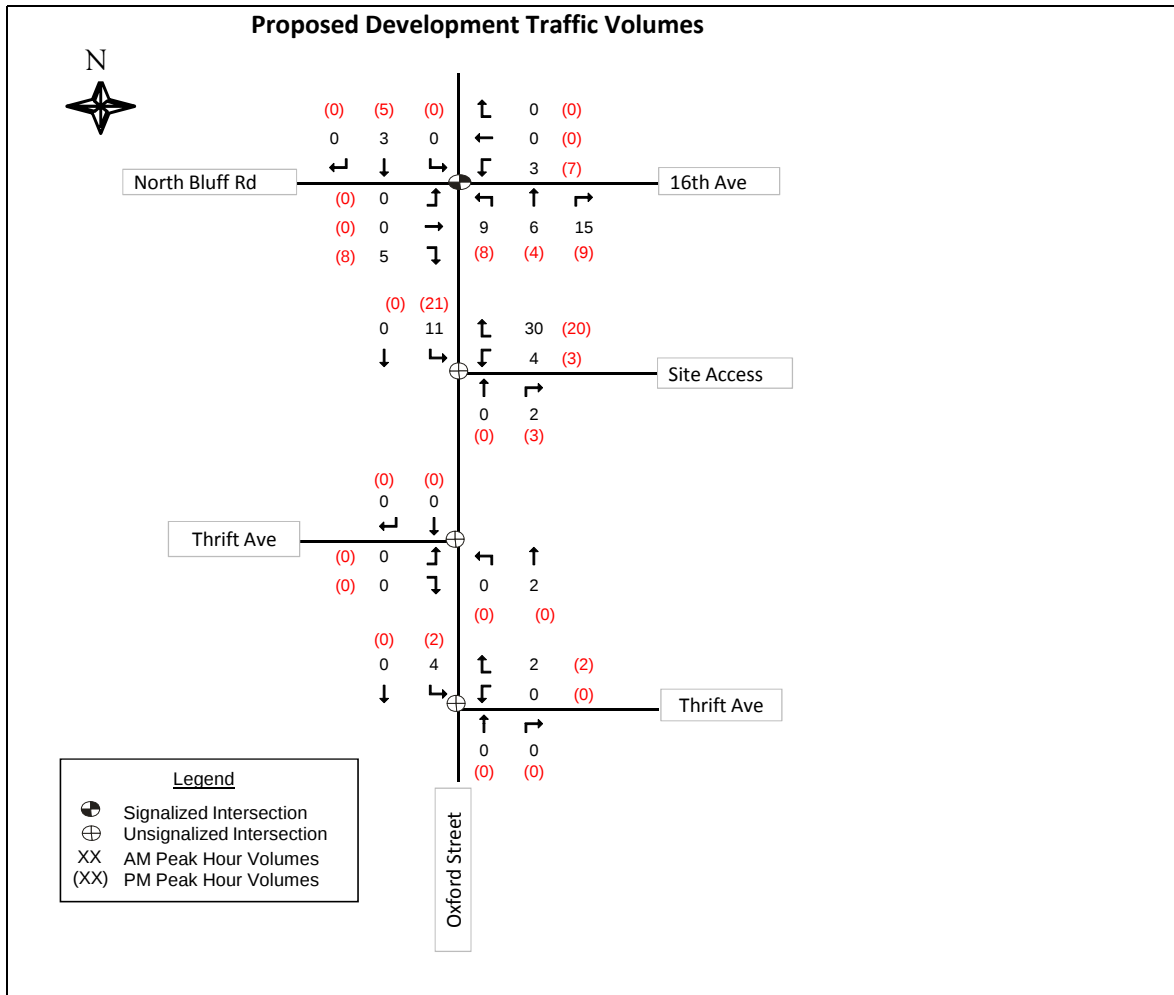


Exhibit 3.1

Proposed Development Traffic Volumes Opening Day

1454 Oxford Street Transportation Impact Assessment - White Rock, BC
4862.03 March 2014 NTS



4. FUTURE TRAFFIC OPERATIONS

This section analyzes the future conditions. The time horizons for the future scenarios include Opening Day (2016), Total Background (2026) and Total Future (2026).

4.1 Opening Day (2016) Traffic Volumes & Traffic Operations

The proposed development will be completed by 2016 and in one phase and the background traffic is assumed to increase at an annual rate of 2%. The Opening Day traffic volumes are calculated by adding the anticipated traffic generated from the site to the background traffic of 2016. The site's traffic is distributed using the existing splits on the adjacent street network. **Exhibit 4.1** shows the Opening Day traffic volumes.

Table 4.1 summarizes the traffic operational analysis results for the Opening Day (2016).

Table 4.1: Opening Day (2016) Traffic Conditions

Intersection/Movement	AM Peak Hour			PM Peak Hour		
	V/C	LOS	95 th Q	V/C	LOS	95 th Q
Signalized Intersections						
Oxford Street / North Bluff Road	0.29	B	-	0.30	B	-
EBL	0.25	B	14	0.34	C	14
EB TR	0.59	C	38	0.59	C	38
WBL	0.17	B	7	0.21	C	9
WBTR	0.30	B	19	0.55	C	36
NBL	0.08	A	8	0.12	A	11
NBTR	0.10	A	11	0.12	A	12
SBL	0.18	A	15	0.20	A	17
SBTR	0.14	A	13	0.18	A	16
Unsignalized Intersections						
Oxford Street / Thrift Avenue N	-	A	-	-	A	-
Oxford Street / Thrift Avenue S	-	A	-	-	A	-
Oxford Street Access	-	A	-	-	A	-

Key Findings:

All approaches and laning groups have adequate capacity to accommodate the Opening Day (2016) traffic volumes (AM and PM peak hour) at satisfactory levels.

4.2 Future Background (2026) Traffic Volumes & Traffic Operations

The Future Background (2026) traffic volumes were developed based on the assumption that the general area traffic will increase continuously at annual rate of 2%, and the proposed development will not be built. **Exhibit 4.2** shows the traffic volumes for the Future Background (2026). **Table 4.2** summarizes the traffic conditions for the Future Background (2026).

Table 4.2: Future Background (2026) Traffic Conditions

Intersection/Movement	AM Peak Hour			PM Peak Hour		
	V/C	LOS	95 th Queue (m)	V/C	LOS	95 th Queue (m)
Signalized Intersections						
Oxford Street / North Bluff Road	0.36	B	-	0.35	B	-
EBL	0.31	B	17	0.31	B	17
EB TR	0.63	C	48	0.63	C	48
WBL	0.19	B	8	0.19	B	8
WBTR	0.34	B	24	0.34	B	24
NBL	0.11	A	11	0.09	A	9
NBTR	0.15	A	18	0.11	A	14
SBL	0.23	A	22	0.22	A	22
SBTR	0.17	A	18	0.17	A	18
Unsignalized Intersections						
Oxford Street / Thrift Avenue N	-	A	-	-	A	-
Oxford Street / Thrift Avenue S	-	A	-	-	A	-

Key Findings:

All approaches and laning groups have adequate capacity to accommodate the Future Background (2026) traffic volumes (AM and PM peak hour) at satisfactory levels.

4.3 Total Future (2026) Traffic Volumes & Traffic Operations

The Total Traffic Volumes (2026) is calculated by adding the Future Background to the proposed site's anticipated traffic volumes. **Exhibit 4.3** shows the Total Future (2026) traffic volumes. **Table 4.3** summarizes the Total Future (2026) traffic operation analysis results.

Table 4.3: Total Future (2026) Traffic Conditions

Intersection/Movement	AM Peak Hour			PM Peak Hour		
	V/C	LOS	95 th Queue (m)	V/C	LOS	95 th Queue (m)
Signalized Intersections						
Oxford Street / North Bluff Road	0.29	B	-	0.30	B	-
EBL	0.31	B	17	0.44	C	16
EB TR	0.64	C	49	0.62	C	45
WBL	0.24	B	9	0.26	B	10
WBTR	0.34	B	25	0.59	C	42
NBL	0.10	A	10	0.17	A	14
NBTR	0.12	A	16	0.15	A	17
SBL	0.23	A	22	0.26	A	24
SBTR	0.17	A	19	0.23	A	24
Unsignalized Intersections						
Oxford Street / Thrift Avenue N	-	A	-	-	A	-
Oxford Street / Thrift Avenue S	-	A	-	-	A	-
Oxford Street Access	-	A	-	-	A	-

Key Findings:

All approaches and laning groups have adequate capacity to accommodate the Total Future (2026) traffic volumes (AM and PM peak hour) at satisfactory levels.

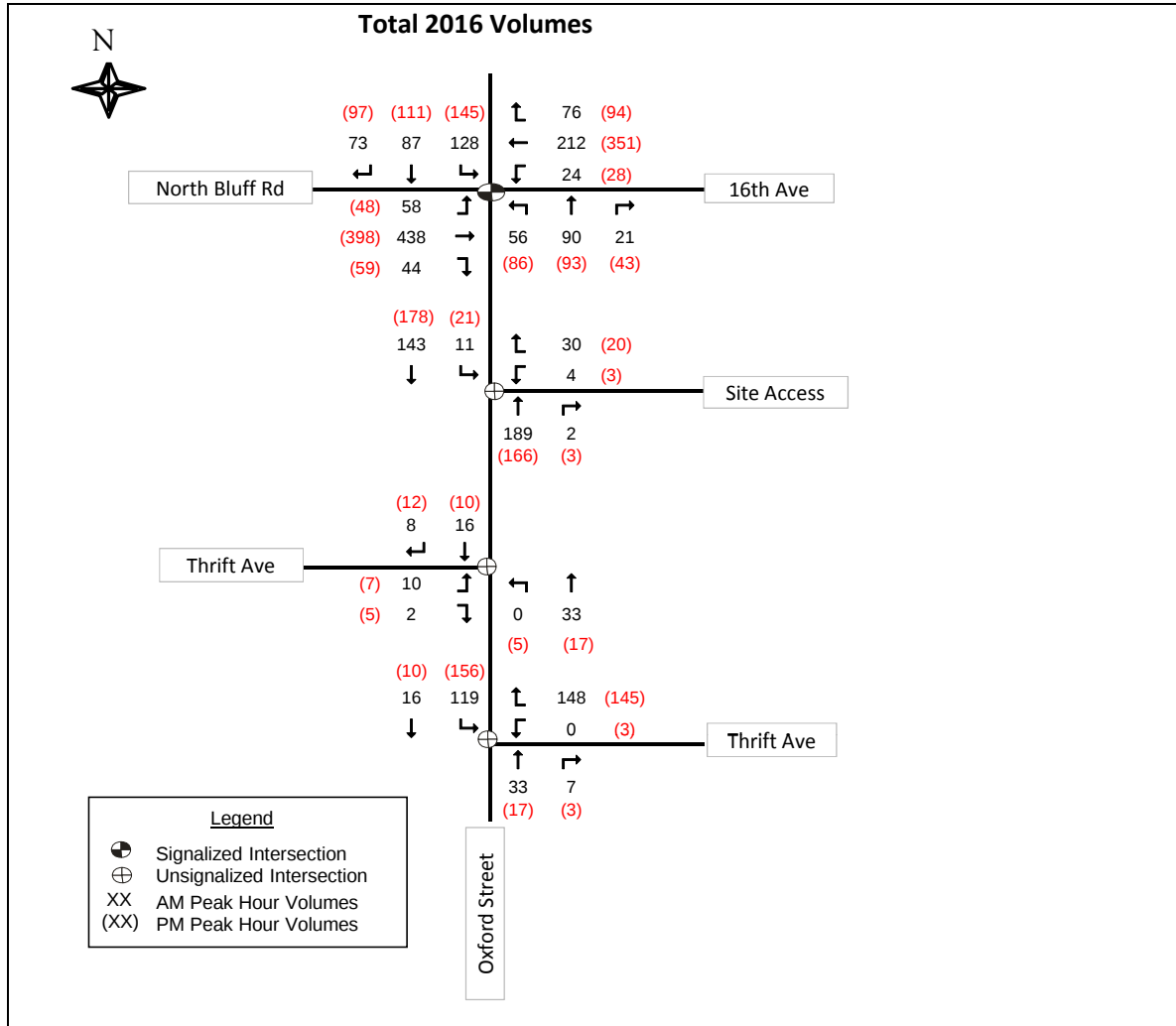


Exhibit 4.1

Opening Day (2016) Traffic Volumes

1454 Oxford Street Transportation Impact Assessment - White Rock, BC
4862.03 March 2014 NTS



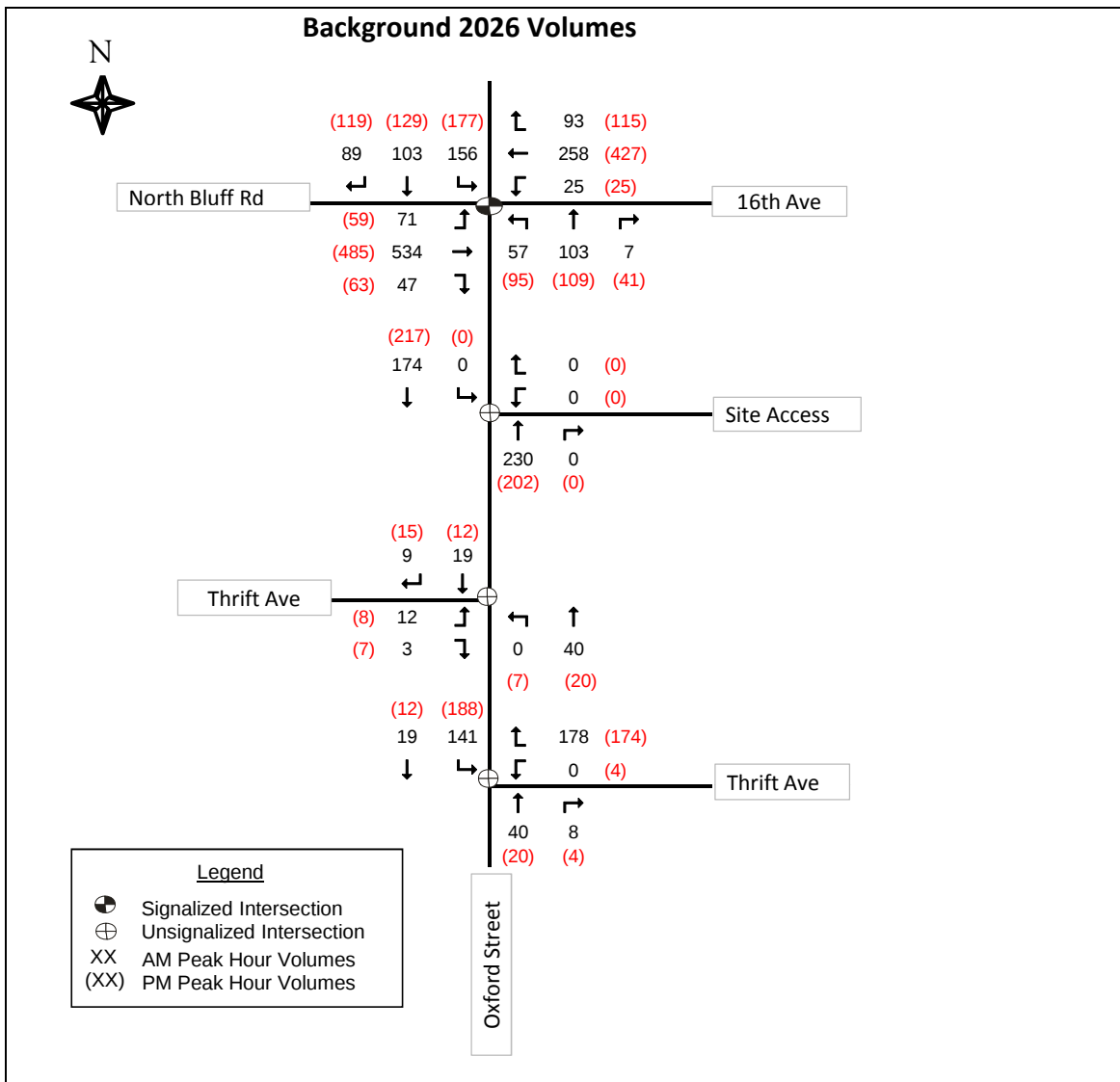


Exhibit 4.2

Future Background (2026) Traffic Volumes

1454 Oxford Street Transportation Impact Assessment - White Rock, BC
 4862.03 March 2014 NTS



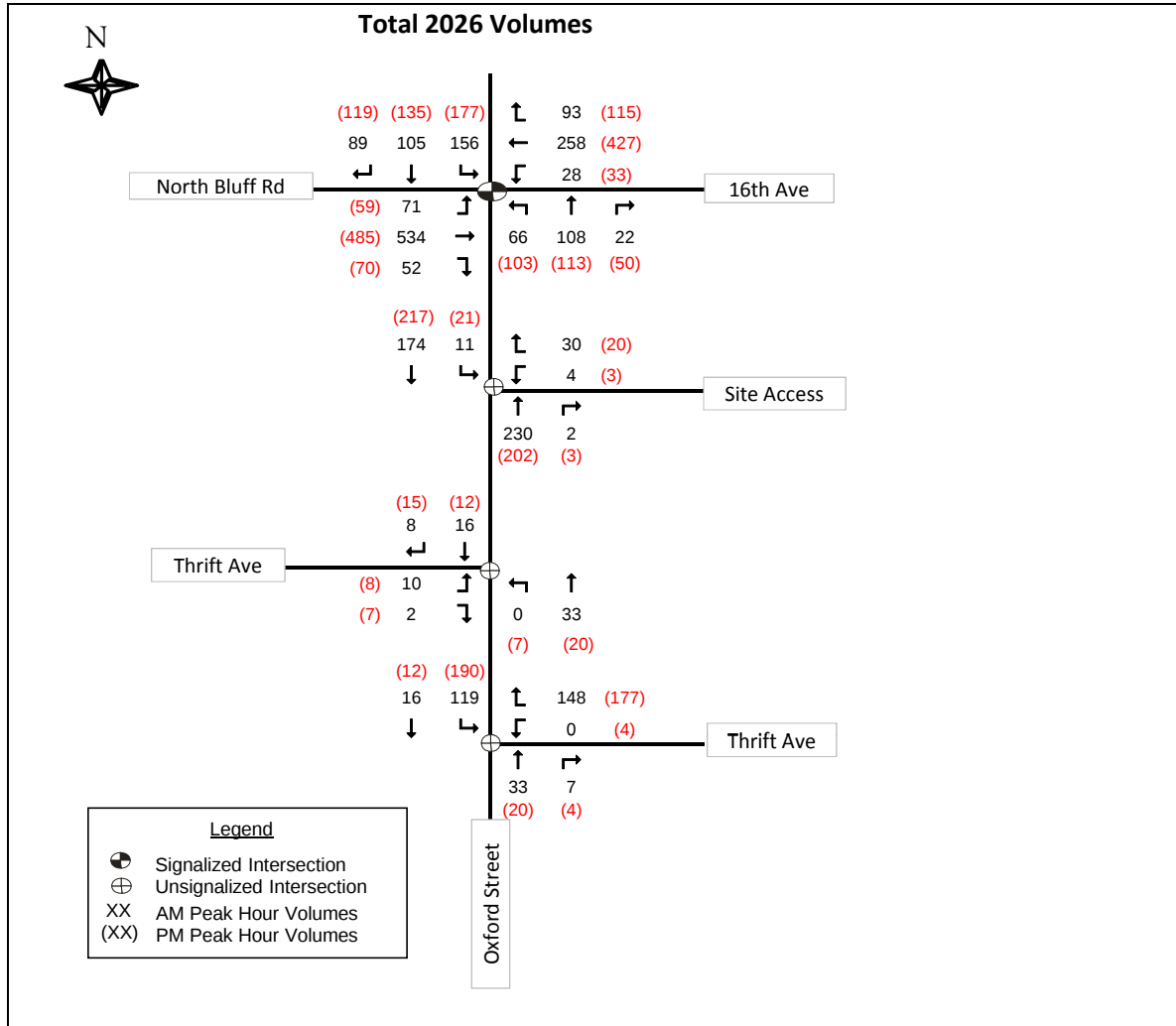


Exhibit 4.3

Total Future (2026) Traffic Volumes

1454 Oxford Street Transportation Impact Assessment - White Rock, BC
4862.03 March 2014 NTS



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5. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

The proposed development will generate total of 47 and 47 trips onto the adjacent street network during the AM and PM peak hours, respectively. Oxford Street intersections with North Bluff Road and Thrift Avenue have adequate capacity to accommodate the existing, Opening Day (2016), Future Background (2026) and Total Future (2026) traffic volumes at satisfactory levels. The queue lengths at each time horizon are well accommodated within the available turning bay storage.

The proposed development proposes to provide 286 off-street parking spaces versus the 187 spaces required by the City of White Rock's By-law. The parking supply reflects the high-end nature of the condominiums planned for the two towers.

Based on the above information and considering the transportation analysis was conducted with a conservative approach, the proposed development and its additional traffic will be accommodated with the existing street network capacity.

5.2 Recommendations

The above analysis and its conclusions are based on available information for the development project. During the detailed design stage, the parking plans may be reviewed to ensure vehicular turning paths do not conflict with the opposing traffic or structural elements. In addition, the internal circulation paths may be tested for the vehicle turning path's width adequacy.

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APPENDIX A

Traffic Data Sheets



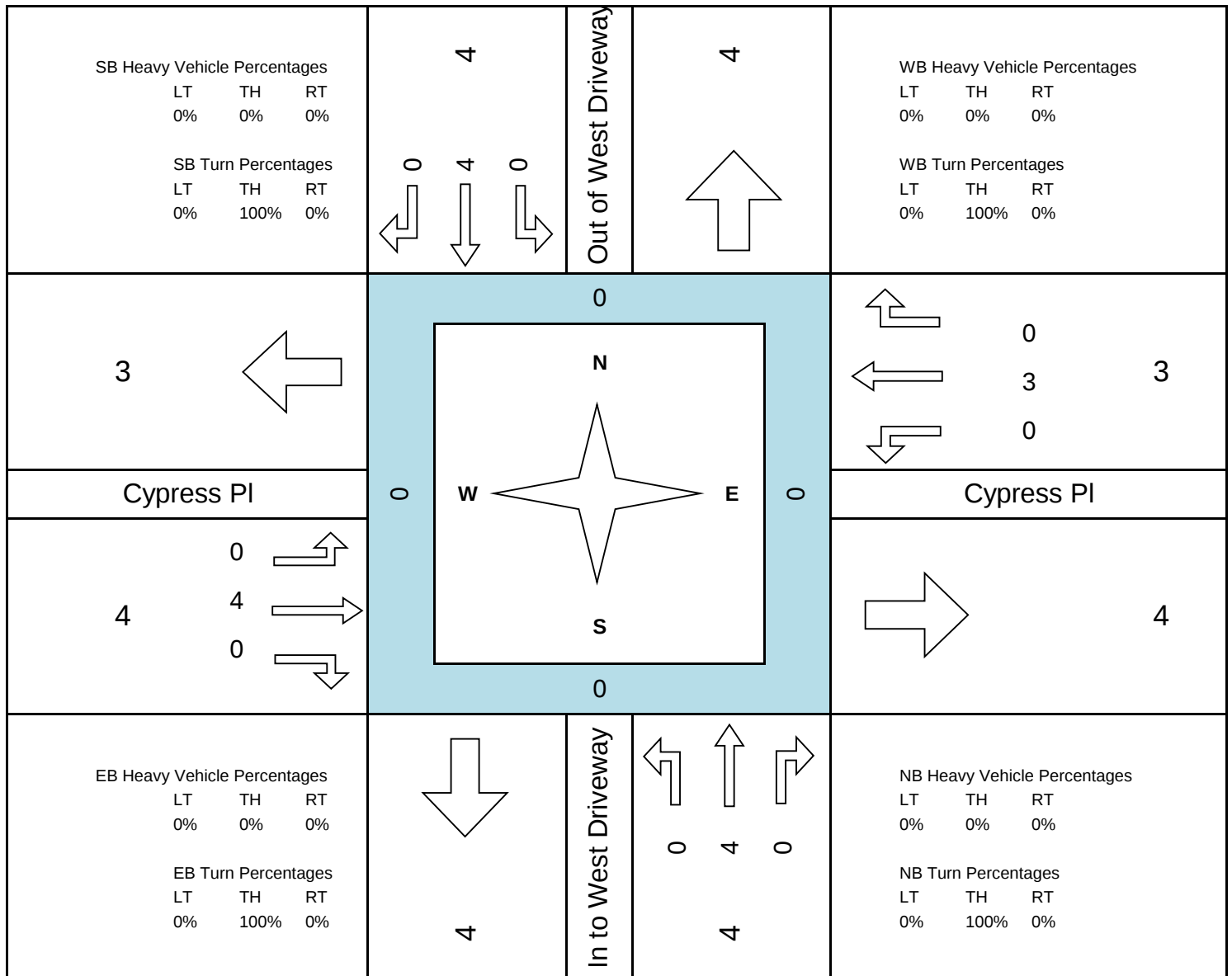
Stone Cliff Residence Driveways

Project #: 4862.03
 Peak Hour: 17:00 — 18:00
 Overall PHF: 0.63
 Notes: 0

Date: Feb 21, 2014
 Weather: Cloudy
 Road Cond: Dry



Time Intervals	Traffic Movements												Pedestrians			
	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
15:45 - 16:00	0	1	0	0	2	0	0	1	0	0	0	0	0	0	0	0
16:00 - 16:15	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
16:45 - 17:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 - 17:15	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0
17:15 - 17:30	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
17:30 - 17:45	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
17:45 - 18:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V _{15min}		2			2			2			2					
PHF		0.50			0.50			0.50			0.38					



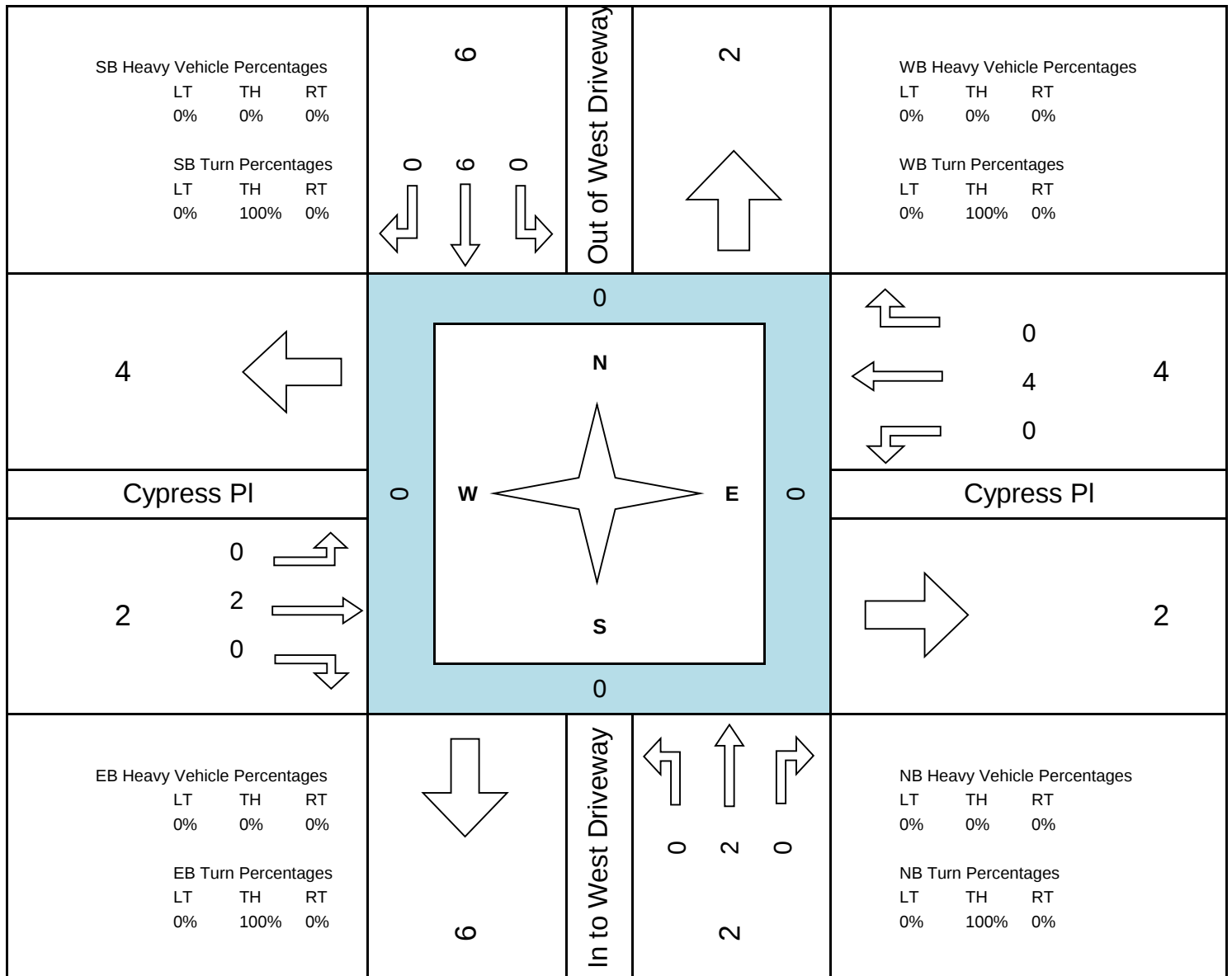
Stone Cliff Residence Driveways

Project #: 4862.03
 Peak Hour: 08:15 — 09:15
 Overall PHF: 0.58
 Notes: 0

Date: Feb 21, 2014
 Weather: Cloudy
 Road Cond: Dry



Time Intervals	Traffic Movements												Pedestrians			
	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 - 07:45	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
07:45 - 08:00	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0
08:45 - 09:00	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0
09:00 - 09:15	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
09:15 - 09:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 - 10:00	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V _{15min}		1			4			1			2					
PHF		0.50			0.38			0.50			0.50					



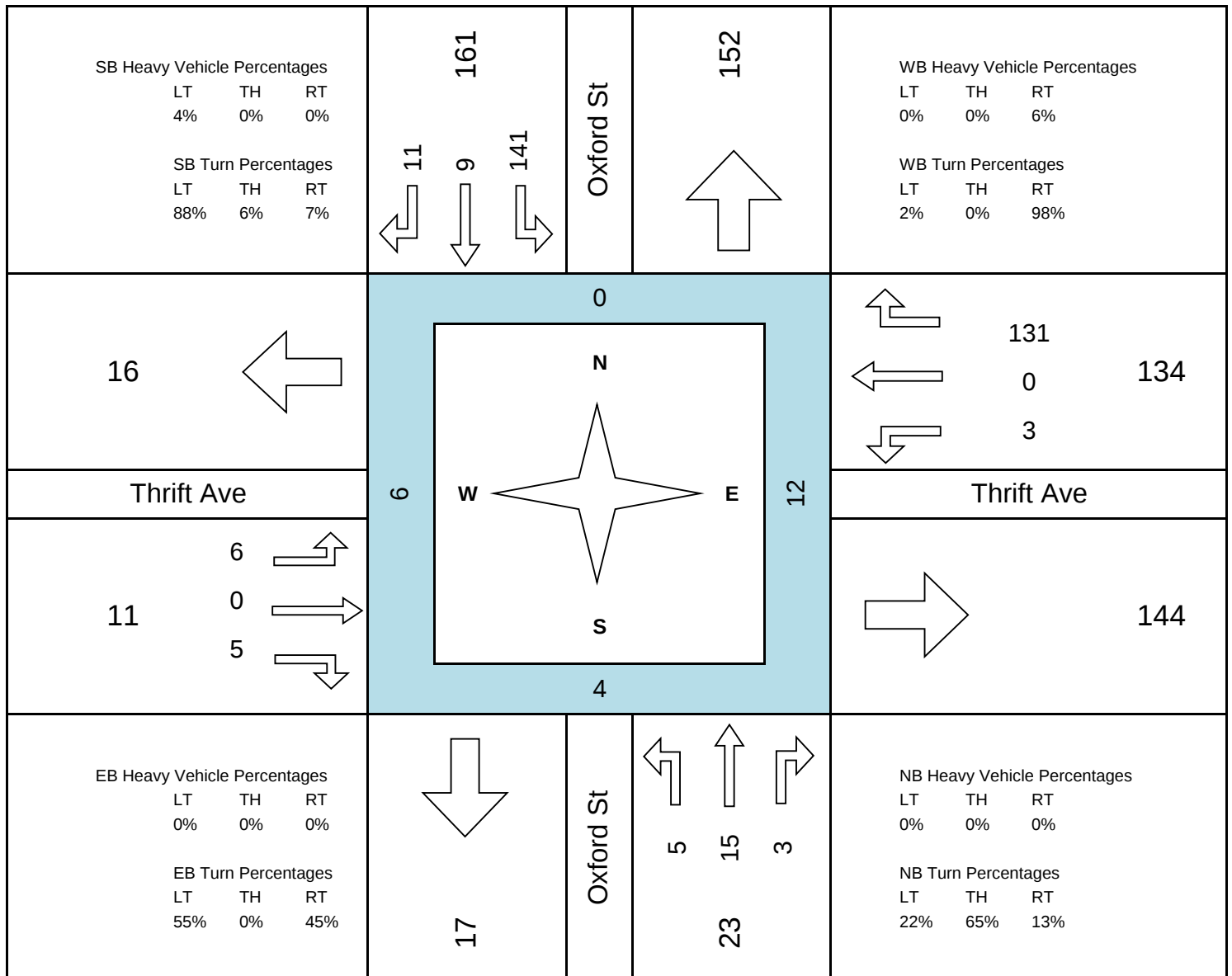
Oxford St @ Thrift Ave

Project #: 4862.03
 Peak Hour: 15:00 — 16:00
 Overall PHF: 0.86
 Notes: 0

Date: Feb 24, 2014
 Weather: Snowing
 Road Cond: Wet and Snow



Time Intervals	Traffic Movements												Pedestrians			
	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	1	4	0	39	0	1	2	0	0	1	0	48	0	1	1	2
15:15 - 15:30	2	1	1	41	2	4	1	0	3	0	0	34	0	2	5	3
15:30 - 15:45	0	5	0	30	3	4	2	0	0	1	0	21	0	0	1	0
15:45 - 16:00	2	5	2	31	4	2	1	0	2	1	0	28	0	1	5	1
16:00 - 16:15	0	2	0	27	4	2	0	0	0	0	0	24	0	2	2	2
16:15 - 16:30	1	2	2	26	0	2	3	0	2	0	0	28	0	4	0	0
16:30 - 16:45	0	1	0	25	0	2	0	0	1	1	0	31	0	0	3	0
16:45 - 17:00	0	2	0	20	0	3	0	0	0	0	0	36	0	2	1	0
17:00 - 17:15	3	1	1	24	3	1	0	0	3	0	0	33	0	1	0	0
17:15 - 17:30	0	0	0	18	2	3	1	0	0	0	0	30	0	0	2	0
17:30 - 17:45	1	0	0	30	1	2	1	0	0	0	0	17	0	0	0	0
17:45 - 18:00	0	1	0	31	2	3	0	0	1	0	0	28	0	0	3	1
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V _{15min}	2	5	2	41	4	4	2		3	1		48				
PHF	0.63	0.75	0.38	0.86	0.56	0.69	0.75		0.42	0.75		0.68				



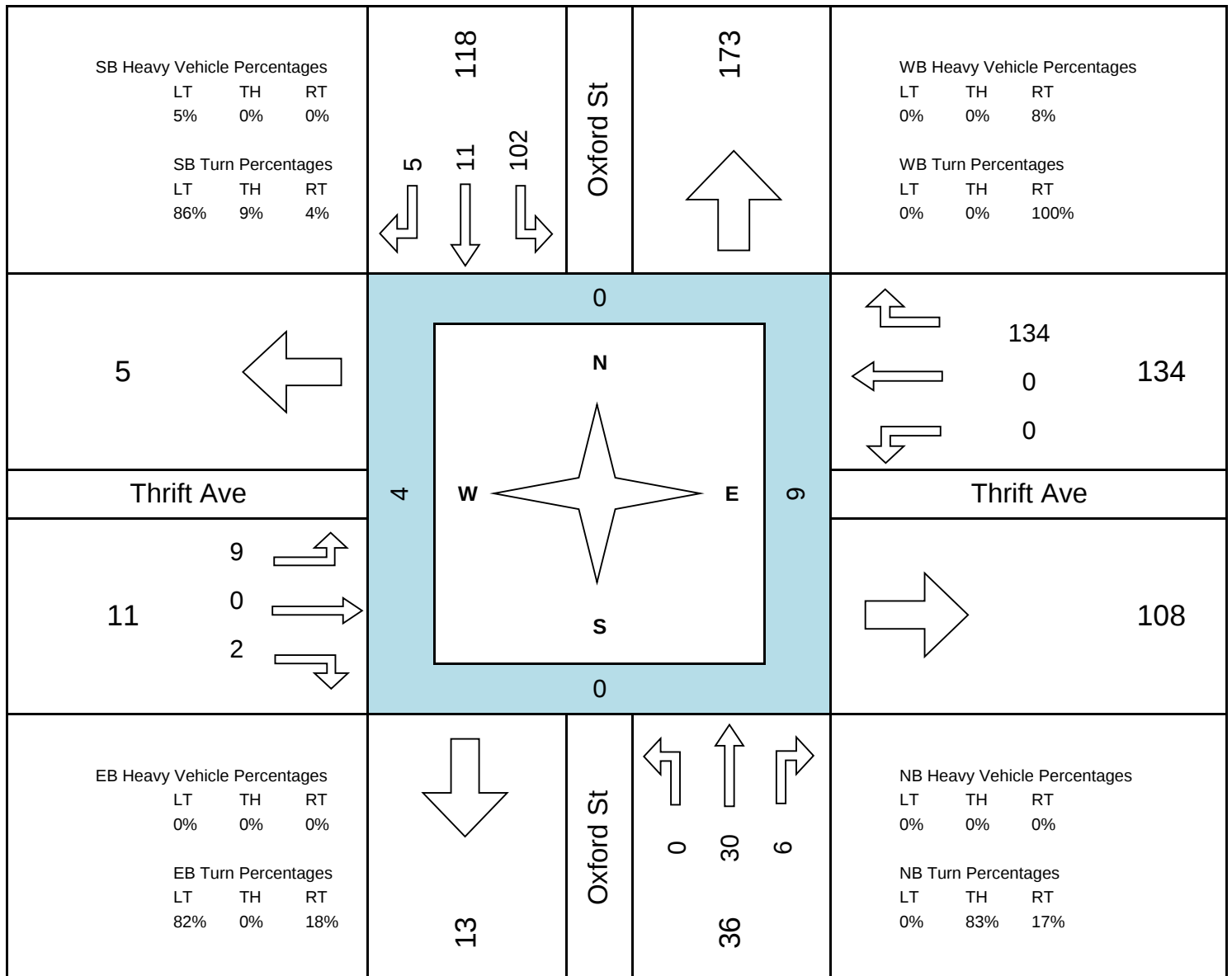
Oxford St @ Thrift Ave

Project #: 4862.03
 Peak Hour: 08:00 — 09:00
 Overall PHF: 0.77
 Notes: 0

Date: Feb 24, 2014
 Weather: Snowing
 Road Cond: Wet and Snow



Time Intervals	Traffic Movements												Pedestrians			
	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	0	3	0	7	1	0	2	0	0	1	0	10	0	0	0	0
07:15 - 07:30	1	8	1	14	0	1	0	0	0	0	0	11	0	0	0	0
07:30 - 07:45	0	11	0	15	1	0	2	0	0	1	0	21	1	1	1	1
07:45 - 08:00	1	7	0	18	6	1	1	0	2	0	0	18	0	0	0	0
08:00 - 08:15	0	7	0	14	1	1	4	0	1	0	0	23	0	0	0	1
08:15 - 08:30	0	15	4	28	2	1	2	0	1	0	0	44	0	0	4	3
08:30 - 08:45	0	2	0	35	4	2	2	0	0	0	0	33	0	0	3	0
08:45 - 09:00	0	6	2	25	4	1	1	0	0	0	0	34	0	0	2	0
09:00 - 09:15	1	2	2	16	4	1	2	0	0	0	0	21	0	2	2	1
09:15 - 09:30	0	5	1	10	8	2	0	0	1	0	0	22	0	0	0	2
09:30 - 09:45	0	2	2	13	1	1	1	0	1	1	0	14	0	0	0	0
09:45 - 10:00	2	5	1	16	2	1	1	0	0	0	0	20	0	0	1	1
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V _{15min}		15	4	35	4	2	4		1			44				
PHF		0.50	0.38	0.73	0.69	0.63	0.56		0.50			0.76				



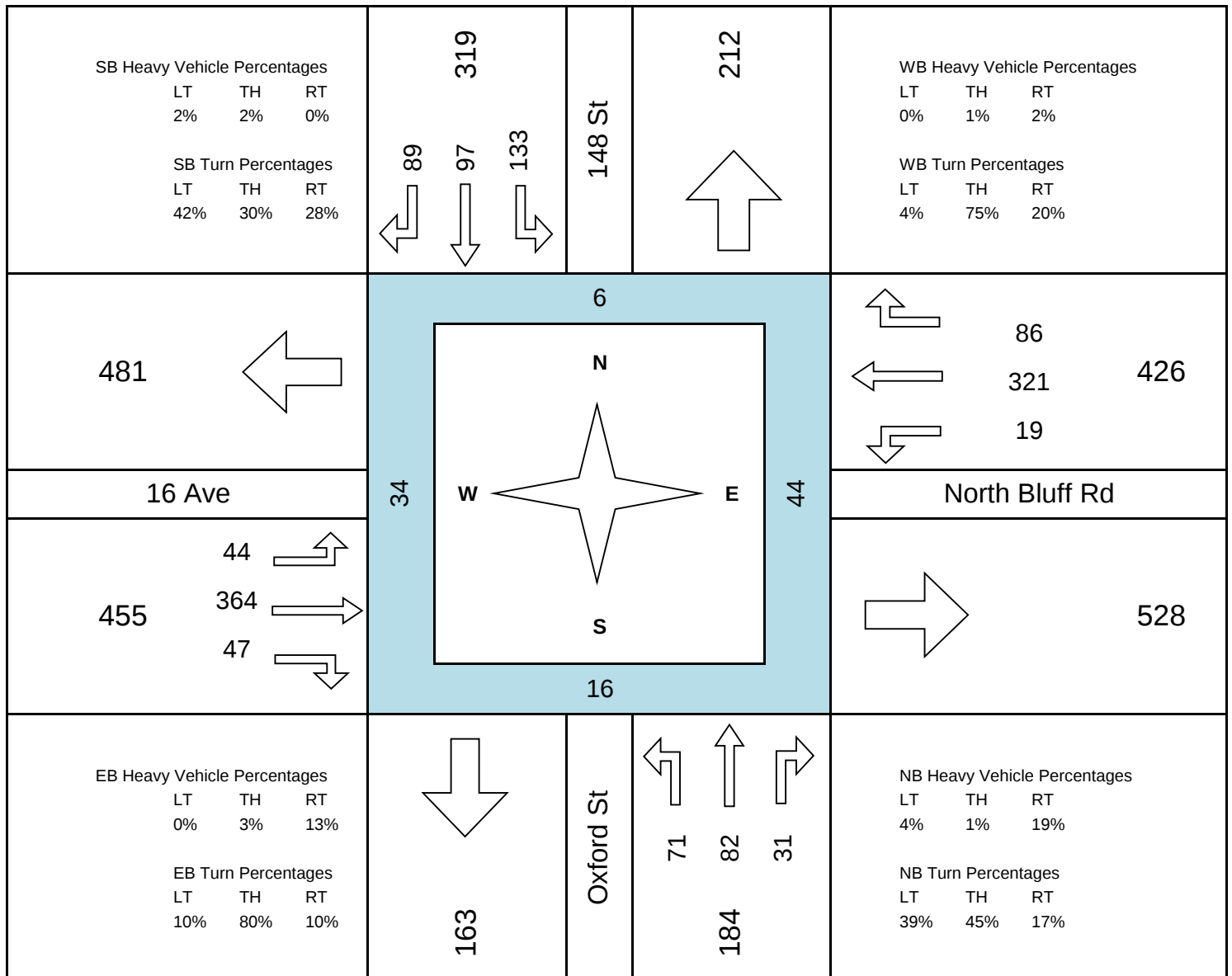
Oxford St @ North Bluff Rd

Project #: 4862.03
 Peak Hour: 15:00 — 16:00
 Overall PHF: 0.83
 Notes: 0

Date: Feb 24, 2014
 Weather: Snowing
 Road Cond: Wet and Snow



Time Intervals	Traffic Movements												Pedestrians			
	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	25	37	16	41	18	16	21	106	18	3	82	34	2	1	21	15
15:15 - 15:30	13	15	5	50	27	27	12	86	15	3	69	19	3	11	14	15
15:30 - 15:45	20	18	5	22	26	25	3	97	6	7	63	10	0	1	7	2
15:45 - 16:00	13	12	5	20	26	21	8	75	8	6	107	23	1	3	2	2
16:00 - 16:15	10	6	6	25	13	9	13	61	6	13	99	14	0	2	0	7
16:15 - 16:30	10	19	3	30	16	16	7	78	9	5	96	13	0	3	2	1
16:30 - 16:45	19	7	7	20	19	13	7	65	9	5	88	17	4	0	2	3
16:45 - 17:00	18	8	7	15	12	25	4	67	6	2	94	11	1	4	2	0
17:00 - 17:15	17	13	1	21	21	13	2	60	4	7	114	19	3	1	3	1
17:15 - 17:30	12	10	2	22	9	17	3	57	12	7	79	21	2	1	2	1
17:30 - 17:45	9	5	4	22	19	32	7	62	11	5	101	10	0	1	1	0
17:45 - 18:00	9	7	8	20	27	64	8	98	4	4	65	13	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V _{15min}	25	37	16	50	27	27	21	106	18	7	107	34				
PHF	0.71	0.55	0.48	0.67	0.90	0.82	0.52	0.86	0.65	0.68	0.75	0.63				



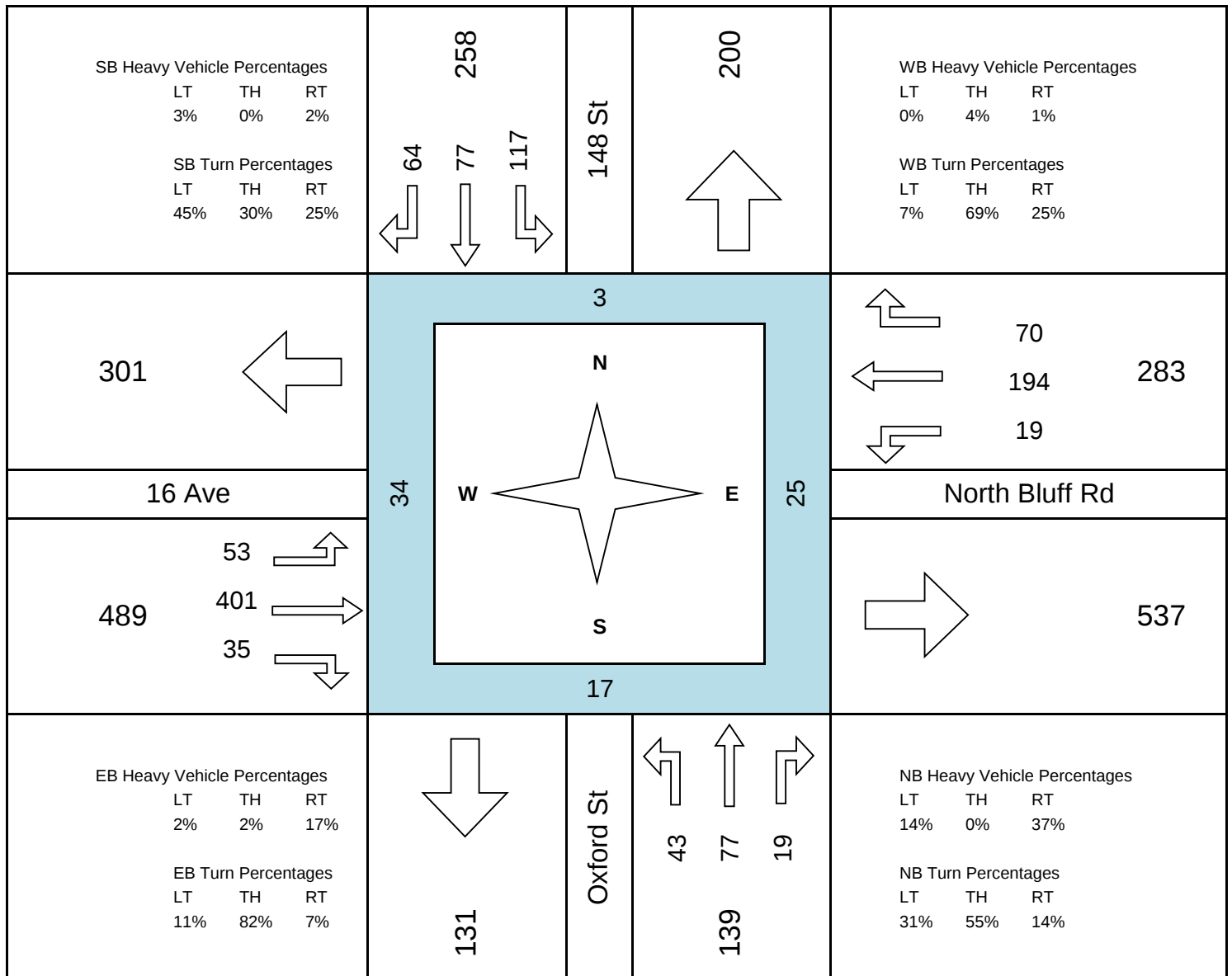
Oxford St @ North Bluff Rd

Project #: 4862.03
 Peak Hour: 08:15 — 09:15
 Overall PHF: 0.88
 Notes: 0

Date: Feb 24, 2014
 Weather: Snowing
 Road Cond: Wet and Snow



Time Intervals	Traffic Movements												Pedestrians			
	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	4	20	6	9	3	7	12	45	5	3	23	19	1	1	2	0
07:15 - 07:30	1	15	0	5	8	3	9	47	6	3	30	8	0	0	0	0
07:30 - 07:45	8	24	3	11	9	8	13	81	7	0	28	10	1	2	1	4
07:45 - 08:00	2	20	5	21	7	8	19	109	10	4	40	13	0	0	1	0
08:00 - 08:15	9	17	7	10	12	12	9	68	6	4	60	14	0	2	3	10
08:15 - 08:30	12	38	6	31	20	18	15	86	5	6	60	34	0	6	11	18
08:30 - 08:45	12	11	2	48	21	20	13	77	9	5	40	7	1	9	9	13
08:45 - 09:00	10	18	8	20	24	20	15	117	13	3	46	14	1	1	4	0
09:00 - 09:15	9	10	3	18	12	6	10	121	8	5	48	15	1	1	1	3
09:15 - 09:30	10	9	10	14	8	11	12	94	6	3	68	6	0	1	0	2
09:30 - 09:45	8	7	3	11	12	10	8	79	5	4	65	14	1	2	0	1
09:45 - 10:00	8	6	6	0	0	0	7	68	5	0	0	0	0	5	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V _{15min}	12	38	8	48	24	20	15	121	13	6	60	34				
PHF	0.90	0.51	0.59	0.61	0.80	0.80	0.88	0.83	0.67	0.79	0.81	0.51				



APPENDIX B

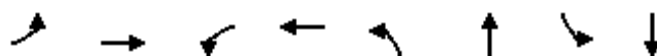
Synchro Reports



Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	64	604	36	589	112	177	192	276
v/c Ratio	0.44	0.63	0.26	0.61	0.17	0.16	0.26	0.25
Control Delay	28.9	22.2	22.6	20.8	7.6	5.6	8.2	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	22.2	22.6	20.8	7.6	5.6	8.2	5.7
Queue Length 50th (m)	6.1	30.8	3.3	28.2	5.0	6.1	9.2	9.2
Queue Length 95th (m)	16.4	44.7	10.0	41.8	14.4	16.7	23.6	23.8
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	293	1907	281	1895	662	1100	735	1087
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.32	0.13	0.31	0.17	0.16	0.26	0.25
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	485	71	33	427	115	103	113	50	177	135	119
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	59	556	0	33	542	0	103	163	0	177	254	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.97	0.85	0.95	0.95	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3548	0	1805	3502	0	1805	1813	0	1805	1766	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00			0.00			0.00		
Protected Option Allowed	Yes			Yes			Yes			Yes		
Reference Time (s)	3.9	18.8	0.0	2.2	18.6	0.0	6.8	10.8	0.0	11.8	17.3	0.0
Adj Reference Time (s)	8.0	22.8	0.0	8.0	22.6	0.0	10.8	14.8	0.0	15.8	21.3	0.0
Permitted Option												
Adj Saturation A (vph)	120	1774		120	1751		120	1813		120	1766	
Reference Time A (s)	58.8	18.8		32.9	18.6		102.7	10.8		176.5	17.3	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		58.8			32.9			102.7			176.5	
Adj Reference Time (s)		62.8			36.9			106.7			180.5	
Split Option												
Ref Time Combined (s)	3.9	18.8		2.2	18.6		6.8	10.8		11.8	17.3	
Ref Time Seperate (s)	3.9	16.4		2.2	14.6		6.8	7.5		11.8	9.2	
Reference Time (s)	18.8	18.8		18.6	18.6		10.8	10.8		17.3	17.3	
Adj Reference Time (s)	22.8	22.8		22.6	22.6		14.8	14.8		21.3	21.3	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	30.8		32.1									
Permitted Option (s)	62.8		180.5									
Split Option (s)	45.4		36.0									
Minimum (s)	30.8		32.1		62.9							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	52.4%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	485	71	33	427	115	103	113	50	177	135	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3510		1789	3465		1789	1797		1789	1751	
Flt Permitted	0.29	1.00		0.28	1.00		0.58	1.00		0.65	1.00	
Satd. Flow (perm)	542	3510		520	3465		1096	1797		1216	1751	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	527	77	36	464	125	112	123	54	192	147	129
RTOR Reduction (vph)	0	18	0	0	39	0	0	15	0	0	30	0
Lane Group Flow (vph)	64	586	0	36	550	0	112	162	0	192	246	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		38.2	38.2		38.2	38.2	
Effective Green, g (s)	17.0	17.0		17.0	17.0		38.2	38.2		38.2	38.2	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.60	0.60		0.60	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	944		140	932		662	1086		735	1058	
v/s Ratio Prot		c0.17			0.16			0.09			0.14	
v/s Ratio Perm	0.12			0.07			0.10			c0.16		
v/c Ratio	0.44	0.62		0.26	0.59		0.17	0.15		0.26	0.23	
Uniform Delay, d1	19.1	20.3		18.1	20.1		5.5	5.4		5.9	5.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	1.3		1.0	1.0		0.6	0.3		0.9	0.5	
Delay (s)	21.2	21.5		19.1	21.1		6.1	5.7		6.7	6.3	
Level of Service	C	C		B	C		A	A		A	A	
Approach Delay (s)		21.5			21.0			5.9			6.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			15.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			63.2			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			52.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	4	177	20	4	190	12
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	181	0	24	0	0	202
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.97	0.85	0.95	0.95
Saturated Flow (vph)	1620	0	1853	0	0	1811
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1853		0	126
Reference Time A (s)	201.2		1.6		0.0	192.9
Adj Saturation B (vph)	NA		1853		0	0
Reference Time B (s)	NA		1.6		20.6	21.4
Reference Time (s)			1.6			21.4
Adj Reference Time (s)			8.0			25.4
Split Option						
Ref Time Combined (s)	13.4		1.6		0.0	13.4
Ref Time Seperate (s)	0.3		1.3		12.6	0.8
Reference Time (s)	13.4		1.6		13.4	13.4
Adj Reference Time (s)	17.4		8.0		17.4	17.4
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		25.4			
Split Option (s)	17.4		25.4			
Minimum (s)	17.4		25.4		42.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	35.7%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	177	20	4	190	12
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	192	22	4	207	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	450	24			26	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450	24			26	
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	82			87	
cM capacity (veh/h)	493	1053			1588	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	197	26	220			
Volume Left	4	0	207			
Volume Right	192	4	0			
cSH	1027	1700	1588			
Volume to Capacity	0.19	0.02	0.13			
Queue Length 95th (m)	5.4	0.0	3.4			
Control Delay (s)	9.3	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	7.2			
Approach LOS	A					
Intersection Summary						
Average Delay		7.7				
Intersection Capacity Utilization		35.7%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Volume (vph)	8	7	7	20	12	15
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	15	0	0	27	27	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.91	0.85	0.95	0.99	0.92	0.85
Saturated Flow (vph)	1720	0	0	1875	1742	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	115		0	376	1742	
Reference Time A (s)	15.7		0.0	8.6	1.9	
Adj Saturation B (vph)	NA		0	0	1742	
Reference Time B (s)	NA		8.5	9.7	1.9	
Reference Time (s)				8.6	1.9	
Adj Reference Time (s)				12.6	8.0	
Split Option						
Ref Time Combined (s)	1.0		0.0	1.7	1.9	
Ref Time Seperate (s)	0.6		0.5	1.3	0.8	
Reference Time (s)	1.0		1.7	1.7	1.9	
Adj Reference Time (s)	8.0		8.0	8.0	8.0	
Summary	EB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		12.6			
Split Option (s)	8.0		16.0			
Minimum (s)	8.0		12.6		20.6	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		17.2%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	7	7	20	12	15
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)	9	8	8	22	13	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	58	21	29			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	58	21	29			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	944	1056	1584			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	16	29	29			
Volume Left	9	8	0			
Volume Right	8	0	16			
cSH	993	1584	1700			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.4	0.1	0.0			
Control Delay (s)	8.7	1.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.7	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		17.2%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	3	21	202	3	21	217
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	24	0	205	0	0	238
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1640	0	1896	0	0	1892
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	109		1896		0	825
Reference Time A (s)	26.3		13.0		0.0	34.6
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			13.0			34.6
Adj Reference Time (s)			17.0			38.6
Split Option						
Ref Time Combined (s)	1.8		13.0		0.0	15.1
Ref Time Seperate (s)	0.2		12.8		1.4	13.7
Reference Time (s)	1.8		13.0		15.1	15.1
Adj Reference Time (s)	8.0		17.0		19.1	19.1
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		38.6			
Split Option (s)	8.0		36.1			
Minimum (s)	8.0		36.1		44.1	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			36.7%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

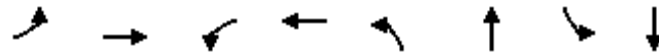
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	21	202	3	21	217
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)	3	23	220	3	23	236
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	503	221			223	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	503	221			223	
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	97			98	
cM capacity (veh/h)	519	818			1346	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	26	223	259			
Volume Left	3	0	23			
Volume Right	23	3	0			
cSH	763	1700	1346			
Volume to Capacity	0.03	0.13	0.02			
Queue Length 95th (m)	0.8	0.0	0.4			
Control Delay (s)	9.9	0.0	0.8			
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	0.8			
Approach LOS	A					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		36.7%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	637	32	381	72	142	170	212
v/c Ratio	0.31	0.64	0.24	0.38	0.10	0.13	0.23	0.20
Control Delay	21.8	23.1	22.4	15.7	7.5	6.4	8.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	23.1	22.4	15.7	7.5	6.4	8.3	5.2
Queue Length 50th (m)	7.3	34.3	3.0	15.2	3.3	5.7	8.4	6.4
Queue Length 95th (m)	16.9	48.8	9.2	24.8	10.4	15.8	22.1	18.6
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	450	1798	245	1779	705	1107	751	1080
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.35	0.13	0.21	0.10	0.13	0.23	0.20
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	534	52	29	258	93	66	109	22	156	106	89
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	71	586	0	29	351	0	66	131	0	156	195	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.99	0.85	0.95	0.96	0.85	0.95	0.97	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3569	0	1805	3474	0	1805	1852	0	1805	1770	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00			0.00			0.00		
Protected Option Allowed	Yes			Yes			Yes			Yes		
Reference Time (s)	4.7	19.7	0.0	1.9	12.1	0.0	4.4	8.5	0.0	10.4	13.2	0.0
Adj Reference Time (s)	8.7	23.7	0.0	8.0	16.1	0.0	8.4	12.5	0.0	14.4	17.2	0.0
Permitted Option												
Adj Saturation A (vph)	120	1785		120	1737		120	1852		120	1770	
Reference Time A (s)	70.8	19.7		28.9	12.1		65.8	8.5		155.6	13.2	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		70.8			28.9			65.8			155.6	
Adj Reference Time (s)		74.8			32.9			69.8			159.6	
Split Option												
Ref Time Combined (s)	4.7	19.7		1.9	12.1		4.4	8.5		10.4	13.2	
Ref Time Seperate (s)	4.7	18.0		1.9	8.9		4.4	7.1		10.4	7.2	
Reference Time (s)	19.7	19.7		12.1	12.1		8.5	8.5		13.2	13.2	
Adj Reference Time (s)	23.7	23.7		16.1	16.1		12.5	12.5		17.2	17.2	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	31.7		26.9									
Permitted Option (s)	74.8		159.6									
Split Option (s)	39.8		29.7									
Minimum (s)	31.7		26.9		58.6							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	48.8%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	534	52	29	258	93	66	109	22	156	106	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3531		1789	3436		1789	1836		1789	1754	
Flt Permitted	0.47	1.00		0.26	1.00		0.63	1.00		0.67	1.00	
Satd. Flow (perm)	886	3531		484	3436		1178	1836		1255	1754	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	580	57	32	280	101	72	118	24	170	115	97
RTOR Reduction (vph)	0	12	0	0	56	0	0	7	0	0	30	0
Lane Group Flow (vph)	77	625	0	32	325	0	72	135	0	170	182	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.2	18.2		18.2	18.2		39.2	39.2		39.2	39.2	
Effective Green, g (s)	18.2	18.2		18.2	18.2		39.2	39.2		39.2	39.2	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.60	0.60		0.60	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	983		135	956		706	1100		752	1051	
v/s Ratio Prot		c0.18			0.09			0.07			0.10	
v/s Ratio Perm	0.09			0.07			0.06			c0.14		
v/c Ratio	0.31	0.64		0.24	0.34		0.10	0.12		0.23	0.17	
Uniform Delay, d1	18.7	20.7		18.2	18.8		5.6	5.7		6.1	5.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.4		0.9	0.2		0.3	0.2		0.7	0.4	
Delay (s)	19.4	22.1		19.1	19.0		5.9	5.9		6.8	6.2	
Level of Service	B	C		B	B		A	A		A	A	
Approach Delay (s)		21.8			19.0			5.9			6.5	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM Average Control Delay			15.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			65.4			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			48.8%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	180	40	8	145	19
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	180	0	48	0	0	164
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.97	0.85	0.95	0.96
Saturated Flow (vph)	1615	0	1853	0	0	1816
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1853		0	131
Reference Time A (s)	200.6		3.1		0.0	149.7
Adj Saturation B (vph)	NA		1853		0	0
Reference Time B (s)	NA		3.1		17.6	18.8
Reference Time (s)			3.1			18.8
Adj Reference Time (s)			8.0			22.8
Split Option						
Ref Time Combined (s)	13.4		3.1		0.0	10.8
Ref Time Seperate (s)	0.0		2.6		9.6	1.2
Reference Time (s)	13.4		3.1		10.8	10.8
Adj Reference Time (s)	17.4		8.0		14.8	14.8
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		22.8			
Split Option (s)	17.4		22.8			
Minimum (s)	17.4		22.8		40.2	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	33.5%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	180	40	8	145	19
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)	0	196	43	9	158	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	384	48			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	384	48			52	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			90	
cM capacity (veh/h)	556	1021			1554	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	196	52	178			
Volume Left	0	0	158			
Volume Right	196	9	0			
cSH	1021	1700	1554			
Volume to Capacity	0.19	0.03	0.10			
Queue Length 95th (m)	5.4	0.0	2.6			
Control Delay (s)	9.4	0.0	6.8			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	6.8			
Approach LOS	A					
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		33.5%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	180	0	40	19	10
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	190	0	0	40	29	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1626	0	0	1900	1802	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)	0.0		0.0			
Adj Reference Time (s)	0.0		0.0			
Permitted Option						
Adj Saturation A (vph)	108	0		1900	1802	
Reference Time A (s)	210.4	0.0		2.5	1.9	
Adj Saturation B (vph)	NA	0		1900	1802	
Reference Time B (s)	NA	0.0		2.5	1.9	
Reference Time (s)				2.5	1.9	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	14.0	0.0		2.5	1.9	
Ref Time Seperate (s)	0.7	0.0		2.5	1.3	
Reference Time (s)	14.0	2.5		2.5	1.9	
Adj Reference Time (s)	18.0	8.0		8.0	8.0	
Summary	EB	NB SB		Combined		
Protected Option (s)	NA	NA				
Permitted Option (s)	Err	8.0				
Split Option (s)	18.0	16.0				
Minimum (s)	18.0	8.0		26.0		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	21.7%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	180	0	40	19	10
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)	11	196	0	43	21	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	70	26	32			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70	26	32			
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	81	100			
cM capacity (veh/h)	935	1050	1581			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	207	43	32			
Volume Left	11	0	0			
Volume Right	196	0	11			
cSH	1043	1581	1700			
Volume to Capacity	0.20	0.00	0.02			
Queue Length 95th (m)	5.6	0.0	0.0			
Control Delay (s)	9.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			21.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	4	31	230	2	12	174
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	35	0	232	0	0	186
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1638	0	1898	0	0	1894
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	109		1898		0	978
Reference Time A (s)	38.5		14.7		0.0	22.8
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			14.7			22.8
Adj Reference Time (s)			18.7			26.8
Split Option						
Ref Time Combined (s)	2.6		14.7		0.0	11.8
Ref Time Seperate (s)	0.3		14.5		0.8	11.0
Reference Time (s)	2.6		14.7		11.8	11.8
Adj Reference Time (s)	8.0		18.7		15.8	15.8
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		26.8			
Split Option (s)	8.0		34.5			
Minimum (s)	8.0		26.8		34.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	29.0%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

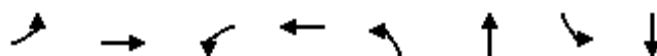
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	31	230	2	12	174
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	34	250	2	13	189
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	466	251			252	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466	251			252	
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	96			99	
cM capacity (veh/h)	549	788			1313	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	252	202			
Volume Left	4	0	13			
Volume Right	34	2	0			
cSH	750	1700	1313			
Volume to Capacity	0.05	0.15	0.01			
Queue Length 95th (m)	1.2	0.0	0.2			
Control Delay (s)	10.1	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		29.0%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	497	30	484	93	148	158	227
v/c Ratio	0.34	0.60	0.21	0.58	0.12	0.13	0.20	0.20
Control Delay	26.4	23.3	22.5	21.7	5.9	4.2	6.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	23.3	22.5	21.7	5.9	4.2	6.3	4.1
Queue Length 50th (m)	5.0	25.5	2.8	23.1	3.5	3.9	6.3	5.7
Queue Length 95th (m)	13.6	38.3	8.9	35.6	10.6	12.0	16.8	16.4
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	335	1810	323	1798	744	1163	800	1150
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.27	0.09	0.27	0.13	0.13	0.20	0.20
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	398	59	28	351	94	86	93	43	145	112	97
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	48	457	0	28	445	0	86	136	0	145	209	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.97	0.85	0.95	0.95	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3548	0	1805	3503	0	1805	1810	0	1805	1768	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	3.2	15.5	0.0	1.9	15.2	0.0	5.7	9.0	0.0	9.6	14.2	0.0
Adj Reference Time (s)	8.0	19.5	0.0	8.0	19.2	0.0	9.7	13.0	0.0	13.6	18.2	0.0
Permitted Option												
Adj Saturation A (vph)	120	1774		120	1751		120	1810		120	1768	
Reference Time A (s)	47.9	15.5		27.9	15.2		85.8	9.0		144.6	14.2	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		47.9			27.9			85.8			144.6	
Adj Reference Time (s)		51.9			31.9			89.8			148.6	
Split Option												
Ref Time Combined (s)	3.2	15.5		1.9	15.2		5.7	9.0		9.6	14.2	
Ref Time Seperate (s)	3.2	13.5		1.9	12.0		5.7	6.2		9.6	7.6	
Reference Time (s)	15.5	15.5		15.2	15.2		9.0	9.0		14.2	14.2	
Adj Reference Time (s)	19.5	19.5		19.2	19.2		13.0	13.0		18.2	18.2	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	27.5		27.9									
Permitted Option (s)	51.9		148.6									
Split Option (s)	38.7		31.2									
Minimum (s)	27.5		27.9		55.4							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	46.1%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	398	59	28	351	94	86	93	43	145	112	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3509		1789	3465		1789	1794		1789	1753	
Flt Permitted	0.35	1.00		0.33	1.00		0.62	1.00		0.66	1.00	
Satd. Flow (perm)	654	3509		630	3465		1162	1794		1248	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	433	64	30	382	102	93	101	47	158	122	105
RTOR Reduction (vph)	0	18	0	0	38	0	0	15	0	0	28	0
Lane Group Flow (vph)	52	479	0	30	446	0	93	133	0	158	199	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.5	14.5		14.5	14.5		40.1	40.1		40.1	40.1	
Effective Green, g (s)	14.5	14.5		14.5	14.5		40.1	40.1		40.1	40.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	151	813		146	803		744	1149		799	1123	
v/s Ratio Prot		c0.14			0.13			0.07			0.11	
v/s Ratio Perm	0.08			0.05			0.08			c0.13		
v/c Ratio	0.34	0.59		0.21	0.55		0.12	0.12		0.20	0.18	
Uniform Delay, d1	20.1	21.4		19.4	21.2		4.4	4.4		4.6	4.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.1		0.7	0.8		0.3	0.2		0.6	0.3	
Delay (s)	21.5	22.5		20.1	22.0		4.7	4.6		5.2	4.9	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		22.4			21.9			4.6			5.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			15.8			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			62.6			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			46.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	3	145	17	3	156	10
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	148	0	20	0	0	166
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.98	0.85	0.95	0.95
Saturated Flow (vph)	1619	0	1857	0	0	1811
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1857		0	126
Reference Time A (s)	164.5		1.3		0.0	158.5
Adj Saturation B (vph)	NA		1857		0	0
Reference Time B (s)	NA		1.3		18.4	19.0
Reference Time (s)			1.3			19.0
Adj Reference Time (s)			8.0			23.0
Split Option						
Ref Time Combined (s)	11.0		1.3		0.0	11.0
Ref Time Seperate (s)	0.2		1.1		10.4	0.6
Reference Time (s)	11.0		1.3		11.0	11.0
Adj Reference Time (s)	15.0		8.0		15.0	15.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		23.0			
Split Option (s)	15.0		23.0			
Minimum (s)	15.0		23.0		38.0	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	31.6%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	145	17	3	156	10
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)	3	158	18	3	170	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	370	20			22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	370	20			22	
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	85			89	
cM capacity (veh/h)	563	1058			1594	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	161	22	180			
Volume Left	3	0	170			
Volume Right	158	3	0			
cSH	1039	1700	1594			
Volume to Capacity	0.15	0.01	0.11			
Queue Length 95th (m)	4.2	0.0	2.7			
Control Delay (s)	9.1	0.0	7.1			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	7.1			
Approach LOS	A					
Intersection Summary						
Average Delay			7.6			
Intersection Capacity Utilization			31.6%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	7	5	5	17	10	12
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No				No	
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	12	0	0	22	22	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.91	0.85	0.95	0.99	0.92	0.85
Saturated Flow (vph)	1729	0	0	1878	1745	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)	0.0				0.0	
Adj Reference Time (s)	0.0				0.0	
Permitted Option						
Adj Saturation A (vph)	115	0		420	1745	
Reference Time A (s)	12.5	0.0		6.3	1.5	
Adj Saturation B (vph)	NA	0		0	1745	
Reference Time B (s)	NA	8.3		9.4	1.5	
Reference Time (s)				6.3	1.5	
Adj Reference Time (s)				10.3	8.0	
Split Option						
Ref Time Combined (s)	0.8	0.0		1.4	1.5	
Ref Time Seperate (s)	0.5	0.3		1.1	0.7	
Reference Time (s)	0.8	1.4		1.4	1.5	
Adj Reference Time (s)	8.0	8.0		8.0	8.0	
Summary	EB	NB SB		Combined		
Protected Option (s)	NA	NA				
Permitted Option (s)	Err	10.3				
Split Option (s)	8.0	16.0				
Minimum (s)	8.0	10.3		18.3		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	15.2%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	5	5	17	10	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	5	5	18	11	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	47	17	24			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	47	17	24			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	960	1061	1591			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	13	24	24			
Volume Left	8	5	0			
Volume Right	5	0	13			
cSH	1000	1591	1700			
Volume to Capacity	0.01	0.00	0.01			
Queue Length 95th (m)	0.3	0.1	0.0			
Control Delay (s)	8.6	1.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.6	1.7	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		2.5				
Intersection Capacity Utilization		15.2%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	3	21	166	3	21	178
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	24	0	169	0	0	199
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	1.00	0.85	0.95	0.99
Saturated Flow (vph)	1640	0	1895	0	0	1890
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	109		1895		0	739
Reference Time A (s)	26.3		10.7		0.0	32.3
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			10.7			32.3
Adj Reference Time (s)			14.7			36.3
Split Option						
Ref Time Combined (s)	1.8		10.7		0.0	12.6
Ref Time Seperate (s)	0.2		10.5		1.4	11.2
Reference Time (s)	1.8		10.7		12.6	12.6
Adj Reference Time (s)	8.0		14.7		16.6	16.6
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		36.3			
Split Option (s)	8.0		31.3			
Minimum (s)	8.0		31.3		39.3	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			32.8%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

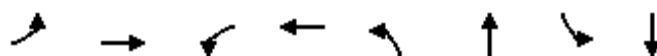
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	21	166	3	21	178
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)	3	23	180	3	23	193
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	421	182			184	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	421	182			184	
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	97			98	
cM capacity (veh/h)	579	860			1391	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	26	184	216			
Volume Left	3	0	23			
Volume Right	23	3	0			
cSH	811	1700	1391			
Volume to Capacity	0.03	0.11	0.02			
Queue Length 95th (m)	0.8	0.0	0.4			
Control Delay (s)	9.6	0.0	0.9			
Lane LOS	A		A			
Approach Delay (s)	9.6	0.0	0.9			
Approach LOS	A					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		32.8%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	524	26	313	61	121	139	174
v/c Ratio	0.25	0.59	0.17	0.34	0.08	0.11	0.18	0.16
Control Delay	20.3	21.9	20.0	14.3	5.9	5.1	6.5	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	21.9	20.0	14.3	5.9	5.1	6.5	4.0
Queue Length 50th (m)	5.5	25.6	2.3	10.7	2.2	3.7	5.5	3.9
Queue Length 95th (m)	13.8	38.4	7.4	19.3	7.5	11.2	15.1	12.7
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	596	2072	363	2044	754	1139	791	1113
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.25	0.07	0.15	0.08	0.11	0.18	0.16
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	438	44	24	212	76	56	90	21	128	87	73
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	58	482	0	24	288	0	56	111	0	128	160	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.99	0.85	0.95	0.96	0.85	0.95	0.97	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3568	0	1805	3474	0	1805	1846	0	1805	1770	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	3.9	16.2	0.0	1.6	9.9	0.0	3.7	7.2	0.0	8.5	10.8	0.0
Adj Reference Time (s)	8.0	20.2	0.0	8.0	13.9	0.0	8.0	11.2	0.0	12.5	14.8	0.0
Permitted Option												
Adj Saturation A (vph)	120	1784		120	1737		120	1846		120	1770	
Reference Time A (s)	57.8	16.2		23.9	9.9		55.8	7.2		127.6	10.8	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		0	1770	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		16.5	10.8	
Reference Time (s)		57.8			23.9			55.8			16.5	
Adj Reference Time (s)		61.8			27.9			59.8			20.5	
Split Option												
Ref Time Combined (s)	3.9	16.2		1.6	9.9		3.7	7.2		8.5	10.8	
Ref Time Seperate (s)	3.9	14.7		1.6	7.3		3.7	5.9		8.5	5.9	
Reference Time (s)	16.2	16.2		9.9	9.9		7.2	7.2		10.8	10.8	
Adj Reference Time (s)	20.2	20.2		13.9	13.9		11.2	11.2		14.8	14.8	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	28.2		23.7									
Permitted Option (s)	61.8		59.8									
Split Option (s)	34.2		26.1									
Minimum (s)	28.2		23.7		51.9							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	43.3%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	438	44	24	212	76	56	90	21	128	87	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3529		1789	3436		1789	1830		1789	1755	
Flt Permitted	0.54	1.00		0.33	1.00		0.65	1.00		0.68	1.00	
Satd. Flow (perm)	1019	3529		620	3436		1219	1830		1279	1755	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	476	48	26	230	83	61	98	23	139	95	79
RTOR Reduction (vph)	0	13	0	0	61	0	0	8	0	0	27	0
Lane Group Flow (vph)	63	511	0	26	252	0	61	113	0	139	147	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.8	14.8		14.8	14.8		37.1	37.1		37.1	37.1	
Effective Green, g (s)	14.8	14.8		14.8	14.8		37.1	37.1		37.1	37.1	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.62	0.62		0.62	0.62	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	252	872		153	849		755	1133		792	1087	
v/s Ratio Prot		c0.14			0.07			0.06			0.08	
v/s Ratio Perm	0.06			0.04			0.05			c0.11		
v/c Ratio	0.25	0.59		0.17	0.30		0.08	0.10		0.18	0.14	
Uniform Delay, d1	18.1	19.9		17.7	18.3		4.6	4.6		4.9	4.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.0		0.5	0.2		0.2	0.2		0.5	0.3	
Delay (s)	18.6	20.9		18.3	18.5		4.8	4.8		5.4	5.0	
Level of Service	B	C		B	B		A	A		A	A	
Approach Delay (s)		20.6			18.5			4.8			5.2	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM Average Control Delay			14.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			59.9			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			43.3%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	148	33	7	120	16
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	148	0	40	0	0	136
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.97	0.85	0.95	0.96
Saturated Flow (vph)	1615	0	1850	0	0	1816
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1850		0	132
Reference Time A (s)	165.0		2.6		0.0	123.9
Adj Saturation B (vph)	NA		1850		0	0
Reference Time B (s)	NA		2.6		16.0	17.0
Reference Time (s)			2.6			17.0
Adj Reference Time (s)			8.0			21.0
Split Option						
Ref Time Combined (s)	11.0		2.6		0.0	9.0
Ref Time Seperate (s)	0.0		2.1		8.0	1.0
Reference Time (s)	11.0		2.6		9.0	9.0
Adj Reference Time (s)	15.0		8.0		13.0	13.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		21.0			
Split Option (s)	15.0		21.0			
Minimum (s)	15.0		21.0		36.0	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	30.0%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	148	33	7	120	16
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)	0	161	36	8	130	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	318	40			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	318	40			43	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	84			92	
cM capacity (veh/h)	619	1032			1565	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	161	43	148			
Volume Left	0	0	130			
Volume Right	161	8	0			
cSH	1032	1700	1565			
Volume to Capacity	0.16	0.03	0.08			
Queue Length 95th (m)	4.2	0.0	2.1			
Control Delay (s)	9.1	0.0	6.7			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	6.7			
Approach LOS	A					
Intersection Summary						
Average Delay		7.0				
Intersection Capacity Utilization		30.0%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Volume (vph)	8	148	0	33	16	8
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	156	0	0	33	24	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1625	0	0	1900	1805	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	108		0	1900	1805	
Reference Time A (s)	172.8		0.0	2.1	1.6	
Adj Saturation B (vph)	NA		0	1900	1805	
Reference Time B (s)	NA		0.0	2.1	1.6	
Reference Time (s)				2.1	1.6	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	11.5		0.0	2.1	1.6	
Ref Time Seperate (s)	0.6		0.0	2.1	1.1	
Reference Time (s)	11.5		2.1	2.1	1.6	
Adj Reference Time (s)	15.5		8.0	8.0	8.0	
Summary	EB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	15.5		16.0			
Minimum (s)	15.5		8.0		23.5	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		19.6%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	148	0	33	16	8
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)	9	161	0	36	17	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	58	22	26			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	58	22	26			
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	85	100			
cM capacity (veh/h)	950	1055	1588			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	170	36	26			
Volume Left	9	0	0			
Volume Right	161	0	9			
cSH	1049	1588	1700			
Volume to Capacity	0.16	0.00	0.02			
Queue Length 95th (m)	4.4	0.0	0.0			
Control Delay (s)	9.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.1	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.7			
Intersection Capacity Utilization			19.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	4	31	189	2	12	143
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	35	0	191	0	0	155
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1638	0	1897	0	0	1893
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	109		1897		0	889
Reference Time A (s)	38.5		12.1		0.0	20.9
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			12.1			20.9
Adj Reference Time (s)			16.1			24.9
Split Option						
Ref Time Combined (s)	2.6		12.1		0.0	9.8
Ref Time Seperate (s)	0.3		12.0		0.8	9.0
Reference Time (s)	2.6		12.1		9.8	9.8
Adj Reference Time (s)	8.0		16.1		13.8	13.8
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		24.9			
Split Option (s)	8.0		29.9			
Minimum (s)	8.0		24.9		32.9	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	27.4%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	31	189	2	12	143
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	34	205	2	13	155
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	388	207			208	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	207			208	
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	96			99	
cM capacity (veh/h)	610	834			1363	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	208	168			
Volume Left	4	0	13			
Volume Right	34	2	0			
cSH	800	1700	1363			
Volume to Capacity	0.05	0.12	0.01			
Queue Length 95th (m)	1.1	0.0	0.2			
Control Delay (s)	9.7	0.0	0.7			
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	0.7			
Approach LOS	A					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		27.4%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBT	WBL	NBL	NBT	SBT
Lane Group Flow (vph)	9	9	9	14	7
v/c Ratio	0.01	0.05	0.01	0.01	0.00
Control Delay	0.0	26.6	1.0	0.7	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	26.6	1.0	0.7	1.0
Queue Length 50th (m)	0.0	0.9	0.0	0.0	0.0
Queue Length 95th (m)	0.0	5.0	0.8	0.8	0.7
Internal Link Dist (m)	294.4			190.0	82.5
Turn Bay Length (m)		45.0	35.0		
Base Capacity (vph)	2157	1037	1356	1609	1801
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.00	0.01	0.01	0.01	0.00
Intersection Summary					

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	8	8	0	0	8	4	9	0	6	0
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	0	8	0	8	0	0	8	13	0	0	6	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	0.85	0.95	1.00	0.85	0.95	0.90	0.85	0.95	1.00	0.85
Saturated Flow (vph)	1805	3075	0	1805	3618	0	1805	1703	0	1805	1900	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00			0.00			0.00		
Protected Option Allowed	Yes			Yes			Yes			Yes		
Reference Time (s)	0.0	0.3	0.0	0.5	0.0	0.0	0.5	0.9	0.0	0.0	0.4	0.0
Adj Reference Time (s)	8.0	8.0	0.0	8.0	8.0	0.0	8.0	8.0	0.0	8.0	8.0	0.0
Permitted Option												
Adj Saturation A (vph)	120	1537		120	1809		120	1703		120	1900	
Reference Time A (s)	0.0	0.3		8.0	0.0		8.0	0.9		0.0	0.4	
Adj Saturation B (vph)	0	3075		0	3618		0	1703		0	1900	
Reference Time B (s)	8.0	0.3		8.5	0.0		8.5	0.9		8.0	0.4	
Reference Time (s)		0.3			8.0			8.0			0.4	
Adj Reference Time (s)		8.0			12.0			12.0			8.0	
Split Option												
Ref Time Combined (s)	0.0	0.3		0.5	0.0		0.5	0.9		0.0	0.4	
Ref Time Seperate (s)	0.0	0.0		0.5	0.0		0.5	0.3		0.0	0.4	
Reference Time (s)	0.3	0.3		0.5	0.5		0.9	0.9		0.4	0.4	
Adj Reference Time (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	16.0		16.0									
Permitted Option (s)	12.0		12.0									
Split Option (s)	16.0		16.0									
Minimum (s)	12.0		12.0		24.0							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	20.0%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	8	8	0	0	8	4	9	0	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0			4.0	4.0			4.0	
Lane Util. Factor		0.95		1.00			1.00	1.00			1.00	
Frt		0.85		1.00			1.00	0.89			1.00	
Flt Protected		1.00		0.95			0.95	1.00			1.00	
Satd. Flow (prot)		3042		1789			1789	1682			1883	
Flt Permitted		1.00		1.00			0.75	1.00			1.00	
Satd. Flow (perm)		3042		1883			1418	1682			1883	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	9	9	0	0	9	4	10	0	7	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	9	0	0	9	13	0	0	7	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.2		1.2			54.3	54.3			54.3	
Effective Green, g (s)		1.2		1.2			54.3	54.3			54.3	
Actuated g/C Ratio		0.02		0.02			0.86	0.86			0.86	
Clearance Time (s)		4.0		4.0			4.0	4.0			4.0	
Vehicle Extension (s)		3.0		3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)		57		36			1213	1438			1610	
v/s Ratio Prot		0.00						c0.01			0.00	
v/s Ratio Perm				c0.00			0.01					
v/c Ratio		0.00		0.25			0.01	0.01			0.00	
Uniform Delay, d1		30.6		30.7			0.7	0.7			0.7	
Progression Factor		1.00		1.00			1.00	1.00			1.00	
Incremental Delay, d2		0.0		3.6			0.0	0.0			0.0	
Delay (s)		30.6		34.3			0.7	0.7			0.7	
Level of Service		C		C			A	A			A	
Approach Delay (s)		30.6			34.3			0.7			0.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			12.6				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.01									
Actuated Cycle Length (s)			63.5				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			20.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	R
Volume (vph)	0	2	0	0	2	0
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	2	0	0	0	0	2
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	1.00	0.85	0.95	0.95
Saturated Flow (vph)	1615	0	1900	0	0	1805
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1900		0	1023
Reference Time A (s)	2.2		0.0		0.0	0.2
Adj Saturation B (vph)	NA		1900		0	0
Reference Time B (s)	NA		0.0		8.1	8.1
Reference Time (s)			0.0			0.2
Adj Reference Time (s)			8.0			8.0
Split Option						
Ref Time Combined (s)	0.1		0.0		0.0	0.1
Ref Time Seperate (s)	0.0		0.0		0.1	0.0
Reference Time (s)	0.1		0.0		0.1	0.1
Adj Reference Time (s)	8.0		0.0		8.0	8.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	8.0		8.0			
Minimum (s)	8.0		8.0		16.0	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	2	0	0	2	0
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)	0	2	0	0	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	4	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1016	1085			1623	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	2	0	2			
Volume Left	0	0	2			
Volume Right	2	0	0			
cSH	1085	1700	1623			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	8.3	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	8.3	0.0	7.2			
Approach LOS	A					
Intersection Summary						
Average Delay		7.8				
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	0	0	0	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	0.95	1.00	1.00	0.85
Saturated Flow (vph)	1805	0	0	1900	1900	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	120		0	1900	1900	
Reference Time A (s)	0.0		0.0	0.0	0.0	
Adj Saturation B (vph)	NA		0	1900	1900	
Reference Time B (s)	NA		0.0	0.0	0.0	
Reference Time (s)				0.0	0.0	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	0.0		0.0	0.0	0.0	
Ref Time Seperate (s)	0.0		0.0	0.0	0.0	
Reference Time (s)	0.0		0.0	0.0	0.0	
Adj Reference Time (s)	0.0		0.0	0.0	0.0	
Summary	EB		NB SB	Combined		
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	0.0		0.0			
Minimum (s)	0.0		0.0	0.0		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	0.0%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
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)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	0	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	1023	1085	1623			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	3	21	0	3	21	0
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	24	0	3	0	0	21
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.85	0.85	0.95	0.95
Saturated Flow (vph)	1640	0	1615	0	0	1805
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	109		1615		0	120
Reference Time A (s)	26.3		0.2		0.0	20.9
Adj Saturation B (vph)	NA		1615		0	0
Reference Time B (s)	NA		0.2		9.4	9.4
Reference Time (s)			0.2			9.4
Adj Reference Time (s)			8.0			13.4
Split Option						
Ref Time Combined (s)	1.8		0.2		0.0	1.4
Ref Time Seperate (s)	0.2		0.0		1.4	0.0
Reference Time (s)	1.8		0.2		1.4	1.4
Adj Reference Time (s)	8.0		8.0		8.0	8.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		13.4			
Split Option (s)	8.0		16.0			
Minimum (s)	8.0		13.4		21.4	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		17.8%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	21	0	3	21	0
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)	3	23	0	3	23	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	47	2			3	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	47	2			3	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	949	1083			1619	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	26	3	23			
Volume Left	3	0	23			
Volume Right	23	3	0			
cSH	1064	1700	1619			
Volume to Capacity	0.02	0.00	0.01			
Queue Length 95th (m)	0.6	0.0	0.3			
Control Delay (s)	8.5	0.0	7.3			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	7.3			
Approach LOS	A					
Intersection Summary						
Average Delay		7.4				
Intersection Capacity Utilization		17.8%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBT	WBL	NBL	NBT	SBT
Lane Group Flow (vph)	7	3	10	24	3
v/c Ratio	0.01	0.02	0.01	0.01	0.00
Control Delay	0.0	26.7	0.9	0.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	26.7	0.9	0.6	1.0
Queue Length 50th (m)	0.0	0.3	0.0	0.0	0.0
Queue Length 95th (m)	0.0	2.6	0.8	1.1	0.4
Internal Link Dist (m)	294.4			190.0	82.5
Turn Bay Length (m)		45.0	35.0		
Base Capacity (vph)	2164	1039	1364	1614	1804
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.00	0.00	0.01	0.01	0.00
Intersection Summary					

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	6	3	0	0	9	6	16	0	3	0
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	0	6	0	3	0	0	9	22	0	0	3	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	0.85	0.95	1.00	0.85	0.95	0.89	0.85	0.95	1.00	0.85
Saturated Flow (vph)	1805	3075	0	1805	3618	0	1805	1693	0	1805	1900	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes			Yes			Yes			Yes		
Reference Time (s)	0.0	0.2	0.0	0.2	0.0	0.0	0.6	1.6	0.0	0.0	0.2	0.0
Adj Reference Time (s)	8.0	8.0	0.0	8.0	8.0	0.0	8.0	8.0	0.0	8.0	8.0	0.0
Permitted Option												
Adj Saturation A (vph)	120	1537		120	1809		120	1693		120	1900	
Reference Time A (s)	0.0	0.2		3.0	0.0		9.0	1.6		0.0	0.2	
Adj Saturation B (vph)	0	3075		0	3618		0	1693		0	1900	
Reference Time B (s)	8.0	0.2		8.2	0.0		8.6	1.6		8.0	0.2	
Reference Time (s)	0.2		3.0				8.6				0.2	
Adj Reference Time (s)	8.0		8.0				12.6				8.0	
Split Option												
Ref Time Combined (s)	0.0	0.2		0.2	0.0		0.6	1.6		0.0	0.2	
Ref Time Seperate (s)	0.0	0.0		0.2	0.0		0.6	0.4		0.0	0.2	
Reference Time (s)	0.2	0.2		0.2	0.2		1.6	1.6		0.2	0.2	
Adj Reference Time (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	16.0		16.0									
Permitted Option (s)	8.0		12.6									
Split Option (s)	16.0		16.0									
Minimum (s)	8.0		12.6		20.6							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	17.2%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	6	3	0	0	9	6	16	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0			4.0	4.0			4.0	
Lane Util. Factor		0.95		1.00			1.00	1.00			1.00	
Frt		0.85		1.00			1.00	0.89			1.00	
Flt Protected		1.00		0.95			0.95	1.00			1.00	
Satd. Flow (prot)		3042		1789			1789	1683			1883	
Flt Permitted		1.00		1.00			0.76	1.00			1.00	
Satd. Flow (perm)		3042		1883			1424	1683			1883	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	7	3	0	0	10	7	17	0	3	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	3	0	0	10	22	0	0	3	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.1		1.1			54.2	54.2			54.2	
Effective Green, g (s)		1.1		1.1			54.2	54.2			54.2	
Actuated g/C Ratio		0.02		0.02			0.86	0.86			0.86	
Clearance Time (s)		4.0		4.0			4.0	4.0			4.0	
Vehicle Extension (s)		3.0		3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)		53		33			1219	1441			1612	
v/s Ratio Prot		0.00						c0.01			0.00	
v/s Ratio Perm				c0.00			0.01					
v/c Ratio		0.00		0.09			0.01	0.01			0.00	
Uniform Delay, d1		30.6		30.6			0.7	0.7			0.7	
Progression Factor		1.00		1.00			1.00	1.00			1.00	
Incremental Delay, d2		0.0		1.2			0.0	0.0			0.0	
Delay (s)		30.6		31.8			0.7	0.7			0.7	
Level of Service		C		C			A	A			A	
Approach Delay (s)		30.6			31.8			0.7			0.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			7.1				HCM Level of Service			A		
HCM Volume to Capacity ratio			0.02									
Actuated Cycle Length (s)			63.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			17.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	2	0	0	4	0
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	2	0	0	0	0	4
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	1.00	0.85	0.95	0.95
Saturated Flow (vph)	1615	0	1900	0	0	1805
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1900		0	1023
Reference Time A (s)	2.2		0.0		0.0	0.5
Adj Saturation B (vph)	NA		1900		0	0
Reference Time B (s)	NA		0.0		8.3	8.3
Reference Time (s)			0.0			0.5
Adj Reference Time (s)			8.0			8.0
Split Option						
Ref Time Combined (s)	0.1		0.0		0.0	0.3
Ref Time Seperate (s)	0.0		0.0		0.3	0.0
Reference Time (s)	0.1		0.0		0.3	0.3
Adj Reference Time (s)	8.0		0.0		8.0	8.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	8.0		8.0			
Minimum (s)	8.0		8.0		16.0	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	13.3%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	2	0	0	4	0
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)	0	2	0	0	4	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	9	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	9	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1009	1085			1623	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	2	0	4			
Volume Left	0	0	4			
Volume Right	2	0	0			
cSH	1085	1700	1623			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	8.3	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	8.3	0.0	7.2			
Approach LOS	A					
Intersection Summary						
Average Delay			7.6			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Volume (vph)	0	2	0	0	0	0
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	2	0	0	0	0	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.95	1.00	1.00	0.85
Saturated Flow (vph)	1615	0	0	1900	1900	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	108		0	1900	1900	
Reference Time A (s)	2.2		0.0	0.0	0.0	
Adj Saturation B (vph)	NA		0	1900	1900	
Reference Time B (s)	NA		0.0	0.0	0.0	
Reference Time (s)				0.0	0.0	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	0.1		0.0	0.0	0.0	
Ref Time Seperate (s)	0.0		0.0	0.0	0.0	
Reference Time (s)	0.1		0.0	0.0	0.0	
Adj Reference Time (s)	8.0		0.0	0.0	0.0	
Summary	EB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	8.0		0.0			
Minimum (s)	8.0		0.0		8.0	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	2	0	0	0	0
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)	0	2	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	0	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	1023	1085	1623			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	2	0	0			
Volume Left	0	0	0			
Volume Right	2	0	0			
cSH	1085	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	8.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		8.3				
Intersection Capacity Utilization		6.7%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	4	31	0	2	12	0
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	35	0	2	0	0	12
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.85	0.85	0.95	0.95
Saturated Flow (vph)	1638	0	1615	0	0	1805
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	109		1615		0	120
Reference Time A (s)	38.5		0.1		0.0	12.0
Adj Saturation B (vph)	NA		1615		0	0
Reference Time B (s)	NA		0.1		8.8	8.8
Reference Time (s)			0.1			8.8
Adj Reference Time (s)			8.0			12.8
Split Option						
Ref Time Combined (s)	2.6		0.1		0.0	0.8
Ref Time Seperate (s)	0.3		0.0		0.8	0.0
Reference Time (s)	2.6		0.1		0.8	0.8
Adj Reference Time (s)	8.0		8.0		8.0	8.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		12.8			
Split Option (s)	8.0		16.0			
Minimum (s)	8.0		12.8		20.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			17.3%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

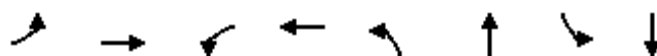
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	31	0	2	12	0
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	34	0	2	13	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	27	1			2	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27	1			2	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			99	
cM capacity (veh/h)	980	1083			1620	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	2	13			
Volume Left	4	0	13			
Volume Right	34	2	0			
cSH	1071	1700	1620			
Volume to Capacity	0.04	0.00	0.01			
Queue Length 95th (m)	0.8	0.0	0.2			
Control Delay (s)	8.5	0.0	7.2			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	7.2			
Approach LOS	A					
Intersection Summary						
Average Delay		7.8				
Intersection Capacity Utilization		17.3%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	468	22	464	82	129	152	212
v/c Ratio	0.33	0.59	0.15	0.57	0.11	0.11	0.19	0.18
Control Delay	25.7	23.1	20.9	21.4	5.4	4.0	5.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	23.1	20.9	21.4	5.4	4.0	5.8	3.6
Queue Length 50th (m)	4.7	23.3	2.0	21.3	2.9	3.3	5.7	4.7
Queue Length 95th (m)	12.9	35.5	6.9	33.4	8.8	10.1	15.0	13.8
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	373	1930	369	1915	759	1176	819	1158
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.24	0.06	0.24	0.11	0.11	0.19	0.18
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	382	49	20	337	90	75	86	33	140	102	93
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	46	431	0	20	427	0	75	119	0	140	195	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.97	0.85	0.95	0.96	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3556	0	1805	3503	0	1805	1821	0	1805	1764	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	3.1	14.5	0.0	1.3	14.6	0.0	5.0	7.8	0.0	9.3	13.3	0.0
Adj Reference Time (s)	8.0	18.5	0.0	8.0	18.6	0.0	9.0	11.8	0.0	13.3	17.3	0.0
Permitted Option												
Adj Saturation A (vph)	120	1778		120	1752		120	1821		120	1764	
Reference Time A (s)	45.9	14.5		19.9	14.6		74.8	7.8		139.6	13.3	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		0	1764	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		17.3	13.3	
Reference Time (s)		45.9			19.9			74.8			17.3	
Adj Reference Time (s)		49.9			23.9			78.8			21.3	
Split Option												
Ref Time Combined (s)	3.1	14.5		1.3	14.6		5.0	7.8		9.3	13.3	
Ref Time Seperate (s)	3.1	12.9		1.3	11.5		5.0	5.7		9.3	6.9	
Reference Time (s)	14.5	14.5		14.6	14.6		7.8	7.8		13.3	13.3	
Adj Reference Time (s)	18.5	18.5		18.6	18.6		11.8	11.8		17.3	17.3	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	26.6		26.3									
Permitted Option (s)	49.9		78.8									
Split Option (s)	37.2		29.1									
Minimum (s)	26.6		26.3		52.9							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	44.1%			ICU Level of Service				A				
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	382	49	20	337	90	75	86	33	140	102	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3518		1789	3465		1789	1805		1789	1749	
Flt Permitted	0.36	1.00		0.36	1.00		0.63	1.00		0.67	1.00	
Satd. Flow (perm)	684	3518		677	3465		1178	1805		1270	1749	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	415	53	22	366	98	82	93	36	152	111	101
RTOR Reduction (vph)	0	16	0	0	40	0	0	12	0	0	28	0
Lane Group Flow (vph)	50	452	0	22	424	0	82	117	0	152	184	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.5	13.5		13.5	13.5		39.1	39.1		39.1	39.1	
Effective Green, g (s)	13.5	13.5		13.5	13.5		39.1	39.1		39.1	39.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	152	784		151	772		760	1165		819	1128	
v/s Ratio Prot		c0.13			0.12			0.06			0.10	
v/s Ratio Perm	0.07			0.03			0.07			c0.12		
v/c Ratio	0.33	0.58		0.15	0.55		0.11	0.10		0.19	0.16	
Uniform Delay, d1	19.8	21.0		18.9	20.9		4.1	4.1		4.3	4.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	1.0		0.4	0.8		0.3	0.2		0.5	0.3	
Delay (s)	21.0	22.0		19.4	21.7		4.4	4.3		4.8	4.6	
Level of Service	C	C		B	C		A	A		A	A	
Approach Delay (s)		21.9			21.6			4.3			4.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			15.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			60.6			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			44.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Volume (vph)	3	138	16	3	148	9
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	141	0	19	0	0	157
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.98	0.85	0.95	0.95
Saturated Flow (vph)	1619	0	1855	0	0	1810
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1855		0	125
Reference Time A (s)	156.7		1.2		0.0	150.2
Adj Saturation B (vph)	NA		1855		0	0
Reference Time B (s)	NA		1.2		17.8	18.4
Reference Time (s)			1.2			18.4
Adj Reference Time (s)			8.0			22.4
Split Option						
Ref Time Combined (s)	10.4		1.2		0.0	10.4
Ref Time Seperate (s)	0.2		1.0		9.8	0.6
Reference Time (s)	10.4		1.2		10.4	10.4
Adj Reference Time (s)	14.4		8.0		14.4	14.4
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		22.4			
Split Option (s)	14.4		22.4			
Minimum (s)	14.4		22.4		36.9	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			30.7%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	138	16	3	148	9
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)	3	150	17	3	161	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	351	19			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	351	19			21	
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	86			90	
cM capacity (veh/h)	582	1059			1595	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	153	21	171			
Volume Left	3	0	161			
Volume Right	150	3	0			
cSH	1041	1700	1595			
Volume to Capacity	0.15	0.01	0.10			
Queue Length 95th (m)	3.9	0.0	2.6			
Control Delay (s)	9.1	0.0	7.1			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	7.1			
Approach LOS	A					
Intersection Summary						
Average Delay		7.6				
Intersection Capacity Utilization		30.7%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Volume (vph)	6	5	0	0	9	12
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	11	0	0	0	21	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.91	0.85	0.95	1.00	0.91	0.85
Saturated Flow (vph)	1722	0	0	1900	1737	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	115		0	1900	1737	
Reference Time A (s)	11.5		0.0	0.0	1.5	
Adj Saturation B (vph)	NA		0	1900	1737	
Reference Time B (s)	NA		0.0	0.0	1.5	
Reference Time (s)				0.0	1.5	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	0.8		0.0	0.0	1.5	
Ref Time Seperate (s)	0.4		0.0	0.0	0.6	
Reference Time (s)	0.8		0.0	0.0	1.5	
Adj Reference Time (s)	8.0		0.0	0.0	8.0	
Summary	EB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	8.0		8.0			
Minimum (s)	8.0		8.0		16.0	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	6	5	0	0	9	12
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)	7	5	0	0	10	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	16	16	23			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	16	16	23			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	1002	1063	1592			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	0	23			
Volume Left	7	0	0			
Volume Right	5	0	13			
cSH	1029	1700	1700			
Volume to Capacity	0.01	0.00	0.01			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.5	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	160	0	0	171
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	160	0	0	171
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1805	0	1900	0	0	1900
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	120		1900		0	1900
Reference Time A (s)	0.0		10.1		0.0	10.8
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			10.1			10.8
Adj Reference Time (s)			14.1			14.8
Split Option						
Ref Time Combined (s)	0.0		10.1		0.0	10.8
Ref Time Seperate (s)	0.0		10.1		0.0	10.8
Reference Time (s)	0.0		10.1		10.8	10.8
Adj Reference Time (s)	0.0		14.1		14.8	14.8
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		14.8			
Split Option (s)	0.0		28.9			
Minimum (s)	0.0		14.8		14.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		12.3%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

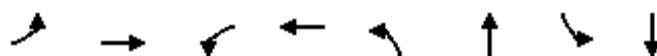
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	160	0	0	171
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)	0	0	174	0	0	186
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	360	174			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360	174			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	639	870			1403	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	174	186			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1403			
Volume to Capacity	0.00	0.10	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		12.3%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	498	22	302	49	110	134	164
v/c Ratio	0.24	0.58	0.14	0.34	0.06	0.10	0.17	0.15
Control Delay	20.4	22.1	19.4	14.3	5.6	4.8	6.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	22.1	19.4	14.3	5.6	4.8	6.2	3.7
Queue Length 50th (m)	5.3	24.2	1.9	10.2	1.7	3.2	5.1	3.3
Queue Length 95th (m)	13.5	36.6	6.7	18.7	6.2	10.0	14.1	11.4
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	617	2100	387	2067	770	1152	809	1124
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.24	0.06	0.15	0.06	0.10	0.17	0.15
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	421	37	20	204	74	45	81	20	123	81	70
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	56	458	0	20	278	0	45	101	0	123	151	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.99	0.85	0.95	0.96	0.85	0.95	0.97	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3574	0	1805	3473	0	1805	1844	0	1805	1768	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	3.7	15.4	0.0	1.3	9.6	0.0	3.0	6.6	0.0	8.2	10.2	0.0
Adj Reference Time (s)	8.0	19.4	0.0	8.0	13.6	0.0	8.0	10.6	0.0	12.2	14.2	0.0
Permitted Option												
Adj Saturation A (vph)	120	1787		120	1737		120	1844		120	1768	
Reference Time A (s)	55.8	15.4		19.9	9.6		44.9	6.6		122.7	10.2	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		0	1768	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		16.2	10.2	
Reference Time (s)		55.8			19.9			44.9			16.2	
Adj Reference Time (s)		59.8			23.9			48.9			20.2	
Split Option												
Ref Time Combined (s)	3.7	15.4		1.3	9.6		3.0	6.6		8.2	10.2	
Ref Time Seperate (s)	3.7	14.1		1.3	7.0		3.0	5.3		8.2	5.5	
Reference Time (s)	15.4	15.4		9.6	9.6		6.6	6.6		10.2	10.2	
Adj Reference Time (s)	19.4	19.4		13.6	13.6		10.6	10.6		14.2	14.2	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	27.4		22.8									
Permitted Option (s)	59.8		48.9									
Split Option (s)	33.0		24.8									
Minimum (s)	27.4		22.8		50.1							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	41.8%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	421	37	20	204	74	45	81	20	123	81	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3535		1789	3436		1789	1827		1789	1753	
Flt Permitted	0.55	1.00		0.35	1.00		0.65	1.00		0.69	1.00	
Satd. Flow (perm)	1041	3535		653	3436		1230	1827		1292	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	458	40	22	222	80	49	88	22	134	88	76
RTOR Reduction (vph)	0	11	0	0	61	0	0	8	0	0	27	0
Lane Group Flow (vph)	61	487	0	22	241	0	49	102	0	134	137	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1		37.1	37.1		37.1	37.1	
Effective Green, g (s)	14.1	14.1		14.1	14.1		37.1	37.1		37.1	37.1	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.63	0.63		0.63	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	842		156	818		771	1145		810	1099	
v/s Ratio Prot		c0.14			0.07			0.06			0.08	
v/s Ratio Perm	0.06			0.03			0.04			c0.10		
v/c Ratio	0.25	0.58		0.14	0.29		0.06	0.09		0.17	0.12	
Uniform Delay, d1	18.2	19.9		17.8	18.5		4.3	4.4		4.6	4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.0		0.4	0.2		0.2	0.2		0.4	0.2	
Delay (s)	18.8	20.9		18.2	18.7		4.5	4.5		5.0	4.7	
Level of Service	B	C		B	B		A	A		A	A	
Approach Delay (s)		20.7			18.6			4.5			4.9	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM Average Control Delay		14.7			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.28										
Actuated Cycle Length (s)		59.2			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		41.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	141	32	0	111	15
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	141	0	32	0	0	126
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	1.00	0.85	0.95	0.96
Saturated Flow (vph)	1615	0	1900	0	0	1816
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1900		0	132
Reference Time A (s)	157.2		2.0		0.0	114.7
Adj Saturation B (vph)	NA		1900		0	0
Reference Time B (s)	NA		2.0		15.4	16.3
Reference Time (s)			2.0			16.3
Adj Reference Time (s)			8.0			20.3
Split Option						
Ref Time Combined (s)	10.5		2.0		0.0	8.3
Ref Time Seperate (s)	0.0		2.0		7.4	0.9
Reference Time (s)	10.5		2.0		8.3	8.3
Adj Reference Time (s)	14.5		8.0		12.3	12.3
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		20.3			
Split Option (s)	14.5		20.3			
Minimum (s)	14.5		20.3		34.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			29.0%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	141	32	0	111	15
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)	0	153	35	0	121	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	292	35			35	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	292	35			35	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	85			92	
cM capacity (veh/h)	645	1038			1577	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	153	35	137			
Volume Left	0	0	121			
Volume Right	153	0	0			
cSH	1038	1700	1577			
Volume to Capacity	0.15	0.02	0.08			
Queue Length 95th (m)	3.9	0.0	1.9			
Control Delay (s)	9.1	0.0	6.7			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	6.7			
Approach LOS	A					
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		29.0%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	7	141	0	32	15	7
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	148	0	0	32	22	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1625	0	0	1900	1809	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)	0.0		0.0			
Adj Reference Time (s)	0.0		0.0			
Permitted Option						
Adj Saturation A (vph)	108	0		1900	1809	
Reference Time A (s)	164.0	0.0		2.0	1.5	
Adj Saturation B (vph)	NA	0		1900	1809	
Reference Time B (s)	NA	0.0		2.0	1.5	
Reference Time (s)				2.0	1.5	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	10.9	0.0		2.0	1.5	
Ref Time Seperate (s)	0.5	0.0		2.0	1.0	
Reference Time (s)	10.9	2.0		2.0	1.5	
Adj Reference Time (s)	14.9	8.0		8.0	8.0	
Summary	EB	NB SB		Combined		
Protected Option (s)	NA	NA				
Permitted Option (s)	Err	8.0				
Split Option (s)	14.9	16.0				
Minimum (s)	14.9	8.0		22.9		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	19.1%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	141	0	32	15	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	153	0	35	16	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	55	20	24			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	55	20	24			
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	86	100			
cM capacity (veh/h)	953	1058	1591			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	161	35	24			
Volume Left	8	0	0			
Volume Right	153	0	8			
cSH	1052	1591	1700			
Volume to Capacity	0.15	0.00	0.01			
Queue Length 95th (m)	4.1	0.0	0.0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		6.6				
Intersection Capacity Utilization		19.1%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	182	0	0	138
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	182	0	0	138
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1805	0	1900	0	0	1900
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	120		1900		0	1900
Reference Time A (s)	0.0		11.5		0.0	8.7
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			11.5			8.7
Adj Reference Time (s)			15.5			12.7
Split Option						
Ref Time Combined (s)	0.0		11.5		0.0	8.7
Ref Time Seperate (s)	0.0		11.5		0.0	8.7
Reference Time (s)	0.0		11.5		8.7	8.7
Adj Reference Time (s)	0.0		15.5		12.7	12.7
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		15.5			
Split Option (s)	0.0		28.2			
Minimum (s)	0.0		15.5		15.5	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			12.9%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

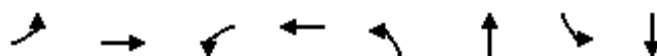
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	182	0	0	138
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)	0	0	198	0	0	150
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	348	198			198	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348	198			198	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	649	843			1375	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	198	150			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1375			
Volume to Capacity	0.00	0.12	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			12.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	631	27	381	62	120	170	209
v/c Ratio	0.31	0.63	0.19	0.38	0.09	0.11	0.22	0.19
Control Delay	21.3	22.6	20.6	15.2	7.4	6.8	8.2	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	22.6	20.6	15.2	7.4	6.8	8.2	5.2
Queue Length 50th (m)	7.1	33.2	2.4	14.7	2.8	5.1	8.2	6.1
Queue Length 95th (m)	16.6	47.5	7.9	24.2	9.2	14.3	21.8	18.2
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	475	1892	265	1868	704	1114	763	1074
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.33	0.10	0.20	0.09	0.11	0.22	0.19
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	534	47	25	258	93	57	103	7	156	103	89
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	71	581	0	25	351	0	57	110	0	156	192	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.99	0.85	0.95	0.96	0.85	0.95	0.99	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3574	0	1805	3474	0	1805	1882	0	1805	1768	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	4.7	19.5	0.0	1.7	12.1	0.0	3.8	7.0	0.0	10.4	13.0	0.0
Adj Reference Time (s)	8.7	23.5	0.0	8.0	16.1	0.0	8.0	11.0	0.0	14.4	17.0	0.0
Permitted Option												
Adj Saturation A (vph)	120	1787		120	1737		120	1882		120	1768	
Reference Time A (s)	70.8	19.5		24.9	12.1		56.8	7.0		155.6	13.0	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		0	1768	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		18.4	13.0	
Reference Time (s)		70.8			24.9			56.8			18.4	
Adj Reference Time (s)		74.8			28.9			60.8			22.4	
Split Option												
Ref Time Combined (s)	4.7	19.5		1.7	12.1		3.8	7.0		10.4	13.0	
Ref Time Seperate (s)	4.7	17.9		1.7	8.9		3.8	6.6		10.4	7.0	
Reference Time (s)	19.5	19.5		12.1	12.1		7.0	7.0		13.0	13.0	
Adj Reference Time (s)	23.5	23.5		16.1	16.1		11.0	11.0		17.0	17.0	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	31.5		25.4									
Permitted Option (s)	74.8		60.8									
Split Option (s)	39.6		28.0									
Minimum (s)	31.5		25.4		56.9							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	47.4%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	534	47	25	258	93	57	103	7	156	103	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3535		1789	3436		1789	1865		1789	1752	
Flt Permitted	0.47	1.00		0.26	1.00		0.63	1.00		0.68	1.00	
Satd. Flow (perm)	891	3535		497	3436		1181	1865		1281	1752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	580	51	27	280	101	62	112	8	170	112	97
RTOR Reduction (vph)	0	10	0	0	57	0	0	2	0	0	30	0
Lane Group Flow (vph)	77	621	0	27	324	0	62	118	0	170	179	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.9	17.9		17.9	17.9		38.2	38.2		38.2	38.2	
Effective Green, g (s)	17.9	17.9		17.9	17.9		38.2	38.2		38.2	38.2	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.60	0.60		0.60	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	987		139	960		704	1111		763	1044	
v/s Ratio Prot		c0.18			0.09			0.06			0.10	
v/s Ratio Perm	0.09			0.05			0.05			c0.13		
v/c Ratio	0.31	0.63		0.19	0.34		0.09	0.11		0.22	0.17	
Uniform Delay, d1	18.2	20.2		17.6	18.4		5.5	5.6		6.0	5.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.3		0.7	0.2		0.2	0.2		0.7	0.4	
Delay (s)	18.9	21.5		18.3	18.6		5.8	5.8		6.7	6.2	
Level of Service	B	C		B	B		A	A		A	A	
Approach Delay (s)		21.2			18.6			5.8			6.4	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM Average Control Delay			15.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			64.1			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			47.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	178	40	8	141	19
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	178	0	48	0	0	160
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.97	0.85	0.95	0.96
Saturated Flow (vph)	1615	0	1853	0	0	1816
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1853		0	132
Reference Time A (s)	198.4		3.1		0.0	145.7
Adj Saturation B (vph)	NA		1853		0	0
Reference Time B (s)	NA		3.1		17.4	18.6
Reference Time (s)			3.1			18.6
Adj Reference Time (s)			8.0			22.6
Split Option						
Ref Time Combined (s)	13.2		3.1		0.0	10.6
Ref Time Seperate (s)	0.0		2.6		9.4	1.2
Reference Time (s)	13.2		3.1		10.6	10.6
Adj Reference Time (s)	17.2		8.0		14.6	14.6
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		22.6			
Split Option (s)	17.2		22.6			
Minimum (s)	17.2		22.6		39.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	33.2%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	178	40	8	141	19
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)	0	193	43	9	153	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	375	48			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	375	48			52	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			90	
cM capacity (veh/h)	564	1021			1554	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	193	52	174			
Volume Left	0	0	153			
Volume Right	193	9	0			
cSH	1021	1700	1554			
Volume to Capacity	0.19	0.03	0.10			
Queue Length 95th (m)	5.3	0.0	2.5			
Control Delay (s)	9.3	0.0	6.8			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	6.8			
Approach LOS	A					
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		33.2%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	9	178	0	40	19	9
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	187	0	0	40	28	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1625	0	0	1900	1808	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)	0.0		0.0			
Adj Reference Time (s)	0.0		0.0			
Permitted Option						
Adj Saturation A (vph)	108	0		1900	1808	
Reference Time A (s)	207.2	0.0		2.5	1.9	
Adj Saturation B (vph)	NA	0		1900	1808	
Reference Time B (s)	NA	0.0		2.5	1.9	
Reference Time (s)				2.5	1.9	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	13.8	0.0		2.5	1.9	
Ref Time Seperate (s)	0.7	0.0		2.5	1.3	
Reference Time (s)	13.8	2.5		2.5	1.9	
Adj Reference Time (s)	17.8	8.0		8.0	8.0	
Summary	EB	NB SB		Combined		
Protected Option (s)	NA	NA				
Permitted Option (s)	Err	8.0				
Split Option (s)	17.8	16.0				
Minimum (s)	17.8	8.0		25.8		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	21.5%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	9	178	0	40	19	9
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	193	0	43	21	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	69	26	30			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69	26	30			
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	82	100			
cM capacity (veh/h)	936	1050	1582			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	203	43	30			
Volume Left	10	0	0			
Volume Right	193	0	10			
cSH	1044	1582	1700			
Volume to Capacity	0.19	0.00	0.02			
Queue Length 95th (m)	5.5	0.0	0.0			
Control Delay (s)	9.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		6.8				
Intersection Capacity Utilization		21.5%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	230	0	0	174
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	230	0	0	174
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1805	0	1900	0	0	1900
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	120		1900		0	1900
Reference Time A (s)	0.0		14.5		0.0	11.0
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			14.5			11.0
Adj Reference Time (s)			18.5			15.0
Split Option						
Ref Time Combined (s)	0.0		14.5		0.0	11.0
Ref Time Seperate (s)	0.0		14.5		0.0	11.0
Reference Time (s)	0.0		14.5		11.0	11.0
Adj Reference Time (s)	0.0		18.5		15.0	15.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		18.5			
Split Option (s)	0.0		33.5			
Minimum (s)	0.0		18.5		18.5	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	15.4%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

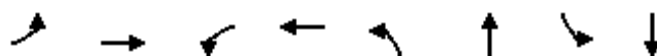
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	230	0	0	174
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)	0	0	250	0	0	189
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	439	250			250	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439	250			250	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	575	789			1316	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	250	189			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1316			
Volume to Capacity	0.00	0.15	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		15.4%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	631	27	381	77	169	170	209
v/c Ratio	0.31	0.63	0.19	0.38	0.11	0.15	0.23	0.19
Control Delay	21.3	22.6	20.6	15.2	7.5	6.5	8.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	22.6	20.6	15.2	7.5	6.5	8.3	5.2
Queue Length 50th (m)	7.1	33.2	2.4	14.7	3.5	6.7	8.3	6.1
Queue Length 95th (m)	16.6	47.5	7.9	24.2	10.8	18.2	22.1	18.2
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	475	1892	265	1868	704	1096	729	1074
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.33	0.10	0.20	0.11	0.15	0.23	0.19
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	534	47	25	258	93	71	123	32	156	103	89
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	71	581	0	25	351	0	71	155	0	156	192	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.99	0.85	0.95	0.96	0.85	0.95	0.97	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3574	0	1805	3474	0	1805	1841	0	1805	1768	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00			0.00			0.00		
Protected Option Allowed	Yes			Yes			Yes			Yes		
Reference Time (s)	4.7	19.5	0.0	1.7	12.1	0.0	4.7	10.1	0.0	10.4	13.0	0.0
Adj Reference Time (s)	8.7	23.5	0.0	8.0	16.1	0.0	8.7	14.1	0.0	14.4	17.0	0.0
Permitted Option												
Adj Saturation A (vph)	120	1787		120	1737		120	1841		120	1768	
Reference Time A (s)	70.8	19.5		24.9	12.1		70.8	10.1		155.6	13.0	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		70.8			24.9			70.8			155.6	
Adj Reference Time (s)		74.8			28.9			74.8			159.6	
Split Option												
Ref Time Combined (s)	4.7	19.5		1.7	12.1		4.7	10.1		10.4	13.0	
Ref Time Seperate (s)	4.7	17.9		1.7	8.9		4.7	8.0		10.4	7.0	
Reference Time (s)	19.5	19.5		12.1	12.1		10.1	10.1		13.0	13.0	
Adj Reference Time (s)	23.5	23.5		16.1	16.1		14.1	14.1		17.0	17.0	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	31.5		28.5									
Permitted Option (s)	74.8		159.6									
Split Option (s)	39.6		31.1									
Minimum (s)	31.5		28.5		60.0							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	50.0%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	534	47	25	258	93	71	123	32	156	103	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3535		1789	3436		1789	1825		1789	1752	
Flt Permitted	0.47	1.00		0.26	1.00		0.63	1.00		0.65	1.00	
Satd. Flow (perm)	891	3535		497	3436		1181	1825		1225	1752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	580	51	27	280	101	77	134	35	170	112	97
RTOR Reduction (vph)	0	10	0	0	57	0	0	9	0	0	30	0
Lane Group Flow (vph)	77	621	0	27	324	0	77	160	0	170	179	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.9	17.9		17.9	17.9		38.2	38.2		38.2	38.2	
Effective Green, g (s)	17.9	17.9		17.9	17.9		38.2	38.2		38.2	38.2	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.60	0.60		0.60	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	987		139	960		704	1088		730	1044	
v/s Ratio Prot		c0.18			0.09			0.09			0.10	
v/s Ratio Perm	0.09			0.05			0.07			c0.14		
v/c Ratio	0.31	0.63		0.19	0.34		0.11	0.15		0.23	0.17	
Uniform Delay, d1	18.2	20.2		17.6	18.4		5.6	5.7		6.1	5.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.3		0.7	0.2		0.3	0.3		0.7	0.4	
Delay (s)	18.9	21.5		18.3	18.6		5.9	6.0		6.8	6.2	
Level of Service	B	C		B	B		A	A		A	A	
Approach Delay (s)		21.2			18.6			6.0			6.5	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM Average Control Delay			15.2			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			64.1			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			50.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	178	40	8	141	19
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	178	0	48	0	0	160
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.97	0.85	0.95	0.96
Saturated Flow (vph)	1615	0	1853	0	0	1816
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1853		0	132
Reference Time A (s)	198.4		3.1		0.0	145.7
Adj Saturation B (vph)	NA		1853		0	0
Reference Time B (s)	NA		3.1		17.4	18.6
Reference Time (s)			3.1			18.6
Adj Reference Time (s)			8.0			22.6
Split Option						
Ref Time Combined (s)	13.2		3.1		0.0	10.6
Ref Time Seperate (s)	0.0		2.6		9.4	1.2
Reference Time (s)	13.2		3.1		10.6	10.6
Adj Reference Time (s)	17.2		8.0		14.6	14.6
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		22.6			
Split Option (s)	17.2		22.6			
Minimum (s)	17.2		22.6		39.8	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	33.2%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	178	40	8	141	19
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)	0	193	43	9	153	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	375	48			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	375	48			52	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			90	
cM capacity (veh/h)	564	1021			1554	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	193	52	174			
Volume Left	0	0	153			
Volume Right	193	9	0			
cSH	1021	1700	1554			
Volume to Capacity	0.19	0.03	0.10			
Queue Length 95th (m)	5.3	0.0	2.5			
Control Delay (s)	9.3	0.0	6.8			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	6.8			
Approach LOS	A					
Intersection Summary						
Average Delay		7.1				
Intersection Capacity Utilization		33.2%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	9	178	0	40	19	9
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	187	0	0	40	28	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1625	0	0	1900	1808	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)	0.0		0.0			
Adj Reference Time (s)	0.0		0.0			
Permitted Option						
Adj Saturation A (vph)	108	0		1900	1808	
Reference Time A (s)	207.2	0.0		2.5	1.9	
Adj Saturation B (vph)	NA	0		1900	1808	
Reference Time B (s)	NA	0.0		2.5	1.9	
Reference Time (s)				2.5	1.9	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	13.8	0.0		2.5	1.9	
Ref Time Seperate (s)	0.7	0.0		2.5	1.3	
Reference Time (s)	13.8	2.5		2.5	1.9	
Adj Reference Time (s)	17.8	8.0		8.0	8.0	
Summary	EB	NB SB		Combined		
Protected Option (s)	NA	NA				
Permitted Option (s)	Err	8.0				
Split Option (s)	17.8	16.0				
Minimum (s)	17.8	8.0		25.8		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	21.5%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	9	178	0	40	19	9
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	193	0	43	21	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	69	26	30			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69	26	30			
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	82	100			
cM capacity (veh/h)	936	1050	1582			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	203	43	30			
Volume Left	10	0	0			
Volume Right	193	0	10			
cSH	1044	1582	1700			
Volume to Capacity	0.19	0.00	0.02			
Queue Length 95th (m)	5.5	0.0	0.0			
Control Delay (s)	9.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization			21.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	230	0	0	174
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	230	0	0	174
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1805	0	1900	0	0	1900
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	120		1900		0	1900
Reference Time A (s)	0.0		14.5		0.0	11.0
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			14.5			11.0
Adj Reference Time (s)			18.5			15.0
Split Option						
Ref Time Combined (s)	0.0		14.5		0.0	11.0
Ref Time Seperate (s)	0.0		14.5		0.0	11.0
Reference Time (s)	0.0		14.5		11.0	11.0
Adj Reference Time (s)	0.0		18.5		15.0	15.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		18.5			
Split Option (s)	0.0		33.5			
Minimum (s)	0.0		18.5		18.5	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		15.4%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

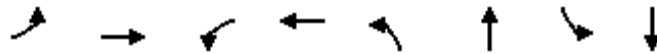
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	230	0	0	174
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)	0	0	250	0	0	189
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	439	250			250	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439	250			250	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	575	789			1316	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	250	189			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1316			
Volume to Capacity	0.00	0.15	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		15.4%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	488	23	484	85	135	158	220
v/c Ratio	0.35	0.59	0.16	0.58	0.11	0.12	0.19	0.19
Control Delay	26.6	23.4	21.2	21.8	5.8	4.3	6.2	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	23.4	21.2	21.8	5.8	4.3	6.2	3.9
Queue Length 50th (m)	5.0	25.2	2.1	23.1	3.2	3.7	6.2	5.2
Queue Length 95th (m)	13.6	37.8	7.2	35.6	9.7	11.3	16.7	15.3
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	335	1815	331	1802	750	1170	811	1150
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.27	0.07	0.27	0.11	0.12	0.19	0.19
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	398	51	21	351	94	78	90	34	145	106	97
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	48	449	0	21	445	0	78	124	0	145	203	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.97	0.85	0.95	0.96	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3556	0	1805	3503	0	1805	1822	0	1805	1764	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	3.2	15.2	0.0	1.4	15.2	0.0	5.2	8.2	0.0	9.6	13.8	0.0
Adj Reference Time (s)	8.0	19.2	0.0	8.0	19.2	0.0	9.2	12.2	0.0	13.6	17.8	0.0
Permitted Option												
Adj Saturation A (vph)	120	1778		120	1751		120	1822		120	1764	
Reference Time A (s)	47.9	15.2		20.9	15.2		77.8	8.2		144.6	13.8	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		47.9			20.9			77.8			144.6	
Adj Reference Time (s)		51.9			24.9			81.8			148.6	
Split Option												
Ref Time Combined (s)	3.2	15.2		1.4	15.2		5.2	8.2		9.6	13.8	
Ref Time Seperate (s)	3.2	13.4		1.4	12.0		5.2	5.9		9.6	7.2	
Reference Time (s)	15.2	15.2		15.2	15.2		8.2	8.2		13.8	13.8	
Adj Reference Time (s)	19.2	19.2		19.2	19.2		12.2	12.2		17.8	17.8	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	27.2		27.0									
Permitted Option (s)	51.9		148.6									
Split Option (s)	38.4		30.0									
Minimum (s)	27.2		27.0		54.2							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	45.2%			ICU Level of Service			A					
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	398	51	21	351	94	78	90	34	145	106	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3518		1789	3465		1789	1806		1789	1749	
Flt Permitted	0.35	1.00		0.34	1.00		0.62	1.00		0.67	1.00	
Satd. Flow (perm)	652	3518		645	3465		1169	1806		1263	1749	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	433	55	23	382	102	85	98	37	158	115	105
RTOR Reduction (vph)	0	15	0	0	38	0	0	12	0	0	29	0
Lane Group Flow (vph)	52	473	0	23	446	0	85	123	0	158	191	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.4	14.4		14.4	14.4		40.1	40.1		40.1	40.1	
Effective Green, g (s)	14.4	14.4		14.4	14.4		40.1	40.1		40.1	40.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	150	811		149	798		750	1159		810	1122	
v/s Ratio Prot		c0.13			0.13			0.07			0.11	
v/s Ratio Perm	0.08			0.04			0.07			c0.13		
v/c Ratio	0.35	0.58		0.15	0.56		0.11	0.11		0.20	0.17	
Uniform Delay, d1	20.1	21.4		19.2	21.2		4.3	4.3		4.6	4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.1		0.5	0.9		0.3	0.2		0.5	0.3	
Delay (s)	21.5	22.5		19.7	22.1		4.6	4.5		5.1	4.8	
Level of Service	C	C		B	C		A	A		A	A	
Approach Delay (s)		22.4			22.0			4.5			5.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay			15.9			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			62.5			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			45.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	3	143	16	3	154	10
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	146	0	19	0	0	164
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.98	0.85	0.95	0.95
Saturated Flow (vph)	1619	0	1855	0	0	1811
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1855		0	126
Reference Time A (s)	162.3		1.2		0.0	156.5
Adj Saturation B (vph)	NA		1855		0	0
Reference Time B (s)	NA		1.2		18.2	18.9
Reference Time (s)			1.2			18.9
Adj Reference Time (s)			8.0			22.9
Split Option						
Ref Time Combined (s)	10.8		1.2		0.0	10.9
Ref Time Seperate (s)	0.2		1.0		10.2	0.6
Reference Time (s)	10.8		1.2		10.9	10.9
Adj Reference Time (s)	14.8		8.0		14.9	14.9
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		22.9			
Split Option (s)	14.8		22.9			
Minimum (s)	14.8		22.9		37.7	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	31.4%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	143	16	3	154	10
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)	3	155	17	3	167	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	365	19			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	365	19			21	
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	85			90	
cM capacity (veh/h)	568	1059			1595	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	159	21	178			
Volume Left	3	0	167			
Volume Right	155	3	0			
cSH	1041	1700	1595			
Volume to Capacity	0.15	0.01	0.10			
Queue Length 95th (m)	4.1	0.0	2.7			
Control Delay (s)	9.1	0.0	7.1			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	7.1			
Approach LOS	A					
Intersection Summary						
Average Delay		7.6				
Intersection Capacity Utilization		31.4%		ICU Level of Service	A	
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	7	5	5	16	10	12
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No				No	
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	12	0	0	21	22	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.91	0.85	0.95	0.99	0.92	0.85
Saturated Flow (vph)	1729	0	0	1877	1745	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)	0.0				0.0	
Adj Reference Time (s)	0.0				0.0	
Permitted Option						
Adj Saturation A (vph)	115	0		404	1745	
Reference Time A (s)	12.5	0.0		6.2	1.5	
Adj Saturation B (vph)	NA	0		0	1745	
Reference Time B (s)	NA	8.3		9.3	1.5	
Reference Time (s)				6.2	1.5	
Adj Reference Time (s)				10.2	8.0	
Split Option						
Ref Time Combined (s)	0.8	0.0		1.3	1.5	
Ref Time Seperate (s)	0.5	0.3		1.0	0.7	
Reference Time (s)	0.8	1.3		1.3	1.5	
Adj Reference Time (s)	8.0	8.0		8.0	8.0	
Summary	EB	NB SB		Combined		
Protected Option (s)	NA	NA				
Permitted Option (s)	Err	10.2				
Split Option (s)	8.0	16.0				
Minimum (s)	8.0	10.2		18.2		
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	15.2%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	5	5	16	10	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	5	5	17	11	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	46	17	24			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	46	17	24			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	961	1061	1591			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	13	23	24			
Volume Left	8	5	0			
Volume Right	5	0	13			
cSH	1001	1591	1700			
Volume to Capacity	0.01	0.00	0.01			
Queue Length 95th (m)	0.3	0.1	0.0			
Control Delay (s)	8.6	1.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.6	1.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			15.2%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	166	0	0	178
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right	No		No			
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	166	0	0	178
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1805	0	1900	0	0	1900
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	120		1900		0	1900
Reference Time A (s)	0.0		10.5		0.0	11.2
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			10.5			11.2
Adj Reference Time (s)			14.5			15.2
Split Option						
Ref Time Combined (s)	0.0		10.5		0.0	11.2
Ref Time Seperate (s)	0.0		10.5		0.0	11.2
Reference Time (s)	0.0		10.5		11.2	11.2
Adj Reference Time (s)	0.0		14.5		15.2	15.2
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		15.2			
Split Option (s)	0.0		29.7			
Minimum (s)	0.0		15.2		15.2	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization	12.7%		ICU Level of Service		A	
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

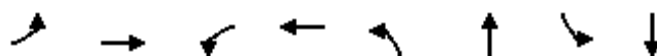
2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	166	0	0	178
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)	0	0	180	0	0	193
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	374	180			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374	180			180	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	627	862			1395	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	180	193			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1395			
Volume to Capacity	0.00	0.11	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		12.7%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: Oxford St & N Bluff Rd

2/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	63	517	23	313	51	96	139	170
v/c Ratio	0.26	0.60	0.15	0.35	0.07	0.08	0.17	0.15
Control Delay	21.5	23.1	20.6	15.2	5.8	5.4	6.3	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	23.1	20.6	15.2	5.8	5.4	6.3	3.7
Queue Length 50th (m)	5.8	26.7	2.1	11.5	1.9	3.4	5.5	3.5
Queue Length 95th (m)	14.3	39.6	7.2	20.3	6.6	10.0	15.0	11.9
Internal Link Dist (m)		294.4		210.6		190.0		82.5
Turn Bay Length (m)	45.0		45.0		35.0		30.0	
Base Capacity (vph)	535	1888	328	1864	770	1177	823	1130
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.27	0.07	0.17	0.07	0.08	0.17	0.15
Intersection Summary								

Intersection Capacity Utilization

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	438	38	21	212	76	47	84	5	128	84	73
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right	No			No			No			No		
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Minimum Green (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
Refr Cycle Length (s)	120	120	120	120	120	120	120	120	120	120	120	120
Volume Combined (vph)	58	476	0	21	288	0	47	89	0	128	157	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.99	0.85	0.95	0.96	0.85	0.95	0.99	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1805	3574	0	1805	3474	0	1805	1884	0	1805	1767	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00				0.00				0.00	
Protected Option Allowed	Yes		Yes				Yes				Yes	
Reference Time (s)	3.9	16.0	0.0	1.4	9.9	0.0	3.1	5.7	0.0	8.5	10.7	0.0
Adj Reference Time (s)	8.0	20.0	0.0	8.0	13.9	0.0	8.0	9.7	0.0	12.5	14.7	0.0
Permitted Option												
Adj Saturation A (vph)	120	1787		120	1737		120	1884		120	1767	
Reference Time A (s)	57.8	16.0		20.9	9.9		46.9	5.7		127.6	10.7	
Adj Saturation B (vph)	NA	NA		NA	NA		NA	NA		0	1767	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		16.5	10.7	
Reference Time (s)		57.8			20.9			46.9			16.5	
Adj Reference Time (s)		61.8			24.9			50.9			20.5	
Split Option												
Ref Time Combined (s)	3.9	16.0		1.4	9.9		3.1	5.7		8.5	10.7	
Ref Time Seperate (s)	3.9	14.7		1.4	7.3		3.1	5.4		8.5	5.7	
Reference Time (s)	16.0	16.0		9.9	9.9		5.7	5.7		10.7	10.7	
Adj Reference Time (s)	20.0	20.0		13.9	13.9		9.7	9.7		14.7	14.7	
Summary	EB WB		NB SB		Combined							
Protected Option (s)	28.0		22.7									
Permitted Option (s)	61.8		50.9									
Split Option (s)	33.9		24.3									
Minimum (s)	28.0		22.7		50.6							
Right Turns												
Adj Reference Time (s)												
Cross Thru Ref Time (s)												
Oncoming Left Ref Time (s)												
Combined (s)												
Intersection Summary												
Intersection Capacity Utilization	42.2%			ICU Level of Service				A				
Reference Times and Phasing Options do not represent an optimized timing plan.												

HCM Signalized Intersection Capacity Analysis

3: Oxford St & N Bluff Rd

2/26/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	438	38	21	212	76	47	84	5	128	84	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3536		1789	3436		1789	1869		1789	1752	
Flt Permitted	0.53	1.00		0.33	1.00		0.65	1.00		0.69	1.00	
Satd. Flow (perm)	1006	3536		616	3436		1224	1869		1309	1752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	476	41	23	230	83	51	91	5	139	91	79
RTOR Reduction (vph)	0	11	0	0	59	0	0	2	0	0	28	0
Lane Group Flow (vph)	63	506	0	23	254	0	51	94	0	139	142	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.1	15.1		15.1	15.1		39.1	39.1		39.1	39.1	
Effective Green, g (s)	15.1	15.1		15.1	15.1		39.1	39.1		39.1	39.1	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.63	0.63		0.63	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	244	858		150	834		769	1175		823	1101	
v/s Ratio Prot		c0.14			0.07			0.05			0.08	
v/s Ratio Perm	0.06			0.04			0.04			c0.11		
v/c Ratio	0.26	0.59		0.15	0.30		0.07	0.08		0.17	0.13	
Uniform Delay, d1	19.0	20.8		18.5	19.3		4.5	4.5		4.8	4.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.1		0.5	0.2		0.2	0.1		0.4	0.2	
Delay (s)	19.6	21.9		19.0	19.5		4.6	4.7		5.2	4.9	
Level of Service	B	C		B	B		A	A		A	A	
Approach Delay (s)		21.7			19.4			4.6			5.1	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM Average Control Delay			15.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			62.2			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			42.2%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Capacity Utilization

7: Oxford St & Thrift Ave

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	146	33	7	116	15
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	146	0	40	0	0	131
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.85	0.85	0.97	0.85	0.95	0.96
Saturated Flow (vph)	1615	0	1850	0	0	1816
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	108		1850		0	131
Reference Time A (s)	162.7		2.6		0.0	119.7
Adj Saturation B (vph)	NA		1850		0	0
Reference Time B (s)	NA		2.6		15.7	16.7
Reference Time (s)			2.6			16.7
Adj Reference Time (s)			8.0			20.7
Split Option						
Ref Time Combined (s)	10.8		2.6		0.0	8.7
Ref Time Seperate (s)	0.0		2.1		7.7	0.9
Reference Time (s)	10.8		2.6		8.7	8.7
Adj Reference Time (s)	14.8		8.0		12.7	12.7
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		20.7			
Split Option (s)	14.8		20.7			
Minimum (s)	14.8		20.7		35.5	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		29.6%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

7: Oxford St & Thrift Ave

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	146	33	7	116	15
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)	0	159	36	8	126	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	308	40			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	40			43	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	85			92	
cM capacity (veh/h)	629	1032			1565	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	159	43	142			
Volume Left	0	0	126			
Volume Right	159	8	0			
cSH	1032	1700	1565			
Volume to Capacity	0.15	0.03	0.08			
Queue Length 95th (m)	4.1	0.0	2.0			
Control Delay (s)	9.1	0.0	6.7			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	6.7			
Approach LOS	A					
Intersection Summary						
Average Delay		7.0				
Intersection Capacity Utilization		29.6%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Volume (vph)	8	146	0	33	15	8
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	154	0	0	33	23	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.86	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1626	0	0	1900	1801	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	108		0	1900	1801	
Reference Time A (s)	170.5		0.0	2.1	1.5	
Adj Saturation B (vph)	NA		0	1900	1801	
Reference Time B (s)	NA		0.0	2.1	1.5	
Reference Time (s)				2.1	1.5	
Adj Reference Time (s)				8.0	8.0	
Split Option						
Ref Time Combined (s)	11.4		0.0	2.1	1.5	
Ref Time Seperate (s)	0.6		0.0	2.1	1.0	
Reference Time (s)	11.4		2.1	2.1	1.5	
Adj Reference Time (s)	15.4		8.0	8.0	8.0	
Summary	EB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		8.0			
Split Option (s)	15.4		16.0			
Minimum (s)	15.4		8.0		23.4	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization		19.5%		ICU Level of Service		A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

8: Oxford St & Thrift Ave

2/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	146	0	33	15	8
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)	9	159	0	36	16	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					378	
pX, platoon unblocked						
vC, conflicting volume	57	21	25			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	57	21	25			
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	85	100			
cM capacity (veh/h)	951	1057	1589			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	167	36	25			
Volume Left	9	0	0			
Volume Right	159	0	9			
cSH	1051	1589	1700			
Volume to Capacity	0.16	0.00	0.01			
Queue Length 95th (m)	4.3	0.0	0.0			
Control Delay (s)	9.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.1	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		6.7				
Intersection Capacity Utilization		19.5%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection Capacity Utilization

10: Oxford St & Site Access

2/26/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	189	0	0	143
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No		No		
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120	120	120	120	120	120
Volume Combined (vph)	0	0	189	0	0	143
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	1.00	0.85	0.95	1.00
Saturated Flow (vph)	1805	0	1900	0	0	1900
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00		0.00			0.00
Protected Option Allowed	No		No			No
Reference Time (s)		0.0		0.0		
Adj Reference Time (s)		0.0		0.0		
Permitted Option						
Adj Saturation A (vph)	120		1900		0	1900
Reference Time A (s)	0.0		11.9		0.0	9.0
Adj Saturation B (vph)	NA		NA		NA	NA
Reference Time B (s)	NA		NA		NA	NA
Reference Time (s)			11.9			9.0
Adj Reference Time (s)			15.9			13.0
Split Option						
Ref Time Combined (s)	0.0		11.9		0.0	9.0
Ref Time Seperate (s)	0.0		11.9		0.0	9.0
Reference Time (s)	0.0		11.9		9.0	9.0
Adj Reference Time (s)	0.0		15.9		13.0	13.0
Summary	WB		NB SB		Combined	
Protected Option (s)	NA		NA			
Permitted Option (s)	Err		15.9			
Split Option (s)	0.0		29.0			
Minimum (s)	0.0		15.9		15.9	
Right Turns						
Adj Reference Time (s)						
Cross Thru Ref Time (s)						
Oncoming Left Ref Time (s)						
Combined (s)						
Intersection Summary						
Intersection Capacity Utilization			13.3%		ICU Level of Service	A
Reference Times and Phasing Options do not represent an optimized timing plan.						

HCM Unsignalized Intersection Capacity Analysis

10: Oxford St & Site Access

2/26/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	189	0	0	143
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)	0	0	205	0	0	155
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						214
pX, platoon unblocked						
vC, conflicting volume	361	205			205	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361	205			205	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	638	835			1366	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	205	155			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1366			
Volume to Capacity	0.00	0.12	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		13.3%		ICU Level of Service	A	
Analysis Period (min)		15				